Maintenance Guide (Linux)

NEC Express Server
Express5800 Series

Express5800/R320e-E4
Express5800/R320e-M4
EXP320R, EXP320S

30.102.03-104.01
August 2016

Manuals

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

EXPRESSBUILDER

Safety Precautions and Regulatory Notices

	Describes points of caution to ensure the safe use of this server. **Read these cautions before using this server.**

User's Guide

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

Installation Guide

Chapter 1: Installing Operating System	Installation of OS and drivers, and precautions for installation
Chapter 2: Installing Bundled Software	Installation of bundled software, such as NEC ESMPRO

Maintenance Guide

Chapter 1: Maintenance	Server maintenance, error messages, and troubleshooting
Chapter 2: Configuring and Upgrading the System	Changing hardware configuration, installing additional devices and setting up management tools
Chapter 3: Useful Features	The detail of system BIOS settings, SAS Configuration Utility, and EXPRESSBUILDER

Other manuals

The detail of NEC ESMPRO, BMC Configuration, and other features.

Contents

Conventions Used in This Document

Signs and symbols for safety

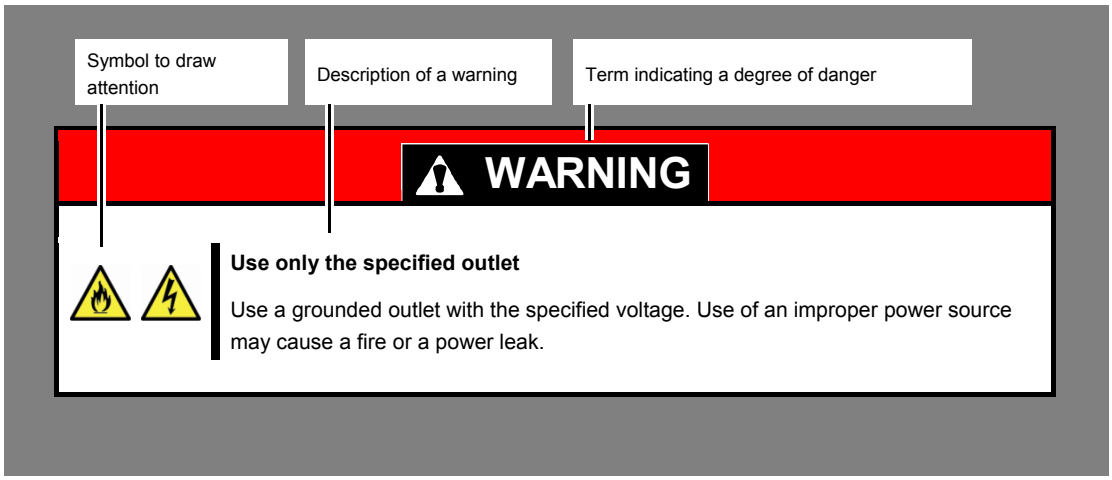
WARNING and CAUTION are used in this guide as following meaning.

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

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

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

(Example in this guide)



Notations used in the text

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

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

Optical disk drive

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

- DVD Super MULTI drive

Hard disk drive

Unless otherwise stated, *hard disk drive* described in this document refers to both of the following.

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

Removable media

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

- USB flash drive
- Flash FDD

Abbreviations of Operating Systems (Linux)

Linux Operating Systems are referred to as follows.

See *Chapter 1* (*1.1 Supported Linux OS)* in *Installation Guide (Linux)* for detailed information.

Notations in this document	Official names of Linux
RHEL7.2	Red Hat Enterprise Linux 7.2(x86_64)

POST

POST described in this document refers to the following.

- Power On Self-Test

BMC

BMC described in this document refers to the following.

- Baseboard Management Controller

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- UEFI Network Stack II and iSCSI
- Crypto package using WPA Supplicant

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- EDK/EDKII

EDK/EDKII

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This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).
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Latest editions

This document was created based on the information available at the time of its creation. The screen images, messages and procedures are subject to change without notice. Substitute as appropriate when content has been modified.

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/

Safety notes

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

NEC Express5800 Series
Express5800/R320e-E4, R320e-M4

1 Maintenance

This chapter explains maintenance of server, and what actions are to be taken in case of trouble when operating this server.

1. **Relocation and Storage**
   Describes how to t move and store this server.

2. **Daily Maintenance**
   Describes what you must confirm for daily use, how to manage files, and how to clean the server.

3. **User Support**
   Describes various services on this product.

4. **Maintenance of the ft Server**
   Describes how to start, stop, diagnose each components of the server, and how to update firmware.

5. **Checking the Duplicating Operation of Modules**
   Describes how to check if the system runs properly after system installation or reinstallation.

6. **Error Messages**
   Describes error messages and actions to be taken at occurrence of an error.

7. **Collecting Failure Information**
   Describes how to collect information about the location where a failure occurred and its cause when the server malfunctions. Refer to this section in case of a failure.

8. **Troubleshooting**
   Describes how to identify the causes of problems and what actions are to be taken to address them. Refer to this section when you suspect a failure.

9. **Resetting the Server and Clearing BIOS Settings**
   Describes how to reset the server and clear the BIOS settings. Refer to this section when the server is not working or when you want to restore BIOS settings to the factory settings.

10. **System Diagnostics**
    Describes the system diagnostics of this server.

11. **Offline Tools**
    Describes tools for preventive maintenance of this product.

1. Relocation and Storage

Follow the steps below when you move or store this 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* .

- **Do not disassemble, repair, or alter the server.**
- **Do not remove the lithium battery, NiMH, or Li-ion battery.**
- **Disconnect the power plug before installing or removing the server.**

CAUTION

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

- **Make sure to complete installation.**
- **Do not get your fingers caught.**
- **Be careful of handling internal components that may be at high temperatures.**

Note

- If the server needs to be relocated/stored due to a change in the floor layout to a great extent, contact your service representative.
- If the server has hard disk drives, move the server while being careful not to damage the drive.
- When storing the server, monitor the environmental conditions of the storage area (temperature: −10°C to 55°C, humidity: 20% to 80%). (No dew condensation is permitted)

Tips

Make backup copies of important data stored in the hard disk drive.

1. Remove the media from the optical disk drive.
2. Power off the server (POWER LED goes off).
3. Unplug the power cord of the server from the power outlet.
4. Disconnect all the cables from the server.
5. Remove both CPU/IO modules and 4U frame.
6. Carry the removed CPU/IO modules and 4U frame separately.

7. Pack the server securely to protect from damage, shock, and vibration.

Important **If this server and internal optional devices are suddenly moved from a cold place to a warm place, condensation will occur and cause malfunctions and failures when these are used in such state. Wait for a sufficient period of time before using the server and other components in the operating environment.**

Note Check and adjust the system clock before operating after relocating or storing the server.

2. Daily Maintenance

To use this server under top conditions at all times, periodically check and perform maintenance as follows. If abnormalities are found, ask your sales representative, avoiding impossible operation.

2.1 Checking and Applying Updates

Express5800 Series posts update information for BIOS, FW (firmware), driver, and others of the server and peripheral devices on our website. We recommend that the latest update always be applied for stable system.

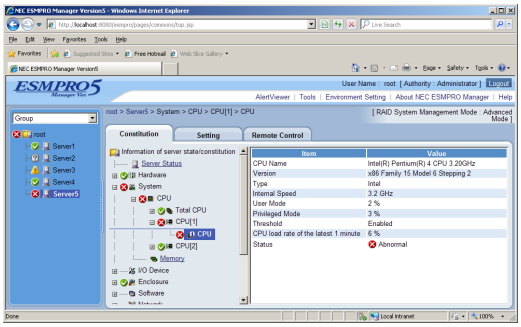
NEC corporate site: http://www.nec.com/

[Support & Downloads]

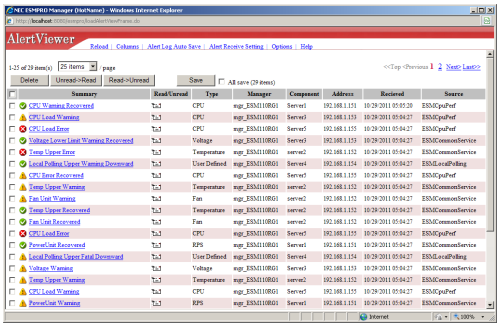
2.2 Checking Alerts

Use NEC ESMPRO Manager to constantly verify that no abnormalities are detected on the monitored server and that no alerts have been issued.

Example image of NEC ESMPRO Manager



NEC ESMPRO Manager



AlertViewer

2.3 Checking STATUS LED

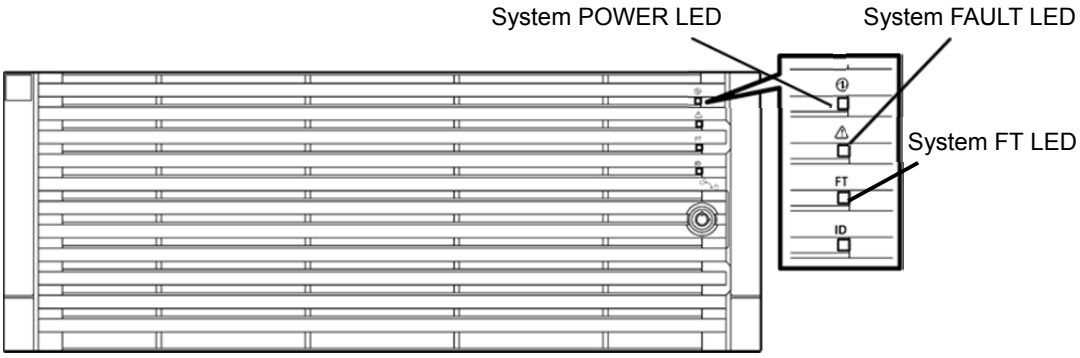
Check LEDs located at front of the server for any abnormalities after the server is powered on or before shutting down the server and the server is powered off. Check LEDs for any abnormalities also while the server is running.

