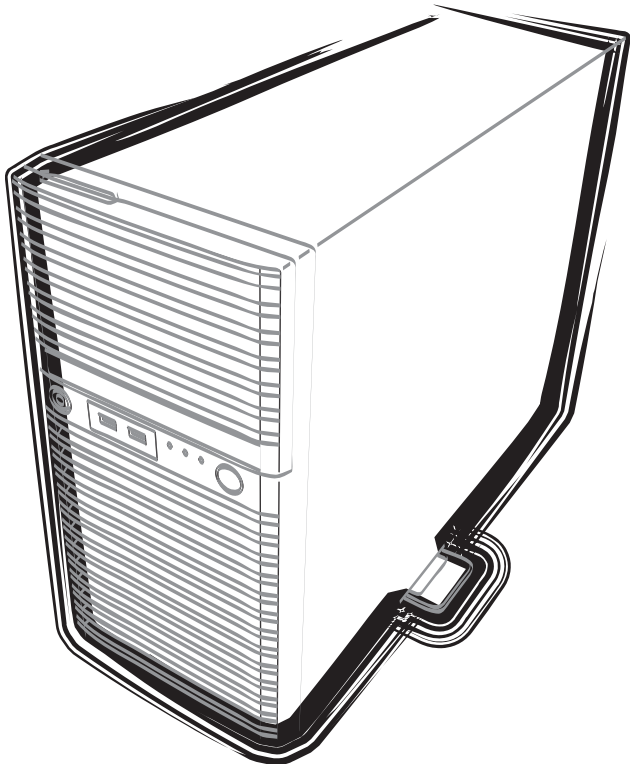
Express5800

NEC



NEC Express Server
Express5800 Series

Express5800/T110f-E
EXP287A, EXP288A
User's Guide

Model Number: N8100-1973F/2006F

Chapter 1 General Description

Chapter 2 Preparations

Chapter 3 Setup

Chapter 4 Appendix

10.101.02-101.01
August. 2018

Documents for This Product

Documents for this product are provided as booklets (📖) or as electronic manuals (PDF) in the EXPRESSBUILDER disc (💿).

📖 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. See this guide at first and confirm an outline of this product.

💿 EXPRESSBUILDER

PDF 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 proper location for this server
Chapter 3: Setup	System BIOS configurations and summary of EXPRESSBUILDER
Chapter 4: Appendix	Specifications and other information

PDF 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

PDF Maintenance Guide

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

PDF Other documents

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

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Notations Used in This Document

Notations used in the text

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

Important	Indicates critical items that must be followed when handling 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 drive

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

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

Hard disk drive

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

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

Removable media

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

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

Abbreviations of Operating Systems

Windows Operating Systems are referred to as follows.

See *Chapter 1* (*1.2 Supported Windows OS)* in *Installation Guide (Windows)* for detailed information.

Notations in this document	Official names of Windows
Windows Server 2012	Widnows Server 2012 Standard
	Widnows Server 2012 Datacenter
	Windows Server 2012 Foundation
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/ Avis de conformité à la réglementation d'Industrie Canada:

CAN ICES-3(A)/NMB-3(A)

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。

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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.

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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.

Turkish RoHS information relevant for Turkish market

EEE Yönetmeliğine Uygundur

CCC声明

声　明

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部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷线路板	×	○	○	○	○	○
HDD、DVD等	×	○	○	○	○	○
机箱、支架	○	○	○	○	○	○
电源	×	○	○	○	○	○
键盘	×	○	○	○	○	○
其他（电缆、鼠标等）	×	○	○	○	○	○

○：表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006标准规定的限量要求以下。
×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006标准规定的限量要求。

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"

警告:
如果更換錯誤池會產生爆炸請以相同或同型電池更換使用

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.

Декларація про Відповідність
Вимогам Технічного Регламенту Обмеження Використання деяких Небезпечних Речовин в електричному та електронному обладнанні
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2. кадм*ій* (Cd) – не перевищує 0,0*1 %* 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 (Cr6+) – 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.

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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 (Cr6+) – 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;
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The most recent version of the guide, as well as other related documents, is also available for download from the following website.

http://www.nec.com/

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, see *Names and Functions of Parts* in this document.

Safety precautions

Follow the instructions in this document for the safe use of the NEC Express server.
This 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.
WARNING or **CAUTION** is used to indicate a danger in this guide or on warning labels. Each term is defined as follows:

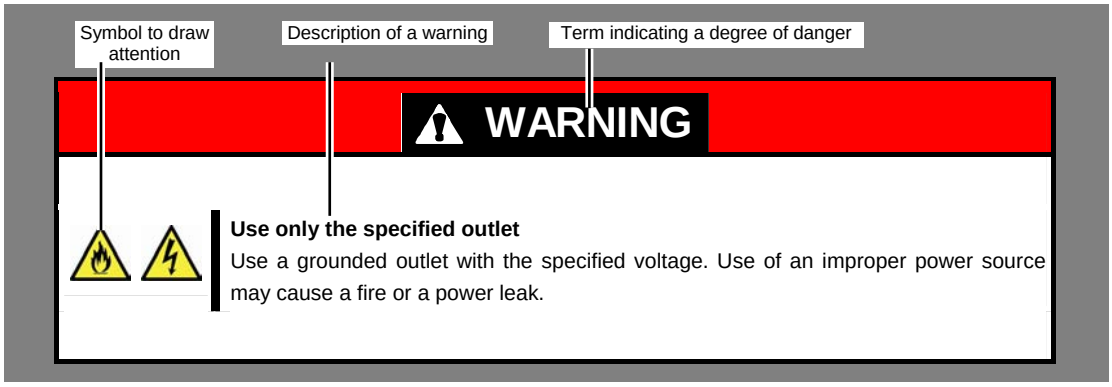
WARNING Indicates there is a risk of death or serious personal injury

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. Each symbol is 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 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.
	Indicates there is a risk of electric shock for the multiple receiving.		

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, see *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.

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.

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

Power supply cord

This server may be shipped with multiple power supply which requires more than one connector to AC mains.

The AC power cord(s) is consider as the mains disconnected device for the server, always disconnect the power supply cord(s) before opening up or servicing the server.

Power supply

The power supplies in your system may produce high voltages and energy hazards, which can cause bodily harm. Unless you are instructed otherwise, only trained service technicians are authorized to remove the covers and access of the components inside the system.

Plug in to a proper power source.

Use a grounded outlet and observe the specified voltage. Use of an improper power source may cause a fire or a power leak.

Do not install the server where you need an extension cord. Use of a cord that does not meet the power specifications of the server may heat up the cord and cause a fire.

If you want to use an AC cord set with a ground wire of class OI, 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.

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.

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.

CAUTION

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)

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.

Installation, relocation, storage, and connection

⚠ CAUTION

Never attempt to lift the server by one person.

The server weights max. 18.5 kg (depending on its hardware configuration). Carrying the server by one person may strain the back.

Securely hold the server by the base to move or lift. Do not attempt to lift it by holding the front bezel. Doing so may cause the front bezel to come off, which may cause not only breakage of the server but also cause the server to fall on to persons 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 connect or disconnect any interface cable with the power cord of the server plugged to a power source.

Be sure to power off the server and unplug the all power cords from a power outlet before installing/removing any optional internal device or connecting/disconnecting any interface cable to/from the server. If the server is off-powered but its power cords is plugged to a power source, touching an internal device, 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 look into the optical disk drive

A laser beam used in the optical disk is harmful to the eyes. Do not look into or insert a mirror into the drive while the drive is powered on. If a laser beam (which is invisible) enters your eyes, you may lose your eyesight.

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.

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

During operation

⚠ CAUTION

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 place any object on top of servers.

Any weight on the server may cause the server to fall, resulting in personal injury or property damage.

Do not leave the optical disk drive tray open.

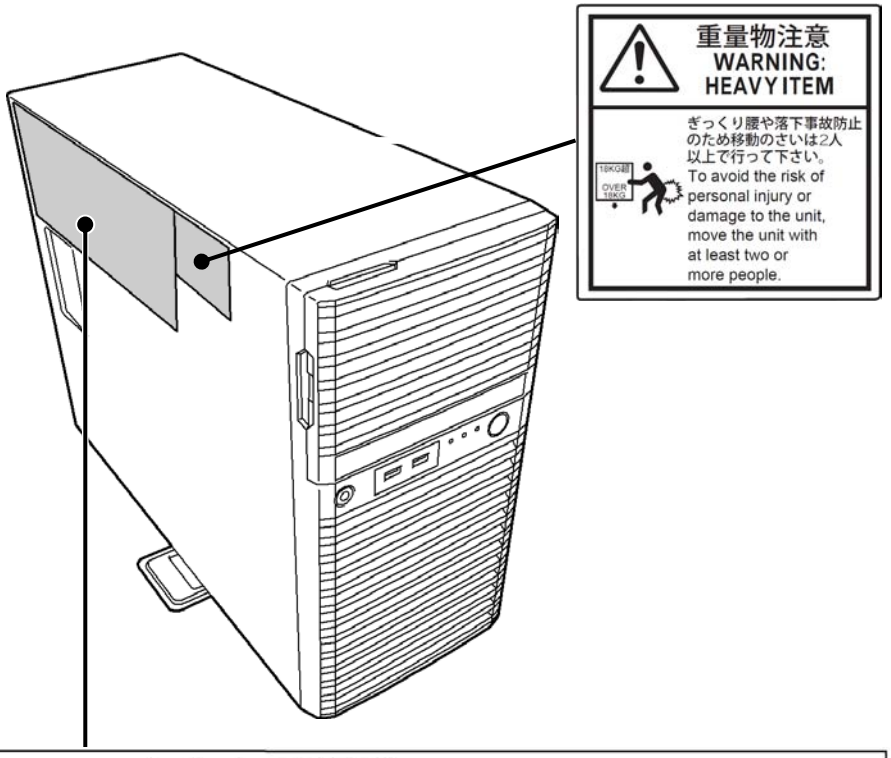
Dust may get in the server when the tray is open, which may result in a malfunction. In addition, bumping the open tray could cause personal injury.

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



⚠ 注 意 CAUTION

高温になるコンポーネントがあります。十分に冷えてから触れるようにして下さい。
As some components may become very hot during system operation, give ample time to allow cooling as well as use precaution when handling internal components immediately after powering down.
有的部件可能会达到高温。请注意待其冷却之后再接触。
有的組件可能會達到高溫。請注意須等冷卻之後再接觸。

電源を切ってもバッテリで稼働している部分があります。
保守をする前に各々のコンポーネントの取り扱い説明書をお読みください。
Some internal components may still be operational on battery power. Refer to instruction manuals for this system as well as options prior to maintenance.
即使切断电源，有的部件也会依靠电池运转。在进行维护之前，请认真阅读各组件的使用说明书。
即使切斷電源，有的組件也會依靠電池運轉。在進行維護之前，請事先閱讀各組件的使用說明書。

オプションの取付け、取外し時はすべての電源プラグをコンセントから抜き、外部装置と接続しているケーブルを外して下さい。
Disconnect all AC power cords from both system and external peripherals prior to installing/removing options.
进行可选配件的安装和拆卸时，请先从插座拔下全部的电源插头并分离与外部设备间的线缆。拔电时请同时拔掉所有电源，否则无法断电。
進行選購配件的安裝和拆卸時，
請先把全部的電源插頭從插座中拔出，並取下與外部設備連接的線纜。

ネジは本体内部へ落とさない様、十分ご注意下さい。
Do not drop any screws inside the system.
请一定注意不要让螺丝掉入设备内部。
請注意絕對不要將螺絲掉入設備內部。

ボード及びオプション機器の接続の際は、必ずユーザーズガイドを参照し、正しく接続して下さい。誤った接続は、故障や火災の原因となります。
Refer to the "User' s Guide" when option board or peripherals are installed. Incorrect installations may result in damage to the system and lead to accidents.
连接板卡及可选设备时，请务必参照“用户指南”进行正确连接。
连接错误，有可能造成故障或火灾。
安裝控制卡及選購設備時，請務必參照“用戶指南”進行正確連接。
連接錯誤時，可能會造成故障或火災。

指をはさんだり、ぶつけたりしないように注意して下さい。
To avoid the risk of personal injury, be careful when accessing the inside of the system.
请小心不要夹住或碰伤手指。
請注意不要夾傷手指，或因碰撞而受傷。

装置の持ち上げ、移動の際は、装置の底面をしっかり持って持ち上げて下さい。
Firmly hold the bottom of the system when required to lift and carry the system.
抬起，移动设备时，请牢固抓住设备底部将其抬起。
抬起，搬運伺服器時，請牢牢抓住設備底部將其抬起。

Handling precautions

Confirm the following precautions.

- 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 location, see *Chapter 2 Preparations (2. Installation and Connection)*.
- Make sure that the server is off and unplug the power cord before connecting/removing cables to/from peripheral devices if they are not plug-and-play devices.
- Connect the provided power cord to a 100 VAC outlet. If an optional cable is used, you can connect to a 100 or 200 VAC power system.
- 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 turning on the server after turning off the server. If any Uninterruptible Power Supply (UPS) unit is connected, set it to wait for at least 30 seconds before turning on the server after power off. If the optional RAID Controller N8103-167 is installed, wait for at least 90 seconds before turning on the server after turning off the power.
- Turn off the server and unplug the power cord before moving it.
- Regularly clean the server to prevent various types of failure. See *Chapter 1 Maintenance (2. Daily Maintenance)* in "*Maintenance Guide*" for details about cleaning.
- Check the system clock approximately once per month. Use of a time server (NTP server) is recommended.
- We recommend you store the server at room temperature. Keep the following storage conditions.
  Temperature: −10°C to 55°C, Humidity: 20% to 80%, No condensation of moisture
- Do not use the server, or removable/backup media such as tape cartridges when moving them from a cold place to a warm place. The condensation will occur and cause malfunctions and failures when these are used in such state. Use the server after waiting sufficiently.
  Reference: Time effective at avoiding condensation in winter (10°C or more differences between the room temperature and atmospheric temperature)
  - Disk devices: Approximately 2 to 3 hours
  - Tape media: Approximately 1 day
- If you use the third party optional device to the server, and it causes failure, a charge for repairing must be paid even within warranty period.

Anti-Static measures

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

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

- **Checking the Workplace**
  - Work on an anti-static floor or concrete floor.
  - If you work on a place where static electricity is likely to be generated (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.

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.

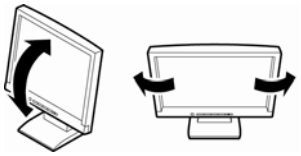
Keep proper posture

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.

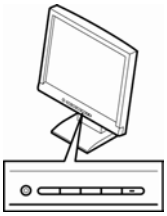
Adjust the angle of your display

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.



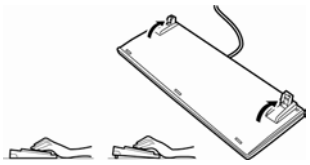
Adjust the brightness and contrast of the display

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/T110f-E

1

General Description

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

1. **Introduction**

2. **Accessories**
   Explains the server's accessories.

3. **Standard Features**
   Explains the server's feature.

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

I. Introduction

Thank you for purchasing this NEC Express5800 Series product.
This high performance server is powered by the latest Intel® 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.

To use the server correctly and to bring out the server's performance, read this document carefully.

2. Accessories

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

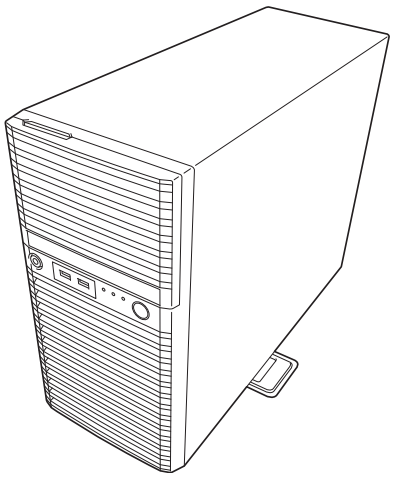
- Keyboard
- Mouse
- Bezel Lock Key × 2
- Screw for fix to back-up devices × 8
- EXPRESSBUILDER*1
- Getting Started
- Power Cord × 1 or × 2
- SDR Update CD-ROM
- Cable Ties (for securing AC power cord) × 1 or × 2*2

*1 Instruction manuals are stored in the PDF format on the EXPRESSBUILDER disc. Install Adobe Reader into your computer to read them.
*2 EXP288A only

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

3. Standard Features

The server has the following standard features:



High performance

- Intel® Xeon® , Core™ i3 , Pentium® processor
- High-speed memory access (DDR3 1600 supported)*
  *:Pentium® processor G3220 is running at 1333MHz.
- High-speed disk access (SATA2 6 Gbps, SAS 6 Gbps supported)
- High-speed 1000BASE-T (2 ports) interface
  (1 Gbps/100 Mbps/10 Mbps supported)

High reliability

- Memory monitoring feature (error correction/error detection)
- Memory degeneracy feature (logical isolation of a failed device)
- Bus parity error detection
- Temperature detection
- Error detection
- Internal fan monitoring feature
- Internal voltage monitoring feature
- RAID System (disk array)
- BIOS password feature

Management utilities

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

Power saving and noiseless design

- Power monitoring feature
- Power control feature
- High-efficiency power supply supporting 80 PLUS® Platinum / Gold.
- Fan control appropriate to environment, work load, and configuration
- Enhanced Intel SpeedStep® Technology supported

Expandability

- Various IO option slots
  - PCI Express 3.0 (x 16 lanes) : 1 slot (low profile)
  - PCI Express 2.0 (x 4 lanes): 1 slot (low profile)
  - PCI Express 2.0 (x 1 lanes): 2 slots (low profile)
- Large memory of up to 32 GB
- Backup device bay provided as standard
- USB 3.0 interface (requires the supporting OS)
- Three LAN connectors (one for management LAN)

Ready to use

- Hard disk drives can be installed with one-touch setup, which requires no cables (requires Hot Plug Drive Cage Kit)

Various built-in features

- El Torito Bootable CD-ROM (no emulation mode) format supported
- Software power-off
- Remote power-on feature
- AC-Link feature
- Remote console feature
- 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 (OS setup utility)
- BIOS setup utility (SETUP)

Maintenance features

- Off-line tool
- Memory dump feature using the DUMP switch
- Feature to back up and restore BIOS/BMC settings using the EXPRESSSCOPE profile key

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 status of the server 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			
	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.
	Door	×	Monitors chassis intrusion (open/close of the covers and doors on the chassis).
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 an MIB item 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: • On-board RAID Controller (LSI Embedded MegaRAID™) • Optional RAID Controller
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

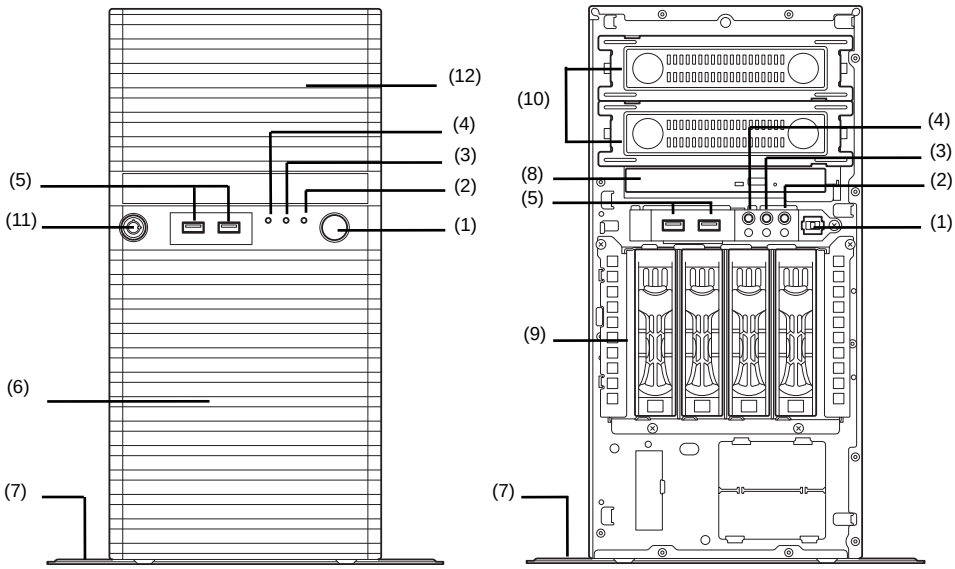
You can manage the version of firmware or software on the server and update them with an update package by using NEC ESMPRO Manager and ExpressUpdate Agent.

This feature automatically updates multiple packages without stopping the system by using NEC ESMPRO Manager.

4. Names and Functions of Parts

The names and the functions of the server's parts are as follows.

4.1 Front of the Server



(1) POWER Switch
The switch to turn the server on and off. Press once to turn on the server. The LED lights green when it is on. Press it again to turn off the server. Hold down the switch for 4 seconds or more to forcibly turn off the server.

(3) POWER LED (green/amber)
After the power cord is connected, this LED lights amber during initialization of system. This LED lights green when the power is ON.

(3) Disk Access LED (green/amber)
This LED lights or flashes green when the internal hard disk drive or optical disk drive is being accessed.
The LED lights amber if a hard disk drive error occurs in the RAID system configurations except for an onboard RAID configuration using 3.5-inch hard disk drives.

(4) STATUS LED (green/amber)
This LED indicates the server status. It lights green when the server is operating normally.

(5) USB Connectors (front)
These connectors are used to connect devices that support the USB interface.
Blue connector: for USB 3.0
Black connector: for USB 2.0

(6) Front Bezel
This cover protects the front part of the server.

(7) Stabilizer
To place the server vertically, install as shown in the above figure

(8) Optical Disk Drive
Either of the following drives can be installed.
– DVD-ROM drive
– DVD SuperMULTI drive
The drive provides the following: an eject button to eject the tray; an LED that indicates the drive access; and an eject hole to eject the tray forcibly.

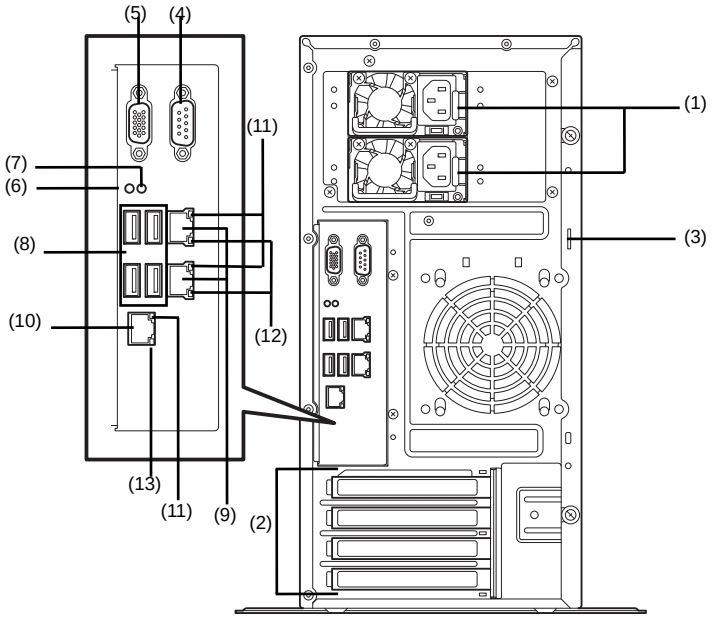
(9) HDD Bay
The bay which can accommodate HDD.

(10) 5.25-inch Expansion Bay
The bay which can accommodate backup device.

(11) Key Slot
Bezel Lock Key can be inserted into Key Slot to lock Front Bezel.

(12) Front Door
Open this door to handle the backup drives or optical disk drive.

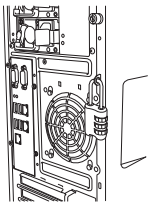
4.2 Rear View



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

(2) PCI Slots

(3) Chassis Lock Tab
The lock protects internal components.



(4) Serial Port (COM A) Connector
This connector is used to connect devices that support a serial interface. Note that it is not possible to directly connect to a dedicated line. If the optional N8117-01A Additional RS232C Connector Kit is connected, the connector of N8117-01A is assigned as the serial port B.

(5) Display Connector
The connector to connect a display

(6) DUMP Switch
Press this switch to get a memory dump.
Do not press DUMP Switch usually. If DUMP Switch is pressed, the server stops.

(7) BMC RESET Switch
The switch to reset BMC of this server. Use the switch only when there is something wrong with EXPRESSSCOPE Engine 3 (BMC).

(8) USB Connectors
These connectors are used to connect devices that support the USB interface.
Blue connector: for USB 3.0
Black connector: for USB 2.0

(9) LAN Connectors
Supports 1000BASE-T interface.
If Shared BMC LAN feature is enabled in ROM Utility, LAN connector 1 can also be used as the management LAN connector. Sharing port is not recommended from the point of performance and security.

(10) Management LAN Connector
A LAN connector which supports 100BASE-TX. This port is used for connection with EXPRESSSCOPE Engine 3, and cannot be used as a data transmission port. This port cannot be used when Shared BMC LAN feature is used.

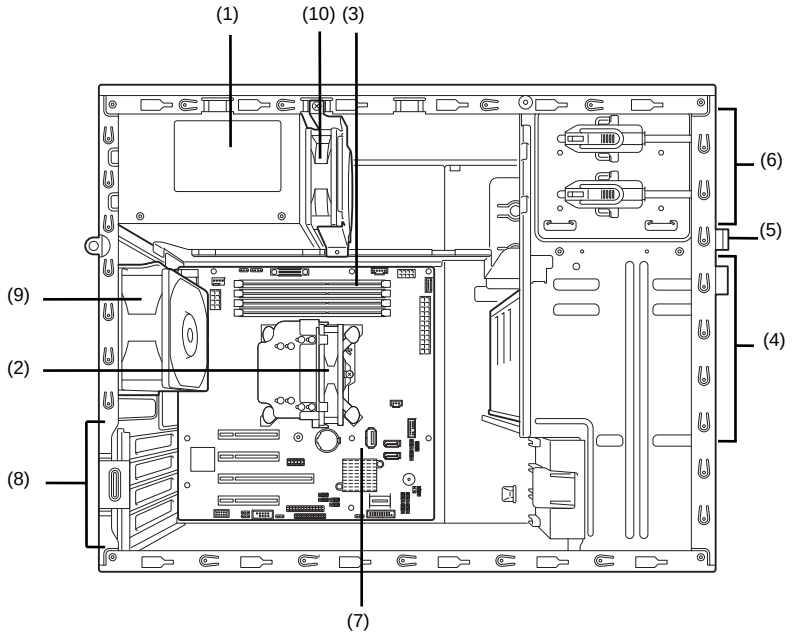
(11) LINK/ACT LED (green)
The LED indicates the access status of LAN

(12) SPEED LED (green/amber)
The LED indicates the transfer speed of LAN ports

(13) SPEED LED (green)
The LED indicates the transfer speed of the LAN port used for management

4.3 Internal View

<Non-redundant power supply model>



(1) Power Supply Unit

(2) Cooling Fan (CPU)

(3) DIMM Slots

(4) Hard Disk Drive Bay

Can be equipped with 3.5-inch or 2.5-inch hard disk drives. The figure shows the view when 2.5-inch hard disk drives are installed.

(5) Optical Disk Drive

(6) 5.25-inch Expansion Bay

The bay that can accommodate back up device.

