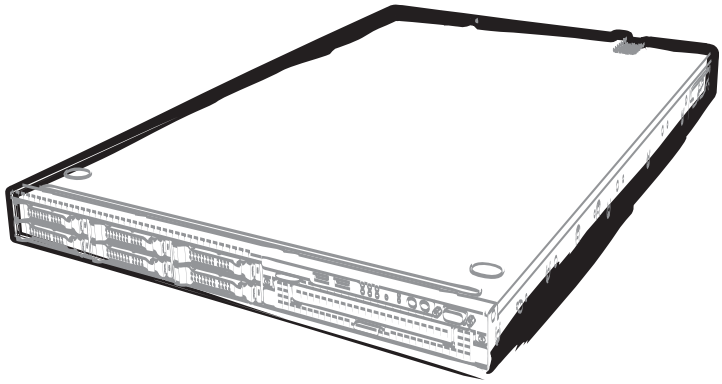
Express5800

NEC



NEC Express Server
Express5800 Series

Express5800/R120e-1M
EXP291
User's Guide

Model Number: N8100-2073F

10.102.01-101.01
July 2013, First Edition

Documents Provided with This Product

Documents for this product are provided as accompanying booklets (📖) and as electronic manuals (📄) stored within EXPRESSBUILDER DVD (💿).

📖 Precautions for Use	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. Refer to this guide as you begin for an overview of this server.

💿 EXPRESSBUILDER

📄 User's Guide

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

📄 Installation Guide (Windows)

Chapter 1: Installing Windows	Installation of Windows and drivers, and important information for installation
Chapter 2: Installing the Bundled Software	Installation of bundled software, such as NEC ESMPRO and Universal RAID Utility

📄 Maintenance Guide

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

📄 Other documents

Provides the detail of NEC ESMPRO, Universal RAID Utility, and the other features.

Contents

Notations Used in This Document

Notations used in the text

In addition to safety-related symbols urging caution, 3 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 the server or operating software. If the procedures described are not followed, **server failure, data loss, and other serious malfunctions could occur**.
Note	Indicates items that must be confirmed when handling the server or operating software.
Tips	Indicates information that is helpful to keep in mind when using this server.

Optical disk drives

This server is equipped with one of the following drives, depending on the order at the time of purchase. These drives are referred to as *optical disk drives* in this document.

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

Hard disk drives

Unless otherwise stated, hard disk drives (HDD) described in this document refer to both of the following.

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

Removable media

Unless otherwise stated, removable media described in this document refer to both of the following.

- **USB memory**
- **Flash FDD**

Abbreviations of Operating Systems (Windows)

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

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

* Includes 64-bit and 32-bit Editions unless otherwise stated.
The following appears on EXPRESSBUILDER.

- Windows Server 2008 64-bit Edition: Windows Server 2008 x64
- Windows Server 2008 32-bit Edition: Windows Server 2008 x86

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FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Industry Canada Class A Emission Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

CE / Australia and New Zealand Statement

This is a Class A product. In domestic environment this product may cause radio interference in which case the user may be required to take adequate measures (EN55022).

BSMI Statement

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Turkish RoHS information relevant for Turkish market

EEE Yönetmeliğine Uygundur.

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In the European Union

EU-wide legislation as implemented in each Member State requires that used electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes Information and Communication Technology (ICT) equipment or electrical accessories, such as cables or DVDs.

When disposing of used products, you should comply with applicable legislation or agreements you may have. The mark on the electrical and electronic products only applies to the current European Union Member States.

Outside the European Union

If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority and ask for the correct method of disposal.

KC Statement

Keep in mind the KC Class A Statement when you use the product.

기 종 별	사 용 자 안 내 문
A 급 기기 (업무용 방송통신기기)	이 기기는 업무용(A 급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

CCC Statement

Keep in mind the CCC Class A Statement when you use the product.

声 明
此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下， 可能需要用户对其干扰采取切实可行的措施。

Vietnam RoHS

Vietnam RoHS information relevant for Vietnam market Complying with "CIRCULAR, No.30/2011/TT-BCT (Hanoi, August 10 2011), Temporary regulations on content limit for certain hazardous substances in electrical products"

Vietnam RoHS

English	Declaration of Conformity with the requirements of Technical Regulation on the Restriction Of the use of certain Hazardous Substances in Electrical and Electronic Equipment (adopted by Order №1057 of Cabinet of Ministers of Ukraine) The Product is in conformity with the requirements of Technical Regulation on the Restriction Of the use of certain Hazardous Substances in electrical and electronic equipment (TR on RoHS). The content of hazardous substance with the exemption of the applications listed in the Annex №2 of TR on RoHS: 1. Lead (Pb) – not over 0,1wt % or 1000wt ppm; 2. Cadmium (Cd) – not over 0,01wt % or 100wt ppm; 3. Mercury (Hg) – not over 0,1wt % or 1000wt ppm; 4. Hexavalent chromium (Cr6+) – not over 0,1wt % or 1000wt ppm; 5. Polybrominated biphenyls (PBBs) – not over 0,1wt % or 1000wt ppm; 6. Polybrominated diphenyl ethers (PBDEs) – not over 0,1wt % or 1000wt ppm.

Ukrainian	Декларація про Відповідність Вимогам Технічного Регламенту Обмеження Використання деяких Небезпечних Речовин в електричному та електронному обладнанні (затвердженого Постановою №1057 Кабінету Міністрів України) Виріб відповідає вимогам Технічного Регламенту Обмеження Використання деяких Небезпечних Речовин в електричному та електронному обладнанні (ТР ОВНР). Вміст небезпечних речовин у випадках, не обумовлених в Додатку №2 ТР ОВНР, : 1. свинець(Pb) – не перевищує 0,1 % ваги речовини або в концентрації до 1000 частин на мільйон; 2. кадмій (Cd)– не перевищує 0,01 % ваги речовини або в концентрації до 100 частин на мільйон; 3. ртуть(Hg) – не перевищує 0,1 % ваги речовини або в концентрації до 1000 частин на мільйон; 4. шестивалентний хром (Cr^{6+}) – не перевищує 0,1 % ваги речовини або в концентрації до 1000 частин на мільйон; 5. полібромбіфеноли (PBB) – не перевищує 0,1% ваги речовини або в концентрації до 1000 частин на мільйон; 6. полібромдефенілові ефіри (PBDE) – не перевищує 0,1 % ваги речовини або в концентрації до 1000 частин на мільйон.
Russian	Декларация о Соответствии Требованиям Технического Регламента об Ограничении Использования некоторых Вредных Веществ в электрическом и электронном оборудовании (утверждённого Постановлением №1057 Кабинета Министров Украины) Изделие соответствует требованиям Технического Регламента об Ограничении Использования некоторых Вредных Веществ в электрическом и электронном оборудовании (ТР ОИВВ). Содержание вредных веществ в случаях, не предусмотренных Дополнением №2 ТР ОИВВ: 1. свинец (Pb) – не превышает 0,1 % веса вещества или в концентрации до 1000 миллионных частей; 2. кадмий (Cd) – не превышает 0,01 % веса вещества или в концентрации до 100 миллионных частей; 3. ртуть (Hg) – не превышает 0,1 % веса вещества или в концентрации до 1000 миллионных частей; 4. шестивалентный хром (Cr^{6+})– не превышает 0,1 % веса вещества или в концентрации до 1000 миллионных частей; 5. полибромбифенолы (PBB) – не превышает 0,1 % веса вещества или в концентрации до 1000 миллионных частей; 6. полибромдифеноловые эфиры (PBDE) – не превышает 0,1 % веса вещества или в концентрации до 1000 миллионных частей.

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Precautions for Use (Be Sure to Read)

The following provides information required to use your server safely and properly. For details of names in this section, refer to *Names and Functions of Parts* in this document.

Safety precautions

Follow the instructions in this document for the safe use of NEC Express server.

This User's Guide describes hazardous parts of the server, possible hazards, and how to avoid them. Server components with possible danger are indicated with a warning label placed on or around them (or, in some cases, by printing the warnings on the server).

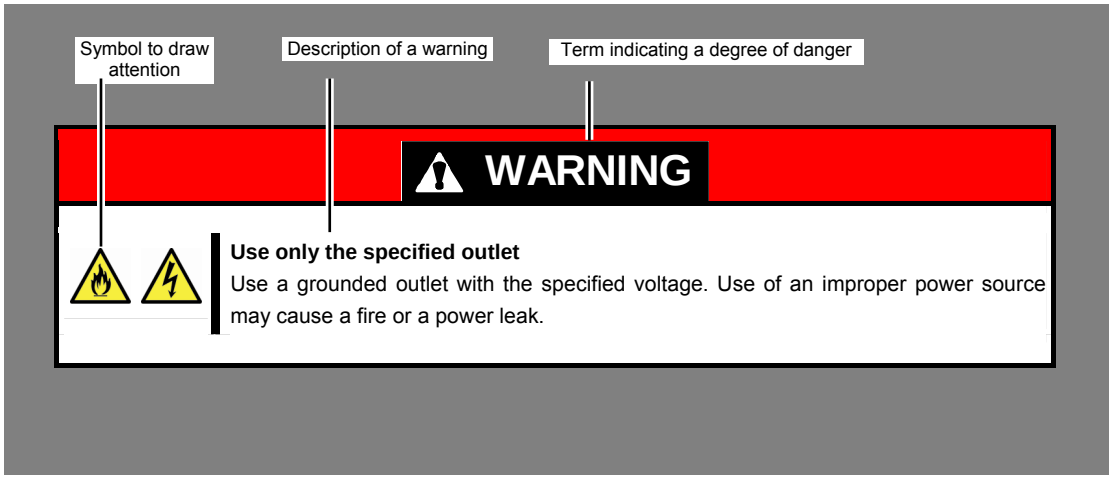
In User's Guide or on warning labels, **WARNING** or **CAUTION** is used to indicate a degree of danger. These terms are defined as follows:

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

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

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

(A label example used in this User's Guide)



Symbols used in this document and on warning labels

Attentions

	Indicates the presence of electric shock hazards.		Indicates the presence of mechanical parts that can result in bodily injury.
	Indicates the presence of a hot surface or component. Touching this surface could result in bodily injury.		Indicates the presence of mechanical parts that can result in pinching or other bodily injury.
	Indicates there is a risk of explosion.		Indicates the presence of laser beam that cause blindness.
	Indicates there is a risk of fire or fumes.		Indicates a general notice or warning that cannot be specifically identified.

Prohibited Actions

	Do not disassemble, repair, or modify the server. Otherwise, an electric shock or fire may be caused.		Do not touch the server with wet hand. Otherwise, an electric shock may be caused.
	Do not touch the component specified by this symbol. Otherwise, an electric shock or burn may be caused.		Do not use the server in the place where water or liquid may pour. Otherwise, an electric shock or fire may be caused.
	Do not place the server near the fire. Otherwise, a fire may be caused.		Indicates a general prohibited action that cannot be specifically identified.

Mandatory Actions

	Unplug the power cord of the server. Otherwise, an electric shock or fire may be caused.		Indicates a mandatory action that cannot be specifically identified. Make sure to follow the instruction.
	Make sure equipment is properly grounded. Otherwise, an electric shock or fire may be caused.		

Safety notes

This section provides notes on using the server safely. Read this section carefully to ensure proper and safe use of the server. For symbols, refer to *Safety precautions*.

General

⚠ WARNING

Do not use the server for services where human life may be at stake or high reliability is required.

This server is not intended for use in medical, nuclear, aerospace, mass transit or other applications where human life may be at stake or high reliability is required, nor is it intended for use in controlling such applications. We disclaim liability for any personal injury and property damages caused by such use of this server.

Do not use the server if any smoke, odor, or noise is present.

If smoke, odor, or noise is present, immediately turn off the server and disconnect the power plug from the outlet, then contact the store where you purchased the product or your maintenance service company. Using the server in such conditions may cause a fire.

Do not insert needles or metal objects.

Do not insert needles or metal objects into ventilation holes in the server or openings in the optical disk drive. Doing so may cause an electric shock.

Use a rack that conforms to the designated standard

This server can be mounted onto a 19-inch rack that conforms to EIA standards. Do not mount the server onto any rack that does not conform to EIA standards. Doing so may cause a server malfunction, personal injury, or damage to peripheral devices. For more information about racks that can be used with the server, consult with your maintenance service company.

Use the server only under the specified environment

Do not install the server rack in any environment that is not suitable for installation.

Installation in an unsuitable environment is harmful for the server and other systems installed in the rack and may cause fire or personal injury due to the rack falling. For a detailed explanation on installation environments or seismic reinforcement, consult with the instruction manual supplied with the rack or your maintenance service company.

⚠ CAUTION

Keep water or foreign matter away from the server.

Do not let any liquid such as water or foreign materials including pins or paper clips enter the server. Failure to follow this warning may cause an electric shock, a fire, or failure of the server. When such things accidentally enter the server, immediately turn off the power and disconnect the power plug from the outlet. Do not disassemble the server, and contact the store where you purchased the product or your maintenance service company.

Rack installation

CAUTION

Do not attempt to carry or install the server alone

More than two people are required to carry or install the rack. Otherwise, the rack may fall, resulting in personal injury or damage to peripheral devices. In particular, tall racks such as a 44U rack become unstable unless steadied with a stabilizer. Make sure that two or more people hold the rack to carry or install the rack.

Do not install with the load weight distributed unevenly

To avoid unevenly distributing the load of the rack and server, install a stabilizer or connect multiple racks to distribute the weight. Otherwise, the rack may fall, resulting in personal injury.

Do not install components alone, and check the door hinge pins of the rack

Two or more people are required to install the rack components such as the door or rails. When installing the door, make sure that both upper and lower hinge pins are held in place. Incomplete attachment may cause components to fall off as well as personal injury.

Do not extend any device from the rack that is not stabilized

When extending a device from the rack, make sure that the rack is stable (by using a stabilizer or seismic reinforcement). Otherwise, the rack may fall, resulting in personal injury.

Do not extend more than one device out of the rack

Extending multiple devices from the rack may cause the rack to fall, resulting in personal injury. Extend only one device at one time.

Do not exceed the rated capacity of the power supply when connecting devices

To prevent burn injuries, fire, and damage to the server, make sure the load on the branch circuit that supplies power to the rack will not exceed the rated load. For inquiries regarding the installation or wiring of the power supply system, consult with the company that performed the installation or wiring, or the power company that services your area.

Power supply and power cord use

⚠ WARNING

Do not hold the power plug with a wet hand.

Do not disconnect/connect the plug while your hands are wet. Failure to follow this warning may cause an electric shock.

Do not connect the ground wire to a gas pipe.

Never connect the ground wire to a gas pipe. Failure to follow this warning may cause a gas explosion.

⚠ CAUTION

Plug in to a proper power source.

Use a grounded outlet with the specified voltage. Use of an outlet with a voltage other than that specified causes fire and electrical leakage. Do not install the server in any environment that requires an extension cord. Connecting to a cord that does not conform to the power supply specs of the server causes overheating, resulting in fire.

If you want to use an AC cord set with a ground wire of class 0I, be sure to connect the ground wire before inserting the power plug into the outlet. Before disconnecting the ground wire, be sure to disconnect the power plug from the output.

Do not connect many cords into a single outlet by using extension cords.

The electric current exceeding the rated flow overheats the outlet, which may cause a fire.

Insert the power plug into the outlet as far as it goes.

Heat generation resulting from a halfway inserted power plug (imperfect contact) may cause a fire. Heat will also be generated if condensation is formed on dusty blades of the halfway inserted plug, increasing the possibility of fire.

Do not use any unauthorized interface cable.

Use only the interface cables provided with the server. Electric current that exceeds the amount allowed could cause fire. Also, observe the following precautions to prevent electrical shock or fire caused by a damaged power cord.

- Do not stretch the cord harness
- Do not bend the power cord.
- Do not twist the power cord
- Do not step on the power cord.
- Uncoil the power cord before use
- Do not secure the power cord with staples or equivalents
- Do not pinch the power cord
- Keep chemicals away from the power cord
- Do not place any object on the power cord
- Do not alter, modify, or repair the power cord
- Do not use a damaged power cord (replace the damaged power cord with a power cord of the same standard. For information on replacing the power cord, contact the store where you purchased the product or a maintenance service company)

CAUTION

Do not use the attached power cord for any other devices or usage.

The power cord that comes with your server is designed aiming to connect with this server and to use with the server, and its safety has been tested. Do not use the attached power cord for any other purpose. Doing so may cause a fire or an electric shock.

Do not pull out a cable by gripping the cable part.

Pull a cable straight out by gripping the connector part. Pulling a cable by gripping the cable part or applying extra pressure to the connector part may damage the cable part, which may cause a fire or electric shock.

Installation, relocation, storage, and connection

CAUTION

Do not attempt to lift the server by yourself

Some servers weigh up to 31 kg depending on the server components. Carrying the server by yourself may damage your back. At least two people should securely hold the server from the bottom when carrying it. Do not attempt to lift the server while the front bezel attached. Doing so causes the front bezel to fall off the server, resulting in personal injury.

Do not install the server in any place other than specified.

Do not install the server in the following places or any place other than specified in this User's Guide. Failure to follow this instruction may cause a fire.

- A dusty place
- A humid place such as near a boiler
- A place exposed to direct sunlight
- An unstable place

Do not use the server in an environment where corrosive gas is present

Do not install the server in a place subject to corrosive gases including sodium chloride, sulfur dioxide, hydrogen sulfide, nitrogen dioxide, chlorine, ammonia, or ozone. Do not install the server in an environment that contains dust, chemicals that accelerate corrosion such as NaCl or sulfur, or conductive materials. Failure to follow this warning may cause the wiring on the printed wiring board to short-circuit, leading to fire. If you have any questions, contact the store where you purchased the product or a maintenance service company.

Do not install the server while the cover is removed

Do not install the server to a rack while the cover or other relevant items removed. Not only will the cooling effect within the server decrease, causing the server to malfunction, but also may allow dust to enter the server, resulting in fire or electrical shock.

Do not get your fingers caught in the rails

When mounting/removing the server onto/from the rack, be careful to avoid getting your fingers caught in the rails or cutting your fingers on the rails.

CAUTION

Do not apply any weight on the server when it is extended from the rack

Do not apply force on the server when it is extended from the rack. Doing so cause the frames to bend, which makes it impossible to be mounted on the rack. It also may cause the server to fall, resulting in personal injury.

Do not attempt to connect or disconnect the interface cable while the power cord is plugged into an outlet

Be sure to unplug the power cord from a power outlet before connecting/disconnecting any interface cable to/from the server. If the server is off-powered but its power cord is plugged to a power source, touching a cable or connector may cause an electric shock or a fire resulted from a short circuit.

Use only the specified interface cable.

Use only interface cables provided by NEC and locate a proper device and connector before connecting a cable. Using an authorized cable or connecting a cable to an improper destination may cause a short circuit, resulting in a fire.
Also, observe the following notes on using and connecting an interface cable.

- Do not use any damaged cable connector.
- Do not step on the cable.
- Do not place any object on the cable.
- Do not use the server with loose cable connections.
  Do not use any damaged cable.

Cleaning and working with internal devices

WARNING

Do not disassemble, repair, or alter the server.

Never attempt to disassemble, repair, or alter the server on any occasion except as described in this document. Failure to follow this warning may cause not only malfunction of the server but also an electric shock or fire.

Do not attempt to remove lithium, NiMH, or Li-ion batteries.

The server contains the lithium, NiMH, or Li-ion battery (some optional devices have a lithium, NiMH, or Li-ion battery installed). Do not remove the battery. Placing a battery close to a fire or in the water may cause an explosion.

When the server does not operate appropriately due to the dead battery, contact the store you purchased the product or your maintenance service company. Do not attempt to disassemble the server to replace or recharge the battery by yourself.

Disconnect the power plug before cleaning the server.

Be to power off the server and disconnect the power plug from a power outlet before cleaning or installing/removing internal optional devices. Touching any internal device of the server with its power cord connected to a power source may cause an electric shock even of the server is off-powered.
Occasionally disconnect the power plug from the outlet and clean the plug with a dry cloth. Heat will be generated if condensation is formed on a dusty plug, which may cause a fire.

⚠ CAUTION

High temperature

Components including internal hard disk drives in the server are extremely hot just after the server is turned off. Allow the surface to cool before installing/removing.

Secure cables or cards in place

Be sure to secure the power cord, interface cables, and cards in place. Incomplete installation causes a loose connection, resulting in smoke or fire

Electric shock

The cooling fans, hard disk drives, and power supply unit (only when two servers are installed) support hot swapping. If replacing a component when the electrical current is being supplied, use extreme caution not to get electric shock by touching terminal parts of the internal components.

During operation

⚠ CAUTION

Do not pull out or remove the server from the rack.

Do not pull the server out of the rack or remove it from the rack. In addition to causing equipment to not function properly, separating the server from the rack may result in personal injury.

Avoid contact with the server during thunderstorms.

Do not touch any part of the server including the cables when a thunderstorm is approaching. Also, do not connect or disconnect any devices. There may be a risk of electric shock from lightning strike.

Keep animals away from the server.

Keep animals such as pets away from the server. Pet hair or other waste enters the server, which may cause a fire or electric shock.

Do not leave the optical disk drive tray open.

Dust may get in the server when the tray is open, which may result in a malfunction. In addition, bumping the open tray could cause personal injury.

Do not remove the server from the rack while it is operating.

Do not pull out or remove the server from the rack while the server is running. In addition to causing equipment to not function properly, separating the server from the rack may result in personal injury.

Do not place any object on top of servers.

Separating the server from the rack may result in personal injury and damage to nearby personal belongings.

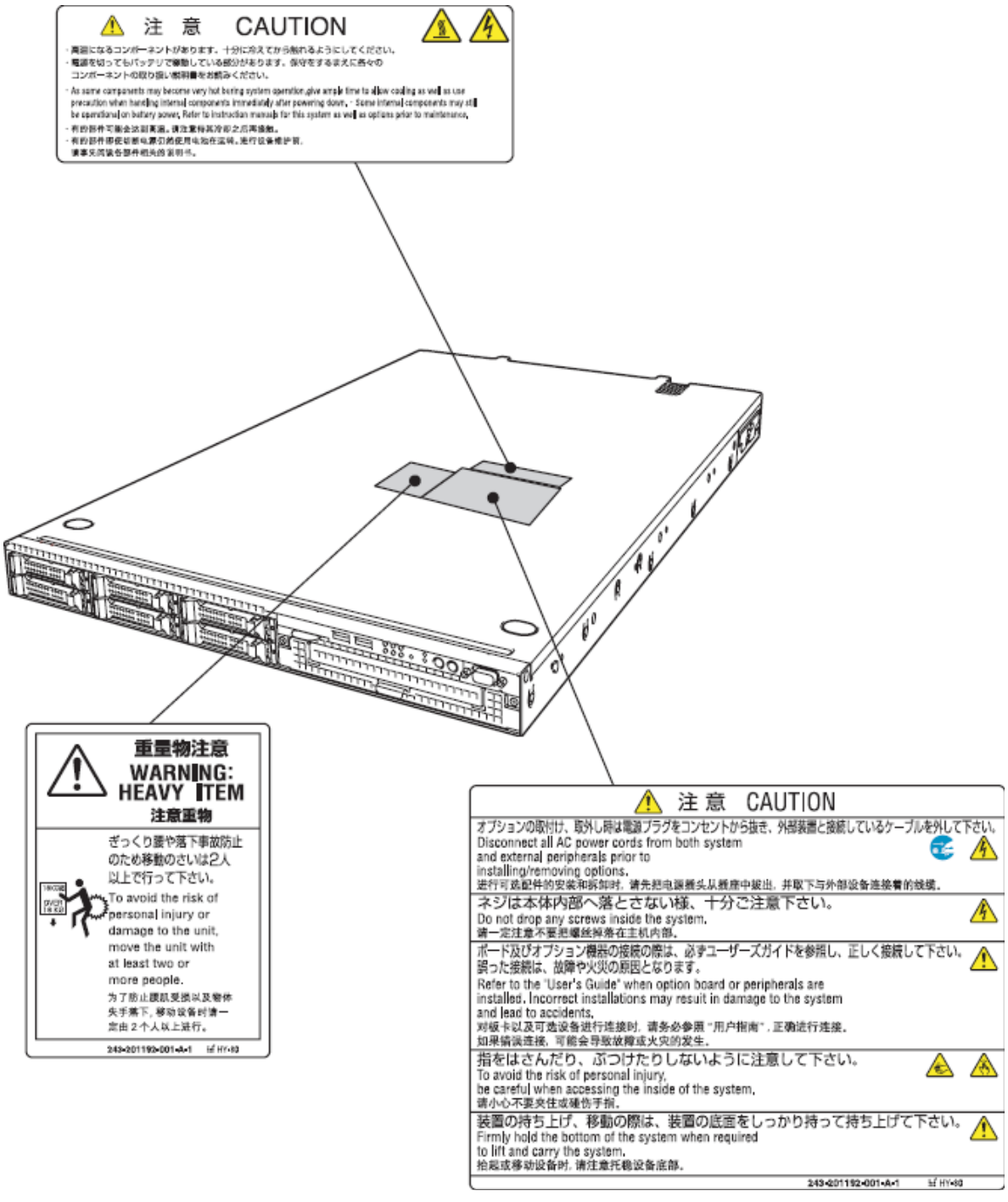
Do not get yourself caught in the fan

Keep your hands and hair away from the cooling fan at the rear of the server during operation. Failure to observe this warning may cause your hands or hair to catch in the fan, resulting in personal injury.

Warning labels

Warning label are attached on or near the components with potential hazards (This label is either attached or printed on the component.) to draw attention from users to potential hazards involved in handling the server. (Do not remove or black out this label and keep it clean). If no label is attached or printed on the server, or if there is a label coming off or stained, contact your sales representative.

External view



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 cell phone or PHS and switch off them near the server. Electric waves from such devices can cause server to malfunction.**
- **Install the server in an appropriate place. For details about the installation location, refer to *Chapter 2 Preparations (2. Installation and Connection)*.**
- **Before connecting/removing cables to/from peripheral devices, make sure that the server is off and unplug the power cord, if they are non plug-and-play devices.**
- **Connect the provided power cord to a 100/200 VAC outlet.**
- **Make sure that the access LED on the server is off before turning off the power or ejecting an optical disk.**
- **Wait for at least 30 seconds before connecting power cord to power outlet after disconnecting it.**
- **If any Uninterruptible Power Supply unit is connected, set it to wait for at least 30 seconds before turning on the server after power off.**
- **Do not press the POWER switch to turn on the server before the POWER LED (amber) is unlit.**
- **Wait for at least 30 seconds before turning on the server after turning off the server.**
- **Turn off the server and unplug the power cord before moving it.**
- **Regularly clean the server to prevent various types of failure. (Refer to *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.**
- **We do not guarantee that any copy-protected CD that does not conform to standards will play on the server's optical disk drive.**
- **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: see the table below; humidity: 20% to 80%).

