User's Guide

NEC Express Server
Express5800 Series

Express5800/R110j-1
EXP340

Chapter 1   General Description

Chapter 2   Preparations

Chapter 3   Setup

Chapter 4   Appendix

Manuals

Booklets	
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.
Electronic manuals are stored on the website (http://www.nec.com/express/).	
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 utility 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 Software	Installation of NEC ESMPRO, and other software
Maintenance Guide	
Chapter 1: Maintenance	Server maintenance and troubleshooting
Chapter 2: Useful Features	The details of system utility settings, RAID Configuration Utility, and EXPRESSBUILDER
Chapter 3: Appendix	Error messages and Windows Event Logs
Other manuals	
The details of NEC ESMPRO, and other features	

Contents

1. Conventions Used in This Document

Signs and symbols for safety

WARNING and CAUTION are used in this guide as the 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)
	Prohibited Action	This symbol indicates prohibited actions. An image in the symbol illustrates a particular prohibited action.	(Example)
	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)

Symbol to draw attention	Description of a warning	Term indicating a degree of danger

⚠ **WARNING**

Use only the specified outlet

Use a grounded outlet with the specified voltage. Use of an improper power source may cause a fire or a power leak.
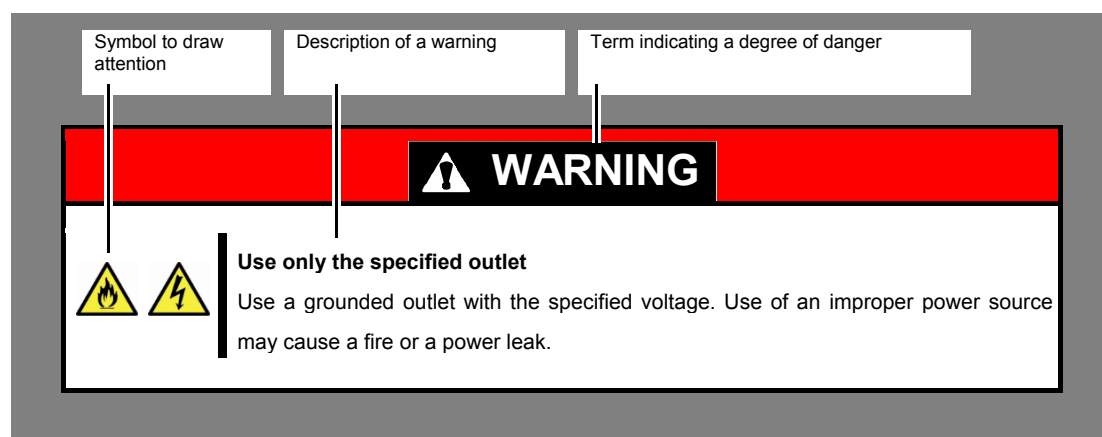
Notations used in the text

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, **hardware 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* described in this document refer to both of the following.
- **Hard disk drive (HDD)**
- **Solid state drive (SSD)**

Removable media

Unless otherwise stated, *removable media* described in this document refer to both of 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 2016	Windows Server 2016 Standard
	Windows Server 2016 Datacenter

POST

POST described in this manual refers to the following.
- **Power On Self-Test**

BMC

BMC described in this manual refers to the following.
- Baseboard Management Controller

The device employs iLO5 as a BMC.

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zlib End User License Agreement

zlib License

zlib.h -- interface of the 'zlib' general purpose compression library
version 1.2.2, October 3rd, 2004

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http://www.nec.com/express/

Safety notes

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

Warning label

Warning label are attached on or near the components with potential hazards. This label is either attached or printed on the component.

Do not remove or black out this label and keep it clean. If no label is attached or printed on the server, contact your sales representative.
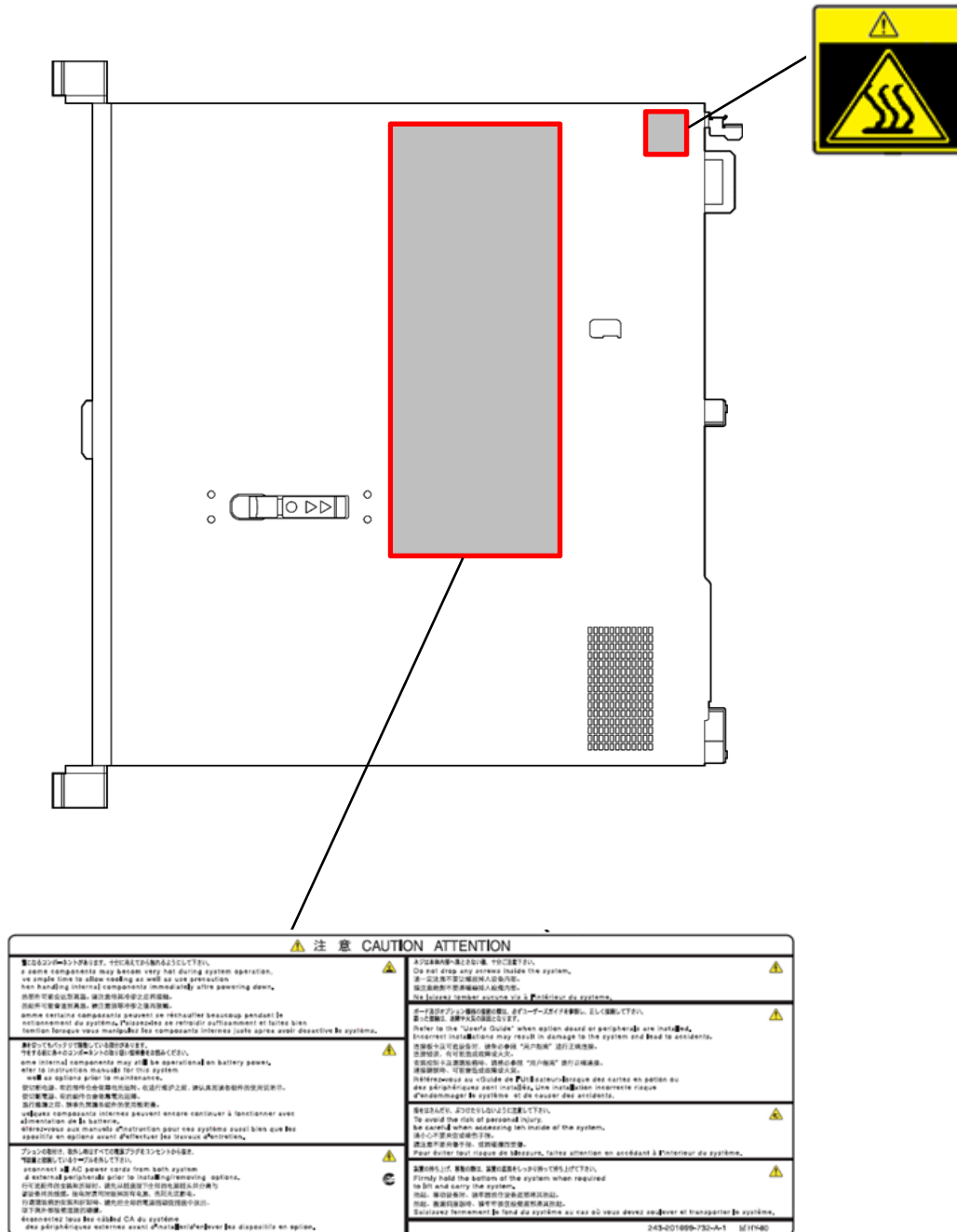
Handling precautions (for proper operations)

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 cellphones 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 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 power off or reset the server, nor disconnect the power cord before POST completes.

- 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 about cleaning.

- Momentary voltage drop may occur due to lightning strike. To prevent this, use of UPS is recommended.

- In the following cases, check and adjust the system clock before operation.

    – After transportation

    – After storage

    – After the server is used following a period of disuse, in which storage conditions did not conform to those that guarantee server operations (temperature: 10 to 35°C; humidity: 8% to 90%).

- 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: -30°C to 60°C, Humidity: 5% to 95%, No condensation of moisture) to store the server. 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

- This server does not support hibernation/standby function.

- 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.

- To avoid damage to the equipment, please do not locate this equipment in or near following environmental conditions.

    - Environment with corrosive gases[1], such as Sulfur dioxide (SO_2), hydrogen sulfide (H_2S), nitrogen monoxide (NO), nitrogen dioxide (NO_2), chlorine (Cl), ammonia (NH_3), ozone (O_3) and so on.
    - Environment with corrosive dust (salt or Sulphur) or conductive particles in the air.
    [1]: Corrosive gases include exhaust emissions from motor vehicles, gases emitted from hot spring and volcanoes, and gases generated stagnant riverbeds in urban areas.

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.
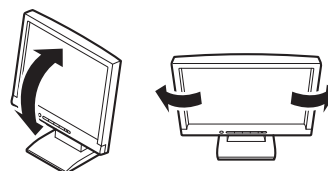
Adjust the brightness and contrast of the display

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.
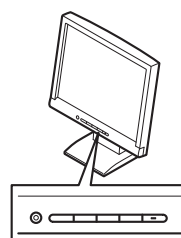
Adjust the angle of keyboard

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.
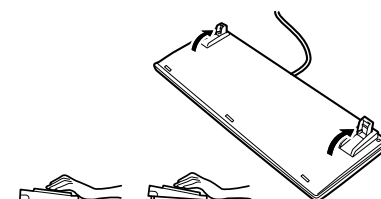
Clean your equipment

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.

1

NEC Express5800 Series
Express5800/R110j-1
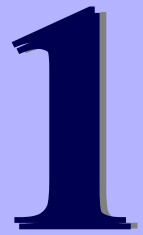
General Description

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 the 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 server is powered by the latest microprocessor "Intel® Xeon® processor".

● Intel® Xeon processor

● Intel® Core i3 processor

● Intel® Pentium processor

With our latest technology and architecture, we offer "high performance" and "high reliability" that could not be accomplished by conventional servers. Furthermore, with its design for "extensibility," our servers can be widely used for general purpose. For proper use of the unit, read this manual carefully to fully understand handling of the product.

$\mathscr{2.}$ **Accessories**

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

The rack or server chassis includes all rack-mounting hardware parts required for the server installation.

・ Rack-mounting hardware

・ Front Bezel

・ Bezel Lock Key (attached to Front Bezel)

・ Safety Precautions and Regulatory Notices

・ Getting Started

・ Test & Diagnostics Tool

Check whether all parts are present and complete. If some parts are missing or damaged, contact the applicable vendor.

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:
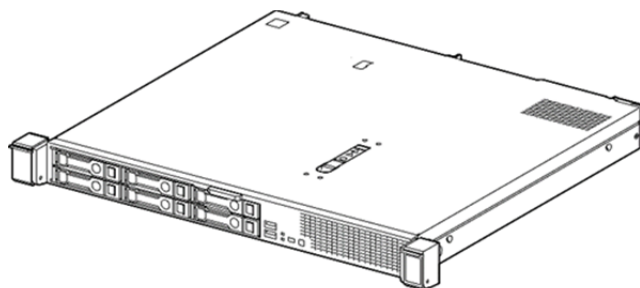
High performance

· Intel® Processor

– Xeon Processor E-2124　(3.30GHz, 4Core / 4Thread)

– Xeon Processor E-2134　(3.50GHz, 4Core / 8Thread)

– Xeon Processor E-2144G　(3.60GHz, 4Core / 8Thread)

– Xeon Processor E-2174G　(3.80GHz, 4Core / 8Thread)

– Xeon Processor E-2126G　(3.30GHz, 6Core / 6Thread)

– Xeon Processor E-2136　(3.30GHz, 6Core / 12Thread)

– Pentium Processor G5400　(3.70GHz, 2Core / 4Thread)

– Core i3-8300 Processor ((3.70GHz, 4Core / 4Thread)

– Xeon Processor E-2186G　(3.80GHz, 6Core / 12Thread)

· Turbo Boost Technology feature *1

· Hyper Threading Technology feature *2

· High-speed memory access (DDR4 2400 / 2666 supported) *3

· High-speed disk access (SATA 6Gb/s, SAS 12Gb/s supported)

· High-speed 1000BASE-T/100BASE-TX / 10BASE-T interface

High reliability

· Processor throttling feature

· Memory monitoring feature (error correction/error detection)

· Memory degeneracy feature (logical isolation of a failed device)

· Memory throttling feature

· Bus parity error detection

· Temperature detection

· Error detection

· Internal fan monitoring feature

· Power redundant feature (hot swapping supported)

· RAID system (Disk Array) (An option card is required.)

· Auto rebuild feature (hot swapping supported)

・System utility password feature

・The security lock that comes with Front Bezel

・HDD (hot swapping supported)

Management Utilities

・NEC ESMPRO

・Remote controlling feature (iLO 5)

・Hard disk drive monitoring

・Power supply monitoring *4

Power saving and noiseless design

・Selection of power unit appropriate to environment, work load, and configuration

・Power consumption monitoring feature *4

・Power control feature *4

・80 PLUS® Platinum、80 PLUS® Silver certified high efficiency power supply *5

・Fan control appropriate to environment, work load, and configuration

・Silent sound design

・Enhanced Intel SpeedStep® Technology supported

Expandability

・Various option slots

– PCI Express 3.0 (x8 lanes): 1 slot (Full height) *6,*7

– PCI Express 3.0 (x8 lanes): 1 slot (dedicated to FLOM card) *6

– PCI Express 3.0 (x8 lanes): 1 slots (Low profile) *7

– PCI Express 3.0 (x4 lanes): 1 slot (dedicated to RAID controller)

・Large capacity memory of up to 64GB

・Expansion Bay (for hard disk drives): up to 2 slots. *8

・Optical disk drive bay provided as an option.

・USB3.0 interface (Front: 1 port, rear: 2 ports, internal: 1 ports)

・Management LAN port: 1 port (option)

・With optional FlexLOM card, two to four LAN ports can be added.

Ready to use

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

・Slide rails for each installation

Many built-in Features

・Redundant power supply system supported (valid when optional power supply unit is installed)

・Software power-off

・Remote power-on feature

・AC-Link feature

・Remote console feature

・Supports Redfish® API and incorporates baseboard management controller (iLO 5) which conforms to IPMI

v2.0

Self-diagnosis

・Power On Self-Test (POST)

Easy setup

・EXPRESSBUILDER (setup utility)

・System utility

*1: The device that mount Intel processor Core i3 / Pentium series is not supported.

*2: The device that mount Intel Xeon processor E-2124 / E-2126G / Intel processor Core i3 is not supported.

*3: Operating frequency can vary depending on the type or the number of boards of processor or memory

installed.

*4: Power supply units N8181-179 is not supported.

*5: Power supply units N8181-159 acquired 80 PLUS®Platinum.

Power supply units N8181-179 acquired 80 PLUS®Silver.

*6: It's practicable at the time of the Riser Card Kit(1xPCI + FLOM)(N8116-89 , option) use.

*7: It's practicable at the time of the Riser Card Kit(2xPCI)(N8116-90 , option) use.

*8: 4x2.5-inch drive model only.

4. Names and Functions of Parts

This section describes the names of the server parts.

4.1 Front View (With Front Bezel)
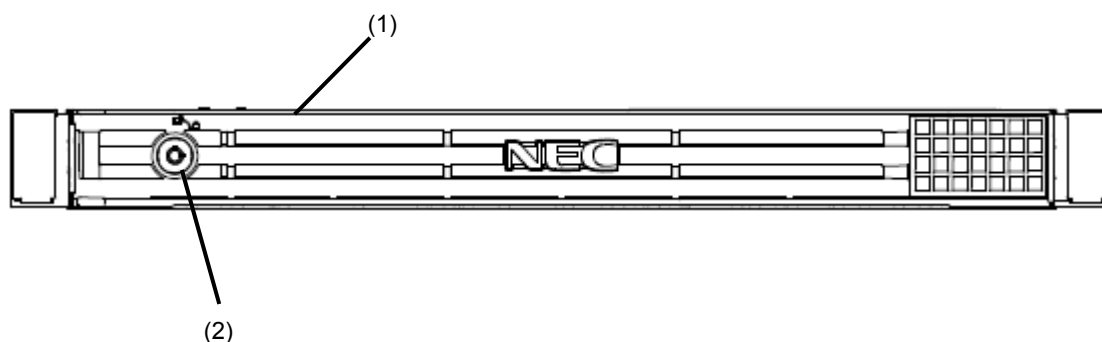
(1) Front Bezel
A cover for protecting the front of the server. This cover can be locked
with the provided Bezel Lock Key.

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

4.2 Front View (Without Front Bezel)

・4x 2.5-inch drive model
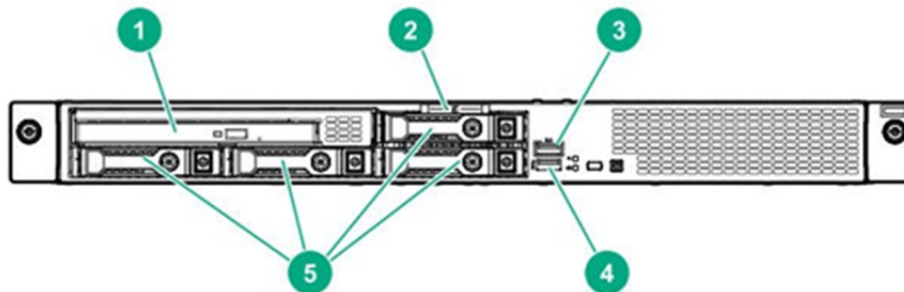
(1) Optical disk drive (Option)

According to the order at the time of buying, one of the following option drives is installed.
  － DVD-ROM drive
  － DVD Super MULTI drive

(2) Pull-out Tab

A tab for showing the model number and serial number of the server.

(3) iLO service port USB connector

A USB connector used for connecting to iLO such as for acquiring log. For details, refer to iLO 5 User's Guide.

(4) USB3.0 connector (front)

Connectors for connecting USB 3.0 interface devices.

(5) 2.5-inch Hard Disk Drive Bay (standard)

Bays for installing HDDs. The sequential numbers indicate the corresponding slot numbers.

Open bays include Dummy Trays.

・**2x 3.5-inch drive model**
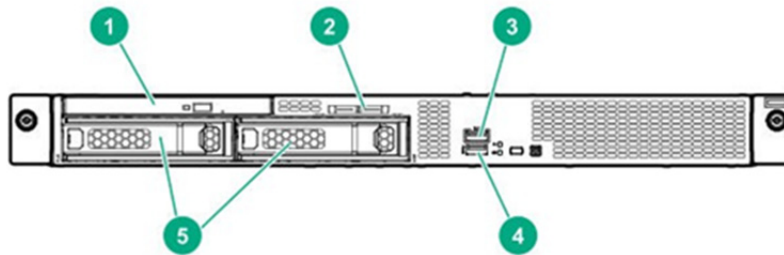
(1) Optical disk drive (Option)
Attaching the optical disk drive.
According to the order at the time of buying, one of the following option drives is installed.
－ DVD-ROM drive
－ DVD Super MULTI drive

(2) Pull-out Tab
A tab for showing the model number and serial number of the server.

(3) iLO service port USB connector
A USB connector used for connecting to iLO such as for acquiring log. For details, refer to
iLO 5 User's Guide.

(4) USB3.0 connector (front)
Connectors for connecting USB 3.0 interface devices.

(5) 3.5-inch Hard Disk Drive Bay
Bays for installing HDDs. The sequential numbers indicate the corresponding slot numbers.
Open bays include Dummy Trays.

4.3 Rear View
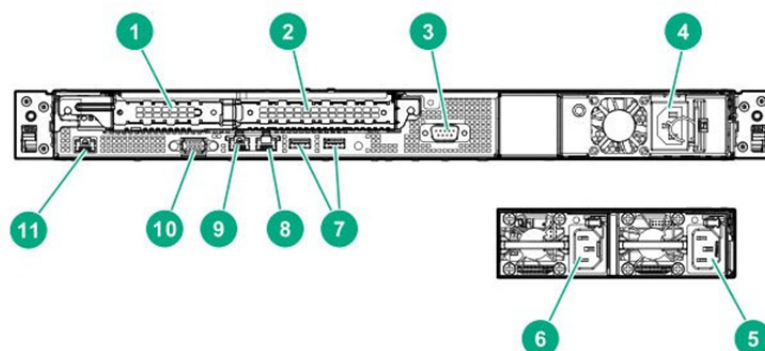
(1) Riser card (slot1) (Required option)
Slots for installing low-profile PCI cards.

(2) Riser card (slot2) (Required option)
Slots for installing full-height PCI cards.

(3) Serial Port (COM) Connector (Option)
A connector for connecting serial interface devices. This cannot directly connect to a network line..

(4) Non-hot Plug Power Supply (Required option) *1
A power supply for supplying the DC power to the server.

(5) Power supply Unit (with Power supply slot 1) (Required option) *1
A power supply for supplying the DC power to the server.

(6) Power supply unit (power supply slot 2) (Option)
The second power supply unit.
It can be redundant if the second unit is arranged.

(7) USB 3.0 Connectors
A connector for connecting serial interface devices. This cannot directly connect to a network line.

(8) LAN connector(LAN2)
A connector for connecting a network (1000BASE-T/100BASE-TX/10BASE-T)

(9) LAN connector(LAN1)
A connector for connecting a network (1000BASE-T/100BASE-TX/10BASE-T)

(10) Display Connector
A connector for connecting a display..

(11) Management LAN Connector(Option)
A LAN connector which supports 1000BASE-T/ 100BASE-TX/10BASE-T.
Incompatible as LANs for regular OS.

*1   It's necessary to choose one of options.

4.4 External View
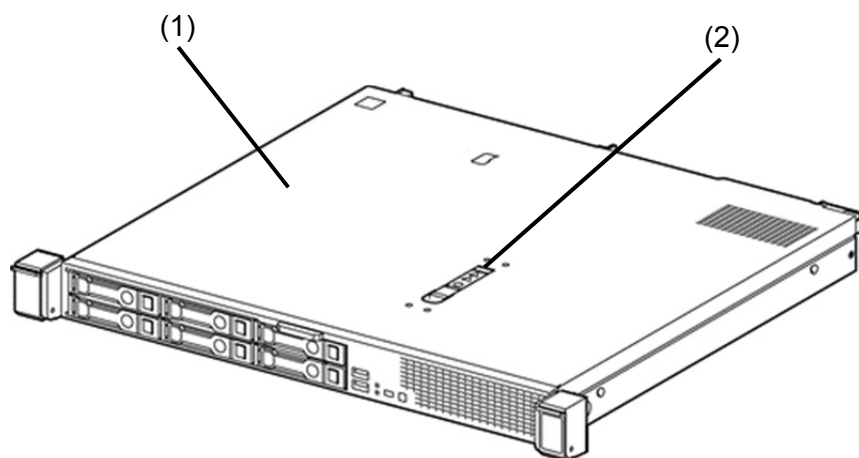
(1)   **Top cover**
(2)   **Hood latch**

4.5 Motherboard
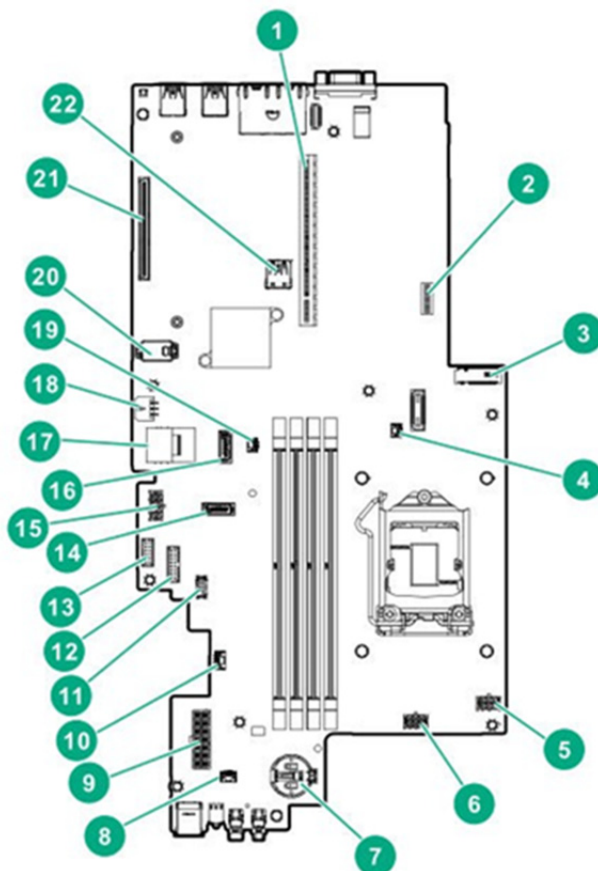
(1)   **Riser Card Kit connector**
(2)   **System maintenance switch**
(3)   **Management Lan with Serial kit connector**
(4)   **Battery backup power connector for slot 1**
(5)   **Fan connector 2**
(6)   **Fan connector 1**
(7)   **Lithium Battery**
(8)   **(not used)**
(9)   **Non-hot Plug Power Supply or Redundant PSU Cage connector**
(10)   **Two-bay SFF drive sideband connector**
(11)   **Battery Backup Unit connector for RAID controller**
(12)   **Non-hot Plug Power Supply or Redundant PSU Cage sideband connector**
(13)   **Redundant PSU Cage connector**
(14)   **x1 SATA port 2**
(15)   **Drive backplane and optical drive power connector**

(16)   **x1 SATA port 1**
(17)   **x4 SATA port**
(18)   **FAN connector 3**
(19)   **Battery backup power connector for slot 2**
(20)   **Internal x 2 USB 3.0 connector Connector for TPM Kit (Option)**
(21)   **RAID controller Connector**
(22)   **Internal USB 3.0 connector**

4.5.1 System Maintenance Switch

Position	Default	Setting	Description
SW1 *1 *5	Off	Off	Set to OFF at regular times.
		On	Sets the security of iLO5 to disabled.
SW2	Off	Reserved	-
SW3	Off	Reserved	-
SW4	Off	Reserved	-
SW5 *2 *5	Off	Off	Set to OFF at regular times.
		On	Clears power-on password and administrator password.
SW6 *3, *5	Off	Off	Set to OFF at regular times.
		On	Set the system configuration back to the default values. *4
SW7	Off	Reserved	-
SW8	Off	Reserved	-
SW9	Off	Reserved	-
SW10	Off	Reserved	-
SW11	Off	Reserved	-
SW12	Off	Reserved	-

Important   **Do not change the switch already configured as "Reserved" unless NEC separately instructs to do so. It may cause the trouble or malfunction of the device.**

*1 Set the SW1 to ON when all the passwords of iLO5 to which administrator authority is given have become unknown or when enabling the iLO5 features.

*2 Regarding the operation procedure of SW5, see *Chapter 1 (7.3.4 Clearing Passwords)* in the *Maintenance Guide*.

*3 Regarding the operation procedure of SW6, see *Chapter 1 (7.3.3 Restore the Default Settings of System Configuration)* in the *Maintenance Guide*.

*4 Default values may be different from the factory presets.

*5 When you set SW1, SW5, and SW6 to ON at the same time, boot with the backup ROM.

4.5.2 DIMM slot

DIMM slots are numbered in order 1 to 4 for each processor.

4.6 Internal View

(1) **Backplane**

(2) **Cooling Fan**
     -1   FAN1
     -2   FAN2
     -3   FAN3

 (3) **Processor (CPU)**
      (required option)

(4) **DIMM (option)**
     1 or more option(s) required per CPU
(5) **Slot for RAID Controller (Option)**

(6) **Riser Card Kit (Option)**

(7) **Motherboard**
(8) **Power Supply Unit**
     (Option, Required optione)
(9) **Battery Backup Unit holding part**

4.7 Cooling fan
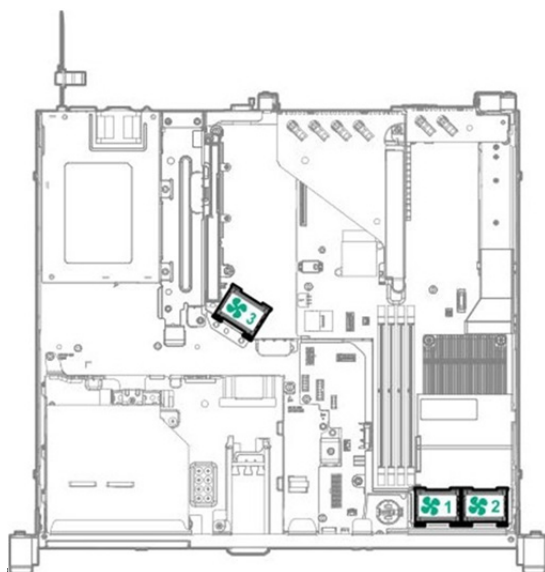
The cooling fan speed varies to operate the server. The cooling fan runs at the minimum speed in accordance with the temperature.

When the equipment internal temperature becomes high by the installation environment of the server and the operation situation, the setting when a cooling fan ships it, [Optimal Cooling] will be sometimes high-speed rotation.

When a cooling fan repeats high-speed rotation, please refer to a maintenance guide and change the setting of a cooling fan of a system utility to [Increased Cooling].