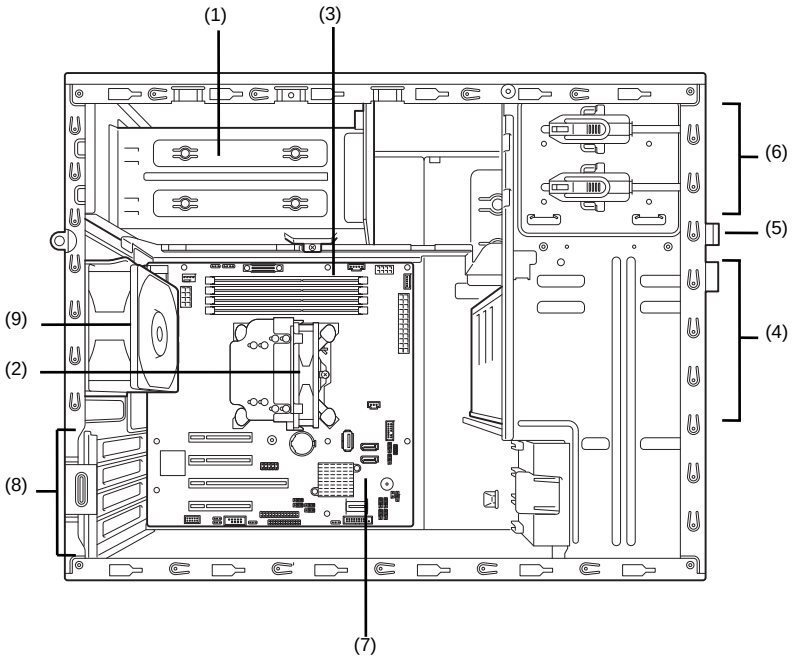
(7) Motherboard

(8) PCI Slot

(9) Cooling Fan (rear)

(10) Cooling Fan (for cooling Power Supply Unit)

<Redundant power supply model>



(1) Power Supply Unit

(2) Cooling Fan (CPU)

(3) DIMM Slots

(4) Hard Disk Drive Bay

Can be equipped with 3.5-inch or 2.5-inch hard disk drives. The figure shows the view when 2.5-inch hard disk drives are installed.

(5) Optical Disk Drive

(6) 5.25-inch Expansion Bay

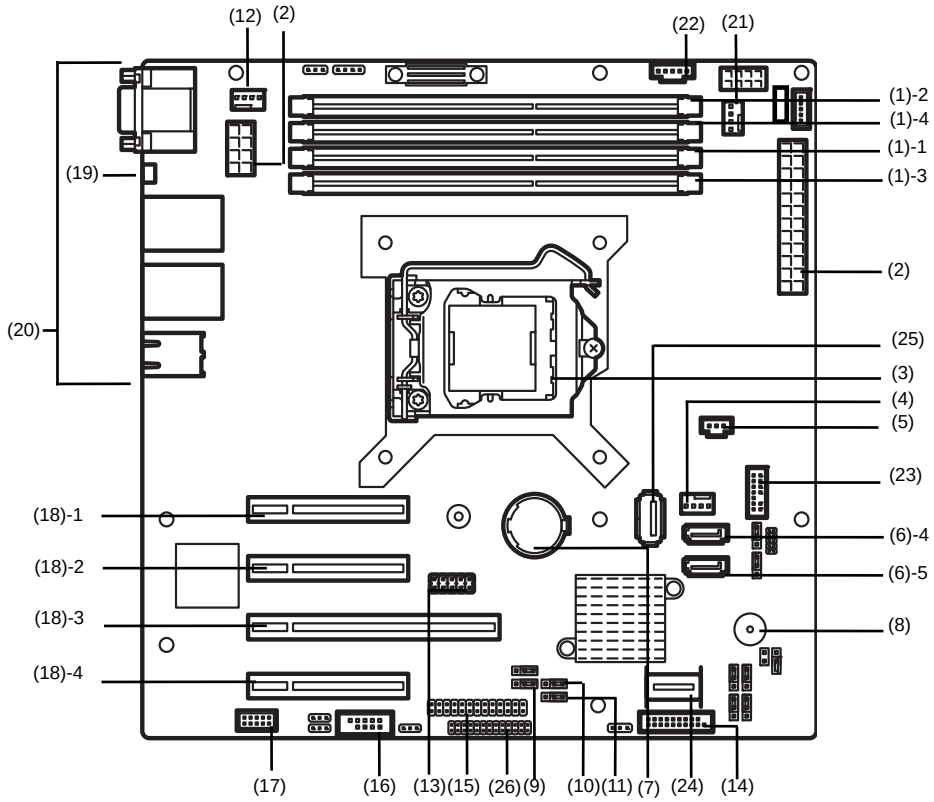
The bay that can accommodate back up device.

(7) Motherboard

(8) PCI Slot

(9) Cooling Fan (rear)

4.4 Motherboard



(1) DIMM Slots (the number after hyphen indicates DIMM number)

(2) Power Connector

(3) CPU Socket

(4) CPU Cooling Fan Connector (FAN1)

(5) RAID LED Cable Connector

(6) Serial ATA Connector (the number after hyphen indicates connector number)

(7) Lithium Battery

(8) Buzzer

(9) Clear CMOS Jumper

(10) RAID Configuration Jumper

(11) Clear Password Jumper

(12) Rear Fan Connector (FAN2)

(13) Internal Flash Memory Connector

(14) USB Connector (for front)

(15) LED/SW Cable Connector

(16) Serial Port (COM B) Connector (for N8117-01A)

(17) SPI Flash Mezzanine Connector

EXPRESSSCOPE profile key (SPI memory) has been installed, where BIOS and BMC configuration data is stored. Move it when replacing MB to keep using the data.

(18) PCI Card Slots

(18)-1 PCI EXPRESS x1 (x8 connector)
(18)-2 PCI EXPRESS x1 (x8 connector)
(18)-3 PCI EXPRESS x16 (x16 connector)
(18)-4 PCI EXPRESS x4 (x8 connector)

(19) (Upper) BMC RESET Switch

(Lower) DUMP Switch (NMI)

(20) External Connector

(21) Power Supply Unit Fan Connector (FAN3)

(22) PMBus Connector

(23) TPM Mezzanine Connector

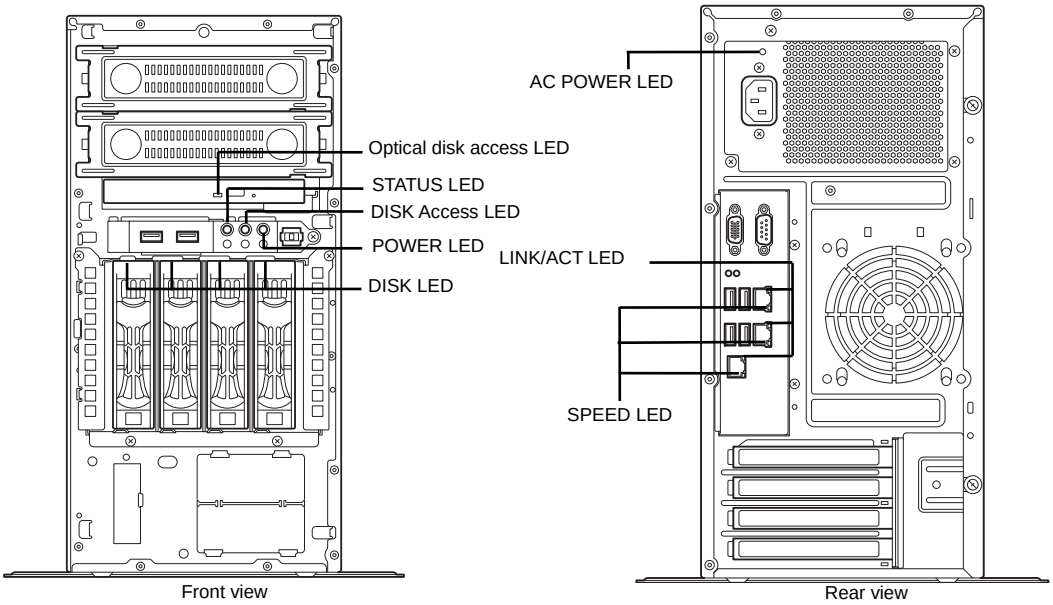
(24) Mini-SAS Connector

(25) USB Connector (for internal)

(26) HDD-BP I/F Connector

4.5 Status Indicators

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



4.5.1 POWER LED ( )

POWER LED indicates the 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)	The power cord is plugged in and BMC is being initialized. The server can be powered on after the amber LED is unlit.
Off	The server is off-powered.

4.5.2 STATUS LED (⚠)

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

The following table lists STATUS LED patterns, their description and solution.

Tips Refer to the system event log (SEL) by using NEC ESMPRO or the offline maintenance utility to view the cause of failure.

STATUS LED pattern	Description	Solution
On (green)	Normal state	–
Flashing (green)	Memory is in a degraded state	Find the device of degraded state by using the BIOS setup utility *SETUP*, and replace it as soon as possible.
	Uncorrectable memory errors have often occurred.	
Off	The power is off.	Turn on the server.
	POST is in progress.	STATUS LED turns green after the POST process.
	Watchdog timer expired.	Turn the power off and then turn it on. If the POST screen displays any error message, take notes of the message, and contact your sales representative.
	An uncorrectable error in memory was detected.	
	A PCI bus error was detected.	
	Memory dump is being requested. (e.g. DUMP Switch was pressed) **Note** It remains green when the dump is caused by software.	Wait until the memory dump is complete.
On (amber)	A temperature alarm was detected.	Check the internal cooling fan for dusts. Also check if the fan unit is properly connected.
	A voltage alarm was detected.	Contact your sales representative.
	A CPU temperature alarm was detected.	
	A CPU error was detected.	Turn the power off and then turn it on. If the POST screen displays any error message, take notes of the message, and contact your sales representative.
	SMI timeout was detected	Contact your sales representative.
	Sensor error was detected.	
Flashing (amber)	Failure of the power supply unit was detected	Contact your sales representative.
	A fan alarm was detected.	Check if the internal cooling fan cable is properly connected.
	A temperature warning was detected.	Check the internal cooling fan for dusts. Also check if the fan unit is properly connected.
	A voltage warning was detected	Contact your sales representative.
	An error was detected on either of the hard disk drives when on a 3.5-inch HDD cage or 2.5-inch HDD cage is installed and the RAID system is configured.	

4.5.3 Disk Access LED ( )

DISK Access LED indicates the status of HDDs.

The following table lists DISK Access LED patterns.

DISK Access LED pattern	Hardware configuration	Description
On (green)/Flashing green	All	Hard disk drive or optical disk drive is being accessed.
On (amber)	A RAID system is configured with 3.5-inch or 2.5-inch Hot Plug Drive Cage Kit.	Hard disk drive is failing. The normal working after powering on or resetting.
Flashing green and amber alternately.		Rebuild is in progress.
Off	All	Hard disk drive is halted.

4.5.4 Optical Disk Access LED

The LED lights/flashes when the media set on the optical disk drive is being accessed.

4.5.5 Disk LED

When 3.5-inch or 2.5-inch Hot Plug Drive Cage Kit is installed, each drive has its respective LED (Disk LED).

The following table lists DISK LED patterns.

Disk LED pattern	Description
On (green)/Flashing green	Hard disk drive is being accessed.
On (amber)	Hard disk drive is failing in RAID system.
Flashing green and amber alternately	Rebuild is in progress.
Off	Hard disk drive is halted.

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

This LED indicates the status 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 correctly.
Flashing (green)	The server is accessing network.
Off	The server is disconnected from network.

4.5.7 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-TX.
- Management LAN (M) supports 100BASE-TX and 10BASE-TX.

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.

4.5.8 AC POWER LED

When an optional redundant power supply unit is installed, an AC POWER LED is added to the unit.
The following table lists AC POWER LED patterns and their meanings.

LED status	Condition	Description
On (green)	The server is on.	–
Flashing (green)	AC power is being supplied via the power cord.	–
	Cold redundancy is enabled.	
On (amber)	A redundant power supply system is configured and a power cord is only connected to one of the power supply units.	Connect the power cord to the other power supply unit.
	The power supply unit is broken.	Contact your sales representative.
Flashing (amber)	The power supply unit is broken.	

NEC Express5800 Series
Express5800/T110f-E

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. **Installation and Connection**

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

1. Installing Internal Optional Devices

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

Important **If you use the third party optional device to the server, and it causes failure, a charge for repairing must be paid 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, NiMH, or Li-ion battery.**
- **Do not handle the server while the power plug is inserted into the outlet.**

⚠ CAUTION

Be sure to observe the following precautions to use of 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 by gripping the front bezel or vent holes cover.**
- **Make sure to complete installation.**
- **Do not get your fingers caught.**
- **High temperature.**

1.2 Anti-static Measures

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

- **Wearing Anti-static Wrist Strap or Anti-static Gloves**

  Wear a wrist strap on your wrist and connect the wire to the chassis. If there is no wrist strap, touch an unpainted metal surface of the chassis connected to the ground to discharge static electricity from your body before touching the component. Touch the metal part occasionally to discharge the static electricity while working on the component.
- **Checking the Workplace**
  - Work on an anti-static floor or concrete floor.
  - If you work on a place where static electricity is likely to be generated (e.g. carpet), be sure to provide anti-static protection.
- **Using the Work Table**

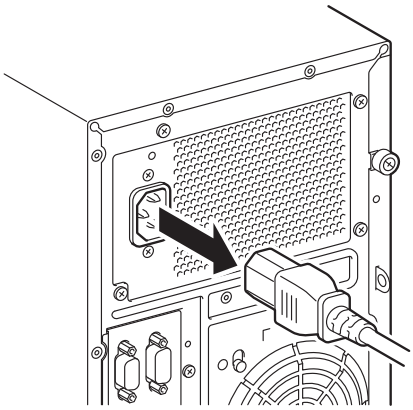
  Place the server on a mat with Electrostatic Discharge (ESD) protection.
- **Clothing**
  - Do not wear wool or synthetic clothes.
  - Wear anti-static shoes.
  - Remove any kind of metal accessories such as a ring, bracelet or wrist watch.
- **Handling of Components**
  - Keep the component in an anti-static 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**

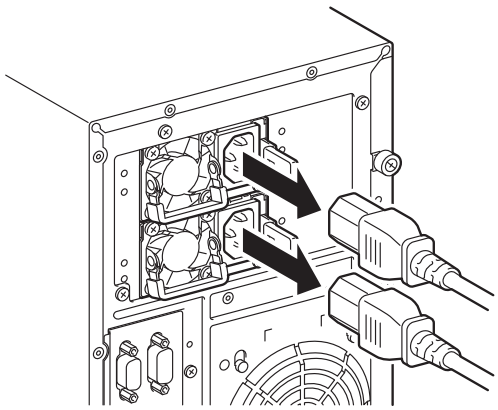
  When connecting a cable (e.g., LAN cable), static electricity may also be charged due to friction against the floor. Connecting the charged cable with an I/O device may cause damage to the devices in the system. It is recommended to use a product such as electrostatic discharge kit to eliminate the static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

1. Turn the server off.
   See *Chapter 3* (6. *Turning off the Server*).
2. Disconnect all the power cables connected to the server from the outlet, and then disconnect them from the server.





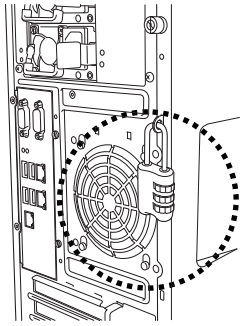
3. Disconnect all cables connected to the connector at the rear.
4. Remove the side cover.
   See *Chapter 2 (1.4. Removing the Side Cover)*.
5. Remove the front bezel if applicable.
   See *Chapter 2 (1.5 Removing the Front Bezel)*.
6. Depending on the components to be installed or removed, follow the procedure in order.
   See *Chapter 2* (*1.6 Internal Flash Memory* to *1.14 Backup Devices)*.
7. Connect cables
   See *Chapter 2* (*1.16 Connecting Cables)*.
8. Attach the front bezel.
   See *Chapter 2 (1.17 Attaching the Front Bezel).*
9. Attach the side cover.
   See *Chapter 2* (*1.18 Installing the Side Cover)*.

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

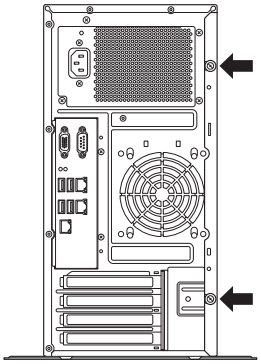
1.4 Removing the Side Cover

Remove the side cover by using the following procedure.

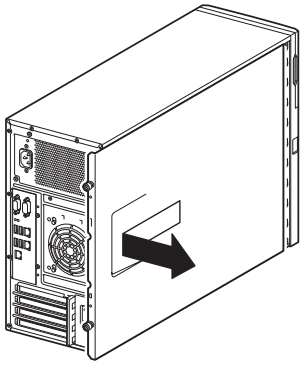
1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Unlock the chassis, if necessary.



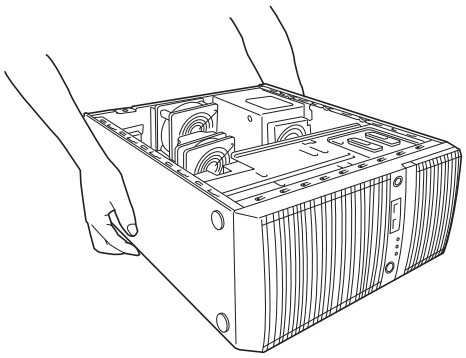
3. Remove the two screws on the rear panel.



4. Remove the side cover, holding it firmly.



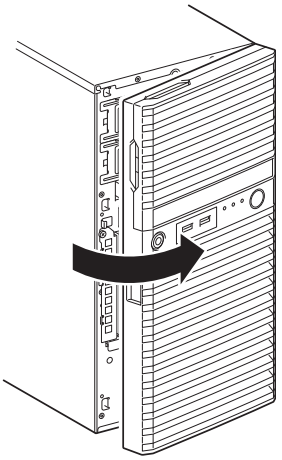
5. Remove the front bezel, if necessary.
   Carefully lay the unit on its side, right side down.



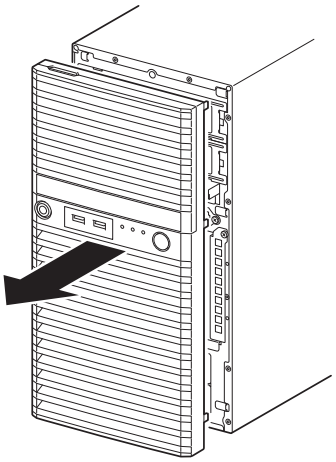
1.5 Removing the Front Bezel

Remove the front bezel by using the following procedure.

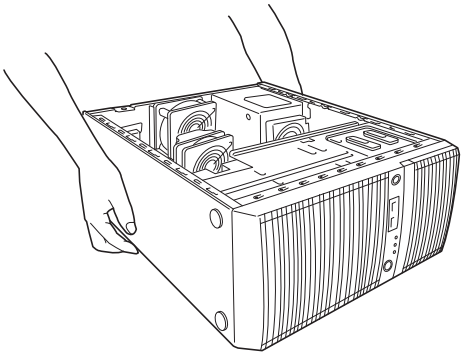
1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Using the indentation on the left side of the front bezel, pull the front bezel forward until the tab pops out of the frame.



3. Continue opening the front bezel until the three tabs on the right side of the server pop out and the front bezel is completely removed.

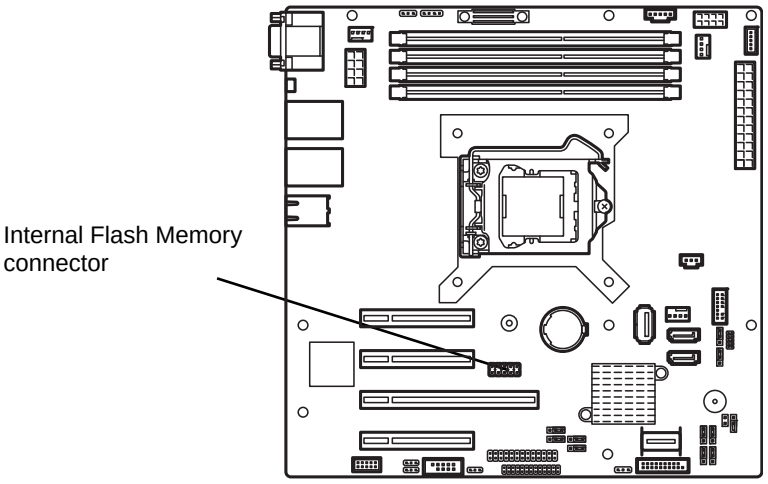


4. Carefully lay the server on its side, right side down.



1.6 Internal Flash Memory

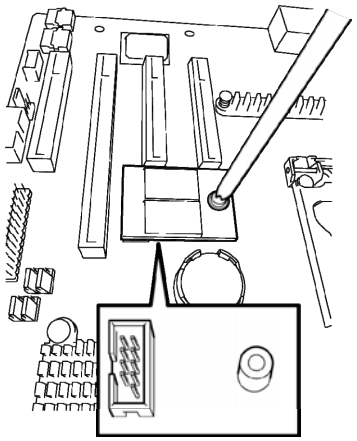
This section describes the procedure for installing the Internal Flash Memory.



1.6.1 Installation

Install the Internal Flash Memory in the following procedure.

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Attach the Internal Flash Memory and fix it with the screw that comes with the Internal Flash Memory Kit.

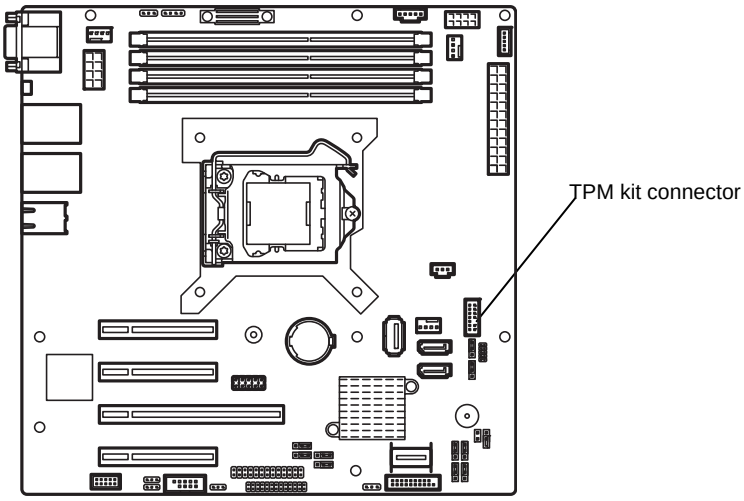


1.6.2 Removal

To remove the Internal Flash Memory, reverse the installation procedure.

1.7 TPM Kit

This section describes the procedure for installing optional TPM Kit.



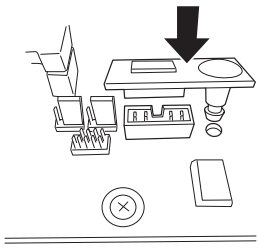
1.7.1 Installation

Install the TPM Kit in accordance with the following procedure.

Note The TPM kit once installed cannot be removed.

1. See steps 1 to 5 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.

2. Install the TPM Kit and secure it by pushing the nylon rivet that comes with the TPM Kit.



1.8 DIMM

Install a Dual In-line Memory Module (DIMM) to a DIMM slot on the motherboard in the server. The motherboard provides four slots to install DIMMs.

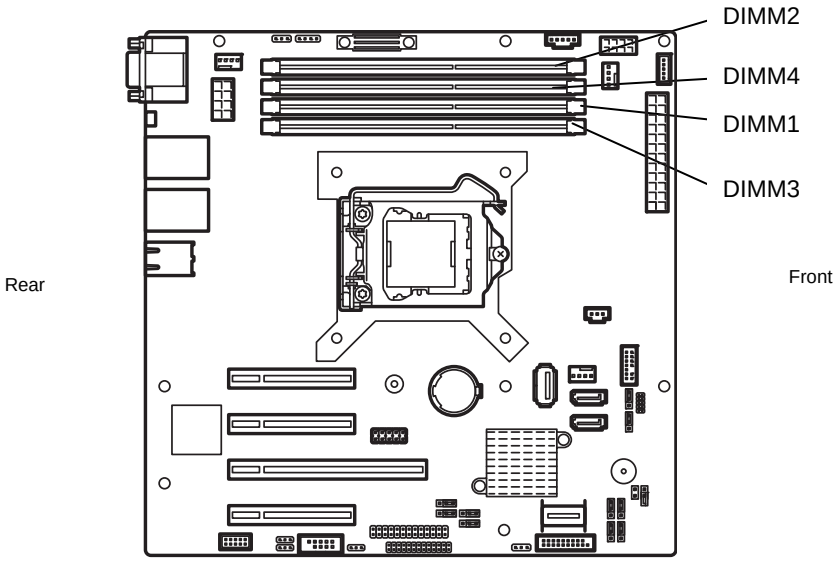
Up to 32 GB (8 GB × 4) of memory can be installed.

Important

- **Use only the DIMMs specified by NEC. Installing a DIMM from a third party may cause the server to fail. You will be charged to repair failures or damages caused by the use of such products even within the warranty period.**
- **Read through *Chapter 2 (1.2 Anti-static Measures)* beforehand.**

Tips

As about 750 MB of memory is used for PCI resources, the available memory size may be less than the mounted memory size.



Motherboard

This server supports 2-way Interleave mode.

In 2-way interleaved memory system, the data transfer rate of the memory is twice that of a non-interleaved memory system.

1.8.1 Maximum supported memory size

The maximum available memory size on the server depends on the architecture (x86 architecture) and OS specs.

A list of maximum memory sizes

OS	The maximum memory size supported on each OS	The maximum memory size supported on the server
Windows Server 2008 Standard	4 GB	4 GB (using HW-DEP feature) * Default factory settings
		About 3.5 GB (not using HW-DEP feature) Note: **Execute Disable Bit (XD Bit)** is set to **Disabled** in BIOS SETUP.
Windows Server 2008 R2 Standard (x64)	32 GB	32 GB
Windows Server 2008 Enterprise	64 GB	
Windows Server 2008 R2 Enterprise	2 TB	
Windows Server 2012 Standard Windows Server 2012 Datacenter	4 TB	
Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6	16 GB	16 GB
Red Hat Enterprise Linux 5 (EM64T)	1 TB	32 GB
Red Hat Enterprise Linux 6 (x86_64)	3 TB	
VMware ESXi 5.1	2 TB	32 GB Up to 1 TB of the main memory is available to each virtual machine.

1.8.2 Installation order

Install DIMMs one by one in order of increasing memory size into slots in the order of DIMM#1, DIMM#2, DIMM#3, and DIMM#4. If you want to run the server in 2Way Interleave mode, observe the following installation rules:

- Install DIMMs in pairs
- The two DIMMs installed together must be of the same specifications and memory size.
- Install the pairs as DIMM#1 and DIMM#2, or DIMM#3 and DIMM#4. The installation order between the pairs does not matter.