N code	N8101-											
	675F	676F	677F	678F	679F	680F	681F	682F	683F	684F	685F	686F
Operation guarantee temperature	10 to 40°C										10 to 35°C	

- **Check the system clock approximately once per month. Use of a time server (NTP server) is recommended if high accuracy timing is required by the system.**
- **Observe the storage conditions (Temperature: –10°C to 55°C, Humidity: 20% to 80%, No condensation of moisture) to store the server.**
- **Do not power off or reset the server, nor disconnect the power cord before POST completes.**
- **If this server, internal optional devices, and media set for the backup devices (tape cartridges) are moved from a cold place to a warm place in a short time, condensation will occur and cause malfunctions and failures when these are used in such state. To protect important stored data and property, make sure to wait for a sufficient period to use the server and components in the operating environment.**

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

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

Tips for your health and safety

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

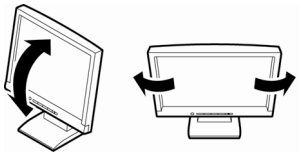
Keep proper posture

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

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

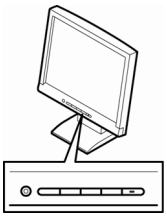
Adjust the angle of your display

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



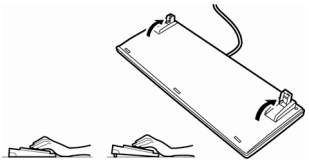
Adjust the brightness and contrast of the display

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



Adjust the angle of keyboard

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



Clean your equipment

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

Take rest breaks

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

NEC Express5800 Series
Express5800/R120e-1M

1

General Description

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

1. **Introduction**

2. **Accessories**
   Verify the condition of your server's accessories.

3. **Standard Features**
   This section describes the server’s features and the server management.

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

1. Introduction

Thank you for purchasing this NEC Express5800 Series product.

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

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

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

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

2. Accessories

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

- **Front Bezel**
- **Bezel Lock Key (attached to Front Bezel)**
- **Slide Rails**
- **EXPRESSBUILDER**[*1]
- **SAS/SATA cable (RAID controller is unmounted)**
- **Getting Started**

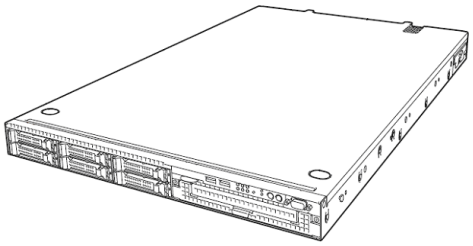
*1 Instruction manuals are stored in EXPRESSBUILDER. Adobe Reader is required to read or print them.

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

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

3. Features

The server has the following features:



High performance

- Intel® Xeon® processor
  - N8101-675F: E5-2609 v2(2.50GHz 4 Core)
  - N8101-676F: E5-2620 v2(2.10GHz 6 Core)
  - N8101-677F: E5-2630 v2(2.60GHz 6 Core)
  - N8101-678F: E5-2630L v2(2.40GHz 6 Core)
  - N8101-679F: E5-2637 v2(3.50GHz 4 Core)
  - N8101-680F: E5-2640 v2(2GHz 8 Core)
  - N8101-681F: E5-2650 v2(2.60GHz 8 Core)
  - N8101-682F: E5-2660 v2(2.20GHz 10 Core)
  - N8101-683F: E5-2670 v2(2.50GHz 10 Core)
  - N8101-684F: E5-2690 v2(3GHz 10 Core)
  - N8101-685F: E5-2697 v2(2.70GHz 12 Core)
  - N8101-686F: E5-2695 v2(2.40GHz 12 Core)
- Turbo Boost Technology feature
- Hyper Threading Technology feature *1
- High-speed memory access (DDR3L 1600 / 1866 supported) *2
- High-speed disk access (SATA/SAS 6Gbps supported)
- High-speed 1000BASE-T/100BASE-TX/10BASE-T (2 ports) interface (1Gbps/100Mbps/10Mbps supported)

High reliability

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

Management Utilities

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

Power saving and noiseless design

- Selection of power unit appropriate to environment, work load, and configuration
- Power consumption monitoring feature
- Power control feature
- 80 PLUS® Platinum certified high efficiency power supply
- Fan control appropriate to environment, work load, and configuration
- Silent sound design
- Enhanced Intel SpeedStep® Technology supported

Expandability

- PCI Express 3.0 (x16 lanes): 1 slot (Full height)
- PCI Express 3.0 (x8 lanes): 1 slot (Low profile)
- PCI Express 3.0 (x8 lanes): 1 slot (dedicated to RAID Controller)
- PCI Express 3.0 (x8 lanes): 1 slot (dedicated to LAN Riser card)
- Large capacity memory of up to 1.5 TB *3
- Can upgrade to multi-processor system with up to two processors
- Expansion Bay (for hard disk drives): 8 slots *4
- Optical disk drive bay provided as standard *5
- USB2.0 interface (Front: 2 ports, rear: 4 ports, internal: 2 ports)
- Three LAN ports (one for management LAN)
- With optional LAN riser card, two 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).

Many built-in Features

- Redundant power supply system supported (valid when optional power supply unit is installed)
- El Torito Bootable CD-ROM (no emulation mode) format supported
- Software power-off
- Remote power-on feature
- AC-Link feature
- Remote console feature
- Power switch mask
- Connector for display unit provided on front panel
- Baseboard Management Controller (BMC) conforming to IPMI v2.0

Self-diagnosis

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

Easy setup

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

Maintenance features

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

*1: Unsupported on Xeon® processor E5-2609 v2 embedded models.

*2: Processor core speed depends on processor type, number and type of DIMMs installed, and operating voltage (1.35/1.5 V).

*3: In 2-CPU configuration. Up to 768 GB in 1-CPU configuration.

*4: With N8154-41 additional HDD cage installed. Six slots in standard configuration

*5: Cannot be installed when N8154-41 additional HDD cage is installed.

3.1 Management Features

The hardware components of the server provide operation control/reliability features as shown below. Additionally, *NEC ESMPRO Agent*, which is provided in EXPRESSBUILDER, enables you to collectively manage the state of your systems. You can also monitor the server states from a PC to manage the network where *NEC ESMPRO Manager* provided in EXPRESSBUILDER is installed.

The features available on this server are as shown in the table below.

Function		Availability	Description
Hardware			Shows physical hardware information.
	Memory bank	○	Shows physical memory information.
	Device info	○	Shows information specific to the server.
	CPU	○	Shows physical CPU information.
System		○	Shows logical CPU information and monitors the load factor. Shows logical memory information and monitors the status.
I/O device		○	Shows information on I/O devices (serial ports, keyboard, mouse, and video).
System environment			Monitors temperatures, fans, voltage, power supply, and others.
	Temperature	○	Monitors the temperature inside of the chassis.
	Fan	○	Monitors the fans.
	Voltage	○	Monitors the voltage inside of the chassis.
	Power supply	○	Monitors the power supply unit.
Software		○	Shows service, driver, and OS information.
Network		○	Shows network (LAN) information and monitors packets.
BIOS		○	Shows BIOS information.
Local polling		○	Monitors the values of MIB items obtained by NEC ESMPRO Agent.
Storage		○	Monitors controllers and storage devices including hard disk drives.
File system		○	Shows the file system configuration and monitors the free space.
RAID System		○	Monitors the following RAID Controllers: • Optional RAID Controller (N8103-149/150/151/160)
Others*		○	Monitors OS stall using the Watch Dog Timer.
		○	Performs alert processing after an OS STOP error occurs.

○: Supported. △: Partially supported. ×: Unsupported.

*: Not displayed on the NEC ESMPRO Manager screen.

Tips NEC ESMPRO Manager and NEC ESMPRO Agent are supplied with the server as standard. For how to install and use each software component, refer to the explanation of the component.

3.2 Firmware and Software Version Management

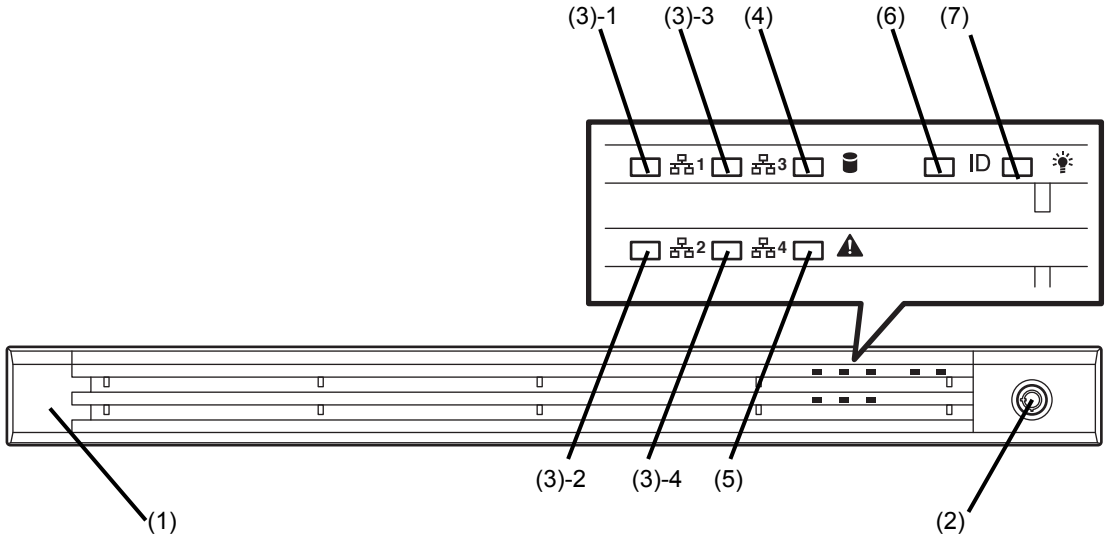
Use of NEC ESMPRO Manager and ExpressUpdate Agent allows you to manage versions of firmware and software as well as update them by applying update packages.

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

4. Names and Functions of Parts

This section describes the names of the server parts.

4.1 Front View (With Front Bezel)



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

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

(3) LINK/ACT LED
This LED turns on when the server is connected to the network. (See page 5.)
(3)-1: LAN connector 1
(3)-2: LAN connector 2
(3)-3: LAN connector 3
(3)-4: LAN connector 4
LEDs for LAN3 and LAN4 are lit when optional LAN riser card is installed.

(4) Disk Access LED
This LED indicates status of internal hard disk drive. (See page 5.)

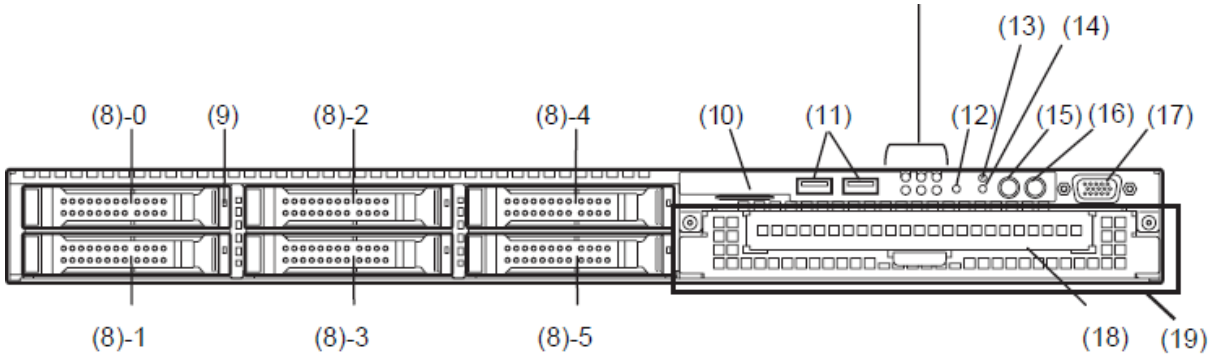
(5) STATUS LED
This LED indicates the server status. (See page 5.)

(6) Unit ID (UID) LED
This LED turns on when UID Switch is pressed. Commands from the software also cause it to turn on or flash. (See page 5.)

(7) POWER LED
This LED indicates power status of server. (See page 5.)

4.2 Front View (Without Front Bezel)

See (3) to (5) on previous page.



(8) Hard disk drive bay
The bay where HDD are installed. The sequential numbers indicate the corresponding slot numbers. All bays include Dummy Trays.

(9) DISK LED
The LED provided for each HDD.
This LED indicates hard disk drive status. (See page 5.)

(10) Pull-out Tab
A label indicating the part number and serial number of the server is located on Pull-out Tab.

(11) USB connectors (front)
These connectors are used to connect devices that support the USB interface.

(12) BMC RESET Switch
The switch to reset BMC of this server. Use the switch only when there is a problem with EXPRESSSCOPE Engine 3 (BMC).

To use this switch, press it at least five seconds.

(13) RESET switch
Press this switch to reset the server.

(14) DUMP Switch (NMI)
When DUMP Switch is pressed, memory dump is performed.

(15) Unit ID (UID) Switch/LED
The switch to turn on and off UID LED.
Pressing the switch once turns on UID LED and pressing again turns off the LED.
Commands from the software also cause it to turn on or flash. (See page 5.)

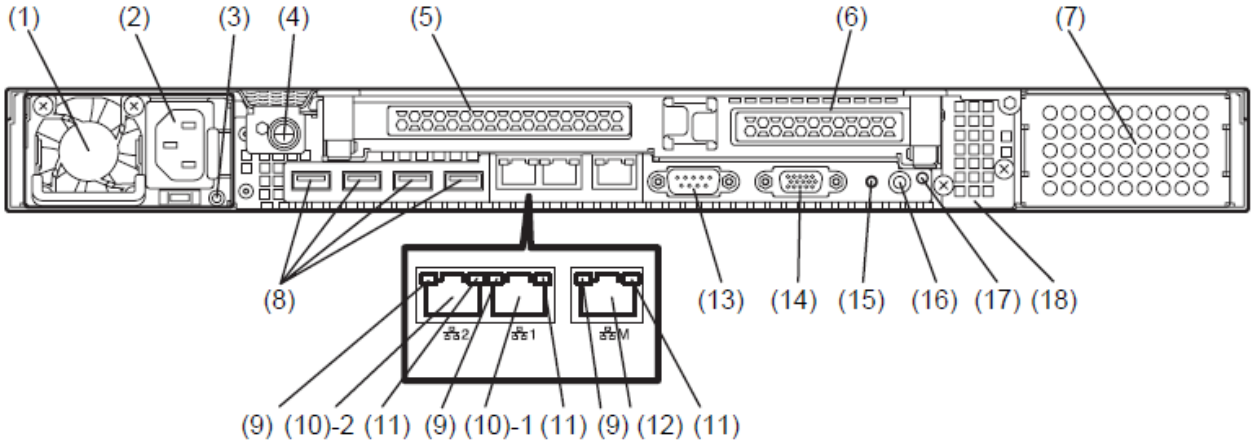
(16) POWER Switch/LED
The switch to turn the server on and off. Press once to turn on the server. POWER LED lights when it is on. Press it again to turn off the server. Hold down the switch for 4 seconds or longer to forcibly turn off the server.
(See page 5.)

(17) Display connector
Connect a display unit. This connector is exclusively used with the display connector on rear panel.

(18) Optical disk drive bay
Bay to install an optical disk drive.
Either of the following drive can be installed.
– DVD-ROM drive
– DVD SuperMULTI drive

(19) 2.5-inch HDD cage bay
Bay to install an optional HDD cage N8154-41.
This bay is exclusively used with an optical disk drive.

4.3 Rear View



(1) Power unit (Power supply slot 1)
The power unit supplies DC power to the server.

(2) AC Inlet
This socket is used to connect the power cord.

(3) AC POWER LED
The LED indicates power supply status. (See page 5.)

(4) Thumb nut
Used to secure the top cover.

(5) Slot for full-height PCI card
Slot to install a full-height PCI card. Assigned PCI slot number is "1B".

(6) Slot for low-profile PCI card
Slot to install a low-profile PCI card. Assigned PCI slot number is "1C".

(7) Blank cover (for additional power unit)
Remove this cover to install an optional power unit.

(8) USB connectors
These connectors are used to connect devices that support the USB interface.

(9) LINK/ACT LED
The LED indicates the access status of LAN. (See page 5.)

(10) LAN connectors
1000BASE-T/100BASE-TX/10BASE-T supported network connectors
(10)-1: LAN port connector 1
(10)-2: LAN port connector 2
If Shared BMC LAN feature is enabled in ROM Utility, LAN connector 1 can also be used as the management LAN port. Sharing port is not recommended from the point of performance and security.

(11) SPEED LED
The LED indicates the transfer speed of LAN ports. (See page 5.)

(12) Management LAN connector
A LAN connector which supports 100BASE-TX/10BASE-T. This port cannot be used as a data transmission port. This port is used for connecting to EXPRESSSCOPE Engine 3.

(13) Serial port A (COM) connector
This connector is used to connect devices that support a serial interface. Note that it is not possible to directly connect to a leased line.

(14) Display connector
The connector to connect a display unit.
This connector is exclusively used with the display connector on front panel.

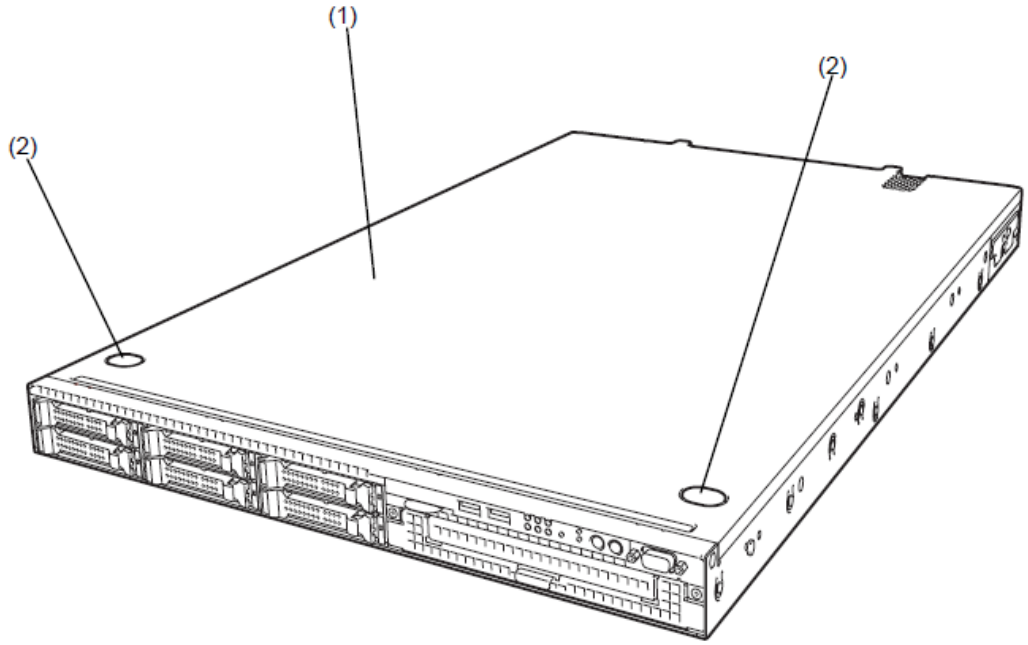
(15) DUMP Switch (NMI)
When DUMP Switch is pressed, memory dump is performed.

(16) UID Switch/LED
The switch to turn on and off UID LED.
Pressing the switch once turns on UID LED and pressing again turns off the LED.
Commands from the software also cause it to turn on or flash. (See page .5)

(17) POWER LED
This LED indicates power supply status. (See page 5.)

(18) Blank cover (for LAN riser card)
Remove this cover to install an optional LAN riser card.

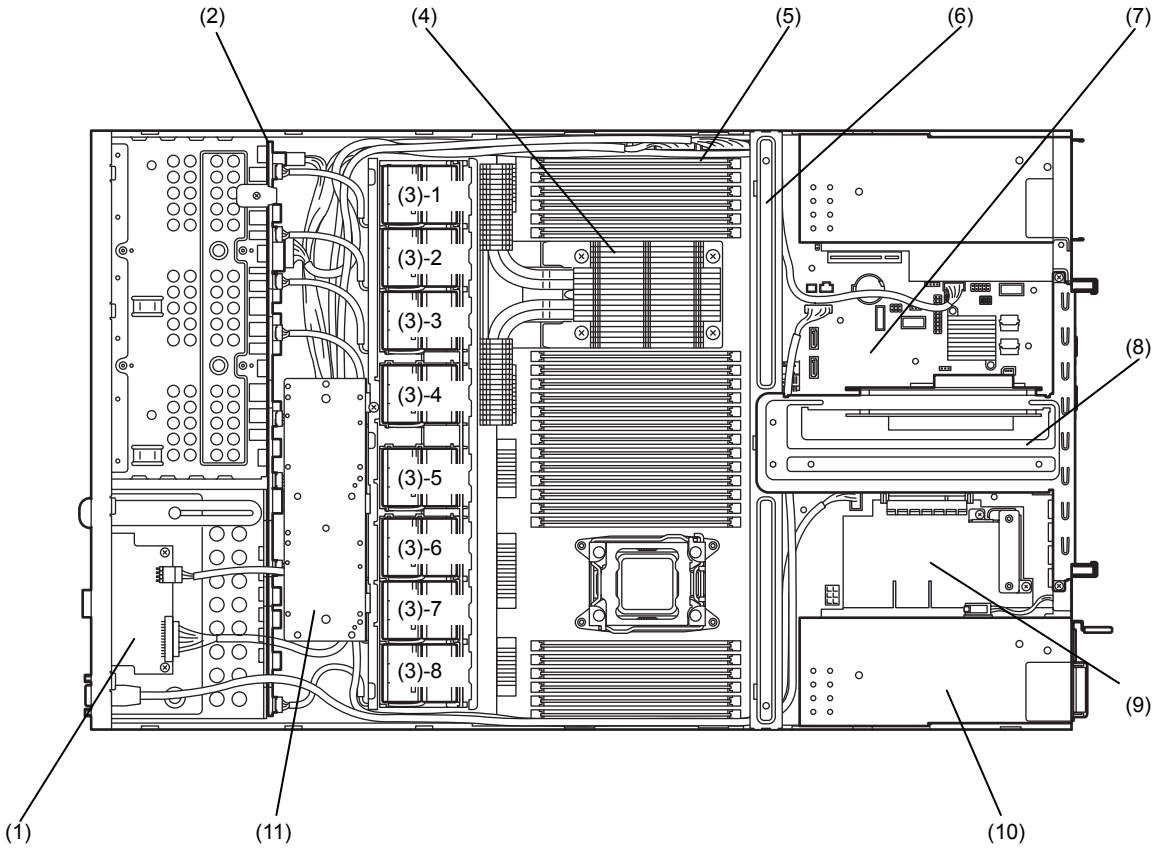
4.4 External View



(1) Top Cover

(2) Release Button.

4.5 Internal View



(1) Front Panel Board

(2) Backplane

(3) Cooling Fan

-1 FAN1F/R
-2 FAN2F/R
-3 FAN3F/R
-4 FAN4F/R
-5 FAN5F/R
-6 FAN6F/R (optional)
-7 FAN7F/R (optional)
-8 FAN8F/R (optional)

FAN1 to FAN5 are factory installed. FAN6 to FAN8 are required in 2-CPU configuration.

(4) Processor (Optional)

(5) DIMM (optional)

(6) Support bar

(7) Motherboard

(8) PCI Riser Card

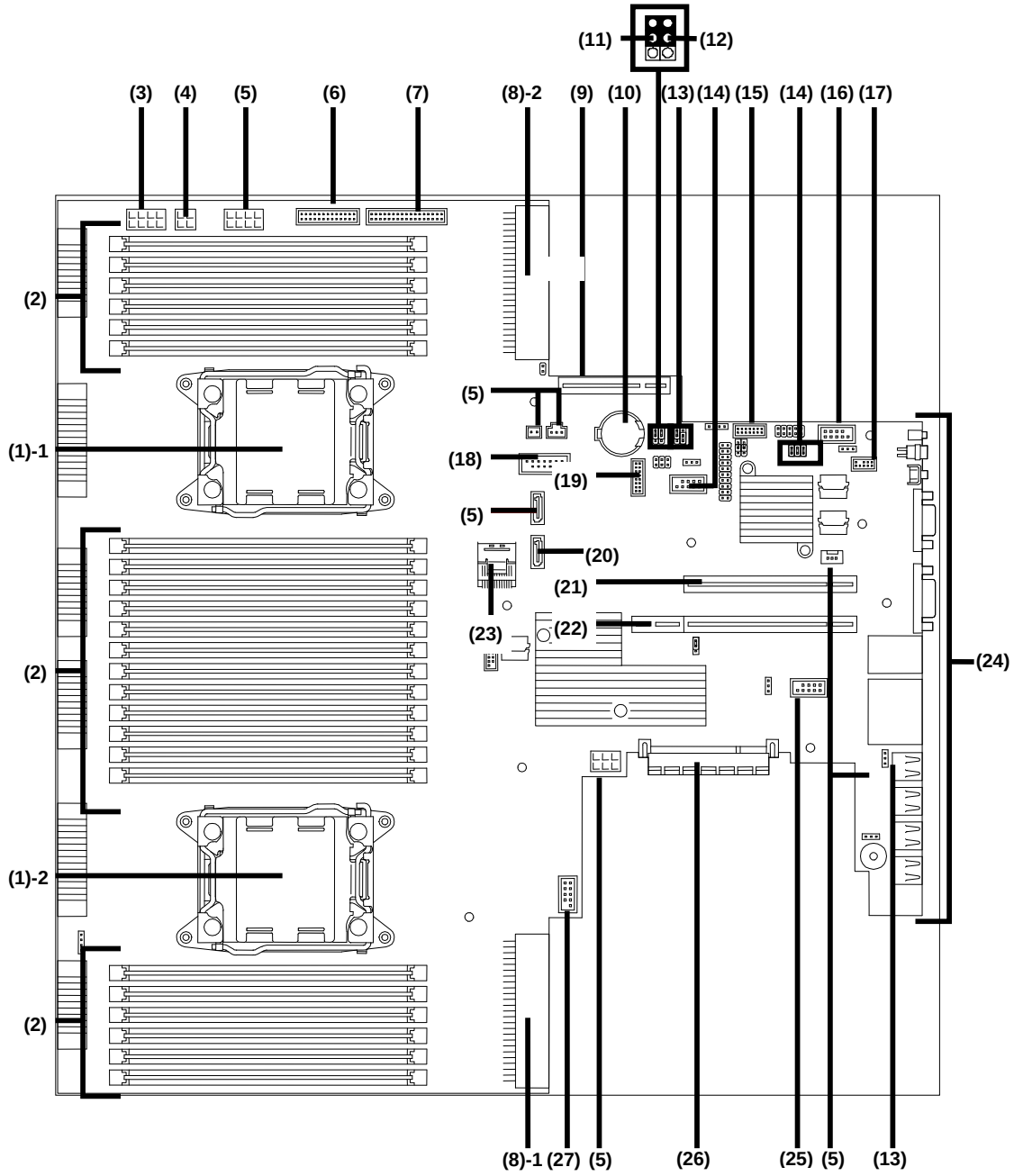
(9) Slot dedicated to RAID Controller

Assigned PCI slot number if "1A".

(10) Power Supply Unit

(11) Battery tray for RAID Controller

4.6 Motherboard



(1) Processor (CPU) socket
-1: Processor #1 (CPU #1)
-2: Processor #2 (CPU #2)

(2) DIMM socket

(3) DC connector

(4) SATA connector (for optical disk drive)

(5) Unused connector

(6) Front Panel connector

(7) Fan connector

(8) Power connector
-1: Standard power unit (POW #1)
-2: Optional power unit (POW #2)

(9) LAN riser card connector

(10) Lithium battery

(11) Clear CMOS Jumper switch

(12) Clear Password Jumper switch

(13) Unused connector

(14) USB memory module connector

(15) HDD BP connector

(16) Connector for option COM
Connect an additional RS-232C connector kit N8117-01A to use this port as a serial port.

(17) SPI Flash Mezzanine connector
EXPRESSSCOPE Profile Key (SPI flash memory) has been installed, where BIOS and BMC configuration data is stored. Relocate it when replacing motherboard to inherit configuration data.