Check LED indication when:

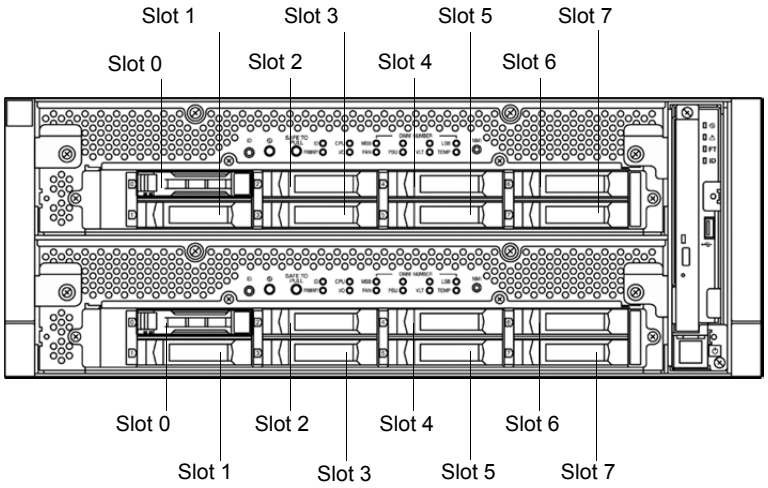
- Power on the server and while the server is running.
- Before shutting down the server.

LEDs to be checked:

- LEDs located at front of the server



- LEDs on hard disk drives installed in 2.5-inch hard disk drive bay



If the indicator shows the server abnormality, contact your sales representative.

For the functions and descriptions of the LED, see *Chapter 1* (*6.1 Error Messages by LED Indication*).

2.4 Making Backup Copies

NEC recommends you make backup copies of your valuable data stored in hard disks of the server on a regular basis. For backup storage devices suitable for the server and backup tools, consult with your sales agent.

When you have changed the hardware configuration or BIOS configuration, make a backup copy of the system information according to *Chapter 1 (2.8 Backing Up System Information)* in *Installation Guide*.

2.5 Cleaning

Regularly clean the server to keep it in good condition.

WARNING

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

- **Do not disassemble, repair, or alter the server.**
- **Disconnect the power plug before cleaning the server.**

2.5.1 Cleaning the server

For daily cleaning, wipe the external surfaces of the server with a dry soft cloth. Follow the procedure below if stains remain on the surfaces:

Important

- **To avoid altering the material and color of the server, do not use volatile solvents such as thinner or benzene to clean the server.**
- **The power receptacle, the cables, the connectors on the rear panel of server, and the inside of the server must be kept dry. Do not moisten them with water.**

1. Power off the server.
   1. Make sure that the server is powered off.
   2. Unplug the power cord of the server from a power outlet.
2. Clean the power plug.
   Wipe off dust from the power cord plug with a dry cloth.
3. Clean the server.
   1. Soak a soft cloth in neutral detergent that is diluted with cold or warm water, and squeeze it firmly.
   2. Rub off stains on the server with the cloth prepared in Step 1.
   3. Soak a soft cloth in water, squeeze it firmly and wipe the server with it once again.
   4. Wipe the server with a dry cloth.
4. Clean the rear panel of the server.
   Wipe off dust from the fan exhaust opening on the rear of the server with a dry cloth.

2.5.2 Cleaning Tape Drive

A dirty tape drive head causes unsuccessful file backup and damages the tape cartridge. Periodically clean the tape drive with the designated cleaning tape.

For the cleaning interval and method, the estimated usable period and lifetime of the tape cartridge, refer to the instructions attached to the tape drive.

2.5.3 Cleaning the Keyboard and Mouse

Check that the entire system including the server and peripheral devices is powered off (POWER LED is unlit), and then wipe the surface of the keyboard with a dry cloth.

If an optical sensor of the mouse is dusty, it cannot work normally. Wipe the optical sensor with a dry cloth to remove any dirt or dust.

3. User Support

Before getting after-sales service, check the contents of the warranty and service.

3.1 Maintenance Services

Service representatives from NEC subsidiary companies or companies authorized by NEC provide maintenance services. For the services, contact your sales representative.

3.2 Before Asking for Repair

If you think that a failure occurred, follow the steps below:

1. Check if the power cord and cables to other products are properly connected.
2. Check LED indications and alarm messages on display unit. See *Chapter 1 (6. Error Messages)*.
3. See *Chapter 1 (8. Troubleshooting)*. If you find a symptom similar to your problem, take the action as instructed.
4. Confirm that the required software has been properly installed.
5. Scan for viruses using a commercial Antivirus Software.

If the problem persists after taking the measures above, contact your sales representative. Take notes on LED indications and the display on the screen at the failure, which will be useful information for the repair.

4. Maintenance of the Server

This server can be maintained in two ways.

- To use NEC ESMPRO Manager for remote maintenance
- To use ft Server Utility on this server for local maintenance.

Tips

To start ft Server Utility, select menus as follows:

/opt/nec/esmpro_sa/bin/ESMftcutil

The table below lists the availability of maintenance features provided by components.

Component / Maintenance features	General	CPU module	PCI module	SCSI enclosure	Firmware under BMC
Start	–	Remote / Local	Remote / Local	–	–
Stop	–	Remote / Local	Remote / Local	–	–
View MTBF information	–	Remote / Local	Remote / Local	–	–
MTBF clear	–	Remote / Local	Remote / Local	–	–
Diagnosis	–	–	–	–	–
Dump collection	–	–	–	–	–
Board switch	–	Remote / Local	–	–	–
BIOS Update	–	Remote / Local	–	–	–
F/W update	–	–	–	–	Local
Quick dump	–	–	–	–	–
Auto firmware update	–	–	–	–	–
Auto module start	–	–	–	–	–

Remote: Executable from remote management PC by using NEC ESMPRO Manager
Local: Executable on local server by using ft Server Utility
–: Not supported

Tips

The server does not support maintenance feature for the components listed below.

- Internal devices
  SCSI adapter under PCI module
  Ethernet board under PCI module
  Network port of Ethernet board under PCI module
  SCSI enclosure and SCSI slots under the enclosure
- Optional devices

Important

- **Consult with your maintenance personnel to use the maintenance features.**
- **Perform the following steps before replacing component.**
  1. Clear MTBF information of relevant component.
  2. Stop the relevant CPU module and PCI module.

4.1 Start and Stop of Components

This section describes how to start or stop components.

If a component fails or needs to be replaced, the server allows you to forcibly stop the component. The stopped component can also be restarted.

Important **Use this feature to stop the relevant CPU module and PCI module before replacing component.**

4.1.1 Available status

The table below shows the potential cases in which the dump is acquired.

Component	State of component	
	Can be started	Can be stopped
CPU module	• Power supply stop • Broken • Forced stop • Firmware Update Complete • Diagnostics Passed	• Duplex
PCI module	• Power supply stop • Broken • Forced stop • Firmware Update Complete • Diagnostics Passed	• Duplex

Tips You can view the state of component by NEC ESMPRO Manager or ft Server Utility.

4.1.2 Procedure in NEC ESMPRO Manager

Perform the procedure below to start component.

1. Select **General** screen of the target component under the **ft System** tree in **Information of server state/constitution**.
2. Check that the current status of the target component is available. The status is shown on Status Information display of **General** screen.
3. Select **Maintenance** screen and click the **Execute** button of **Bring Up** operation.

Tips

- The target component starts after a while.
- The start result can be verified by "**State**" in the **General** screen of target component. The result of the start operation is reported by the server as an alert.

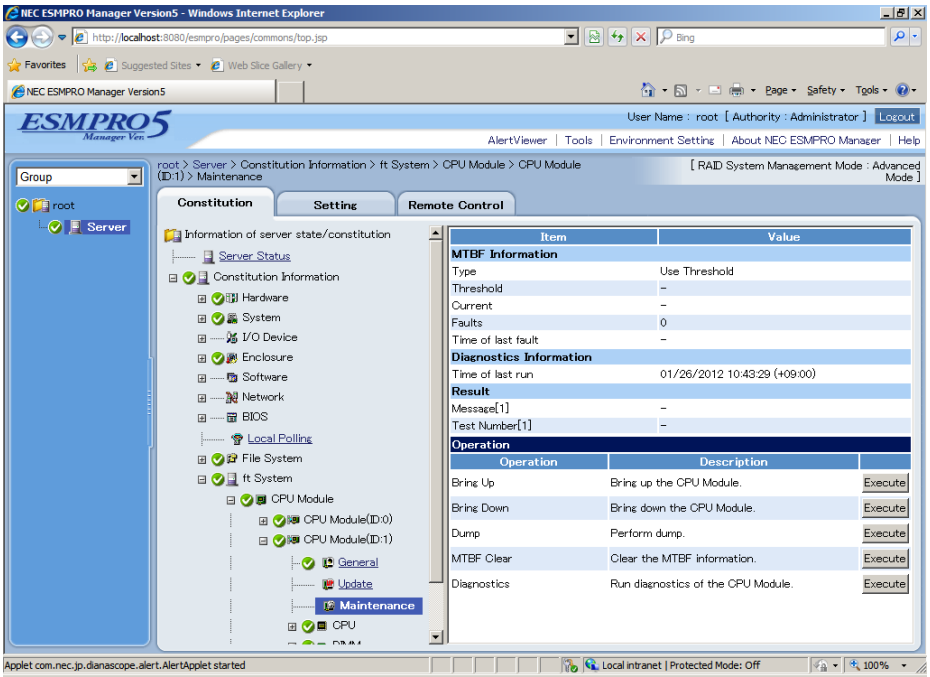
Perform the procedure below to stop the component.

1. Select **General** screen of the target component under the **ft System** tree in **Information of server state/constitution**.
2. Check that the current status of the target component is available. The status is shown on Status Information display of **General** screen.
3. Select **Maintenance** screen and click the **Execute** button of **Bring Down** operation.

Tips

- The target component stops after a while.
- The stop result can be verified by "**State**" in the **General** screen of target component. The result of the stop operation is reported by the server as an alert.

Sample screen of NEC ESMPRO Manager



Maintenance screen of CPU Module

4.1.3 Procedure in ft Server Utility

Use ft Server Utility menu and select the relevant component.

Perform the procedure below to start component.

1. Select the target component.
2. Check **Current state** of the target component by selecting **Refresh**.
3. Select **Start** button of the target component.

Tips

- The target component starts after a while.
- The start result can be verified by "**State**" of target component.
  Note that state display is not refreshed automatically, you need to select **Refresh** to check **Current state**.