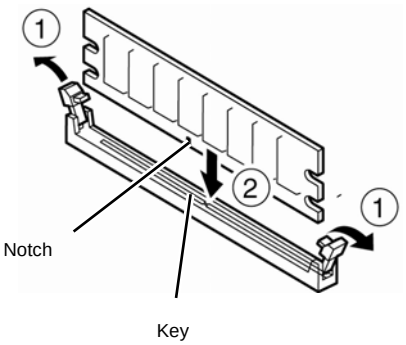
Installation examples

Example	2Way Interleave	DIMM#1	DIMM#2	DIMM#3	DIMM#4
1	Available	2 GB DIMM (Standard)	2 GB DIMM	Not installed	Not installed
2	Available	2 GB DIMM (Standard)	2 GB DIMM	2 GB DIMM	2 GB DIMM
3	Not available	2 GB DIMM (Standard)	2 GB DIMM	2 GB DIMM	Not installed
4	Not available	2 GB DIMM (Standard)	2 GB DIMM	Not installed	2 GB DIMM

1.8.3 Installation

Install a DIMM by using the following procedure.

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Hold the server with both hands and slowly and gently lay it so that the left side faces upward.
3. Open both levers of the target DIMM slot outward.
4. Hold the DIMM vertically and push it into the slot.
   When the DIMM is inserted correctly, the lever automatically closes.



Important **Do not apply too much pressure when you push a DIMM into the socket.**

Note Align the notch on the DIMM with the key on the slot.

5. Firmly close the lever.
6. Continue to install or remove internal optional devices, mount and connect the server, and turn it on.
7. 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*".
8. Run the BIOS Setup Utility, go to the **Advanced** menu, and check the **Memory Configuration**. Confirm that the added DIMM has been recognized in the BIOS. Confirm that the applicable **DIMM Group Status** is set to "Normal". See *Chapter 2 (1. Details of System BIOS)* in "*Maintenance Guide*".
9. Set the paging file size to the recommended value (Total memory size x 1.5) or more.
   When using a Windows OS, see *Chapter 1 (7.1 Specifying Memory Dump Settings (Debug Information))* in "*Installation Guide (Windows)*".
   For other OS, see the manual provided with the operating system or contact your sales representative.

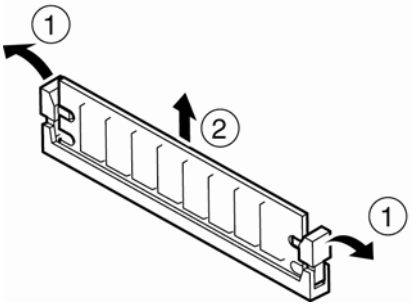
1.8.4 Removal

Remove a DIMM in the following procedure.

Note

- When removing a defective DIMM, check error messages displayed at POST or NEC ESMPRO and check the DIMM slot where the defective DIMM is installed.
- At least one DIMM needs to be installed for the server to operate.

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal* for preparations.
2. Open both levers of the target DIMM slot outward.
   The DIMM is unlocked
3. Remove the DIMM by pulling it out from the slot in a straight direction.



Important **Do not apply too much pressure when you pull a DIMM out from the socket.**

4. Assemble the server.
5. Turn on the server and 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*".
6. If you replaced a broken DIMM, choose **Yes** in **Memory Configuration**-**Memory Retest** of the **Advanced** menu, and then choose **Save Changes and Exit** to restart.
7. Set the paging file size to the recommended value (Total memory size x 1.5) or more.
   When using a Windows OS, see *Chapter 1 (7.1 Specifying Memory Dump Settings (Debug Information))* in "*Installation Guide (Windows)*".
   For other OS, see the manual provided with the operating system or contact your sales representative.

1.9 Use of Internal Hard Disk Drives in the RAID System

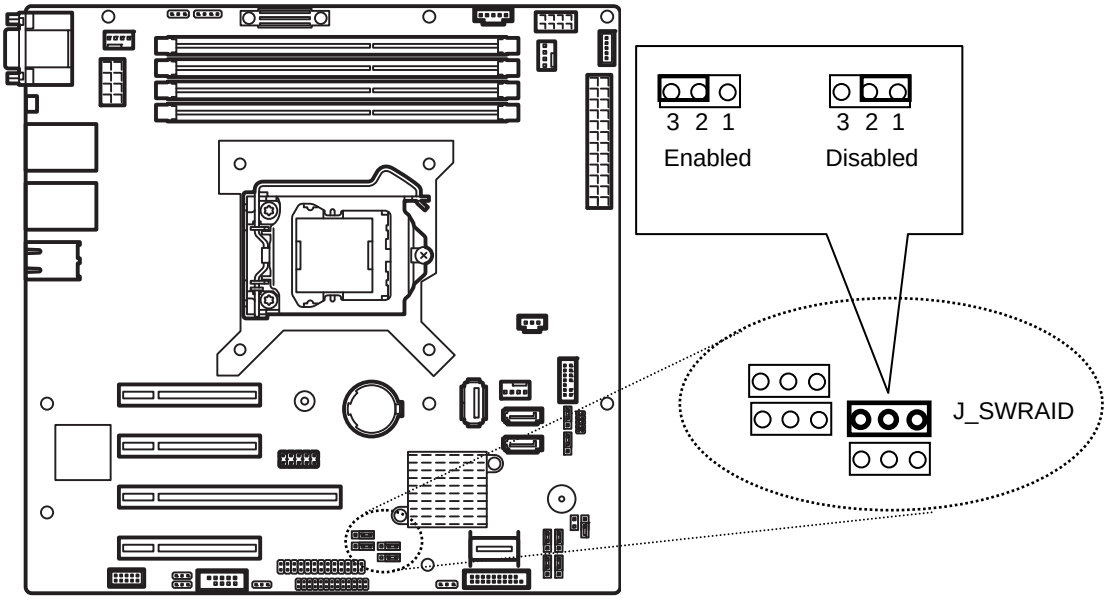
This section describes how to use the hard disk drives installed in the HDD cage at the front of the server in the RAID system.

Important **If you use hard disk drives in the RAID system or change the RAID level, initialize the hard disk drives. If the hard disk drive used in the RAID system contains valuable data, be sure to backup the hard disk drive before installing the RAID controller and configuring the RAID system.**

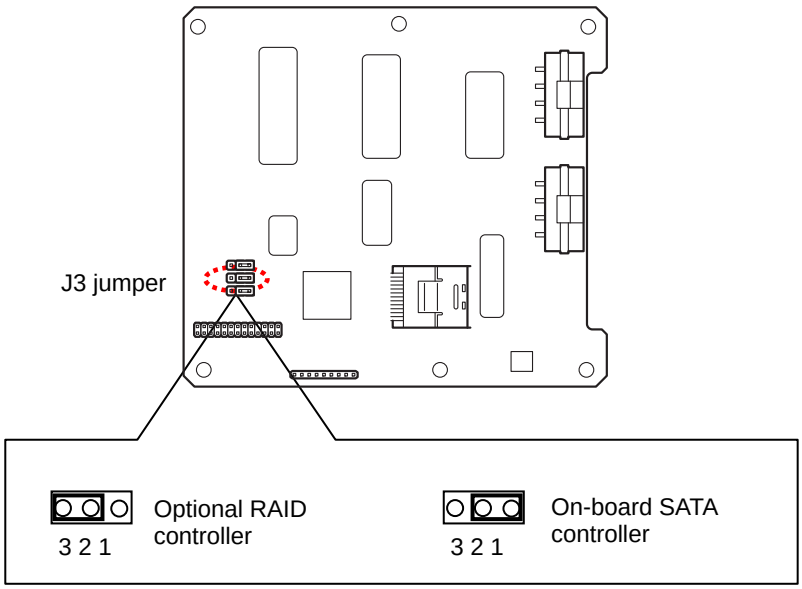
Note In the RAID system, use hard disk drives that have the same specifications (capacity, rotational speed, and standard) for each disk array.

Tips Logical drives can be created even with only one physical device.

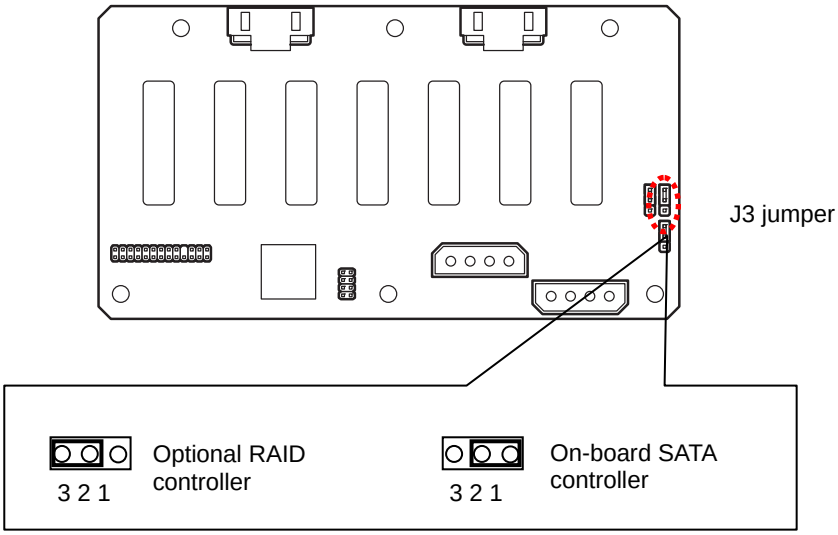
To build a RAID system, change the jumper switch on motherboard and backplane, as shown below.



Motherboard



Backplane for 3.5-inch hard disk drives with 3.5-inch HDD cage



Backplane for 2.5-inch hard disk drives with 2.5-inch HDD cage

(a) Using on-board RAID controllers (LSI Embedded MegaRAID™)

Jumper on motherboard (J_SWRAID)
Change jumper setting to 2-3 (Enabled).

[Using 3.5-inch fixed hard disk drive]

No setting other than the jumper on the motherboard is required.

[Using 3.5-inch hard disk drive]

Backplane for 3.5-inch hard disk drive with 3.5-inch HDD cage (J3)

Change jumper setting to 1-2 (Onboard SATA controller).

[Using 2.5-inch hard disk drive]

Backplane for 2.5-inch hard disk drive with 2.5-inch HDD cage (J3)

Change jumper setting to 1-2 (Onboard SATA controller).

Configure the RAID system using EXPRESSBUILDER or LSI Software RAID Configuration Utility, after changing the jumper.

For details, see *Chapter 2 (4. RAID System Configuration)* or *(5. Details of EXPRESSBUILDER)* in "*Maintenance Guide*".

(b) Using an optional RAID controller

Jumper on motherboard (J_SWRAID)
Change jumper setting to 1-2 (Disabled).

[Using 3.5-inch fixed hard disk drive]

No setting other than the jumper on the motherboard is required.

[Using 3.5-inch hard disk drive]

Backplane for 3.5-inch hard disk drive with 3.5-inch HDD cage (J3)

Change jumper setting to 2-3 (Optional RAID controller)

[Using 2.5-inch hard disk drive]

Backplane for 2.5-inch hard disk drive with 2.5-inch HDD cage (J3)

Change jumper setting to 2-3 (Optional RAID controller)

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**.

Important **Do not change the mode to hibernate when building a RAID system.**

(c) Installation

For the instruction of installing the optional RAID controller, see *Chapter 2 (1.11 PCI Card)*.

Important **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.**

(d) Removal

To remove the optional RAID controller, reverse the installation procedure.

If you intend to use with the card removed, be sure to attach the blank cover attached to the riser card.

1.9.1 Notes on setting up a RAID system

Note the following points when setting up a RAID system.

- The number of hard disk drives required varies in each RAID level.
- If an on-board RAID controller or optional RAID controller (N8103-128/149) is used, the RAID system cannot be built in RAID5/RAID6.

RAID level	The minimum number of hard disk drives required to set up a RAID system	
	On-board RAID controller or N8103-171/149	N8103-171/151/167
RAID 0	1	1
RAID 1	2	2
RAID 5		3
RAID 6		3
RAID 10	4	4
RAID 50		6
RAID 60		6

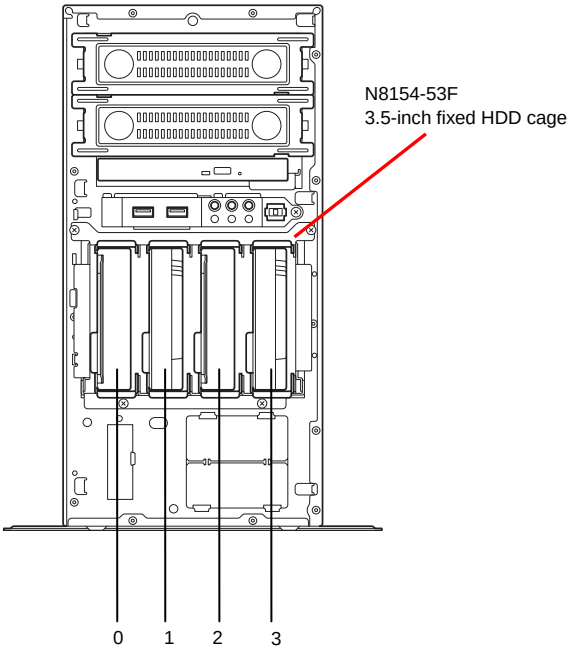
- Use SAS/SATA hard disk drives or SSDs that have the same capacity and rotational speed.
- RAID 10 using a hard disk drive of 2 TB or more cannot be supported if an on-board RAID controller is used.
- When installing an OS in your RAID system, you can easily complete the setup process, including RAID configuration and OS installation, by using EXPRESSBUILDER.
- If you are installing the OS manually, use the RAID system configuration utility. 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.

Important

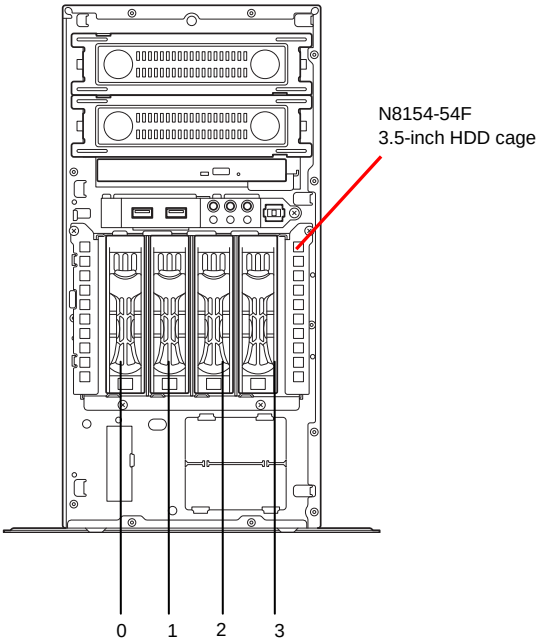
- **Do not change the RAID system mode to hibernate.**
- **A mix of SAS and SATA drives cannot be used within the RAID system.**

HDD slot numbering

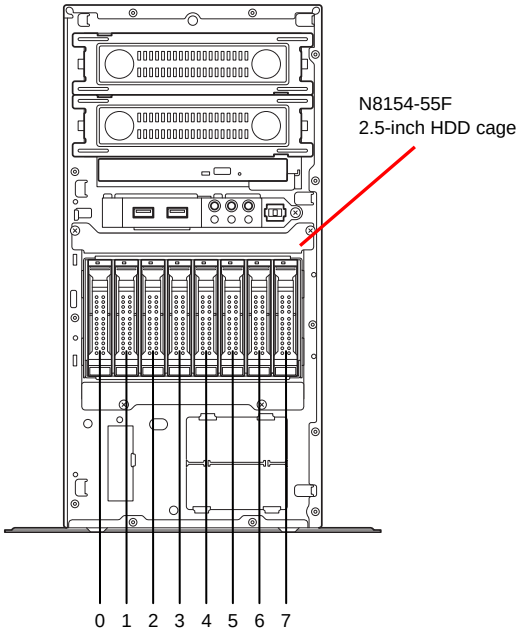
<Express5800/T110f-E with 3.5-inch fixed HDD cage installed>



<Express5800/T110f-E with 3.5-inch HDD cage installed>



<Express5800/T110f-E with 2.5-inch HDD cage installed>



1.10 Extra Battery for RAID Controller

The optional extra battery is used in order to avoid data loss caused by accidents during a write-back operation. The model of the extra battery to be used depends on a RAID controller.

- For N8103-149/150/151, use N8103-155 extra battery
- For N8103-167, use flash backup unit that comes with N8103-157 RAID controller

1.10.1 Handling precautions

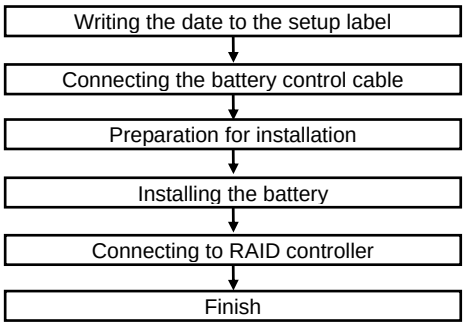
Observe the following precautions to use the extra battery.

- Use the extra battery that supports the RAID controller used.
- The extra battery is a very delicate electronic device. Before installation, touch the metal frame part of the server to discharge the static electricity from your body.
- Do not drop or bump the backup battery.
- For recycling and disposing the backup battery, refer to the manual that comes with it.

1.10.2 Installing N8103-155 extra battery

Install an extra battery in the server by using the following procedure.

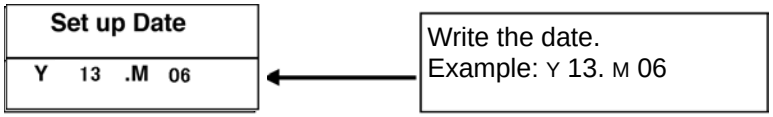
Note Read through the manual supplied with the RAID controller before installation.



Filling out the date on the Set up date label

Write down the installation date (year and month) on the Set up date label supplied with the extra battery. Attach the label on the battery cover or somewhere easy to find on the server.

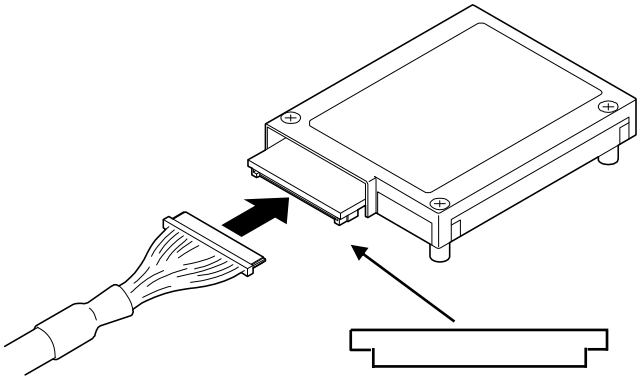
Fill out the *Set up date* label supplied with the battery



Important **The battery life is about two years. If it has been used for two years or more, replace it soon with a new battery pack, referring to the manual for the extra battery.**

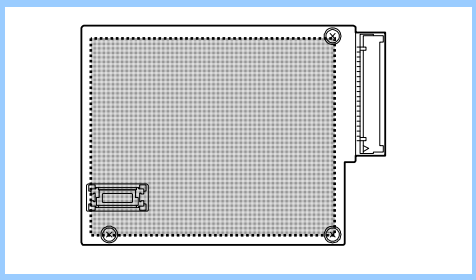
Connecting the battery control cable

To connect the battery control cable into the battery pack, see the following figure. Check the form of the connector and connect the cable straight into the connector.



The upper portion is wider than that of lower portion.

Important **When installing or removing the extra battery, pay attention not to apply excessive pressure on the part of the battery cover marked in the image below.**

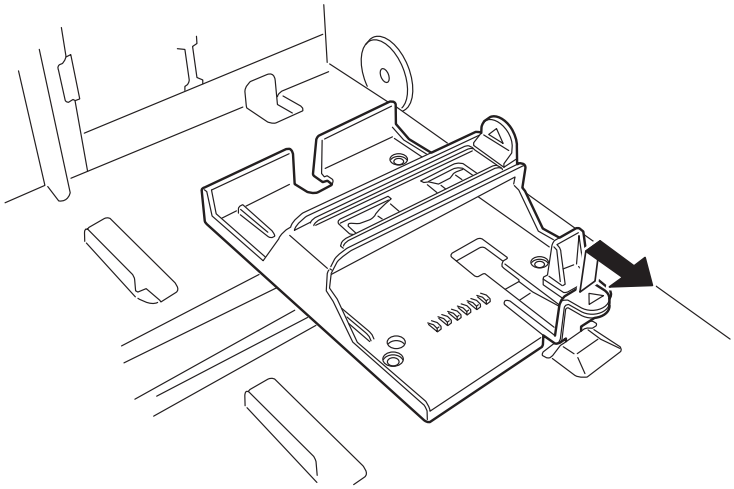


Getting ready to install the battery

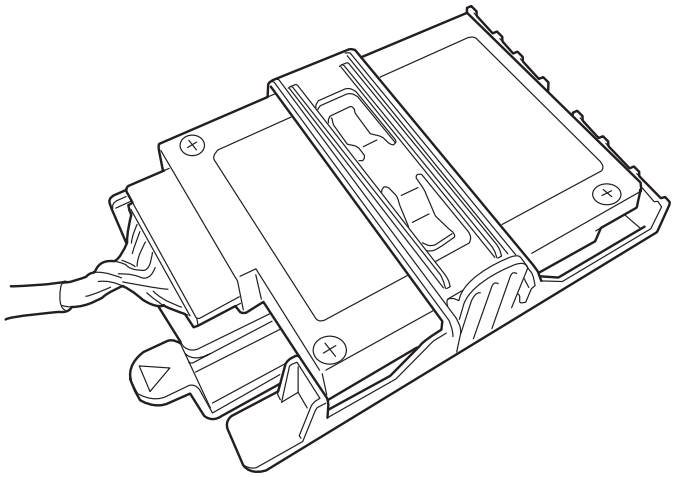
1. See *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and the front bezel, see *Chapter 2 (1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel)*.

Installing the battery pack

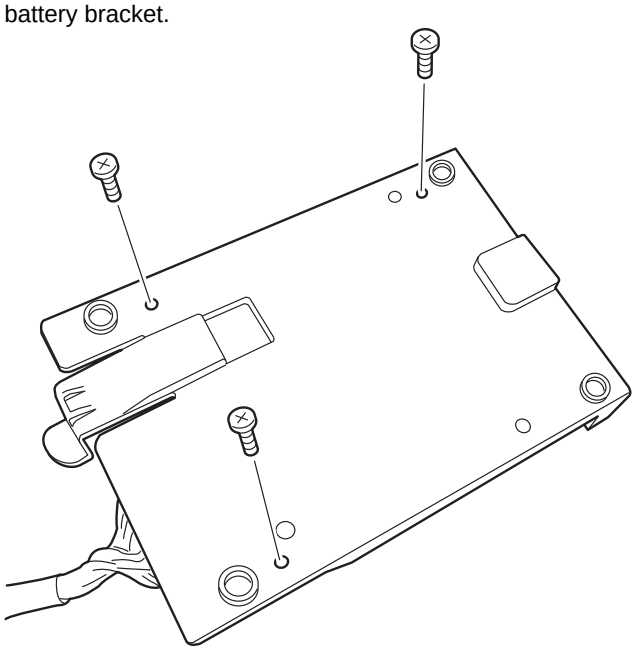
1. Slide out and remove the battery bracket, holding onto the tabs.



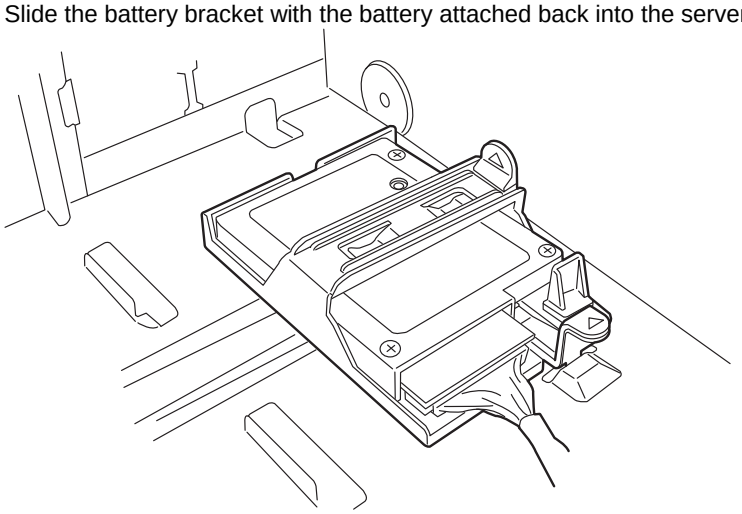
2. Attach the battery to the battery bracket.



3. Secure the battery to the battery bracket by using the three screws on the underside of the battery bracket.



4. Slide the battery bracket with the battery attached back into the server.

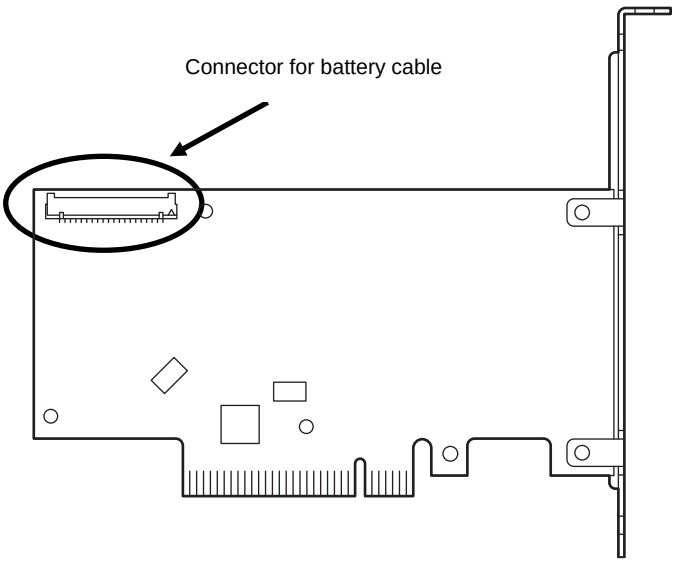


Important **Make sure that the battery bracket is correctly attached to the server.**

Connecting to a RAID controller

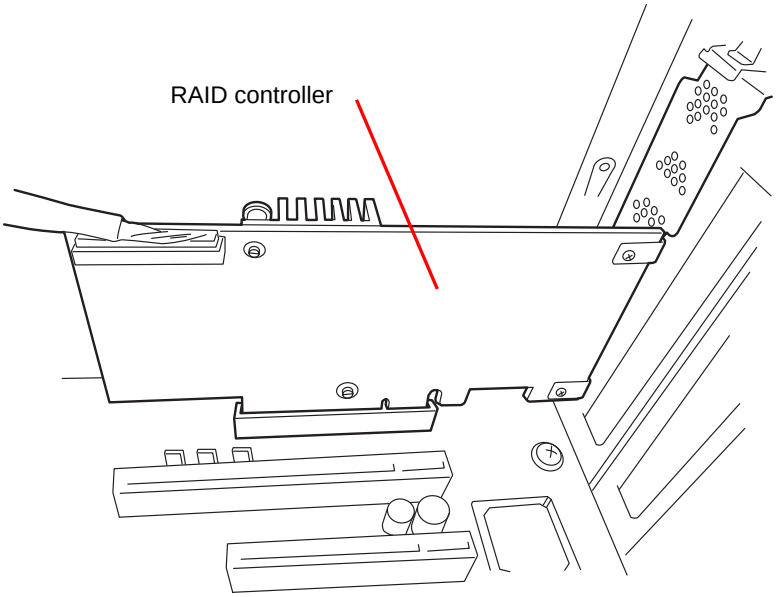
1. Connect another connector of the flash backup unit control cable to the connector on the RAID controller. Check the form of the connector and connect the cable straight into the connector. Be careful not to press it in at an angle when connecting.