(18) Front video connector

(19) TPM kit connector

(20) SATA connector (for optical disk drive)

(21) PCI Riser Card connector (dedicated to low profile cards)
For the supported card specifications, refer to *Chapter 2 (1.11 PCI card)*.

(22) PCI Riser Card connector (dedicated to full height cards)
For the supported card specifications, refer to *Chapter 2 (1.11 PCI card)*.

(23) SATA connector

(24) Connectors for external devices

(25) Internal Flash Memory connector

(26) RAID Controller connector

(27) USB connector (front)

4.7 Status Indicators

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

4.7.1 POWER LED ( )

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

The following table lists POWER LED patterns.

POWER LED pattern	Description
On (green)	The server is normally powered on.
On (amber)	BMC is being initialized. When the power cord is connected, the LED goes on amber for 40 seconds. The server can be powered on after the amber LED is unlit. Do not power on the server while the LED is lit amber.
Off	The server is off-powered. The server is in halt status.

4.7.2 STATUS LED (⚠)

While hardware is operating normally, STATUS LED lights green. STATUS LED is off or lights/flashes amber if there is a hardware failure.

The following table lists STATUS LED patterns.

Tips Once you have installed NEC ESMPRO, you can reference error logs to check the causes of failures.

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

4.7.3 LINK/ACT LED (1, 2, 3, 4)

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

LEDs 3 and 4 turns on, off, or flashes when an optional LAN riser card is installed.

The following table lists LINK/ACT LED patterns.

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

4.7.4 DISK Access LED ( )

DISK Access LED indicates the status of HDDs.

The following table lists DISK Access LED patterns.

DISK Access LED pattern	Description	Solution
On (green)	Hard disk drive is being accessed.	–
On (amber) (only when RAID system is configured)	Hard disk drive is failing.	Contact your sales representative.
Flashing green and amber alternately. (only when RAID system is configured)	Rebuild is in progress.	–
Off	Hard disk drive is halted.	–

4.7.5 Optical Disk Drive Access LED

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

4.7.6 UID LED (ID)

UID LED is provided one each at the front and rear of the server. If you press UID Switch provided at the front or rear of the server, the light turns on. If you press it again, the light turns off. It flashes when commands from software are received. This LED is used to identify the target server among multiple servers installed in a rack. Especially when performing maintenance from behind the server, lighting the LED will help you to identify which server to work with.

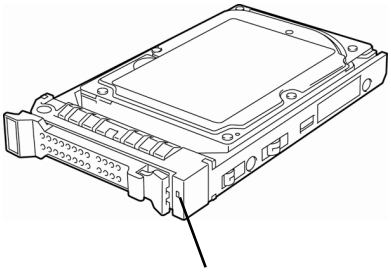
The following table lists UID LED patterns.

UID LED pattern	Description
On (blue)	The UID switch is pressed.
Off	The UID switch is not pressed.

Tips You can turn on an LED using remote management software.

4.7.7 LED on a hard disk drive

Each HDD is equipped with DISK LED.



DISK LED

The following table lists DISK LED patterns.

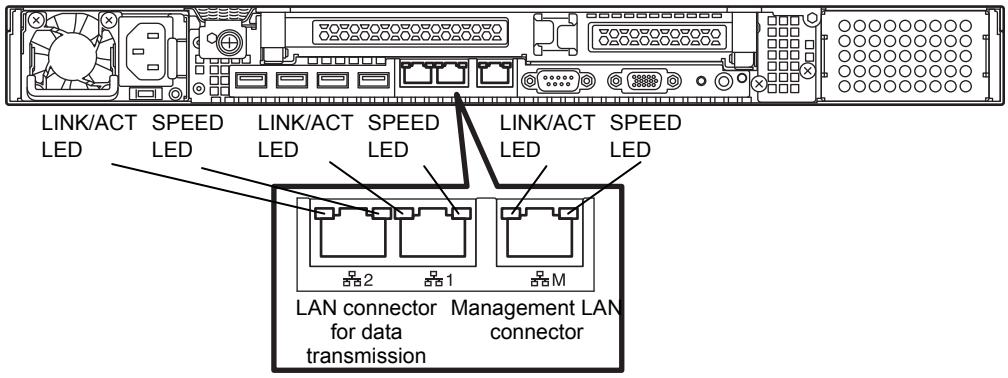
DISK LED pattern	Description	Solution
On (green)	Hard disk drive is being accessed.	–
On (amber) (only when RAID system is configured)	Hard disk drive is failing.	Contact your sales representative.
Flashing green and amber alternately. (only when RAID system is configured)	Rebuild is in progress. When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

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

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

4.7.8 LEDs for LAN connectors

Three LAN connectors provided at the rear of the server have two LEDs each.



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

  This LED indicates the state of the LAN port.

  The following table lists LINK/ACT LED patterns.

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

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

  This LED indicates which network interface is used.

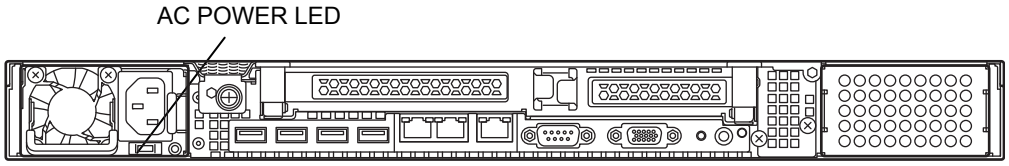
  – Two onboard LANs (1, 2) support 1000BASE-T, 100BASE-TX, and 10BASE-T.
  – Management LAN (M) supports 100BASE-TX and 10BASE-T.

  The following table lists LINK/ACT LED patterns.

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

4.7.9 AC POWER LED on Power Unit

The power unit is equipped with AC POWER LED.



Standard power unit

The following table lists LINK/ACT LED patterns.

AC POWER LED pattern	Description	Solution
On (green)	The server is powered on.	–
Flashing (green)	The power cable is connected and AC power is supplied.	–
	Cold Redundant feature is enabled. (See page 97.)	–
On (amber)	The power cable is not connected in redundant power configuration.	Connect the power cable.
	Power unit is failing.	Contact your sales representative.
Flashing (amber)	Power unit is failing.	

NEC Express5800 Series
Express5800/R120e-1M

2 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. **Location and Connection**

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

1. Installing Internal Optional Devices

This section describes the instructions for installing supported optional devices and precautions. If you did not purchase any optional device requiring installation, you may skip this section.

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

1.1 Safety Precautions

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

⚠ WARNING

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

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

⚠ CAUTION

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

- **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 Anti-static Measures

The server contains electronic components sensitive to static electricity. Avoid failures caused by static electricity when installing or removing any optional devices.

This product contains static-sensitive electronic components. Follow this measures below to avoid a failure caused by static electricity when installing or uninstalling any optional device.

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

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

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

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

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

- **Handling of Cables**
  When connecting a cable (e.g., LAN cable), static electricity may also be charged due to friction against the floor. Connecting the charged cable with an I/O device may cause damage to the devices in the system. It is recommended to use a product such as electrostatic discharge kit to eliminate the static charge before connecting the cable.

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

1.3 Overview of Installation and Removal

Install/remove components by using the following procedure.

Installing/removing internal components except for hard disk drives should be done after dismounting the server from the rack. It is recommended that more than one person removes the server from the rack.

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* in *Precautions for Use.*

- **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 (1.4 Confirming Servers (UID Switch))*.
2. Remove Front Bezel.
   See *Chapter 2 (1.5 Removing Front Bezel)*.
3. If the server is ON, turn it off.
   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 continuing to work because the components on the motherboard might still be operating for about 30 seconds even after the power cord was disconnected.**

5. You need to pull out the server from rack and put it on a flat rigid desk when installing or removing the components other than the following two devices:
   See *Chapter 2 (2.1 Installation)* for details.

   Hard disk drive Power supply unit

Important **Do not leave the server open on the rack.**

If you are going to install a hard disk drive only, go to step 10.

6. Remove Top Cover.
   See *Chapter 2 (1.6 Removing Top Cover)*.
7. Depending on the components to be installed or removed, follow the procedure in order.
   See *Chapter 2 (1.7 Internal Flash Memory*) to (*1.16 Use of Internal Hard Disk Drives in the RAID System*).

8. Attach Top Cover.
   See *Chapter 2* (*1.17 Installing Top Cover)*.
9. Mount the server onto the rack.
   See *Chapter 2 (2.1.2 (1) Installation).*
10. Install hard disk drives
    See *Chapter 2 (1.18 Hard Disk Drive)*.
11. Install power supply units
    See *Chapter 2 (1.19 Power Supply Unit)*.
12. Attach Front Bezel.
    See *Chapter 2 (1.20 Installing Front Bezel).*

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

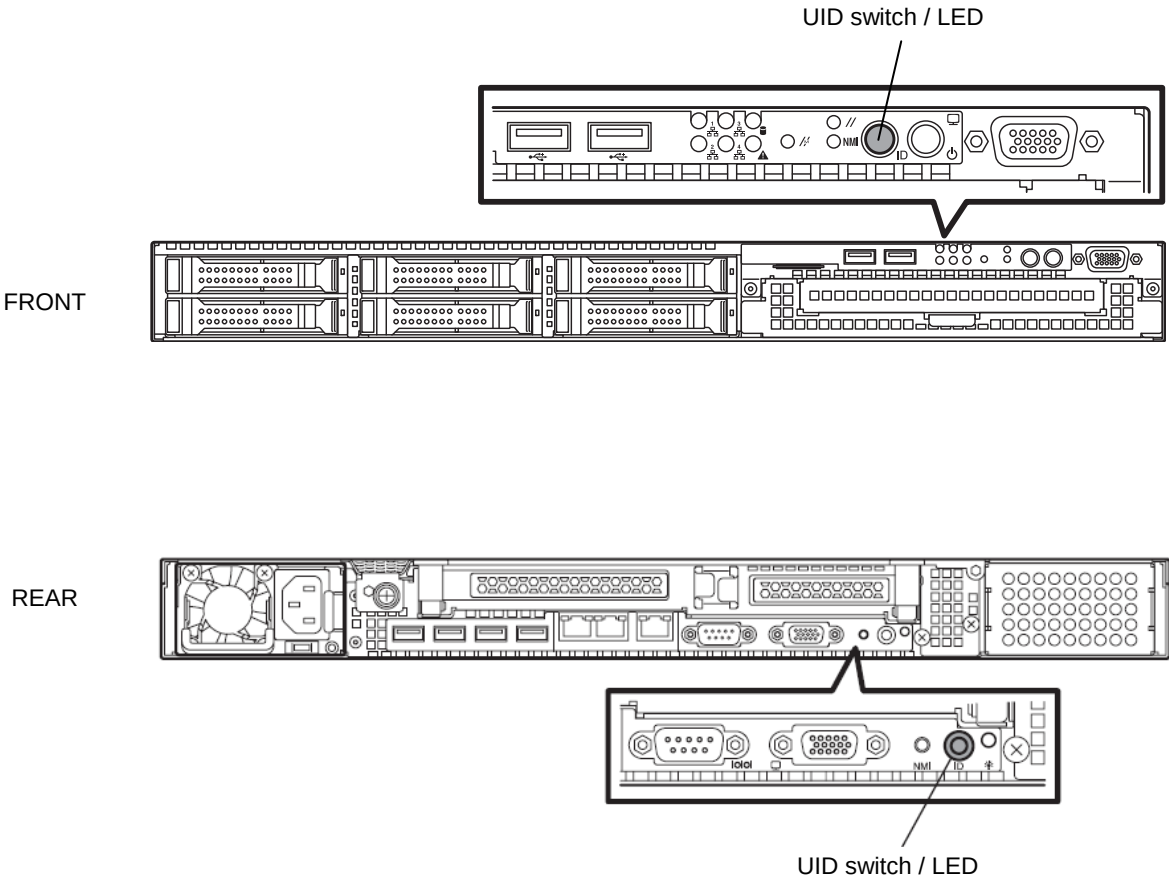
Continue the setup with reference to *Chapter 2 (2.2 Connection)*.

1.4 Confirming Servers (UID Switch)

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

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

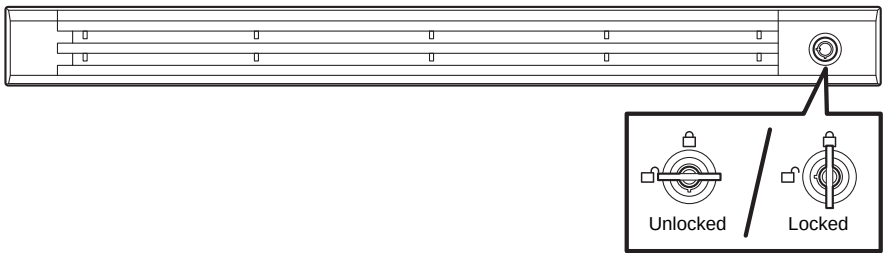
To turn UID LED on, press UID Switch. When it is pressed again, the LED will be off.



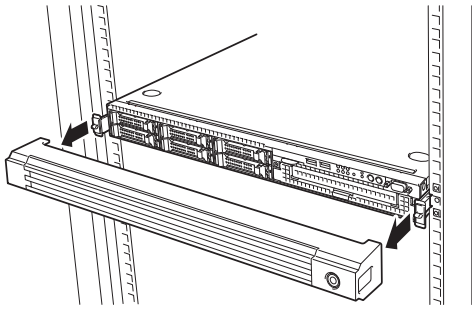
1.5 Removing Front Bezel

To remove Front Bezel, follow the steps below.

1. Insert the attached Bezel Lock Key into the key slot and turn the key to the front bezel side while pressing it lightly to release the lock.



2. Pull the Front Bezel toward you to release the tab from the frame and then remove Front Bezel from the server.



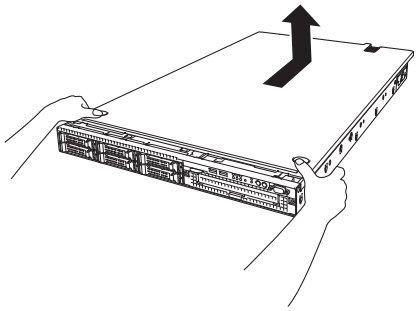
Note Be careful not to press POWER Switch.

1.6 Removing Top Cover

You need to remove top cover when installing or removing the following component:

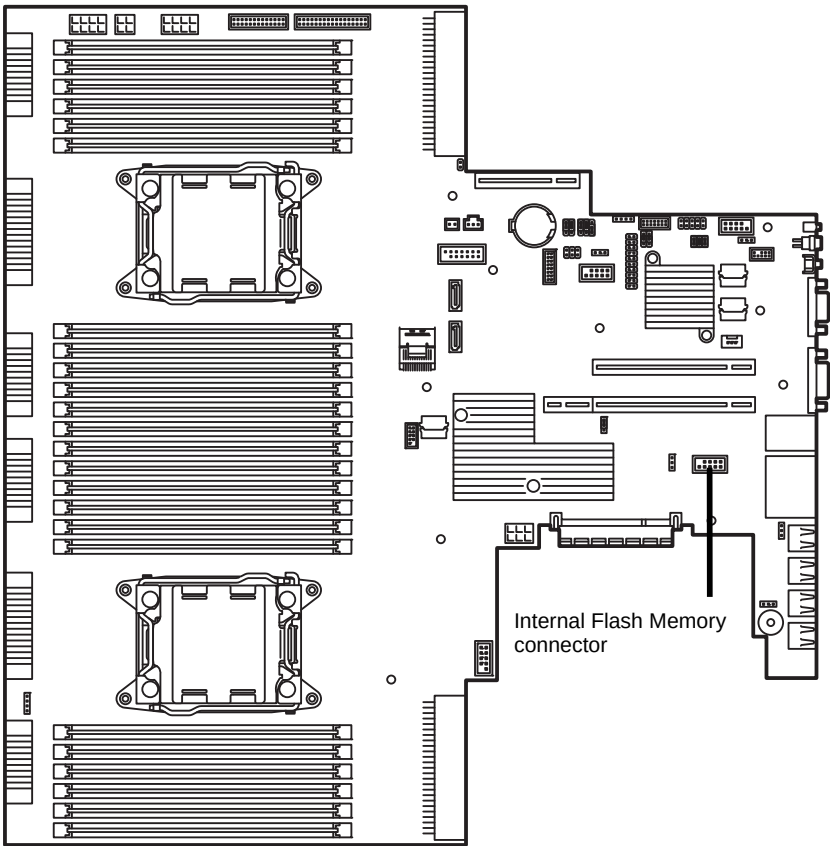
Optical disk drive,	LAN riser card,
DIMM,	Processor,
TPM module,	Internal Flash Memory,
Additional HDD cage,	PCI card,
RAID Controller,	Battery for RAID Controller

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Loosen thumb nut located on rear panel.
3. Slide Top Cover toward the rear of the server while pressing Release Button on the cover.
4. Lift the cover, and remove it from the server.



1.7 Internal Flash Memory

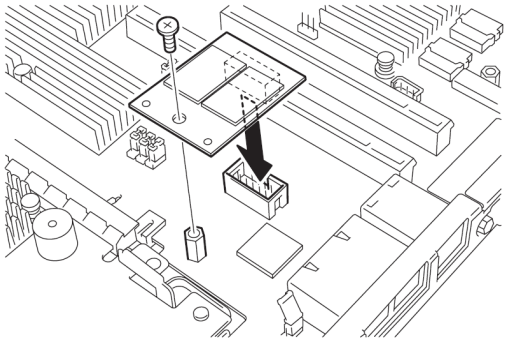
This section describes the procedure for installing Internal Flash Memory (optional).



1.7.1 Installation

Install Internal Flash Memory in the following procedure.

1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Attach Internal Flash Memory and fix it with the screw provided with Internal Flash Memory.

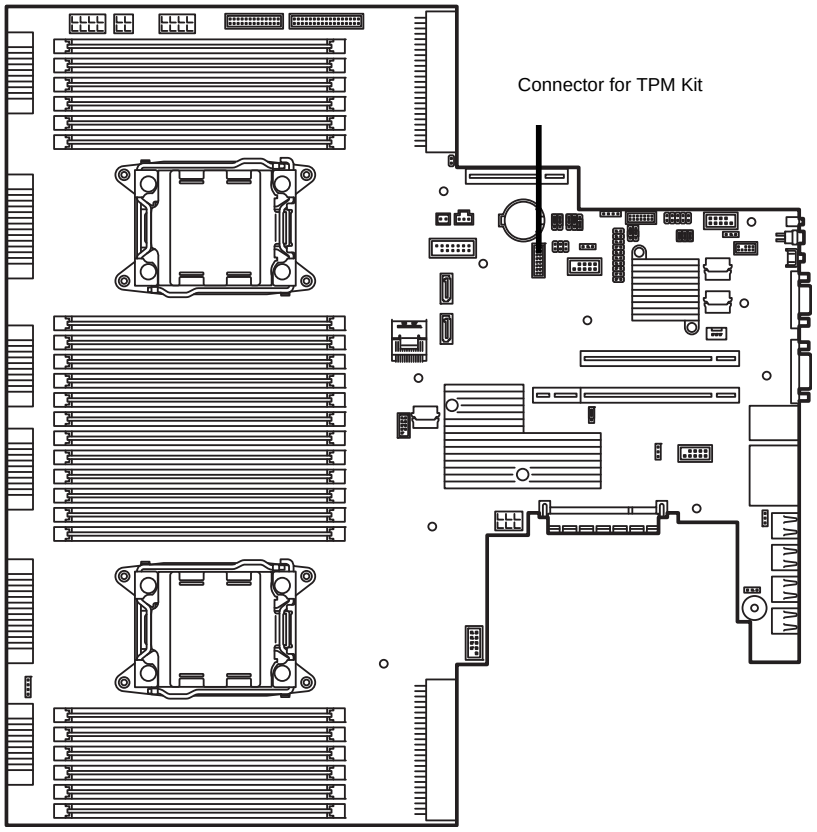


1.7.2 Removal

To remove Internal Flash Memory, reverse the installation procedure.

1.8 TPM Kit

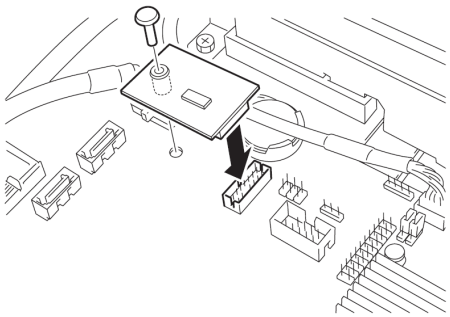
This section describes the procedure for installing optional TPM Kit.



1.8.1 Installation

Install TPM Kit in the following procedure.

1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Install TPM Kit and secure it by pushing the nylon rivet provided with TPM Kit.



Note The TPM kit once installed cannot be removed.

1.9 Processor

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

Important

- **You must avoid static electricity to work with the procedure below. For details, see *Chapter 2 (1.2 Anti-static Measures)*.**
- **Make sure to use the processor authorized by NEC. Installing a third-party processor may cause a failure of the processor as well as the motherboard. Repair of the server due to failures or damage resulted from installing such a processor will be charged.**

Tips

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

1.9.1 Maximum number of processor cores supported by this server

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

Maximum number of processor cores

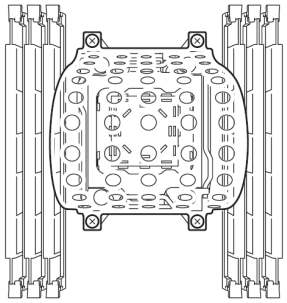
OS	The maximum number of logical processors supported by OS	The maximum number of logical processors supported by this server
Microsoft Windows Server 2008 Standard Microsoft Windows Server 2008 Enterprise	32	32
Microsoft Windows Server 2008 Standard (x64) Microsoft Windows Server 2008 Enterprise (x64)	64	48
Microsoft Windows Server 2008 R2 Standard (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	256	48
Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter	640 *1	48
Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter	640 *1	48

*1: Up to 320 when Hyper-V featurre is used.

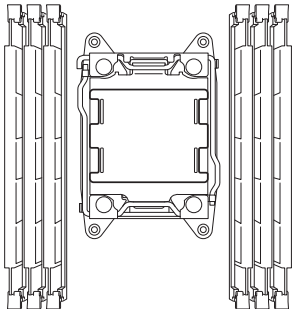
1.9.2 Installation

Follow steps below to install the processor.

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

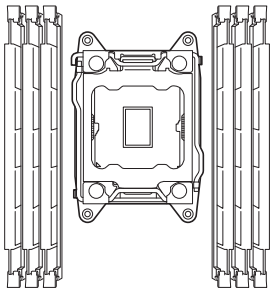


3. Remove the screws that secure the dummy cover, and remove it.



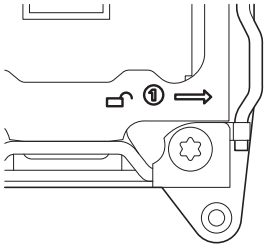
Note Keep the removed dummy cover for future use.

4. Remove the protective cover from the CPU socket.

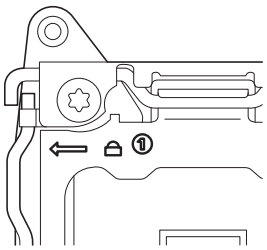


Note Keep the removed protective cover for future use.

5. Push down the socket lever marked with "  " once to unlatch it from the hook, then slowly open the lever until it stops.



6. Push down the socket lever marked with "  " once to unlatch it from the hook, then slowly open the lever until it stops.

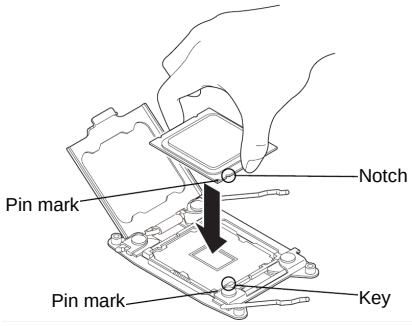


7. Lift the plate.

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

8. Put the additional processor on the CPU socket slowly and gently.

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



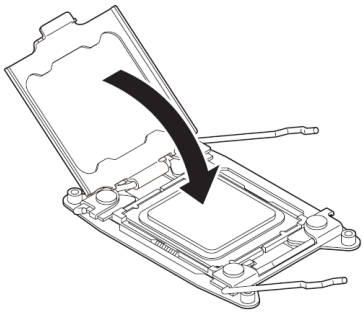
Important

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

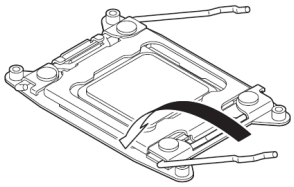
Note

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

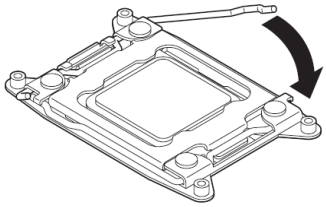
9. Lightly push the processor to the CPU socket, and close the plate.



10. Close the socket lever marked with "← ① " to fix it.



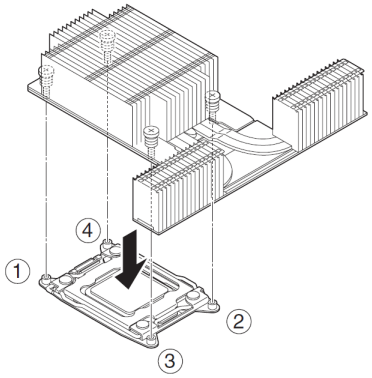
11. Close the socket lever marked with " ① → " to fix it.



12. Put the heat sink on the processor and fix the heat sink with four screws.

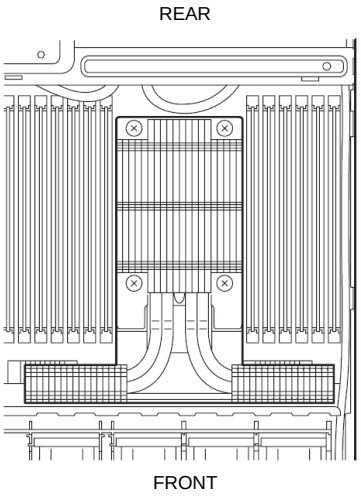
    Temporarily tighten the four screws diagonally, then tighten them securely.

    Make sure that the screw aligns with the screw hole. If not, the screw may damage the motherboard.



Note Make sure the location to put the heat sink.

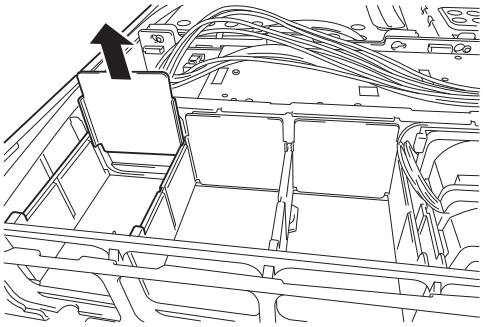
13. Make sure that the heat sink is installed on a level with the motherboard.



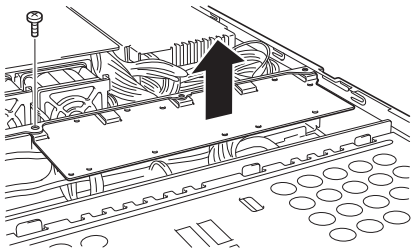
Note

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

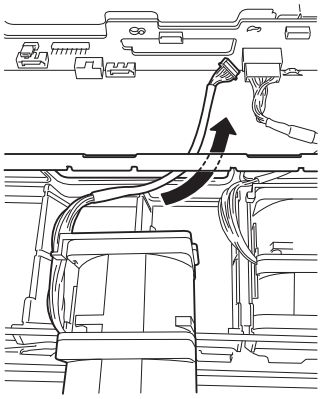
14. Install an additional fan unit provided with additional CPU board. Remove fan cover from the slot where you are going to install an additional fan.