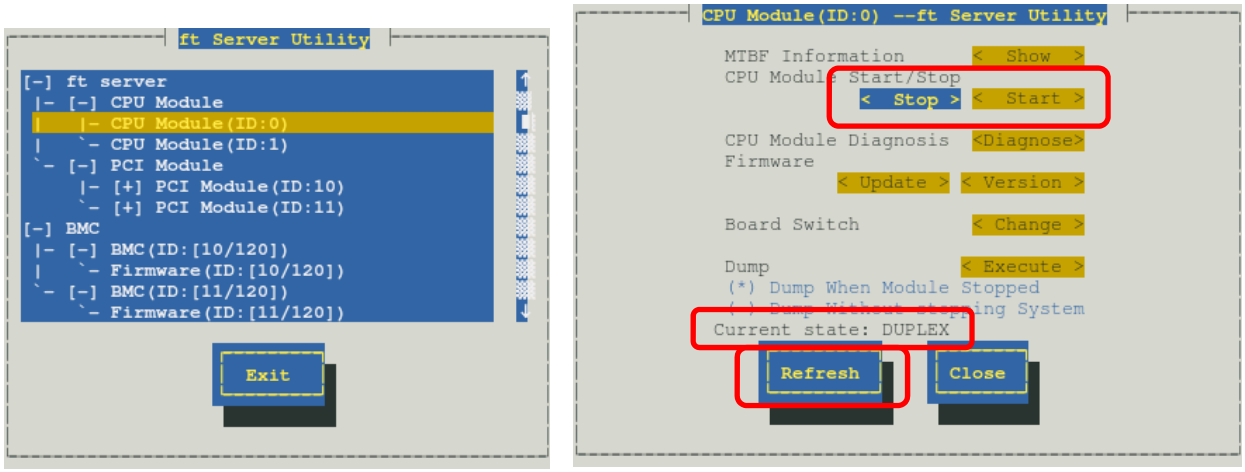
Perform the procedure below to stop the component.

1. Select the target component.
2. Check **Current state** of the target component by selecting **Refresh**.
3. Select **Stop** button of the target component.

Tips

- The target component stops after a while.
- The stop result can be verified by "**State**" of target component.
  Note that state display is not refreshed automatically, you need to select **Refresh** to check **Current state**.

Sample screen of ft Server Utility



CPU module

4.2 Check and Clear of MTBF Information

The server manages the MTBF (mean time between failure) of each component. If a fault occurs in a component, the server calculates the MTBF of the component again. If the calculated value is lower than the pre-defined threshold, the server disables the component to be used.

A disabled component with the MTBF lower than the threshold can be forcibly enabled by clearing the MTBF.

Important **Before clearing MTBF and forcedly enable the component, contact your maintenance personnel for the forced use of such a component.**

4.2.1 Available status

The table below shows the potential cases in which the MTBF information can be cleared.

Component	Status of component
CPU module	• Broken • MTBF is lower than the threshold.
PCI module	• Broken • MTBF is lower than the threshold.

Tips The status of component can be verified on screen of NEC ESMPRO Manager or ft Server Utility.

4.2.2 Procedure in NEC ESMPRO Manager

Perform the procedure below to clear (initialize) MTBF information of component.

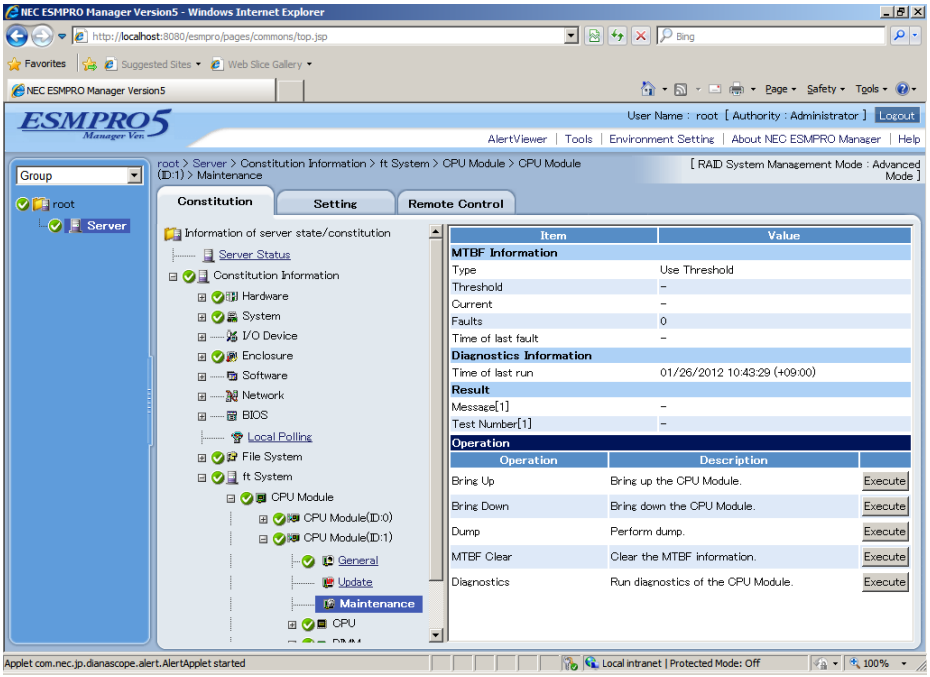
1. Select **General** screen of the target component under the **ft System** tree in **Information of server state/constitution**.
2. Check that the current status of the target component is available. The status is shown on Status Information display of **General** screen.
3. Select **Maintenance** screen and click the **Execute** button of **MTBF Clear** operation.

Tips

The MTBF clearing result can be verified by "**Status Information**" in **General** on the target component screen. The result of the MTBF clearing operation is reported by the server as an alert.

4. Start the target component.

Sample screen of NEC ESMPRO Manager



Maintenance screen of CPU Module

4.2.3 Procedure in ft Server Utility

Use ft Server Utility menu and select the relevant component.

Perform the procedure below to clear MTBF information of component.

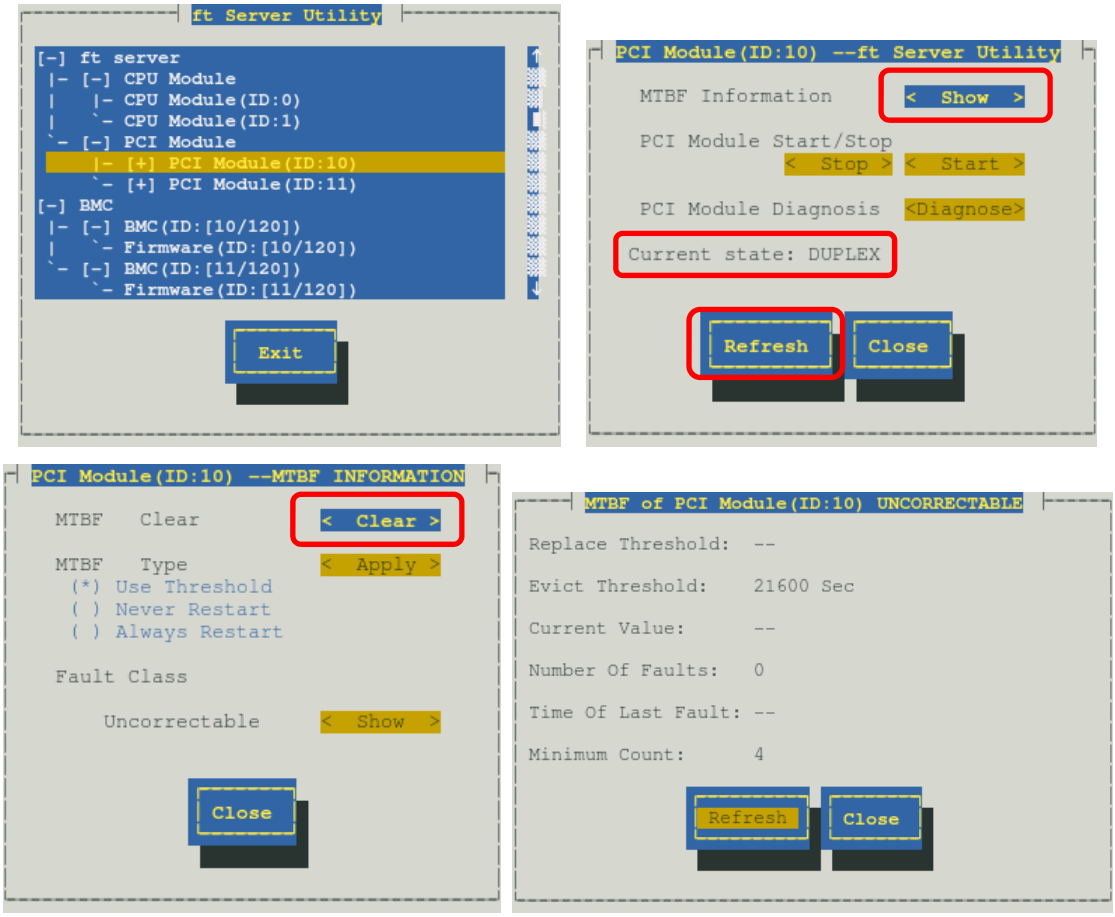
1. Select the target component.
2. Check **Current state** of the target component by selecting **Refresh**.
3. Select **Show** on **MTBF INFORMATION** of the target component.
4. Select **Clear** button in **MTBF Clear** of the target component.

Tips

If the **Number of Faults** in MTBF information on the screen of target component becomes zero, MTBF information is cleared.

5. Start the component.

Sample screen of ft Server Utility



PCI Module

4.3 Diagnostics

The current version of utility does not support this feature.

4.4 Dump Collection

The current version of utility does not support this feature.

4.5 BIOS Update

The BIOS of CPU module can be updated with CPU module in offline state (system is continuously running, but the target CPU module is in halt state).

4.5.1 Available status

The table below shows the potential cases in which the BIOS update can be performed.

Component	Status of component
CPU module	• Offline

Tips The status of component can be verified on screen of NEC ESMPRO Manager or ft Server Utility.

4.5.2 Procedure in NEC ESMPRO Manager

Take the steps below to update BIOS of CPU module.