・Maintenance Guide

  "Chapter 2 Useful Features"

   - "1. System Utilities"

    - "1.2.2 BIOS/Platform Configuration(RBSU)"

     - "(12) Advanced Options Menu"

      - "(a) Fan and Thermal Options Menu"

       - "Thermal Configuration"

The server shuts down under the following conditions related to the temperature.

● If the temperature at the caution level is detected, iLO5 shuts down OS safely. If the temperature at the critical level is detected, the power shuts down forcibly without shutting down OS.

● If "Thermal Shutdown" function is set to "Disabled" in "BIOS/Platform Configuration (RBSU)", this unit runs directly without shutting down OS when the temperature at the caution level is detected, while the power shuts down forcibly when the temperature at the critical level is detected.

Important	If the "Thermal Shutdown" function is set to "Disabled" in "BIOS/Platform Configuration (RBSU)", the high temperature may damage the server. In case NEC ESMPRO ServerAgentService is installed, since a shut down due to high temperature is executed by NEC ESMPRO ServerAgentService, you need to set "Thermal Shutdown" to "Disabled."

4.8 Status Indicators

4.8.1 LEDs on the front side of the unit
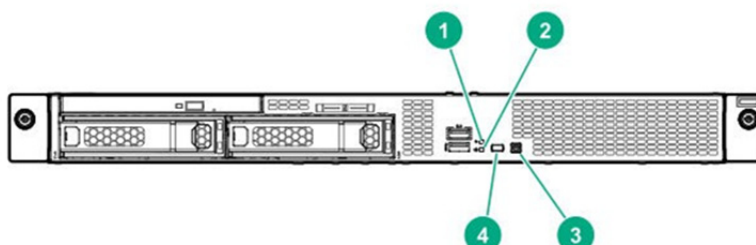
No.	Item	Status	Description
3	Status LED [*1]	Lights in green	Normal state
		Flashes in green (once per second)	Restarting iLO
		Flashes in amber	The function of the system is deteriorating
		Flashes in red (once per second)	The system is in a critical state [*3]
4	LINK/ACT LED [*1]	Lights in green	Linked to the network
		Flashes in green (once per second)	The network is working
		Lights off	The network is not working
2	Power switch and system power LED [*1]	Lights in green	The system is powered on
		Flashes in green (once per second)	The power on sequence in progress
		Lights in amber	The system is in standby state
		Lights off	Power is not supplied [*2]
1	UID switch/LED [*1]	Lights in blue	Working in operation
		Flashes in blue (once per second)	Remote management or firmware upgrade is in progress
		Flashes in blue (4 times per second)	The iLO restart sequence using the UID switch has been launched
		Flashes in blue (8 times per second)	The iLO restart sequence using UID switch is in progress
		Lights off	Not working

*1 If all the four LEDs described in this table is flashing at the same time, it indicates that a power failure has occurred. For details, refer to *(2) Power failure LED*.

*2 The power is not supplied, the power cord is not connected, the power supply unit is not installed, the power supply unit is defect, or the power cord is disconnected.

*3 If the STATUS LED indicates a degraded or critical condition, check the system IML or use iLO to check the system status.

(1) UID switch function

When the server does not turn on, the UID switch can be used to display Server Health Summary.

(2) Power failure LED

The following table shows a list on power failure LEDs and affected subsystems. Not all power failures are applied on all servers.

Subsystem	LED status
Motherboard	Flashes once
Processor	Flashes twice
Memory	Flashes 3 times
Riser card board PCIe slot	Flashes 4 times
LOM card	Flashes 5 times
RAID controller/SAScontroller	Flashes 6 times
Motherboard PCIe slot	Flashes 7 times
Power backplane or storage backplane	Flashes 8 times
Power Supply Unit	Flashes 9 times

4.8.2 LEDs on the backside of unit
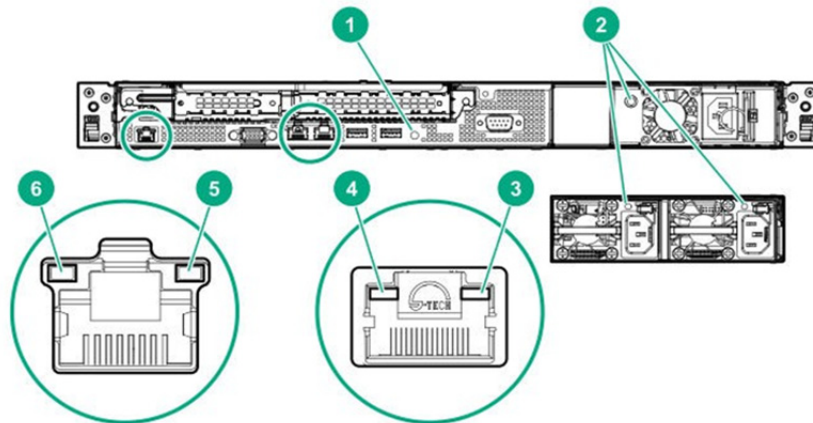
No	Item	Status	Description
1	UID LED	Lights in blue	Working in operation
		Flashes in blue (once per second)	Remote management or firmware upgrade is in progress
		Flashes in blue (4 times per second)	The iLO restart sequence using the UID switch has been launched
		Flashes in blue (8 times per second)	The iLO restart sequence using UID switch is in progress
		Lights off	Not working
2	AC POWER LED	Lights in green	Normal state
		Lights off	One or more of the following situations are occurring ・ AC power is not supplied ・ Power supply unit has failed ・ Power supply unit is in standby mode ・ Power supply unit exceeds the current limit
3	ACT LED	Lights in green	Working in operation.
		Flashes in green	Working in operation.
		Lights off	Not working.
4	LINK LED	Lights in green	Connected.
		Lights off	Not linked to the network.
5	iLO ACT LED	Lights in green	Working in operation.
		Flashes in green	Working in operation.
		Lights off	Not working.
6	iLO Link LED	Lights in green	Connected.
		Lights off	Not linked to the network.

4.8.3 Hot plug 3.5″ SAS/SATA drive LED

DISK ACT LED (Green) ②	DISK STATUS LED (Amber/Blue) ①	Description
Lights in green, lights off, or flashes	Flashes in amber and blue	One or more of the following situations are occurring ・ A drive failure has occurred ・ A predictive failure alert has been received for this drive ・ The drive has been selected by the management application
Lights in green, lights off, or flashes	Lights in blue	One or both of the followings are occurring ・ The drive is running correctly ・ The drive has been selected by the management application
Lights in green	Flashes in amber	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Lights in green	Lights off	The drive is online but is currently not running
Flashes in green (once per second)	Flashes in amber	Do not remove the drive. Removing the drive will shut down the current operation which may lead to a loss of data. The drive is part of an array that is undergoing capacity expansion or stripe migration, but a predictive failure alert has been received for this drive. To minimize the risk of data loss, do not remove the drive until the expansion or migration is complete.
Flashes in green (once per second)	Lights off	Do not remove the drive. Removing the drive will shut down the current operation which may lead to a loss of data. The drive is rebuilding, erasing, or is part of an array that is undergoing capacity expansion or stripe.
Flashes in green (4 times per second)	Flashes in amber	The drive is active but a predictive failure alert has been received for the drive. Replace the drive as soon as possible.
Flashes in green (4 times per second)	Lights off	The drive is running correctly
Lights off	Lights in amber	A critical fault condition has been identified for this drive and the controller has placed it offline. Replace the drive as soon as possible.
Lights off	Flashes in amber	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.

DISK ACT LED (Green) ②	DISK STATUS LED (Amber/Blue) ①	Description
Lights off	Lights off	The drive is offline, is a backup, or has not been set as a part of the array

Important

Observe the following precautions whenever you use the auto rebuilding feature
● **Do not turn off or reboot the server while a HDD is being rebuilt.**
● **Wait for at least 90 seconds while a HDD is being rebuilt.**
● **Do not replace a HDD while another HDD is being rebuilt.**

4.8.4 Hot plug compatible SATA/SAS drive LED
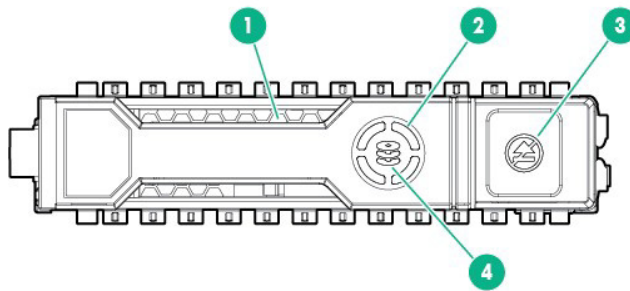
No.	Item	Status	Description
1	Position Check LED	Lights in blue	The drive is identified by the host application
		Flashes in blue	Firmware on the drive carrier is being updated or requires updating
2	DISK ACT LED	Rotates in green	Drive is working
		Lights off	Drive is not working
3	Remove Protect Switch/LED	Lights in white	Do not remove the drive. Removing a drive causes one or more logical drives to fail.
		Lights off	Even if the drive is removed, the logical drive will not fail.
4	DISK STATUS LED	Lights in green	A drive is a member of one or more logical drives.
		Flashes in green	Rebuilding the drive, migrating RAID on the drive, migrating or expanding the capacity of the strip size, expanding the capacity of the logical drive, or erasing the drive.
		Flashes in amber/green.	A drive is a member of one or more logical drives and a drive failure is predicted.
		Flashes in amber	The drive does not form in the array configuration, and a failure in the drive is predicted.
		Lights in amber	Drive has failed.
		Lights off	The RAID controller does not allow the drive to form in the array configuration.

Important	Observe the following precautions whenever you use the auto rebuilding feature ● **Do not turn off or reboot the server while a HDD is being rebuilt.** ● **Wait for at least 90 seconds while a HDD is being rebuilt.** ● **Do not replace a HDD while another HDD is being rebuilt.**

4.8.5 Optical Disk Drive Access LED (option)

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

4.9   Identifying Drive BOX

4.9.1   Front BOX

4x2.5-inch drive model ＋ 2x2.5-inch HDD/SSD（Option）
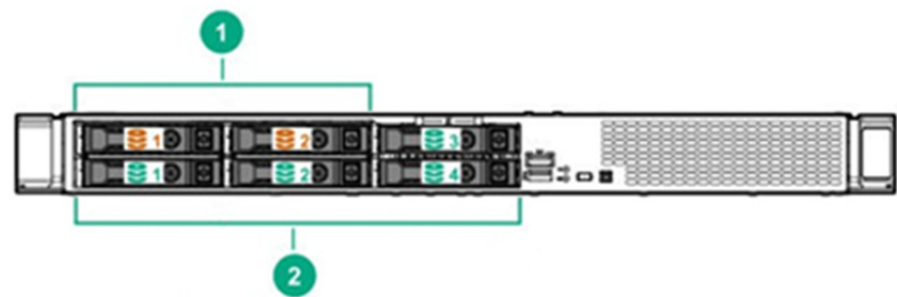
No.	BOX number
1	BOX1
2	BOX2

4.10 **Drive bay number**

Drive bay numbering depends on how the drive backplanes are connected:

4.10.1 **Drive bay numbering : OnBoard SATA , RAID controller**

4x2.5-inch drive model

2x3.5-inch drive model

4x2.5-inch drive model＋2 x 2.5 -inch HDD/SSD(Option)

No.	BOX number
1	BOX1、bay 1, 2
2	BOX2、bay 1〜4

2

NEC Express5800 Series
Express5800/R110j-1
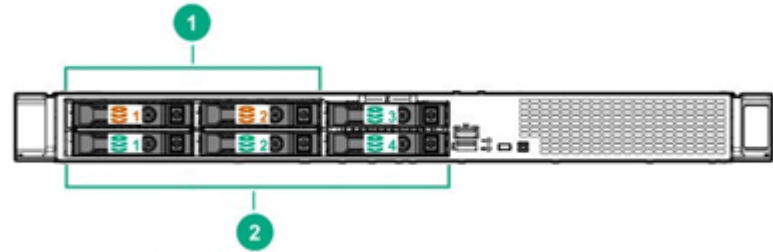
Preparations

This chapter describes preparations for using this server.

1. Installing Internal Optional Devices

You can skip this section if you did not purchase any optional devices.

2. Installation and Connection

Place the server in a suitable location and connect cables following this section.

1. Installing Internal Optional Devices

This section describes the instructions for installing supported optional devices and precautions.

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.
● Do not disassemble, repair, or modify the server.
●
● 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
● Do not leave the server being pulled out.
● Make sure to complete installation.
● Do not install with the cover removed.
● Do not get your fingers caught.
● High temperature
● Electrical shock

1.2   Overview of Installation and Removal

Install/remove components by using the following procedure.

⚠ 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**

● **Do not leave the server pulled out of the rack**

● **Replace the cover after installing components**

● **Beware of high temperatures**
● **Do not get your fingers caught when installing components**

---

1. If the server is mounted on a rack, use the UID switch to identify the target server.

    See *Chapter 2 (1. Installing Internal Optional Devices)*.

2. Remove Front Bezel.

    See *Chapter 2 (1.4 Front Bezel)*.

3. Turn off the server.

    See *Chapter 3 (6. Turning Off the Server)*.

4. 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 installing/removing optional devices.**
	● **Make sure AC POWER LED on power supply unit is unlit.**

5. If only installing a disk drive, proceed to step 12. If only installing a power supply unit, proceed to step 13. When installing or removing other internal options, remove from the rack from the main device, and place it on a sturdy, flat desk.

Important	**Do not leave the server being pulled out from the rack.**

6. Remove Top Cover.

    See *Chapter 2 (1.5 Top Cover)*

7. Depending on the components to be installed or removed, follow the procedure in order.

    See *Chapter 2 (1.6 TPM Kit to 1.21 Power Supply Unit)*.

8.   Attach Top Cover.

See *Chapter 2 (1.5 Top Cover)*.

9.   Mount the server onto the rack.

See *Chapter 2 (2.1 Installation)*.

10. Install disk drives.

See *Chapter 2 (1.20 Drives)*.

11. Install power supply units

See *Chapter 2 (1.21 Power Supply Unit)*.

12. Attach Front Bezel.

See *Chapter 2 (1.4 Front Bezel)*.

Installation and removal for internal optional devices are now complete.

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

Note	Do not let the server operate for long time with the top cover, air baffle, expansion slot cover, or the blank cover removed. If the server operates under these conditions, it will not be properly ventilated and the cooling mechanism will not properly function, which may lead to damages due to high temperature.

1.3   **Identifying Servers (UID Switch)**

Using UID (Unit ID) Switch helps you to identify the target server.

When the server is working, **be sure to identify the target server by using UID Switch first** before you turn off the server or disconnect a cable from the server.

To turn UID LED on, press UID Switch. When it is pressed again, the LED will be off.

・4x2.5-inch drive model、2x3.5-inch drive model

UID switch / UID LED
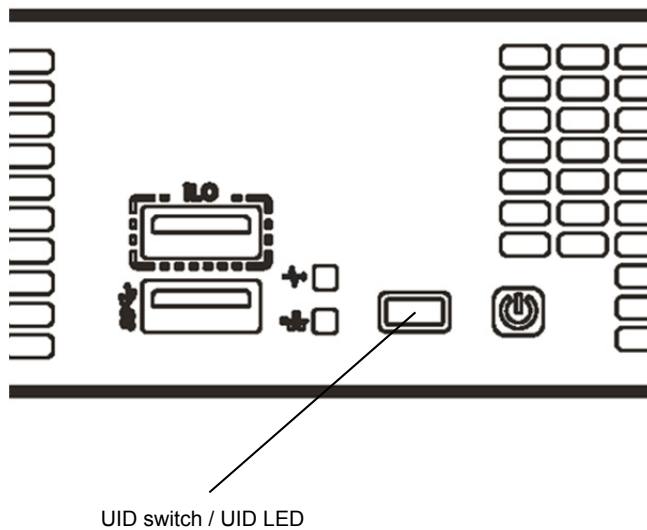
1.4　Front Bezel

Remove the front bezel when pressing the POWER switch or removing Top Cover.

1.4.1　Removing Front Bezel

1. To unlock the bezel, insert the attached Bezel Lock Key into the key slot and turn the key while pressing it lightly.
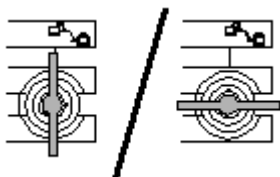
2. Press to the right and unlock the lever seen on the left when you face the front bezel, and pull only the left side of bezel by about 10 cm toward you. Then, as shown in the diagram, pull the bezel to the left forward direction with the lock on the left unlocked to remove the bezel from the device.
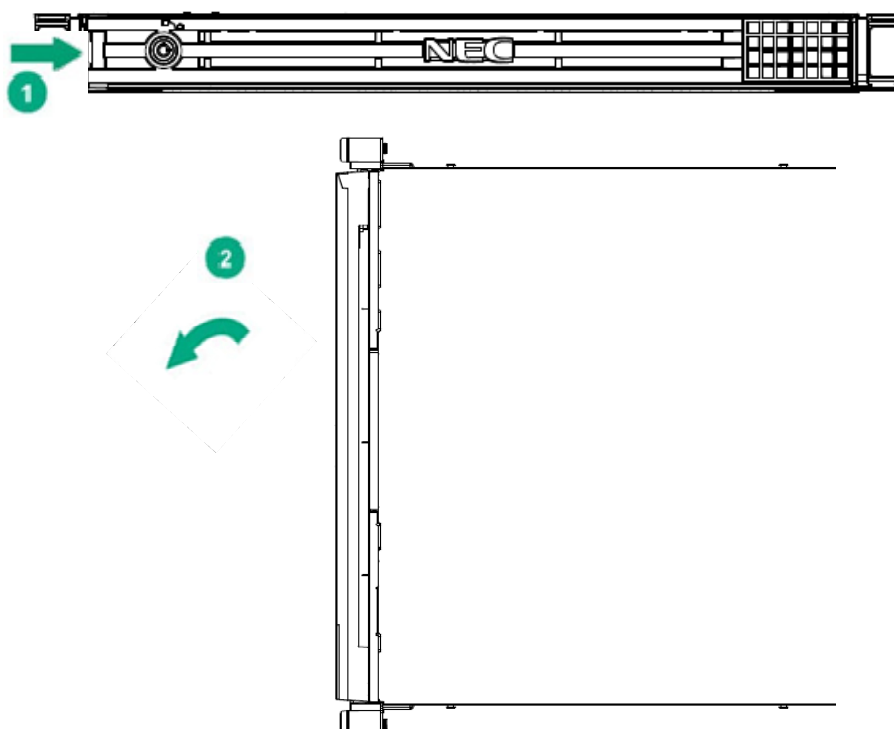
Note	Be careful not to press the POWER Switch.

Important	● If you fail to remove the front bezel properly, the front bezel might be damaged. ● Pay attention not to press the power switch when installing the front bezel.

1.4.2　Installing Front Bezel

The procedure for removal is the reverse of installation.

Note

Be careful not to press the POWER Switch.

Important

If you fail to remove the front bezel properly, the front bezel might be damaged.

Pay attention not to press the power switch when installing the front bezel.

1.5 Top Cover

Remove Top Cover when installing or removing the optional component or change internal cable connection.

- Hexalobular driver (T-15) or flathead driver
- Hexalobular driver (T-10)

1.5.1 Removing Top Cover

1. See steps 1 to 5 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.
2. Unscrew the security screw with the hexalobular driver or flathead driver
3. Unlock the latches on the top by pressing from behind and open the lever on the back.
4. Slide the cover a little bit to the rear side of the chassis.
5. Lift Top Cover and remove it from the server.
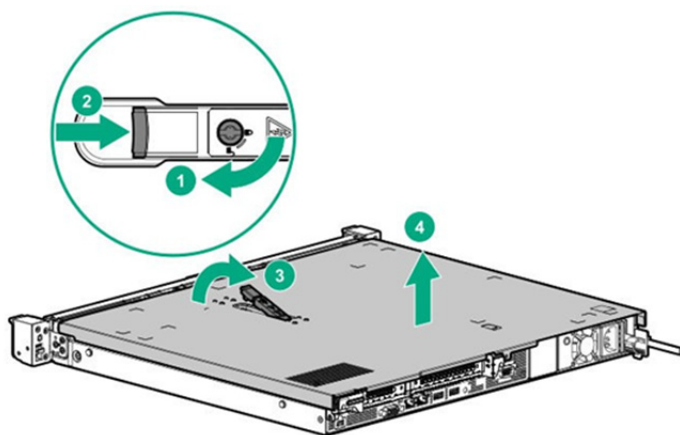
Important	If you fail to follow a right procedure properly, the hardware might be damaged.

1.5.2 Installing Top Cover

The procedure for removal is the reverse of installation.

Important	If you fail to follow a right procedure properly, the hardware might be damaged.

1.6   TPM Kit

Install the TPM (Trusted Platform Module) Kit unit according to the instructions in this section to enable it.

There are two steps to follow.

1. Installation of TPM Kit

2. Enabling TPM

When using drive encryption technologies, such as Microsoft Windows BitLocker Drive Encryption feature, you must enable TPM. For more information, see the Microsoft Web site.

Important	**Follow the procedures precisely as they are described in this section. If instructions are not followed, the hardware may be damaged and TPM may not work correctly.**

During installation or replacement of the TPM Kit follow these guidelines.

● Do not remove the installed TPM Kit. Once the TPM is installed it becomes a permanent part of the system board.

● During hardware installation or replacement our service counter cannot to enable TPM or encryption technology. For security reasons, please enable yourself.

● When returning the system board for service replacement, do not remove the TPM Kit from the system board.

● Trying to remove the TPM Kit from the system board may damage or deform the TPM security rivets. If rivets on the installed TPM Kit are found to have been damaged or deformed, the administrator will assume that the security of the system has been breached, and it will be necessary to take appropriate measures to ensure the integrity of the data system.

● Please keep the recovery key/password when using BitLocker. When BitLocker detects the system integrity may be compromised the recovery/password is necessary for recovery mode.

● Our company will not be responsible for any data access block that was caused by improper use of the TPM. Please see the encryption technology functions document attached to each operating system to operate the encryption functions used by TPM.

Check the position of the TPM installer connector on the figure below.

TPM KIT CONNECTOR
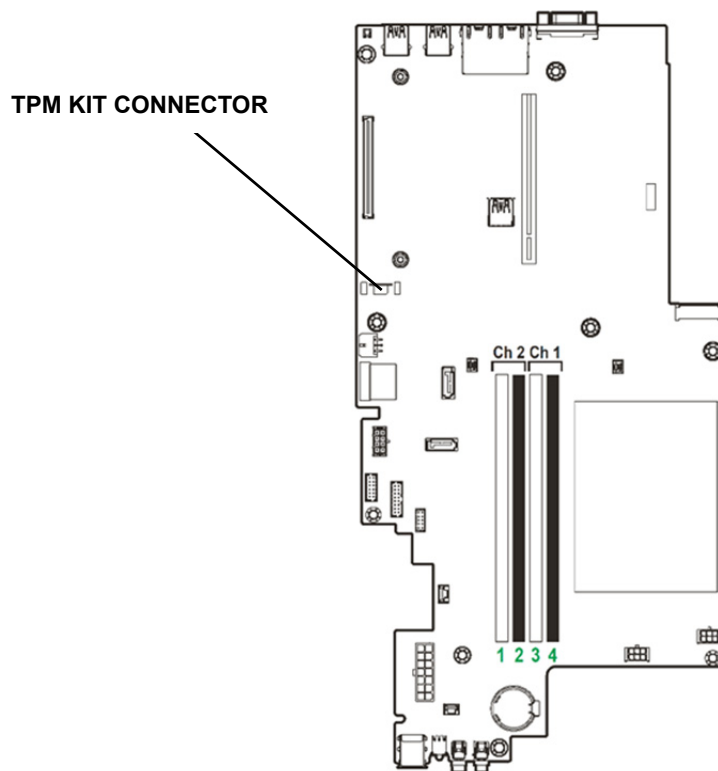
1.6.1 Installing the TPM Kit

Important	Install TPM kit when the machine is not powered. Please make sure the power cord has been unplugged to prevent personal injury, electrical shock, or damage to the unit. The main machine cannot be turned off completely just by using the POWER SWITCH on the front panel. Until the power cord is unplugged from the power some internal circuits will remain energized.
Important	The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.

To install the components, follow these steps.

1.   Update System ROM

     Please download the latest version from our support center website. For updating System ROM, please follow the instructions on the website.

2.   See steps 1 to 5 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3.   Temporarily remove options and cables that prevent the installation of TPM.

4.   Attach the TPM kit with the connector grooves on the motherboard. Press the connector in firmly and install the TPM kit. Please check the location of the TPM connector on the motherboard by looking at the quick reference level attached to the back of the top cover.
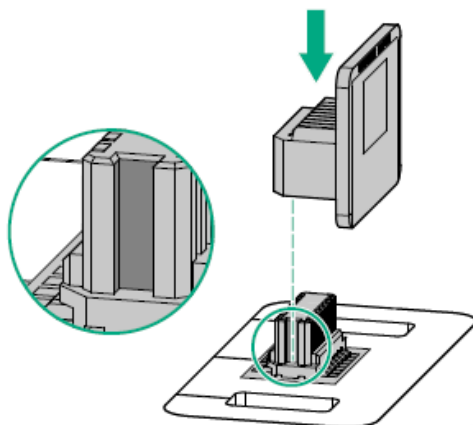
Note	If you try to remove the already attached TPM from the motherboard you will damage the TPM cover, TPM, and motherboard. Data including that stored in TPM key will be detected if you turn on the power the TPM that has been removed from the original server and installed on another server.

5.   Installing the TPM cover.

     ①   Align the holes and locking latches on both sides of the TPM connector.

     ②   Press down the center of the cover firm and straight until you hear a locking sound.
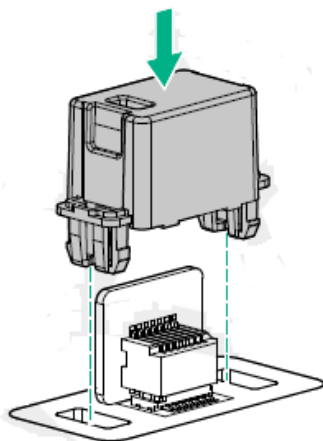
6.   Re-attach the options and cables that were removed in step 3.

7.   See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

8.   Please see *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON

Important	**TPM Kit once installed cannot be removed.** **Ask your sales representative if you want to remove the TPM kit.**

1.6.2 Enable TPM

The server will restart twice without user input. TPM setting is enabled after restarting and POST is complete. You can now make use of Microsoft Windows BitLocker using TPM and major boot etc. according to above.

Note	When enabling TPM, and operating it as below please follow the appropriate steps. Data access will be blocked if the operation is incorrect. • Updating system and firmware of options • Replacing system board • Replacing hard disk drive • Modifying OS application TPM settings

If you need detailed information on the update of firmware and the procedure of hardware, refer to the Web Site of NEC Support Center.
For more information about how to configure the TPM to using BitLocker, see the Microsoft Web site.

1.6.3 **Notes on Windows BitLocker**

When you set up BitLocker, a recovery key/password will be generated. Once BitLocker has been enabled, you can save and print them.

Please keep the recovery key/password when using BitLocker. When BitLocker detects the system integrity may be compromised the recovery/password is necessary for recovery mode.

To ensure security, please keep the recovery key/password information according to the following guidelines.

- Be sure to store in multiple locations.
- Store away from the machine.
- Do not store on a BitLocker encrypted hard disc drive.

1.7   Processor (CPU)

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

Note

● In order to prevent damage to the processor or system board, please ensure that only an authorized representative conducts replacements and installation of the processor on this server.

Important

● **To avoid static electricity, see** *Chapter 1 (1.8 Anti-static Measures)* **in Safety Precautions and Regulatory Notices.**
● **Make sure to use the CPU authorized by NEC. Installing a third-party CPU may cause a failure of the CPU as well as the motherboard. Repair of the server due to failures or damage resulted from installing such a CPU will be charged.**
● **Update the system ROM before installing the processor if a higher speed processor is to be installed.**

Note

Pins on the motherboard are very fragile and easily damaged. To avoid damaging the motherboard, do not touch the processor or processor socket contact point.

Note

When handling the heat sink always hold along the fin shaft. You may damage the fin by holding it.

1.7.1   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 2016 Standard Microsoft Windows Server 2016 Datacenter	640 *1	112
Red Hat Enterprise Linux 7 (x86_64)	240	112
VMware ESXi 6.5	480	112
VMware ESXi 6.7	576	112

*1：When Hyper-V is used, the maximum number of logical processors is as shown below:

- Windows Server 2016：512

1.8   **DIMM**

Install a Dual Inline Memory Module (DIMM) to a DIMM slot on the motherboard in the server. The motherboard provides 4 slots to install DIMMs

Important	●	**To avoid static electricity, see** *Chapter 1 (1.8 Anti-static Measures)* **in Safety Precautions and Regulatory Notices.**
	●	**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.**

1.8.1   **Maximum supported memory size**

The maximum available memory 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 2016 Standard *1 Microsoft Windows Server 2016 Datacenter *1	24TB	64GB
Red Hat Enterprise Linux 7 (x86_64)	12TB	64GB
VMware ESXi 6.5 *2	12TB	64GB
VMware ESXi 6.7	12TB	64GB

*1: Shown below is the maximum memory size when Hyper-V is used:
    - Windows Server 2016: Up to 24TB
*2: Up to 16TB on virtual machine

1.8.2 DIMM population order

This server's memory subsystem is divided into two channels. The processor supports 2 channels and each channel supports 2 DIMM slots.