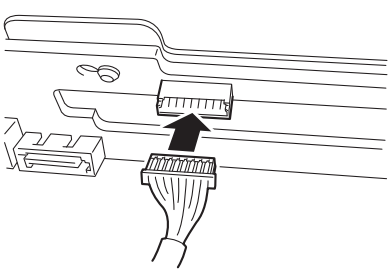
15. Remove a single screw from the tray, and remove the battery tray for RAID Controller.

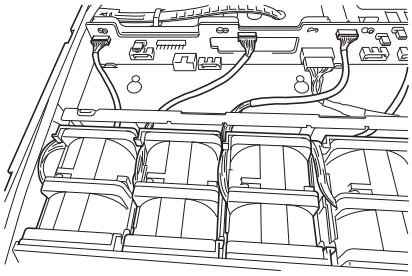


16. Pass the cable below the cage, and set the additional fan unit.

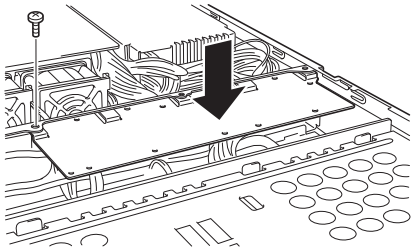


17. Connect fan cable securely to HDDBP connector.





18. When the additional fan unit is installed, secure the battery tray for RAID Controller with a single screw you have removed in Step 15.



19. Continue to install or remove internal optional devices, mount and connect the server, and turn it on.

20. Run BIOS Setup Utility (SETUP) to confirm the following settings. See *Chapter 2 (1. Details of System BIOS)* in "*Maintenance Guide*".

Advanced → Processor Configuration → Processor Information

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

1.9.3 Replacement / Removal

To remove processor (CPU), reverse the installation procedure.

Perform the following steps if using the server with the processor (CPU) being removed.

1. Mount the protective cover to processor (CPU) socket.
2. Secure the dummy cover to the slot with four screws.
3. Remove the additional fan.
4. Mount the fan cover.

Important

- **Do not remove any processor unless it is failed.**
- **To remove the heat sink from the processor, first turn the heat sink to the left and right lightly to make sure that the heat sink can be apart from the processor.**
  Removing the heat sink with it adhering to the processor may cause the processor and/or CPU socket to be defected.

1.10 DIMM

Install a DIMM (Dual Inline Memory Module) to a DIMM socket on the motherboard in the server. The motherboard provides twenty-four sokets to install DIMMs.

Important

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

Tips

Up to 1.5 TB (64 GB x 24) can be installed in 2-CPU configuration. Up to 768 GB (64 GB x 12) can be installed in 1-CPU configuration. No DIMM is factory installed in standard configuration.

1.10.1 Maximum supported memory size

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

List of maximum memory sizes

OS	The maximum memory size supported on each OS	The maximum memory size supported on the server
Microsoft Windows Server 2008 Standard	4 GB	4 GB (If using HW-DEP feature) * Default factory settings
		About 2 GB (If not using HW-DEP feature) Note: If you are not using the HW-DEP feature, set **Execute Disable Bit (XD Bit)** to **Disabled** in the BIOS settings.
Windows Server 2008 Standard x64 Edition Windows Server 2008 R2 Standard x64 Edition	32 GB	32 GB
Windows Server 2008 Enterprise x86 Edition	64 GB	64GB
Microsoft Windows Server 2008 Enterprise (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	2TB	1.5TB
Microsoft Windows Server 2012 Standard *1 Microsoft Windows Server 2012 Datacenter *1	4TB	1.5TB

*1: Up to 1 TB on virtual machine.

1.10.2 Memory Clock

The server supports the memory clock speed of DDRL3-1066/1333/1600MHz. However, the actual memory clock speed depends on CPU and memory configuration. (The all of DIMMs operate at the same clock speed.)

- The factory-set memory clock speed is 1.35 V (power-saving mode). You can change this setting in BIOS SETUP menu.
- The system operates at 1.5 V of memory clock speed in the configuration listed below (setting of 1.35 V is not allowed).

Server model number (CPU type)	Type of DIMMs	Number of DIMMs (per 1 CPU)	Clock speed	
			Supply voltage 1.35V	Supply voltage 1.5V
N8101-675F (E5-2609v2)	N8102-534F 8GB DDR3-1600 UNB Memory Kit	Up to 4 sets (8 DIMMs)	1333 MHz	1333 MHz
	N8102-537F 8GB DDR3-1600 REG Memory Kit N8102-538F 16GB DDR3-1600 REG Memory Kit	Up to 4 sets (8 DIMMs)	1333 MHz	1333 MHz
	N8102-539F 32GB DDR3-1600 REG Memory Kit N8102-548 8GB DDR3-1600 REG Memory Kit N8102-549 16GB DDR3-1600 REG Memory Kit N8102-550 32GB DDR3-1600 REG Memory Kit	5 sets (10 DIMMs) or more	800 MHz	1066 MHz
	N8102-540F 64GB DDR3-1600 LR Memory Kit	Up to 4 sets (8 DIMMs)	1333 MHz	1333 MHz
		5 sets (10 DIMMs) or more	1066 MHz	1066 MHz
	N8102-541F 128GB DDR3-1333 LR Memory Kit	–	1066 MHz	1066 MHz
	N8102-545F 16GB DDR3-1866 REG Memory Kit N8102-546F 32GB DDR3-1866 REG Memory Kit	Up to 2 sets (4 DIMMs)	–	1333 MHz
	N8102-552 12GB DDR3-1600 REG Memory Kit N8102-553 24GB DDR3-1600 REG Memory Kit N8102-554 48GB DDR3-1600 REG Memory Kit	–	800 MHz	1066 MHz
N8101-676F (E5-2620v2) N8101-677F (E5-2630v2) N8101-678F (E5-2630Lv2)	N8102-534F 8GB DDR3-1600 UNB Memory Kit	Up to 4 sets (8 DIMMs)	1333 MHz	1600 MHz
	N8102-537F 8GB DDR3-1600 REG Memory Kit N8102-538F 16GB DDR3-1600 REG Memory Kit	Up to 4 sets (8 DIMMs)	1333 MHz	1600 MHz
	N8102-539F 32GB DDR3-1600 REG Memory Kit N8102-548 8GB DDR3-1600 REG Memory Kit N8102-549 16GB DDR3-1600 REG Memory Kit N8102-550 32GB DDR3-1600 REG Memory Kit	5 sets (10 DIMMs) or more	800 MHz	1066 MHz
	N8102-540F 64GB DDR3-1600 LR Memory Kit	Up to 4 sets (8 DIMMs)	1600 MHz	1600 MHz
		5 sets (10 DIMMs) or more	1066 MHz	1066 MHz
	N8102-541F 128GB DDR3-1333 LR Memory Kit	–	1066 MHz	1066 MHz
	N8102-545F 16GB DDR3-1866 REG Memory Kit N8102-546F 32GB DDR3-1866 REG Memory Kit	Up to 2 sets (4 DIMMs)	–	1600 MHz
	N8102-552 12GB DDR3-1600 REG Memory Kit N8102-553 24GB DDR3-1600 REG Memory Kit N8102-554 48GB DDR3-1600 REG Memory Kit	–	800 MHz	1066 MHz

Server model number (CPU type)	Type of DIMMs	Number of DIMMs (per 1 CPU)	Clock speed	
			Supply voltage 1.35V	Supply voltage 1.5V
N8101-679F (E5-2637v2)	N8102-534F 8GB DDR3-1600 UNB Memory Kit	Up to 4 sets (8 DIMMs)	1333 MHz	1600 MHz
N8101-680F (E5-2640v2) N8101-681F (E5-2650v2) N8101-682F (E5-2660v2) N8101-683F (E5-2670v2) N8101-684F (E5-2690v2) N8101-686F (E5-2695v2) N8101-685F (E5-2697v2)	N8102-537F 8GB DDR3-1600 REG Memory Kit N8102-538F 16GB DDR3-1600 REG Memory Kit	Up to 4 sets (8 DIMMs)	1333 MHz	1600 MHz
	N8102-539F 32GB DDR3-1600 REG Memory Kit N8102-548 8GB DDR3-1600 REG Memory Kit N8102-549 16GB DDR3-1600 REG Memory Kit N8102-550 32GB DDR3-1600 REG Memory Kit	5 sets (10 DIMMs) or more	800 MHz	1066 MHz
	N8102-540F 64GB DDR3-1600 LR Memory Kit	Up to 4 sets (8 DIMMs)	1600 MHz	1600 MHz
		5 sets (10 DIMMs) or more	1066 MHz	1066 MHz
	N8102-541F 128GB DDR3-1333 LR Memory Kit	–	1066 MHz	1066 MHz
	N8102-545F 16GB DDR3-1866 REG Memory Kit N8102-546F 32GB DDR3-1866 REG Memory Kit	Up to 2 sets (4 DIMMs)	–	1866 MHz
	N8102-552 12GB DDR3-1600 REG Memory Kit N8102-553 24GB DDR3-1600 REG Memory Kit N8102-554 48GB DDR3-1600 REG Memory Kit	–	800 MHz	1066 MHz

1.10.3 Memory RAS Feature

The server supports the following RAS features. Some restrictions (e.g., DIMM installation location) are imposed on using the Memory Mirroring or Memory LockStep feature. See *Chapter 2 (1.10.7 Using Memory RAS Feature*) for conditions appropriate to your requirements.

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

Supported RAS features depend on additiional memory board.
See the table below for RAS features supported by additiional memory board.

List of features supported by additiional memory board

N code Product name	Standard feature (x4 SDDC)	Memory Mirroring feature	Memory LockStep feature (x8 SDDC)	Memory Sparing feature
N8102-534F 8GB DDR3-1600 UNB Memory Kit	○	×	×	×
N8102-537F 8GB DDR3-1600 REG Memory Kit	○	×	×	×
N8102-538F 16GB DDR3-1600 REG Memory Kit	○	×	×	×
N8102-539F 32GB DDR3-1600 REG Memory Kit	○	×	×	×
N8102-540F 64GB DDR3-1600 LR Memory Kit	○	×	×	×
N8102-541F 128GB DDR3-1333 LR Memory Kit	○	×	×	×
N8102-545F 16GB DDR3-1866 REG Memory Kit	○	×	×	×
N8102-546F 32GB DDR3-1866 REG Memory Kit	○	×	×	×
N8102-548 8GB DDR3-1600 REG Memory Kit	×	○	○	×
N8102-549 16GB DDR3-1600 REG Memory Kit	×	○	○	×
N8102-550 32GB DDR3-1600 REG Memory Kit	×	○	○	×
N8102-552 12GB DDR3-1600 REG Memory Kit	×	×	×	○
N8102-553 24GB DDR3-1600 REG Memory Kit	×	×	×	○
N8102-554 48GB DDR3-1600 REG Memory Kit	×	×	×	○
N8102-582F 4GB DDR3-1600 REG Memory Kit	○	×	×	×

○: Supported, ×: Not supported

1.10.4 DIMM installation order

Note

- DIMM installation order in 1-CPU configuration differs from that in 2-CPU configuration.
- If CPU2 is not installed, CPU2_DIMM1 to CPU2_DIMM12 are disabled.
- See *List of features supported by additiional memory board* before using memory RAS feature.

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

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

Installation order depends on combination of DIMMs to be installed. See the table below to find allowable combination of DIMMs, and install DIMMs starting from the largest capacity and from the smallest slot number.

N code	N8102-							
	534F	537F	538F	539F	540F	541F	545F	546F
N8102-534F	○	×	×	×	×	×	×	×
N8102-537F	×	○	○	○	×	×	×	×
N8102-538F	×	○	○	○	×	×	×	×
N8102-539F	×	○	○	○	×	×	×	×
N8102-540F	×	×	×	×	○	○	×	×
N8102-541F	×	×	×	×	○	○	×	×
N8102-545F	×	×	×	×	×	×	○	○
N8102-546F	×	×	×	×	×	×	○	○

○: Allowed to be install together. ×: Not allowed to be install together.

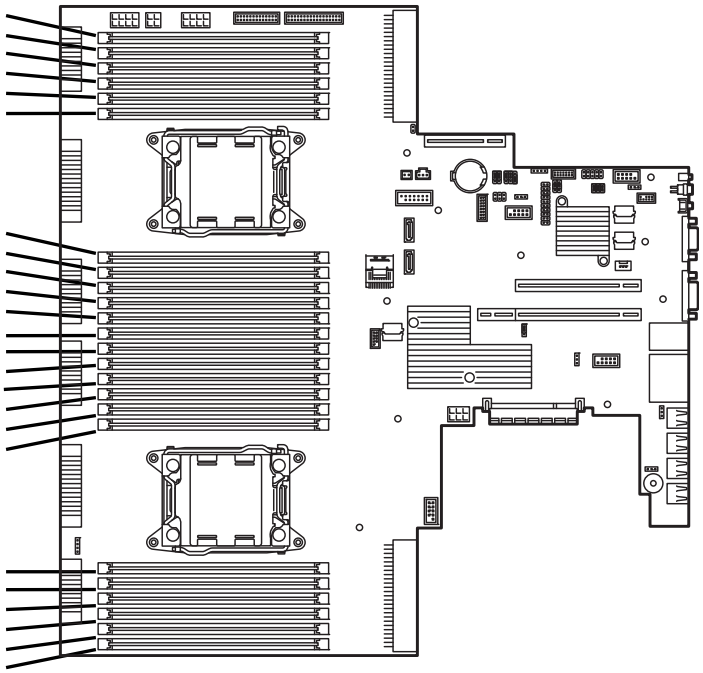
N code	N8102-		
	548*	549*	550*
N8102-548	○	○	○
N8102-549	○	○	○
N8102-550	○	○	○

○: Allowed to be install together. ×: Not allowed to be install together.
* : Any other combination of DIMMs than described in this table is not allowed.

N code	N8102-		
	552*	553*	554*
N8102-552	○	×	×
N8102-553	×	○	×
N8102-554	×	×	○

○: Allowed to be install together. ×: Not allowed to be install together.
* : Any other combination of DIMMs than described in this table is not allowed.

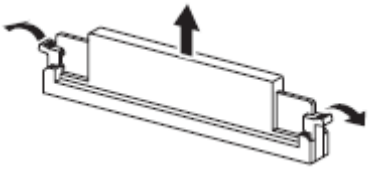
1CPU configuration	2CPU configuration	
2	3	CPU1_DIMM 3
4	7	CPU1_DIMM 7
6	11	CPU1_DIMM 11
2	3	CPU1_DIMM 4
4	7	CPU1_DIMM 8
6	11	CPU1_DIMM 12
5	9	CPU1_DIMM 10
3	5	CPU1_DIMM 6
1	1	CPU1_DIMM 2
5	9	CPU1_DIMM 9
3	5	CPU1_DIMM 5
1	1	CPU1_DIMM 1
	4	CPU2_DIMM 3
	8	CPU2_DIMM 7
	12	CPU2_DIMM 11
	4	CPU2_DIMM 4
	8	CPU2_DIMM 8
	12	CPU2_DIMM 12
	10	CPU2_DIMM 10
	6	CPU2_DIMM 6
	2	CPU2_DIMM 2
	10	CPU2_DIMM 9
	6	CPU2_DIMM 5
	2	CPU2_DIMM 1



1.10.5 Installation

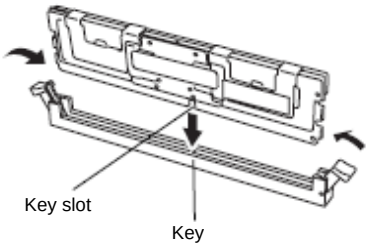
Install a DIMM by using the following procedure.

1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Open levers on left and right sides of DIMM slot, and remove the dummy cover.



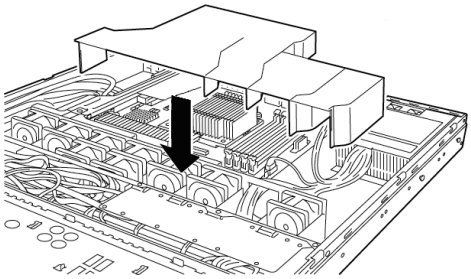
Note Keep the removed dummy cover for future use.

3. Push the DIMM straight into the socket. When a DIMM is inserted into the socket, the lever automatically closes.



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

4. Attach the duct.



5. Continue to install or remove internal optional devices, mount and connect the server, and turn it on.
6. Confirm that no error messages are displayed in POST screen.
   If any error messages are displayed, see *Chapter 3 (1. POST Error Message)* in "*Maintenance Guide*".
7. Run BIOS Setup Utility, and select **Memory Configuration** and then **Memory Information** from the **Advanced** menu. Make sure the capacity of added DIMM is displayed properly.
   See *Chapter 2 (1. Details of System BIOS)* in "*Maintenance Guide*".
8. Select **Memory Configuration** from the **Advanced** menu, and then specify **Yes** for **Memory Retest**. After that, select **Save Changes and Exit** to reboot.
9. Set the size of Paging File to the recommended value (Total memory size x 1.5) or more.
   If using a Windows OS, see *Chapter 1 (7.1 Specifying Memory Dump Settings (Debug Information))* in "*Installation Guide (Windows)*".
   For other OS, follow the manual of the OS.

1.10.6 Removal / Replacement

To remove DIMM, reverse the installation procedure.

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

Important **Failing to install dummy cover to vacant slot may cause malfunction of the server due to insufficient cooling effect.**

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.
- At least one DIMM needs to be installed for the server to operate.

Take the steps below after replacing or removing DIMMs.

1. Confirm that no error messages are displayed on POST. If any error message is displayed, see *Chapter 3 (1. Post Error Message)* in "*Maintenance Guide*".
2. Run BIOS Setup Utility, select **Memory Configuration** from the **Advanced** menu, and then specify **Yes** for **Memory Retest**. After that, select **Save Changes and Exit** to reboot.
3. Set the size of Paging File to the recommended value (Total memory size x 1.5) or more.
   If using a Windows OS, see *Chapter 1 (7.1 Specifying Memory Dump Settings (Debug Information))* in "*Installation Guide (Windows)*".
   For other OS, follow the manual of the OS.

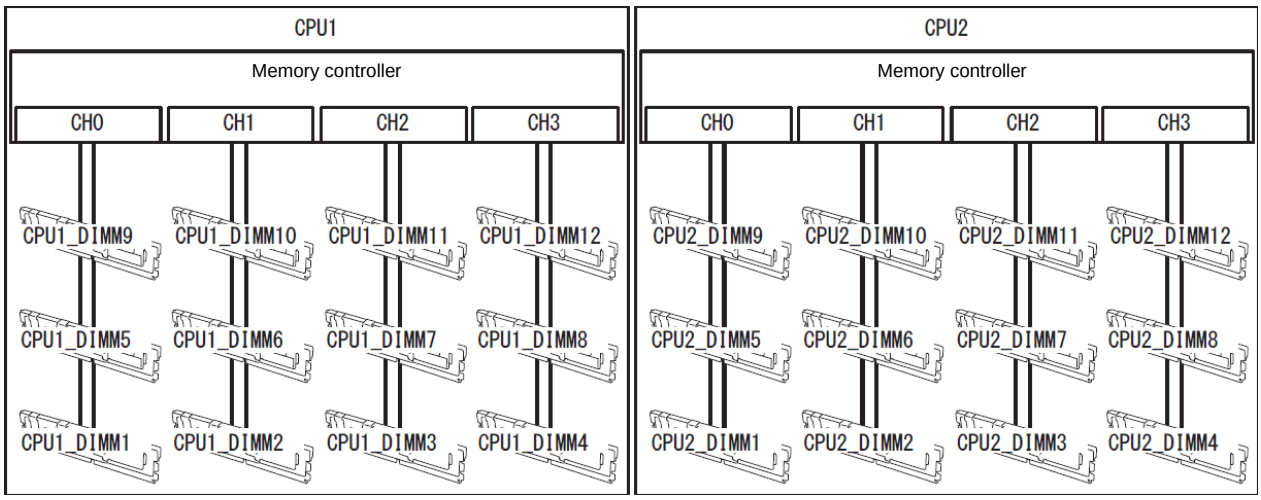
1.10.7 Using Memory RAS Feature

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

Note

- See *List of features supported by additiional memory board* in *1.10.3 Memory RAS Feature* before using memory RAS feature.
- Only the features that additiional memory board support can be used.

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



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

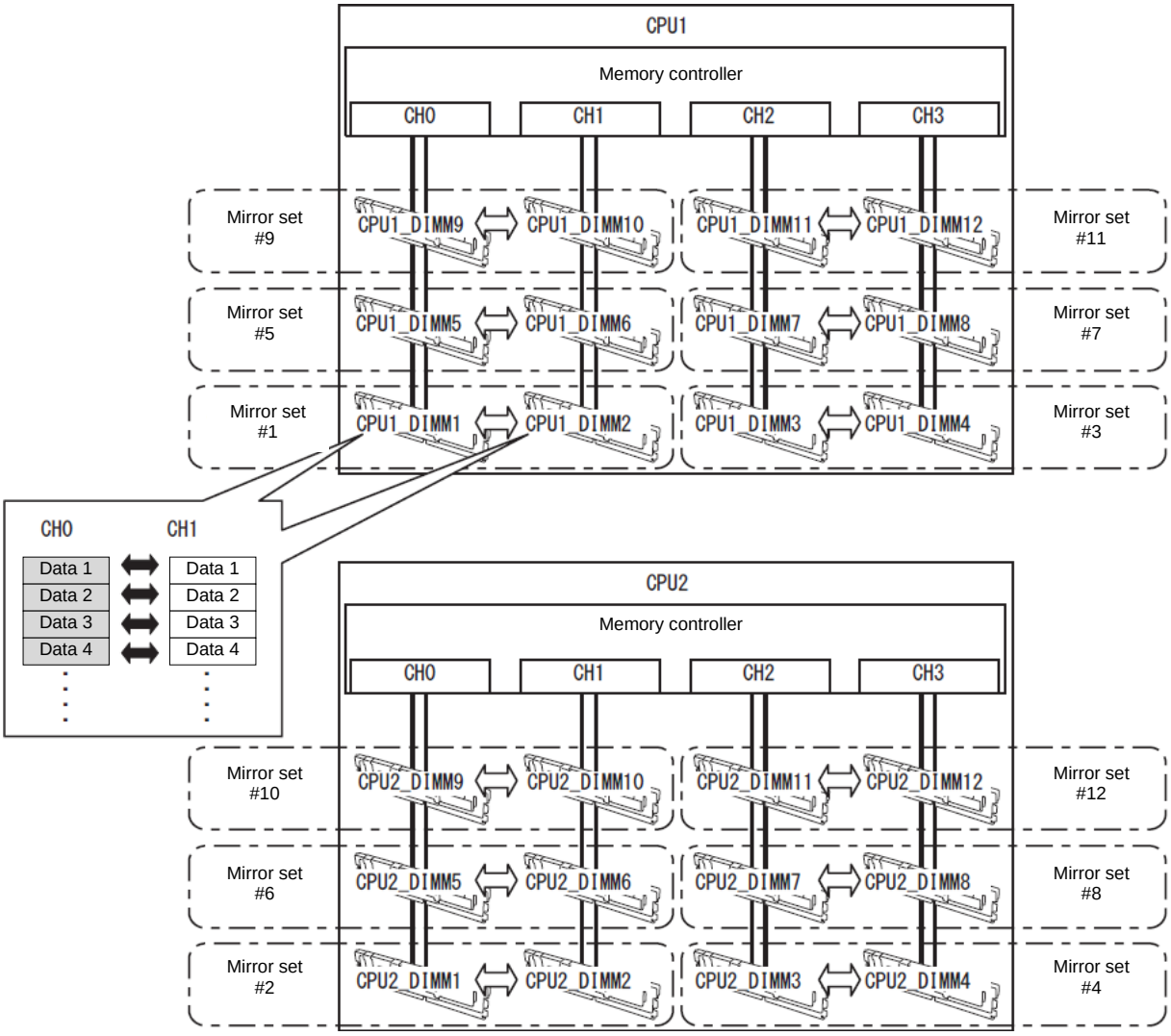
(1) Memory Mirroring Feature

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

Note

- Memory Mirroring feature uses channels 0 and 1 or channels 2 and 3.
- To use Memory Mirroring feature, install N8102-548/549/550 additional memory board (two DIMMs of same model).
- DIMMs used in mirror set must be of the same model number.

Example: 2-CPU configuration

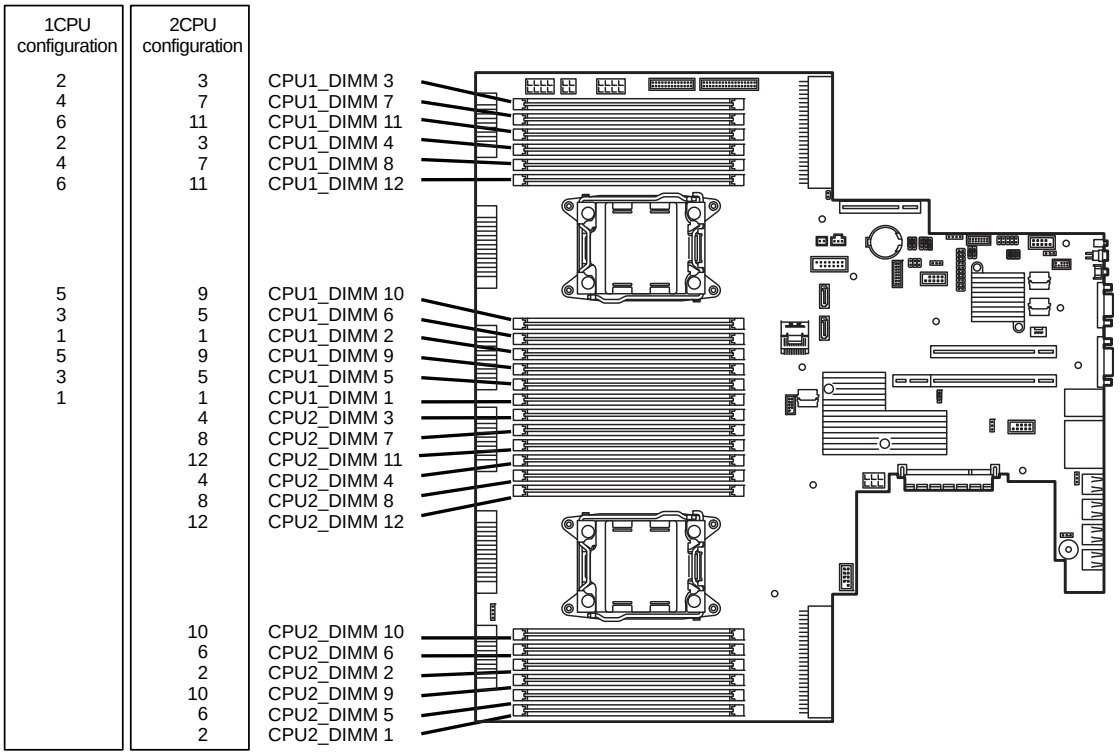


Tips

The operating system only recognizes a half of the total physical capacity.