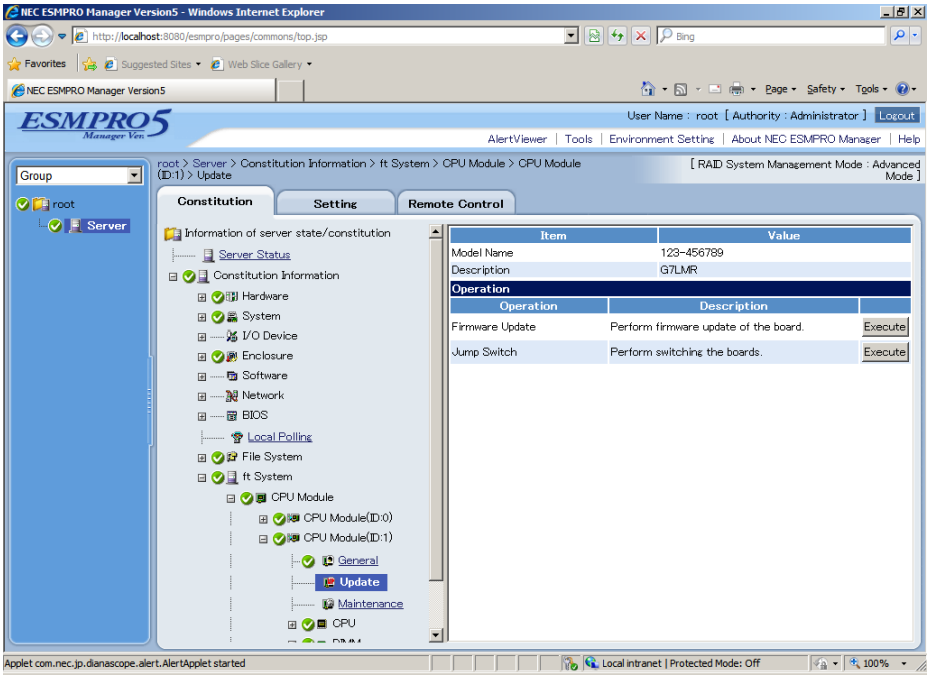
Important **To update BIOS of CPU module, a BIOS image file for updating needs to be stored on the server.**

1. Save the BIOS image file for update in the following folder in the server.

   /etc/opt/ft/BIOS.ROM

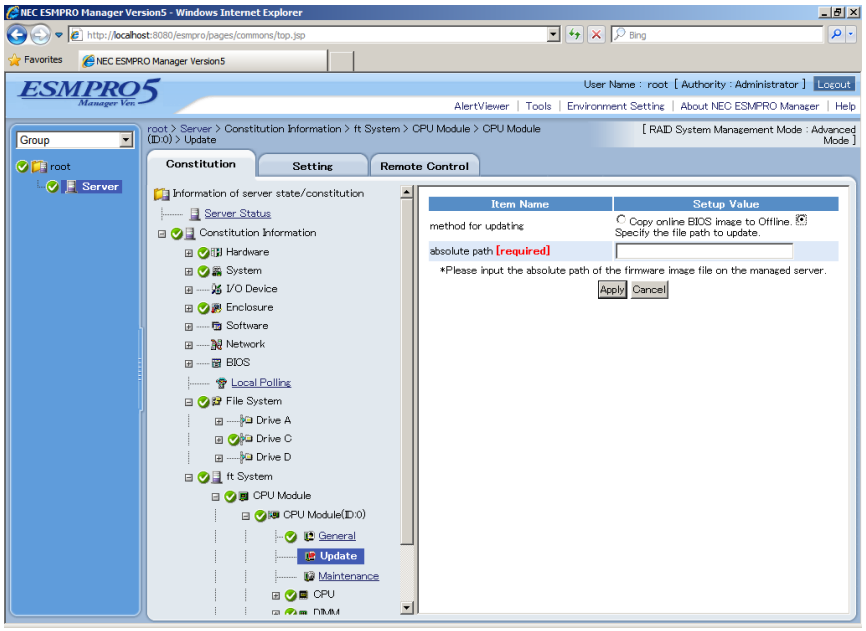
2. Select **General** screen of the target CPU under the **ft System** tree in **Information of server state/constitution**.
3. Check that the current status of the target component is available. The status is shown on Status Information display of **General** screen.
4. Select **Update** screen and click the **Execute** button of **Firmware Update**.

Sample screen of NEC ESMPRO Manager



Update screen of CPU Module

5. Select **Specify the file path to update**, enter the path for BIOS image file you have recorded in Step 1 into **absolute path** box, and click **Apply**.



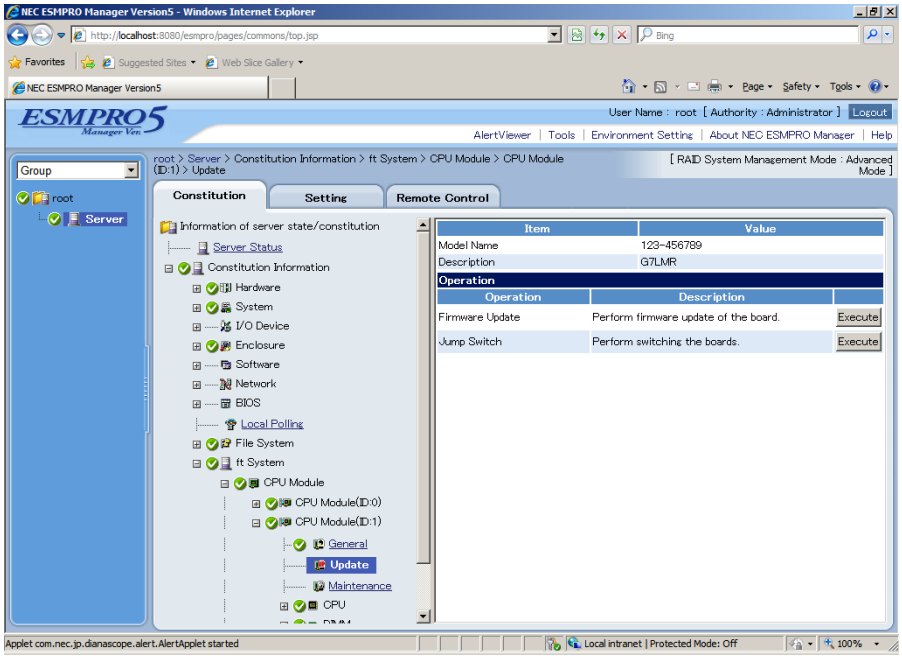
6. When you click **OK** on confirmation dialog box, firmware update starts.

Tips

The update result can be verified by **Status Information** of **General** of target component ("Firmware update completed" is displayed). In addition, the result of the update is reported by the server as an alert.

When the firmware update is completed, check that the firmware revision is modified as you expect.

7. When BIOS update completes, open **Update** screen, and click **Execute** button on **Jump Switch**.



8. When you click **OK** on confirmation dialog box, the CPU module of which BIOS has been updated starts, and the other CPU module stops.
9. Start the CPU module that has stopped. The firmware is updated automatically.

4.5.3 Procedure in ft Server Utility

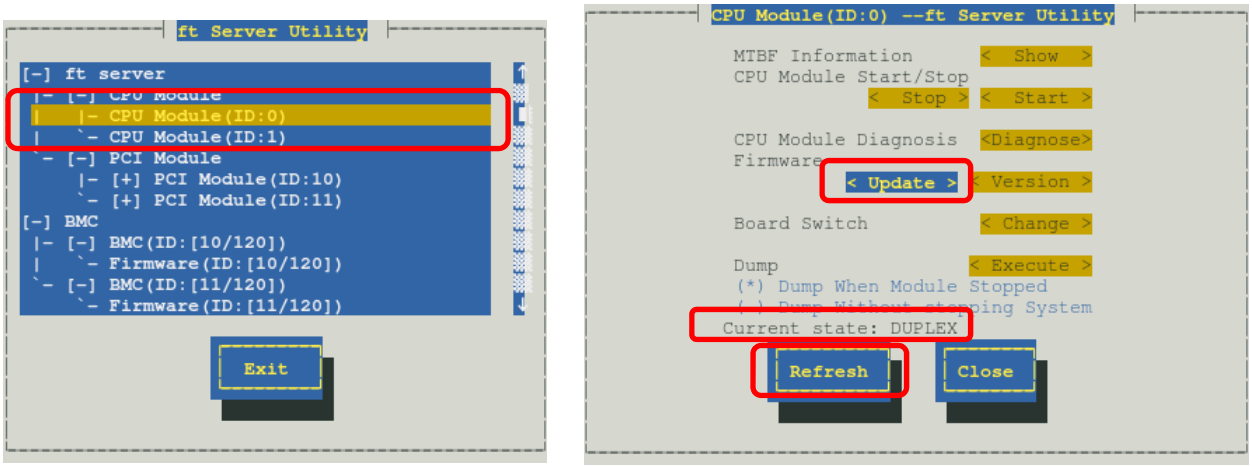
Use ft Server Utility menu and select the relevant component.

Take the steps below to update BIOS of CPU module.

Important **To update BIOS of CPU module, a BIOS image file for updating needs to be stored on the server.**

1. Save the BIOS image file for update in the /etc/opt/ft/BIOS.ROM directory in the server.
2. Select either one CPU module.
3. Check **Current state** of the target CPU module by selecting **Refresh**.
   If the target CPU module is operating, stop it.
4. Select **Update** on **Firmware** of CPU module screen.

Sample screen of ft Server Utility



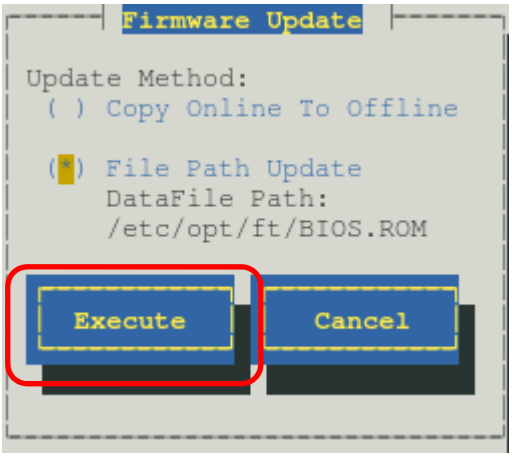
CPU module

5. Select **File Path Update**, and select **Execute**.

   The firmware update starts.

Tips

- You must use the file path (/etc/opt/ft/BIOS.ROM) recorded in Step 1.
- The update result can be verified by "**State**" of target component.
  Note that state display is not refreshed automatically, you need to select **Refresh** to check **Current state**.