Slot number shows DIMM slot ID for spare replacement.

Please see the following chart for the location of the slot number.
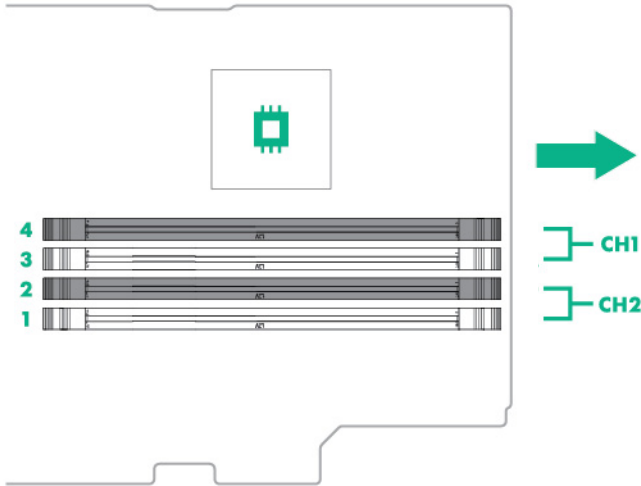
The following table describes the DIMM population order.

You should install in turn from large capacity DIMM.

Mounted number	Slot number			
1 DIMM			3	
2 DIMMs	1		3	
3 DIMMs	1		3	4
4 DIMMs	1	2	3	4

This server supports 2-way interleaving of memory channel.

The 2-way interleaving of memory channel achieves better memory performance.

To enable 2-way interleaving of memory channel, DIMMs should be populated under following conditions.

- Installed quantity should be a pair of DIMMs.
- A pair of DIMMs should have same capacity and should meet same specification.
- First pair should be installed to Slot 1 and 3, and then second pair can be installed to Slot 2 and 4.

1.8.3 Memory processor compatibility information

・Memory clock frequency

Operating frequency of DDR4 memory varies by processor type and memory configuration.

Please refer to the table below for the actual maximum operating frequency.

CPU brand	Operating frequency driving voltage 1.2 V
Xeon E Series	2666MHz
Core i3	2400MHz
Oentium	

The operation memory speed is decided by rating DIMM speed, DIMM attached on each channel, processor model and speed selected on System Utility.

1.8.4 **Checking DIMM**

To check out the features of the DIMM, please refer to the label affixed to the DIMM, the following illustrations and tables.
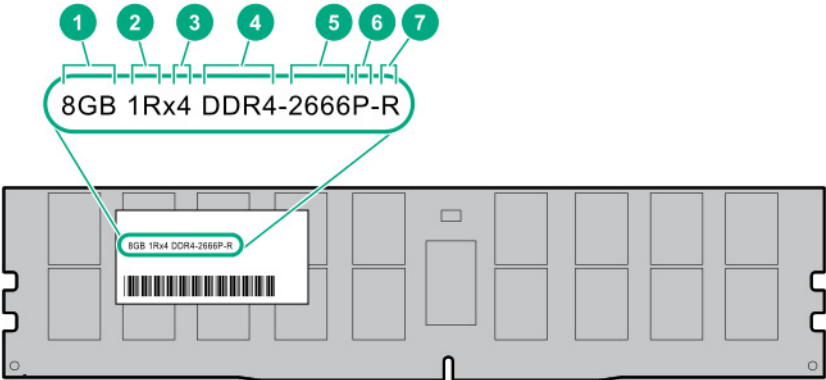
Number	Description	Meaning
1	Capacity	8GB 16GB 32GB 64GB 128GB
2	Rank	1R = Single rank 2R = Dual rank 4R = Quad rank 8R = Octa rank
3	DRAM data width	x 4 = 4 bit x 8 = 8 bit x16 = 16 bit
4	Memory generation	DDR4
5	The maximum speed of the memory	2133 MT/s 2400 MT/s 2666 MT/s
6	CAS latency	P = CAS 15-15-15 T = CAS 17-17-17 U = CAS 20-18-18 V = CAS 19-19-19 (for RDIMM,LRDIMM) V = CAS 22-19-19 (for 3DS TSVLRDIMM)
7	DIMM type	R = RDIMM (with register) L = LRDIMM (low loading) E = Unbuffered ECC (UDIMM)

1.8.5 Installation

Follow the steps below to install a DIMM.

1. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

2. Open levers on left and right sides of DIMM slot

3. Push the DIMM straight into the slot.

   When a DIMM is inserted into the slot, the lever automatically closes

   .
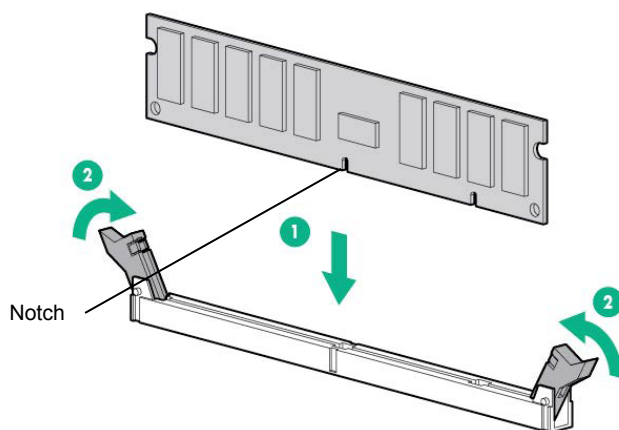
Notch

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

4. Continue to install/remove the internal options.

5. Refer to *Chapter 2 (1.5 Top Cover)* in this manual to replace the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

6. Refer to *Chapter 2 (2. Installation and Connection)* in this manual to install/connect and turn the power ON.

7. Confirm that no error messages are displayed in POST screen

8. Configure memory mode using RBSU of System Utility.

1.8.6 **Removal / Replacement**

To replace or remove DIMM, follow these steps.

To remove DIMM, reverse the installation procedure.

Be sure to install dummy cover to the slots from where DIMMs are removed

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.

Please check if there is no error on POST after replacing/removing DIMM.

1.9   Riser Card

This machine has Riser card which can equip 2 PCI boards (slot 1 / 2) so has high extendability.
（Required option）
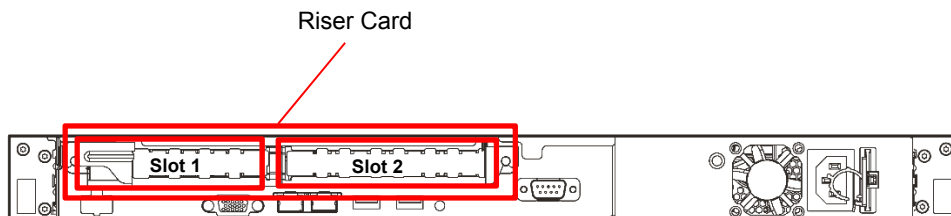
Riser Card

Important	You must avoid static electricity to work with the procedure below. For details, see *Chapter 1 (1.8 Anti-static Measures)* in Safety Precautions and Regulatory Notices.
Important	To prevent personal injury, electrical shock or equipment damage, unplug the power cord and ensure no power is supplied to the server. You cannot turn off the system power supply completely by the power button on the front panel. Until the AC power cord is unplugged, the power supply circuit is still active in some parts of the machine.
Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without installing blank cover or PCI boards.

1.9.1   Notes

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

● Do not touch the terminals of the riser 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.

● Available type of PCI card depends on the type of a riser card. Make sure the card type before connecting it to riser card.

Note	Keep a removed blank cover importantly.

・Riser Card
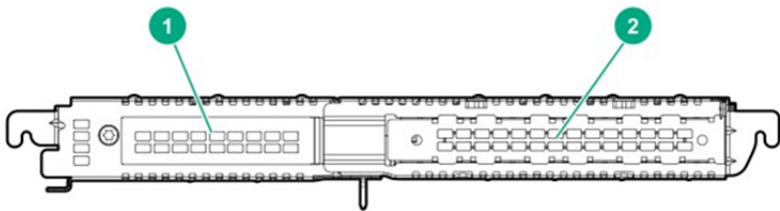
Riser card (PCIe3.0) [Required option]

Product number	SLOT1			SLOT2		
	Slot performance *1	Slot form *2	Slot size	Slot performance *1	Slot form *2	Slot size
N8116-90	x8	x8	LP/HL(168mm)	x8	x16	FH/HL(168mm)
N8116-89	x8	x8	FLOM	x8	x16	FH/HL(168mm)

*1 The data transfer rate of PCI slot is calculated from a transfer band multiplied by the number of lanes.

<Ex.> x8 lanes = 64Gbps (one way)

*2 Shows a connector size. Cards having the number of plugs or lower can be connected.

<Ex.> x8 Plug→ x1card, x4card, or x8card can be installed. x16 card cannot be installed.

FH: Full height
LP：Low profile
FL：Full length
HL：Half length

1.9.2   **Removing Riser Card**

Please prepare the following before installing the options.

● Parts included in the option kit.

Note	In order to prevent the damage to server's main body or the expansion board, please remove all the AC power cables before removing/installing riser card.

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

To install the components, follow these steps.

● Backup all of the data for server.

● See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

● Hold the both ends of the PCI riser card unit and lift it off.

・**Riser card**

● See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

| Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

● Please see *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.9.3 Installing Riser Card

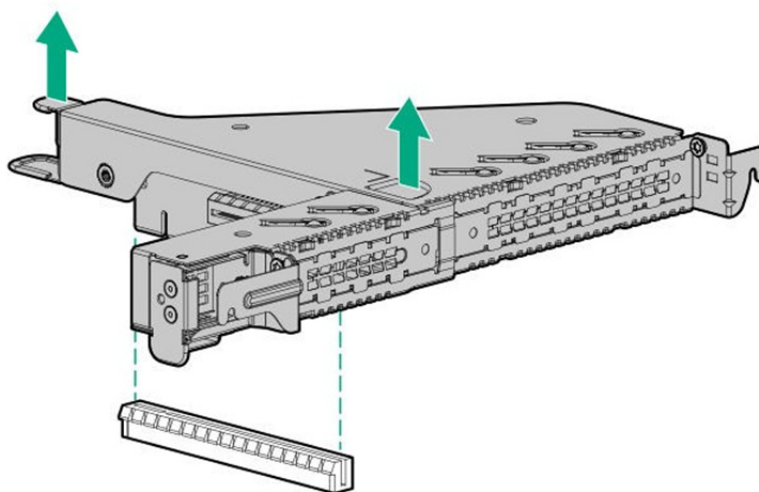| Note	In order to prevent damage to the server or PCI boards, ensure to unplug all power cords before installing or removing boards.

Important	Do not touch the terminal part of PCI riser card or PCI card and the signal pins of electric parts installed on the board. Installing boards with dirt or oil can cause malfunction.

To install the components, follow these steps.

1.　The procedure for removal is the reverse of installation.

2.　See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3.　Install a riser Card

Stick the edge connector part of riser card and slot part on the mother board and insert them certainly.

・**Riser card**
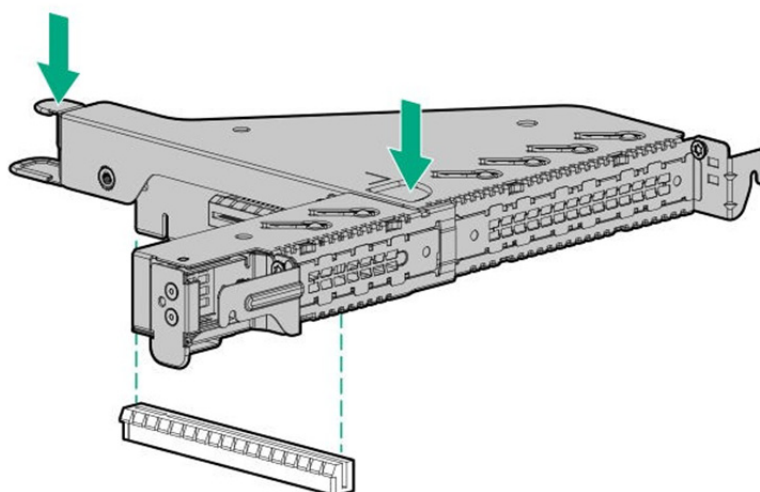
4.　See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

5.　Please see *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.
 Re-attach the blank cover if you operate without it attached

Important	Re-attach the blank cover removed to maintain the internal cooling.

1.10   PCI board

This unit is equipped with 3 slots to mount PCI boards; 2 slots for two types of PCI riser card and 1 slot dedicated for the RAID controller to which the RAID controller can be mounted. For PCI riser card, 1 full height PCI board and 1 low profile PCI board can be mounted while 1 RAID controller can be mounted to the slot dedicated for the RAID controller. (A total of 3 PCI boards can be mounted).

Important	**You must avoid static electricity to work with the procedure below. For details, see *Chapter 1 (1.8 Anti-static Measures)* in Safety Precautions and Regulatory Notices.**

1.10.1   Notes

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

- Do not touch the terminals of the riser 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.

- Available type of PCI card depends on a riser card. Make sure the card type before connecting it to riser card.

1.10.2 Supported PCI cards and available slots

The following table lists supported cards and slots available for them. For details of the features of each card, see the manual supplied with the card.

Tips	If the operation performance of PCI card differs from that of PCI Slot, the PCI card operates at lower frequency.

(1) Supported cards and slots

Product number	Product name	Slot number	RAID	FLOM *3	Slot1 *4	Slot2	Remarks
		PCI standard	PCIe 3.0				
		PCI slot performance *1	×4	×8	×8	×8	
		Bandwidth/lane *1	8Gb/s				
		PCI board type *2	-	-	x8	×16	
		Slot size	Dedicated to RAID	Dedicated to LOM	LP	FH	
		Available size			HL	HL	
N8103-193	RAID Controller (2GB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		①	—	—	—	Up to 1 battery per device can be mounted. For N8103-193/196, up to 2 units can be mounted.
N8103-192	RAID Controller (RAID 0/1) [PCI Express 3.0(x8)]		①	—	—	—	
N8104-172	Quad Port 1000BASE-T LOM Card [PCI Express 3.0(x8)]		—	①	—	—	
N8104-173	Dual Port 10GBASE-T LOM Card [PCI Express 3.0(x8)]		—	①	—	—	
N8103-E184 N8103-184	SAS Controller [PCI Express 3.0(x8)]		—	—			Up to 2 units can be mounted.
N8103-196	RAID Controller (4GB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		—	—	②	①	For external device Up to 1 battery per device can be mounted. For N8103-193/196, up to 2 units can be mounted.
N8103-197	SAS Controller [PCI Express 3.0(x8)]		—	—	②	①	For external device
N8190-165	Fibre Channel Controller(1ch) [PCI Express 3.0(x8)]		—	—	②	①	
N8190-166	Fibre Channel Controller(2ch) [PCI Express 3.0(x8)]		—	—	②	①	
N8190-167	Fibre Channel Controller(1ch) [PCI Express 3.0(x8)]		—	—	②	①	
N8190-171	Fibre Channel Controller(1ch) [PCI Express 3.0(x8)]		—	—	①	①	
N8190-172	Fibre Channel Controller(2ch) [PCI Express 3.0(x8)]		—	—	②	①	When the number of CPU threads is 4 (*5), 2 units of FC controller (2 channels) [N8190-172 or N8190-164] can be mounted.
N8190-163	Fibre Channel Controller(1ch) [PCI Express 3.0(x8)]		—	—	②	①	
N8190-164	Fibre Channel Controller(2ch) [PCI Express 3.0(x8)]		—	—	②	①	
N8104-185	Dual Port 10GBASE SFP+ Adapter [PCI Express 2.0(x8)]		—	—	②	①	
N8104-182	Dual Port 10GBASE-T Adapter [PCI Express 2.0(x8)]		—	—	②	①	
N8104-183	Dual Port 10GBASE-T Adapter [PCI Express 3.0(x8)]		—	—	②	①	
N8118-312	M.2 SATA SSD Installation kit		—	—	②	①	
N8104-178	Dual Port 1000BASE-T Adapter [PCI Express 2.0(x1)]		—	—	②	①	
N8104-180	Dual Port 1000BASE-T Adapter [PCI Express 2.0(x1)]		—	—	②	①	Network cables with RJ-45 plug covers cannot be used.
N8104-181	Quad Port 1000BASE-T Adapter [PCI Express 2.0(x4)]		—	—	—	①	Network cables with RJ-45 plug covers cannot be used.

● Installed as standard ○ Installation Available ─ Installation Not Available The numbers stand for the order of installation. Cards are installed from the top in order.

*1 The data transfer rate of PCI slot is calculated from a transfer band multiplied by the number of lanes.

   <Ex.> x8 lanes = 64Gbps (one way)

*2 Shows a connector size. Cards having the number of plugs or lower can be connected.

   <Ex.> x8 Plug→ x1 card, x4 card, or x8 card can be installed. x16 card cannot be installed.

*3 It can be installed only when Riser card (1xPCI + FLOM) [N8116-89] is selected.

*4 It can be installed only when Riser card (2xPCI) [N8116-90] is selected.

*5 Targeted configuration/CPU are as follows.

N8101-1504 CPU board (4C/E-2124), N8101-1512 CPU board (2C/Pentium G5400), and N8101-1515 CPU board (4C/i3-8300)

- Refer to the technical guide for the detailed feature of each card.

- Inside of [ ] of the product, are the best operation performance of its card.

- We offer various types of riser cards. Depending on the types of riser cards, performance, form and support PCI card of a slot may be different. Check the compatibilities of PCI cards referring to the list of riser cards.

- In case the performances are different between a PCI slot and a PCI board, the device operates on the lower performance.

    - FH: Full height
    - FL: Full length
    - LP: Low profile
    - HL: Half length

*3 Refer to the list of riser card slots for slot performance/ slot form of each slot.

*4 We offer various types of riser cards. Depending on the types of riser cards, performance, form and support PCI card of a slot may be different. Check the compatibilities of PCI cards referring to the list of riser cards. Suppose you intend to select N8104-188 25GBASE connection basic board. As far as Slot1 of riser card has the performance/ form of x16, an N8104-188 25GBASE connection basic board can be mounted. In case Slot1 of riser card has the performance/ form of x8, N8104-188 25GBASE connection basic board can not be mounted.

1.10.3 Installing PCI card in the primary and secondary riser card

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

Note	Check the card type (Low profile or Full Height) which respective riser card supports and the type of PCI card to be installed.

Important	**To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power On/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power cord is removed.**

Note	For proper cooling, do not operate the server before the access panel, baffles, expansion slot covers, or blanks are installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the option.
- Parts included in the option kit
- T-10 hexalobular drive

To install the components, follow these steps

1.   Back up all data in the server.

2.   See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations

3.   See *Chapter 2 (1.9 Riser Card)* to remove the riser card.

4.   See supported PCI boards and mountable slots and confirm the installation location.

5.   Remove the fixing screw and the blank cover of the riser card.

   Further, Slot1 has to draw out ②sliding section.

Note	Store safely the removed blank cover.

・Slot 1
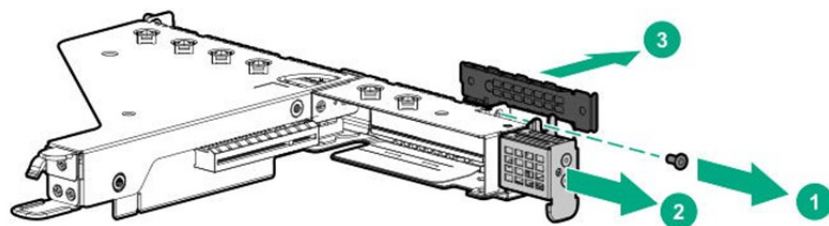
・Slot 2
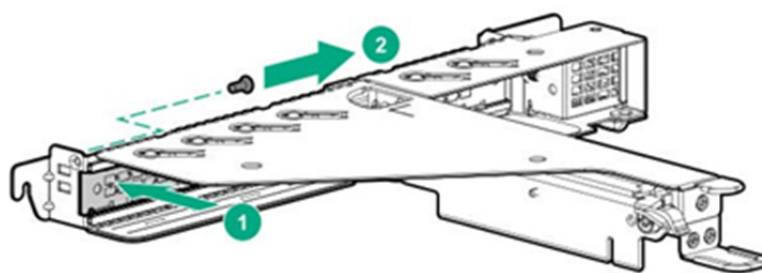
6. Position the terminal part of the PCI card to the PCI riser card slot and insert it carefully.

    Further Slot1 return ②sliding section to the original location at the time of bracket fixing of a PCI card, and

    tighten the screw after it is confirmed that a bracket is held right.

・Slot 1

・Slot 2

Important	Do not touch the terminal part of riser card or PCI card and the signal pins of electric parts installed on the board. Installing boards with dirt or oil can cause malfunction.

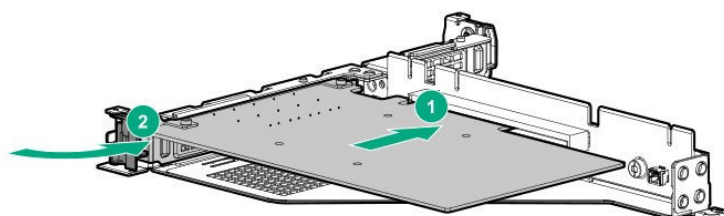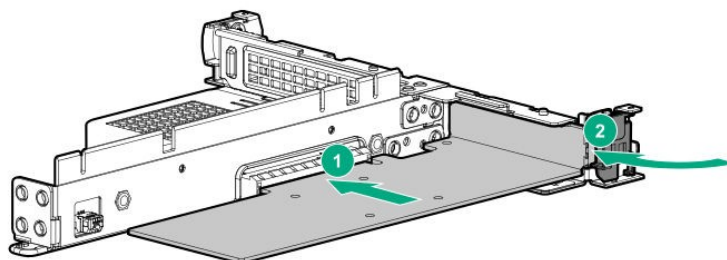| Note	• Make sure that the edge of a PCI card bracket is seated into the fixed slot of the riser card. • Depending on type of PCI cards, the terminal part of the PCI card may be too large to fit in the connector. • If you have trouble installing the card, remove the card once and try again. If you apply excessive pressure on the card, a PCI card or riser card might break.

7.   The necessary interior or the outside cable is connected to a PCI board. Refer to a document bundled by a PCI board.

Tips	When connecting the connector on the motherboard and PCI board with cable, connect the board before installing the riser card unit.

8.   See *Chapter 2 (1.9 Riser Card)* to install the riser card.

9.   See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

10. Please see *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

Important	Do not touch the terminal part of riser card or PCI card and the signal pins of electric parts installed on the board. Installing boards with dirt or oil can cause malfunction.

Note	• Make sure that the edge of a PCI card bracket is seated into the fixed slot of the riser card.
	• 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, a PCI card or riser card might break.

| Note | In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays. |

1.10.4 Removal

To remove a PCI card, reverse the installation procedure.

If using the server with the PCI card removed, attach the blank cover that comes with the riser card unit.

| Important | **Re-attach the blank cover removed to maintain the internal cooling.** |

1.11 RAID controller

RAID controller is supported.

RAID controller N8103-196 is provided.

See *Chapter 2 (1.10 PCI board)* for performance features.

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

| Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

1.11.1 Installing RAID Controller

Please prepare the following before installing the option.
* Parts included in the option kit

* T-15 hexalobular driver

To install the components, follow these steps.
1. Meet the requirements described below.
    * Be sure to install the additional battery (N8103-215) for the RAID controller when implementing the RAID controller (N8103-196) equipped with the FBWC function.
    * The entire data of the server must be backed up.
2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.
3. See *Chapter 2 (1.9 Riser Card)* for removing the Riser card.
4. See *Chapter 2 (1.10 PCI board)* for removing the blank cover of Slot 1 or Slot 2. Controller Board can be fit into Slot 1 or Slot 2.
5. Position the terminal part of the PCI card to the PCI riser card slot and insert it carefully.

6.   When installing Battery Backup Unit, connect mother board and RAID controller with power cable.

・**Slot 1**
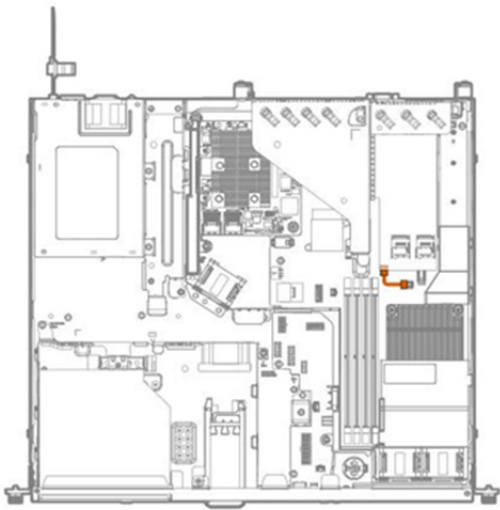
Color	Description
Orange	Slot 1 storage controller backup power cable
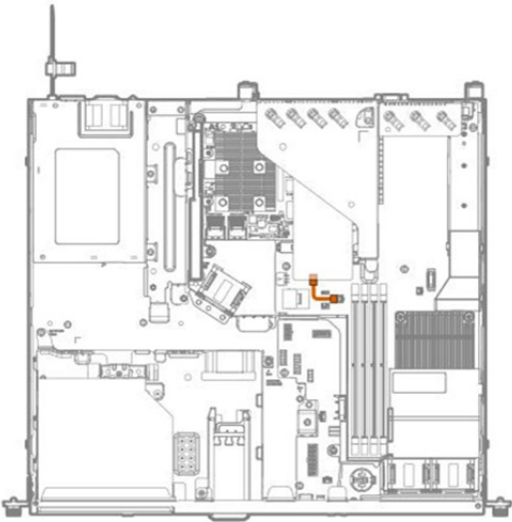
・**Slot 2**

Color	Description
Orange	Slot 2 storage controller backup power cable

7.   See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

Note

In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

8.   Please see *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.11.2 Removal

To remove a PCI card, reverse the installation procedure.

If using the server with the PCI card removed, attach the blank cover that comes with the riser card unit.
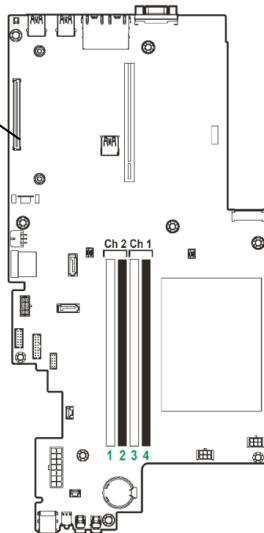
Important

Re-attach the blank cover removed to maintain the internal cooling.

1.12   RAID controller N8103-192/193

RAID controller board exclusive slot is supported.

RAID controller exclusive slot

| Important | **The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.** |

| Note | In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted. |

1.12.1   Installing RAID Controller

Please prepare the following before installing the option.
- Parts included in the option kit

- T-15 hexalobular driver

- Internal SAS/SATA cable (K410-446(00)) (for 2 x 3.5 inch. drive model)

| Note | Three cables are included for internal SAS/SATA cable (K410-446(00)). 1 cable is used when installing RAID controller.
Internal SAS/SATA cable for 2 x 3.5 inch. drive model is included in main unit and extended drive cage (N8154-135). |

To install the components, follow these steps.

1. Meet the requirements described below.

   - Be sure to install the additional battery (N8103-198) for the RAID controller when implementing the RAID controller (N8103-193/201) equipped with the FBWC function.

   - Connect the cable with the connector of the component in accordance with the label on the cable.

   - The entire data of the server must be backed up.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. See *Chapter 2 (1.9 Riser Card)* for removing the Riser card.

4. Insert the alignment pins on the system board through the holes on the controller board.

5. Press on the area of the controller board marked as PRESS TO INSTALL to ensure that the board is firmly seated on the slot.

   Tighten the controller board thumbscrews.

Alignment pins
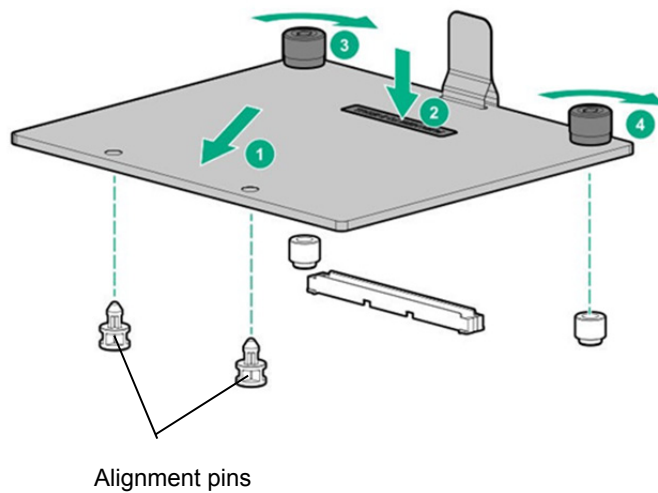
6.   Connect the SAS/SATA cable from the back plane to the controller port. The SAS/SATA cables are labeled "Port1" or "Port2". Align with the label number and insert.