Memory Mirroring feature can be used under the following conditions:

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



Memory Mirroring cannot be configured in the following case:

- Memory Mirroring within a specific memory channel

Notes on Configuring Memory Mirroring

In Memory Mirroring configuration, [Memory RAS Mode] menu is changed from "Mirroring" to "Independent" in the following cases:

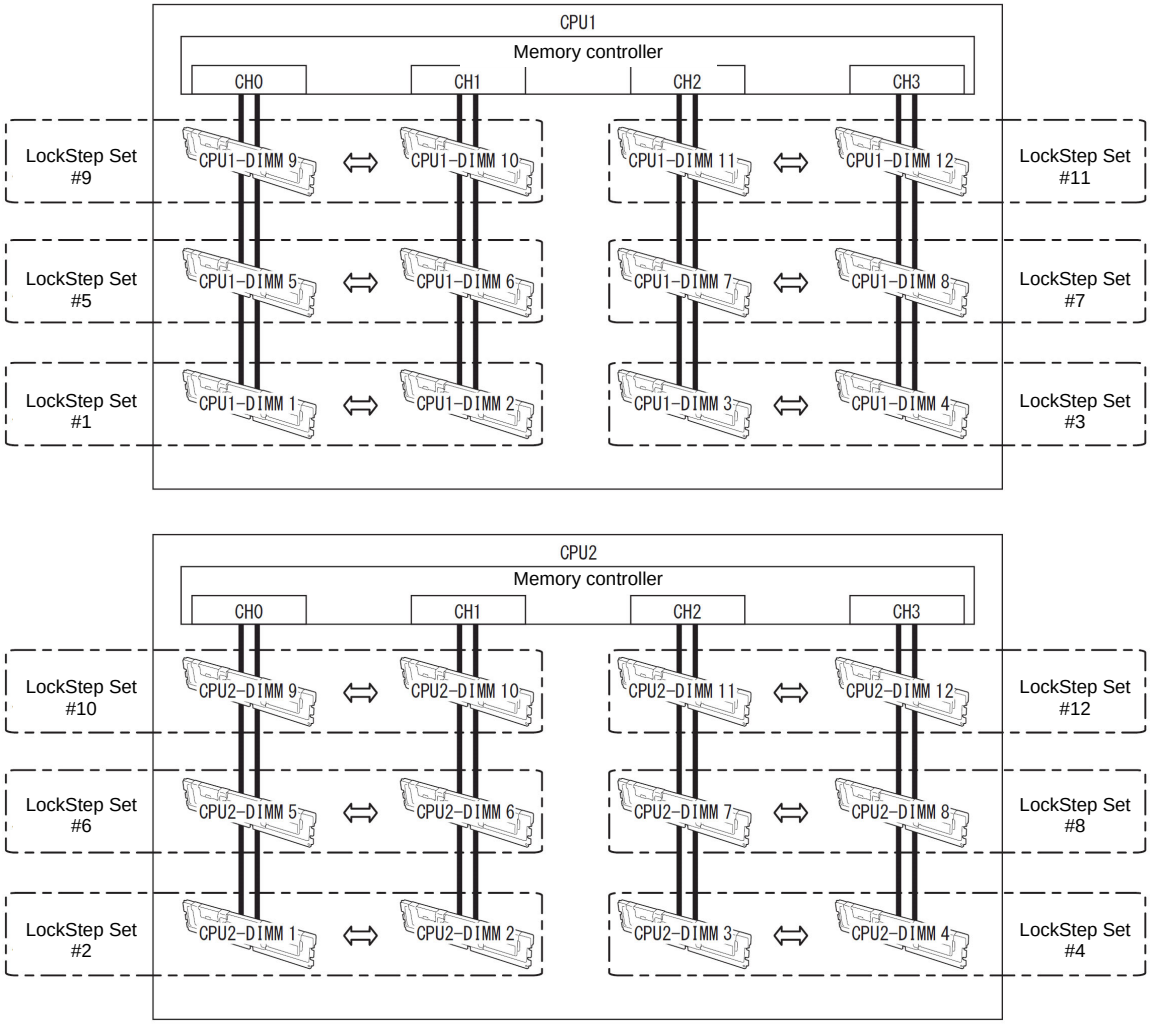
- When you additionally install DIMMs that unable to configure Memory Mirroring
- When you remove DIMMs that takes down Memory Mirroring

(2) Memory Lock Step Feature (x8 SDDC)

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

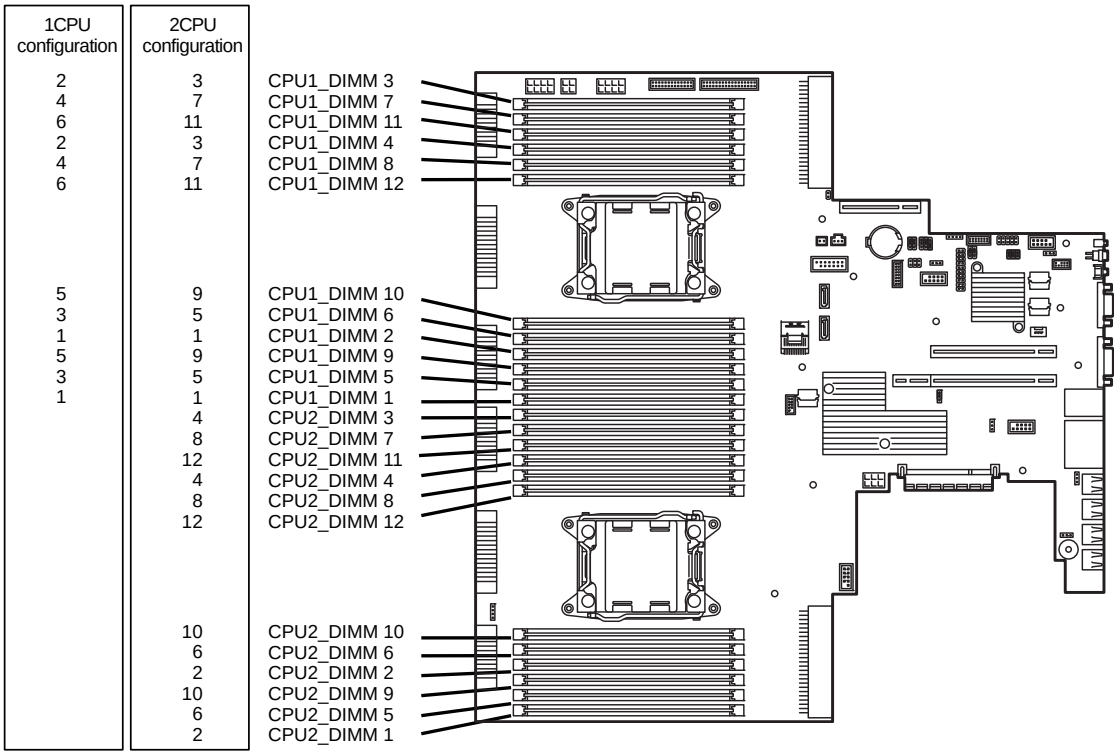
Note

- Memory LockStep feature uses channels 0 and 1 or channels 2 and 3.
- To use Memory LockStep feature, install N8102-548/549/550 additional memory board (two DIMMs of same model).
- DIMMs used in LockStep set must be of the same model number.



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

- Install DIMMs that operate in parallel in DIMM socket.
- All the installed DIMMs should have the same capacity.
- See *Chapter 2 (1. System BIOS)* in "*Maintenance Guide*", run SETUP, change parameters as shown below, save the settings, and exit from SETUP.
  Advanced → **Memory Configuration** → **Memory RAS Mode** → Change to **LockStep**.
- After restart, run SETUP again, and check if "**Lock Step**" is displayed for the following parameter.
  Advanced → **Memory Configuration** → **Memory Information** → **CPUx_DIMMx Status**
- Installation order depends on CPU configuration. See the figure below.



Memory Lock Step cannot be configured in the following cases:

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

Notes on Configuring Lock Step

In Memory Lock Step configuration, **Memory RAS Mode** menu is changed from "**Lock Step**" to "**Independent**" in the following cases:

- When you additionally install DIMMs that unable to configure Memory Lock Step
- When you remove DIMMs that takes down Memory Lock Step

(3) Memory Sparing Feature

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

Note

To use Memory Sparing feature, install N8102-552/553/554 additional memory board (three DIMMs of same model).

DIMMs installed in the system must be of the same model number.

Tips

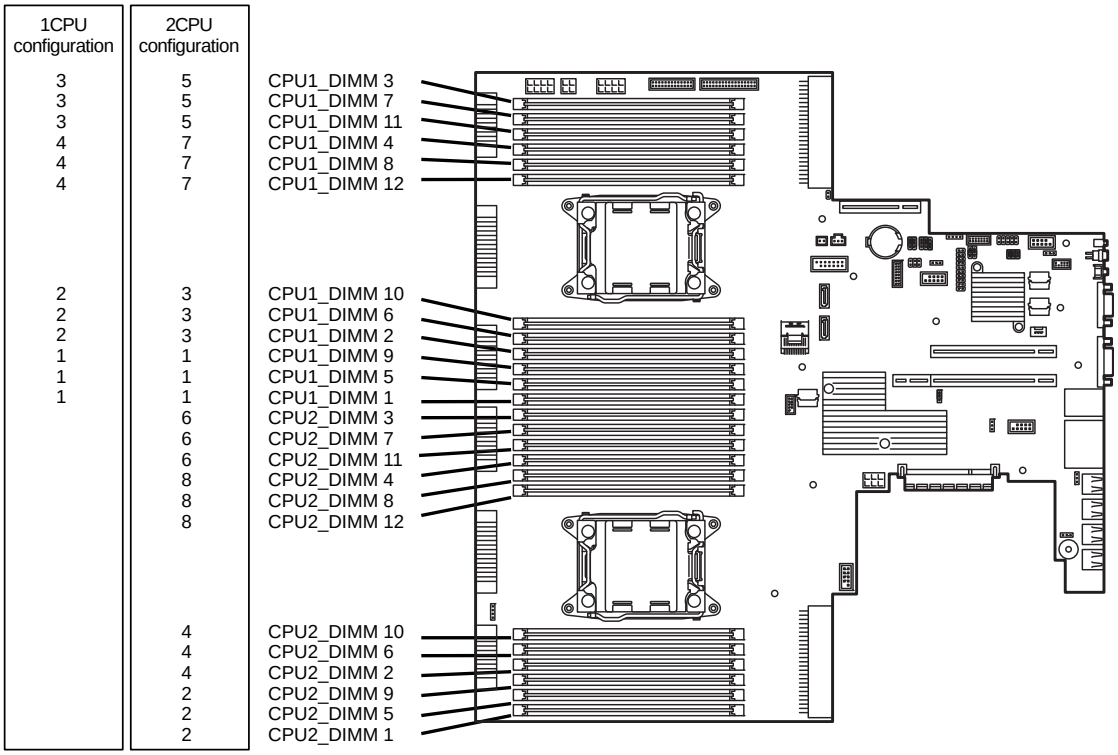
The operating system recognizes the DIMMs as those with capacities less than the actual physical capacities. (The recognized capacities vary depending on the number of DIMMs and the physical capacity per DIMM.)

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

Number of CPUs	Number of DIMMs	Capacity of DIMM installed		
		4GB	8GB	16GB
1	3	8GB	16GB	40GB
	6	16GB	32GB	80GB
	9	24GB	48GB	120GB
	12	32GB	64GB	160GB
2	6	16GB	32GB	80GB
	12	32GB	64GB	160GB
	18	48GB	96GB	240GB
	24	64GB	128GB	320GB

Memory Sparing feature can be used under the following conditions:

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



The following Memory Sparing cannot be configured.

- A DIMM of different capacity is installed.

Notes on Configuring Memory Sparing

In Memory Sparing configuration, **Memory RAS Mode** menu is changed to "**Independent**" in the following cases:

- When you additionally install DIMMs that unable to configure Memory Sparing
- When you remove DIMMs that takes down Memory Sparing

1.11 Extra Battery / Flash Backup Unit for RAID Controller

If a RAID Controller (N8103-161/168/172/173/174) is installed, use the extra battery or flash backup unit (FBU) to avoid data loss caused by accidents including temporary blackout during a Write Back operation. The model of the extra battery and flash backup unit to be used depends on RAID Controller.

- For N8103-172/173/174, use N8103-153.
- For N8103-161/168, use FBU.

1.11.1 Handling precautions

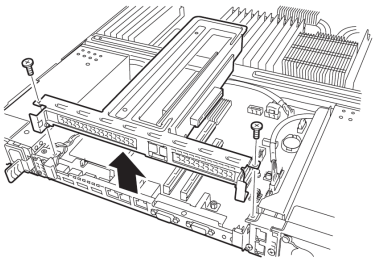
Observe the following when using extra battery or FBU. Ignoring these precautions may cause damage to your data or other devices.

- Use the extra battery or FBU appropriate to the RAID Controller to be used.
- The extra battery is an electronic device sensitive to static electricity. Before installation, touch the metal frame part of the server to discharge the static electricity from your body.
- Do not drop or bump the extra battery or FBU.
- For recycling and disposing of the extra battery or FBU, refer to the User's Guide that comes with the RAID Controller or extra battery.

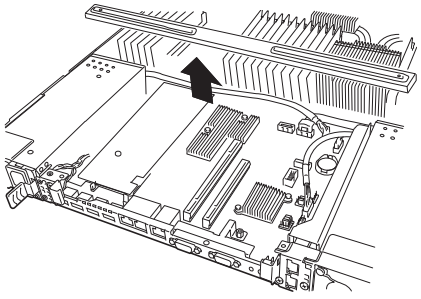
1.11.2 Installing Battery (N8103-153/162)

This section describes the procedure of installing a battery for RAID Controller (N8103-149/150/151/160).

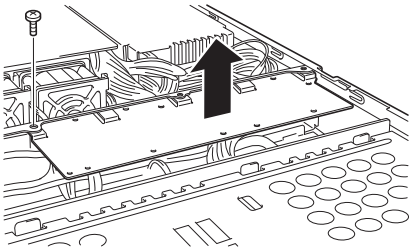
1. See steps 1 to 6 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.
2. Remove the two screws and remove PCI riser card.



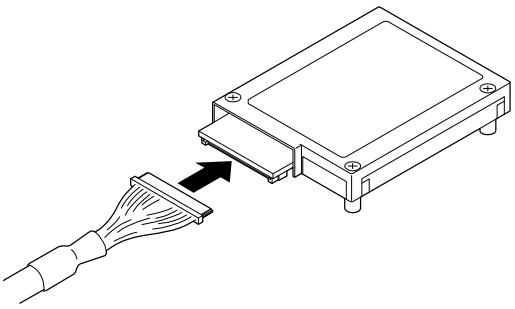
3. Remove the support bar.



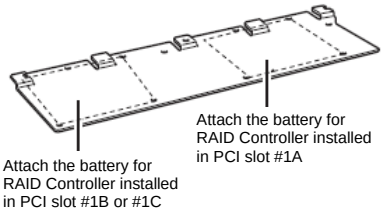
4. Remove a single screw and remove battery tray for RAID Controller.



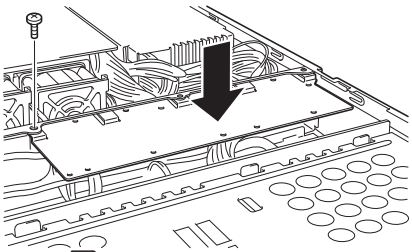
5. Connect a cable that comes with extra battery to the extra battery.
When connecting the cable, pay attention to the shape of connector, and align the connector on extra battery with black marking on battery control cable.



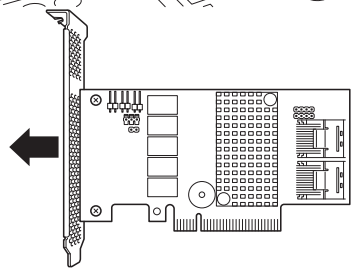
6. Install the additional battery to the battery tray by using 3 screws.
The installation position of the battery depends on installed RAID Controller. See the figure on the right.
Install N8103-162 additional battery to the position for PCI slot #1 or #1C.



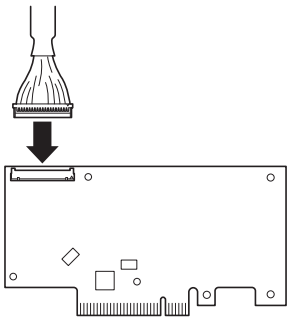
7. Install the battery tray for RAID Controller using a single screw removed in Step 4.



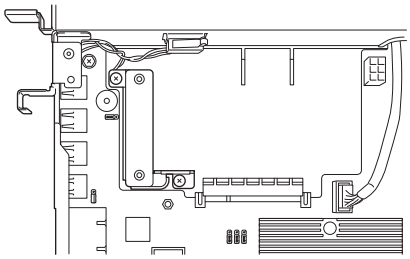
8. Remove the two screws from RAID Controller, and remove PCI bracket.



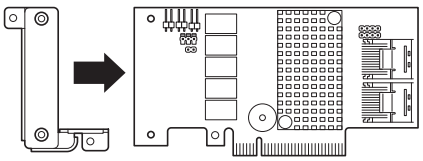
9. Connect the cable of extra battery to RAID Controller.
Align the connector on battery control cable with the black making on RAID Controller, then connect the battery control cable.



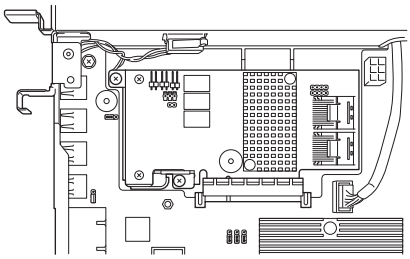
10. Remove the two screws from server chassis, and remove the RAID Controller bracket.



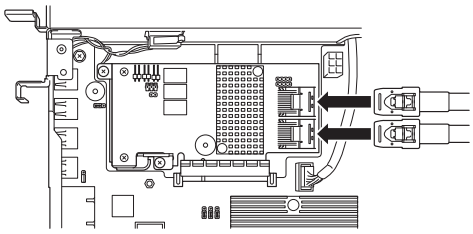
11. Install the RAID Controller bracket to RAID Controller using two screws you have removed in Step 8.



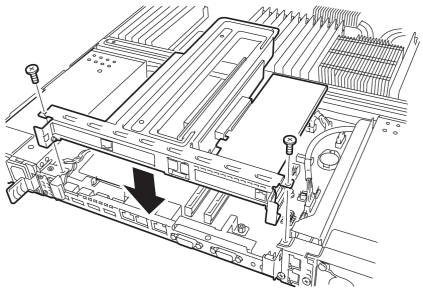
12. Install RAID Controller to the RAID Controller connector on motherboard, using two screws you have removed in Step 10.



13. Connect Mini SAS cable to RAID Controller.



14. Install support bar and PCI riser card you have removed in Steps 2 and 3.



1.11.3 Removal

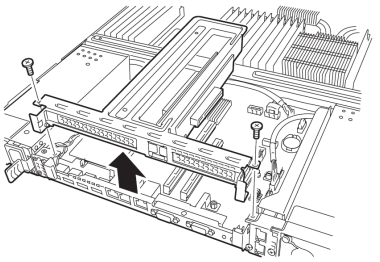
For removing the battery for the RAID Controller, reverse the installation procedure.

1.11.4 Installing FBU

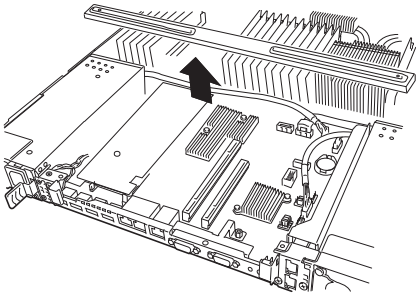
Take the steps below to install FBU.

1. See steps 1 to 6 in Chapter 2 (1.3 Overview of Installation and Removal) for preparations.

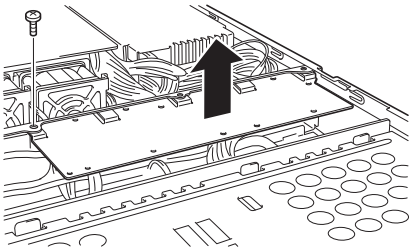
2. Remove the two screws, then remove the PCI riser card.



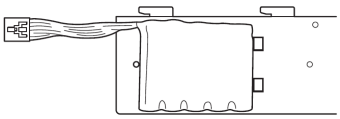
3. Remove the support bar.

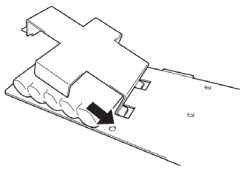


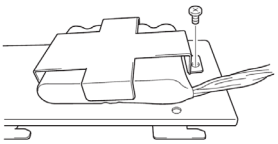
4. Remove one screw, then remove the battery tray for RAID Controller.



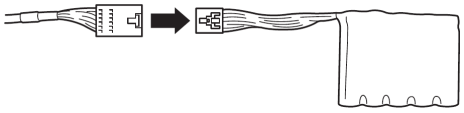
5. Put the FBU, provided as the standard accessory of RAID Controller, on the battery tray. Then, mount the FBU bracket, provided as the standard accessory of RAID Controller, and secure it with a screw.



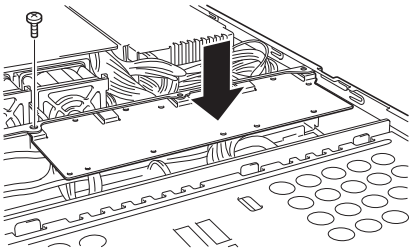




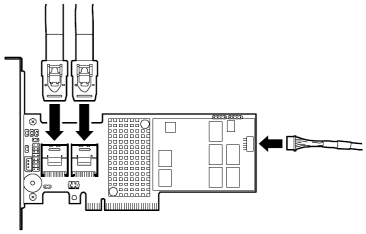
6. Connect the FBU control cable (600 mm), provided as the standard accessory of RAID Controller, to FBU.



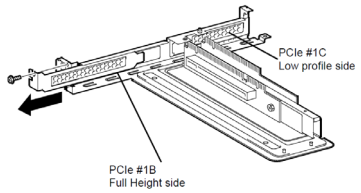
7. Mount the battery tray for RAID Controller (removed in Step 4) with a screw.



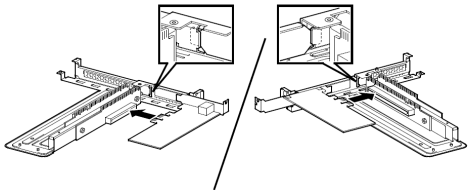
8. Connect the FBU control cable (600 mm in length) and Mini SAS cable to RAID Controller. Align the black marking on connector of FBU control cable with that on connector of RAID Controller.

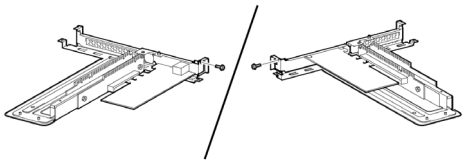


9. Remove one screw from the blank cover on the PCI riser card (removed in Step 2) on which you are going to mount the RAID Controller, then remove the blank cover.

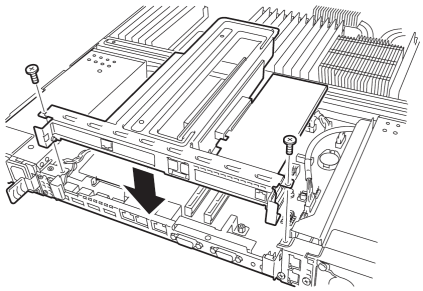


10. Mount the RAID Controller to PCI riser card, and secure it with one screw you have removed in Step 9.





11. Mount the support bar you have removed in Steps 2 and 3.



Note Keep the removed blank cover for future use.

1.11.5 Removing FBU

Remove the FBU in reverse order of installation procedure.

1.12 LAN Riser Card

The server supports LAN Riser Card that allows a LAN port to be added.

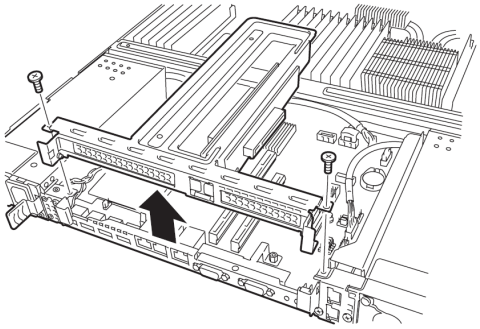
Install LAN Riser Card to the LAN Riser Card slot on motherboard. The motherboard has one slot to install LAN Riser Card.

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

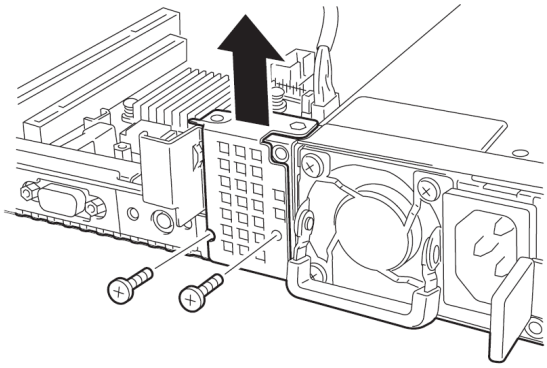
1.12.1 Installation

Follow steps below to install LAN Riser Card.

1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Remove the scrw that secures the PCI riser card, and remove the PCI riser card.



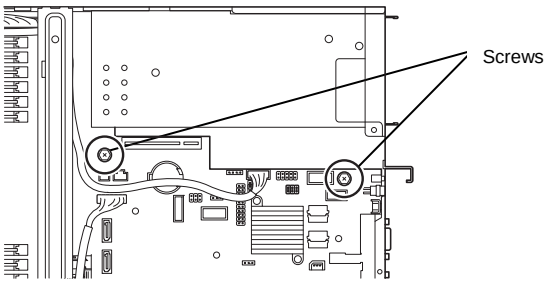
3. Remove the screw from the blank cover.



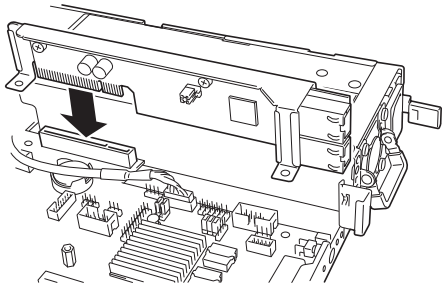
4. Remove the blank cover.

Note Keep the removed cover for future use.

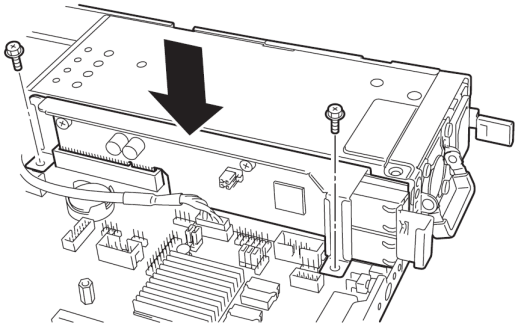
5. Remove two screws from the motherboard.



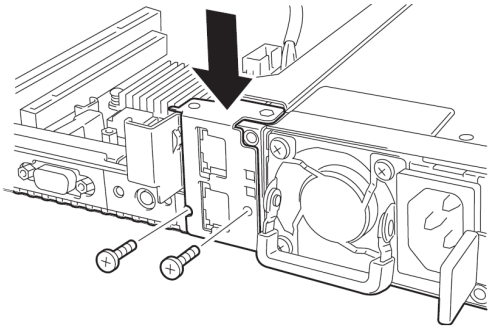
6. Align the pin terminals of LAN Riser Card with the LAN Riser Card slot, and insert the card securely.