6. Verify the firmware update status.

   It takes about 5 to 10 minutes until the firmware update completes from start of update.

   When firmware update completes, verify the firmware revision shows the one you expected.

Tips

- Pressing the **Refresh** button refreshes the display of ft Server Utility.
  Display changes according to progress of update process.
  During update → "FIRMWARE_UPDATE"
  When firmware update completes → "FIRMWARE_UPDATE_COMPLETE"
- No state changes when the firmware is not correctly updated. Confirm whether the update file on the server is correctly stored in "/etc/opt/ft/BIOS.ROM".

7. When BIOS update completes, select **Change**.
   The CPU module of which BIOS has been updated starts, and the other CPU module stops.

8. Start the other module in halt state.
   Starting the module causes the firmware to be updated automatically.

4.6 BMC Firmware Update

This server has BMC on each of PCI modules 0 and 1. With the procedure described below, both BMCs are automatically updated.

Important **Consult with your maintenance personnel before updating BMC firmware.**

4.6.1 Available status

BMC firmware update can be performed only on the secondary PCI module.
If the target module is primary, change it to secondary.

The table below shows the potential cases in which the BMC firmware can be updated.

Component	Status of component
Firmware under BMC	• Duplex

Tips The status of component can be verified on screen of ft Server Utility.

4.6.2 Procedure in ft Server Utility

Take the steps below to update BMC firmware.

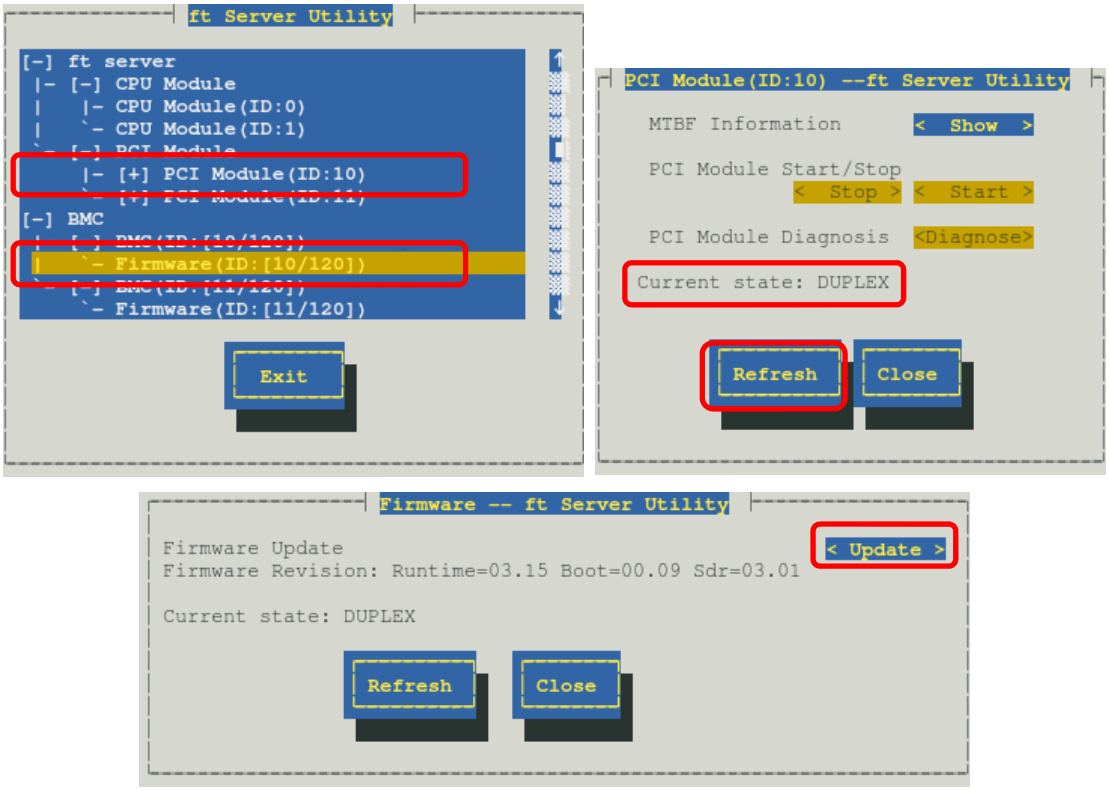
1. Save the image data of the BMC update firmware in a desired directory of the server. Write down the path to the directory in which the image data is saved.

Important **To update BMC firmware, a firmware image file for updating needs to be stored on the server.**

2. Select the secondary PCI module.
3. Check **Current state** of the target component by selecting **Refresh**.
4. Select a firmware #n under the target BMC #n in the [BMC] tree.
   BMC #0 is BMC of the PCI module (ID:10), BMC #1 is BMC of the PCI module (ID:11).
5. Select **Update** of firmware update.
   When update starts, the following message is output to syslog.
   kernel: EVLOG: INFORMATION - BMC nn/120, firmware burn starting.

Tips The color of the screen may be different due to newt package used for screen display. However, the initial position is **Update** on firmware screen.

Sample screen of ft Server Utility

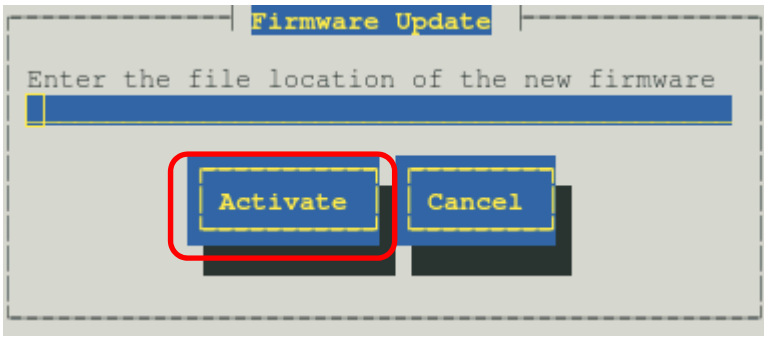


BMC

6. Enter the file path you have written down in Step 1 in **Enter the file location of the new firmware** text box, and select **Activate**.

   BMC firmware update starts.

   When update is completed, the following message is output on syslog.
   kernel: EVLOG: INFORMATION - BMC nn/120, firmware burn succeeded.



Tips

When the following error message is displayed, check the file location of the new firmware.

- The length of the file name must be between 1 and 255 characters.
- Update file does not exist.

7. If the BMC firmware update of one PCI module is completed, select another PCI module, **stop** and **start**.

8. When it is necessary to replace it to return primary and the secondary of PCI module to an original state, **stop** PCI module of the primary side and **start**.

5. Checking the Duplicating Operation of Modules

This section describes how to check if the system runs properly after system installation or reinstallation.

Tips CPU/IO module has a processor function part and IO function part. Each part is monitored and managed by the module. In this section, the processor function part is referred to as CPU module and IO function part PCI module.

5.1 Evaluate Startup and Stop of PCI Modules

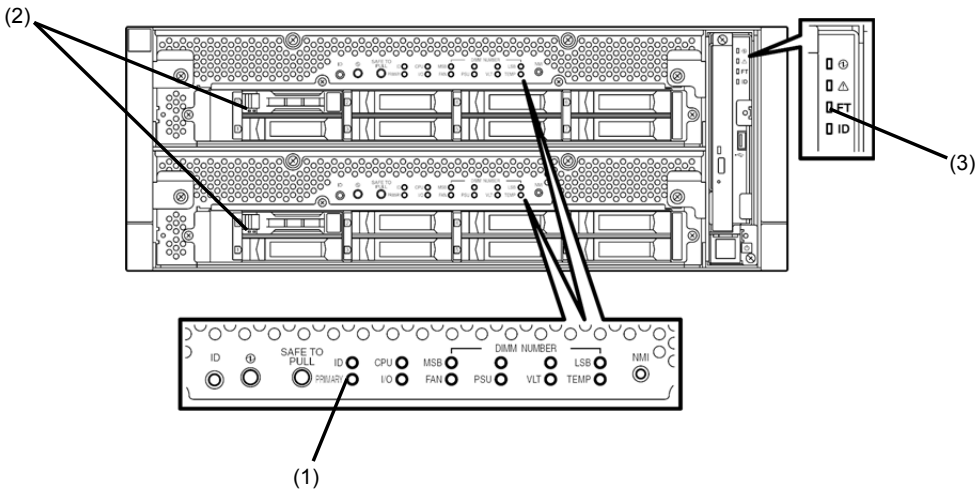
This section describes how to confirm the continuous system operation by failover after stopping the primary CPU/IO module.

1. Check which is the primary CPU/IO module.

Tips The PCI module with the PRIMARY LED illuminated is the primary module.

2. Check whether the CPU/IO modules are duplicated.

Tips To check if the CPU/IO modules are duplicated, see the System FT LED.

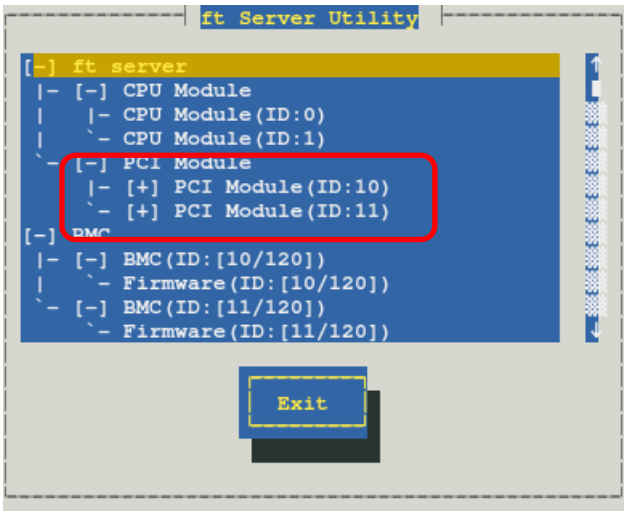


Indications of the status LEDs when CPU/IO modules are duplicated

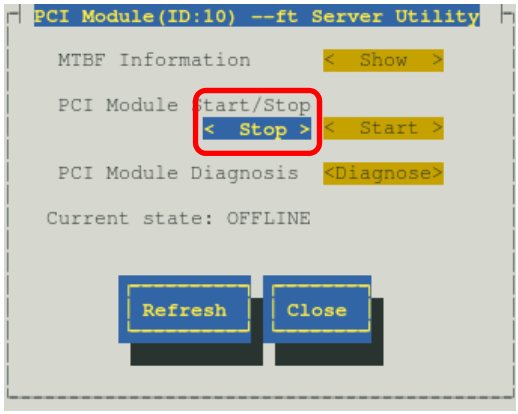
LED		Primary	Secondary
1	PRIMARY LED	On (Green)	–
2	DISK ACCESS LED	Blinking (Green)	Blinking (Green)
LED		System	
3	System FT LED	On (Green)	

* The numbers in table above correspond to those shown in figure above.
DISK ACCESS LED (2) lights only when hard disk drive is accessed.