   Position of the connector
   Connect the cable to the connector shown in the figure below.



Rear face of RAID controller

2. Install the RAID controller into the PCI slot #4 and fix it in place. Be careful not to disconnect the battery control cable.



3. Connect the cables and components that you removed.

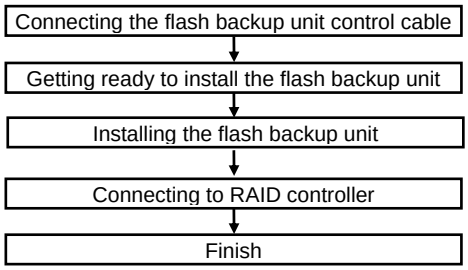
1.10.3 Removal

To remove the extra battery for the RAID controller, reverse the installation procedure.

1.10.4 Installing the flash backup unit that comes with N8103-167

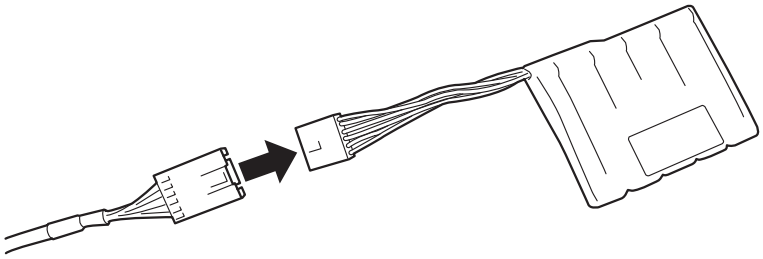
Install the flash backup unit that comes with N8103-167 RAID controller the by using the following procedure.

Note Read through the manual supplied with the RAID controller before installation.



Connecting the flash backup unit control cable

To connect the flash backup unit control cable into the battery pack, see the following figure. Check the form of the connector and connect the cable straight into the connector.

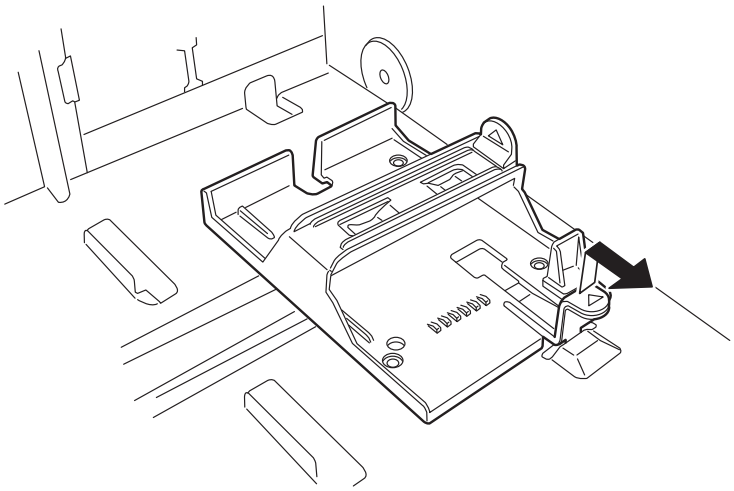


Getting ready to install the battery

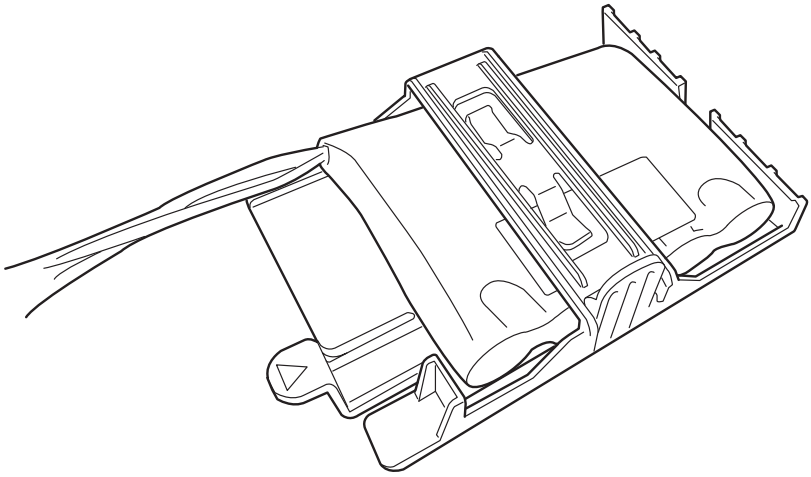
1. See *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and the front bezel, see *Chapter 2 (1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel).*

Installing the flash backup unit

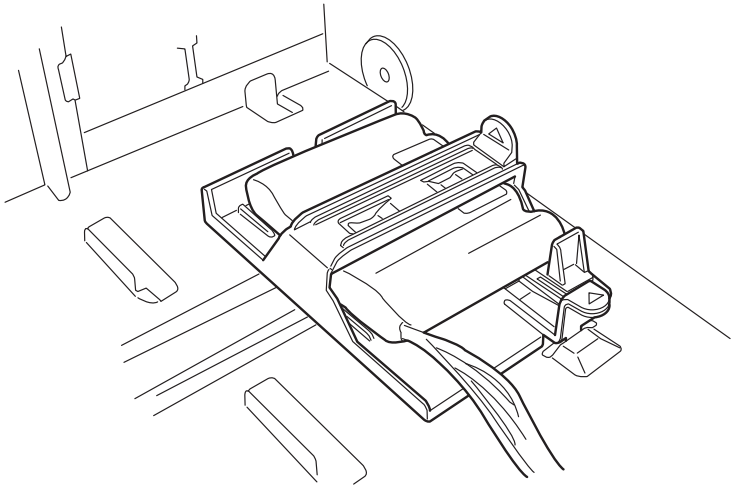
1. Slide out and remove the battery bracket, holding onto the tabs.



2. Attach the flash backup unit to the battery bracket.



3. Attach the battery bracket to the server.



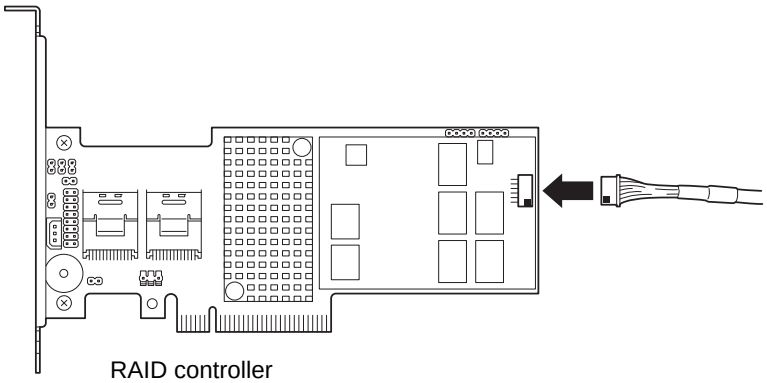
Important **Make sure that the battery bracket is correctly attached to the server.**

Connecting to a RAID controller

1. Connect another connector of the flash backup unit control cable to the connector on the RAID controller. Check the marker of the connector and connect the cable straight into the connector. Be careful not to press it in at an angle when connecting.

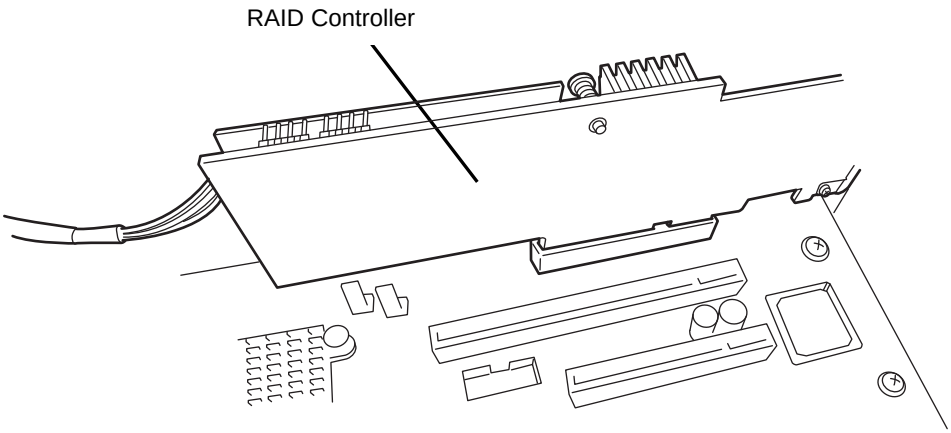
Position of the connector

Connect the cable to the connector shown in the figure below.



RAID controller

2. Install the RAID controller into the PCI slot #4 and fix it in place. Be careful not to disconnect the cable.



3. Connect the cables and components that you removed.

1.10.5 Removal

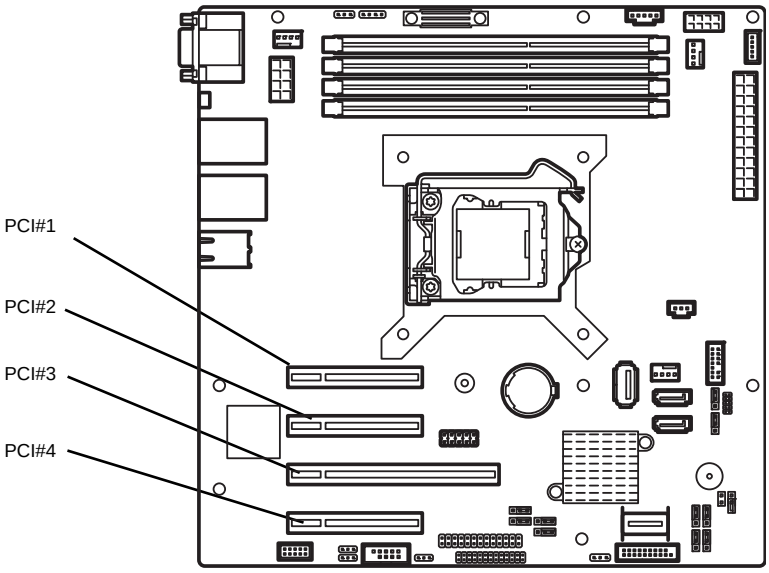
To remove the flash backup unit, reverse the installation procedure.

1.11 PCI Card

This server provides four slots where PCI cards can be installed.

Important

- **Avoid static electricity to work with the procedure below. For details, see *Chapter 2* (*1.2 Anti-static Measures*).**
- **When installing PCI cards, see *Chapter 2 (1.11.2 List of optional devices and installation slots)* to prevent mistaking slot numbers.**
- **Configure the Option ROM in [PCI Configuration] according to the application of the installed PCI card. For the configuration instructions, see *Chapter 2 (1. Details of system BIOS)* in "*Maintenance Guide*". Disabling the deployment of Option ROM can not only prevent memory consumption but also shorten the startup time.**



Motherboard

1.11.1 Notes

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

- Do not touch the terminals of 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.
- The search order for PCI bus slot on boot is as follows.
  Slot 3 → Slot 4 → Slot 1 → Slot 2
- 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 System BIOS utility. Check the slot location of PCI device by PCI bus number, device number and function number shown in the table below.

PCI device	PCI bus number	Device number	Function number
Onboard NIC1	3h	0	0
Onboard NIC2	3h	0	1
Slot 1	41h	0	×
Slot 2	59h	0	×
Slot 3	1h	0	×
Slot 4	21h	0	0

- Set **Disabled** for the optional ROM of a LAN device not to be booted by using the BIOS Setup utility.
- If an additional bootable PCI card (such as a RAID controller, SAS controller, or LAN card) is installed, the boot priority may change. After the installation, set the boot priority in the **Boot** menu of the BIOS Setup utility.
- If a bootable device such as a PCI card and USB device is added, the boot priority might be changed. In this case, configure the boot priority for **Hard Drive BBS Priorities** in the **Boot** menu of the BIOS Setup utility.
  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.

1.11.2 List of optional devices and installation slots

Model name	Product name		PCI Express				Remark	
			2.0		3.0	2.0		
			PCI#1	PCI#2	PCI#3	PCI#4		
		PCI slot performance*1	X1 lane	X1 lane	x16 lane	x4 lane		
		PCI slot size	Full Height					
		PCI board socket type*1	x8	x8	x16	x8		
		Size of mountable board	168 mm or less	168 mm or less	312mm	168mm		
N8103-142	SAS controller (card performance: PCI Express 2.0 (x8))		–	○	○	○	For connecting internal/external devices. Cannot be connected to internal hard disk drives.	
N8103-G171	RAID controller (0 MB, RAID 0/1) (card performance: PCI Express 2.0 (x8))		–	–	–	○	For connecting internal hard disk drives (dedicated for pre-installation model) Cannot be connected to an extra battery.	Only one card can be inserted
N8103-171	RAID controller (0 MB, RAID 0/1) (card performance: PCI Express 2.0 (x8))		–	–	–	○	For connecting internal hard disk drives Cannot be connected to an extra battery.	
N8103-149	RAID controller (512 MB, RAID 0/1) (card performance: PCI Express 2.0 (x8))		–	–	–	○	For connecting internal hard disk drives Can be connected to an extra battery (N8103-155)	
N8103-150	RAID controller (512 MB, RAID 0/1/5/6) (card performance: PCI Express 2.0 (x8))		–	–	–	○		
N8103-151	RAID controller (1 GB, RAID 0/1/5/6) (card performance: PCI Express 2.0 (x8))		–	–	–	○		
N8103-167	RAID controller (1 GB, RAID 0/1/5/6) (card performance: PCI Express 3.0 (x8))		–	–	–	○	For connecting internal hard disk drives The RAID cache can be backed up by using the flash backup unit that comes with N8103-167.	
N8104-138	1000BASE-T connection board (1ch) (card performance: PCI Express 2.0 (x1))		○	○	○	○	For additional LAN Card type: PCI Express 2.0(x4)	
N8104-132	1000BASE-T connection board (2ch) (card performance: PCI Express 2.0 (x1))		○	○	○	○	For additional LAN Card type: PCI Express 2.0(x4)	
N8104-133	1000BASE-T connection board (4ch) (card performance: PCI Express 2.0 (x4))		○	○	○	○	For additional LAN LAN cable boot cannot be used	
N8104-128	10GBASE adapter (SFP+/2ch) (card performance: PCI Express 2.0 (x8))		–	–	○	○	For additional LAN Prepare an SFP+ module [N8104-129] if needed. For RHEL6 (x86), only one card can be inserted	
N8104-131	10G conversion network adapter (card performance: PCI Express 2.0 (x8))		–	–	○	○	For additional DCB/FcoE SFP+ module is included with N8104-131. NEC Storage PathManager supports redundant bus of FC. Teaming/bonding with LAN is not available.	
N8117-01A	Expansion RS-232C connector kit*2		○	○	○	○	For additional serial port (RS-232C)	

○ Can be installed – Cannot be installed

*1 Lane: Indicates the transfer performance (transfer bandwidth).
<e.g.> 1 lane = 2.5 Gbps (unidirectional), 4 lanes = 10 Gbps (unidirectional)

Socket: Indicates the connector size. A card up to the number of sockets can be connected.
<e.g.> x4 socket = x1 card, x4 card can be installed. x8 card cannot be installed.

*2 The N8117-01A expansion RS-232C connector kit contains two types of cables. This server uses the RS-232C cable (B).

- The depth of mountable boards is up to 168 mm (MD2).
- For details about the functions of each card, refer to the technical guide.
- The card performance described in the parentheses after the Product name indicates the maximum operation performance of the card.
- Even if you use PCI cards of a higher performance than the PCI slot, the operation of the device will be that of the PCI slot.

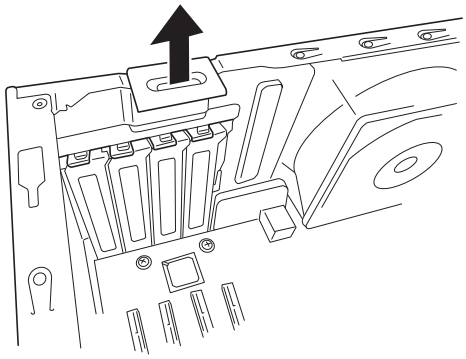
About the standard network

You can use functional equivalents of AFT/SFT/ALB teaming and bonding with the standard network and the following LAN cards:
N8104-132, N8104-133, and N8104-138

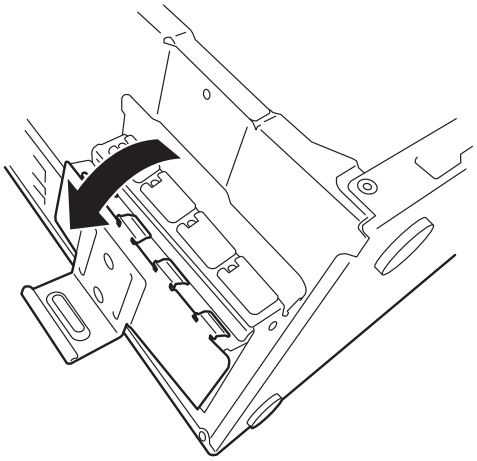
1.11.3 Installation

Install a PCI card to connect to a PCI slot by using the following procedure.

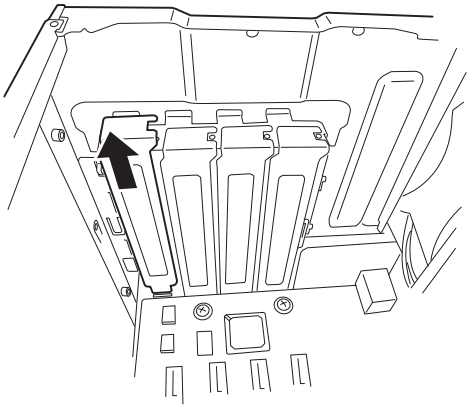
1. Before installation, make sure the switch or jumper settings on the PCI card are proper according to the instruction manual supplied with the card.
2. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
3. To remove the side cover, see *Chapter 2 (1.4 Removing the Side Cover)*.
4. Lift up the PCI retention latch tab until it clicks, indicating that the lock is released.



5. Rotate the PCI retention latch toward the rear of the server and push it back down.

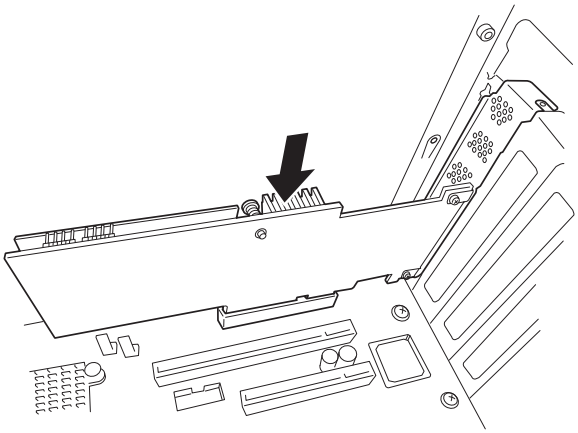


6. Remove the blank cover aligned with the slot where you install a card.



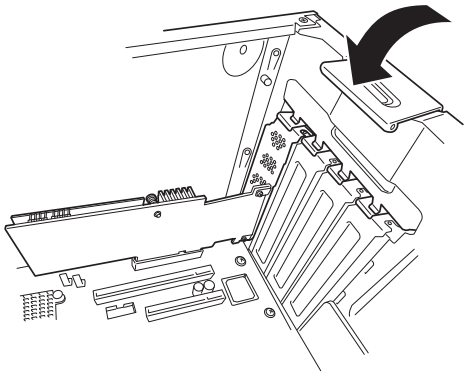
Important **Keep the removed blank cover for future use.**

7. Face the component side of the card toward the bottom of the server. When the rear panel of the card is firmly engaged with the spring, firmly press the card into the slot so that the component parts of the card securely connect to the slot.



Important **If you have trouble installing the card, remove the card once and try again. If you apply excessive pressure on the card, there is a risk of breaking the card.**

8. Close the PCI retention latch until it clicks, indicating that it is locked.



9. Assemble the server.
10. Turn on the server and confirm that no error messages are displayed in POST.
    If an error message is displayed, take notes on the message and ask your sales representative.

1.11.4 Configuration after installing

Depending on the type of card installed, you need to use a utility, such as the BIOS setup utility, a setup utility provided with the card, following installation to modify server settings.

Follow the instructions in the manual provided with the card to specify the correct settings.

After turning the server power on, the PCI bus numbers are scanned in ascending order. If the option ROM installed in the card contains a BIOS utility, the startup message (banner) is displayed in ascending order of the PCI bus numbers.

1.11.5 Removal

Remove a PCI card connected to a PCI slot by using the following procedure.

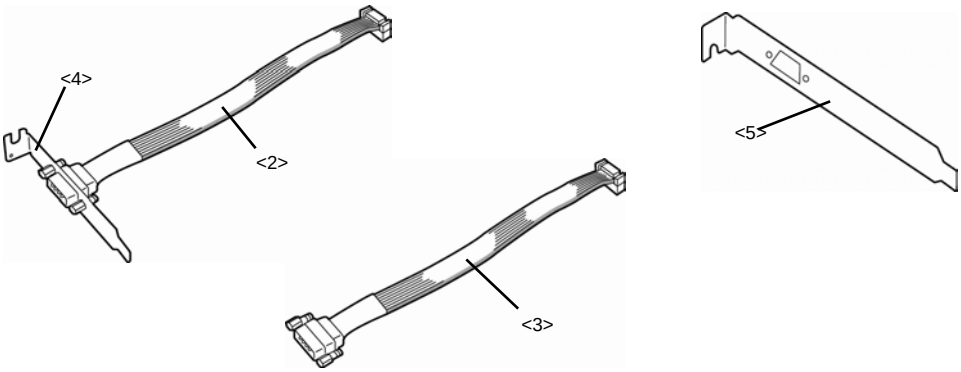
1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover, see *Chapter 2 (1.4 Removing the Side Cover)*.
3. See installation steps 4 and 5 in Chapter 2 (*1.11.3 Installation*) to close the PCI retention latch.
4. Remove the card.
5. Attach the blank cover, and see installation step 8 in Chapter 2 (*1.11.3 Installation*) to close the PCI retention latch.
6. Assemble the server.
7. Turn on the server and confirm that no error messages are displayed in POST.
   If an error message is displayed, take notes on the message and ask your sales representative.

1.11.6 Installing the N8117-01A extra RS-232C connector kit

Install a PCI card to connect to the PCI slot by using the following procedure. For details, refer to the instruction manual supplied with the connector kit.

The component parts for N8117-01A are as follows:

Item no.	Item name	Specification	Amount	Remark
<1>	RS-232C connector Kit User's Guide	856-125671-002	1	
<2>	RS-232C cable (A)	804-063264-020	1	Not available for this server
<3>	RS-232C cable (B)	804-062746-820	1	
<4>	PCI bracket (1)	243-112122-001	1	Preinstalled to cable
<5>	PCI bracket (2)	243-112122-002	1	For full height PCI

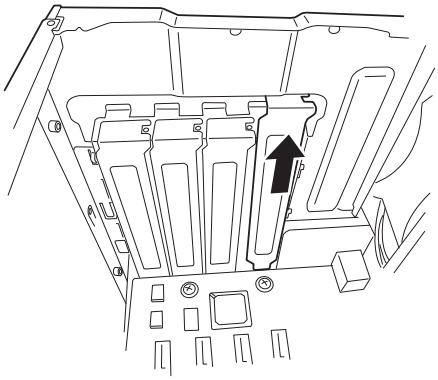


This product uses a combination of items <3> and <5>.

Follow the procedure below to install the kit.

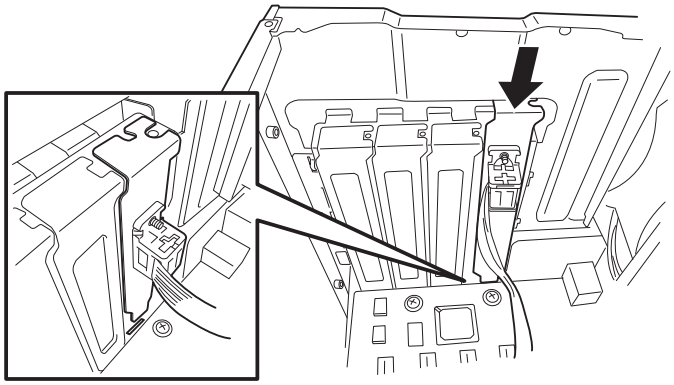
1. See *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover, see *Chapter 2 (1.4 Removing the Side Cover)*.
3. Assemble <3> RS-232C cable (B) and <5> PCI bracket (2).

4. To open the PCI retention latch, see *Chapter 2 (1.11.3 Installation)*.
5. Remove the blank cover aligned with the slot where you install a card.



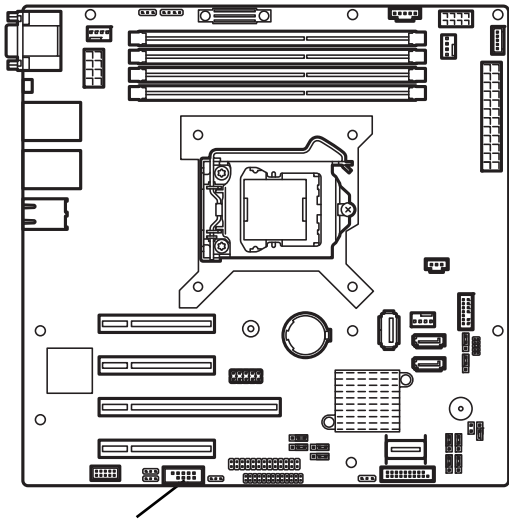
Important **Keep the removed blank cover for future use.**

6. Make sure that you are properly inserting the bracket edge into the frame guide, and attach it securely.



7. Arrange the cable so as not to buffer other PCI cards, and connect to the COM connector used for internal connections in the motherboard.
   See the following for the position of the COM connector for internal connections.

Important **Note the direction of the connector when connecting the cable.**



COM connector for internal connections
(serial port B (COM B))

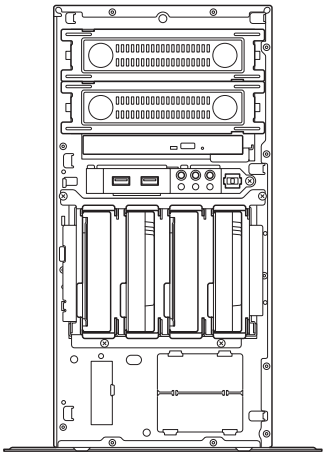
8. Reassemble the server.

1.12 HDD Cages

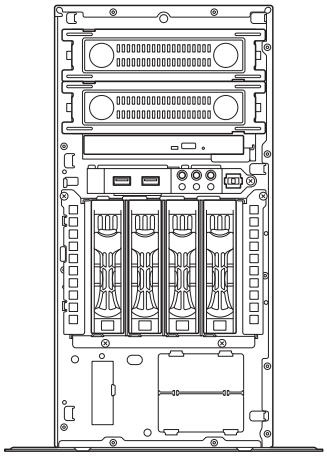
N8154-53F 3.5-inch fixed HDD cage, N8154-54F 3.5-inch HDD cage, or N8154-55F 2.5-inch HDD cage can be installed in the HDD bay in this server.