7. Secure the bracket of LAN Riser Card with two screws you have removed in step 5.



8. Install the port cover provided with LAN Riser Card.



1.12.2 Removal

Remove LAN Riser Card in reverse order of installation steps.

Important **To maintain the cooling effect in the server, install the blank cover in the vacant LAN Riser Card slot.**

1.13 PCI Card

This server provides a riser card for PCI card and a slot for RAID controller. The riser card can connect one Full Height PCI card, one Low Profile PCI card and one RAID controller (total three PCI card can be mounted).

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

1.13.1 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 riser card. Make sure the card type before connecting it to riser card.
- The server provides no connector to connect a LED connector which is supplied in RAID Controller used to indicate disk access.
- PCI slot number "1C" is assigned to the riser card for Low Profile PCI cards, "1B" is assigned to the riser card for Full Height PCI cards, "1A" is assigned to the RAID controller slot, “1D” is assigned to LAN Riser Card slot.
- The search order for PCI bus slot on boot is as follows.
  Slot 1A (dedicated to RAID Controller) → Slot 1B (Full height card slot) → Slot 1C (Low profile card slot) → Slot 1D (dedicated to LAN riser card)
- The PCI devices of the same type (including onboard PCI device) may be recognized in different order from that described above, depending on OS or RAID Configuration Utility. Check the slot location of PCI device by PCI bus number, device number and function number shown in the table below.

PCI device	Bus number	Device number	Function number
Onboard LAN1	02h	0	0
Onboard LAN2	02h	0	1
RAID controller slot 1A	21h	0	×
Slot 1B (Full Height)	25h	0	×
Slot 1C (Low Profile)	2Dh	0	×
LAN Riser Card slot 1D	03h	0	×

- If an additional LAN card is installed, it is hard to push the catch of the connector with your finger that is connected to the LAN card. Disconnect the connector pushing the catch with a standard screwdriver. At this time, be very careful for the screwdriver not to damage the LAN card.
- If a bootable device such as a PCI card or USB device is added, the boot order may change.
  In BIOS Setup Utility, select **Hard Drive BBS Priorities** from **Boot** menu, and then specify a higher priority for the boot device.
  Boot → **Hard Drive BBS Priorities** → Check the display
  If the boot device is an HDD under an optional RAID Controller, the display is `(Bus xx Dev 00) PCI RAID Adapter`. Note that the value for *xx* changes depending on the PCI slot where a RAID board is installed.
- For a RAID Controller, LAN card (network boot), or Fibre Channel controller, if no hard disk drive on which an OS is installed is connected, set the option ROM for that slot to **Disabled**. See *Chapter 2 (1. Detail of System BIOS)* in "*Maintenance Guide*" for how to specify it.

1.13.2 Supported boards and available slots

The following tables list supported boards and slots available for them. For details of the features of each board, see the manual supplied with it.

Tips

- Different boards mounted on the same bus operate at the lower frequency.
- When the operation performance of a PCI card is higher than the PCI slot on the server, the PCI card operates with the performance of the PCI slot on the server.

(1) Standard riser cards

Model name	Product name	Slot number	PCIe 3.0 #1A	PCIe 3.0 #1B	PCIe 3.0 #1C	PCIe 3.0 #1D	Remarks
		PCI slot performance*1	x8 lane	x16 lane	x8 lane		
		Transfer bandwidth (per lane) *1	8Gb/s				
		Slot size	Dedicated to RAID Controller	Full height	Low profile	Dedicated to LAN riser card	
		PCI card type *2	x8 socket	x16 socket	x8 socket		
		Available card size	Dedicated to RAID Controller	Up to 220 mm		Dedicated to LAN riser card	
N8103-172	RAID Controller (512MB, RAID 0/1) [PCI Express 3.0(x8)]		○	–	–	–	Dedicated to connecting internal disks. An extra battery [N8103-153] can be mounted.
N8103-173	RAID Controller (512MB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		○	–	–	–	
N8103-174	RAID Controller (1GB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		○	–	–	–	
N8103-168	RAID Controller (1GB, RAID 0/1/5/6) [PCI EXPRESS 3.0(x8)]		–	○	○	–	Dedicated to connecting internal disks. FBU is factory installed. Cannot be installed together with N8103-172/173/174.
N8103-161	RAID Controller (1GB, RAID 0/1/5/6) [PCI EXPRESS 2.0(x8)]		–	○	○	–	Dedicated to connecting external devices.. FBU is factory installed. Up to two extra battery and/or FBU can be installed.

Model name	Product name	Slot number	PCIe 3.0 #1A	PCIe 3.0 #1B	PCIe 3.0 #1C	PCIe 3.0 #1D	Remarks
		PCI slot performance*1	x8 lane	x16 lane	x8 lane		
		Transfer bandwidth (per lane) *1	8Gb/s				
		Slot size	Dedicated to RAID Controller	Full height	Low profile	Dedicated to LAN riser card	
		PCI card type *2	x8 socket	x16 socket	x8 socket		
		Available card size	Dedicated to RAID Controller	Up to 220 mm		Dedicated to LAN riser card	
N8103-142	SAS Controller [PCI Express 2.0(x8)]		−	○	○	−	For connecting external devices.
N8190-153	Fibre Channel Controller (8Gbps/Optical) [PCI Express 2.0(x8)]		−	○	○	−	For connecting external Fibre Channel device. Cannot be installed together with N8190-157/158.
N8190-154	Fibre Channel Controller(2ch) (8Gbps/Optical) [PCI Express 2.0(x8)]		−	○	○	−	
N8190-157	Fibre Channel Controller (16Gbps/Optical) [PCI Express 3.0(x8)]		−	○	○	−	For connecting external Fibre Channel device. Cannot be installed together with N8190-153/154.
N8190-158	Fibre Channel Controller(2ch) (16Gbps/Optical) [PCI Express 3.0(x8)]		−	○	○	−	
N8104-135	1000BASE-T Riser Card (2ch) [PCI Express 2.0(x1)]		−	−	−	○	For additional LAN port. Card type: PCI Express 2.0(x8)
N8104-138	1000BASE-T Adapter (1ch) [PCI Express 2.0(x1)]		−	○	○	−	For additional LAN port. Card type: PCI Express 2.0(x4)
N8104-132	1000BASE-T Adapter (2ch) [PCI Express 2.0(x1)]		−	○	○	−	For additional LAN port. Card type: PCI Express 2.0(x4)
N8104-133	1000BASE-T Adapter (4ch) [PCI Express 2.0(x4)]		−	○	○	−	For additional LAN port. Jumbo frame not supported. LAN cable with protective cap cannot be used.
N8104-136	10GBASE-T Adapter (2ch) [PCI Express 2.0(x8)]		−	−	−	○	For additional LAN port. Up to two cards including N8104-136/128/148/131 can be installed.

Model name	Product name	Slot number	PCIe 3.0 #1A	PCIe 3.0 #1B	PCIe 3.0 #1C	PCIe 3.0 #1D	Remarks
		PCI slot performance*1	x8 lane	x16 lane	x8 lane		
		Transfer bandwidth (per lane) *1	8Gb/s				
		Slot size	Dedicated to RAID Controller	Full height	Low profile	Dedicated to LAN riser card	
		PCI card type *2	x8 socket	x16 socket	x8 socket		
		Available card size	Dedicated to RAID Controller	Up to 220 mm		Dedicated to LAN riser card	
N8104-137	10GBASE-SFP+ riser card [PCI Express 2.0(x8)]		–	–	–	○	For additional LAN port. Prepare SFP+ module [N8104-129] if needed. Up to two cards including N8104-137/128/148/131 can be installed.
N8104-128	10GBASE Adapter (SFP+/2ch) [PCI Express 2.0(x8)]		–	○	○	–	For additional LAN port. Prepare SFP+ module [N8104-129] if needed. Only one card can be installed in RHEL6. Up to two cards including N8104-136/137/128/148/131 can be installed.
N8104-148	10GBASE Adapter (SFP+/2ch) [PCI Express 2.0(x8)]		–	○	○	–	
N8104-131	10G Converged Network Adapter (2ch) (10Gbps/Optical) [PCI Express 2.0(x8)]		–	○	○	–	For additional DCB/FcoE. SFP+ module is factory-installed. StoragePathSavior supports redundant path of FC. Teaming/bonding with LAN is not available. Only one port per system can be used as LAN of N8104-131. Only one card can be installed in RHEL6. Up to two cards including N8104-137/128/131 can be installed.
N8117-01A	Additional RS-232C connector *3		–	–	○	–	For additional serial port B (RS-232C).

√: Can be mounted, –: Cannot be mounted

*1 Data transfer rate of PCI slot = Transfer bandwidth × Number of lanes
<Example> x8 lane = 64 Gbps (one-way)
*2 Connector size. Cards exceeding the number of sockets cannot be connected.
<Example> x4 socket can connect with x1 and x4 cards, but not x8 card.
*3 Use RS-232C cable (B).

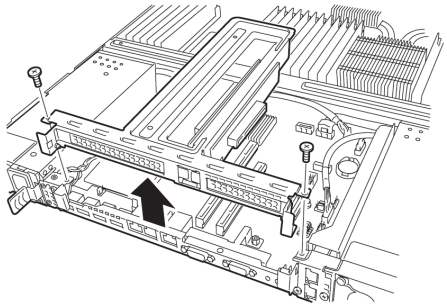
1.13.3 Installation

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

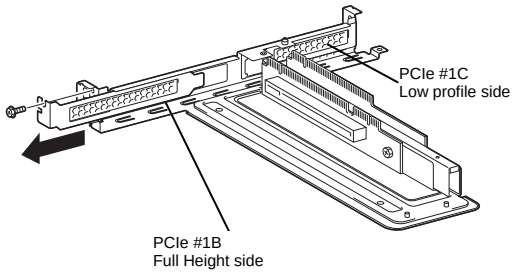
Important **When installing a PCI card, make sure the connector of the board fits the connector of the riser card.**

Note
- Check the board type (Low Profile or Full Height) which respective riser card supports and the type of PCI card to be installed.
- When installing an extra battery for RAID Controller or FBU, see Chapter 2 (1.11 Extra Battery / Flash Backup Unit for RAID Controller).

1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Remove the screw securing the PCI riser card. Hold the both ends of the PCI riser card and lift it off.

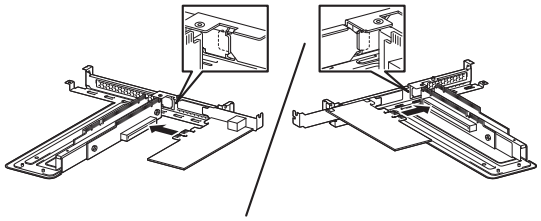


3. Confirm the installation position with the reference to the table on *1.14.2 Supported boards and available slots*.
4. Remove the screw from the PCI riser card and remove the blank cover.



Note Keep the removed blank cover for future use.

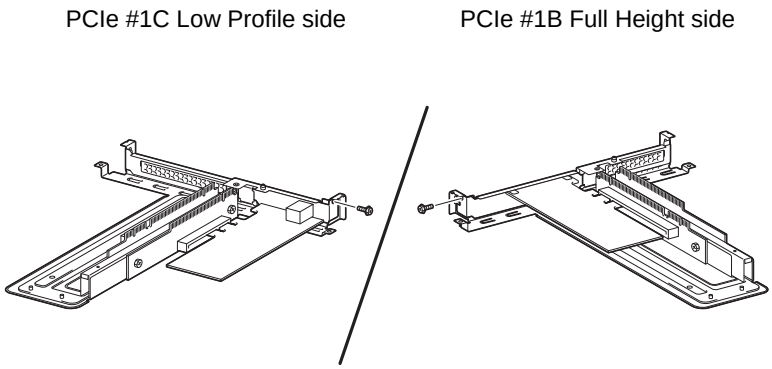
5. Install a PCI card to the PCI riser card. When installing the card, position the terminal part of the PCI card to the PCI riser card slot and insert it.



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.**

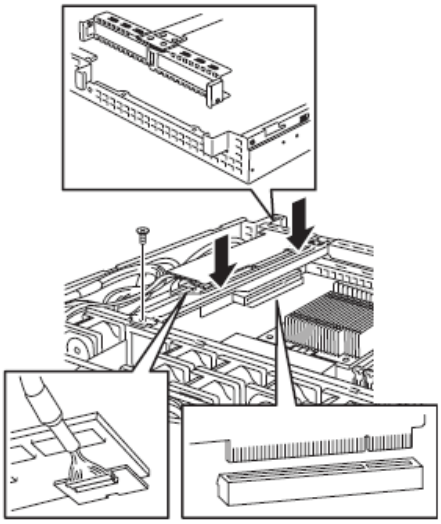
Note
- Make sure that the head of a PCI card bracket is seated into the fixed slot.
- Depending on type of PCI cards, the terminal part of the PCI card may be too large to fit in the connector.
- If you have trouble installing the card, remove the card once and try again. If you apply excessive pressure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

6. Fix the PCI card with the screw you removed at step 4.



Tips To connect a PCI card to the connector on motherboard with cable, connect a cable to PCI card before installing PCI riser card.

7. Connect the PCI riser card to the motherboard slot and fix the card with the screw you removed at step 2.
When connecting the card, position the terminal part of the PCI riser card to the slot on the motherboard and insert it.



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

1.13.4 Removal

To remove a PCI card, reverse the installation procedure.

Run SETUP and change boot order in **Boot** menu. See *Chapter 2 (1. Details of System BIOS)* in "*Maintenance Guide*" for how to specify it.

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

1.13.5 Installing RAID Controller

This section describes how to install an optional RAID Controller to the slot dedicated to RAID Controller.

(1) When using the optional RAID controller (N8103-172/173/174)

For details, see the manual that comes with optional RAID Controller (N8103-172/173/174).

Important

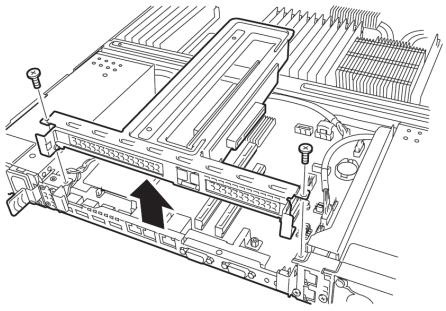
- **You must avoid static electricity to work with the procedure below. For details, see *Chapter 2 (1.2 Anti-static Measures)*.**
- **Do not change the mode to hibernate while building a RAID System.**

Note

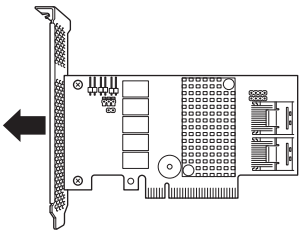
- When installing an optional RAID Controller, start the BIOS Setup utility, select **PCI Configuration** from the **Advanced** menu, and then make sure that the parameter of **PCI Slot *xx* ROM** (*xx* is PCI slot number) is set to **Enabled**.
- When connecting a RAID Controller, set the boot priority to 8th or higher in the Boot menu of the BIOS Setup utility. If the setting is 9th or lower, the configuration menu for RAID Controllers cannot be launched.

Take the following procedure to install RAID Controller (N8103-172/173/174).

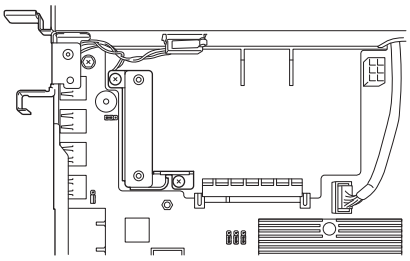
1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Remove the two screws and remove PCI riser card.



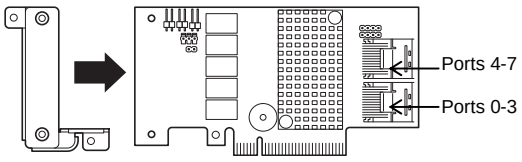
3. Remove the support bar.
4. Remove the two screws from RAID Controller, and remove PCI bracket.



5. Remove the two screws from server chassis, and remove RAID Controller bracket.



6. Attach the RAID Controller bracket to RAID Controller with two screws you have removed in Step 4.



7. Insert RAID Controller into the slot dedicated to RAID Controller.

8. Secure the RAID Controller bracket with two screws you have removed in Step 5.
9. Disconnect SAS/SATA cable from SATA connector on motherboard.

9-1. When four or less hard disk drives are installed:

Connect SAS/SATA cable removed in Step 9 to connector (Ports 0-3) on RAID Controller.

9-2. When five or more hard disk drives are installed:

Connect SAS/SATA cable removed in Step 9 to connector (Ports 0-3) on RAID Controller.

Connect SAS/SATA cable provided with the server to connector (Ports 4-7) on RAID Controller.

Remove a single screw from server chassis, and remove battery tray for RAID Controller.

Connect another end of SAS/SATA cable that has been connected to connector (Ports 4-7) on RAID Controller, to the connector on backplane.

Secure the battery tray for RAID Controller with a single screw.

10. Continue to install or remove internal optional devices, mount and connect the server, and turn it on.

(2) When using optional RAID Controller (N8103-161/168)

See *Chapter 2 (1.14.4 Installing FBU)*.

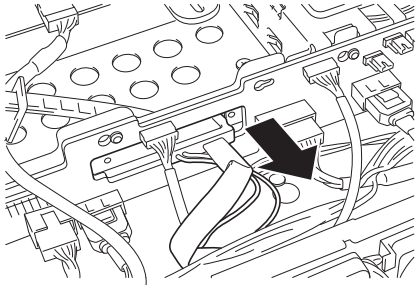
1.14 Additional HDD Cage

This server can have additional HDD cage for installing additional hard disk drives. The additional HDD cage is installed on front side of the server, and is used exclusively with the optical disk drive.

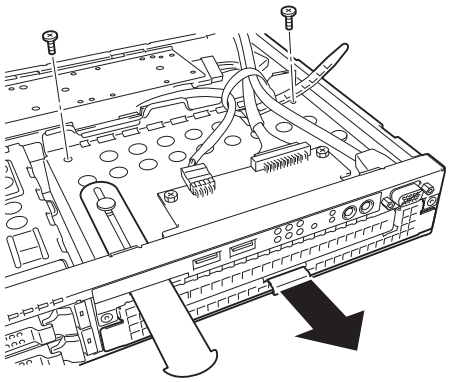
1.14.1 Installation

Follow steps below to install an additional HDD cage.

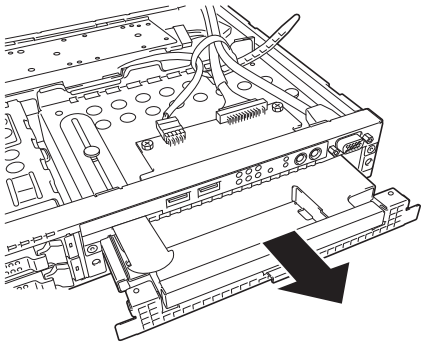
1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. If an optical disk drive is already installed, disconnect the cable from optical disk drive.



3. Remove the screw that secures the optical disk drive bay bracket.

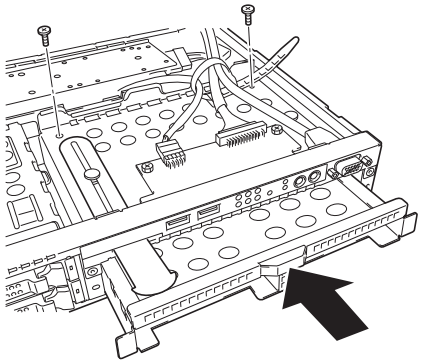


4. Pull out the optical disk drive bay bracket to the direction shown by an arrow.



Note Keep the removed bracket for future use.

5. Install the additional HDD cage to the chassis, and secure it with screws.



1.14.2 Removal

To remove additional HDD cage, reverse the installation procedure.

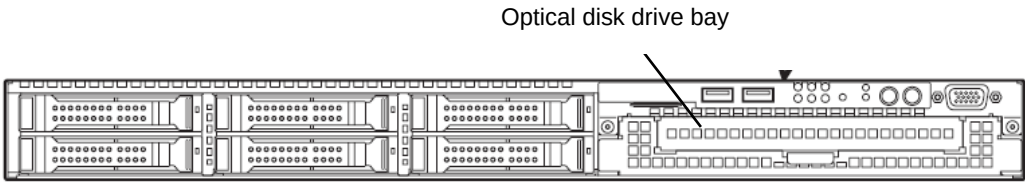
Important

- **Before removing additional HDD cage, be sure to remove hard disk drives installed in that cage.**
- **Be sure to install a bracket to maintain cooling effect in server.**

1.15 Optical Disk Drive

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

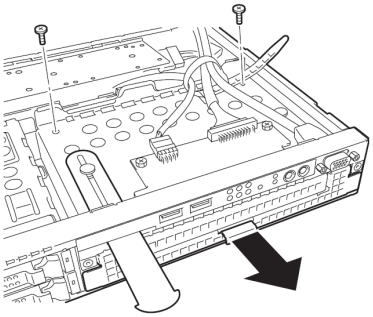
Important **Do not install any unsupported optical disk drive.**



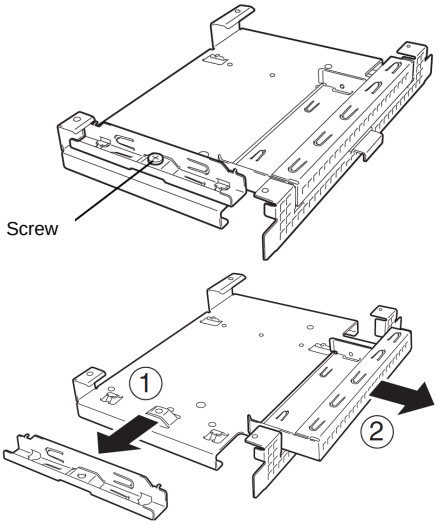
1.15.1 Installation

Install an optical disk drive in the following procedure.

1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Remove the two screws from the optical disk drive bay, and pull the bay out.



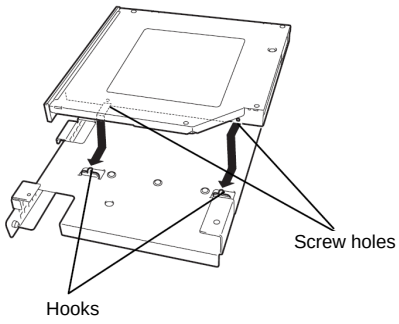
3. Remove a single screw from the bay you have removed in Step 2, and remove the bracket.



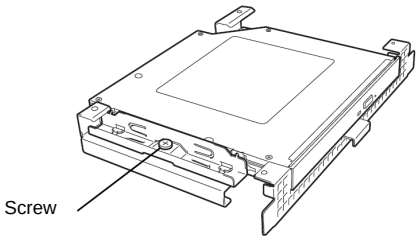
4. Remove the dummy cover.

Note Keep the removed screws and dummy cover for future use.

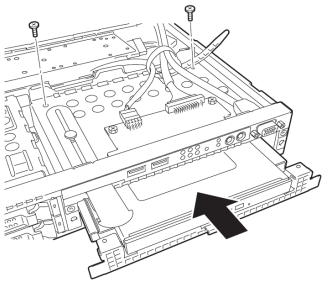
5. Install the optical disk drive to the tray.



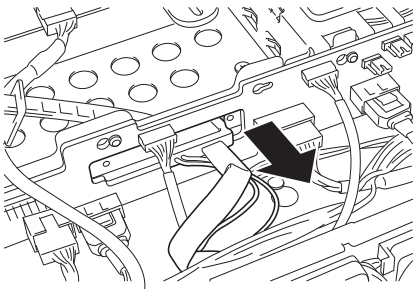
6. Secure the bracket to optical disk drive with a screw you have removed in Step 3.



7. Insert the optical disk drive and secure the drive tray with two screws you have removed in Step 2.



8. Connect the optical disk drive cable.



1.15.2 Removal

To remove an optical disk drive, reverse the installation procedure above.

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

Tips Logical Drives can be created even with only one Physical Device.

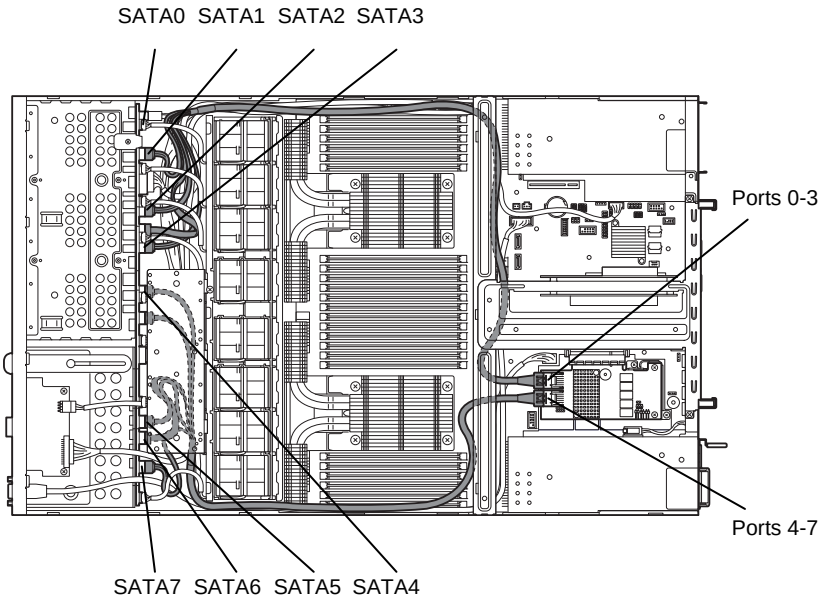
If using internal hard disk drives in RAID System with an optional RAID Controller (N8103-168/172/173/174) installed in the server, the SATA cable needs to be rewired.

Tips When using SAS hard disk drives, RAID Controllers must be connected.

1.16.1 Connecting cables

See the figures below for how to connect cables.

If using optional RAID Controller (1 to 6 hard disk drives)



Optional RAID Controller	Hard Disk Drive	Backplane
Ports 0-3	SLOT 0	SATA 0
	SLOT 1	SATA 1
	SLOT 2	SATA 2
	SLOT 3	SATA 3
Ports 4-7	SLOT 4	SATA 4
	SLOT 5	SATA 5
	–	–
	–	–

When optional 2.5-inch HDD cage is installed

Optional RAID Controller	Hard Disk Drive	Backplane
Ports 0-3	SLOT 0	SATA 0
	SLOT 1	SATA 1
	SLOT 2	SATA 2
	SLOT 3	SATA 3
Ports 4-7	SLOT 4	SATA 4
	SLOT 5	SATA 5
	SLOT 6	SATA 6
	SLOT 7	SATA 7

1.16.2 Notes on Building RAID System

Note the following points when setting up a RAID System.

- The number of hard disk drives required varies in each RAID level.
- If the optional RAID Controller is used, the RAID System cannot be built in RAID5/RAID6/RAID50/RAID60.

RAID level	The minimum number of hard disk drives required to set up a RAID System	
	N8103-172	N8103-168/173/174
RAID 0	1	1
RAID 1	2	2
RAID 5		3
RAID 6		3
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.
- 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 Configuration utility (WebBIOS). The utility can be run during POST which starts immediately after the server is turned on. For details, see *Chapter 2 (4. RAID System Configuration)* in "*Maintenance Guide*" or the manual supplied with the optional RAID Controller (N8103-168/172/173/174).