3. Start ft Server Utility.
   # /opt/nec/esmpro_sa/bin/ESMftcutil



4. Select **PCI Module** and then the primary PCI module (*) from the **ft server** tree.
   – Select **PCI module (ID:10)** when CPU/IO module 0 is primary module.
   – Select **PCI module (ID:11)** when CPU/IO module 1 is a primary module.
5. Select **Stop** of **Start/Stop**



Tips When you stop the operation of the primary PCI module, a failover occurs and the secondary PCI module becomes the primary module.

When the primary PCI module is stopped, the screen temporarily blacks out and then displayed again, and the status changes as follows. This indicates that PCI module is failed over.

Indications of status LEDs

LED		Secondary*	Primary*
1	PRIMARY LED	–	On (Green)
2	DISK ACCESS LED	–	Blinking amber or green (Lights green when accessing the disk drive)
LED		System	
3	System FT LED	–	

* The primary and secondary modules after failover

6. Restart the stopped PCI module.

Select **Start** of **Start/Stop** to the PCI module which has been stopped, and the PCI module will be started.

Tips When the PCI module is started, PCI module diagnosis, mirror volume duplication and PCI module duplication are performed.

The PCI modules' status LEDs changes as shown below:

Indications of the status LEDs

Immediately after the PCI module startup until the completion of diagnosis:

LED		Secondary	Primary
1	PRIMARY LED	–	On (Green)
2	DISK ACCESS LED	–	Blinking amber or green (Lights green when accessing the disk drive)
LED		System	
3	System FT LED	–	

When duplication of disks is started after the completion of PCI module diagnosis:

* The status of LEDs varies depending on the method of disk duplication.

LED		Secondary	Primary
1	PRIMARY LED	–	On (Green)
2	DISK ACCESS LED	Blinking amber or green (Lights green when accessing the disk drive)	Blinking amber or green (Lights green when accessing the disk drive)
LED		System	
3	System FT LED	–	

After the completion of mirror volume duplication and when the PCI modules are duplicated:

LED		Secondary	Primary
1	PRIMARY LED	–	On (Green)
2	DISK ACCESS LED	Blinking (Green) (Lights green when accessing the disk drive)	Blinking (Green) (Lights green when accessing the disk drive)

LED		System
3	System FT LED	On (Green)

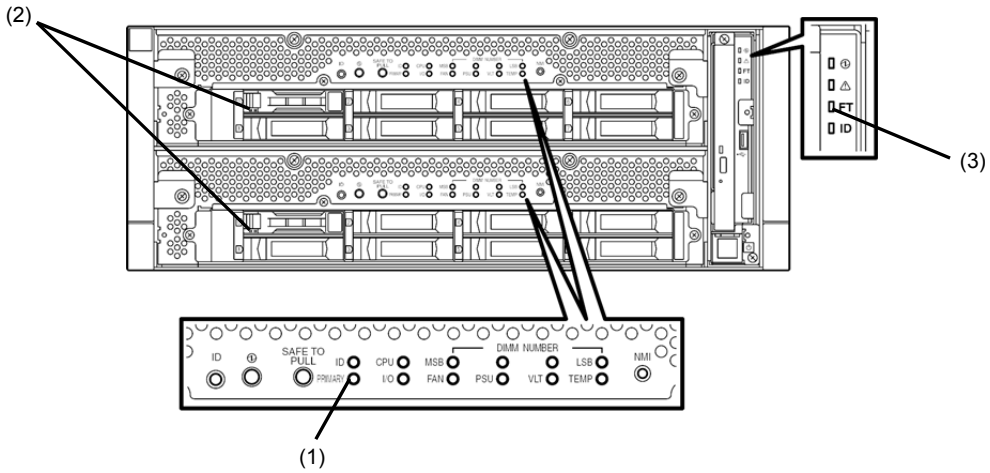
Important **After duplication is completed, the FT LED lights in green. Do not perform the evaluation of start and stop unless the above process is completed.**

5.2 Confirm Start and Stop of CPU Modules

This section describes how to confirm the continuous system operation after stopping one of the CPU modules.

1. Confirm that the CPU modules are duplicated.

Tips To check if the CPU modules are duplicated, see the System FT LED.



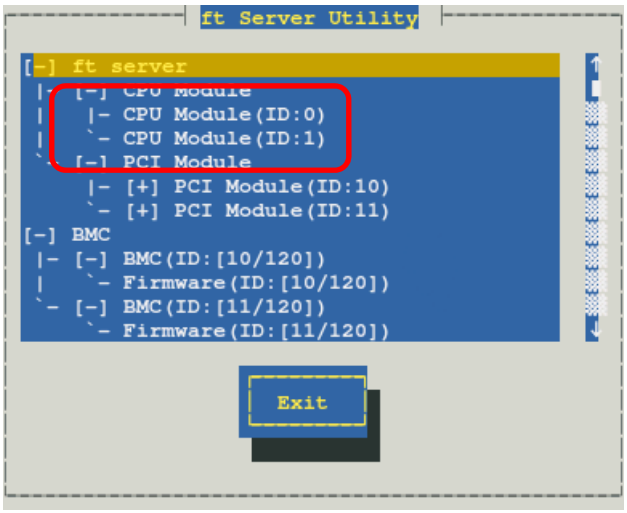
Indications of status LEDs when CPU modules are duplicated

	LED	CPU/IO module 0 (Operating)	CPU/IO module 1 (Operating)
1	PRIMARY LED	On (Green)	–
2	DISK ACCESS LED	Blinking (Green) (Lights green when accessing to HDD)	Blinking (Green) (Lights green when accessing to HDD)

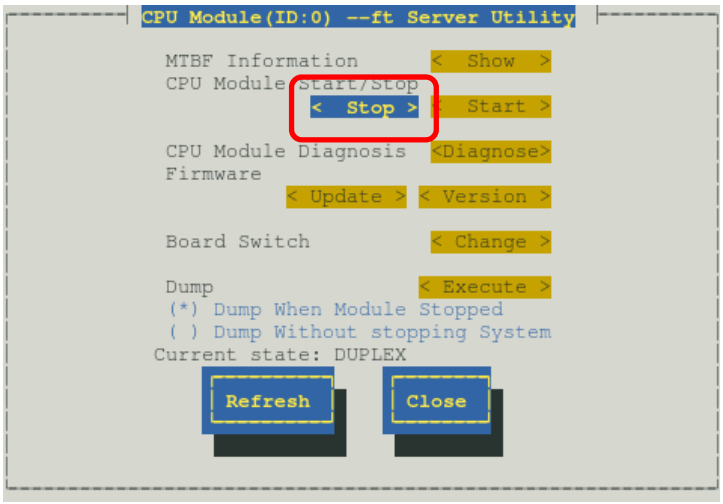
	LED	System
3	System FT LED	On (Green)

* The numbers in table above correspond to those shown in figure above.
DISK ACCESS LED (2) lights only when hard disk drive is accessed.

2. Start ft Server Utility.
   # /opt/nec/esmpro_sa/bin/ESMftcutil



3. Select **CPU Module** then the CPU module to stop (*) from the **ft server** tree.
   - Select **CPU module (ID:0)** to stop CPU/IO module 0.
   - Select **CPU module (ID:1)** to stop CPU/IO module 1.
4. Select **Stop** of **Start/Stop**.



When you stop the operation of a CPU module, the indications of the status LEDs change as follows. Below denotes that the only one CPU module is operating.

Indications of status LEDs

LED		CPU/IO module 0 (Stopped)*	CPU/IO module 1 (Operating)
1	PRIMARY LED	On (Green)	–
2	DISK ACCESS LED	Blinking (Green) (Lights green when accessing the disk drive)	Blinking (Green) (Lights green when accessing the disk drive)
LED		**System**	
3	System FT LED	–	

* As an example, the indications of when CPU/IO module 0 is stopped are shown.

5. Start the CPU module stopped.
   Select the stopped CPU module and select **Start** of **Start/Stop**.

Tips

When the CPU module is started, **Hardware diagnosis** and then **synchronization of memory (memory copy)** are performed, and the duplication process is completed.
Note that the system is paused temporarily for copying memory during memory synchronization.

Indications of status LEDs after completion of duplication

LED		CPU/IO module 0 (Operating)	CPU/IO module 1 (Operating)
1	PRIMARY LED	On (Green)	–
2	DISK ACCESS LED	Blinking (Green) (Lights green when accessing the disk drive)	Blinking (Green) (Lights green when accessing the disk drive)

LED		System
3	System FT LED	On (Green)

Important

After duplication is completed, the System FT LED lights in green. Do not perform the evaluation of start and stop unless the above process is completed.

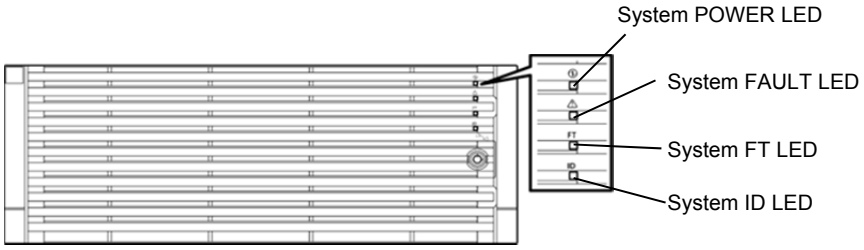
6. Error Messages

If the server enters the abnormal state, the error is posted by various means. This section explains the types of error messages.