・**4 x 2.5-inch drive model**
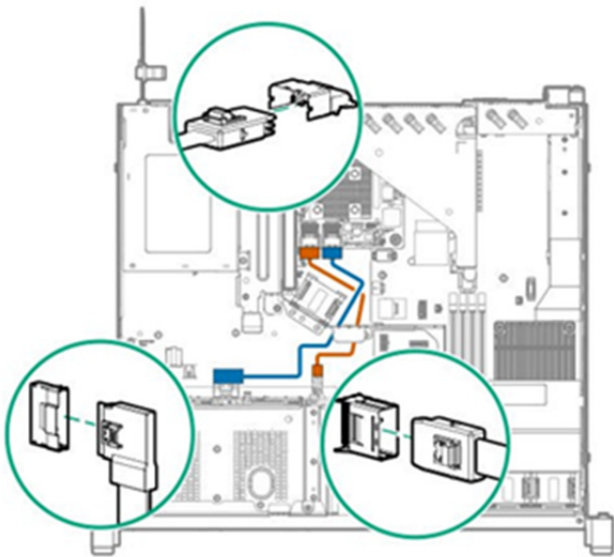
Color	Description
Orange	Mini-SAS cable from 4 SFF drive backplane to AROC port 1
Blue	Mini-SAS cable from 2 SFF drive backplane to AROC port 2

・**4 x 2.5-inch drive model＋2 x 2.5-inch HDD/SSD（Option）**
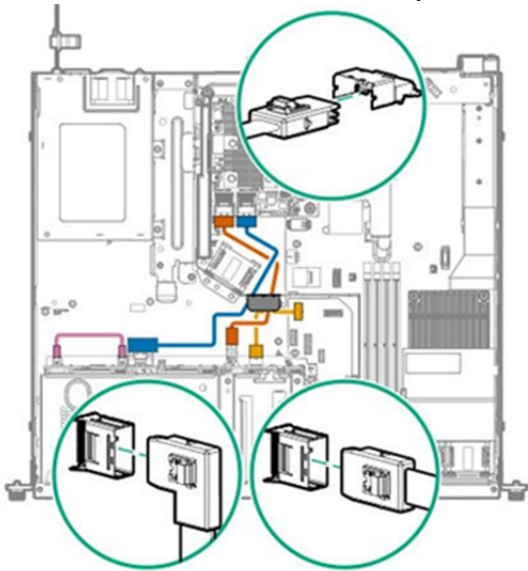
Color	Description
Blue	Two-bay SFF drive backplane Mini-SAS cable to AROC port 2
Orange	Four-bay SFF drive backplane Mini-SAS cable to AROC port 1
Gold	Four-bay SFF drive backplane power cable
Pink	Two-bay to four-bay SFF drive backplane power cable

· 2 x 3.5-inch drive model
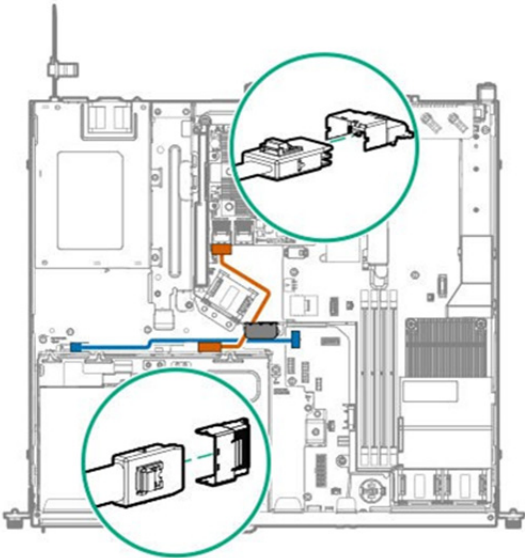
Color	Description
Orange	Drive backplane to AROC port 1 Min-SAS cable (P06078-001)
Blue	Drive backplane power cable

Important	**A cable of Orange (P06078-001) in a table is included in an Internal SAS/SATA cable (K410-446 (00)).**

7.   See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

8.   Please see *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.12.2 **Removal**

The procedure for removal is the reverse of installation.

1.13　Battery Backup Unit　N8103-215

When mounting a RAID controller (N8103-193 / 196), by installing an extension battery, data loss due to accident such as power shortage can be avoided. if Write Back being enabled,

1.13.1　Handling precautions

When using an extension battery, please pay attention to the following. If you ignore the following warnings, there may be loss of data and hardware.

- The extension battery is an extremely sensitive device. Prior to installation, avoid static electricity by touching the metal frame of the unit or similar.

- Do not drop or otherwise damage the extension battery.

- For recycling and disposal of extension batteries, refer to the user's guide attached to the Battery Backup Unit.

1.13.2　Installing the Battery Backup Unit in a normalized setting

Check the parts of the kit before installing extensions.

To install the components, follow these steps.

1.　See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

2.　Install the battery and connect the cable.
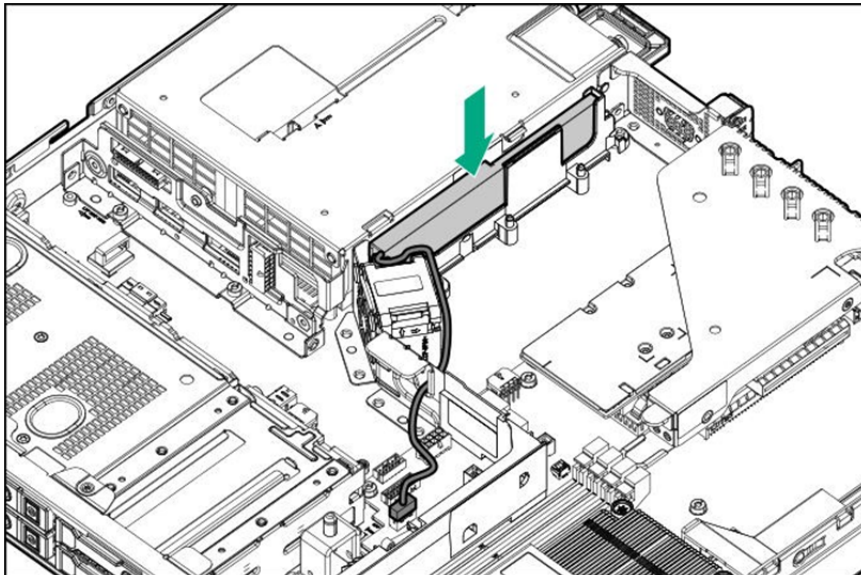
3.　When using RAID controller (4GB, RAID 0/1/5/6) (N8103-196), please be sure to connect power cable.

・**Slot 1**
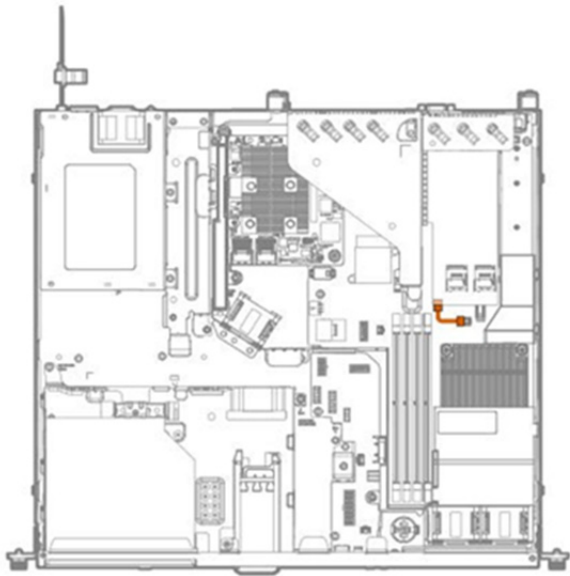
Color	Description
Orange	Slot 1 storage controller backup power cable
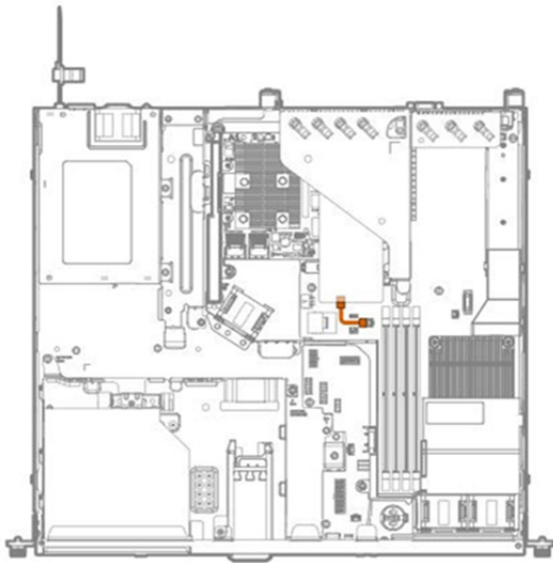
・**Slot 2**

Color	Description
Orange	Slot 2 storage controller backup power cable

1.13.3　**Removal**

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

1.14   M.2 SATA SSD Kit

The M.2 SATA SSD (Optional, Max 2) can be installed to M.2 SATA SSD Kit (Optional).

Note	When loading an optical disk drive (N8151-137 or N8151-138) by 4x 2.5 drive model, one M.2 SATA SSD can be installed.

1.14.1   Install the M.2 SATA SSD Kit

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the options.

- Parts included in the option kit

- T-15 hexalobular driver

- Phillips screwdriver

- Internal SAS/SATA Cable (K410-446(00))

Note	3 cables are included in an Internal SAS/SATA cable (K410-446(00). M.2 SATA SSD Installation kit (N8118-312) when installing it, 2 cables are used

To install the components, follow these steps.

1.   Back up all data in the server.

2.   See steps 1 to 7 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3.   See *Chapter 2 (1.9 Riser Card)* to remove the riser card in the loaded location

4.   See *Chapter 2 (10 PCI board)* to install M.2 SATA SSD Kit in the loaded location.

When mounting on Slot1, it's exchanged for a LP bracket.
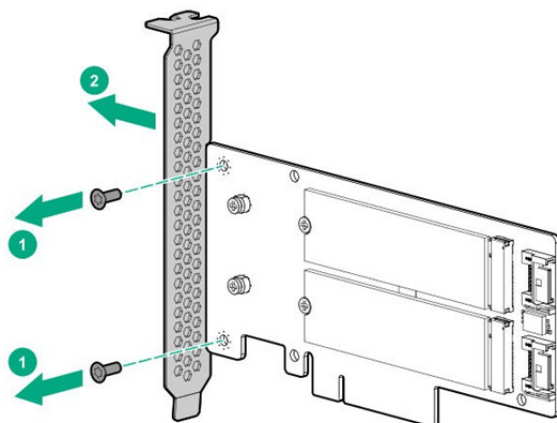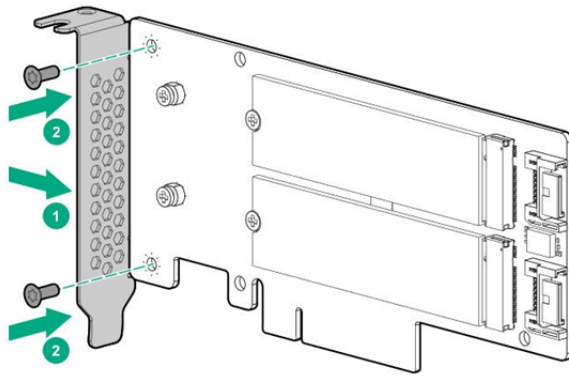
5.   Attach M.2 SSD to the M.2 SSD assembly board that is in the M.2 SATA SSD kit.

      Insert the M.2 SSD (with the M.2 SSD assembly board) to the connector at 45 degree then recline it toward
      to the board. Fix the M.2 SSD to the board with one screw. Repeat the same process for 2nd M.2 SSD.
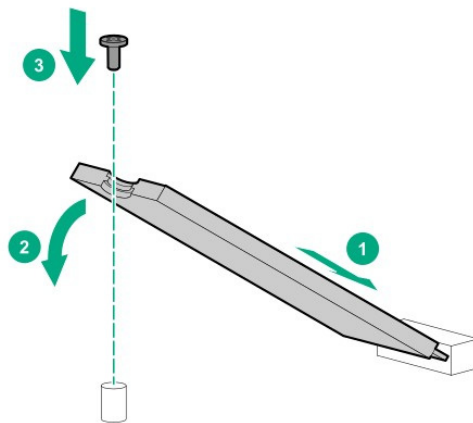
Note	When loading an optical disk drive (N8151-137 or N8151-138) by 4x 2.5 drive model, please connect to Slot1 of M.2 SATA SSD Installation kit (N8118-312).

6.   Install SATA cable in the M.2 SATA SSD Kit
7.   See *Chapter 2 (1.9 Riser Card)* to install the riser card attaching M.2 SATA SSD Kit

8.   Connect cable with motherboard

> **Important**
>
> **A cable of Orange and Blue is included in a SATA cable (K410-446 (00)).**
> **When loading an optical disk drive (N8151-137 or N8151-138) by 4x 2.5 drive**
> **model, please connect a SATA cable (P06072-001) chisel of Orange.**

・Slot.1
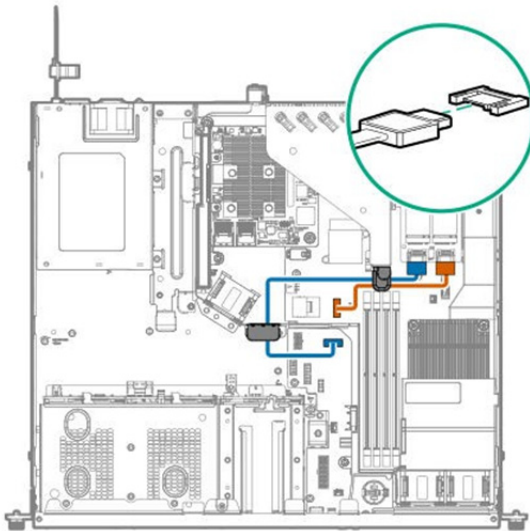
Color	Description
Orange	SATA cable to x1 SATA port 1 (P06072-001)
Blue	SATA cable to x1 SATA port 2 (P06072-001)

・Slot.2
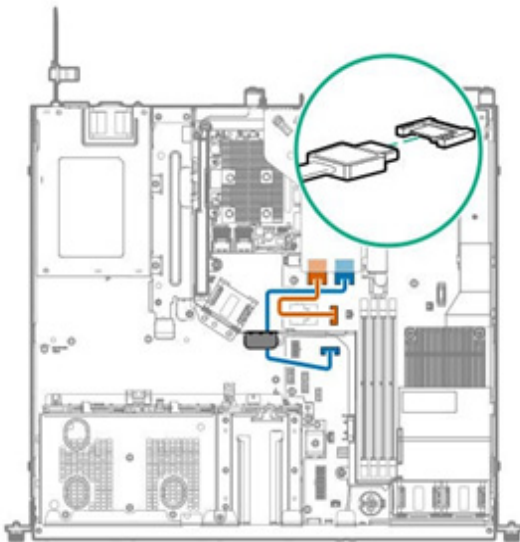
Color	Description
Orange	SATA cable to x1 SATA port 1 (P06073-001)
Blue	SATA cable to x1 SATA port 2 (P06073-001)

9.   See *Chapter 2 (1.5 Top Cover) t*o attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

10. Please see *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.14.2 **Removal**

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.15 VMware ESXi USB flash memory for installation (N8106-016/017)

VMware ESXi flash memory for installation（N8106-016/017）can be connected to USB 3.0 connector   inside the device.

Two type of USB flash memory are prepared.

①   N8106-016   **2x8GB microSD installing kit(USB)**

Two micro SDs able to install and boot VMware ESXi   and USB conversion lit

②   N8106-017   **8GB USB memory**

USB flash memory able to install and boot VMware ESXi

■   Notes

● N8106-016 2x8GB microSD card installing kit (USB) is equipped with RAID1 function.

● The function cannot be installed with M.2 SATA SSD.

● This product does not include an install media of ESXi and the license.

1.15.1 Mounting of USB flash memory N8106-016/017

Note	In order to prevent the damage for the electric parts, start the installation of system after providing power anti-static treatment. If a proper earth is not provided, electrostatic discharge may occur.

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Confirm the position of internal USB3.0 connector.
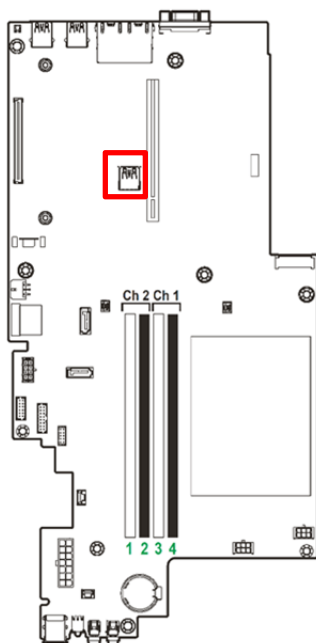
4.   Insert   a USB flash memory in a connector
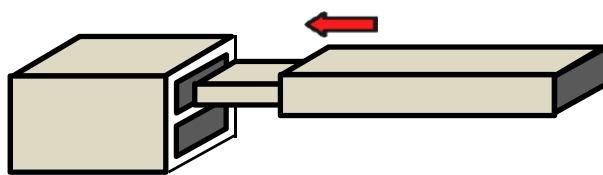
1.15.2 **Removal**

The procedure for removal is the reverse of installation.

If it is operated while being removed, install the blank cover that was removed.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.16   4x2.5-inch Drive Model media bay

For the 4x2.5-inch drive model, you can install a 2x2.5-inch SAS/SATA drive or an optical disk drive in the media bay.

2x2.5-inch drive cage (SAS/SATA) (N8154-135) and Internal DVD Drive Installation Kit (N8154-134) are exclusive use

Media bay

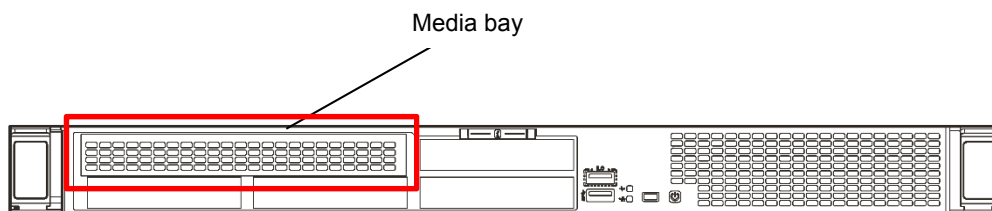## *1.16.1*   Installing 2x2.5-inch Drive Cage (SAS/SATA) N8154-135

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the option.
- Parts included in the option kit

- T-10 hexalobular driver

- 2x SAS, SATA drive, or dummy tray

To install the components, follow these steps.

1.   Back up all data in the server.

2.   See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3.   Remove the screws (x2) and remove the media bay blank panel.
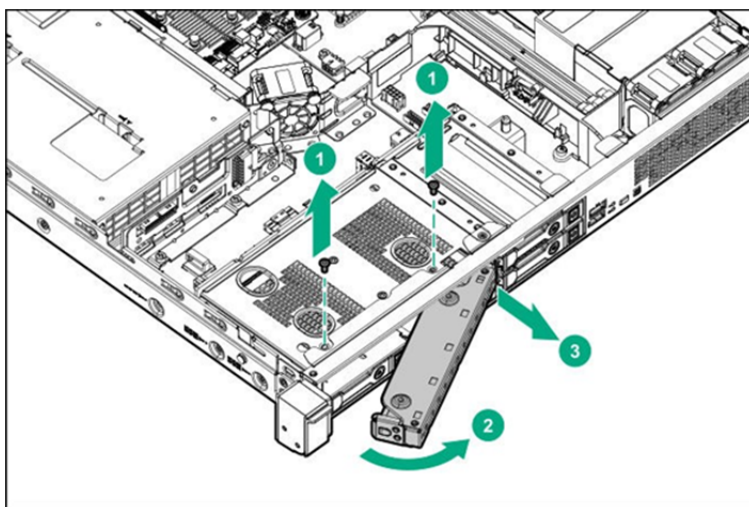
4.   Install the 2x2.5-inch Hot Plug Drive Cage Kit (SAS/SATA), and fasten with the screws (x2) removed in step.2
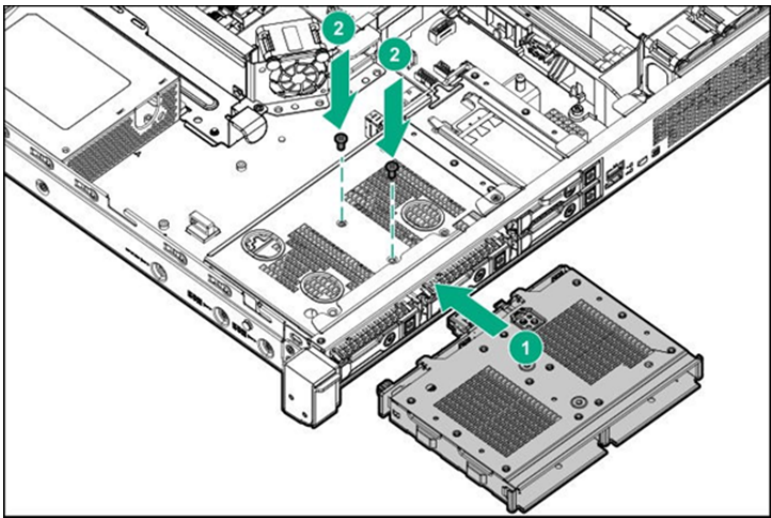
5.   Connect SAS/SATA cable from drive cage to Mini-SAS port 3 on motherboard and connect power cable to left power connector on backplane. Refer to the below cable routing.
     When connecting RAID controller, refer to Chapter 2 (1.12   RAID controller N8103-192/193).
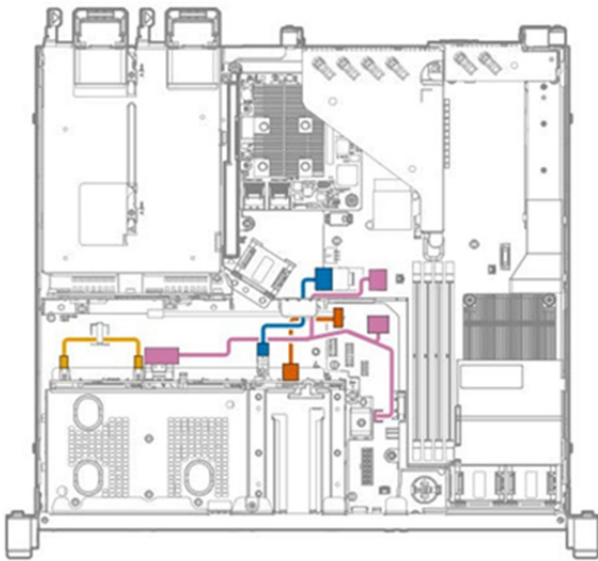
Color	Description
Orange	Power cable to 2 SFF drive backplane & ODD power connector
Blue	Mini-SAS cable to x4 SATA port
Pink	Mini-SAS cable to 2 SFF SATA sideband connector, x1 SATA port 1 & x1 SATA port 2

6.   See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

> **Note**
>
> In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

7.   Mount the SAS/SATA drives.

8.   Please see *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.16.2 Installing the Internal DVD Drive Installation Kit N8154-134

Note

In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the options.
- Parts included in the option kit

- T-10 hexalobular drive

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Remove the screws (x2) and remove the media bay blank panel.
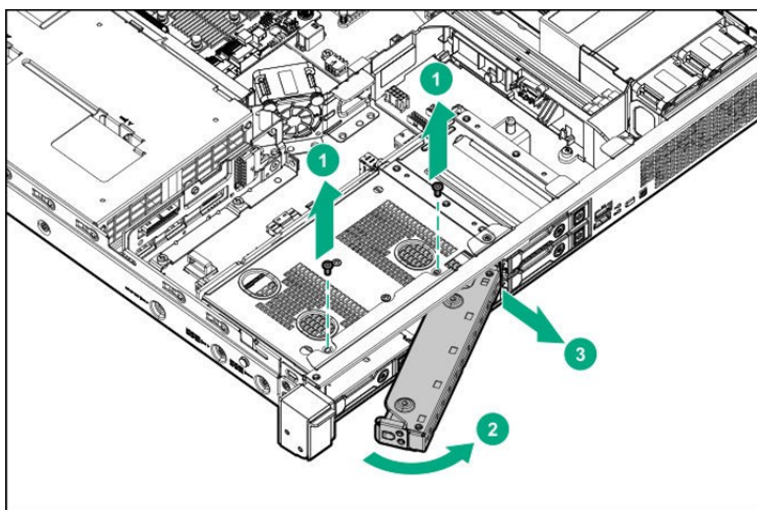
4. Remove the internal drive blank cover and install the internal drive DVD-ROM (N8151-137), or DVD-Dual (N8151-138).
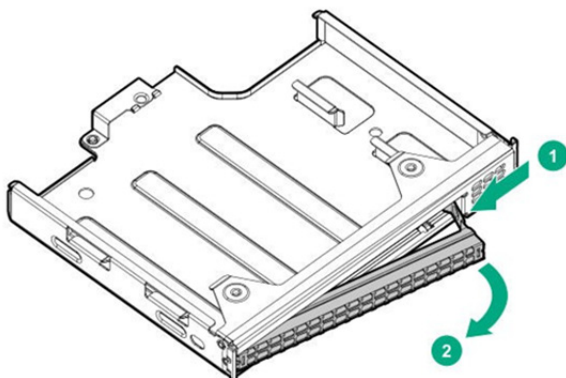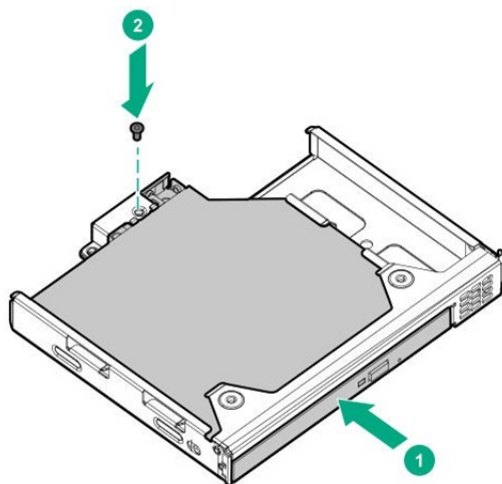
5.   Install the internal DVD drive extension kit, and fix with the screw(x2) removed by step3.
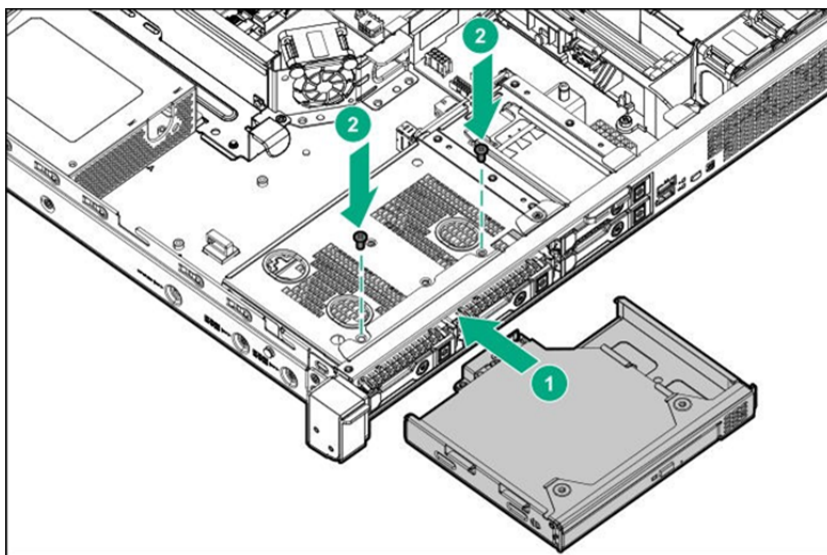
6.   Connect a SATA cable for optical disk drives to the on board SATA port 5 connector of a motherboard as shown below.
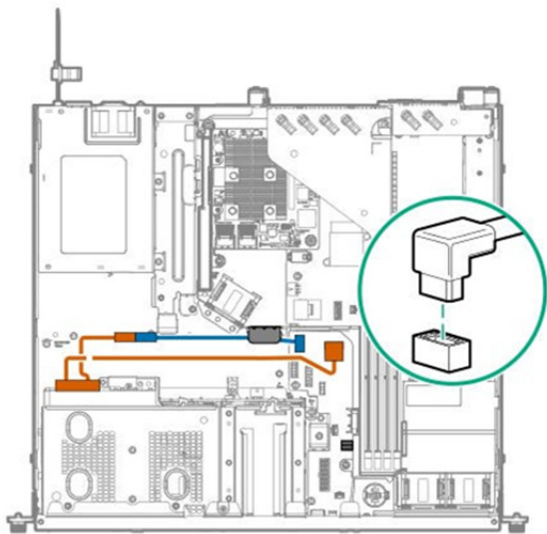
Color	Description
Orange	SATA power-Y cable to x1 SATA port 2
Blue	Power extension cable

7.   See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

> **Note** In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

8.   See *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.16.3   Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

> **Important** **Re-attach the blank cover removed to maintain the internal cooling.**

1.17   2x 3.5-inch drive model   Optical Disk Drive

2x3.5-inch drive model can be attached to the media Bay optical disk drive.