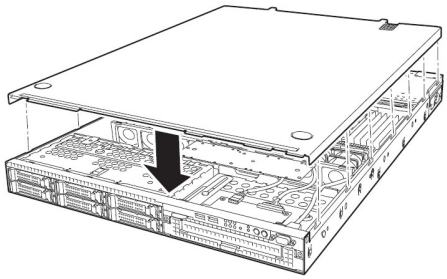
Important

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

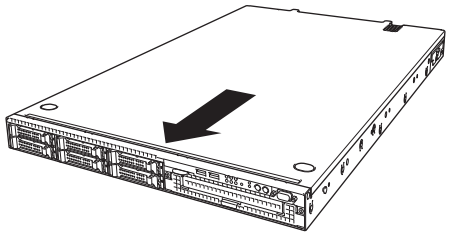
1.17 Installing Top Cover

When all internal optional devices are installed, close the server with Top Cover.

1. Put Top Cover straight on the server chassis so that it can be surely engaged with the chassis frame.



2. Slide Top Cover toward the front of the server.



3. Tighten the thumb nut on rear of the server.

1.18 Hard Disk Drive

Expansion Bays for hard disk drives are provided at the front of the server.

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

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

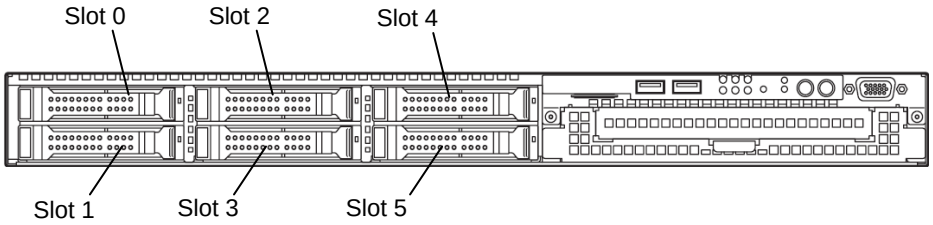
Note the following precautions to install hard disk drives.

- For onboard connection, hard disk drives having different capacities, types, or rotational speeds cannot be installed together.
- In the RAID System, all the hard disk drives in a group (pack) must have the same capacity, type, and rotational speed.
- If using hard disk drives in a RAID System, jumper settings or a change of cables may be required.

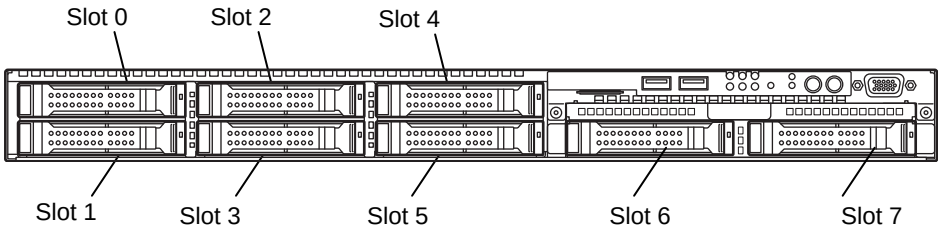
Bays can accommodate up to 6 hard disk drives (when HDD cage is added, 8 HDDs can be installed).

slot numbers have been assigned to each slot.

<Standard configuration>



<With 2.5-inch HDD cage installed>



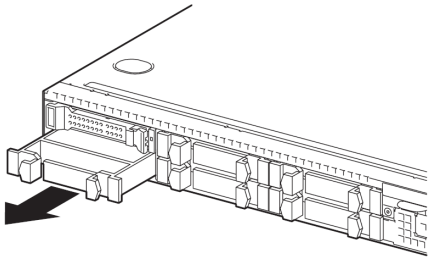
1.18.1 Installation

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.

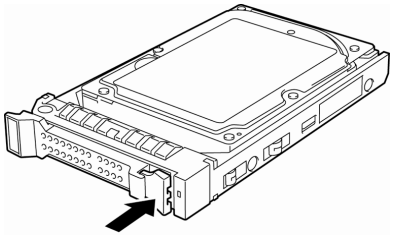
1. See *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Locate the slot where you install the hard disk drive.
   The server has 6 slots (or 8 slots when additional HDD cage is installed). Install hard disk drives in ascending port number order.
3. Remove the dummy trays.
   Dummy trays are installed in every slot except for slot 0.

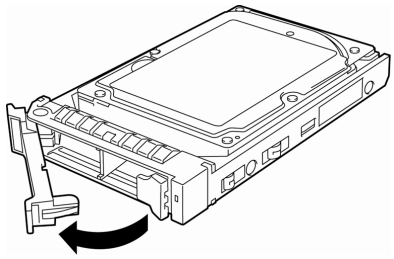


Note

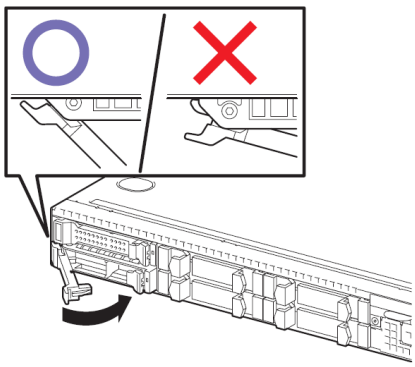
Keep the removed dummy trays for future use.

4. Unlock the handle of the tray.





5. 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.

6. 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.

7. Turn on the server, run BIOS Setup Utility, and then specify the boot order from **Boot** menu.
   For details, see *Chapter 2 (1. Details of System BIOS)* in "*Maintenance Guide*"

Tips

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

1.18.2 Removal

To remove hard disk drive, reverse the installation procedure.

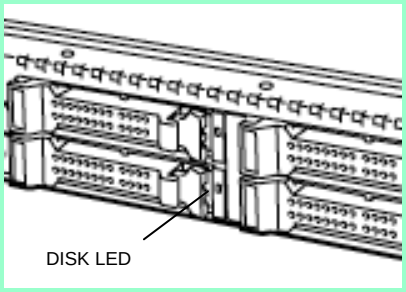
If you transfer or dispose of the removed hard disk drive, see *Chapter 1 (1. Transfer, Movement, and Disposal) in "Maintenance Guide"* to erase data.

Important

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

Note

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



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

Turn on the server, start BIOS Setup Utility, and then specify the boot order from **Boot** menu.
For details, see *Chapter 2 (1. Details of System BIOS)* in "*Maintenance Guide*".

Tips

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

1.18.3 Replacing a hard disk drive in the RAID System (Auto Rebuild)

In the RAID System, you can use the auto rebuild feature to restore data back to the state before a failure occurred.

The auto rebuild feature is enabled in logical drives set to RAID 1, RAID 5, RAID 6, RAID 10, RAID 50, and RAID60.

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

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

Observe the following precautions whenever executing the auto rebuild

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

1.19 Power Supply Unit

This server can contain two power supply units. 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.

Select a suitable power supply unit according to System Configuration Guide.

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

1.19.1 Cold Redundant Feature

The server supports the feature to optimize power efficiency as described below:

- Cold redundant feature can run the system with optimum power efficiency by raising operating efficiency of primary power supply unit and lowering that of redundant power supply unit in redundant power configuration.
- If power efficiency of power units is not optimized due to system configuration, this feature is disabled automaticlly.

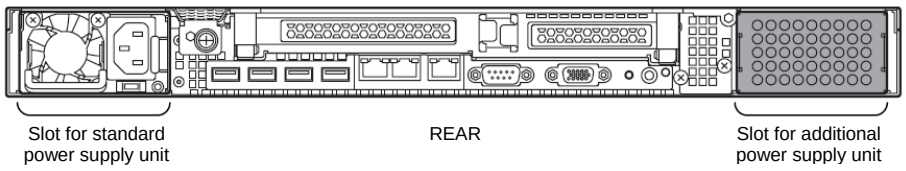
Cold redundant feature can be used under the following conditions:

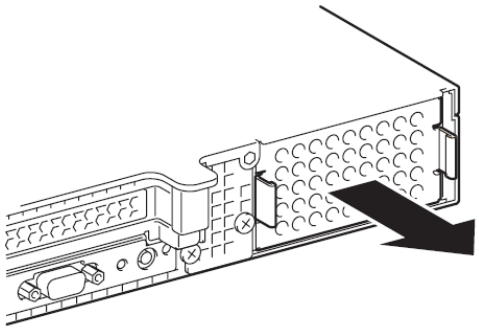
- Two power supply units must be installed for redundant configuration.
- See *Chapter 2 (1. Details of System BIOS) in "Maintenance Guide"*, change parameters as shown below, save the settings and exit from SETUP.
  Server → **Power Control Configuration** → **Cold Redundant Mode** → **Enabled**
  Run SETUP again, and check if the status of **Cold Redundant Mode** shows **Enabled** in **Server** menu.

1.19.2 Installation

Follow steps below to install a power supply unit:

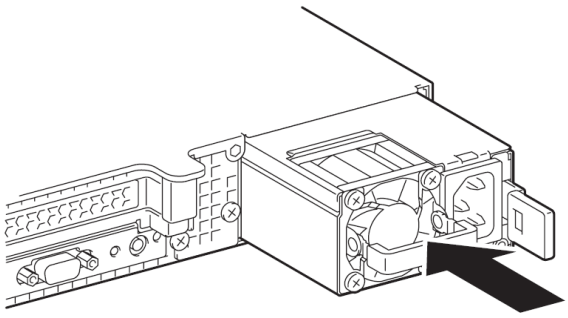
1. See steps 1 to 4 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Remove the blank cover.





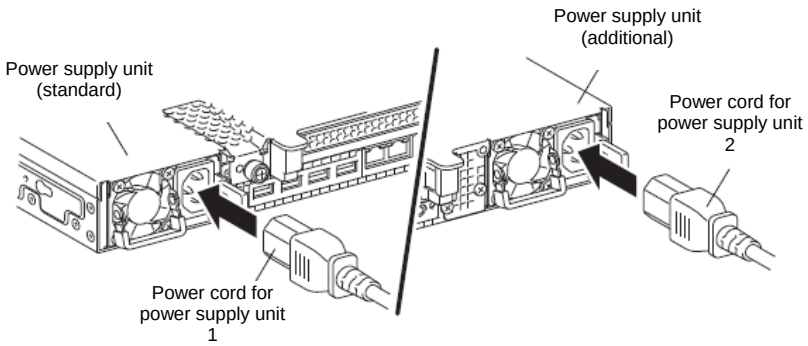
Note Keep the removed blank cover for future use.

3. Insert the power supply unit until it is locked with clicking sound.



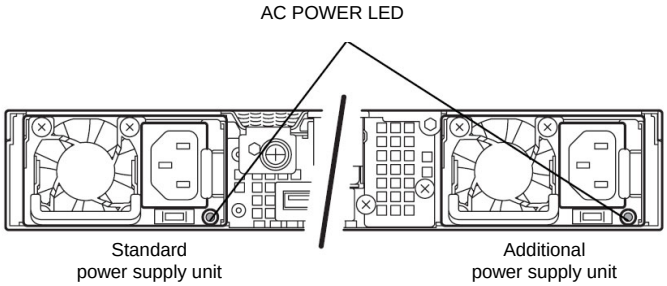
4. Connect power cords.

   Use the power cord that comes with the server and the one comes with the additional power supply unit.



AC POWER LED blinks green when the power cord is connected to a power supply unit and the other power supply unit's AC POWER LED goes on amber.

When the power cord is connected to it, AC POWER LEDs on both power supply units blink green.



5. Power on the server.

   AC POWER LEDs go on green.

6. Confirm, by STATUS LED or on POST screen, that there are no errors related to the power supply units.

   See *Chapter 3 (1. POST 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.

1.19.3 Replacing a failing power supply unit

Replace only when the power supply unit fails.

To remove power supply unit, reverse the installation 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, refer to *Safety precautions* in *Precautions for Use.*

- **Pay attention to electric hazard.**

Important **Do not remove a power supply unit operating normally.**

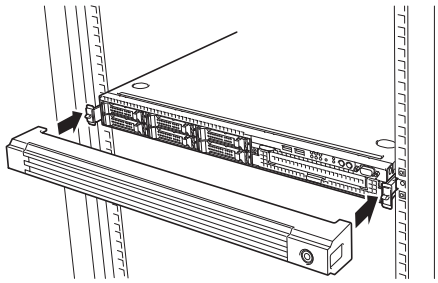
Tips In the redundant power configuration (with two power supply units) and if either one of power supply units fails, the failing power supply unit can be replaced with the system power on.

Important **To maintain the cooling effect in the server, install the blank cover in the vacant slot.**

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

1.20 Installing Front Bezel

When installing Front Bezel, engage catch of front bezel with that on rails.
After installing Front Bezel, lock it with Bezel Lock Key.



Note Be careful not to press POWER Switch.

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* in *Precautions for Use*.

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

CAUTION

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

- **Do not carry or install the server only by a single person.**
- **Do not install the server so that the load may be concentrated on a specific point.**
- **Do not 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 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 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* in *Precautions for Use*.

- **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* in *Precautions for Use.*

- **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

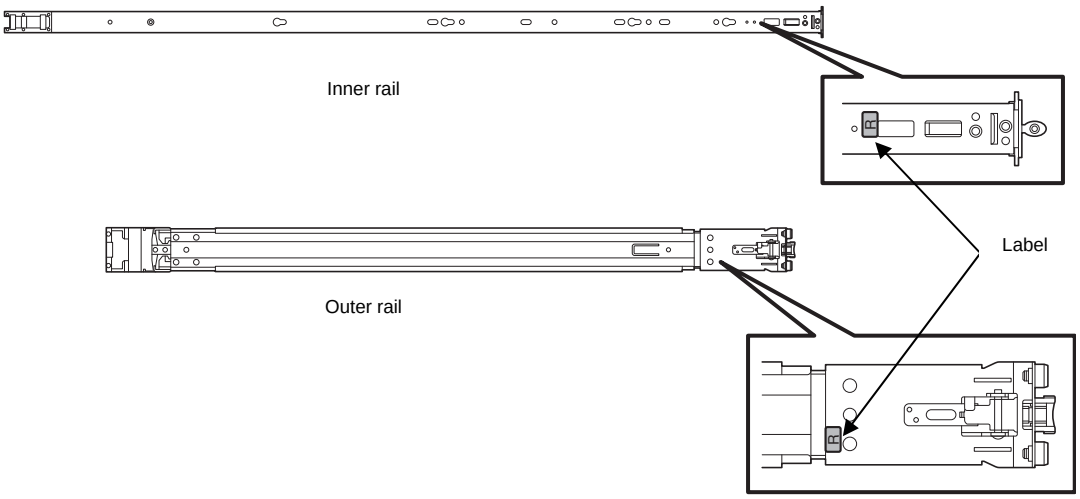
If multiple devices are installed, or if the inside of the rack is not sufficiently ventilated, the internal temperature rises due to the heat emitted from each device, which may result in a malfunction. Review airflow in the rack and room and take sufficient measures so that the internal temperature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

Preparation

- Checking rails
- Installing inner and outer rails

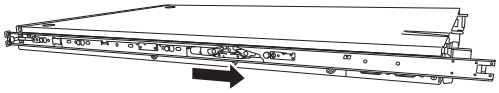
Checking rails

Make sure the orientation of inner and outer rails by viewing labels on each rail.



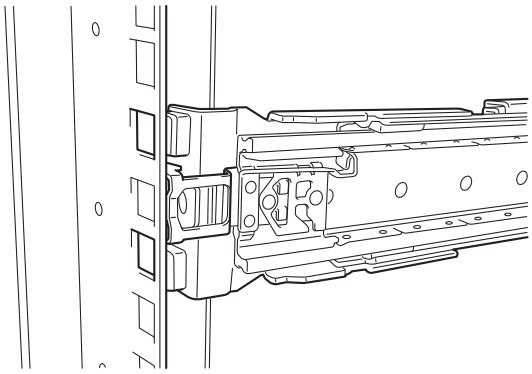
Installing inner rails

1. Mount an inner rail marked as "R" to the right side of the server and "L" to the left side when viewed the server from front.
2. Align the locks and holes, and insert the inner rails until it clicks.



Installing outer rails

1. Mount an outer rail marked as "R" to the right side of the rack and "L" to the left side when viewed the rack from front.
2. Fit the square-shaped protrusions of outer rail to the square holes of a 19-inch rack. Make sure that it makes a clicking sound indicating that it is locked.
   The image on the right shows the front left side of the rack. Install to the rear left side and front and rear right sides following the same procedure.
   Make sure that the rail is installed at the same height as the other rail already installed.



Important **Confirm that the rail are securely locked so that they will not fall off.**

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

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 in Precautions for Use.

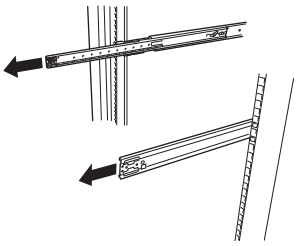
- **Do not attempt to lift the server with single person.**
- **Do not drop.**
- **Do not leave the server being pulled out.**
- **Do not install with the cover removed.**
- **Do not get your fingers caught.**

(1) Installation

Mount the server to a rack in the following procedure.

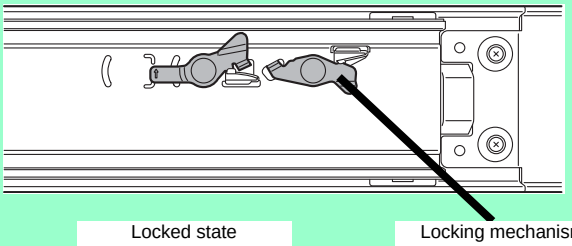
Important **Always install the server with two or more persons.**

1. Pull the slide rail from the outer rail that is mounted on rack until the slide rail is locked.

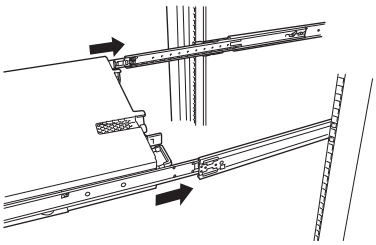


Note

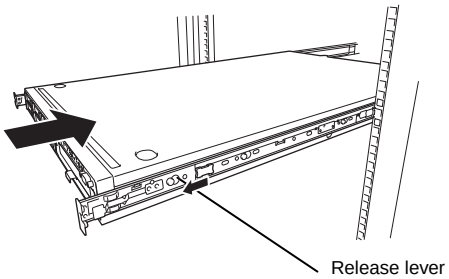
Make sure that locking mechanism work normally.



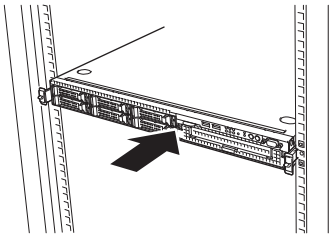
2. With two or more persons, firmly hold the server and mount it to the rack.



3. When the server is pushed into the rack and is locked, push the server to the end while pulling the release levers (blue) on both sides of the server.



4. Push the server until its lock on front panel clicks.

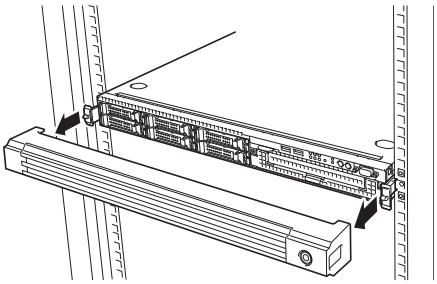


(2) Removal procedure

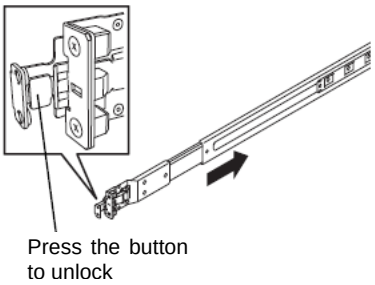
Remove the server from the rack in the following procedure.

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

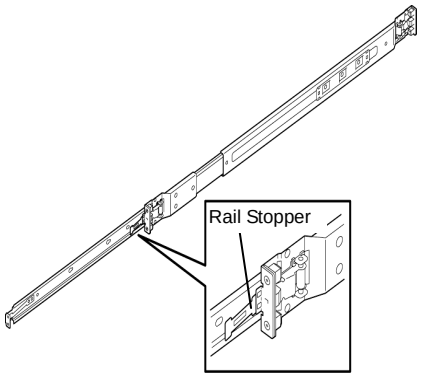
1. Make sure that the server is turned off and then disconnect the power cord or all interface cables from the server.
2. Remove the front bezel.



3. Slowly pull the server out while pressing the buttons located on either side of the front of the server.



4. Because there are stoppers, the server will come to a stop halfway. Press and hold Rail Stopper on the rails and pull the server out of the rack.



Important **Be careful not to get your fingers caught in the rails or lever.**

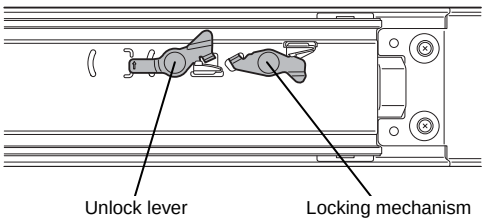
5. Hold the server firmly and remove it from the rack.

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.**

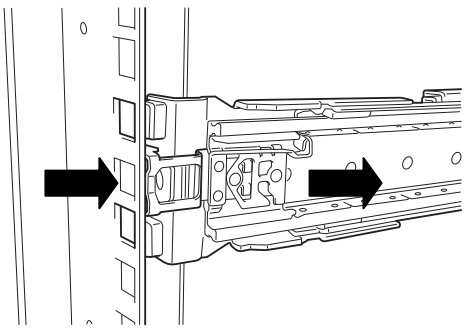
(3) Removing Outer Rail

Remove outer rails from the rack in the following procedure.

1. See Chapter 2 (*2.1.2 Installing the server to the rack or removing it from the rack, (2) Removal procedure*) to remove the server from the rack.
2. Push the unlock lever on outer rail to the direction shown by arrow to house the slide rail.



3. While pressing the lever on outer rail, push the outer rail toward inside of the rack, then remove it.



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

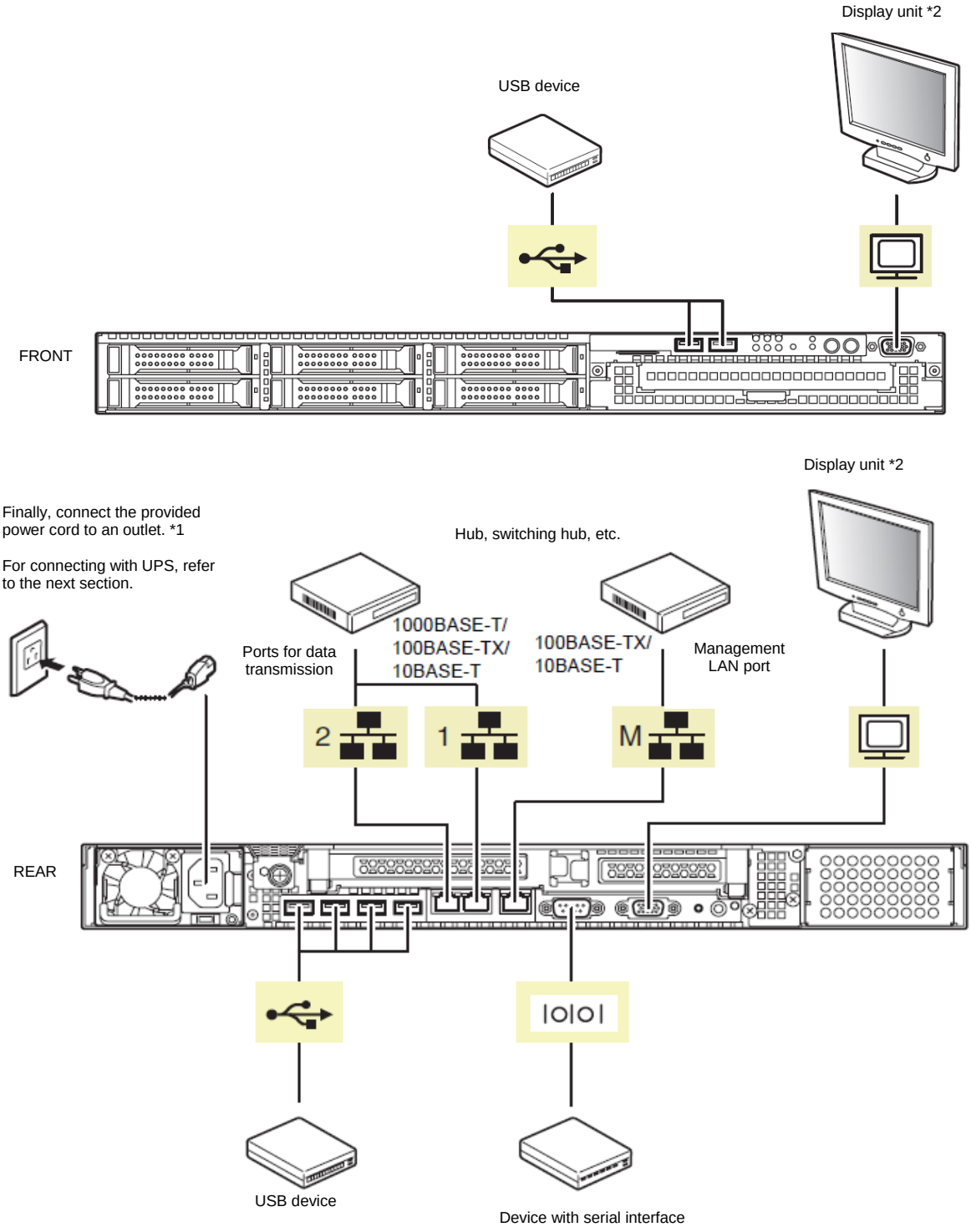
Be sure to observe the following precautions to use the server safety. Failure to observe the precautions may cause death or serious injury. For details, refer to *Safety precautions* in *Precautions for Use*.

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

CAUTION

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

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



*1 Connect the power cord to a circuit breaker of up to 15 A.
*2 Either one can connect with a display unit.

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

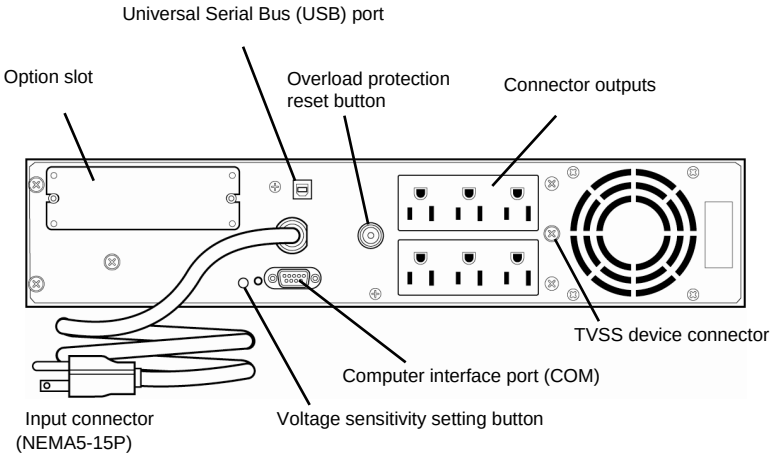
Note the following precautions to connect cables.

- 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.

Example



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

To change the settings, select **Server** and then **AC-LINK** in BIOS Setup Utility, and change the displayed parameters. Select **Power On** to perform automatic operations by using the UPS. For details, see *Chapter 2 (1. Details of System BIOS)* in "*Maintenance Guide*".

NEC Express5800 Series
Express5800/R120e-1M

3 Setup

This chapter describes how to set up the server.

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

2. **BIOS Setup Utility (SETUP)**
   You can customize the BIOS settings by following the instructions in this section.

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

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

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

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

1. Turning on the Server

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

Turn on the server by using the following procedure.