Important **Use hard disk drives provided by NEC.**

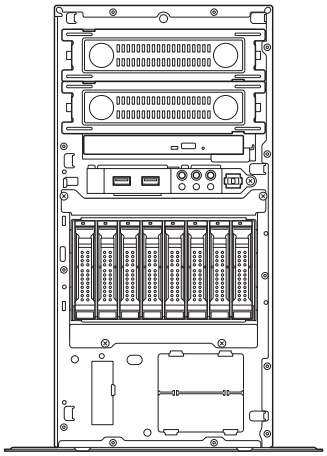
<3.5-inch fixed HDD cage installed>



<3.5-inch HDD cage installed>



<2.5-inch HDD cage installed>

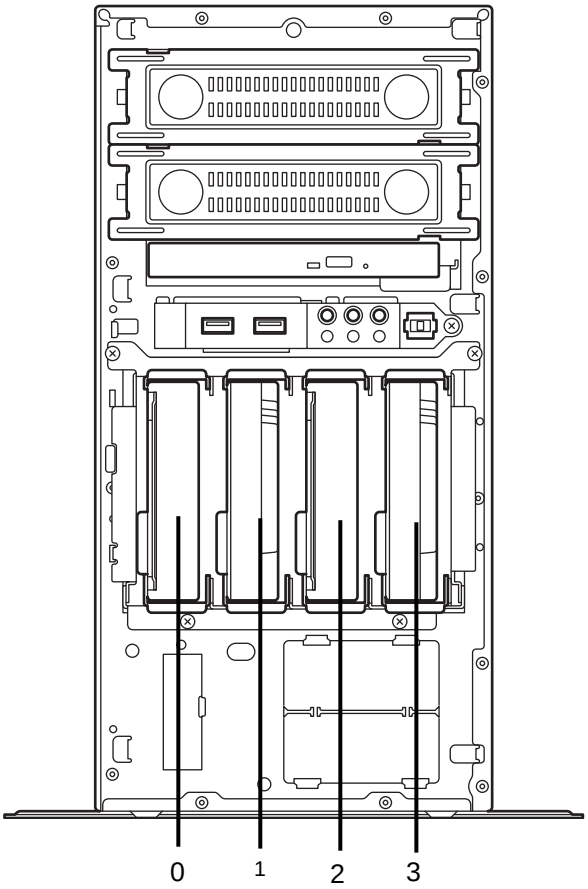


Important **Install the hard disk drives sequentially starting from slot 0.**

1.12.1 Installing a 3.5-inch fixed HDD cage and hard disk drives

By installing a 3.5-inch fixed HDD cage, up to four 3.5-inch SATA fixed hard disk drives can be mounted.

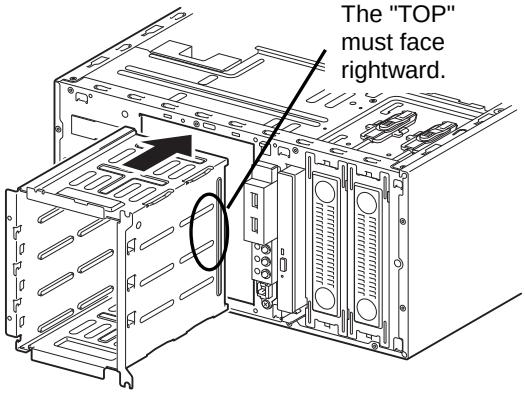
Important **Use hard disk drives provided by NEC.**



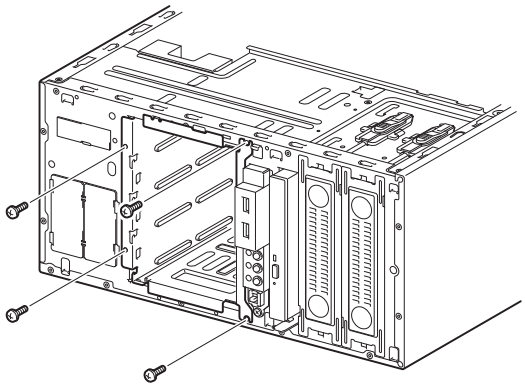
Important **Install the hard disk drives sequentially starting from slot 0.**

Install a 3.5-inch fixed HDD cage and hard disk drives in the server by using the following procedure.

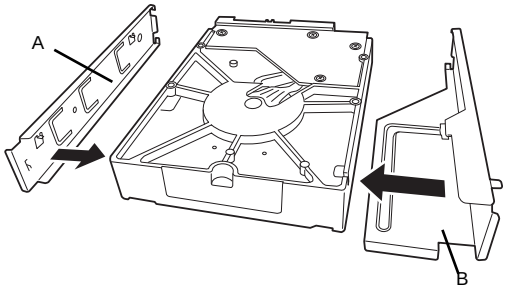
1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and front bezel, see Chapter 2 (*1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel*).
3. Insert the HDD cage into the HDD bay. The "TOP" must face rightward.



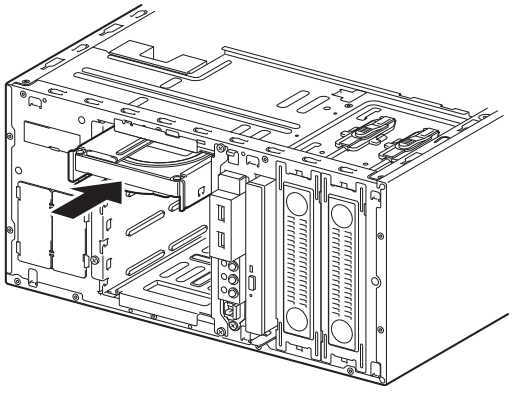
4. Attach the HDD cage by using the four screws.



5. Place the unit so that the flat face of the hard disk drive faces downward. Mount the HDD trays that come with the HDD cage from both sides of the 3.5-inch hard disk drive. Mount the tray marked "A" on the left side, and the tray marked "B" on the right side.



6. Insert the hard disk drive attached to the tray with HDD tray “A” facing the right side into the slot of the HDD cage until it clicks, indicating that it is locked.



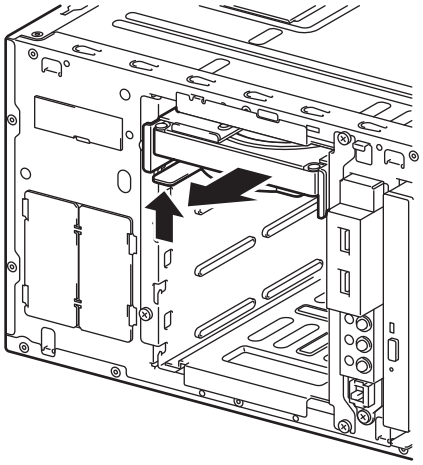
7. Connect the interface cables and power cable to the hard disk drive. Use the interface cables that come with the HDD cage. For details about cable connection, see *1.16 Connecting Cables*.

1.12.2 Removing the 3.5-inch fixed hard disk drives

Remove the 3.5-inch fixed hard disk drives from the HDD cage by using the following procedure.

Important **When disposing of the hard disk drives, follow the instructions described in *Chapter 1* (*1.2 Disposal of consumables and servers*) in the Maintenance Guide.**

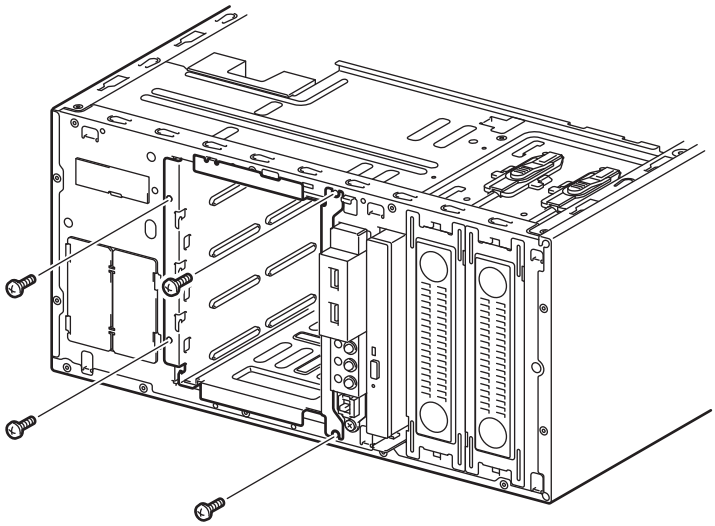
1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and front bezel, see *Chapter 2* (*1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel*).
3. Disconnect the power cable and interface cable from the hard disk drives.
4. Press the part shown in the figure to unlock the HDD tray, and then remove the hard disk drive out from the HDD cage.



1.12.3 Removing the 3.5-inch fixed HDD cage

Remove the 3.5-inch fixed HDD cage from the server by using the following procedure.

1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and front bezel, see *Chapter 2* (*1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel*).
3. To remove the hard disk drives installed in the HDD cage, see *Chapter 2* (*1.12.2 Removing the 3.5-inch fixed hard disk drives*.).
4. Disconnect the interface cable from the motherboard or RAID controller.
5. Remove four screws that attach the HDD cage.

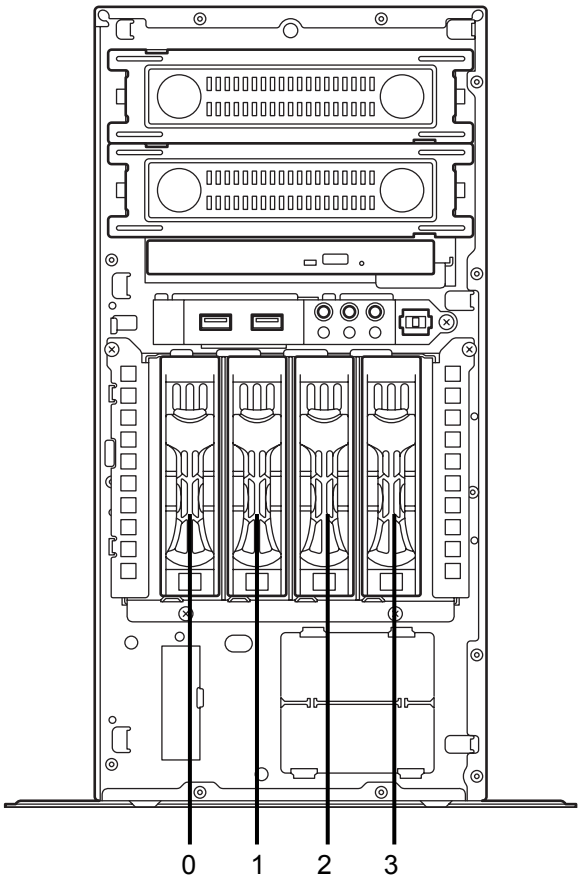


6. Remove the HDD cage from the server.

1.12.4 Installing the 3.5-inch HDD cage and hard disk drives

By installing a 3.5-inch HDD cage, up to four 3.5-inch SATA fixed hard disk drives can be mounted.

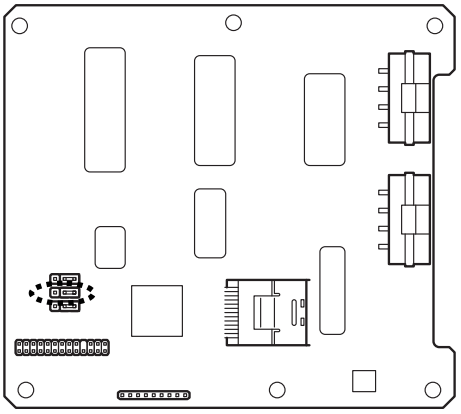
Important **Use hard disk drives provided by NEC.**



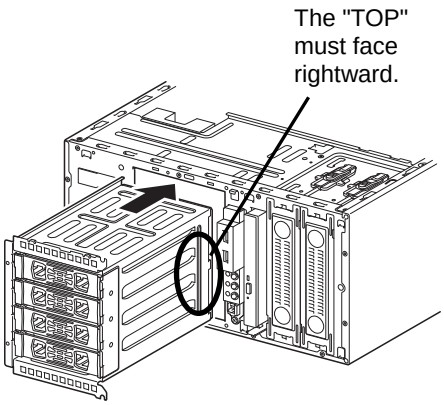
Important **Install the hard disk drives sequentially starting from slot 0.**

Install a 3.5-inch HDD cage and hard disk drives in the server by using the following procedure.

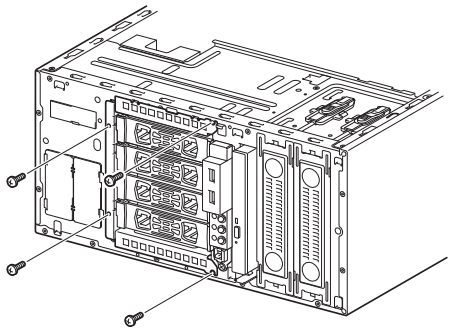
1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and front bezel, see *Chapter 2* (*1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel*).
3. Set the jumper for the backplane installed in the HDD cage. The jumper setting when the onboard SATA controller (LSI Embedded MegaRAID) is used differs from that when the optional RAID controller is used. For details, see *1.9 Use of Internal Hard Disk Drives in the RAID System*.



4. Insert the HDD cage into the HDD bay. The "TOP" must face rightward.

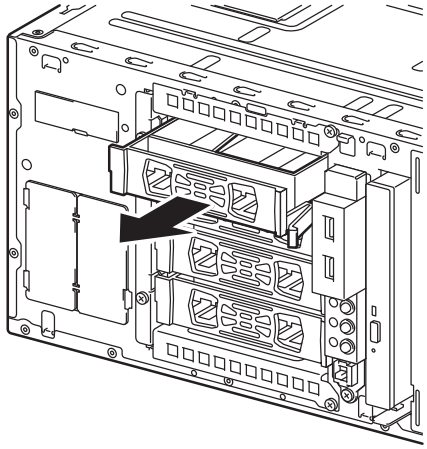


5. Attach the HDD cage by using the four screws.



6. Connect the interface cables and power cable to the backplane board installed in the HDD cage. Use the interface cables that come with the HDD cage. For details about cable connection, see *1.16 Connecting Cables*.
7. Reassemble the server.

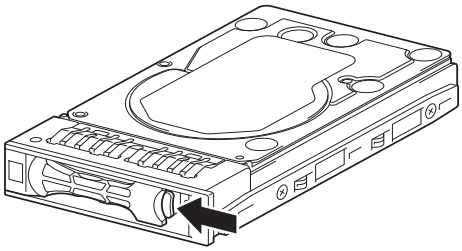
8. Remove the dummy tray from the HDD cage.

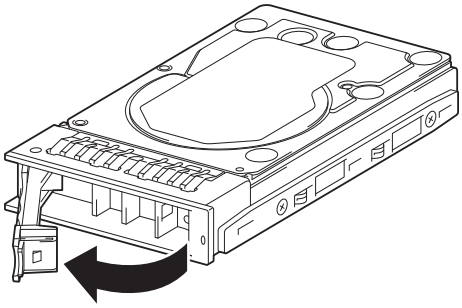


Important

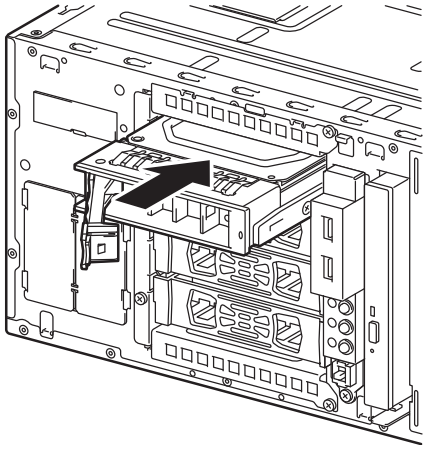
- **Keep the dummy trays for future use.**
- **Keep the dummy trays installed in slots where hard disk drives are not installed.**

9. Unlock the handle in the tray.





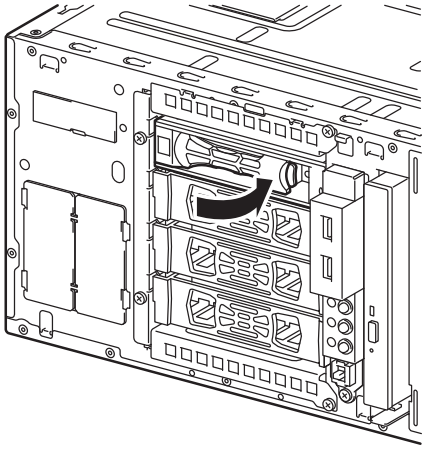
10. Hold the tray firmly and insert it in the slot.



Note

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

11. Gently close the handle until it clicks, indicating that it is locked.



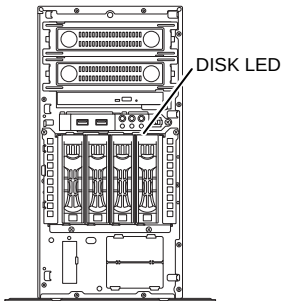
Note When you push the drive into the slot, confirm the handle got hooked on the frame.

1.12.5 Removing the 3.5-inch hard disk drives

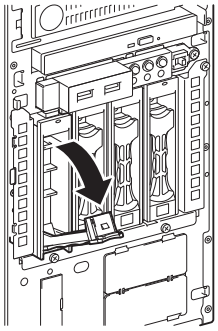
Remove the 3.5-inch hard disk drives from the HDD cage by using the following procedure.

Important **When disposing of the hard disk drives, follow the instructions described in *Chapter 1* (*1.2 Disposal of consumables and servers*) in the Maintenance Guide.**

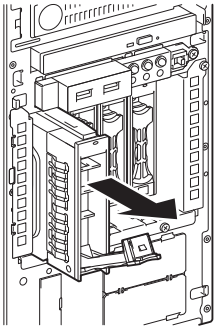
Note If you remove a disk due to a hard disk drive failure, check the slot with its DISK LED lit in amber.



1. To remove the front bezel, see *Chapter 2* (*1.5 Removing the Front Bezel*).
2. Release the lock lever and open the handle.



3. Hold the tray firmly and pull it toward the front.



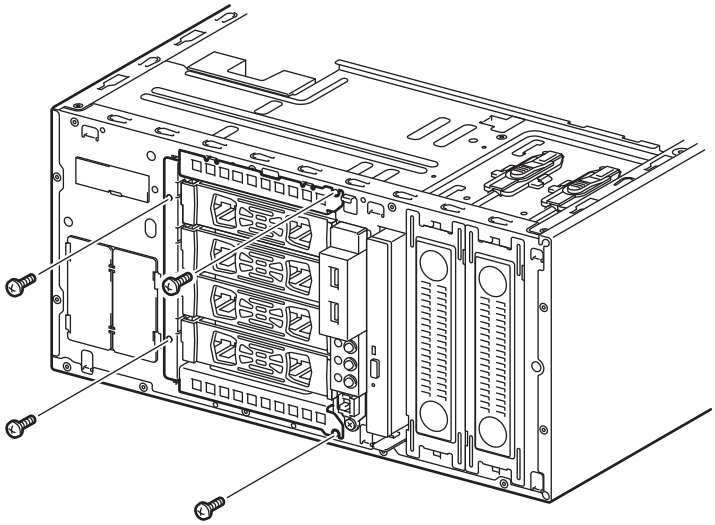
Note Do not pull the handle to remove the hard disk drive.
Doing so may damage the handle.

Important **Do not use this server while removing the hard disk drive.**

1.12.6 Removing the 3.5-inch HDD cage

Remove the 3.5-inch HDD cage from the server by using the following procedure.

1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and front bezel, see *Chapter 2* (*1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel*).
3. To remove the hard disk drives installed in the HDD cage, see *Chapter 2* (*1.12.5 Removing the 3.5-inch hard disk drives*).
4. Disconnect the interface cable and power cable from the backplane installed in the HDD cage.
5. Disconnect the interface cable from the motherboard or RAID controller.
6. Remove four screws that attach the HDD cage.



7. Remove the HDD cage from the server.

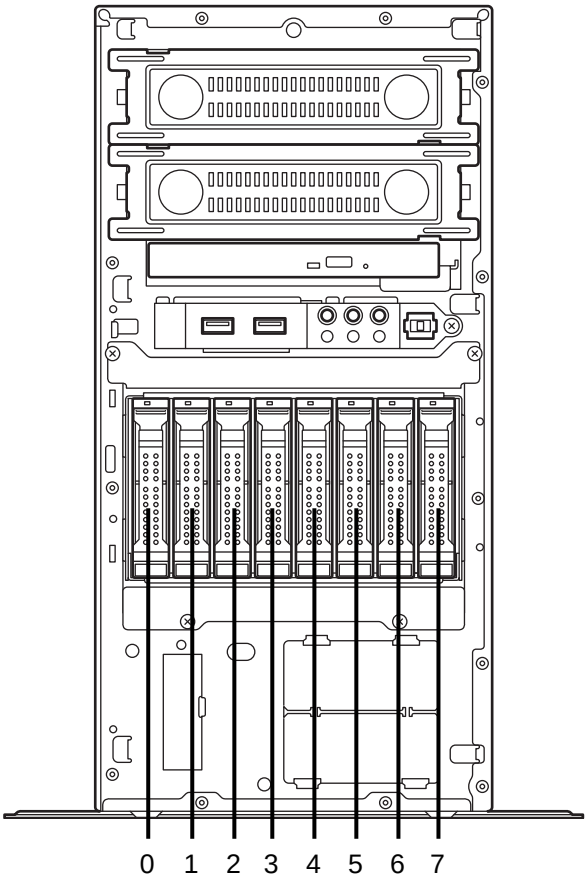
1.12.7 Installing the 2.5-inch HDD cage and hard disk drives

By installing a 2.5-inch HDD cage, up to eight 2.5-inch SAS/SATA hard disk drives or solid state drives (SSD) can be mounted.

Combining SATA/SAS hard disk drives and SSDs

- An optional RAID controller is required to use SAS hard disk drives together with SSDs.
- An optional RAID controller is required to install five or more hard disk drives.
- You cannot mix them within the same RAID array.
- You cannot use SAS hard disk drives that have different rotation speeds.
- Mount SATA/SAS hard disk drives in order from slot 0, and mount the SSDs to the remaining slots.

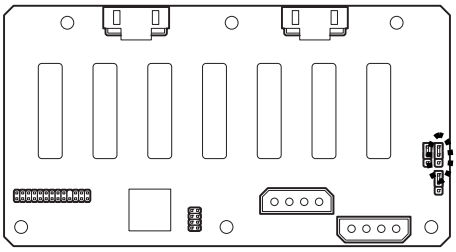
Important **Use hard disk drives provided by NEC.**



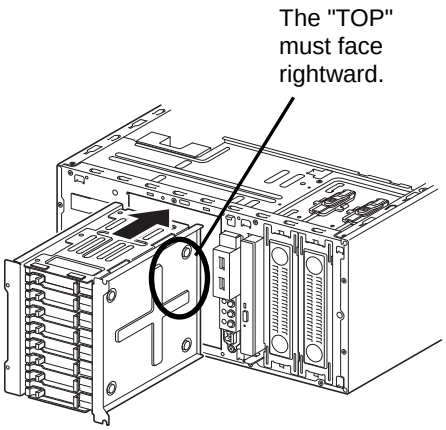
Important **Install the hard disk drives sequentially starting from slot 0.**

Install a 2.5-inch HDD cage and hard disk drives in the server by using the following procedure.

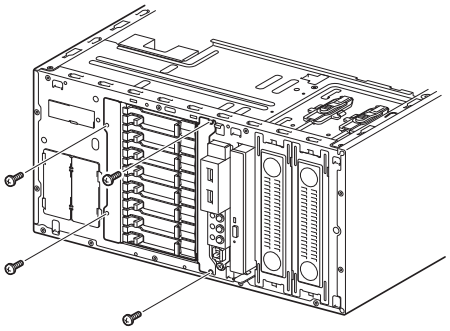
1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and front bezel, see *Chapter 2* (*1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel*).
3. Set the jumper for the backplane installed in the HDD cage. The jumper setting when the onboard SATA controller (LSI Embedded MegaRAID) is used differs from that when the optional RAID controller is used. For details, see *1.9 Use of Internal Hard Disk Drives in the RAID System*.



4. Insert the HDD cage into the HDD bay. The "TOP" must face rightward.

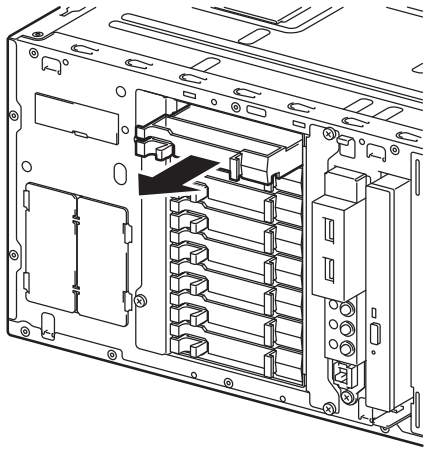


5. Attach the HDD cage by using the four screws.



6. Connect the interface cables and power cable to the backplane board installed in the HDD cage. Use the interface cables that come with the HDD cage. For details about cable connection, see *1.16 Connecting Cables*.
7. Reassemble the server.

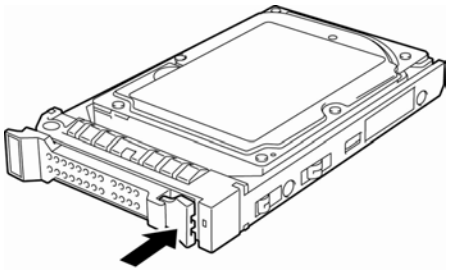
8. Remove the dummy tray from the HDD cage.

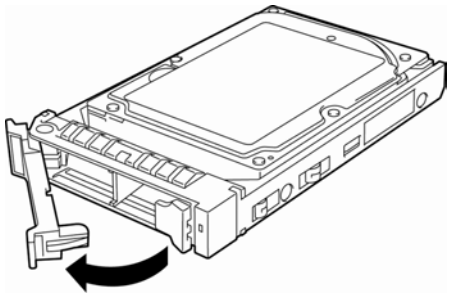


Important

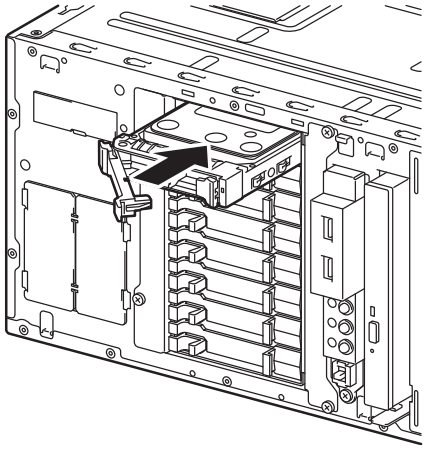
- **Keep the dummy trays for future use.**
- **Keep the dummy trays installed in slots where hard disk drives are not installed.**

9. Unlock the handle in the tray.





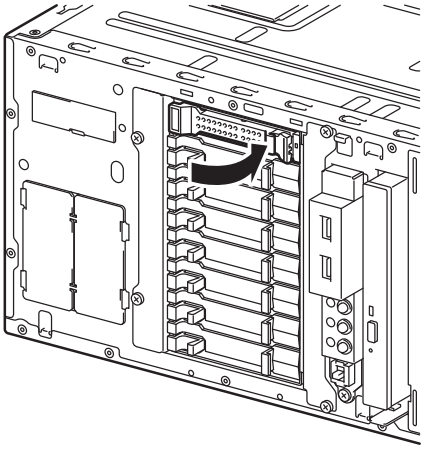
10. Hold the tray firmly and insert it in the slot.