Media bay
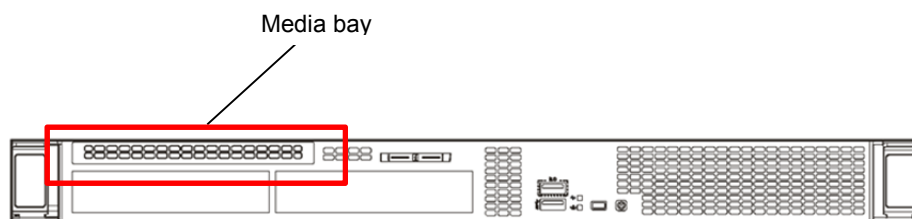
1.17.1   Installing the internal drive DVD-ROM N8151-137/DVD-Dual N8151-138

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the option.

- Parts included in the option kit

- T-10 hexalobular driver

- Optical disc drive cable kit (K410-445(00))

- DVD-ROM drive (N8151-137), DVD-Dual drive (N8151-138)

To install the components, follow these steps.

1.   Back up all data in the server.

2.   See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3.   Remove the internal drive blank cover.
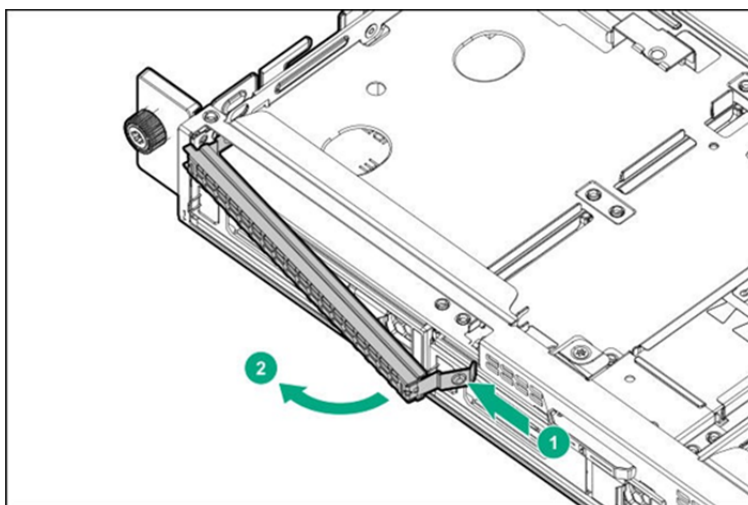
4.   Attach the internal drive DVD-ROM (N8151-137) or DVD-Dual (N8151-138).
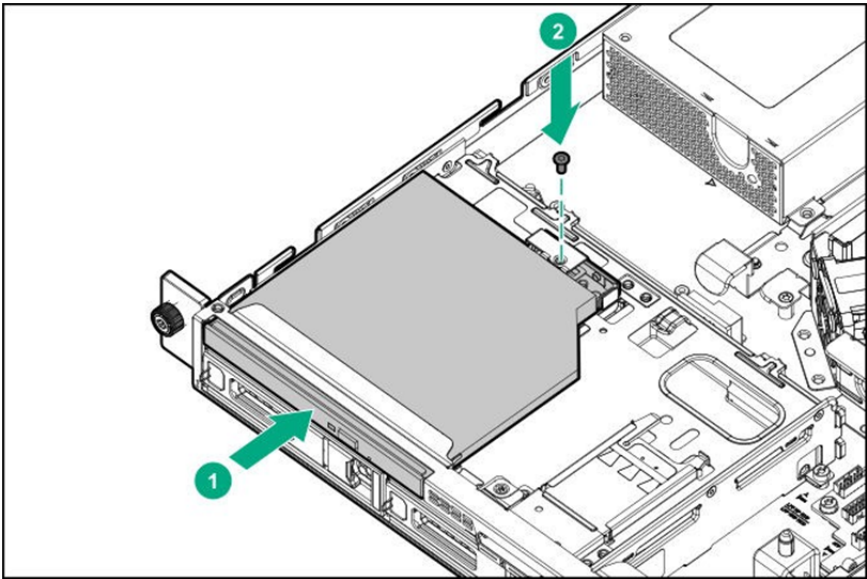
5.   Connect the SATA cable (K410 - 445 (00)) for the optical disk drive to the built in drive rear connector and the on board SATA port 2 connector of the motherboard as shown below.
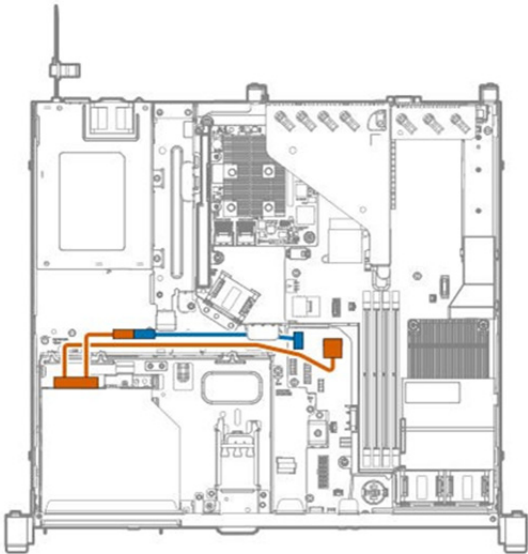
Color	Description
Orange	SATA power Y-cable to x1 SATA port 2
Blue	Power extension cable

6.   See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

> **Note** In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

7.   See *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.17.2 **Removal**

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

> **Important** **Re-attach the blank cover removed to maintain the internal cooling.**

1.18   Management LAN with Serial kit   N8117-12

Management LAN with Serial kit (Option)can be attached to this device.

|	
Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

1.18.1   Management LAN with Serial kit Installation

Please prepare the following before installing the options.

- Parts included in the option kit
- T-15 hexalobular driver

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. See *Chapter 2 (1.9 P Riser card*) to remove *Riser card.*

4. Pull out the blank cover of Management LAN to the front and remove it.
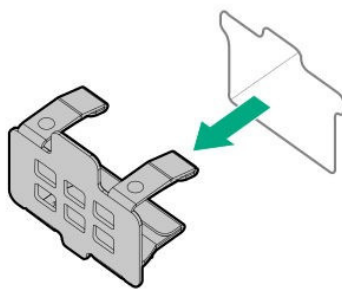
5.   Remove the air baffle.
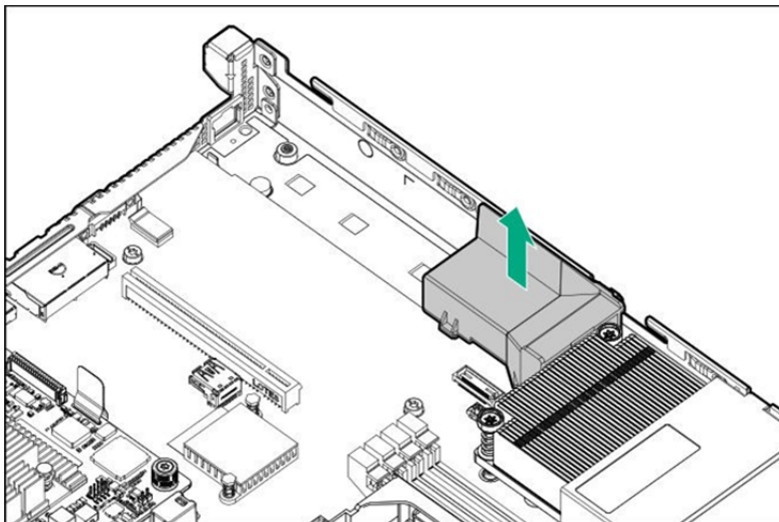
6.   Remove the screw and the standoff, which are located on installation positions of Management LAN with serial kit.

Smoothen the tape mylar on the system board after the removal.
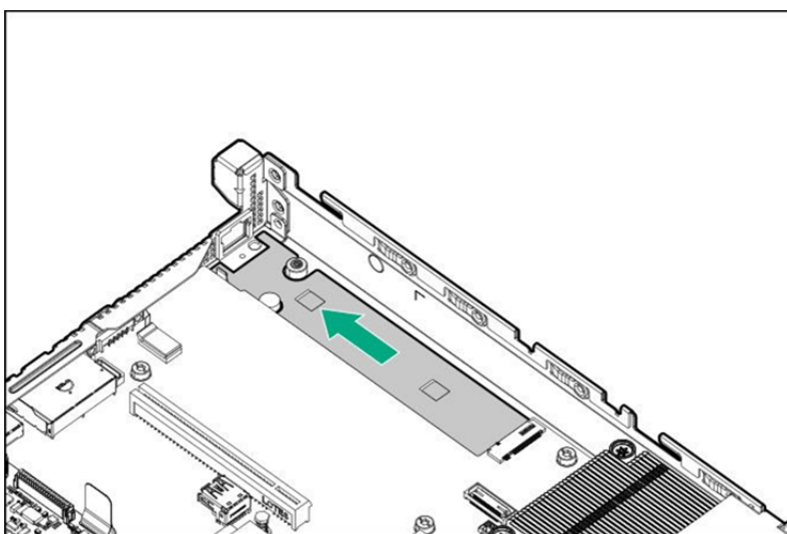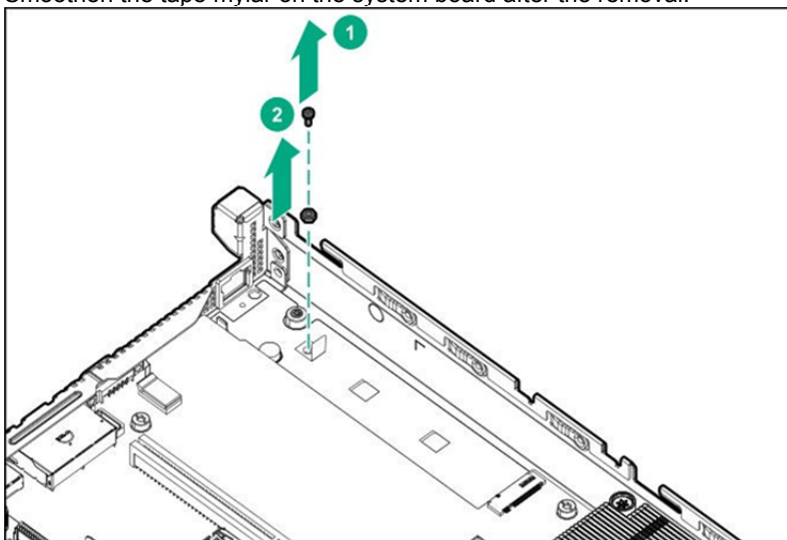
7.   Install the Management LAN with Serial kit enablement board.
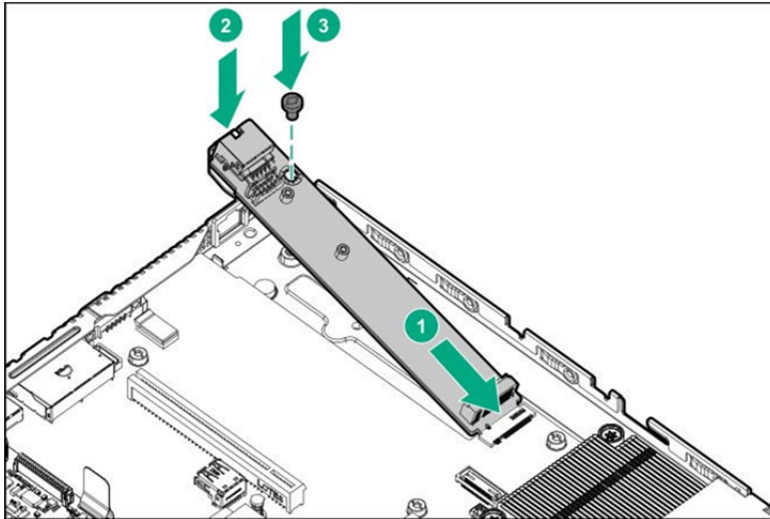
8.   Install the air baffle at 5.
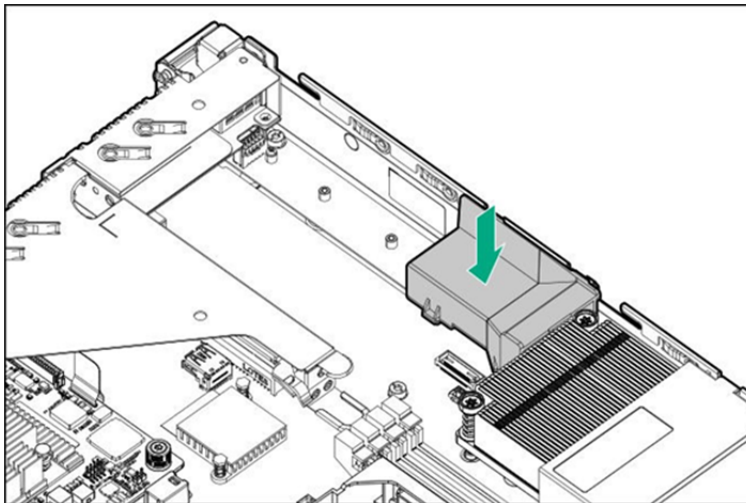
9.   Install the r*iser card at 3.*

10.   See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

11.   See *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.18.2   Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.18.3   Installing the Serial Port

Please prepare the following before installing the options.

- Parts included in the option kit
- T-15 hexalobular driver

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in Chapter 2 (1.2 Overview of Installation and Removal) for preparations.

3. See Chapter 2 (1.9 Riser Card) to remove Riser card.

4. Remove the blank cover of serial cable.
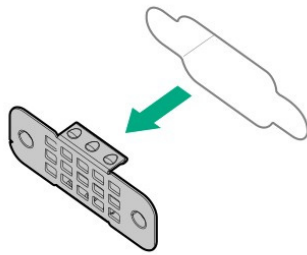
5. Install a serial cable.

   Install external connector part from inside.

   Secure the external connector with screws (x2).
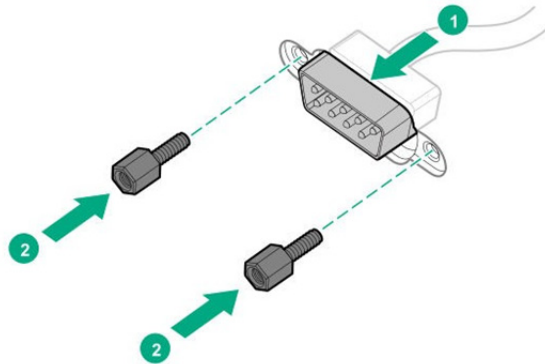
6.   Connect the serial cable connector.
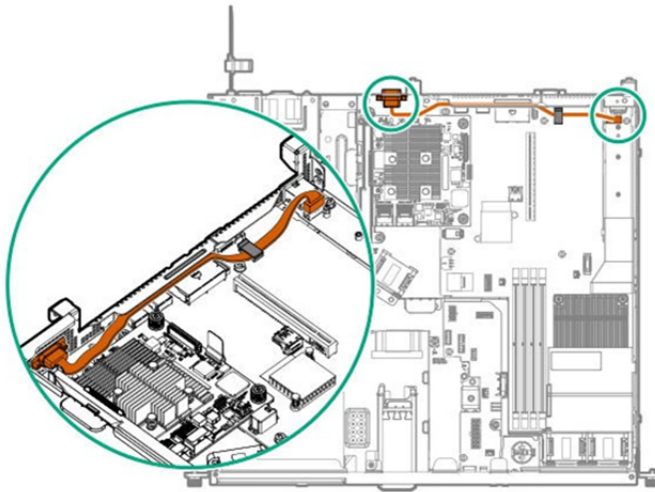
7.   Install the R*iser card removed at 3.*

8.   See *Chapter 2 (1.5 Top Cover)* to attach the top cover of the server.

9.   Please see *Chapter 2 (2. Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.18.4 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.19   Use of Internal Hard Disk Drives in the RAID System

This section describes how to use the internal hard disk drives in the RAID System.

Important	**If you use hard disk drives in the RAID System or change the RAID level, hard disk drives are initialized. If the hard disk drive contains valuable data, be sure to backup the hard disk drive before installing the RAID Controller and configuring the RAID System.**
Note	Build a Disk Array in the RAID System using hard disk drives that have the same specifications (capacity, rotational speed, and standard).
Tips	● Logical Drives can be created even with only one Physical Device. ● When using SAS hard disk drive, SAS SSD, or SATA SSD, it must be connected to RAID Controller.

1.19.1   Notes on Building RAID System

Note the following points when building a RAID System.

● The number of hard disk drives required varies in each RAID level.
● If the optional RAID Controller (N8103-192) is used, the RAID System cannot be built in RAID6/RAID50.

RAID level	The minimum number of hard disk drives required to set up a RAID System	
	N8103-192/195	N8103-193/201
RAID 0	1	1
RAID 1	2	2
RAID 5	3	3
RAID 6		4
RAID 10	4	4
RAID 50		6
RAID 60		6

● In the RAID System, all the hard disk drives in a group (pack) must have the same capacity, interface type, and rotational speed.
● Logical Drives can be created up to 31 pcs. Do not create more than 32 pcs logical drive.
● If you intend to install the OS to the RAID System, the process from RAID configuration to OS installation can be easily completed by using EXPRESSBUILDER.
● If you wish to install the OS manually, use RAID System Off-line Utility (Ctrl-R or HII). For details, see *Chapter 2 (2. RAID System Configuration)* in "Maintenance Guide" or the manual supplied with the optional RAID Controller (N8103-192/193).

Important	**Build a Disk Array in the RAID System using hard disk drives that have the same specifications (capacity, rotational speed, and standard).**

1.20   **Drives**

The expansion bay for connecting drives is located on the front and back. Drives can be purchased mounted on a dedicated tray. The device should be installed as 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 as well as the hard disk drive.**

Note the following when attaching.
● For on-board connections, hard disk drives of different types and/or rotational frequencies cannot be used together.
● When performing RAID constructions, use hard disk drives of the same capacity, type, and rotational frequency within the same group (pack).
● If you are using only one hard disk drive, please install it in the bay with the smallest lowest device number.
● When drives that are grouped together into the same drive array, for the most efficient use of storage space, set each drive at the same capacity.

Unique slot numbers have been assigned to each slot.

4 x 2.5-inch drive model（SAS/SATA HDD/SSD）

4 x 2.5-inch drive model＋2 x 2.5-inch　HDD/SSD（Option）

2 x 3.5-inch drive model　（SAS/SATA HDD）
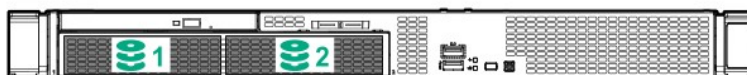
1.20.1 Installing a SAS or SATA drive

Install a hard disk drive by using the following procedure.

Note	In the RAID System, use hard disk drives that have the same specifications (capacity, rotational speed, and standard) for each Disk Array.

1. See *Chapter 2 (1.2 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 drive dummy tray.

   Dummy trays are installed in every slot.
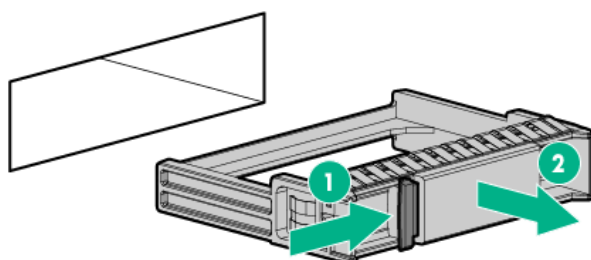
Note	Keep the removed dummy trays for future use.

3. Prepare the drive.

   Unlock the handle of the tray.
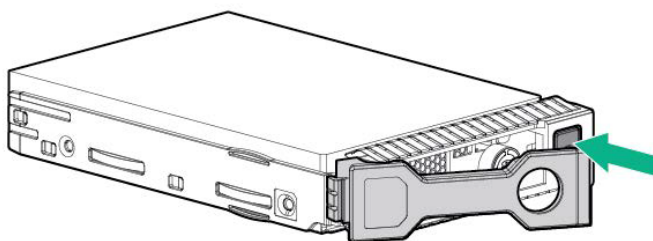
4. Hold the tray firmly and insert it into the slot.
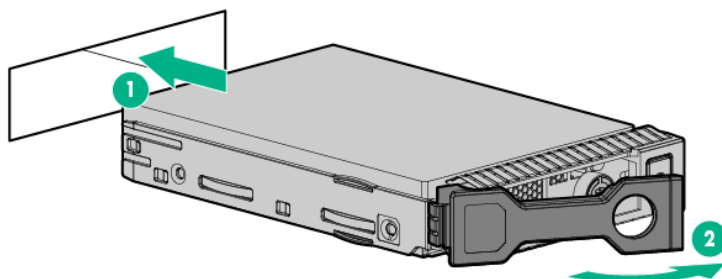
Note	● Push it all the way until the handle's lock touches the frame.
	● Hold the tray firmly with both hands.

5.   Slowly close the handle.

     The tray is locked making a clicking sound.

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

6.   Check the drive status via definition of the drive LED.

1.20.2   Removing Hot Plug Compatible SAS or SATA Hard Disk Drive

Note	To ensure adequate cooling effect, top cover, baffle, expansion slot cover, and blank should be installed for server operation. If the server supports the hot-pluggable components, please minimize the opening time of the top cover.

1.   Check the drive status via definition of the drive LED.

2.   Back up all server data in the drive.

3.   Unlock the handle of the tray.

     Grasp the handle and slowly pull it to remove the drive.
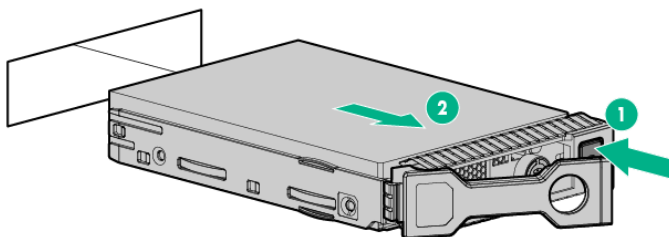
If you transfer or dispose of the removed hard disk drive, see *Chapter 1 (1. Relocation and Storage)* in *Maintenance Guide* to erase data.

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

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

1.21   **Power Supply Unit**

A redundant configuration can be set with two hot-swappable power supply units (The standard version has one unit).

The server provides a redundant power configuration that ensures continued operation of the system in the unlikely event one of the power supply units fails.

Note   AC power supply unit has a cable tie to prevent AC cable from slipping out.

1.21.1   **500W Hot Plug Power Supply Installation**

Follow steps below to install a power supply unit:

● Parts included in the option kit

Install the power supply unit according to the following procedure.

Note   The both two power supply units installed in the server must have the same capacity. Make sure that the two power supply units have the same part number and the same label color. If the two power supply units are inappropriate, the system may become unstable to be shut down.

Note   In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

Important   **The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

1. When making redundant power configuration, remove blank cover of redundant power cage, then Insert
    the power supply unit into the bay until it is locked with clicking sound.
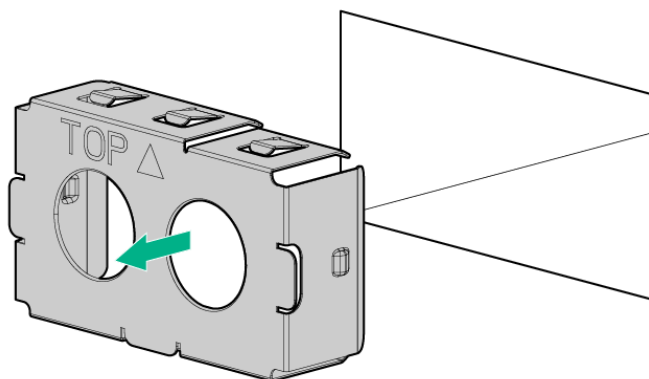
Note	Keep the removed blank cover for future use.
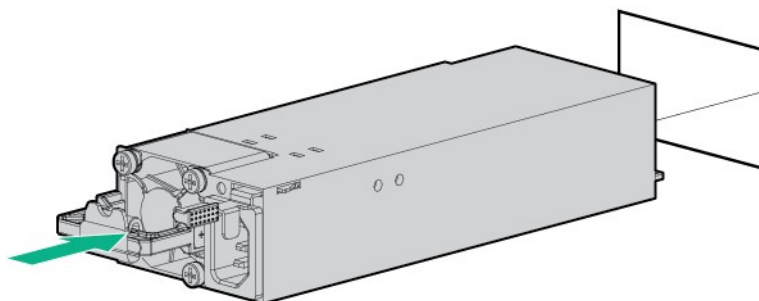
2. Connect power cords.
    Use the specified power cords.
    When the power cord is connected, the AC power LED on the power unit will turn green.
    When the power cord in connected Power Supply Unit2, AC power LED on Power Supply Unit2 will turn
    green.

AC POWER LED

Power supply unit 2   Power supply unit 1
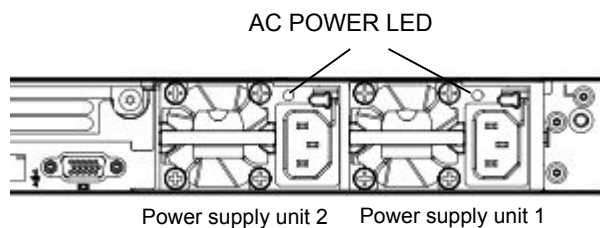
3.   Power on the server.

4. Confirm, by STATUS LED or on POST screen, that there are no errors related to the power supply units.
    See *Chapter 3 (1. IML Error Message)* in *Maintenance Guide* for details on POST error messages.
    If AC POWER LEDs are off, reinstall the power supply units. If the same error occurs, contact with your
    sales representative.

1.21.2 **Removing/Replacing the faulty power supply unit**

Replace only when the 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, refer to Safety Precautions and Regulatory Notices. ●   Pay attention to electric hazard.

Important	● Do not remove a power supply unit operating normally. ● The blank cover installation is essential for maintaining the cooling effect.

1. Check the power supply unit where the LED (AC power LED) is off.

2. Power off the server.

Tips	In the redundant power configuration (with two power supply units) and if either one of power supply units fails, the failing power supply unit can be replaced with the system power on.

3. Disconnect the AC power cord from the failing power supply unit.

4. Push the lever of the failing power supply unit toward inside, and pull the power supply unit while holding the handle.
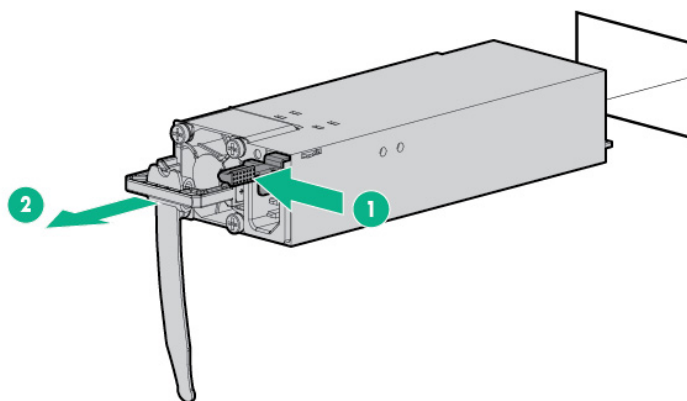
5. If operating the server with a single power supply unit without installing a new one, install the blank cover you removed in step 2 of installation procedure.

Important	To maintain the cooling effect in the server, be sure to install the blank cover in the vacant slot.

6. Install the new power supply unit taking steps 3 to 6 of *"Installation"*, and confirm that the power supply unit is installed normally.

2. Installation and Connection

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

2.1 Installation

This server must be mounted to a rack which conforms to EIA standards for use.

2.1.1 Installing Rack

Refer to the manual that comes with your rack for how to install the rack, or consult with your sales representative.

⚠ 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, refer to Safety Precautions and Regulatory Notices.

● **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, refer to Safety Precautions and Regulatory Notices.

● **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 install any components only by a single person.**
  Confirm that hinge pins of the door are completely secured in place.
● **Do not pull out the server from the rack when the rack is unstable.**
● **Do not leave more than one device being pulled out from the rack.**
● **Do not provide the wiring for the server to exceed the rating of the power supply.**
● **Do not use the server in the environment where corrosive gas is generated.**

Do not install the rack or server under the following environment. Doing so may cause malfunction of the server.