Tips

- Do not power on the server before amber POWER LED is unlit.
- Wait for at least 30 seconds before turning on the server after turning off the server.

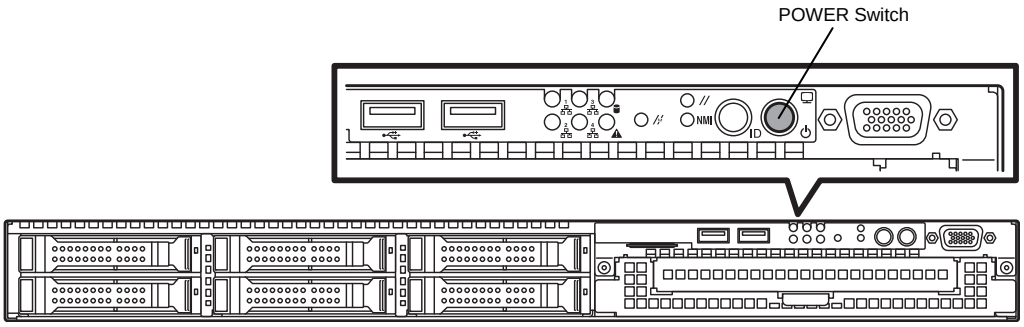
1. Turn on the peripheral devices and display unit.

Note

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

2. Remove Front Bezel.
3. Press POWER Switch at the front of the server.
   POWER LED is turned on green and after a while, logo appears on the display.

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



While logo is being displayed, the self-diagnostic program (POST) runs and diagnoses the hardware. For details, see *Chapter 3 (1.1 POST)*.

1.1 POST

POST (Power-On Self-Test) 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 you hear beep many times during the time between power ON and OS startup
- When any error message is displayed

1.1.1 POST sequence

Explains how POST runs in order.

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

Note

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

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

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

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

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

4. POST displays several types of message. These messages let you know that the installed CPU or connected keyboard and mouse are detected.
5. After a while, the following message is displayed on the screen.

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

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

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

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

Note

- If the optional Internal Flash Memory is not installed in the system, <F3> key message will not be displayed.
- <F3> key must be pressed within 5 seconds of the message being displayed.
- Note that the server will not boot from Internal Flash Memory even if it is specified to do so by pressing <F3> key, as long as a bootable CD/DVD-ROM is set on the drive.

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

<F12> key: Boot from network.

6. If a controller which has its dedicated BIOS such as a RAID Controller board is installed, a message that prompts you to start the dedicated utility to set each board is displayed.

   Example: If an optional RAID Controller is installed

   ```
   Press <Ctrl> <H> for Web BIOS
   ```

   The utility starts by pressing <Ctrl> + <H> keys.

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

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

7. The OS starts when POST is completed.

1.1.2 POST error messages

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

Note

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

2. BIOS Setup Utility (SETUP)

This section describes how to configure Basic Input Output System (BIOS).

Before you install the server and add or remove optional devices, make sure you have read and understood this section to configure properly.

2.1 Overview

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

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

2.2 Starting and Exiting SETUP Utility

2.2.1 Starting SETUP

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

After a while, the following message will be displayed on the lower left of the screen.

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

If you press <F2> key at this time, SETUP runs and displays **Main** menu upon completion of POST. (You can also press <F2> key while NEC logo appears to display **Main** menu.)

Tips

If password is set, you will be prompted to enter password at next startup of SETUP. (The timing when prompt appears depends on setting of password.)
Up to three password entries are accepted. If you enter incorrect password consecutively three times, the system halts (you can no longer proceed).
In this case, power off the server once, then power it on.

2.2.2 Exiting SETUP

To exit SETUP after saving parameters, select **Save & Exit** → **Save Changes and Exit**.

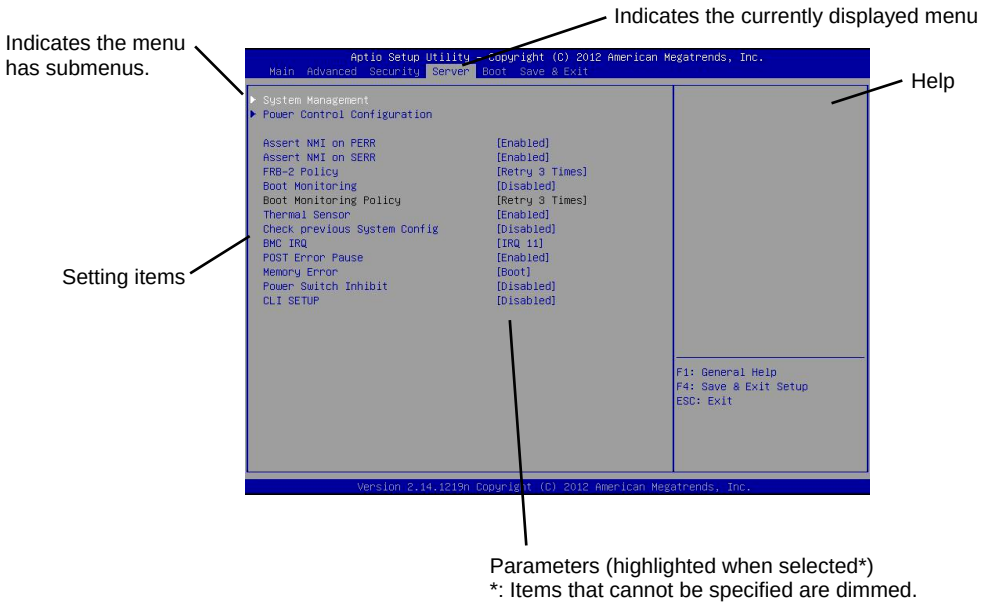
To exit SETUP without saving parameters, select **Save & Exit** → **Discard Changes and Exit**.

Tips

To restore the default value, select **Save & Exit** → **Load Setup Defaults**.
(The default value might be different from the factory setting.)

2.3 Description on On-Screen Items and Key Usage

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

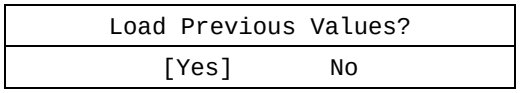


- Cursor keys (<↑>, <↓>)
  Select an item displayed on the screen. If characters of an item are highlighted, that means the item is currently selected.
- Cursor keys (<←>, <→>)
  Select menus including **Main**, **Advanced**, **Security**, **Server**, **Boot**, and **Save & Exit**.
- <–> key/<+> key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

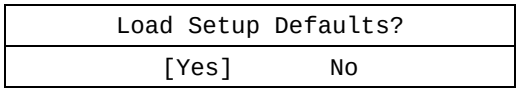
Quit without saving?
[Yes] No

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

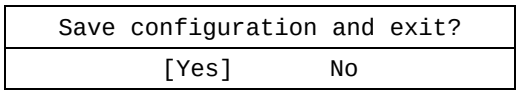
- <F2> key
  If you press this key, the following window appears. If you select **Yes**, the previous parameter(s) are restored.



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



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



2.4 Cases that Require Configuration

Only if a case applies to any of following cases, use SETUP to change a parameter which was configured as factory setting. Other than cases described below, do not change the settings. A list of SETUP parameters and factory settings are described in ***Chapter 2 (1. Details of System BIOS)*** **in "*Maintenance Guide*".**

Category	Description	To be changed	Remark
Basic	Change date and time	**Main → System Date** **Main → System Time**	Configurable on OS
	On/Off NumLock on power ON	**Boot → Bootup Numlock State → ON** or **OFF**	
	On/Off the function to display NEC logo during POST	**Boot → Quite Boot → Disabled**	By pressing <Esc> key, prevent the display of the logo.
Memory	Add or change DIMM	**Advanced → Memory Configuration → Memory Retest → Yes**	After rebooting, **Memory Retest** changes **No** automatically.
	Use memory RAS feature	**Advanced → Memory Configuration → Memory RAS Mode** → change to RAS mode	Some of RAS features may not be used depending on DIMM configuration.
Optional board	Disable Option ROM Scan of installed option board	**Advanced → PCI Configuration → PCI Device Controller and Option ROM Settings → PCIXX Slot Option ROM → Disabled**	*XX* is PCI slot number of the installed option board
Boot	Change the boot order of devices	**Boot → Boot Option Priorities** → Change the boot priority	When you use EXPRESSBUILDER, set **CD/DVD** to the highest priority.
	Use remote power on feature (via modem)	**Advanced → Advanced Chipset Configuration → Wake On Ring → Enabled**	
	Use remote power on feature (via RTC alarm)	**Advanced → Advanced Chipset Configuration → Wake On RTC Alarm → Enabled**	
	Use console redirection feature	**Advanced → Serial Port Configuration → Console Redirection Setting** → Change respective setting.	
Security	Set a password	**Security → Administrator Password** → Enter a password (Set a password for Administrator first and then User)	There are two types of password; Administrator and User. Settings for User password is limited compared to for Administrator.
	Restrict bootup by entering password	**Security → Password on Boot → Enabled**	Can be selected when password is set.
UPS Powerlink	When the server is supplied with power from UPS, always turn on the power.	**Server → Power Control Configuration → AC-LINK → Power On**	
	If it is turned off by using POWER switch, leave it OFF even when UPS supplies power.	**Server → Power Control Configuration → AC-LINK → Last State**	
	Keep the power OFF even when UPS supplies power.	**Server → Power Control Configuration → AC-LINK → Stay off**	

Password

If you have set a password, a message prompt you to enter password will be displayed from the next time.

```
Enter password [                ]
```

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

Saving changes

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

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

Or if you wish to restore the setting to default values, select **Save & Exit** and then **Load Setup Defaults**.

(**The default value might be different from the factory setting.**)

3. EXPRESSSCOPE Engine 3

3.1 Overview

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

See *EXPRESSSCOPE Engine 3 User's Guide* for detailed information.

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

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

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

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

3.2 EXPRESSSCOPE Engine 3 Network Configuration

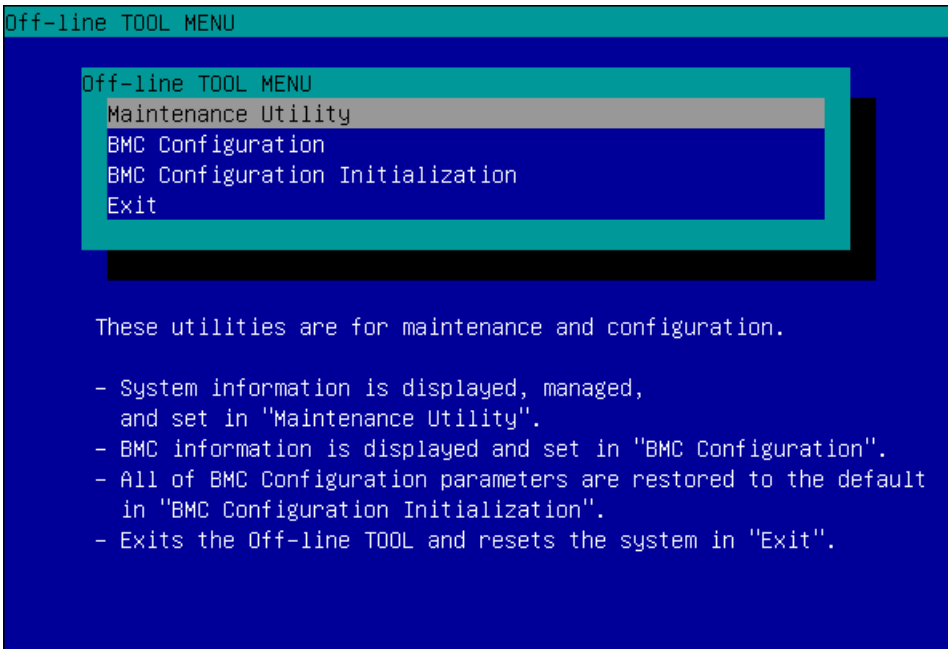
To enable EXPRESSSCOPE Engine 3 to be used via network, network configuration is required. Below is an example of the configuration procedure which enables EXPRESSSCOPE Engine 3 to be used via a web browser.

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

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

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

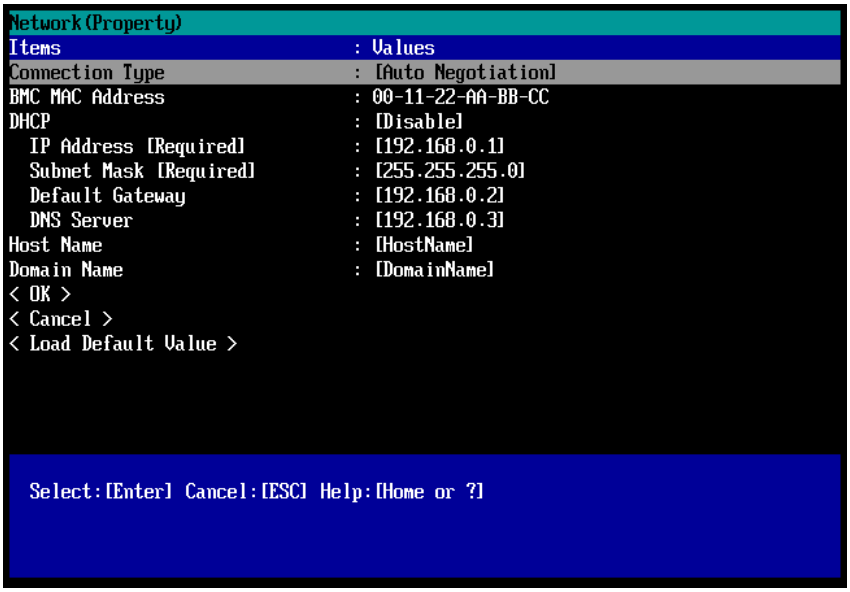
4. When the Off-line TOOL MENU appears, select **BMC Configuration**, **BMC Configuration**, **Network**, and then **Property**.



Tips

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

5. If **Property** is selected, the following screen is displayed. On this screen, specify Enable if you want to use DHCP, or specify IP Address/Subnet Mask if you do not use DHCP.



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

4. EXPRESSBUILDER

EXPRESSBUILDER helps you to install Windows or maintain the server.

4.1 Features of EXPRESSBUILDER

EXPRESSBUILDER provides the following features.

Features	Descriptions
Setup (Windows reinstallation)	Installs Windows on your server. Easily completes the process from RAID configuration to installation of applications. To use this feature, select **OS installation** in the menu after boot.
Bundled software*	Stores various bundled software (such as NEC ESMPRO Agent).
Maintenance	Diagnoses your server system. To use this feature, select **Tool menu** in the menu after boot.
Documents*	Stores various documents (including "*User's Guide*", "*Installation Guide*" and "*Maintenance Guide*").

* Documents and some software components are not stored in N8115-05 Internal Flash Memory (option).

4.2 Starting EXPRESSBUILDER

Follow the procedures below to start EXPRESSBUILDER.

EXPRESSBUILDER DVD:

Set the DVD on the drive and either turn on the server or restart the server by pressing <Ctrl> + <Alt> + <Delete>. EXPRESSBUILDER is booted from DVD.

If you want to install any bundled software or see documents, set the DVD to a computer running Windows. Autorun menu appears automatically.

N8115-05 Internal Flash Memory (option):

Press <F3> key during POST. **Make sure that the media was removed from the drive** when using this option.

See *Chapter 2 (5. Details of EXPRESSBUILDER)in Maintenance Guide* for detail.

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 is OFF.
3. Turn off peripheral devices.

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

NEC Express5800 Series
Express5800/R120e-1M

4 Appendix

1. **Specifications**

2. **Interrupt Lines**

I. Specifications

Product name			Express5800/R120e-1M					
N code			N8100-2073F					
CPU	CPU		N8101-675F	N8101-676F	N8101-677F	N8101-678F	N8101-679F	N8101-680F
			Intel ®Xeon® processor					
			E5-2609 v2	E5-2620 v2	E5-2630 v2	E5-2630L v2	E5-2637 v2	E5-2640 v2
	Clock speed		2.50GHz	2.10GHz	2.60GHz	2.40GHz	3.50GHz	2.00GHz
	Number of CPUs, standard/maximum		1/2					
	3rd cache		10M	15M				20M
	Number of cores (C) / Number of threads (T) per CPU		4C/4T	6C/12T			4C/8T	8C/16T
Chipset			Intel® C602-J chipset					
Memory	Capacity, standard/maximum		Not pre-installed /Unbuffered DIMM: 64GB (16x 4GB), Registered DIMM: 384GB (24x 16GB), Load Reduced DIMM: 1536GB (24x 64GB)					
	Memory module		DDR3L-1600 Unbuffered DIMM (4GB), DDR3L-1600 Registered DIMM (2/4/8/16GB), DDR3L-1866 Registered DIMM (8/16GB), DDR3L-1333 Load Reduced DIMM (32GB), DDR3L-1600 Load Reduced DIMM (64GB)					
	Maximum operating frequency		1333MHz	1600MHz			1866MHz	1600MHz
	Error check, correction		ECC, x4 SDDC, Memory LockStep (x8 SDDC)					
	Memory sparing		Supported					
	Memory mirroring		Supported					
Auxiliary storage	Hard disk drive	Internal (standard)	—					
		Internal (maximum)	2.5-inch HDD: SATA 8TB (8x 1TB), SAS 9.6TB (8x 1.2TB), 2.5-inch SSD: SAS 3.2TB (8x 400GB)(with optional HDD cage installed)					
		Hot swap	Supported					
	Interface / RAID level		SATA 3, 6Gb/s : RAID 0/1/5/6/10/50/60 (Option) SAS 6Gb/s : RAID 0/1/5/6/10/50/60 (Option)					
	Optical disk drive		Internal or external drive (option) *1					
	FDD		Option: Flash FDD (1.44MB) *2					
	Expansion bay		None					
Expansion slots	Supported slots		1x PCI EXPRESS 3.0 (x16 lane, x16 socket) (Full hight, length 220 mm) 1x PCI EXPRESS 3.0 (x8 lane, x8 socket) (Low profile, length 220 mm) 1x PCI EXPRESS 3.0 (x8 lane, x8 socket) (Dedicated to RAID Controller) 1x PCI EXPRESS 3.0 (x8 lane, x8 socket) (Dedicated to LAN riser card)					
Graphics	Chip/VideoRAM		Embedded management controller chip / 32 MB					
	Graphic display / resolution		16,770,000 colors: 640x840, 800x600, 1,024x768, 1,280x1,024					
Interface			9x USB 2.0 (2x front, 4x rear, x3 internal), 2x Analog RGB (Mini D-sub15-pin, 1x front, 1x rear), 1x Serial port (RS-232C compliant / D-sub 9-pin, Serial port A, 1x rear, optional port can be used (up to two ports in total)). 2x 1000BASE-T LAN connector (1000BASE-T/100BASE-T/10BASE-T supported, RJ45, 2x rear), 1x Management LAN connector (100BASE-T/10BASE-T supported, RJ45, 1x rear)					
Power supply unit			Not pre-installed / 450W or 800W 80 Plus® Platinum compliant (bipolar grounded outlet) (hot-plug available) maximum: 2 units) 100/200 VAC ± 10%, 50/60 Hz ± 3 Hz					
Redundant power supply			Supported (option, hot-plug available)					
Redundant fan			Supported (standard, hot-plug unavailable)					
External dimensions (width × depth × height)			439.8mm x 722.0mm x 43.4mm (front bezel/ protrusions/ inner rails excluded) 482.4mm x 757.0mm x 44.4mm (front bezel/ protrusions/ inner rails included)					
Weight (Standard/ Max.)			15.2 kg / 23 kg (including rails)					
Power consumption (100V at maximum configuration)	High-load state		584VA/583W	584VA/583W	584VA/583W	544VA/543W	684VA/683W	614VA/613W
	40°C environment		680VA/670W	680VA/670W	680VA/670W	640VA/630W	780VA/770W	710VA/700W
Environmental requirements Temperature/Humidity		Operating	10 to 40°C / 20 to 80%,					
		Storage	–10～55°C / 20 to 80% (no condensation either when operating or when stored)					
Main accessories			EXPRESSBUILDER (NEC ESMPRO Manager) (Windows), NEC ESMPRO Agent, User's Guide (electronic document) included), Getting Started, one-touch rack rail					
Installed OS			—					
Supported OSs			Microsoft Windows Server 2008 Standard (RTM, SP2 or later), Microsoft Windows Server 2008 Enterprise (RTM, SP2 or later), Microsoft Windows Server 2008 Standard (x64) (RTM, SP2 or later), Microsoft Windows Server 2008 Enterprise (x64) (RTM, SP2 or later), Microsoft Windows Server 2008 R2 Standard, Microsoft Windows Server 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard, Microsoft® Windows Server® 2012 Datacenter, VMware ESXi™ 5.1 update 1, Red Hat® Enterprise Linux® 5.9 or later, Red Hat® Enterprise Linux® 5.9 or later (EM64T) Red Hat® Enterprise Linux® 6.4 or later, Red Hat® Enterprise Linux® 6.4 or later (x86_64)					

*1 If you do not intend to install an internal DVD-ROM or an internal DVD SuperMULTI in all systems, prepare at least one external DVD-ROM per system for maintenance and OS reinstallation purposes.

*2 Prepare this if required. For the principal uses of a Flash FDD, refer to the notes on Flash FDD in the Maintenance Guide.

Product name			Express5800/R120e-1M					
N code			N8100-2073F					
CPU	CPU		N8101-681F	N8101-682F	N8101-683F	N8101-684F	N8101-685F	N8101-686F
			Intel ®Xeon® processor					
			E5-2650 v2	E5-2660 v2	E5-2670 v2	E5-2690 v2	E5-2697 v2	E5-2695 v2
	Clock speed		2.60GHz	2.20GHz	2.50GHz	3.00GHz	2.70GHz	2.40GHz
	Number of CPUs, standard/maximum		1/2					
	3rd cache		20M	25M			30M	
	Number of cores (C) / Number of threads (T) per CPU		8C/16T	10C/20T			12C/24T	
Chipset			Intel® C602-J chipset					
Memory	Capacity, standard/maximum		Not pre-installed /Unbuffered DIMM: 64GB (16x 4GB), Registered DIMM: 384GB (24x 16GB), Load Reduced DIMM: 1536GB (24x 64GB)					
	Memory module		DDR3L-1600 Unbuffered DIMM (4GB), DDR3L-1600 Registered DIMM (2/4/8/16GB), DDR3L-1866 Registered DIMM (8/16GB), DDR3L-1333 Load Reduced DIMM (32GB), DDR3L-1600 Load Reduced DIMM (64GB)					
	Maximum operating frequency		1866MHz					
	Error check, correction		ECC, x4 SDDC, Memory LockStep (x8 SDDC)					
	Memory sparing		Supported					
	Memory mirroring		Supported					
Auxiliary storage	Hard disk drive	Internal (standard)	—					
		Internal (maximum)	2.5-inch HDD: SATA 8TB (8x 1TB), SAS 9.6TB (8x 1.2TB), 2.5-inch SSD: SAS 3.2TB (8x 400GB)(with optional HDD cage installed)					
		Hot swap	Supported					
	Interface / RAID level		SATA 3, 6Gb/s : RAID 0/1/5/6/10/50/60 (Option) SAS 6Gb/s : RAID 0/1/5/6/10/50/60 (Option)					
	Optical disk drive		Internal or external drive (option) *1					
	FDD		Option: Flash FDD (1.44MB) *2					
	Expansion bay		None					
Expansion slots	Supported slots		1x PCI EXPRESS 3.0 (x16 lane, x16 socket) (Full hight, length 220 mm) 1x PCI EXPRESS 3.0 (x8 lane, x8 socket) (Low profile, length 220 mm) 1x PCI EXPRESS 3.0 (x8 lane, x8 socket) (Dedicated to RAID Controller) 1x PCI EXPRESS 3.0 (x8 lane, x8 socket) (Dedi					
Graphics	Chip/VideoRAM		Embedded management controller chip / 32 MB					
	Graphic display / resolution		16,770,000 colors: 640x840, 800x600, 1,024x768, 1,280x1,024					
Interface			9x USB 2.0 (2x front, 4x rear, x3 internal), 2x Analog RGB (Mini D-sub15-pin, 1x front, 1x rear), 1x Serial port (RS-232C compliant / D-sub 9-pin, Serial port A, 1x rear, optional port can be used (up to two ports in total)). 2x 1000BASE-T LAN connector (1000BASE-T/100BASE-T/10BASE-T supported, RJ45, 2x rear), 1x Management LAN connector (100BASE-T/10BASE-T supported, RJ45, 1x rear)					
Power supply unit			Not pre-installed / 450W or 800W 80 Plus® Platinum compliant (bipolar grounded outlet) (hot-plug available) maximum: 2 units) 100/200 VAC ± 10%, 50/60 Hz ± 3 Hz					
Redundant power supply			Supported (option, hot-plug available)					
Redundant fan			Supported (standard, hot-plug unavailable)					
External dimensions (width × depth × height)			439.8mm x 722.0mm x 43.4mm (front bezel/ protrusions/ inner rails excluded) 482.4mm x 757.0mm x 44.4mm (front bezel/ protrusions/ inner rails included)					
Weight (Standard/ Max.)			15.2 kg / 23 kg (including rails)					
Power consumption (100V at maximum configuration)	High-load state		614VA/613W	614VA/613W	654VA/653W	684VA/683W	684VA/683W	654VA/653W
	40°C environment		710VA/700W	710VA/700W	750VA/740W	780VA/770W	780VA/770W	750VA/740W
Environmental requirements Temperature/Humidity		Operating	10 to 40°C / 20 to 80%,				10 to 35°C / 20 to 80%,	10 to 40°C / 20 to 80%,
		Storage	–10～55°C / 20 to 80% (no condensation either when operating or when stored)					
Main accessories			EXPRESSBUILDER (NEC ESMPRO Manager) (Windows), NEC ESMPRO Agent, User's Guide (electronic document) included), Getting Started, one-touch rack rail					
Installed OS			—					
Supported OSs			Microsoft Windows Server 2008 Standard (RTM, SP2 or later), Microsoft Windows Server 2008 Enterprise (RTM, SP2 or later), Microsoft Windows Server 2008 Standard (x64) (RTM, SP2 or later), Microsoft Windows Server 2008 Enterprise (x64) (RTM, SP2 or later), Microsoft Windows Server 2008 R2 Standard, Microsoft Windows Server 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard, Microsoft® Windows Server® 2012 Datacenter, VMware ESXi™ 5.1 update 1, Red Hat® Enterprise Linux® 5.9 or later, Red Hat® Enterprise Linux® 5.9 or later (EM64T) Red Hat® Enterprise Linux® 6.4 or later, Red Hat® Enterprise Linux® 6.4 or later (x86_64)					

*1 If you do not intend to install an internal DVD-ROM or an internal DVD SuperMULTI in all systems, prepare at least one external DVD-ROM per system for maintenance and OS reinstallation purposes.

*2 Prepare this if required. For the principal uses of a Flash FDD, refer to the notes on Flash FDD in the Maintenance Guide.

2. Interrupt Lines

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

- **Interrupt lines**
  As factory settings, interrupt lines are assigned as follows.

IRQ	Peripheral Device (Controller)	IRQ	Peripheral Device (Controller)
0	System timer	12	SM Bus
1	–	13	Numeric data processor
2	–	14	–
3	COM 2 serial port	15	–
4	COM 1 serial port	16	VGA, LAN1
5	PCI	17	LAN2, SATA
6	–	18	–
7	PCI	19	–
8	Real-time clock	20	USB
9	Microsoft ACPI-Compliant System	21	USB
10	PCI	22	USB
11	Motherboard resource	23	USB