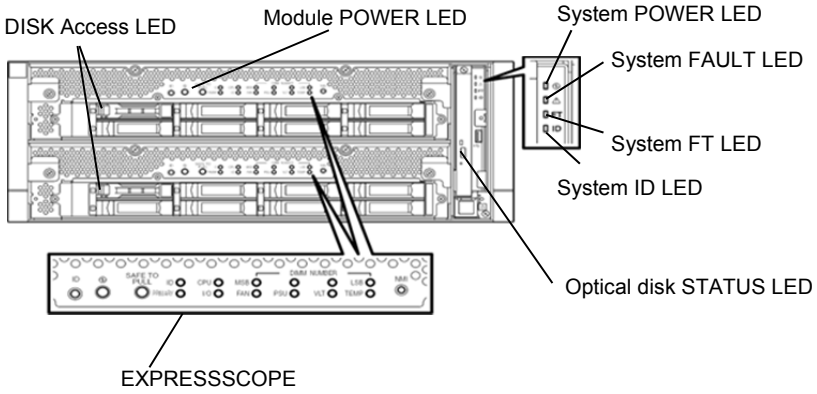
- LED indication is unusual.
  → See "*6.1 Error Messages by LED Indication*".
- An error message appeared.
  → See "*6.2 POST Error Message*".

6.1 Error Messages by LED Indication

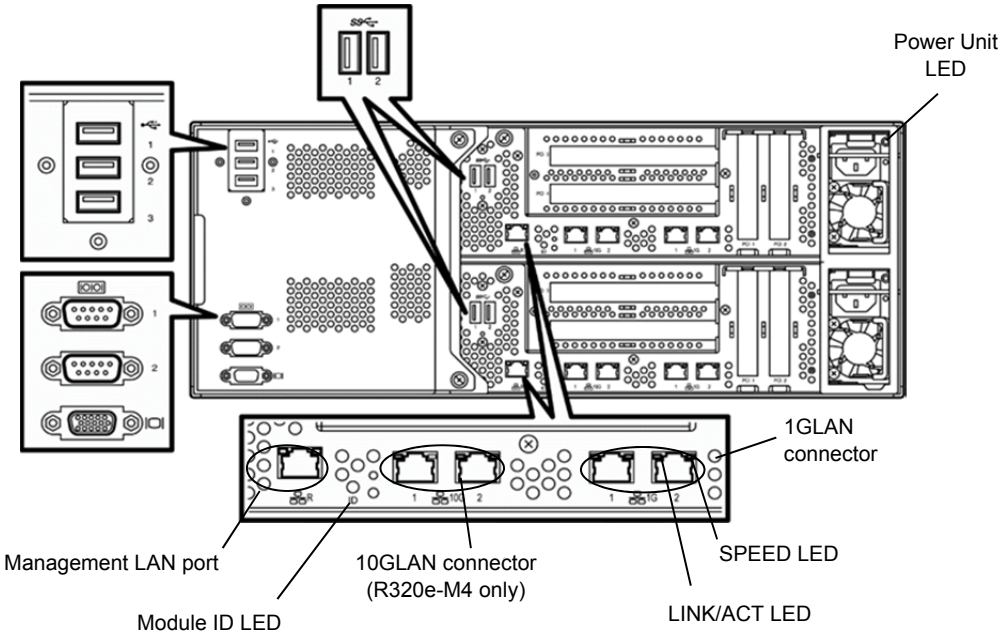
LEDs on the front and rear panels of the server and near the handles of hard disk drives notify the various server statuses by the colors and the patterns of going on, going off, and flashing. If trouble seems to have occurred, check the LED indication. This Maintenance Guide describes actions to be taken for watch error message. However, if replacement of modules is necessary, contact your sales agent.



< Front (With Bezel) >



< Front (Without Bezel) >



<Rear>

(1) System POWER LED

LED indication	Description	Action
On (green)	Either or both of CPU/IO modules are powered on.	–
Off	Both of CPU/IO modules are powered off.	–

(2) System FAULT LED

LED indication	Description	Action
Off	Both of CPU/IO modules are offline or normal.	System FAULT LED does NOT notify of Hard Disk Drive status. Check it according to (5)Disk Access LED indication.
On (amber)	One of the CPU/IO modules failed.	Take a note of LED indications on EXPRESSSCOPE, and then contact your sales representative.
Blinking (amber)	One of the CPU/IO modules failed. Failed CPU/IO module cannot be identified.	Contact your sales representative.

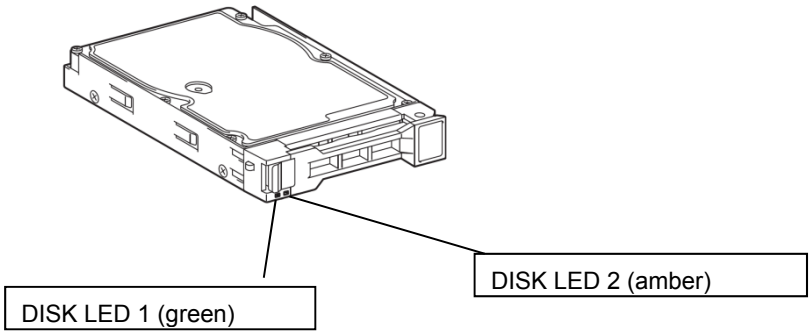
(3) System FT LED

LED indication	Description	Action
On (green)	System is operating under duplex condition.	–
Off	System is not duplexed.	–

(4) System ID LED

LED indication	Description	Action
On (blue)	UID switch is pressed.	–
Blinking (blue)	The device identification request is issued from remote site.	–
Off	–	–

(5) Disk ACCESS LED



Conditions of DISK LED		Description	Action
DISK LED 1	DISK LED 2		
Off	Off	The disk is in the idle state.	–
Blinking (green)	Off	The disk is being accessed.	–
Off	On (amber)	The disk is failing.	Contact your sales representative.
Off	Blinking (amber)	The mirror of the disk is disconnected.	Perform mirroring.
Blinking in green and amber in turn		The mirror of the disk is being rebuilt or disconnected.	Check whetehr the mirror of the diks is disconnected.

(6) ACCESS LED on optical disk drive

LED indication	Description	Action
Off	Optical disk is not accessed.	–
On	Optical disk is being accessed.	–

(7) LEDs on Management LAN Connector and LAN connectors

LINK/ACT LED

LED indication	Description	Action
On (green)	Power is supplied to the server and hub, and they are connected correctly ("LINK").	–
Blinking (green)	The network port is sending or receiving data (ACT).	–
Off	Disconnected from network.	Check the condition and connection of network cables.

SPEED LED (Management LAN Connector)

LED indication	Description	Action
On (green)	Port is operating on 100BASE-T.	–
Off	Port is operating on 10BASE-T.	–

SPEED LED (1G LAN connector)

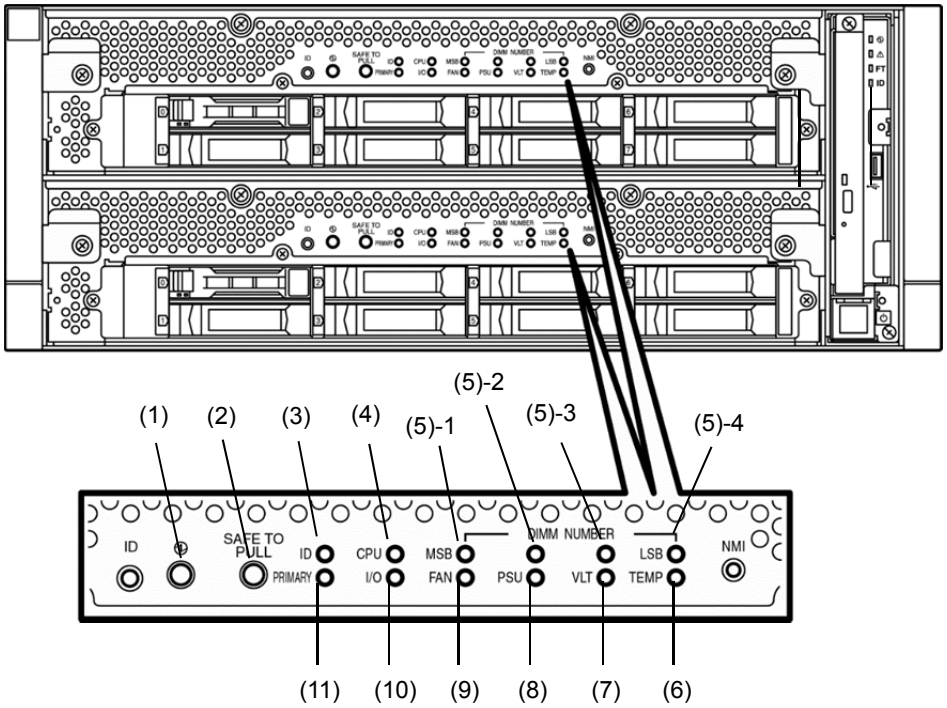
LED indication	Description	Action
On (amber)	Port is operating on 1000BASE-T.	–
On (green)	Port is operating on 100BASE-TX.	–

SPEED LED (10G LAN connector)

LED indication	Description	Action
On (amber)	Port is operating on 1000BASE-T.	–
On (green)	Port is operating on 10GBASE-T.	–
Off	Port is operating on 100BASE-TX.	–

(8) EXPRESSSCOPE

If any module fails, LED on EXPRESSSCOPE relevant to the failed module lights in amber.



(1) Module POWER LED

LED indication	Description	Action
On (green)	The power of CPU/IO module is ON.	–
Off	The AC power is not supplied to CPU/IO module. (It may take about 1 minute until standby state (this LED is blinking) after the AC power is supplied.)	–
Blinking (green)	CPU/IO module is in standby state.	–

(2) SAFE TO PULL (SAFE TO PULL LED)

This LED indicates the possibility to remove CPU/IO module safely.

LED indication	Description	Action
On (green)	CPU/IO module can be removed.	–
Blinking (green)	CPU/IO module cannot be removed.	–
Off	CPU/IO module is in off line state.	–

(3) Module ID (ID LED)

Module ID LED is used for identifying the device that requires maintenance among devices mounted on the rack.

LED indication	Description	Action
On (green)	UID switch is pressed.	–
Blinking (green)	The device identification request is issued from remote site.	–
Off	–	–

(4) CPU (CPU FAULT LED)

The LED lights amber when the CPU part of CPU/IO modules fails. Contact your sales representative.