- Narrow space from which devices cannot be pulled out from the rack completely
- Place that cannot bear the total weights of the rack and devices mounted on the rack
- Place where stabilizers cannot be installed or where the rack can be installed only after the practice of proper earthquake-resistant construction
- Place of uneven or slanting floor
- Place of drastic temperature change (near a heater, air conditioner, or refrigerator)
- Place where intense vibration may be generated
- Place where corrosive gases (sulfur dioxide, hydrogen sulfide, nitrogen dioxide, chlorine, ammonia, ozone, etc) exist. Place where the air (or dust) includes components accelerating corrosion (ex. sulfur, sodium chloride) or conductive metals
- Place where chemicals may be accidentally sprayed over
- Place where a carpet not subject to anti-static process is laid
- Place where some objects may be fallen on the rack
- Place near a device generating intense magnetic field (such as TVs, radios, broadcast/communication antennas, power transmission wires, and electromagnetic cranes) is placed.
- Place where the power cord of the server must be connected to an AC outlet that shares the outlet of another device with large power consumption
- Place near equipment that generates power noise (e.g., contact spark at power-on/power-off of commercial power supply through a relay).
- Environment where operation of the server is not guaranteed

2.1.2 **Space and air flow requirements**

For easier repairing and improvement of ventilation, follow the space requirements when you determine the install location of the rack.
- Make a clearance of 63.5 cm (25 in.) or more on the front side of the rack.
- Make a clearance of 76.2 cm (30 in.) or more on the back side of the rack.
- Make a clearance of 121.9 cm (48 in.) or more between the back side of the rack and the back side of the other racks or the rack row.

In this server, the cold air is absorbed from the front door, and the hot air inside is discharged via the rear door. Therefore, make sure to leave an adequate clearance both on the front and rear rack doors for absorption of outside air into the cabinet. Also, make sure to leave an adequate clearance on the rear door for discharging hot air from the cabinet.

Note	To prevent improper cooling situations or damages to the equipment, do not block the ventilation openings.

If a server or rack component is not installed on every shelf in the rack, the air flow through the rack or the server will change because the shelf is empty. To maintain adequate ventilation, blank panels should be covered on all the shelves that do not have components installed.

Note

Blank panels should be used to cover on all the shelves that do not have components installed. This ensures the adequate ventilation. If a rack without a blank panel is used, high-temperature damage may occur due to improper cooling.

Note

When using racks of other companies, the following additional requirements must be met in order to improve the ventilation for preventing damages to the equipment.

● Front and rear doors - When closing the front or rear doors with a 42U rack, the ventilation holes of 5350 cm 2 (830 sq in.) should be distributed evenly from top to bottom for the proper ventilation (These are equivalent to 64% of the opening required for ventilation).

● Side - Make at least 7 cm (2.75 in.) clearance between the installed rack components and the side panels of the rack. Blank panels should be used to cover on all the shelves that do not have components installed. This ensures the adequate ventilation. If a rack without a blank panel is used, high-temperature damage may occur due to improper cooling.

2.1.3   Temperature requirement

The system must be installed or located in well-ventilated and well-controlled places so that the equipment operates safely and properly.

For most server products, the maximum recommended ambient operating temperature (TMRA) is 35°C. The temperature inside the room where the rack is installed should not exceed 35°C.

Note

When installing options of other companies, note the following points for preventing damages to the equipment.

● Never block the ventilation around the server with optional equipment, and make sure that temperature inside the rack does not exceed the maximum specifications.

● Make sure that the manufacturer's TMRA specification is not exceeded. When using racks of other companies, the following additional requirements must be met in order to improve the ventilation for preventing damages to the equipment.

2.1.4   Power requirements

The installation of this equipment must be performed by a qualified electrician according to the electrical standards of your region regarding to the installation of information technology equipment. This device is designed to operate in the system configuration specified by NFPA 70; 1999 Edition (National Electric Code) and NFPA-75; 1992 (Code for Protection of Electronic Computer/Data Processing Equipment). For the rating of the optional power supply, refer to the rating label of the product or the user document included with the option.

Important	To prevent injuries, fires, or damages to the equipment, the rated load of the AC power supply branch circuit that supplies power to the rack should not be exceeded. For wiring and installation requirements of electrical equipment, contact the power company in your area.

Note	Use a UPS (Uninterruptible power supply) to protect the server from unstable power situation or temporary power outages. The UPS protects the hardware against damages caused by power surges and voltage spikes, and allows the system to continue operation even during a power outage.

If more than one server are installed, additional distribution equipment may require to be used for securely powering all the devices. Follow the guidelines below.

● Make sure that each of the power supply loads is uniform among the available AC power branch circuits.

● Make sure that the AC current load through the entire system does not exceed 80% of AC current rating of the branch circuits.

● Do not use the extension cord with the outlet for general use for this unit.

● Prepare a dedicated electrical circuit on the server.

2.1.5   Grounding Requirements

For proper operation and usage, the server must be properly grounded. In the United States, the equipment must be installed according to the section 250 of NFPA 70, 1999 Edition (National Electric Code) as well as regional building standards. In Canada, the equipment must be installed according to Canadian Standards Association, CSA C 22.1, Canadian Electrical Code. In all other countries, the equipment must be installed according to the Electrical Wiring Rules of your region such as the Codes 364-1 to 7 of International Electrotechnical Commission (IEC). In addition, all types of the distribution equipment used for installation such as branch wires and outlets must be the grounded equipment that is specified or approved.

For preventing high voltage leakage current generated from multiple servers that are connected to the same power supply, we recommend connecting fixedly to the branch circuit of the building, or using a PDU equipped with a non-removable cord connected to the industrial plug. NEMA locking plugs or IEC 60309 compliant plugs are suitable for this purpose. For the server, an extension cord with the outlet for general use is not recommended to be used.

2.1.6   Connecting DC power cable and DC power supply

Important

To prevent injuries due to electric shock or high voltage, observe the following precautions.
● Installation of this equipment should be performed by a trained specialist that is defined in NEC and IEC 60950-1 Second edition "The standard for Safety of Information Technology Equipment."
● Connect the equipment to the secondary circuit power supply that is properly grounded. The secondary circuit does not have direct connection with the primary circuit, and gains power from a transformer, converter, or equivalent isolation device.
● The overcurrent protection of the branch circuit should be 27 A.

Important

When installing the DC power supply unit, the ground wire must be connected before connecting the positive or negative electrode lead.

Important

Turn off the power supply before performing the power supply installation procedure or maintenance.

Note

The grounded conductor of the DC supply circuit and the ground conductor are connected each other in the server unit. For details, refer to the document included in the power supply.

Note

If the grounded conductor of the DC supply circuit and the ground conductor are DC-connected on the server device, the following conditions must be met.
● This device must be connected directly to the grounded electrode conductor of the DC supply system, or to the bonding jumper from the bar or the bus of the ground terminal of the connection destination.
● This device must be installed in other devices which the grounded conductors of the same DC supply circuit and the ground conductors are connected to, and in the same adjacent area as the DC system ground point (such as an adjacent cabinet). The DC system must be grounded elsewhere.
● The DC source must be installed in the same building where the equipment installed.
● The switches or power-off devices should not be located on the grounded circuit conductor between the DC source and the connection point of the ground electrode conductor.

For connecting the DC power cable to DC power supply, follow the procedure below.

1.   Cut the DC power cord at least 150 cm (59.06 in.) in length.

2.   If ring tongs are required for the power supply, use a crimping tool to attach the ring tongue to the power cord wire.

Important

The ring terminal must conform to UL certified 12 gauge.

Important | The minimum nominal diameter for the sled of pillar or stud type terminal should be 3.5 mm (0.138 in.). Also, the diameter of the screw type terminal should be 4.0 mm (0.157 in.).

3. Group together wires of the same color and attach them to the same power supply. The power cord consists of three wires (black, red, and green).

For details, refer to the document included in the power supply.

2.1.7   Installing the server to the rack or removing it from the rack

Mount the server to the rack. (This section also describes the removal procedure.)

⚠ 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, refer to *Safety Precautions and Regulatory Notices*.

● **Do not use any racks out of standards.**
● **Use only under the specified environment.**

⚠ 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, refer to Safety Precautions and Regulatory Notices.

● **Do not drop.**
● **Do not leave the server being pulled out.**
● **Do not install with the cover removed.**
● **Do not get your fingers caught.**

Important | Temperature increases and airflow in the rack
If multiple devices are installed, or if the inside of the rack is not sufficiently ventilated, the internal temperature rises due to the heat emitted from each device, which may result in a malfunction. Review airflow in the rack and room and take sufficient measures so that the internal temperature will not exceed the operational temperature during operation.
Air enters the server from the front and exits from the rear.

(1) Preparation before installing to the rack

Use a rail which attaches to a server to install a server in the rack.

Important   **Rail for left side has different shape from that for right side. Make sure the orientation of rails to properly install them.**

● **Checking the inner and outer rails**

Check the direction of the inner and outer rails.

Since there are markings of "Right" and "Left" on the outer rail, check the proper directions of right and left with it. Likewise, check the directions of front and back with the markings of "Front" and "Rear."

On the inner rail, there is no marking for Front, Rear, Right or Left, so refer to the figure below to check the each direction.

Outer rail

Cable Band
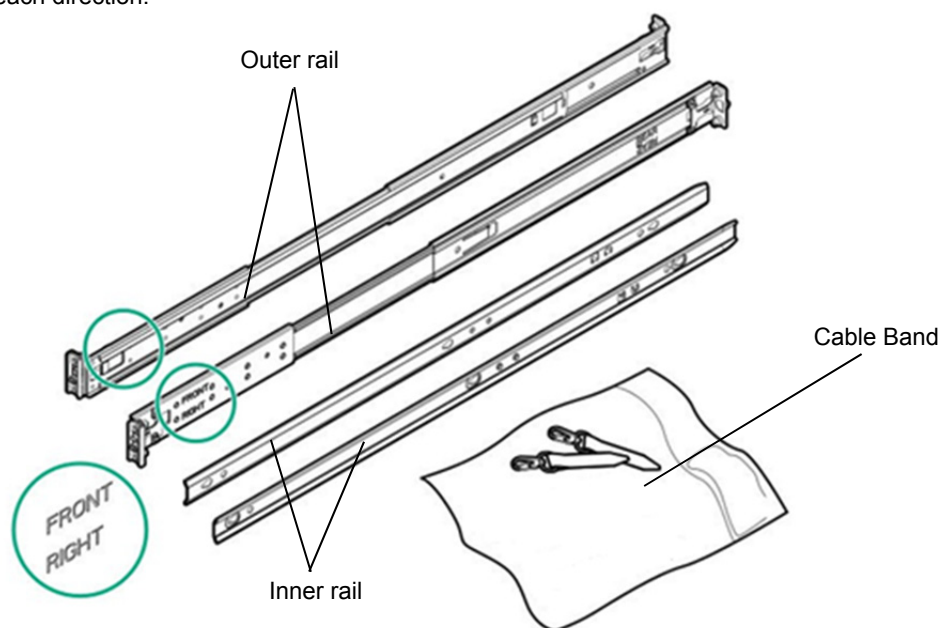
Inner rail

● Attaching the inner rail to the server

As seen from the front side of the rack, attach the outer rail (LEFT) to the left, and the outer rail (RIGHT) to the right.

Slide the inner rail to the rear side of the unit, in accordance with the two protrusions on the side of the unit.

At this time, check whether the lock located around the rear of the inner rail clicks to be securely locked.
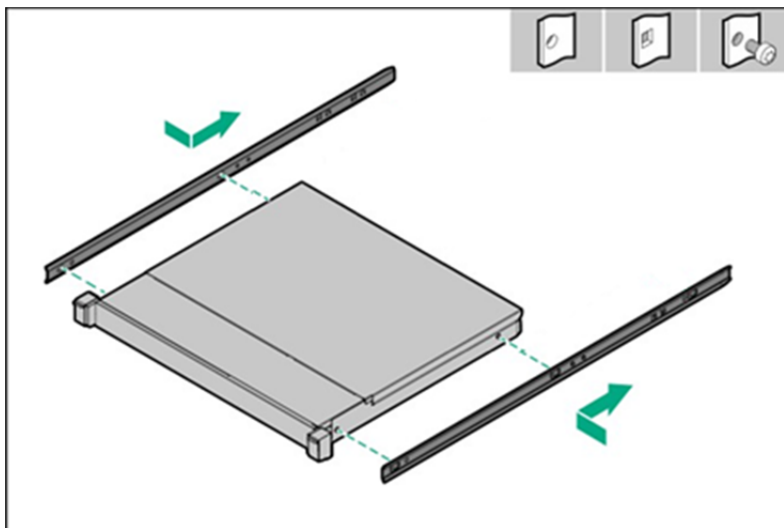
● **Removing the inner rail**

Lifting a little the metal plate part located around the center of the inner rail, then the lock will be released.

Slide it forward in the unlocked state, and it can be removed

● **Attaching the outer rail to the rack**

It's seen from a front of a rack, and an outer rail (LEFT) is installed in the left side and an outer rail (RIGHT) is installed in the right side.

・**For square hole racks:**

Align the rail pins with the holes of the rack column and insert the pins.

The left figure indicates a front of the right outer rail. The right figure indicates the back of the right outer rail.

The left outer rail, like, it's installed.

Please install a rail in left and right together with the height.
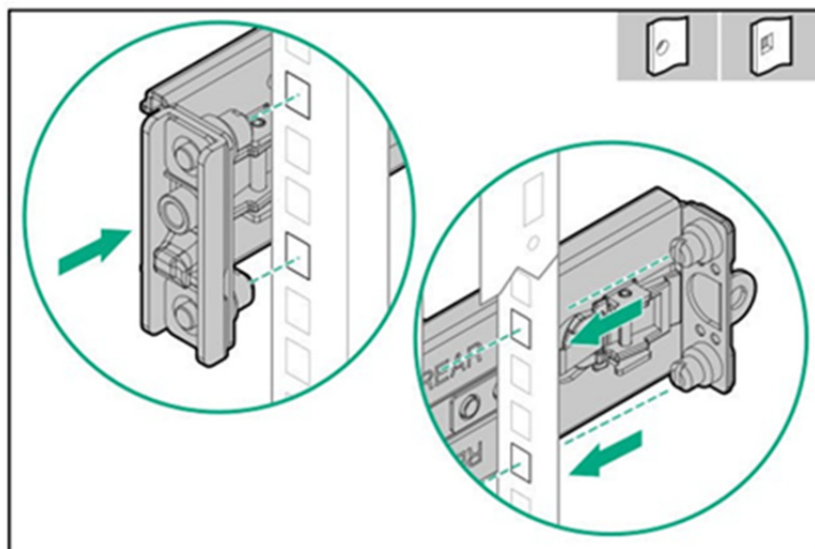
・**For round hole racks:**

Remove the pins and also the pin nuts from the ends of the right and left rails.

Further, keep so that removed pins and pin nuts may be never lost.
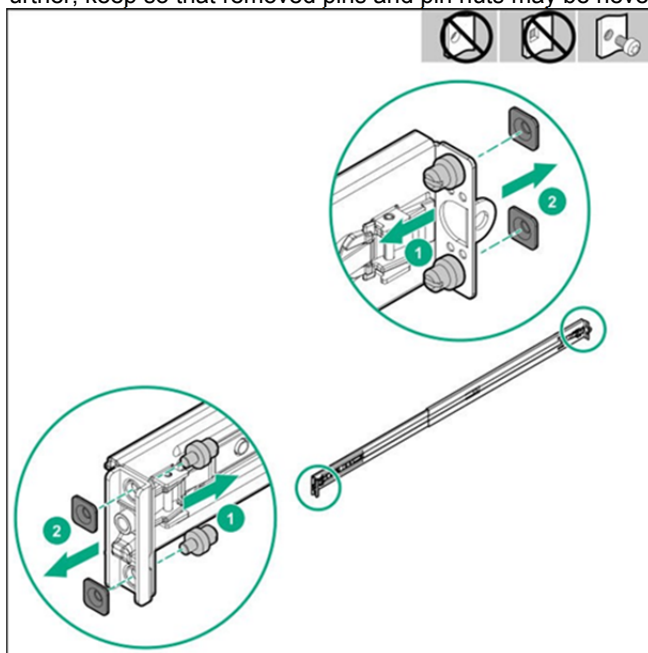
It's fixed by a removed pin or a screw for exclusive fixing together with the location of the round hole and the screw hole of a rack of an outer rail.

The left figure indicates a front of the right outer rail. The right figure indicates the back of the right outer rail. The left outer rail, like, it's installed.

Please install a rail in left and right together with the height.
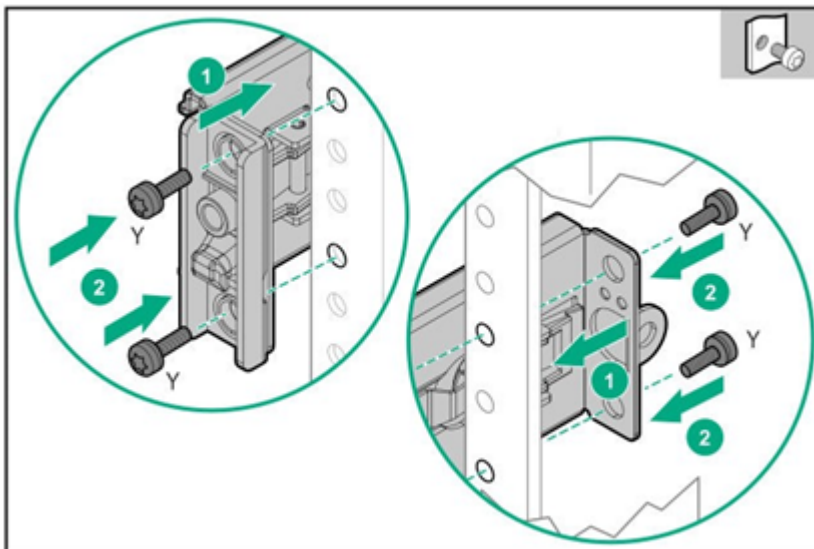
Important	**Confirm that the rail is securely locked so that they will not fall off.**

| Tips | Although the rail may be somewhat unsteady, it is not defective. |

● **Removing outer rails**

Remove outer rails from the rack in the following procedure.

1.   See *Chapter 2 (2.1.7 Installing the server to the rack or removing it from the rack, (2) Removal procedure)* to remove the server from the rack.

2.   Reduce the slide rail of the outer rail. In case the slide rail is locked in the middle, continue pushing the rail stopper on the side of the rail to reduce the slide rail.

3.   Push and release the unlocking lever of the outer rail in the direction of the arrow, and push it into the rack to remove it.

(2) Installing/removing 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, refer to Safety Precautions and Regulatory Notices. ● **Do not attempt to lift the server with single person.** ● **Do not drop.** ● **Do not leave the server being pulled out.** ● **Do not install with the cover removed.** ● **Do not get your fingers caught.**

● **Installation**

  Mount the server to a rack in the following procedure.

Important	Always install the server with two or more persons.

1. With two or more persons, firmly hold the server and mount it to the rack.
2. Make sure the inner rails on both sides are correctly inserted in the outer rail.

   Push the device slowly into the back. Push the front lock until it clicks for the unit to be fixed.
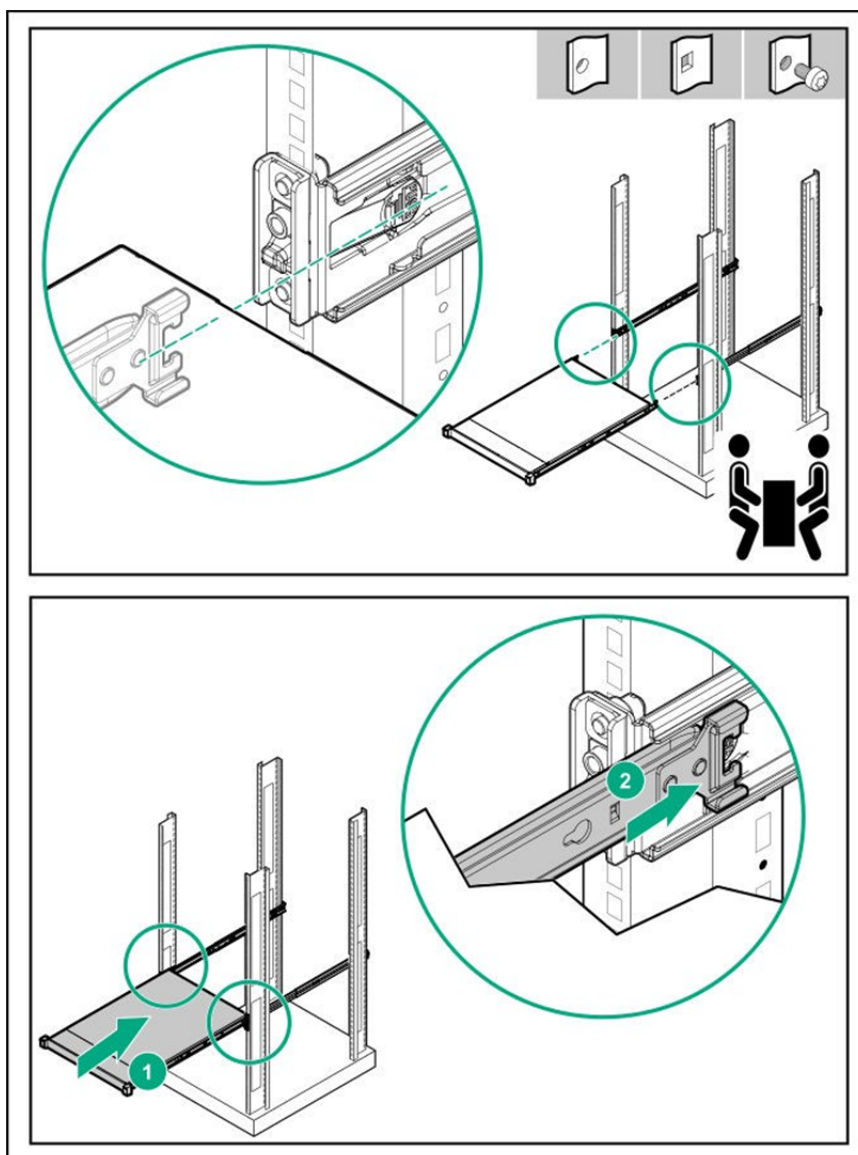
3.   If you like to install the included cable tie strip to the rear side of the rack, attach the tie strip to the
      mounting hole of the outer rail as shown below.
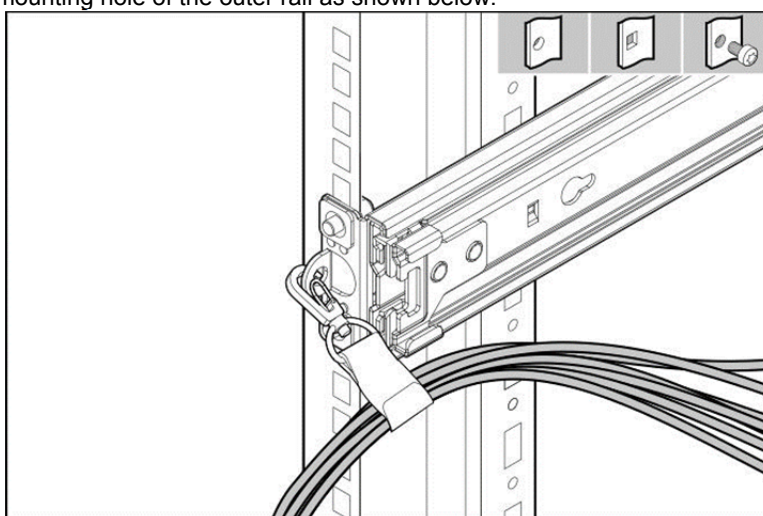
4.   If you like to secure the unit to the rack with screw, open the lid of the edge part of the unit and fasten
     the Hexalobular screw inside with a Hexalobular screwdriver to secure the unit to the rack.
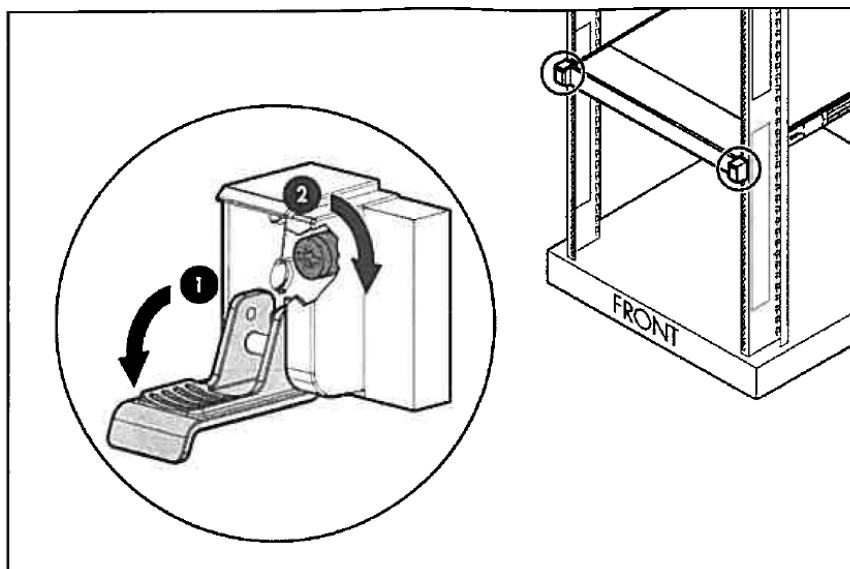
5.   Connect the power cord to the power supply.
     To prevent accidental power cord disconnection when sliding the server in and out of the rack, secure
     the power cord in the strain relief strap attached to the power input module handle:

·   Redundant PSU Cage (N8181-180) + 500W Hot Plug Power Supply (N8181-159)
     Unwrap the strain relief strap from the power input module handle.
     Secure the power cord with the strain relief strap.
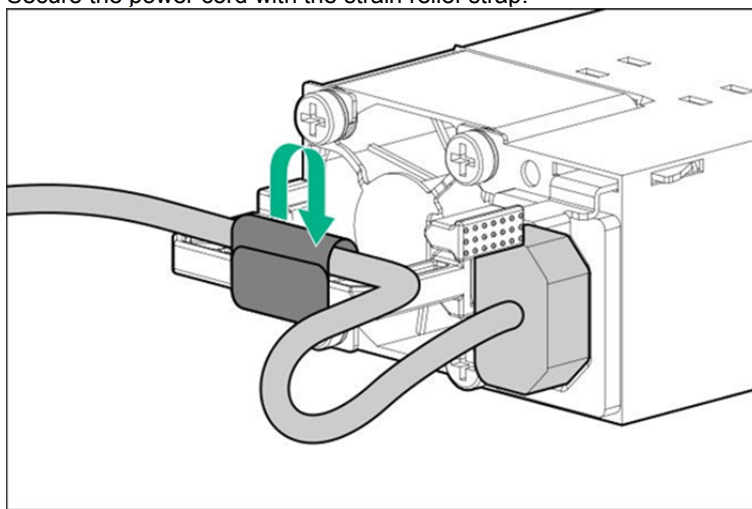
- 290W Non-hot Plug Power Supply (N8181-179)

  If the clip is positioned too near the power cord that it blocks the power cord plug connection, pull the

  release tab and then slide the clip backward.
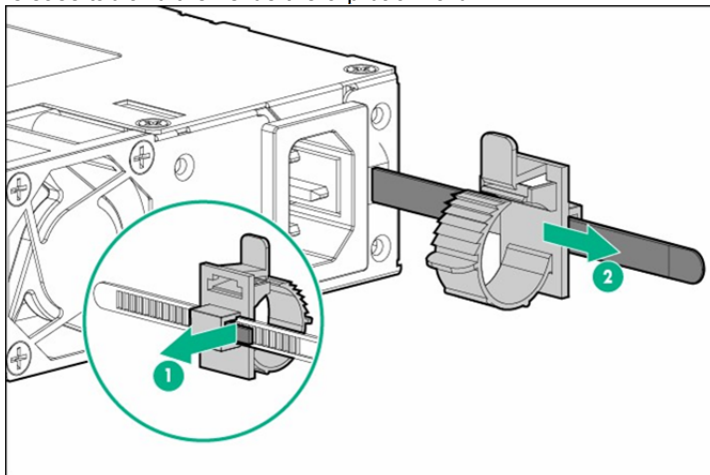
Open the clip and insert the power cord to be connected.
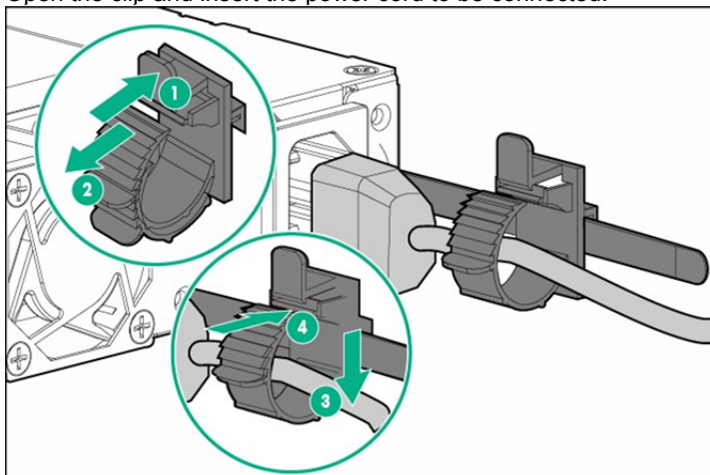
Slide the clip forward until it is positioned at the edge of the power cord.
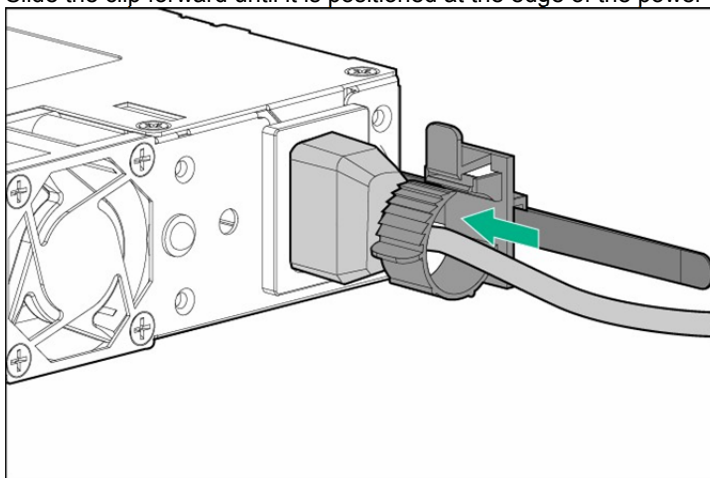
● **Removal procedure**

Remove the server from the rack in the following procedure.