Note

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

11. Gently close the handle until it clicks, indicating that it is locked.



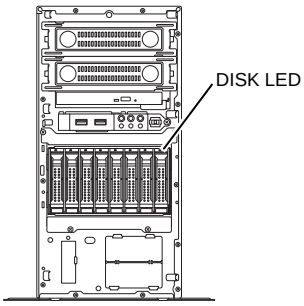
Note When you push the drive into the slot, confirm the handle got hooked on the frame.

1.12.8 Removing the 2.5-inch hard disk drives

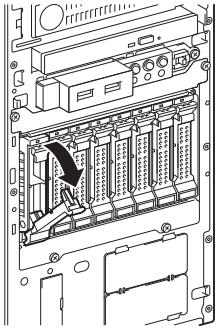
Remove the 2.5-inch hard disk drives from the HDD cage by using the following procedure.

Important **When disposing of the hard disk drives, follow the instructions described in *Chapter 1* (*1.2 Disposal of consumables and servers*) in the Maintenance Guide.**

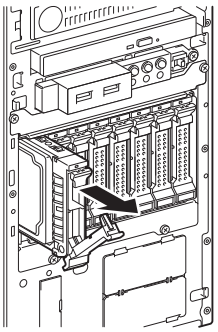
Note If you remove a disk due to a hard disk drive failure, check the slot with its DISK LED lit in amber.



1. To remove the front bezel, see *Chapter 2* (*1.5 Removing the Front Bezel*).
2. Release the lock lever and open the handle.



3. Hold the tray firmly and pull it toward the front.



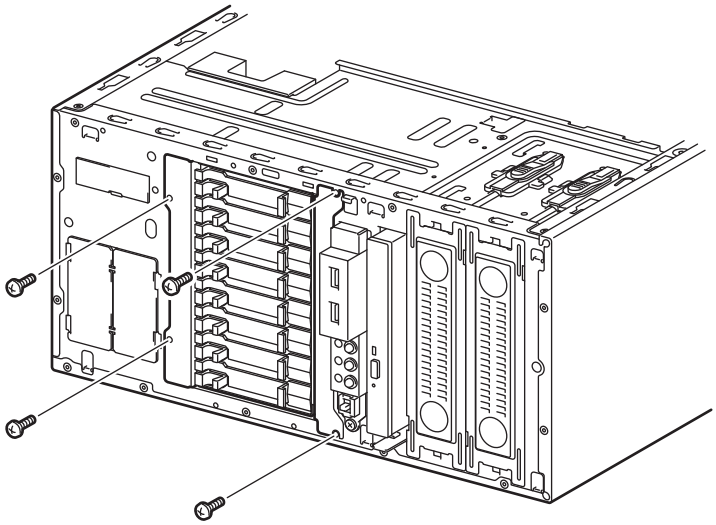
Note Do not pull the handle to remove the hard disk drive.
Doing so may damage the handle.

Important **Do not use this server while removing the hard disk drive.**

1.12.9 Removing the 2.5-inch HDD cage

Remove the 2.5-inch HDD cage from the server by using the following procedure.

1. See steps 1 to 3 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and front bezel, see *Chapter 2* (*1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel*).
3. To remove the hard disk drives installed in the HDD cage, see *Chapter 2* (*1.12.8 Removing the 2.5-inch hard disk drives*).
4. Disconnect the interface cable and power cable from the backplane installed in the HDD cage.
5. Disconnect the interface cable from the motherboard or RAID controller.
6. Remove four screws that attach the HDD cage.



7. Remove the HDD cage from the server.

1.13 Optical Disk Drive

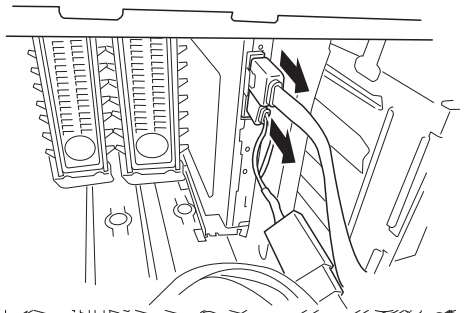
Procedures for replacing the standard optical disk drive with the optional internal DVD SuperMULTI drive are described below.

Important **Do not install a drive manufactured by a third party.**

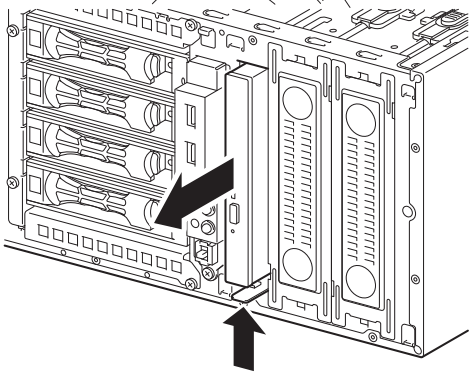
1.13.1 Replacing drives

Follow the procedure below to replace your drive with the optional internal DVD SuperMULTI drive.

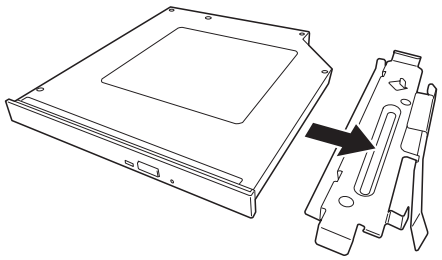
1. See *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and front bezel, see *Chapter 2 (1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel)*.
3. Remove the duct, If a device is installed in the 5.25-inch expansion bay (1), remove it so that you can access the cable connected to the optical disk drive.
4. Disconnect the SATA cable and DC power cable from the optical disk drive.



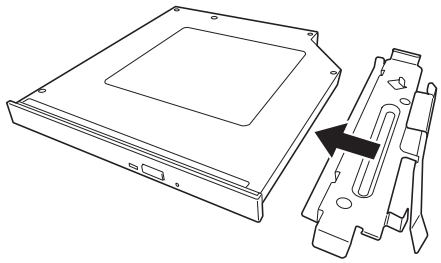
5. Push the stopper on the right side and remove the optical disk drive.



6. Remove the bracket from the optical disk drive.



7. Mount the bracket for the optical disk drive on the DVD SuperMULTI drive.



8. Install the bracket with DVD SuperMULTI drive installed to the server.

9. Connect the SATA cable and DC power cable you disconnected in step 3 to the server.

This completes the installation procedures.

1.13.2 Removal

You can remove the optical disk drive by reversing the installation procedure.

1.14 Backup Devices

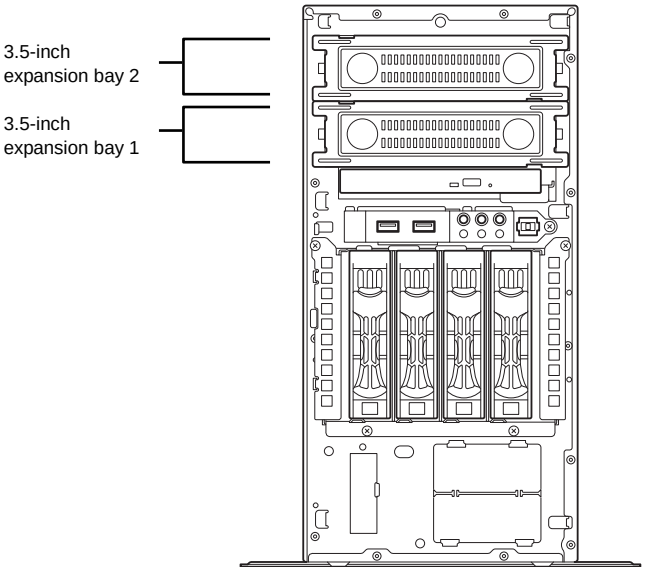
The 5.25-inch expansion bay of the server can contain a backup device such as a magnetic tape drive.

Tips

An optional internal USB cable is required to install a backup device.

- K410-276(00) internal USB cable (USB 3.0)
- K410-286(00) internal USB cable (USB 2.0)

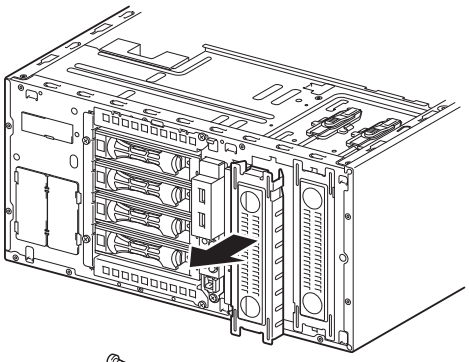
Prepare whichever cable is appropriate for your configuration.



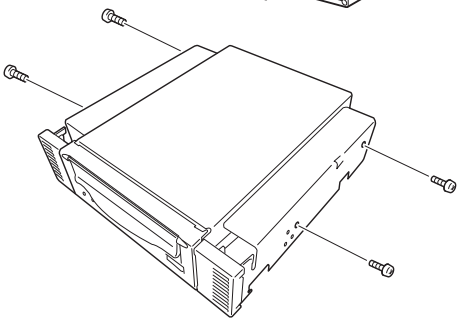
1.14.1 Installation

Install a backup device by using the following procedure.

1. See *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. To remove the side cover and front bezel, see *Chapter 2 (1.4 Removing the Side Cover* and *1.5 Removing the Front Bezel)*.
3. Remove the blank cover from the front bezel and the server.



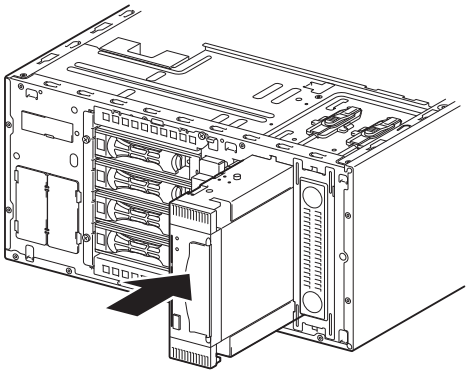
4. Secure the backup device on the left and right sides by using the four screws that come with the server.



Important **Use screws supplied with this server to attach the backup device to the tray.**

5. Insert the backup device into chassis.

   Do not push the backup device in completely as the cable has to be connected to the device.



6. Connect the interface cable and power cable to the installed 3.5-inch backup device.

   For more information, see *Chapter 2* (*1.16 Connecting Cables)*.
7. Push the device all the way until it clicks, indicating that it is locked.
8. Assemble the server.
9. Install device drivers for installed backup device as needed.

   For more information, refer to the manual provided with the backup device.

1.14.2 Removal

You can remove the backup device by reversing the installation procedure. If the devices are to remain removed, attach the stored dummy cover.

1.15 Power Supply (EXP288A)

Non-redundant power supply or redundant power supply can be installed into Express5800/T110f-E (EXP288A). Using two redundant power supplies enables the system to continue processing even if one power supply fails.

1.15.1 Cold redundant feature

Cold redundant provides the following features by using redundant power supply.

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

Cold redundant feature can be used under the following conditions:

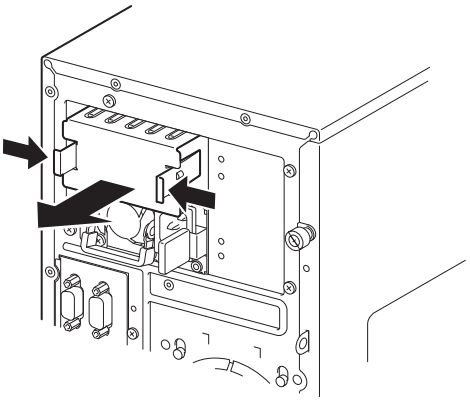
- Two power supplies must be installed for redundant configuration.
- Change the parameter as shown below.
  Server → **Power Control Configuration** → **Cold Redundant Mode** → **Enabled**

  See *Chapter 3 (2. System BIOS Setup)* for details.
  Run SETUP after restarting, and check if the status of **Cold Redundant Mode** shows **Enabled**.

1.15.2 Installing a redundant power supply

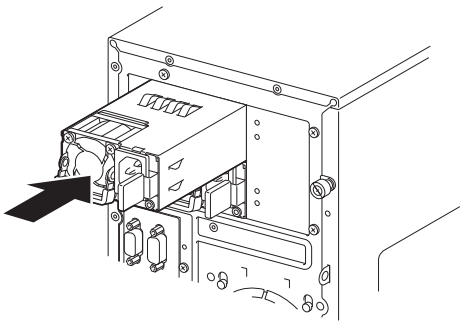
Install a redundant power supply by using the following procedure.

1. Remove the blank cover from the server.

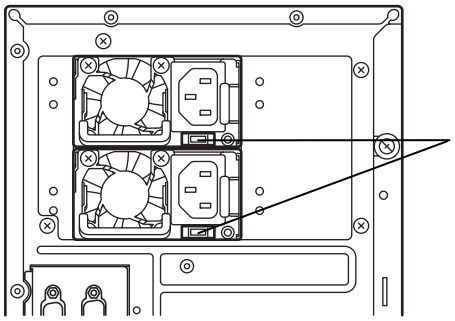


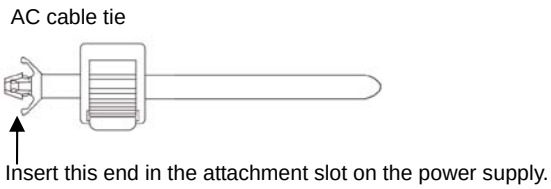
Important **Keep the removed blank cover for future use.**

2. Install the power supply in the server. Push the power supply until it clicks, indicating that it is locked.



3. See steps 7 to 9 in *Chapter 2* (*1.3 Overview of Installation and Removal*) to prepare, and then connect the power cable to the AC inlet of each power supply.
   Once the cable is connected to the power supply, AC POWER LED of power supply blinks green.
4. Secure the power cables to the server by using AC cable ties.





5. If POWER LED of the server lights amber, wait until the LED is unlit.
6. Turn on the server. AC POWER LED on the power supply lights green.

1.15.3 Replacing or removing a faulty redundant power supply

Only replace power supplies if they are faulty.

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 the power supply that is operating normally.

Do not use the server with a faulty power supply removed. Remove power supply only when replacing with a new one.

1. Make sure that AC POWER LED on the power supply lights or blinks amber.
2. Turn off the server.

Tips

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

3. Remove the power cable from the power supply that was checked in step 1.
4. Push the lever of the power supply toward the inside and slide the unit out by pulling on its handle.
5. When removing one power supply from a redundant configuration and not replacing it, thereby changing to a single power supply configuration, attach the blank cover according to step 2 in *Chapter 2* (*1.15.2 Installing a redundant power supply*).

Important

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

6. Install the power supply in the server. Push the power supply unit until it clicks, indicating that it is locked

1.16 Connecting Cables

This section shows an example of internal device cable connection.

1.16.1 Internal interface cables

This section describes the connection of internal interface cables.

Tips The figure shown here primarily describes connections. For more information about the connectors on the motherboard, see *Chapter 1 (4.4 Motherboard)*.

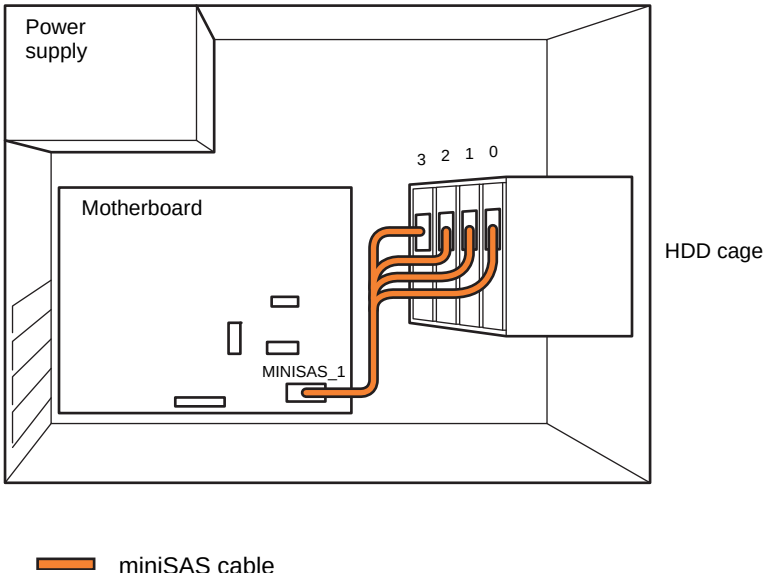
(1) Connecting hard disk drives

This section describes how to connect additional hard disk drives.

(a) In case of 3.5-inch fixed hard disk drive installed

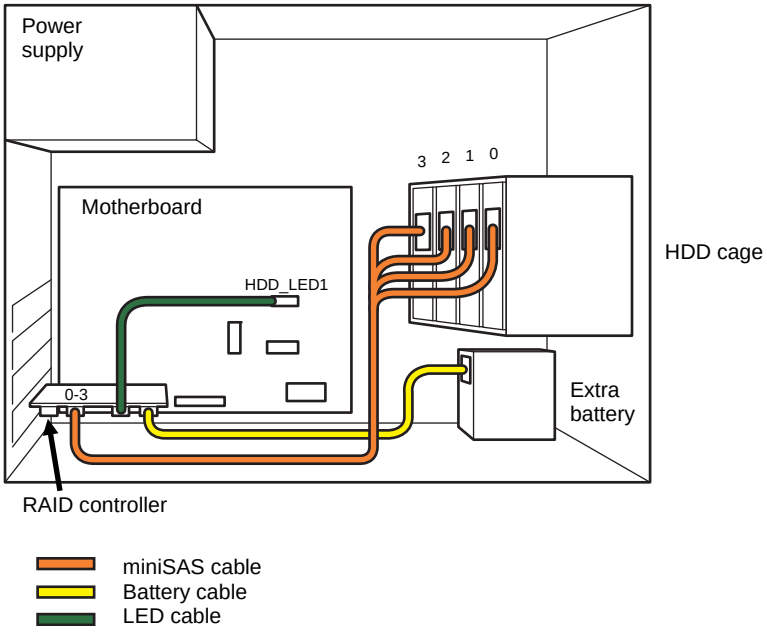
Connect the cables as shown in the following figure. Install the hard disk drives in order from the left side.

- Connecting to the miniSAS connector on the motherboard



You can use the controller on the motherboard to build a RAID system. For more information, see Chapter 2 (*4. RAID System Configuration*) in "*Maintenance Guide*".

- Adding a RAID controller (N8103-149/150/151/171)



Tips

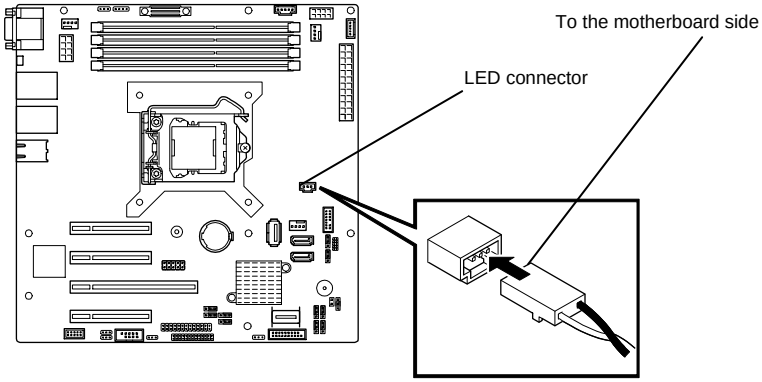
The dedicated cable K410-293(00) is required for installing the RAID controller (N8103-149/150/151) in the server.

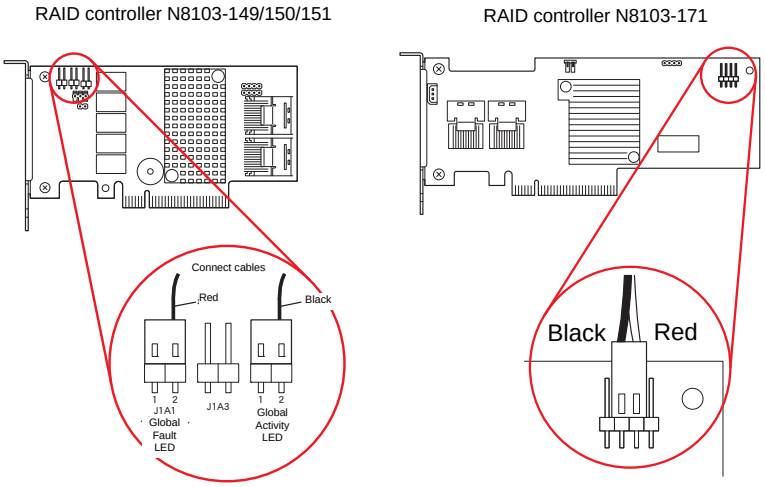
The dedicated cable K410-316(00) is required for installing the RAID controller (N8103-171) in the server.

- **About RAID LED cables**

The DISK access LED on the front of the equipment shows the access status of hard disk drives that are connected to a RAID controller. To display this status, connect the LED cable that comes with the optional cable K410-293(00) or K410-316(00).
Connect the LED connector on the motherboard to the connector on the RAID controller.

See the figures below and connect the LED cable to the LED connector of the motherboard.

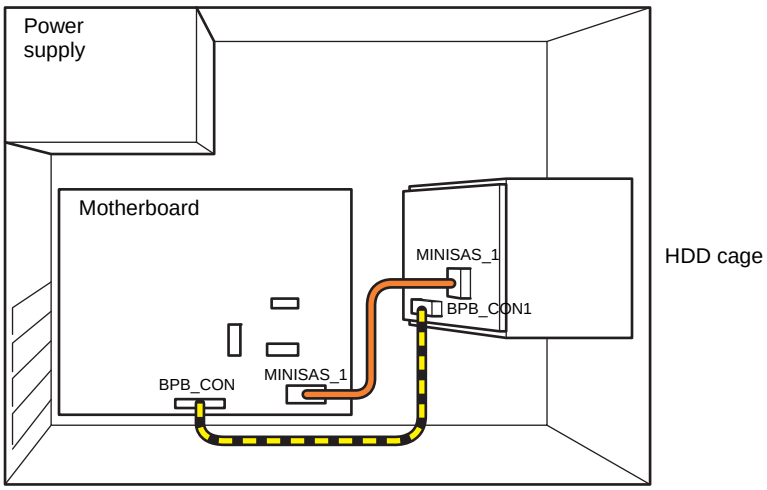




(b) In case of 3.5-inch HDD cage installed

Connect the cables as shown in the following figure. Install the hard disk drives in order from the left side.

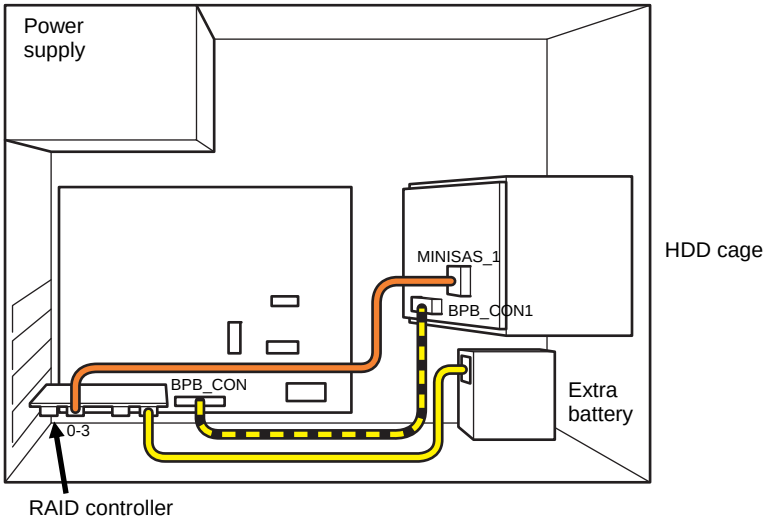
- Connecting to the miniSAS connector on the motherboard



miniSAS cable
HDD backplane interface cable

You can use the controller on the motherboard to build a RAID system. For more information, see Chapter 2 (*4. RAID System Configuration*) in "*Maintenance Guide*".

- Adding a RAID controller (N8103-149/150/151/167/171)

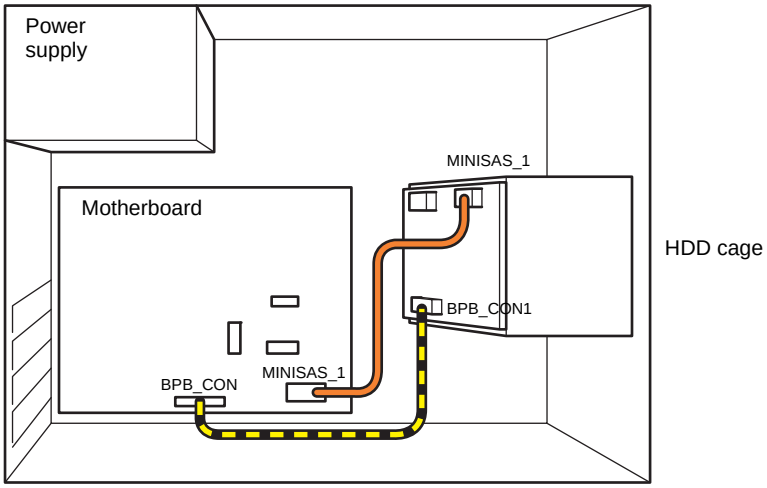


miniSAS cable
HDD backplane interface cable
Battery cable

(c) In case of 2.5-inch HDD cage installed

Connect the cables as shown in the following figure. Install the hard disk drives in order from the left side.

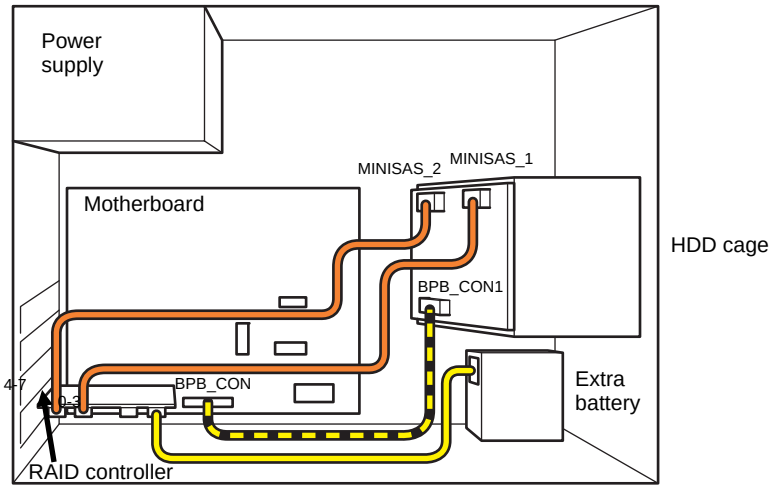
- Connecting one to four hard disk drives to the miniSAS connector on the motherboard



miniSAS cable
HDD backplane interface cable

You can use the controller on the motherboard to build a RAID system. For more information, see Chapter 2 (*4. RAID System Configuration*) in "*Maintenance Guide*".

- Adding one to eight hard disk drives with a RAID controller (N8103-149/150/151/167/171)
  An optional SAS/SATA cable (K410-294(00)) is required when installing five or more hard disk drives.



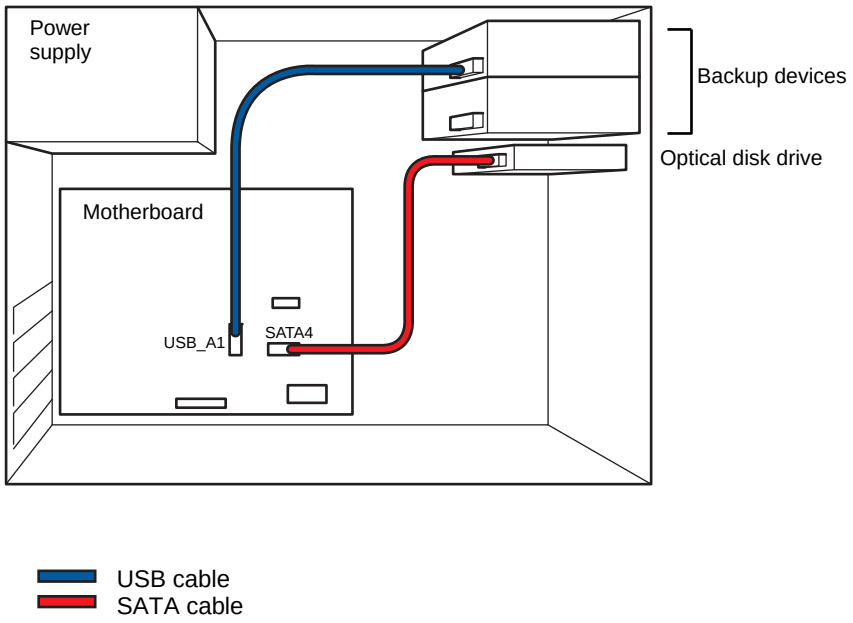
miniSAS cable
HDD backplane interface cable
Battery cable

(2) Connecting backup devices

The 5.25-inch expansion bay of the server can mount USB devices for internal connection.

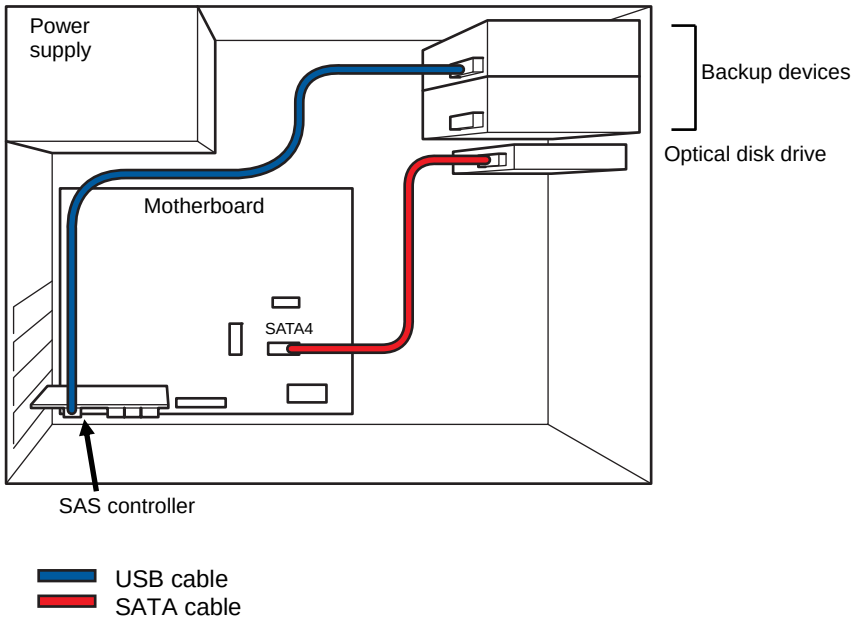
(a) Mounting an internal USB device

Use the dedicated internal USB cable (for USB 3.0: K410-276(00), for USB 2.0: K410-286(00).



(b) Mounting a SAS device

Use the dedicated internal SAS cable (K410-217(00)).

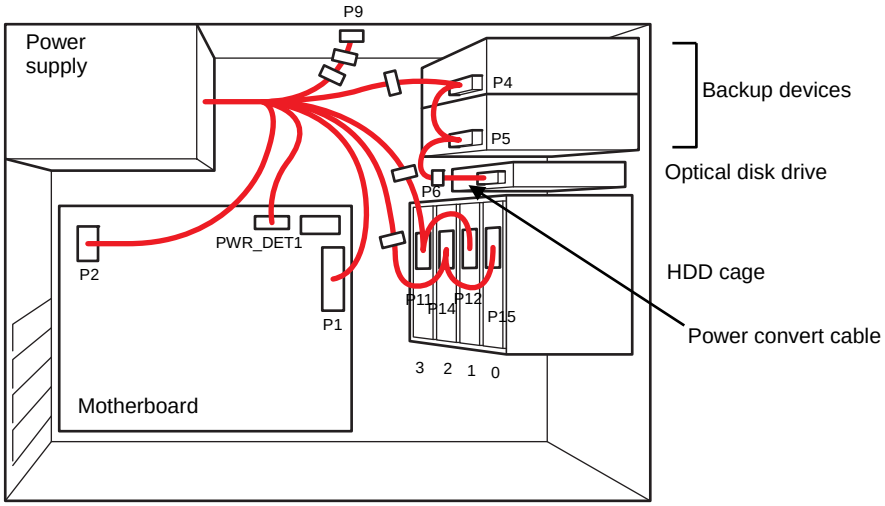


1.16.2 Power cables

The figure below shows an example of connecting the power cables. Power cables other than those shown here are not used by the devices.

(1) Express5800/T110f-E (EXP287A)

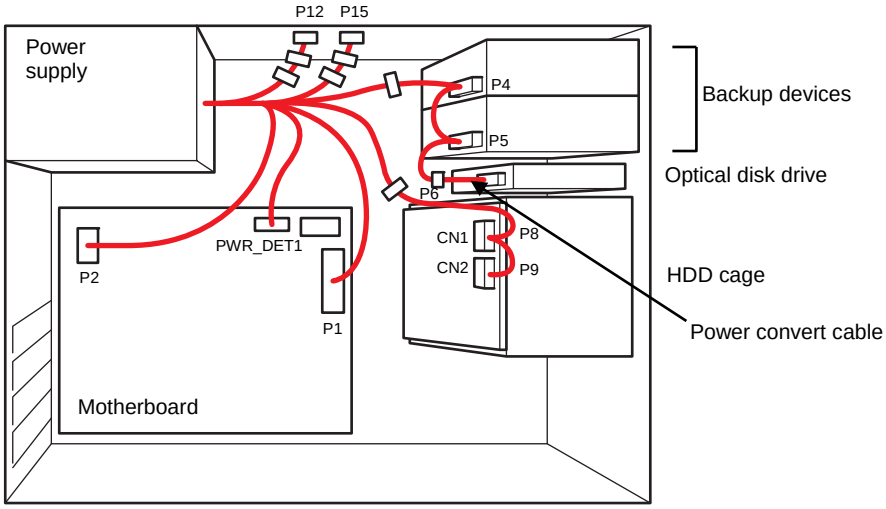
(a) In case of 3.5-inch fixed HDD cage installed



Cable connected to power supply

Unused power supply cable connector

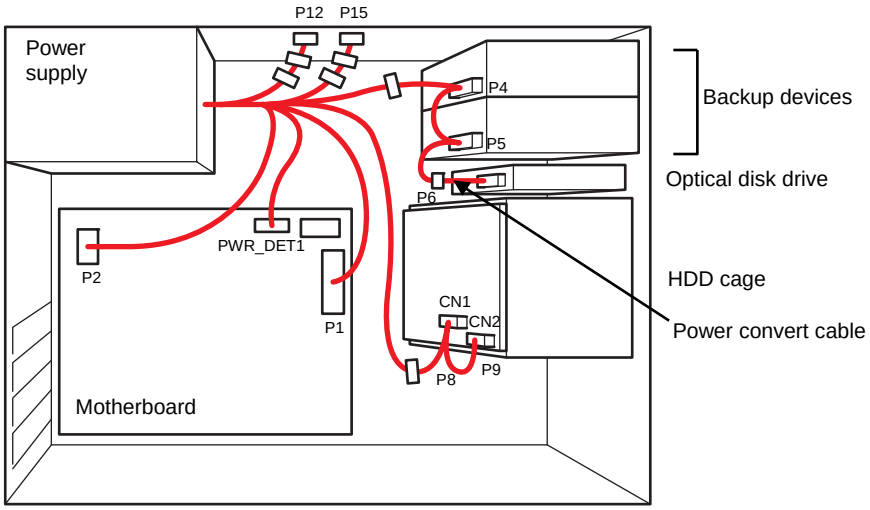
(b) In case of 3.5-inch HDD cage installed



Cable connected to power supply

Unused power supply cable connector

(c) In case of 2.5-inch HDD cage installed

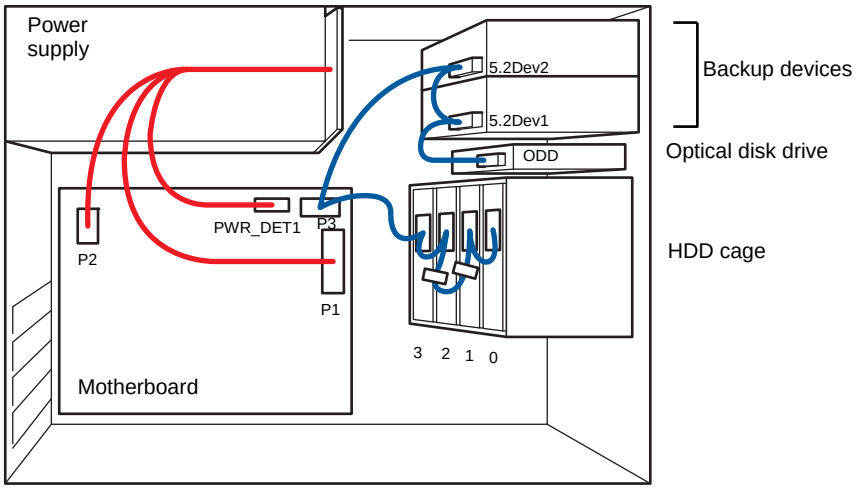


Cable connected to power supply

Unused power supply cable connector

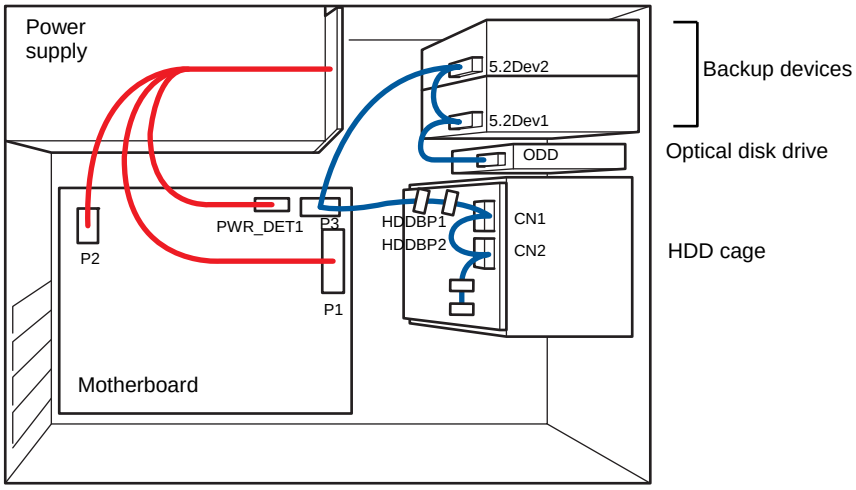
(2) Express5800/T110f-E (EXP288A)

(a) In case of 3.5-inch fixed HDD cage installed



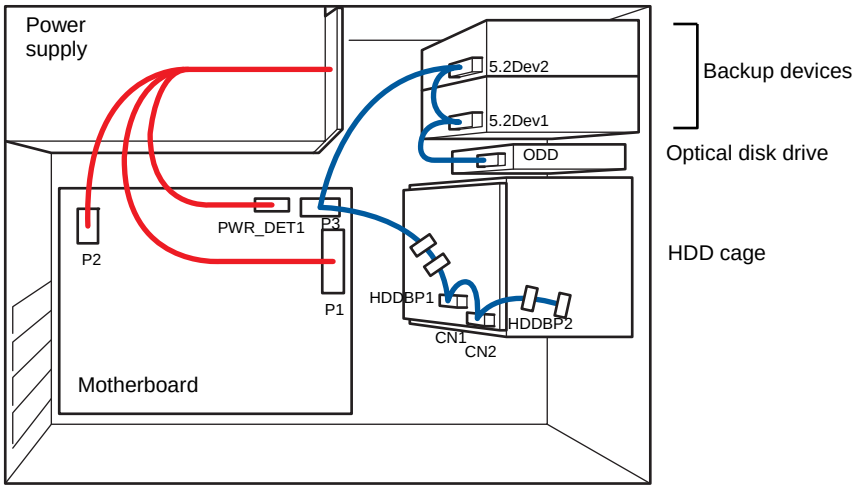
Cable connected to power supply backplane
DC cable
Unused power supply cable connector

(b) In case of 3.5-inch HDD cage installed



Cable connected to power supply backplane
DC cable
Unused power supply cable connector

(c) In case of 2.5-inch HDD cage installed



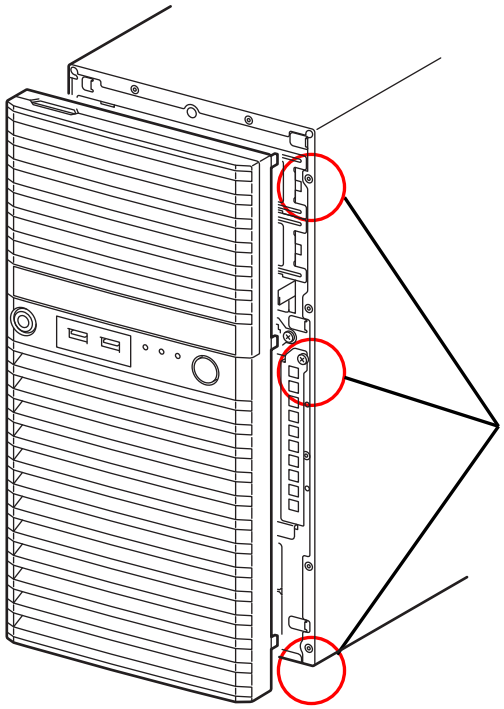
Cable connected to power supply backplane

DC cable

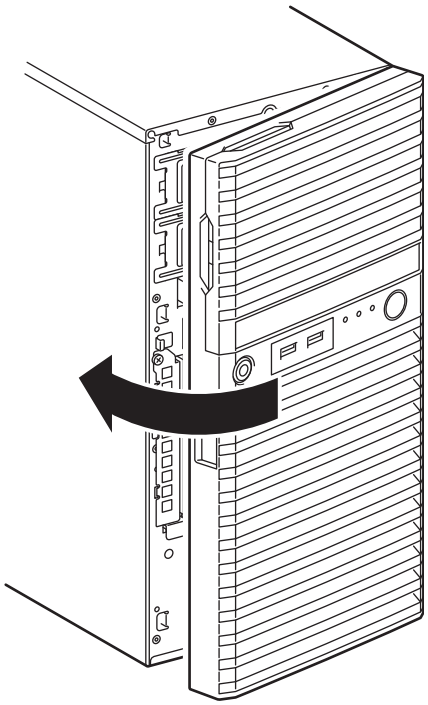
Unused power supply cable connector

1.17 Attaching the Front Bezel

You can attach the front bezel by reversing the removal procedure. Attach the front bezel to the server by inserting the three tabs on the inside of the front bezel into the slits on the right-front of the server and then pressing the left side of the front bezel to secure it into place on the front of the server.



Insert tabs inside the bezel into the slit on the chassis.



1.18 Installing the Side Cover

You can attach the side cover by reversing the removal procedure.

Make sure that hooks at both the top and bottom of the side cover are securely inserted in the slits on the server frame. Also make sure that the hooks at the front of the cover are engaged with the server frame when sliding the side cover forward to attach. If they are not engaged with the frame, the cover cannot be secured in place.

2. Installation and Connection

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

2.1 Installation

WARNING

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

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

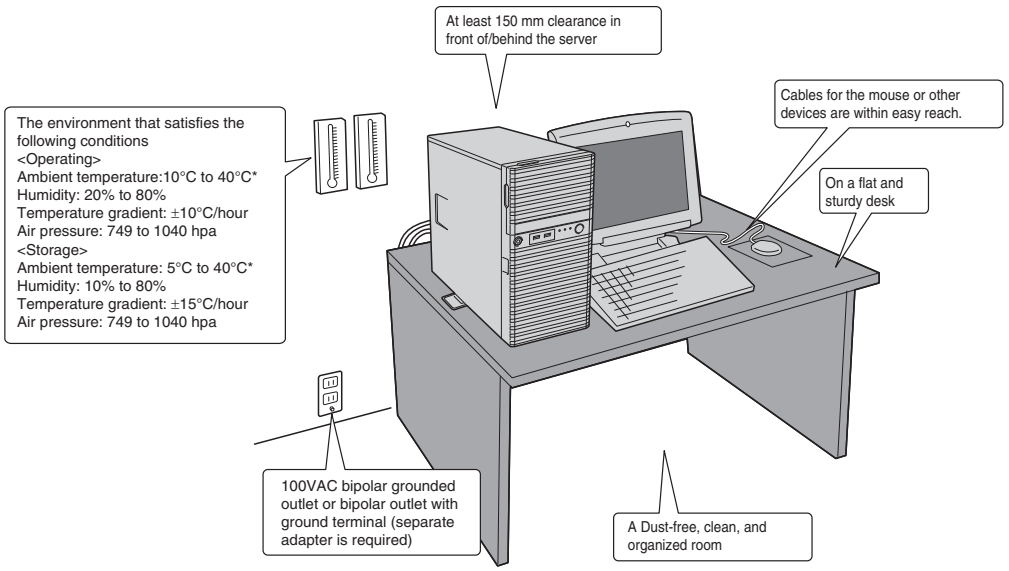
CAUTION

Be sure to observe the following precautions to use of 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.*

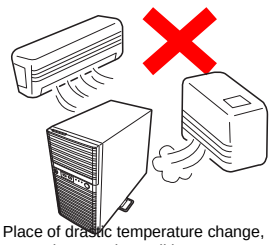
- **Do not attempt to lift the server by gripping the front bezel.**
- **Do not carry or install the server only by a single person.**
- **Install and store only in the specified environment.**

The environment suitable for the server is as follows.

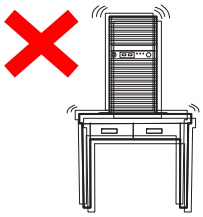
Hold the server firmly, and slowly and gently place it in the position in which it is to be installed.



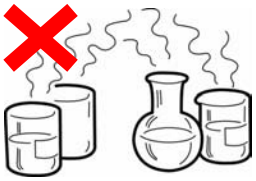
Do not install the server in an environment in which any of the following conditions apply: Installing the server in any of the following conditions will cause the server to malfunction.



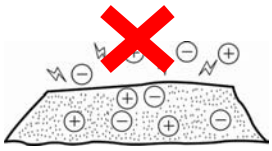
Place of drastic temperature change, near a heater, air conditioner, or refrigerator.



Place where intense vibration may be generated.



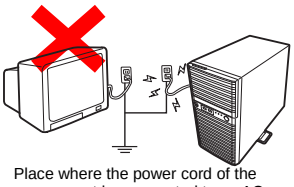
Places where corrosive gas is present, such as environments where there is sulfur vapor in the atmosphere, or places where chemicals are nearby or may be accidentally sprayed over.



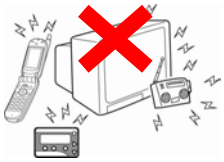
Place where a carpet not subject to anti-static process is laid.

Place where some objects may be fallen.

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



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



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

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

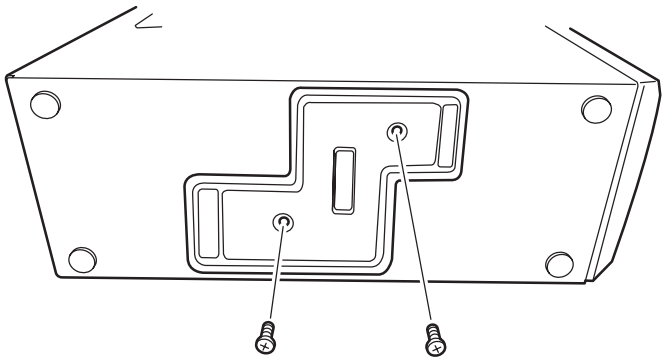
2.1.1 Preparation for installation

Remove the stabilizer attached to the bottom of the server, and then change as instructed below.

Removing/installing the stabilizer

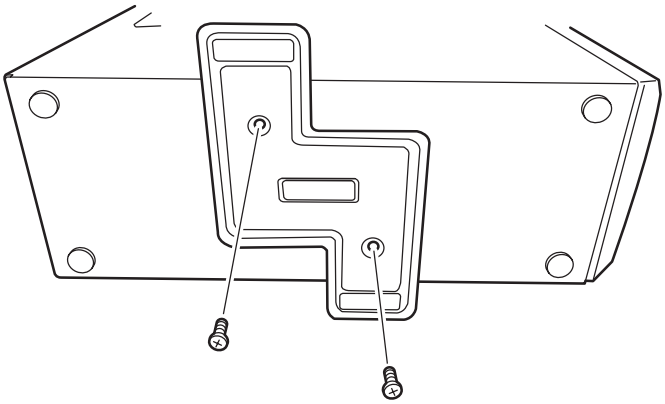
Removing the stabilizer

Remove the two screws from the stabilizer to remove the stabilizer from the server.

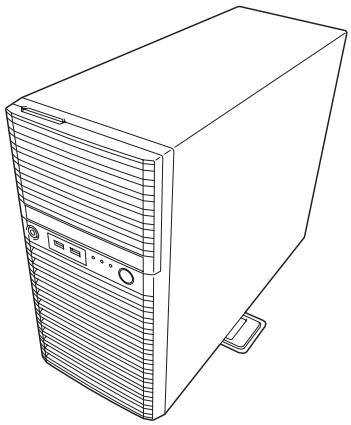


Installing the stabilizer

Turn the stabilizer 90 degree as shown in the figure below, and then fix it by using the two screws.



After attaching the stabilizers, set up the server as shown in the image.



2.2 Connection

Connect peripheral devices to the server. Connectors that enable a variety of peripheral devices to be connected are provided at the front and rear of the server. Figures on the following pages show the peripheral devices that can be connected as standard. Connect the peripheral devices before connecting the power cord to the server.

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.**

CAUTION

Be sure to observe the following precautions to use of 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 while the power cord is connected.**
- **Use only the specified interface cable.**

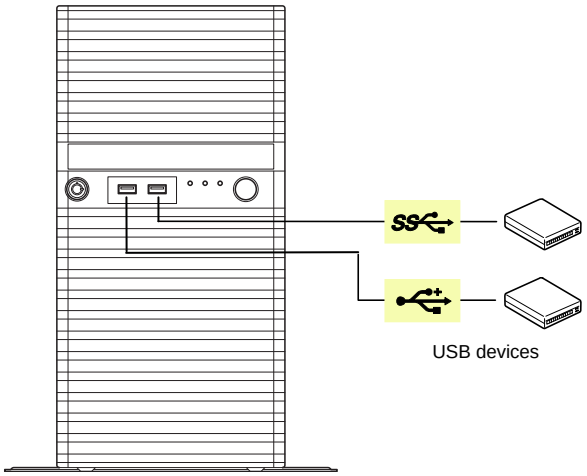
2.2.1 Interface cables

Connect the interface cable before connecting the power cord.

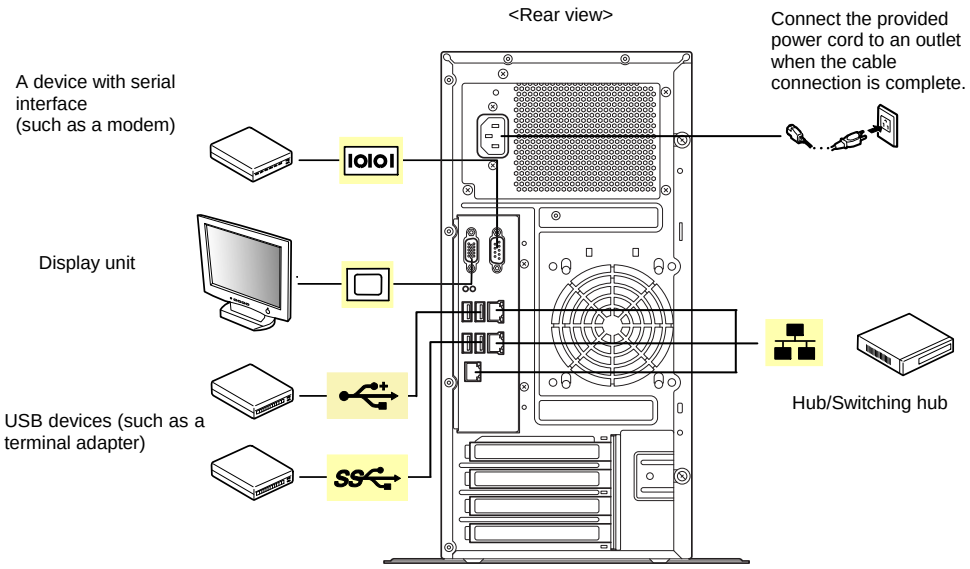
Important

- **Turn off the server and peripheral devices to be connected before connecting.**
- **The connectors that are not explained here are not available. Do not connect anything to the connectors.**

<Front view>



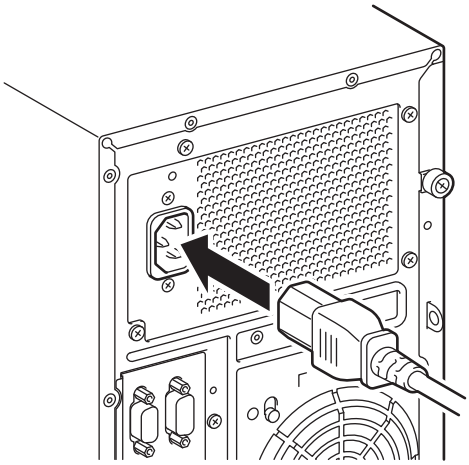
<Rear view>



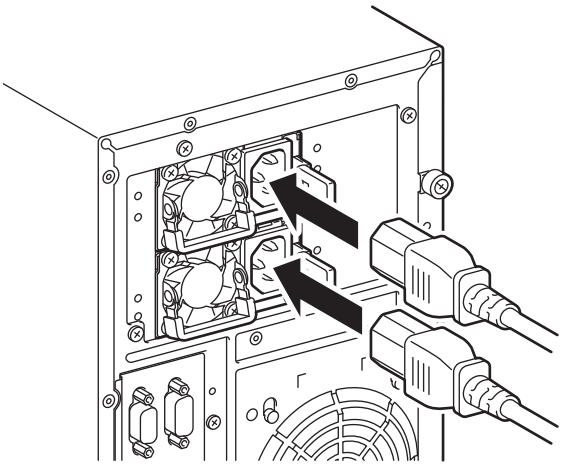
2.2.2 Power cord

Connect the provided power cord to the server.