Important	At least two persons are required to remove the server from rack.

1. Make sure that the server is turned off and then disconnect the power cord or all interface cables from the server.
2. Remove the front bezel.
3. Open the lids of the unit fixing screws on both sides of the device. Then remove the fixing screws inside with Hexalobular screwdriver, if the device is screwed on. If the device is not screwed on, you can unlock the device just by opening the lid.
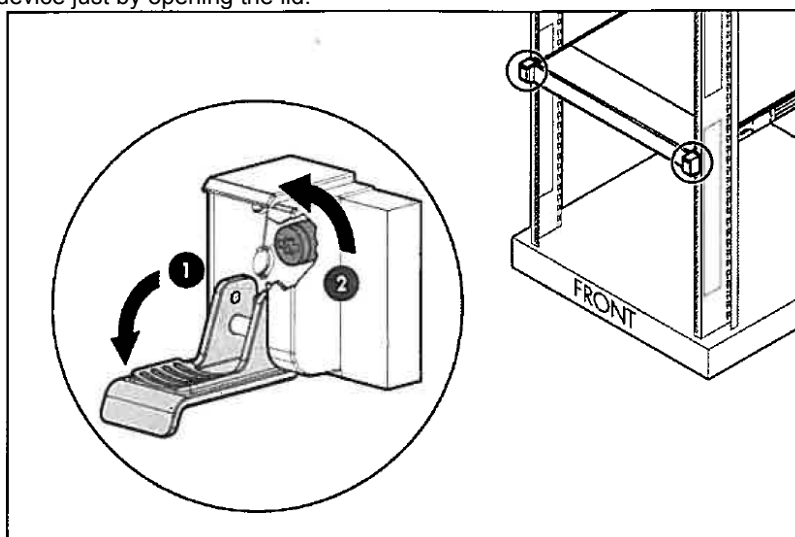
Important	Be careful not to get your fingers caught in the rails or lever.

4. Slide the unit forward, and remove from the rack while holding it securely. In case the unit is locked in the middle, continue pushing the rail stopper on the side of the rail and slowly draw out the unit to remove from the rack.

Important	● While more than one person is supporting the bottom part of the server, slowly pull out the server. ● Do not apply pressure on the server from top when it is being pulled out. Doing so cause the server to drop.

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. Images on the following pages show the peripheral devices that can be connected in their standard state and their respective connector positions.

⚠ 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, refer to Safety Precautions and Regulatory Notices.

● **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, refer to Safety Precautions and Regulatory Notices.

● **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**

4x 2.5-inch drive model + 2x 2.5-inch drive gauge (SAS/SATA)(Option)

Front

2x 3.5-inch drive model

USB 3.0 device

Hub, switching hub, ...
1000BASE-T/
100BASE-TX/
10BASE-T

Ports for data
transmission /
Port for
management

1

2

Ports for data
transmission

Rear

iLO

Port for management
1000BASE-T/
100BASE-TX/
10BASE-T
(Option)

Display unit

USB 3.0
device

Device with
serial interface
(Option)

Finally, connect the
power cord to an outlet.*1

Tips	The serial port cannot be used to connect with leased line.

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 Uninterruptible Power Supply (UPS)

To connect the power cord of the server to a UPS, use the connector output on the rear of the UPS. For details, refer to the manual supplied with the UPS.
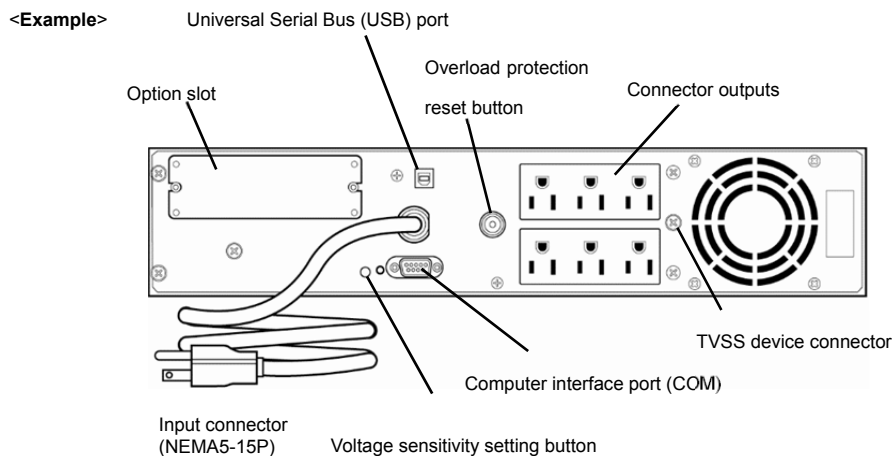
When turning on the main unit by using UPS at recovery, change the following settings from System Utility of main unit.

1. To change the settings, **select System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Server Availability** > **Automatic Power-On**. And, select Always Power On.

When a cereal cable is connected to UPS, change the following 2 settings to "Disabled".

1. "**System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Serial Port Options** > **BIOS Serial Console and EMS** > **BIOS Serial Console Port**"
2. "**System Configuration** > **BMC Configuration Utility** > **Setting Options** > **Serial CLI Status**"

For details, see *Chapter 3 (2. Description on System Utility)*.

3

NEC Express5800 Series
Express5800/R110j-1

Setup

This chapter describes how to set up the server.

1. **Turning on the Server**

   Power-On Self-Test (POST) is explained in this section.

2. **Description of System Utility**

   Describes how to set up the system.

3. **iLO 5**

   Describes iLO 5 installed in the unit.

4. **EXPRESSBUILDER and Starter Pack**

   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 POWER Switch at the front of the server turns on the server.

Turn on the server by using the following procedure.

1. Turn on a display, an Uninterruptible Power Supply (UPS), and other peripherals.

Note	If the power cord is connected with the power supply control unit such as uninterruptible power supply (UPS), make sure that the power supply control unit is turned ON.

2. Remove Front Bezel

3. When the STATUS lamp flashes green (once per second), wait until the lamp lights in steady state.

4. Press POWER Switch at the front of the server.

    POWER LED flashes green (once per second) and after a while, logo appears on the display.
    While NEC logo is being displayed, the self-diagnostic program (POST) runs and diagnoses the hardware. For details, see *Chapter 3 (1.1 POST)*.

Important	**Do not connect/disconnect USB devices during POST execution.**

    ・ 4 x 2.5-inch drive model / 2 x 3.5-inch drive model

POWER Switch
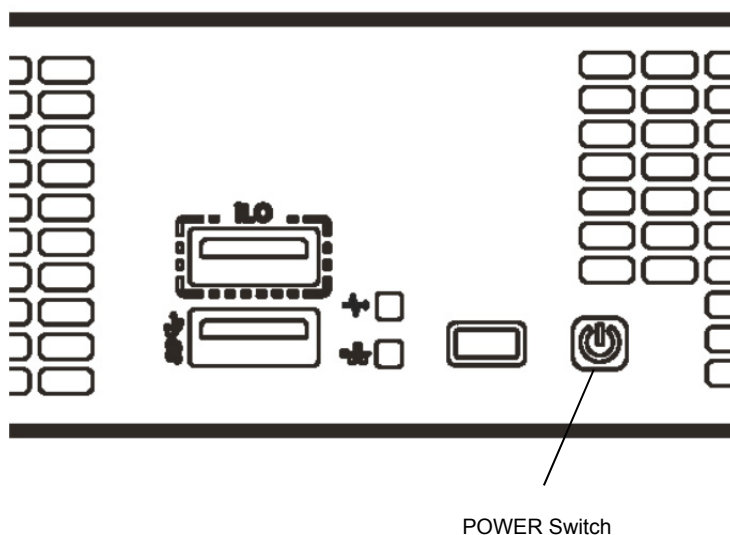
1.1 POST

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, memory, 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 any error message is displayed

1.1.1 POST sequence

1. When the server is turned on, POST starts and initialization messages appear. The message indicates the initialization of a memory and a PCI device.

Note	• The display is rescanned two or three times during POST process. Ignore this behaviour until POST ends.
	• If an optional VGA controller is connected or depending on system utility settings, logos or initialization messages does not appear.
	• Initialization messages are also shown in the console redirect screen in the serial port.

2. The server prompts you to enter the password after setting a password at **Set Power On Password** under **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Server Security** menu in System Utility. If you enter the incorrect password three times consecutively, POST stops and you cannot operate the server. In this case, power off the server, and power it on.

Important	Do not set a password before OS is installed.

3. After a while, the following message appears on the screen depending on your environment.

F9 System Utilities   F10 EXPRESSBUILDER   F11 Boot Menu   F12 Network Boot
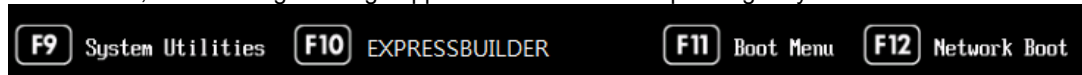
By pressing the function key, you can call the functions below upon completion of POST.

<F9> key: Start System Utility. See *Chapter 3 (2 Description on System Utility)*.

<F10> key: Run EXPRESSBUILDER. For details, see *Chapter 3 (4. EXPRESSBUILDER and Starter Pack)*.

<F11> key: Start Boot Menu. See *Chapter 3 (2 Description on System Utility)*.

<F12> key: Boot from network.

Regarding the built-in utility of optional board, see instruction manuals attached to each optional board.

4.   The OS starts after POST is complete.

Tips	When no bootable device is connected, the following message is displayed by terminating POST.
	— No bootable devices ware detected
	— Please attach a UEFI bootable device.
	— System will automatically retry the UEFI Boot Order in x seconds.

1.1.2   POST error messages

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

Note	Tell the indication displayed on display unit your sales representative. Alarm messages are useful information for maintenance.

2. Description on System Utility

Here we describe System Utility. You need to fully understand the content and configure correctly.

2.1 Overview

System Utility is a utility to set up this device. This utility is installed in a flash memory in the server as standard and can be run without requiring a media for boot.

Since the device is delivered with optimum set-up, in almost all cases no change is required. **Use only when the case applies to any of cases described in *Chapter 3 (2.4 Cases that Require Configuration).***

By using System Utility, wide variety of set-ups as follows become possible.
- Configuration of the system device and options installed.

- Enabling and disabling system functions

- Display of system information

- Selection of Primary Boot Controller

- Configuration of Memory Option

- Selection of language

- Start of pre-boot environment such as built-in UEFI shell or EXPRESSBUILDER.

Regarding the details of System Utility, see *Chapter 2 (1. System Utilities)* of *Maintenance Guide.*

Important	**Make** a backup of **system** information beforehand to prepare **for failure or update** implementation of **SystemROM.**

2.2　**Starting SETUP Utility**

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

After a while, the following message is displayed on the screen. (The on-screen message depends on your environment.)

By pressing <F9> Key here, System Utility starts after POST is completed.

Furthermore, if an Admin Password has been set, a dialog box for password input will be displayed before starting the system utility. Please enter the correct Admin Password.
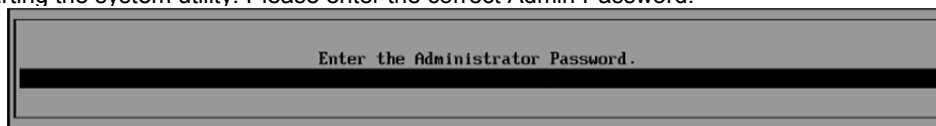
You can enter password three times. **If you enter wrong passwords three times in a row, further entry of password is rejected.**

To enter password again, reboot the server.

To save your change in System Utility and exit, press <F12> Key (F12: Save and Exit). In case you cancel your change and exit, press <ESC> Key (Exit).

Tips	• To put the setting back to the default values, press <F7> Key (F7: Load Defaults).
	• The default value might be different from the factory setting.
	• **iSCSI Configuration** menu in **Network Options** menu cannot be put back to the default values.

The default language of System Utility is English.

2.3　Description on On-Screen Items and Key Usage

Here we describe the operation of System Utility. Use keyboard and mouse to operate System Utility.
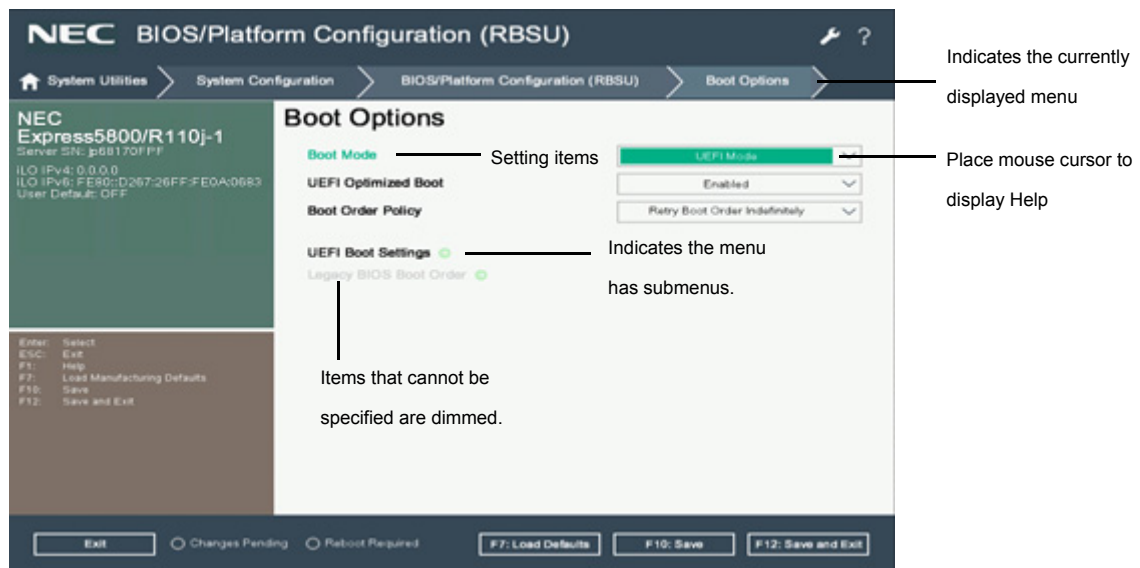
□ Cursor keys (〈↑〉, 〈↓〉, 〈←〉, 〈→〉)

Select an item displayed on the screen. If characters of an item are highlighted, that means the item is currently selected.

□ 〈−〉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 determine 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. Choose **OK** to close System Utility.
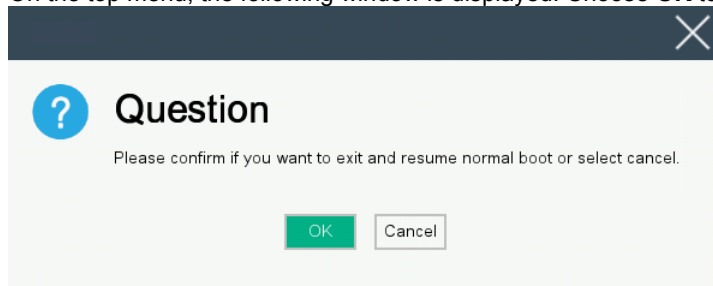
In case the setting has been changed, the following screen is displayed. To put the changed parameters back to the original setting, select **No - Discard Changes**.

□　〈F1〉 key
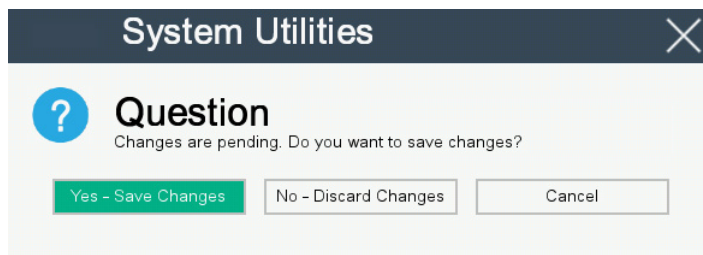
Press this key to display help information. Press this key when you have any questions about the operation of System Utility. Press <Esc> key to go back to the original screen.

□　〈F7〉 key

The following screen is displayed. To put the parameters of System Utility back to the default setting, select **Restore Defaults and Reboot**. This operates in the same manner as **Restore Default System Settings** in the **System Default Options** menu. For details, refer to *Chapter 2 (1. System Utilities)* in the *Maintenance Guide*.
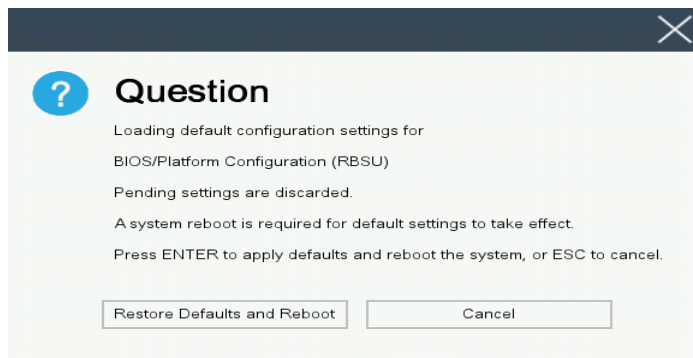
Note	**iSCSI Configuration** menu in **Network Options** menu cannot be put back to the default setting.

□　〈F10〉 key

The following screen is displayed. To save parameters you set, select **Yes**.

□   〈F12〉 key
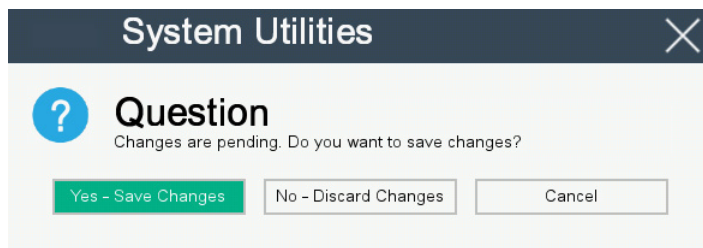
The following screen is displayed. If you choose **Yes**, the parameter you set is saved and then a message urging to reboot is displayed.
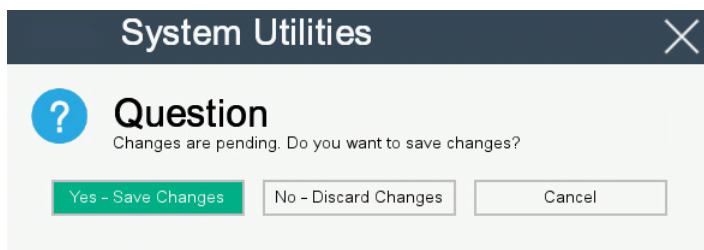
If you select **Reboot**, the device restarts.
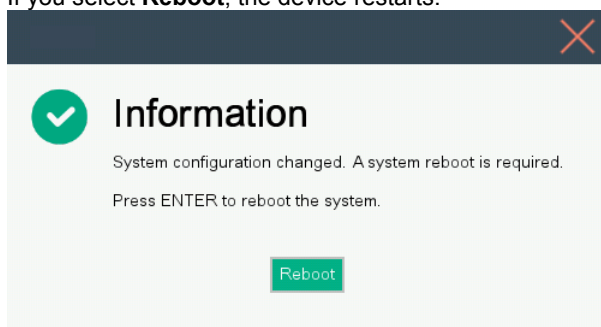
□ Caution for operating BMC Configuration Utility in the System Utilities

If you execute POST or change the BMC configuration while rebooting the iLO, some server settings such as Serial Number and Product ID may be lost.

To avoid this trouble in rebooting the iLO, follow these steps:

(1) In the System Utilities, changing the settings of BMC Configuration Utility may display the following pop-up before rebooting the iLO:
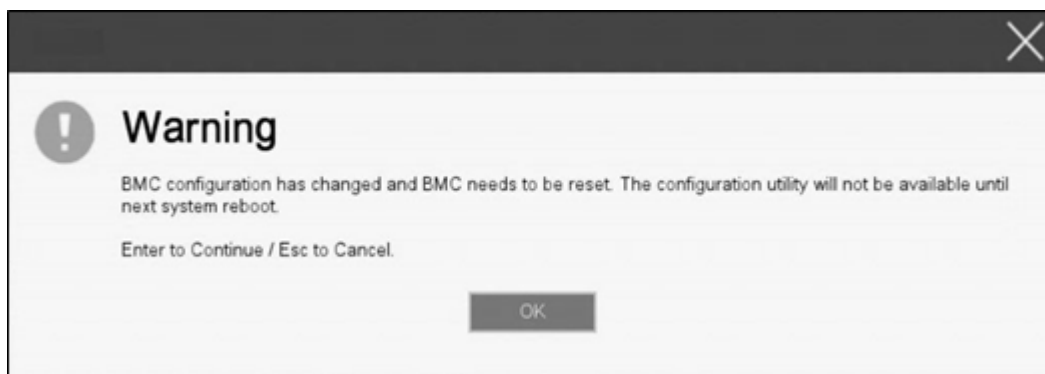
(2) Press OK to proceed.

(3) The iLO will start to reboot and then the following pop-up appears:
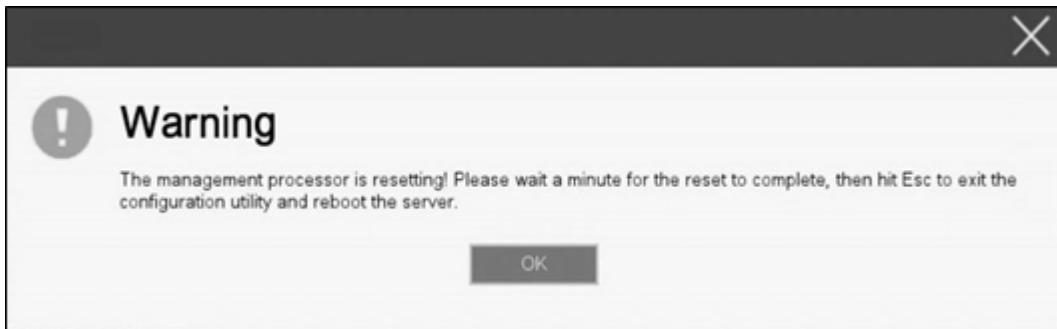
(4) Leave this pop-up for one minute.

(5) Confirm if the iLO reboot is completed.

Important	When the next is operated without waiting for a restart of iLO, setting information on Serial Number and the Product ID recorded in a product disappears. When the status LED in the front of this product makes the flash green (once per second), iLO restarts it. When a restart is completed, the status LED in the body front of this product lights up green.

(6) If the confirmation succeeds, press OK to proceed.

(7) Press the ESC key several times to return to the top screen of the System Utilities.

(8) From the top screen, select Reboot the System to reboot the server.

☐ Caution for the "Submit Fail For Form" Question pop-up

If you encounter the "Submit Fail For Form" Question pop-up while changing the configuration in the System Utilities, discard the changes by pressing Cancel. To apply the desired changes after that, reboot the server and re-enter the System Utilities.

Important	When "OK" is pushed and setting change is advanced just as it is, setting information on Serial Number and the Product ID recorded in a product disappears.
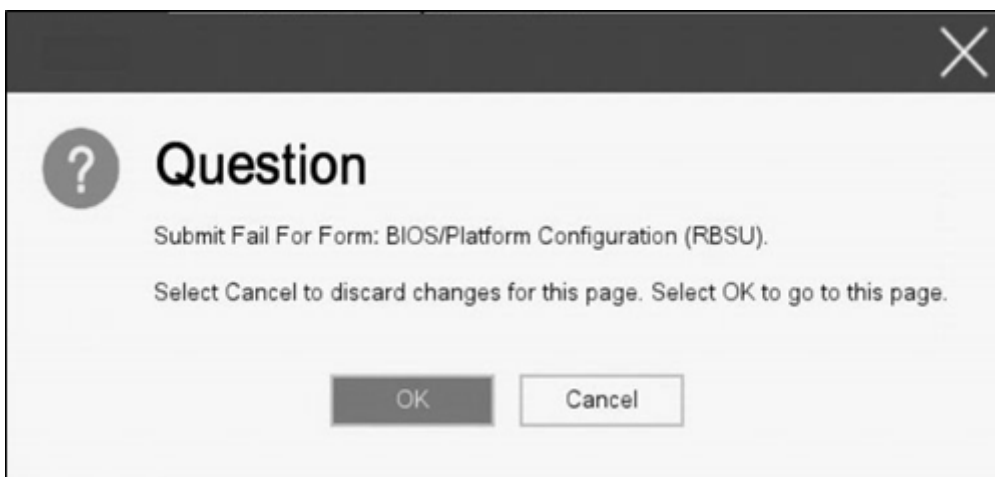
2.4 Cases that Require Configuration

If any of the following cases are applicable, operate in System Utility to change parameters from the factory preset. Other than cases described below, do not change the settings. The catalog of parameters in System Utility and the factory presets can be found in ***Chapter 2 (1. System Utilities)* of *Maintenance Guide.***

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Category	Description	To be changed	Remark
Settings to be saved in the user default	Items to be set at all times	Set to **Allow Operation with Critical Fan Failure** at **System Configuration > BIOS/Platform Configuration (RBSU) > Advanced Options > Fan and Thermal Options > Fan Failure Policy**.	At the time of shipment, **Fan Failure Policy** is set to **Allow Operation with Critical Fan Failures**.
	Setting up the **Time Format** in accordance with your OS	・If you use Windows Set **Coordinated Universal Time (UTC)** to **System Configuration > BIOS/Platform Configuration (RBSU) >Date and Time** - **Time Format**. (Included in line 16)	Set up following the pre-install checklists in the installation guide below. For Windows: Chapter 1 Installing Windows
		・If you use Linux Set **Coordinated Universal Time (UTC)** to **System Configuration > BIOS/Platform Configuration (RBSU) > Date and Time** - **Time Format**	Set up following the pre-install checklists in the installation guide below. For Linux: Chapter 1 Installing Linux
		・If you use another OS Set up following the pre-install checklist in the installation guide of your OS.	
	If you use NEC ESMPRO ServerAgentService	Set to **Disabled** at **System Configuration > BIOS/Platform Configuration (RBSU) > Advanced Options > Fan and Thermal Options > Thermal Shutdown**.	At the time of high temperature, shutdown is executed by NEC ESMPRO ServerAgentService.
Basic	Setting up **Time Zone** when **Time Format** is set to **UTC**	・If you use the device in Japan Set **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Date and Time** - **Time Zone** to **UTC+09:00**.	
	Change date and time	Fix the date as follows; **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Date and Time** - **Date**. Then, fix the time as follows **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Date and Time** - **Time**	

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Category	Description	To be changed	Remark
Boot	Set the Boot Mode to UEFI Mode according to your OS.	Change **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Boot Options** – **Boot Mode** to **UEFI Mode** *1 ・The following OSs are applicable. 　－Red Hat Enterprise Linux 7 (x86_64) 　－Microsoft Windows Server 2016 Standard 　－Microsoft Windows Server 2016 Datacenter 　－VMware ESXi6.5 　－VMware ESXi6.7	The setting must be done in compliance with the checklist before setup in the installation guide of your OS For Windows: [Chapter 1 Installing Windows]
	Set the Boot Mode to Legacy BIOS Mode according to your OS.	Change **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Boot Options** – **Boot Mode** to **Legacy BIOS Mode** *1	The setting must be done in compliance with the checklist before setup in the installation guide of your OS [Legacy BIOS Mode]に設定が必要なサポートOSはありません。
	Select configuration of **Embedded SATA Configuration**	In case of using Windows with software RAID controller, set **System Configuration > BIOS/Platform Configuration (RBSU) > Storage Options > SATA Controller Options > Embedded SATA Configuration** to **Smart Array SW RAID Support.**	
		In case of using Linux, set **System Configuration > BIOS/Platform Configuration (RBSU) > Storage Options > SATA Controller Options > Embedded SATA Configuration** to **Enable SATA AHCI Support.**	Do not set to **Smart Array SW RAID Support,** when you use Linux.
	Change the boot order of devices	In case **Boot Mode** is **UEFI Mode**, change the boot order in **System Configuration** > **BIOS… (RBSU)** > **Boot Options** > **UEFI Boot Settings** - **UEFI boot Order Control** In case **Boot Mode** is **Legacy BIOS Mode**, change the boot order in **System Configuration > BIOS… (RBSU)** > **Boot Options** - **Legacy BIOS Boot Order**.	When you use CD/DVD, press <F11> key during POST and select CD/DVD from boot menu,
	Use console redirection feature	Configure in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Serial Port Options** > **BIOS Serial Console and EMS**	In console redirection connection, if the corrupted text is displayed on terminal screen, change font type (character code) appropriate to your environment.

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Category	Description	To be changed	Remark
Boot	Enable X2APIC feature according to your OS.	Advanced > Processor Configuration > X2APIC > Disabled *1 ・Disable X2APIC for the following OS. 　－Red Hat Enterprise Linux 7 (x86_64) 　－Microsoft Windows Server 2016 Standard 　－Microsoft Windows Server 2016 Datacenter 　－VMware ESXi6.5 Patch1 　－VMware ESXi6.7	The setting must be done in compliance with the checklist before setup in the installation guide of your OS For Windows: [Chapter 1 Installing Windows]
	Use Wake on LAN (WOL)	Set enable or disable of (a) and (b) below. When using the built-in network controller, the setting in (b) is not reflected. (a) **System Configuration > (Network device) > NIC Configuration** - **Wake On LAN** (b) **System Configuration > BIOS/Platform Configuration (RBSU) > System Options > Server Availability** - **Wake-On LAN** When performing WOL from OS shutdown, set the followings since the setting OS of (a) has a priority. Windows OS: **Device Manager > Device used for WOL under the network adapter > Advanced** – Set **Enable PME** to **Enable**. Set it to **Disable** to disable WOL.	If you connect UPS via RS232C, make console redirection setting invalid from System Utility (set to Disabled in BIOS Serial Console Port).

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Category	Description	To be changed	Remark
Security	Set a password	Set your password in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Server Security** - **Set Admin Password**	If you set your password, your are prompted to enter the password from the next time you start System Utility
	Restrict **BMC Configuration Utility** by entering password	Set **Enabled** to **BMC Configuration Utility > Setting Option - Require user login and configuration privilege for BMC Configuration**	If you set Enabled, you are prompted to enter the login name and password from the next time you start the **BMC Configuration Utility.**
	Restrict bootup by entering password	Set your password in **System Configuration** > **BIOS/PlatformConfiguration (RBSU)** - **Server Security** using **Set Power On Password**	If you set your password, your are prompted to enter the password from the next time you start the system
UPS Powerlink	When the server is supplied with power from UPS, always turn on the power.	Set to **Always Power On** in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Server Availability** - **Automatic Power-On**	If you connect UPS via RS232C, make console redirection setting invalid from System Utility. 1. Set **Disabled** to **System Configuration > BIOS/Platform Configuration (RBSU) > System Options > Serial Port Options > BIOS Serial Console and EMS - BIOS Serial Console Port.** 2. Set **Disabled** to **System Configuration > BMC Configuration Utility > Setting Options - Serial CLI Status.**
	If it is turned off by using POWER switch, leave it OFF even when UPS supplies power.	Set to **Restore Last Power Stats** in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Server Availability** - **Automatic Power-On**	
	Keep the power OFF even when UPS supplies power.	Set to **Always Power Off** in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Server Availability** - **Automatic Power-On**	

*1　The factory setting is that "the Boot Mode menu" is set as "UEFI" and "the X2APCI menu" is set as "Enabled".

2.5   **System Configuration via Network**

2.5.1   **Overview**

By using RESTful Interface Tool, which is provided as one of the server administration tool, you can backup and restore your system configuration.
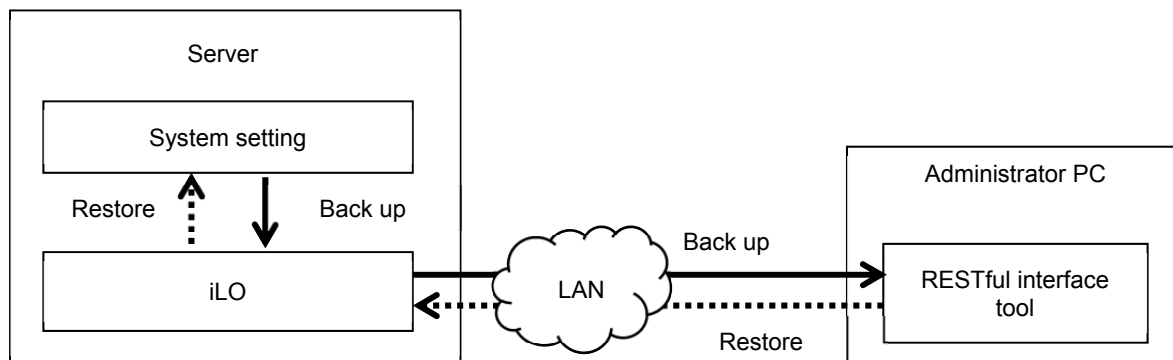
□   Back up

The backup of system configuration is established by downloading JSON format file describing system configuration (hereafter called "System Configuration File") via ILO of controlled server.

・The power of the server is OFF

・OS is running

You cannot backup under the following situations.

・Immediately after the power is turned OFF

・While POST

・Immediately after POST

Tips	• After completion of POST execution or the powering OFF, it may take several minutes to reach downloadable state. Please wait for a while to start download. • The time required to reach downloadable state may vary depending on configuration or operating status of the unit.

□   Restore

The restore of system configuration is established by uploading system configuration file from the administrator PC via iLO of controlled server. The system configuration uploaded is reflected at the next boot.

Restore is possible only when the device is in the following conditions.

・The power of the server is OFF

・OS is running

Restore is not possible under the following condition.

・Immediately after the power is turned OFF

・While POST

・Immediately after POST

Tips	• After completion of POST execution or the powering OFF, it may take several minutes to reach downloadable state. Please wait for a while to start download.
	• The time required to reach downloadable state may vary depending on configuration or operating status of the unit.

2.5.2 How to Backup System Configuration

Here we describe how to backup system configuration file from the administrator PC.

1. Turn OFF the server or start the OS.

2. Start RESTful Interface Tool.

3. Execute login command to log In iLO of the controlled server.
    Initial user name and initial password, which are required to log in, are written on a slide tag attached to the controlled server

4. Execute types command and confirm the parameter on whose lead "Bios" is displayed.

5. Select BIOS in select command.
    As the argument of select command, specify the parameter you confirmed in step 4.

6. Execute save command to backup system configuration relating to BIOS.
    If you do not specify file name, the default file name becomes "ilorest.json".

Examples of Command Execution

iLOrest > login 192.168.xxx.xxx –u Administrator –p <password>

iLOrest > select Bios.v1_0_0

iLOrest > save

When backup is completed, the following message is displayed.

Configuration saved to: ilorest.json

Tips	• When you log in, use proper user account having administrator authority.
	• 192.168. xxx. xxx is the IP address of management specialized LAN of controlled server.

2.5.3 How to Restore System Configuration

Here we describe how to restore system configuration file via administrator PC.

1. Turn OFF the server or start the OS.

2. Start RESTful Interface Tool.

3. Execute login command to log in iLO of the controlled server.

Initial user name and initial password, which are required to log in, is written on a slide tag attached to controlled server.

4. Execute types command and confirm the parameter on whose lead "Bios" is displayed.

5. Select BIOS in select command.

As the function of select command, specify the parameter you confirmed in step 4.

6. Execute load command to restore system configuration you backed up.

As the argument of select command, specify the parameter you confirmed in step 4

Tips	The serial number of system information and product ID are not restored.

7. When the power of device is OFF, make it ON. Or, in case OS is running, reboot.

Tips	Since the changes of system configuration are applied during POST, please wait until POST is completed. Then the device restarts automatically.

2.5.4 Notes

- Configurations whose backup and restore are possible are the menus under **System Utilities – System Configuration** - **BIOS/Platform Configuration (RBSU)** of System Utility.

- The following menus and menus under them cannot be backed up or restored.

    ➢ **Advanced Options** - **Advanced Service Options** - **Serial Number**
    ➢ **Advanced Options** - **Advanced Service Options** - **Product ID**
    ➢ **Date and Time** - **Date (mm/dd/yyyy)**
    ➢ **Date and Time** - **Time (hh:mm:ss)**
    ➢ **Server Security** - **Secure Boot Settings**
    ➢ **Network Options** - **iSCSI Configurations**
    ➢ **Storage Options** - **Embedded Storage Boot Policy**
    ➢ **Storage Options** - **PCIe Slot Storage Boot Policy**
    ➢ **Boot Options** - **UEFI Boot Settings**
    ➢ **Boot Options** - **Legacy BIOS Boot Order**

- The following Information display menus cannot be backed up or restored.

    - Status
    - Version and revision of firmware
    - Serial number and product ID of system information

- You cannot restore system information you backed up to a different model.

- You cannot restore system configuration in case the System ROM version is different between the time of restoring and the time of backup.

- You cannot restore some system configurations in case there is a difference in hardware configuration between the time of back up and that of restore.

- If you restore with your OS running, restart the device in order to reflect the system configuration to it.

- **Backup and restore of system configuration file may take several minutes. In case you use a remote console or remote media features of iLO and backup or restore is not completed although more than 10 minutes have passed, make these functions unable.** After that, wait until the process completes.

3. iLO 5

3.1 Overview

Using iLO5, which is LSI for system management, this device has realized various features.

Regarding the details of iLO5 features, see *iLO5 User's Guide*.

iLO5 provides the following controls.

The main features of iLO	Description
Monitoring server conditions	iLO monitors a temperature inside server, controls the cooling fan, and cools down the server to the proper temperature. In addition, iLO monitors versions of firmware and software installed, the cooling fan installed to the device, memory, network, processor, power supply unit, storage, and statuses of device and others.
Agentless management	The service operates not on host OS but within iLO firmware, so you can manage without using the memory on host OS or the resources of processor. In addition to the monitoring of all the important inner sub-systems, iLO can, even if host OS is not installed, send SNMP notification directly to management software such as NEC ESMPRO Manager.
Integrated Management Log (IML)	You can display events occurred on the server and configure SNMP notification, Email alert, and notifications in Remote Syslog.
Active Health System Log (AHS Log)	Download Active Health System Log. In case the support is needed, AHS Log file may need to be sent to NEC or taken by maintenance staff.
iLO Cooperative Network Management	By using iLO Cooperative Function, you can detect and manage multiple servers at once without using management software.
Integrated Remote Console (IRC)	If network connection is established with a server, by using remote console, you can access the server speedily and safely from anywhere in the world and execute display or management.
Virtual Media	From Remote, you can mount high-performance virtual media devices on the server.
Virtual Power Control	From Remote, you can control the power state of controlled server safely.
Deployment and Provisioning	From numerous GUI and CLI for the tasks including computerizing of deployment and provisioning, you can use power control and virtual media.
Power Consumption and Power Management Setting	You can monitor power consumption and set the power limit on supported server.
User Account	By using local or directory service user account, you can log in to iLO.
Kerberos Support	You can set Kerberos authentication. **Zero Sign In** button is added to the log-in screen.

Important	**Make a backup of setting information on iLO 5 beforehand to prepare for failure or update implementation of iLO firmware.** **For details, refer to "iLO 5 User's guide".**

3.2   Comparison of License Features

By applying optional license, you can use the following features.

Item	On-board Functions	Remote Management Extended License (Essentials) N8115-36	Remote Management Extended License (Advanced) N8115-33
Directory Service Certification(Active Directory, LDAP)			✓
Two-Factor Certification (Kerberos Support)			✓
Virtual Media via Integrated Remote Console		✓	✓
Script Method Virtual Method			✓
Integrated Remote Console (IRC)	Pre-OS only	✓	✓
Global Team Collaboration by 6 server administrators at the maximum via IRC			✓
Recording and playback of video via IRC			✓
Recording and playback of Virtual Serial Port			✓
Remote Console of text base via SSH			✓
Email alerts		✓	✓
Remote Syslog			✓
Advanced Power Management (power graph)			✓
iLO Collaborative Management			✓
iLO Collaborative Detection	✓	✓	✓
Remote Serial Console (Virtual Serial Port)	✓	✓	✓
Server Health Summary	✓	✓	✓
iLO Reboot	✓	✓	✓
Redfish® API	✓	✓	✓
Agentless Management	✓	✓	✓
Monitoring server conditions	✓	✓	✓
Web base GUI	✓	✓	✓
Virtual Power Control	✓	✓	✓
SSH/SMASH CLI (Including serial console redirection)	✓	✓	✓
IPMI/DCMI (Including serial console redirection)	✓	✓	✓

3.3   iLO 5 Network Settings

Take the steps below to use iLO 5 through the Web browser.

1.   Run POST following *Chapter 3 (1.1.1 POST sequence)*. After a while, the following message is displayed on the lower part of the screen.
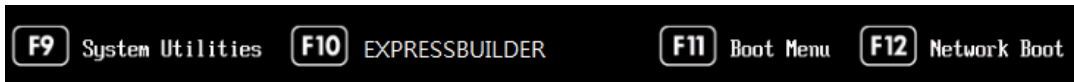
2.   Press the <F9> key while the message is being displayed to launch System Utilities.

3.   From the menu of System Utilities, select **System Configuration** → **BMC Configuration Utility**.
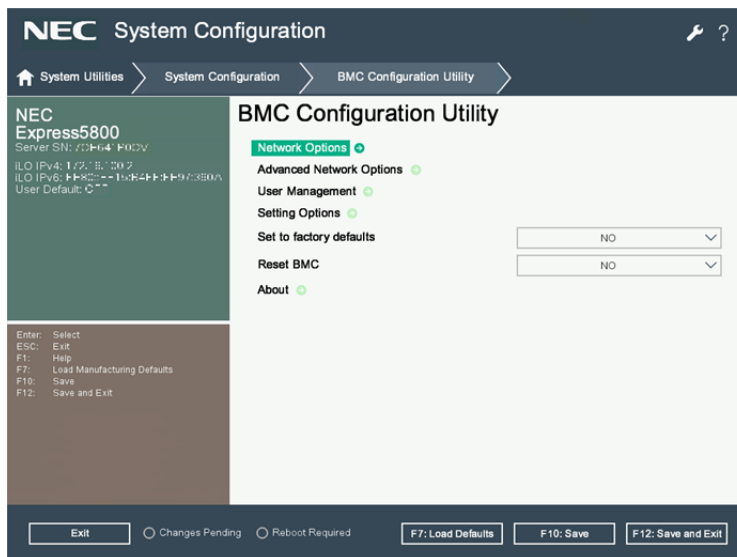
View example when **BMC Configuration Utility** is selected

4.　Then, on the screen on which you selected **Network Options**, use DHCP (make "DHCP Enable" **ON**) or configure items under IP Address/Subnet Mask.

Important	When the setting of [Shared Netwerk Port] - [LOM] or [Shared Netwerk Port] - [FlexibleLOM] is changed in [BMC Configuration Utility], a restart of iLO is needed. Please refer to a "2.3 Description on On-Screen Items and Key Usage" one "Caution for operating BMC Configuration Utility in the System Utilities" and operate.

Tips	When you configure Shared Network Port - LOM or Shared Network Port - FlexibleLOM, the network connection of iLO5 may be disconnected temporarily. In such a case, wait a while and reconnect.
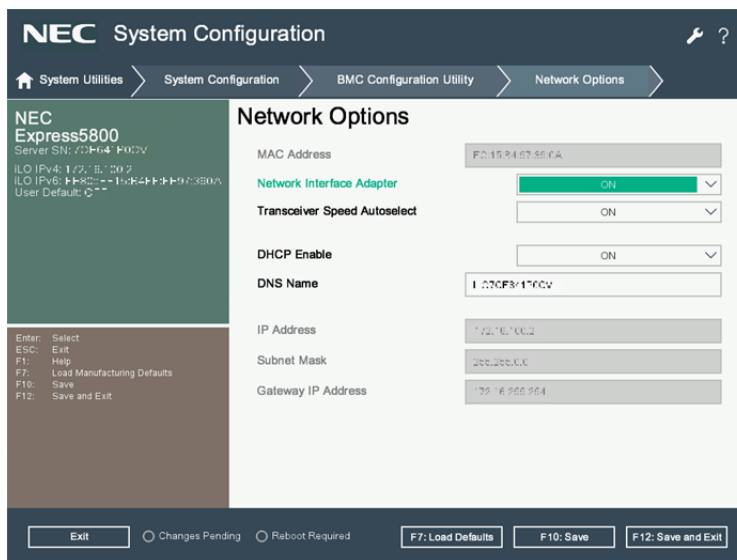
View example when **Network Options** is selected

5.　On the next screen, use DHCP (Set DHCP to **Enable**), or set the item under IP Address/Subnet Mask. Connect a LAN cable to a management specialized LAN connector to connect to the network. Follow the setting in Step 4. to access iLO5 from Web browser of the administrator PC.
iLO5 contains default username, password, and DNS name set at the time of shipment. The default username, password, and DNS name are written on a slide tag attached to a device to which iLO is installed. Using these values and the network setting you configured in Step 4., access iLO remotely from network client with your Web browser.

The default values are as follows.
・Username: Administrator
・Password: randomly selected 8 characters including alphabets and numbers
・DNS name: BMCXXXXXXXXXXXX (12 Xs is the serial number of server)
If you enter a wrong username or password or fail to log in, iLO imposes security delay time.

Important	If you do not change and use default password in devices controlled via network, risk of unauthorized access by a malicious third party will increase. If your device is taken over by unauthorized access, not only data breach but also such losses as system damage due to retardation of availability or integrity, or an improper use as the means of cyber attack by botnets will become possible.
	The initial password of this product is simply provided for the initial configuration for maintenance and operation. Change password without fail at the time of initial setup. If you use the initial password unchanged and then you suffer unauthorized access, we will not hold any responsibility at all.
	Even if you change the initial password, less strong ones (ones including fewer figures) or easily conceivable ones ("123456789," "abrade," "Administrator," etc.) are difficult to prevent unauthorized accesses. Please change to a stronger password (ones with more than 8 figures containing capital letters, small letters and numbers are recommended).
	"How to change password"
	1. Log in iLO 5 and then go to Administration - User Administration page.
	2. Select "Administrator User" and click Edit.
	3. Put the check in "Change password" and enter a new password in New Password and Confirm Password.
	4. Click Update User to update.

6. A LAN cable is connected to a LAN connector and it's linked to a network.

7. Please access iLO5 from a web browser of a management PC with setting of procedure 4.

    The management LAN connector is as follows.

priority	composition	management LAN connector
Hi	N8117-12 (management LAN / Seria port) is loaded.	N8117-12 (management LAN connector)
|	FLOM is loaded and N8117-12 isn't loaded.	LAN1 connector of FLOM
Low	Both of N8117-12 and FLOM aren't loaded.	LAN1 connector of the product

4. EXPRESSBUILDER and Starter Pack

EXPRESSBUILDER and Starter Pack helps you to install Windows or maintain the server.

4.1   Features of EXPRESSBUILDER/Starter Pack

Feature	Description
EXPRESSBUILDER	
Setup (OS reinstallation)	Installs Windows on your server.
Maintenance	Configures system settings and RAID array.
Starter Pack	
SPP installation	Updates OS drivers and BIOS/FW by using Standard Program Package (SPP). EXPRESSBUILDER does not install SPP automatically when installing OS. SPP must be installed after installing OS.
Application installation	Installs NEC ESMPRO, RESTful Interface Tool, and other applications.
Manuals	Stores manuals for applications.

4.2   Usage of EXPRESSBUILDER

Run EXPRESSBUILDER by pressing <F10> key during POST when you want to configure RAID array or install Windows.

It isn't necessary to start EXPRESSBUILDER at the product I have done OS installation of in BTO (factory built-in shipment).

For details, see *Chapter 2. (3. Details of EXPRESSBUILDER)* of *Maintenance Guide*.

4.3   Usage of Starter Pack

Starter Pack includes OS driver, application, and other software.

Starter Pack is provided as an optional product and on the following web site.

https://www.nec.com/

For details, see *Chapter 2. (4. Details of Starter Pack)* of Maintenance Guide.

5. Installing Software Components

Continue to install software components such as OS.

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 documentation supplied with the UPS or the documentation for the application controlling the UPS.

1. Shut down the OS.

2. The server automatically turns off after the OS shuts down.
   Confirm that POWER LED lights amber.

3. Turn off peripheral devices.

In the upgrading or maintenance procedure, back up the important server data and programs before shutting down the server.

Important	**Auxiliary power will continue to be supplied to the system, even if the server is in standby mode.**

When shutting down the server, use one of the following methods.
- Press and release the POWER switch.
  This method shuts down applications and OS in the correct order before the server enters standby mode.

- Press and hold the POWER switch for 4 seconds or more to force the server to enter standby mode.
  This method forces the server to enter standby mode without shutting down applications and OS in the correct order. If the application stops responding, this method can be used to force it to shut down.

- Use the virtual POWER switch via the iLO 5.
  This method remotely shuts down applications and OS in the correct order before the server enters standby mode.

Before continuing with the procedure, make sure that the server is in standby mode (POWER LED in amber color).

4

**NEC Express5800 Series
Express5800/R110j-1**

Appendix

1. **Specifications**

2. **Glossary**

3. **Revision Record**

1. Specifications

Product Name			N8100-2766F	N8100-2767F
CPU	On-board CPU, operation frequency Number of cores (C)/ threads (T) (1CPU) Intel Smart Cache (Last level cache)		See the attached file "On-board CPU"	
	Number of standard installation/ maximum installation		0/1	
Chipset			Intel® C242 Chipset	
Memory	Capacity Standard/ Maximum		Not included in Standard Installation/ (Option) Unbuffered DIMM : 64GB (4x 16GB)	
	On-board Memory		DDR4-2666 SDRAM DIMM, Unbuffered	
	Maximum frequency		2666MHz (See *System Configuration Guide* regarding the maximum operation frequency of CPU)	
	Error Detection and Correction		ECC	
	Memory sparing		—	
	Memory mirroring		—	
Storage	Drive bay	Drive bay / Front	4x 2.5-inch drive 2x 2.5-inch additional drive (Option)	2x 3.5-inch drive
		Built-in (standard)	—	

		Built-in (maximum)	2.5-inch HDD:
			  SATA 12TB (6x2TB),
			  SAS 14.4TB (6x2.4TB)
			2.5-inch SSD:
			  SATA 23TB (6x3.84TB)
			(When an optional HDD cage is added)
				3.5-inch HDD:
				  SATA 24TB (2x12TB),
				  SAS 24TB (2x12TB)

		Hot-swap	Supported	
	Interface/RAID level		SATA 6Gb/s : RAID 0/1/5/6/10/50 (Option), SAS 12Gb/s : RAID 0/1/5/6/10/50 (Option)	
	Optical disk drive		Connection of built-in/ external drive (Option) [*1]	
	FDD		Option: Flash FDD (1.44MB) [*2]	
	Expansion bay		—	
Expansion Slots	Supported slots		Standard configuration 1x PCI Express 3.0 (x4 lanes, x8 sockets) (dedicated for RAID controller) PCI slot configuration depends on optional riser cards. For details, refer to *System Configuration Guide* on our website.	
Graphics	Built-in chips/ video RAM		Internal management controller chip/ 16MB	
	Graphics and resolution		16 million colors: 640x480, 800x600, 1,024x768, 1,280x1,024, 1,600x1,200, 1,920x1,080	
Standard interface	Front		Standard configuration 1x USB3.0 (Type A), 1x USB2.0 (Type A)(iLO service port)	
	Rear		2x USB3.0 (TypeA) , 1x Analog RGB (Mini D-Sub15 pin), 1x Management LAN (1000BASE-T/100BASE-TX/ 10BASE-T, RJ-45) (Option) 2x LAN (1000BASE-T/100BASE-TX/10BASE-T (RJ-45)) 1x Serial Port (Option)	
	Internal		1x USB3.0 (TypeA)	
Redundant power supplies			Supported (Option, hot-plug supported)	
Redundant fans			Not Supported	
Dimensions (Width x Depth x Height)			434.6mm × 382.3mm × 43.2mm (Front bezel/ rails/ protruding part(s) not included)	
Weghts (Minimum[*3] / Maximum)			6kg/11kg	6kg/11kg
Power supply units			290W Non-hot Plug Power Supply (N8181-179) 290W 80 PLUS Silver power supply unit (Outlet with two pole parallel earth) (Hot-plug not supported)) AC100-240V±10%, 50-60Hz±3Hz (Power cable needs to be selected) 500W Hot Plug Power Supply (N8181-159) 500W 80 PLUS Platinum power supply unit (Outlet with two pole parallel earth) (Hot-plug supported) (Max: 2) AC100-240V±10%, 50-60Hz±3Hz (Power cable needs to be selected)	
Temperature/ humidity conditions			Operating: 10℃ to 35℃/8% to 90% (no condensation) Storage: −30℃ to 60℃/5% to 95% (no condensation)	
Accessories			Getting Started, Safety Precautions and Regulatory Notices, Front Bezel	
OS preinstallation			—	

Product Name	N8100-2766F	N8100-2767F
Supported OS	Microsoft® Windows Server® 2016 Standard , Microsoft® Windows Server® 2016 Datacenter , VMware ESXi™ 6.5 Patch1 or later VMware ESXi™ 6.7	

*1   If you do not install an internal DVD-ROM or DVD SuperMULTI, please purchase an optional external DVD-ROM for the maintenance and the reinstall of OS.

*2   For details, refer to *Configuration Guide* on our website.

*3   Operable minimum constitution (1x CPU, 2x DIMM, 1x HDD, 1x power unit)

On-board CPU

| On-board CPU, Operation Frequency Number of cores(C)/Threads(T) (1CPU) Intel Smart Cache (Last Level Cache) MB **TDP** (Thermal Design Power) Maximum heat radiation W | Xeon E-2124 Processor (3.30 GHz, 4C/4T, 8MB, TDP 71W), Xeon E-2134 Processor (3.50 GHz, 4C/8T, 8MB, TDP 71W), Xeon E-2144G Processor (3.60 GHz, 4C/8T, 8MB, TDP 71W), Xeon E-2174G Processor (3.80 GHz, 4C/8T, 8MB, TDP 71W), Xeon E-2126G Processor (3.30 GHz, 6C/6T, 12MB, TDP 80W), Xeon E-2136 Processor (3.30 GHz, 6C/12T, 12MB, TDP 80W), Xeon E-2186G Processor (3.80 GHz, 6C/12T, 12MB, TDP 95W), Pentium G5400 Processor (3.70 GHz, 2C/4T, 4MB, TDP 54W), Core i3-8300 Processor (3.7 GHz, 4C/4T, 8MB, TDP 62W), | |

2. **Glossary**

Term	Description
AHS	Active Health System (AHS) monitors the status/configuration of the server, and records it to a log file if any changes occur. AHS log is used for maintenance to investigate the failure.
AMP	Advanced Memory Protection (AMP) is a technology for realizing a fault tolerance of the server by memory redundancy (such as mirroring).
AMS	Agentless Management Service (AMS) is an OS service for sending information (such as OS events) that iLO cannot collect directly. iLO records the information received by AMS, and send it to Agentless Management.
EXPRESSBUILDER	Software for setting up the server. EXPRESSBUILDER can be started by pressing <F10> key during POST.
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.
Hexalobular	A type of screw head characterized by a 6-point star-shaped pattern. This is often called as "Torx" (the Torx is a third party's trademark). Head sizes are described from T1 to T100. This is sometimes abbreviated as 6lobe.
iLO	A built-in controller that supports the IPMI version 2.0 protocol. The controller is called as iLO5 because this server adopts a generation 5 version controller.
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.
NEC ESMPRO Manager	Software for managing a number of servers on network.
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 and event logs. You can easily collect the data for the server maintenance by using this software.
RAID Report Service	This service monitors the RAID status and notifies failures.
RBSU	ROM-Based Setup Utility (RBSU) is a built-in utility that can configure connected devices and BIOS settings. RBSU is called from System Utilities.
RESTful Interface Tool	A tool that supports API based on Representational State Transfer (REST) architecture. You can send maintenance commands in JSON format to iLO by HTTP protocol after installing this tool.
SPP	Standard Program Package (SPP) is a software package that includes BIOS, FW, driver, and other basic software. SPP is included in Starter Pack.

Term	Description
SSA	Smart Storage Administrator (SSA) is a utility that can configure RAID arrays. SSA is provided for Windows/Linux and can also start from F10 key function.
Starter Pack	A software package that includes SPP, instruction manual, application, and other software for the server. This must be installed before using OS on the server. Starter Pack is provided as an optional product and ISO data on our website.
System Maintenance Switch	A DIP switch on motherboard. This switch can enable/disable initialization, password, iLO settings, and other functions of maintenance.
System ROM	A System ROM is a built-in non-volatile firmware storage. A System ROM contains firmware such as BIOS, POST and System Utilities which are necessary to perform hardware initialization during the booting process, and to provide system configuration feature.
System Utilities	System Utilities is a built-in utility that provides system information, calling RBSU, collecting system log, and other system utilities. You can start System Utilities by F9 key during POST.
TPM Kit	An optional product of Trusted Platform Module for the server.

3. Revision Record

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10.202.02-101.01	January 2019	Newly created

[MEMO]

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NEC Express Server

Express5800/R110j-1

User's Guide

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