Express5800/T110f-E (EXP287A)



Express5800/T110f-E (EXP288A)



When the power cord is connected to an outlet, POWER LED lights amber during initialization of the system.

Tips

- To connect the power cord to a UPS, connect it to the outlet provided at the rear of the UPS.
  For details, refer to the instruction manual supplied with the UPS
- In order to link the power supply from the UPS with the power-on/off of this server, the BIOS settings change might be required depending on the UPS to which the power cord of this server is connected.
  In the BIOS Setup Utility, select **Server**, and then **AC-LINK** to change the parameter to the appropriate value.

NEC Express5800 Series
Express5800/T110f-E

3 Setup

This chapter describes how to set up the server.

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

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

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

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

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

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

1. Turning on the Server

Turn on the server by using the following procedure.

Important

- **Wait for approximately 30 seconds before turning on the server again after the power has been turned off.**
- **When the optional RAID controller N8103-167 is installed, wait for at least 90 seconds before turning on the server.**

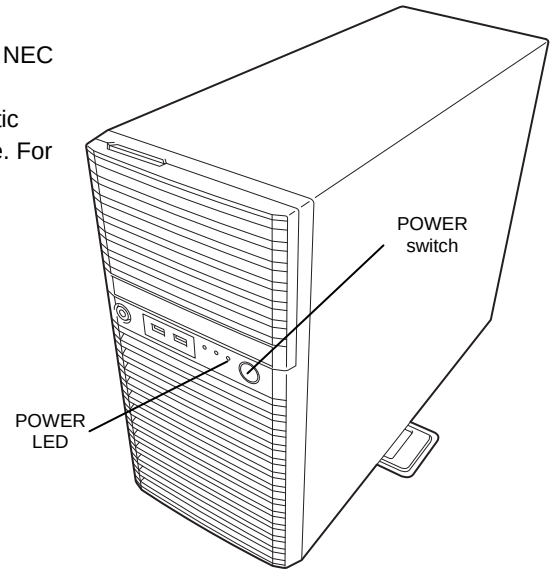
1. Disconnect Flash FDD if applicable.
2. Turn on the peripheral devices such as display unit.

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.

3. If POWER LED lights amber, wait until POWER LED is unlit.

4. Press POWER Switch at the front of the server.
   POWER LED is turned on green and after a while, NEC logo appears on the display.
   While the logo is being displayed, the self-diagnostic program (POST) runs and diagnoses the hardware. For details, see *Chapter 3 (1.1 POST)*.



1.1 POST

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

Usually, you do not need to check the messages of POST. 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.

Important

- **Do not press any keys or perform mouse operations while POST is in progress.**
- **Powering on the server, after you installed or removed an optional PCI board or moved it to another slot, may display the message that indicates incorrect board configuration and suspend POST.**
  In such a case, press F1 to continue POST. Board configuration can be made using the utility described later.

1. POST runs automatically when the server is turned on.
   NEC logo appears on the screen as factory settings.
2. When **Password On Boot** is set to **Enabled** on the **Security** menu in the BIOS setup utility (SETUP), the logo is displayed, and then the password entry is displayed. If you enter the wrong password three times in a row, POST stops and you cannot proceed to the subsequent operation. In this case, turn off and on the server.

Important **Do not set a password until you install the OS.**

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

Tips To show the details of POST without pressing <ESC> key, set **Quiet Boot** to **Disabled** in the **Boot** menu of the BIOS settings.

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
   ```

   You can call the functions below upon completion of POST by pressing the designated function key.

   <F2> key: Run the SETUP. For information on the SETUP, see *Chapter 3 (2. System BIOS Setup)*.
   <F3> key: Run EXPRESSBUILDER from Internal Flash Memory (optional). For information on EXPRESSBUILDER, see *Chapter 3 (4. EXPRESSBUILDER)*.
   <F4> key: Run the offline tool. For information on the offline tool, see *Chapter 1 Maintenance (9. Offline Tools) in "Maintenance Guide*".
   <F12> key: Boot from network.

   Note

   - If the optional Internal Flash Memory is not installed in the system, <F3> key message will not be displayed.
   - Note that the server dose not boot from Internal Flash Memory when a bootable CD/DVD-ROM is set on the drive.

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

   Example: optional SAS controller

   ```
   Press Ctrl-C to start LSI Corp Configuration Utility…
   ```

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

   Example: optional RAID controller

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

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

   Example: on-board RAID controller

   ```
   Press <Ctrl> <M> to Run LSI Software RAID Configuration Utility
   ```

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

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

   Depending on the hardware 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. If you set a password at **SETUP** in the BIOS Setup utility, the password entry appears upon successful completion of POST.
   Up to three password entries will be accepted. Three incorrect password entries disable the server to boot. In such a case, turn off the power and wait about ten seconds before turning on to boot the server.

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

8. The OS starts when POST is completed.

1.1.2 POST error messages

If POST detects an error, an error message is displayed on the screen or beeps are sounded. Write down the error message for future use. For details, see "*Maintenance Guide*".

2. System BIOS Setup

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

2.1 Overview

The BIOS Setup Utility (SETUP) is a utility to configure basic hardware settings. This utility is pre-installed in the server as standard and can run without bootable discs.

Usually, you do not need to change the parameters of the SETUP. **Use only when the case applies to any of cases described in *Chapter 3 (2.4 Cases that Require Setting Changes*).**

2.2 Starting SETUP Utility

Turn on the server and wait until the following message appears. See *Chapter 3 (1.1.1 POST sequence)* for details.

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

When you press <F2> key during displaying the message or the NEC logo, SETUP runs and displays the **Main** menu upon completion of POST.

About password entry

The entry of the password appears after you set a password in SETUP.

```
Enter password [                ]
```

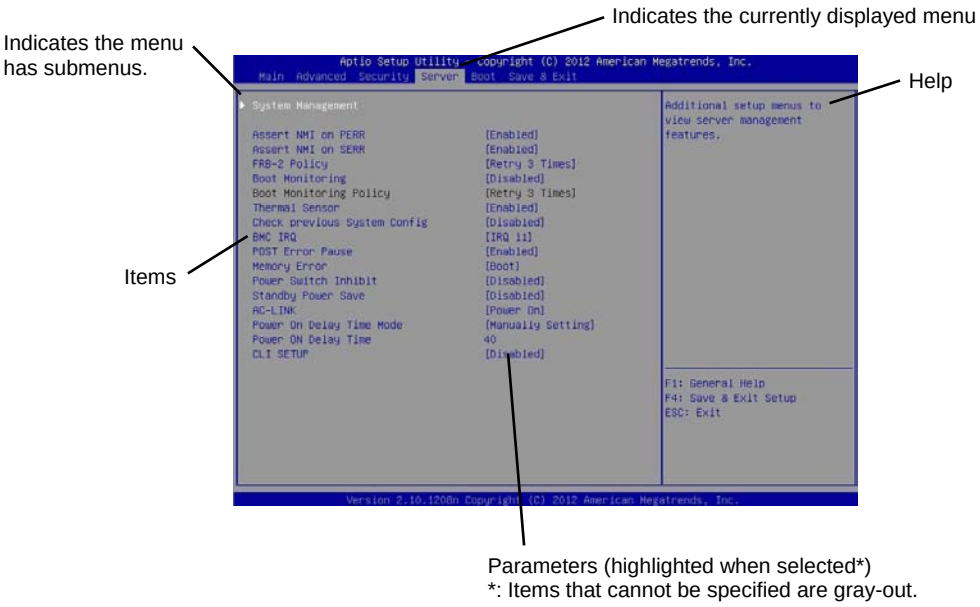
If you enter a wrong password three times, SETUP stops. Turn off the server and try again.

To exit SETUP after saving the parameters, choose **Save & Exit** and then **Save Changes and Exit**.

To exit SETUP without saving the parameters, choose **Save & Exit** and then **Discard Changes and Exit**.

2.3 Description on On-Screen Items and Key Usage

This section explains how to use 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 parameters 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
Press this key to return the previous screen. If you choose **Yes** in the following message, SETUP closes without saving the changed parameters.

Quit without saving?
[Yes] No

☐ <F1> key
Press this key to display help information. Press <Esc> key to go back to the original screen.

☐ <F2> key
Press this key to restore the parameters. If you choose **Yes** in the following message, the previous parameter(s) are restored.

Load Previous Values?
[Yes] No

☐ <F3> key
Press this key to load default settings. If you choose **Yes** in the following message, the default settings of SETUP are restored. **The default settings are different from the factory settings.** See *Chapter 2 (1. Details of System BIOS)* in "*Maintenance Guide*" for details.

Load Setup Defaults?
[Yes] No

☐ <F4> key
Press this key to save parameters. If you choose **Yes** in the following message, the parameters you configured are saved and SETUP closes.

Save configuration and exit?
[Yes] No

2.4 Cases that Require Setting Changes

Specify parameters according to the following table when your system matches "Description". The 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/Off the function to display the NEC logo during POST	**Boot** → **Quite Boot** → **Disabled**	By pressing <Esc> key, prevent the display of the logo.
Optional board	Install a RAID controller board	**Advanced** → **PCI Configuration** → **PCI Device Controller and Option ROM Settings** → **PCI Slot n Option ROM** → **Enabled**	*n* is PCI slot number of the RAID controller
Memory	Configure the memory after the DIMM is added or exchanged.	**Advanced** → **Memory Configuration** → **Memory Retest** → **Yes**	After rebooting, the **Memory Retest** setting changes to **No** automatically.
Boot	Change the boot order of devices	**Boot** → **Boot Option Priorities** → Change the boot priority	
	Use remote power on feature (from modem)	**Advanced** → **Advanced Chipset Configuration** → **Wake On Ring** → **Enabled**	
	Use remote power on feature (from RTC alarm)	**Advanced** → **Advanced Chipset Configuration** → **Wake On RTC Alarm** → **Enabled**	
	Control from HW console terminal	**Advanced** → **Serial Port Configuration** → Change respective setting.	
Security	Set a password to restrict operation of SETUP.	**Security** → **Administrator Password** → **Security** → **User password**	After a password is set, the entry of password is displayed when SETUP is launched.
	Set a password to restrict booting.	**Security** → **Password on Boot** → **Enabled**	You can select this parameter after you set a password.
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 the server 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**	

3. EXPRESSSCOPE ENGINE 3

3.1 Overview

EXPRESSSCOPE Engine 3 provides useful features by using Baseboard Management Controller (BMC).

EXPRESSSCOPE Engine 3 monitors the power unit, cooling fans, temperature, and voltage of the server. If the management LAN connector is connected to the network, you can remotely perform the following features by using a web browser or SSH client.

- Managing the server
- Remotely controlling the keyboard, video, and mouse (KVM)*
- Remotely accessing a CD/DVD/floppy disk/ISO image/USB flash drive*.

***** To use this feature, the optional license for remote management (N8115-04) is required.
To enable this feature, a USB mass storage device, such as Remote FD, Remote CD/DVD, Remote USB flash drive, or Virtual Flash is virtually connected.

About N8115-04 Remove KVM and Media License

More than one removable drives other than the actual drives are displayed on the operating system of the server. These added removable drives are the virtual removable drives reserved for the remote media feature of EXPRESSSCOPE Engine 3 (*1).

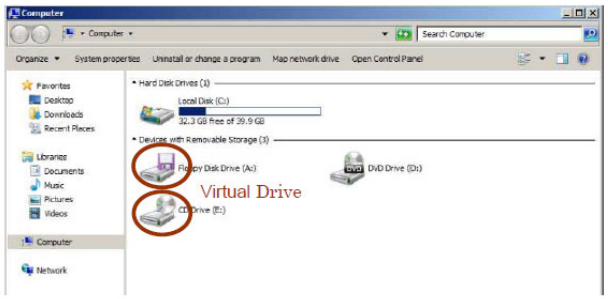


Fig. 1 Example of Windows Server 2008 R2 Computer Folder (*2)

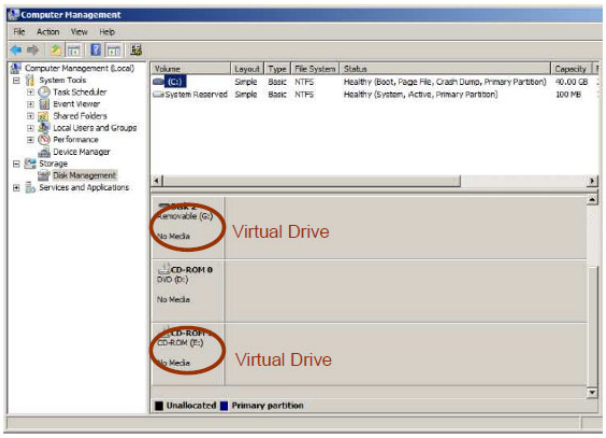


Fig. 2 Example of Windows Server 2008 R2 Server Manager (*2)

*1 This feature enables you to use FD/CD/DVD drives, ISO images or USB flash drives on "PC for Management" as virtual drives that are connected to the server.

*2 The number of drives and the drive character are different depending on hardware configurations.

3.2 EXPRESSSCOPE ENGINE 3 Network Configuration

To use EXPRESSSCOPE Engine 3 through the network, follow the steps below.

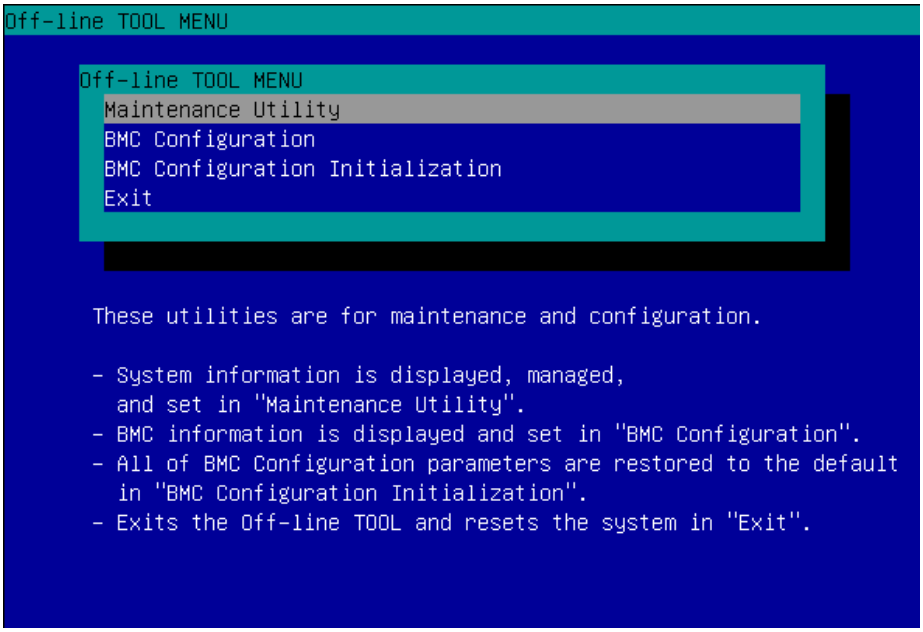
1. Turn on the server and wait until the following message appears on the lower left of the screen. See *Chapter 3 (1.1.1 POST sequence)* for details.

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

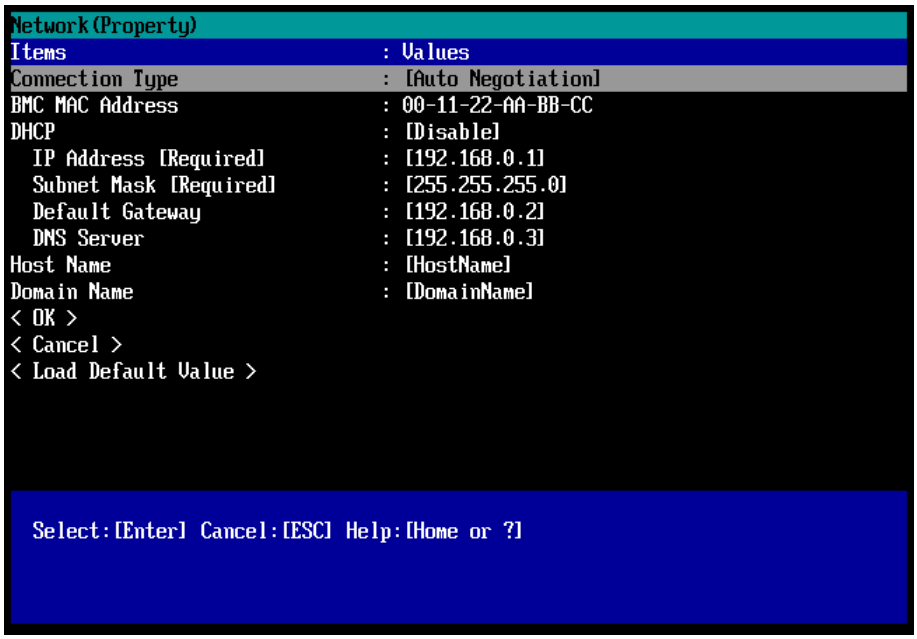
2. When you press <F4> key during displaying the message or NEC logo, ROM utility starts upon completion of POST.

3. The keyboard selection menu appears. Choose your keyboard type.

4. On the Off-line TOOL MENU, choose **BMC Configuration**, **BMC Configuration**, **Network**, and then **Property**.



5. In the **DHCP** of the Property screen, specify **Enable** or configure **IP Address**/**Subnet Mask**.



Tips

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

6. Connect the LAN cable to the management LAN connector in order to connect to the network.
Access EXPRESSSCOPE Engine 3 by using a web browser from "PC for Management" with the settings specified by step 5.

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, choose **OS installation** in Boot Selection Menu.
Bundled software*	Stores various bundled software, such as NEC ESMPRO Agent.
Maintenance	Diagnoses your server system. To use this feature, choose **Tool menu** in Boot Selection Menu.
Instruction manuals*	Stores various documents, such as "*User's Guide*", "*Installation Guide*" and "*Maintenance Guide*".

*Documents and some software components are not stored in N8115-14 Internal Flash Memory (option).

4.2 Usage of EXPRESSBUILDER

If you want to install Windows, start EXPRESSBUILDER by using any of the following.

EXPRESSBUILDER disc:

Insert the disc into the server and either turn on the server or restart the server by pressing <Ctrl> + <Alt> + <Delete> keys. EXPRESSBUILDER starts from the disc.

If you want to install any bundled software or see documents, insert the disc into a computer on which Windows is running. The Autorun menu appears automatically.

N8115-14 Internal Flash Memory (optional):

Confirm that the EXPRESSBUILDER disc or other bootable disc is not inserted. Press <F3> key when the following message appears on POST screen.

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

5. Installing Software Components

Continue to install the operating system and other bundled software.

See the instructions below.

- *Installation Guide (Windows)*

6. Turning off the Server

Turn off the server by using the following procedure. When 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. If the server does not automatically power off, press POWER Switch at the front of the server. Confirm that POWER LED is OFF.
3. Turn off peripheral devices.

NEC Express5800 Series
Express5800/T110f-E

4 Appendix

1. **Specifications**

2. **Interrupt Lines**

I. Specifications

I.I Express5800/T110f-E (EXP287A)

Product name		Express5800/T110f-E (EXP287A)				
		N8100-1973F				
CPU	Type	Intel® Pentium® processor G3220	Intel® Core™ i3-4330 processor	Intel® Xeon® processor E3-1220 v3	Intel® Xeon® processor E3-1230 v3	Intel® Xeon® processor E3-1270 v3
	Clock/cache	3 GHz/3 MB	3.50 GHz/4 MB	3.10 GHz/4 MB	3.30 GHz/8 MB	3.50 GHz/8 MB
	Standard / (maximum)	Not pre-installed / (1)				
Chipset		Intel® C224 Chipset				
Memory	Standard	Not pre-installed				
	Maximum	32 GB (8 GB x 4)				
	Expansion unit	DDR3L-1600 SDRAM DIMM (unbuffered) x 1				
	Memory module	ECC DDR3L-1600 SD-RAM DIMM				
Graphics		Integrated in BMC (more than 32 MB)				
Storage	Hard disk drive (standard)	Not pre-installed				
	Hard disk drive (maximum)	With 3.5-inch Fixed HDD cage (N8154-53F): 16 TB (4 x 4 TB) With 3.5-inch HDD cage (N8154-54F): 16 TB (4 x 4 TB) With 2.5-inch HDD cage (N8154-55F): SATA 8 TB (8 x 1 TB), SAS 9.6 TB (8 x 1.2 TB), SAS SSD 3.2 TB (8 x 400 GB)				
	RAID	SATA 6 Gb/s : RAID 0/1/10(standard)*1, RAID 5/6/50/60 (optional) SAS 6 Gb/s : RAID 0/1/5/6/10/50/60 (optional)				
	Optical disk drive	Selectable: DVD-ROM drive or DVD SuperMULTI drive				
Expansion bay	Drive bay	Selectable: 3.5-inch Fixed hard disk drive x 4(optional) / 3.5-inch hard disk drive x 4(optional) / 2.5-inch hard disk drive x 8(optional)				
	Backup device	2 slot				
Expansion slot (PCI)		1x PCI Express 3.0 (x16 lane, x16 socket) 1x PCI Express 2.0 (x4 lane, x8 socket) 2x PCI Express 2.0 (x1 lane, x8 socket)				
External interface	USB3.0	Front: 1 port; rear: 2 ports; internal: 1 port				
	USB2.0	Front: 1 port; rear: 2 ports; internal: 1 port				
	Serial	1 port (D-sub 9-pin)*				
	Network	2-port 1000Base-T, 100Base-TS/10Base-T (RJ-45) Management LAN connector (RJ-45)				
	Display	MINI D-sub 15-pin (1 port)				
Dimensions (width x depth x height)		175.0 mm x 472.0 mm x 367.0 mm (not including stabilizer and protrusions) 249.0 mm x 486.7 mm x 367.0 mm (including stabilizer and protrusions)				
Weight (maximum)		11.4 kg (18.2 kg)				
Power supply		1 x 400 W 80 PLUS® Gold (bipolar grounded outlet) (hot-plug not available) 100/200 VAC ± 10%, 50/60 Hz ± 3 Hz				
Power rating		455 W				
Environmental requirements	Operating	Temperature: 10 to 40°C; Humidity: 20 to 80% (and no condensation)				
	Non-operating	Temperature: –10 to 55°C; Humidity: 20 to 80% (and no condensation)				
Bundled OS		None				
Supported OSs		Microsoft® Windows Server® 2008 Standard (RTM, SP2 or later) Microsoft® Windows Server® 2008 Enterprise (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				
Included parts		104 keyboard, two-button mouse with scroll wheel, EXPRESSBUILDER DVD, Getting Started, screws for device, Power cord				

* Can be optionally expanded to two ports.

1.2 Express5800/T110f-E (EXP288A)

Product name		Express5800/T110f-E (EXP288A)				
		N8100-2006F				
CPU	Type	Intel® Pentium® processor G3220	Intel® Core™ i3-4330 processor	Intel® Xeon® processor E3-1220 v3	Intel® Xeon® processor E3-1230 v3	Intel® Xeon® processor E3-1270 v3
	Clock/cache	3 GHz/3 MB	3.50 GHz/4 MB	3.10 GHz/4 MB	3.30 GHz/8 MB	3.50 GHz/8 MB
	Standard / (maximum)	Not pre-installed / (1)				
Chipset		Intel® C224 Chipset				
Memory	Standard	Not pre-installed				
	Maximum	32 GB (8 GB x 4)				
	Expansion unit	DDR3L-1600 SDRAM DIMM (unbuffered) x 1				
	Memory module	ECC DDR3L-1600 SD-RAM DIMM				
Graphics		Integrated in BMC (more than 32 MB)				
Storage	Hard disk drive (standard)	Not pre-installed				
	Hard disk drive (maximum)	With 3.5-inch Fixed HDD cage (N8154-53F): 16 TB (4 x 4 TB) With 3.5-inch HDD cage (N8154-54F): 16 TB (4 x 4 TB) With 2.5-inch HDD cage (N8154-55F): SATA 8 TB (8 x 1 TB), SAS 9.6 TB (8 x 1.2 TB), SAS SSD 3.2 TB (8 x 400 GB)				
	RAID	SATA 6 Gb/s : RAID 0/1/10(standard)*1, RAID 5/6/50/60 (optional) SAS 6 Gb/s : RAID 0/1/5/6/10/50/60 (optional)				
	Optical disk drive	Selectable: DVD-ROM drive or DVD SuperMULTI drive				
Expansion bay	Drive bay	Selectable: 3.5-inch Fixed hard disk drive x 4(optional) / 3.5-inch hard disk drive x 4(optional) / 2.5-inch hard disk drive x 8(optional)				
	Backup device	2 slot				
Expansion slot (PCI)		1x PCI Express 3.0 (x16 lane, x16 socket) 1x PCI Express 2.0 (x4 lane, x8 socket) 2x PCI Express 2.0 (x1 lane, x8 socket)				
External interface	USB3.0	Front: 1 port; rear: 2 ports; internal: 1 port				
	USB2.0	Front: 1 port; rear: 2 ports; internal: 1 port				
	Serial	1 port (D-sub 9-pin)*				
	Network	2-port 1000Base-T, 100Base-TS/10Base-T (RJ-45) Management LAN connector (RJ-45)				
	Display	MINI D-sub 15-pin (1 port)				
Dimensions (width x depth x height)		175.0 mm x 472.0 mm x 367.0 mm (not including stabilizer and protrusions) 249.0 mm x 498.2 mm x 367.0 mm (including stabilizer and protrusions)				
Weight (maximum)		11.0 kg (18.5 kg)				
Power supply		1 x 450W 80 PLUS® Platinum compliant (bipolar grounded outlet) (hot-plug available) (Maximum : 2 [Standard +option]) 100/200 VAC ± 10%, 50/60 Hz ± 3 Hz				
Power rating		531 W				
Environmental requirements	Operating	Temperature: 10 to 40°C; Humidity: 20 to 80% (and no condensation)				
	Non-operating	Temperature: –10 to 55°C; Humidity: 20 to 80% (and no condensation)				
Bundled OS		None				
Supported OSs		Microsoft® Windows Server® 2008 Standard (RTM, SP2 or later) Microsoft® Windows Server® 2008 Enterprise (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				
Included parts		104 keyboard, two-button mouse with scroll wheel, EXPRESSBUILDER DVD, Getting Started, screws for device, Power cord				

* Can be optionally expanded to two ports.

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	8	Real-time clock
1	–	9	Microsoft ACPI-Compliant System
2	Cascade connection	10	PCI
3	COM 2 serial port	11	PCI
4	COM 1 serial port	12	–
5	PCI	13	Arithmetic operation processor
6	–	14	–
7	–	15	–