(5) MEM NUMBER (Memory slot error LED)

The LED lights amber when failure occurs on the memory slot of CPU/IO module.
Memory slots with errors can be identified by illumination status of the following (5)-1 to (5)-4.

Status of memory slot error LED				Description	Action
(5)-1 (MSB)	(5)-2	(5)-3	(5)-4 (LSB)		
–	–	–	–	Operating normally	–
–	–	–	○	Error at memory slot 1	Contact your sales representative.
–	–	○	–	Error at memory slot 2	Contact your sales representative.
–	–	○	○	Error at memory slot 3	Contact your sales representative.
–	○	–	–	Error at memory slot 4	Contact your sales representative.
–	○	–	○	Error at memory slot 5	Contact your sales representative.
–	○	○	–	Error at memory slot 6	Contact your sales representative.
–	○	○	○	Error at memory slot 7	Contact your sales representative.
○	–	–	–	Error at memory slot 8	Contact your sales representative.
–	–	–	●	Error at memory slot 9	Contact your sales representative.
–	–	●	–	Error at memory slot 10	Contact your sales representative.
–	–	●	●	Error at memory slot 11	Contact your sales representative.
–	●	–	–	Error at memory slot 12	Contact your sales representative.
–	●	–	●	Error at memory slot 13	Contact your sales representative.
–	●	●	–	Error at memory slot 14	Contact your sales representative.
–	●	●	●	Error at memory slot 15	Contact your sales representative.
●	–	–	–	Error at memory slot 16	Contact your sales representative.
●	●	●	●	Error at unknown memory slot, or the memory is not installed	Contact your sales representative.

○: LED is lit.
●: LED is blinking.
–: LED is unlit.

(6) TEMP (Abnormal temperature LED)

Amber: Temperature in CPU/IO module becomes abnormal. Contact your sales representative.

(7) VLT (Power error LED)

Amber: Electric voltage failure occurs in CPU/IO module. Contact your sales representative.

(8) PSU(Power supply unit error LED)

Amber: Failure occurs on the power supply unit of CPU/IO module. Contact your sales representative.

(9) FAN (Fan error LED)

Amber: Failure occurs on the cooling fans for CPU and power supply unit of CPU/IO module. Contact your sales representative.

(10) I/O (I/O FAULT LED)

Amber: Failure occurs on the I/O (PCI) part of CPU/IO module. Contact your sales representative.

(11) PRIMARY (PRIMARY LED)

Green: CPU/IO module is primary.

This LED may blink in green while the DUMP (NMI) switch is pressed.

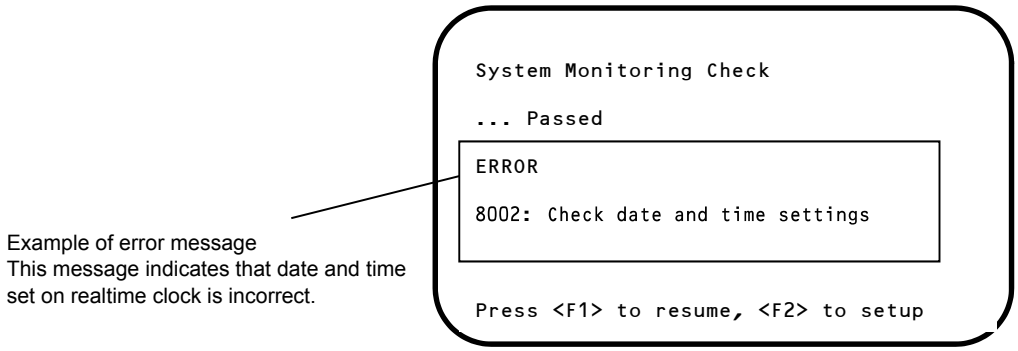
(9) Power Unit LED

Power Unit LED is located at power supply unit at the rear of the server.

LED indication	Description	Action
Off	The server is NOT receiving AC power.	
Blinking (green)	The server is receiving AC power.	–
On (green)	The server is powered on.	–
On (amber) Blinking (amber)	The power supply unit fails.	Contact your sales representative.

6.2 POST Error Message

If POST detects any error, it displays an error message on the display unit.



Example of error message
This message indicates that date and time set on realtime clock is incorrect.

The following table lists error messages and the actions to take in response to them.

Tips

- Write down the displayed messages before contacting your sales representative.
- The list only contains messages for the server. For details about error messages of optional devices, and the actions to take, refer to the instructions that come with each product.

(1) Error messages

Error Message		Cause	Solution
8000	System variable is corrupted.	Illegal setup information of BIOS was detected.	Start BIOS Setup Utility (SETUP), and then execute **Load Setup Defaults** and specify the necessary settings. If the same error is detected repeatedly in spite of re-setting, contact your sales representative.
8001	Real time clock error	Real time clock error was detected.	Start SETUP, and then specify the correct date and time. If the same error is detected repeatedly in spite of re-setting, contact your sales representative.
8002	Check date and time settings	Incorrect date and time set on real time clock was detected.	
8006	System configuration data cleared by Jumper.	The setup utility settings were cleared using the jumper.	Follow the steps described in *Chapter 1 (9. Resetting the Server and Clearing BIOS Settings).*
8007	SETUP Menu Password cleared by Jumper.	The setup utility password was cleared using the jumper.	
8800	DXE_NB_ERROR	An error was detected during initialization of chipset.	Contact your sales representative.
8801	DXE_NO_CON_IN	An error was detected during initialization of console.	
8802	DXE_NO_CON_OUT		
8803	PEI_DXE_CORE_NOT_FOUND	A flash ROM is corrupt.	
8804	PEI_DXEIPL_NOT_FOUND		
8805	DXE_ARCH_PROTOCOL_NOT_AVAILABLE		
8806	PEI_RESET_NOT_AVAILABLE	The system was not reset correctly.	
8807	DXE_RESET_NOT_AVAILABLE		
8808	DXE_FLASH_UPDATE_FAILED	The Flash ROM was not written to correctly.	
B000	Expansion ROM not initialized	Failed to expand option ROM.	Disable expansion of option ROM of the board that is not used for OS boot.
B001	Expansion ROM not initialized - PCI Slot 1	Option ROM expansion in PCI slot 1 failed.	Disable expansion of option ROM of the option board that is not used for OS boot. Start SETUP, and select **Advanced** → **PCI Configuration** → **PCI Device Controller and Option ROM Settings** → **PCIxx Slot Option ROM** → **Disabled**. (xx: PCI slot number)
B002	Expansion ROM not initialized - PCI Slot 2	Option ROM expansion in PCI slot 2 failed.	
B003	Expansion ROM not initialized - PCI Slot 3	Option ROM expansion in PCI slot 3 failed.	
B004	Expansion ROM not initialized - PCI Slot 4	Option ROM expansion in PCI slot 4 failed.	
B022	Serial Port Configuration Overlapped.	Overlapping serial port configuration was detected.	Start SETUP, select **Advanced** → **Serial Port Configuration**, and specify the setting again in a way that the values of Base I/O or Interrupt in **Serial Port A** and **Serial Port B** will not be the same.
B800	DXE_PCI_BUS_OUT_OF_RESOURCES	PCI device resource allocation failed.	Check the connection of the optional board.
C010	The error occurred during temperature sensor reading	An error was detected while reading temperature sensor.	Contact your sales representative.
C011	System Temperature out of the range.	A temperature abnormality was detected.	It is possible that a fan has failed or is clogged. Contact your sales representative.

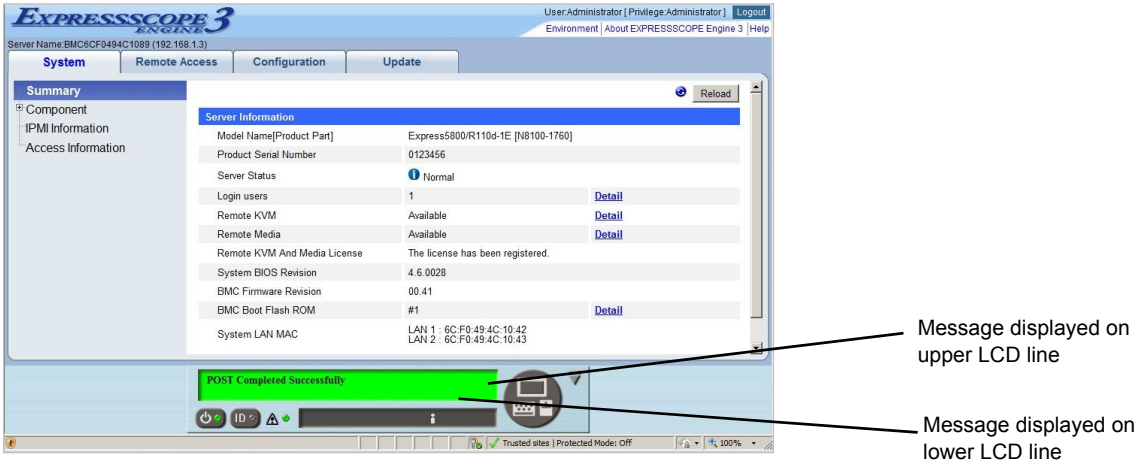
Error Message		Cause	Solution
C061	1st SMBus device Error detected.	An error was detected on 1st SM Bus.	Contact your sales representative.
C062	2nd SMBus device Error detected.	An error was detected on 2nd SM Bus.	
C063	3rd SMBus device Error detected.	An error was detected on 3rd SM Bus.	
C064	4th SMBus device Error detected.	An error was detected on 4th SM Bus.	
C065	5th SMBus device Error detected.	An error was detected on 5th SM Bus.	
C066	6th SMBus device Error detected.	An error was detected on 6th SM Bus.	
C067	7th SMBus device Error detected.	An error was detected on 7th SM Bus.	
C101	BMC Memory Test Failed..	An error was detected on BMC.	Unplug the power cord, wait for at least 30 seconds, then restart the server. If the same error is detected repeatedly, contact your sales representative.
C102	BMC Firmware Code Area CRC check Failed.		
C103	BMC core hardware failure.		
C104	BMC IBF or OBF check failed.	An error was detected while accessing BMC.	
C105	BMC SEL area full.	There is not enough space to store the system event log.	Start up Offline Tools (*Chapter 1, 11. Offline Tools*) and delete the event logs.
C10C	BMC update firmware corrupted.	An illegality was detected while updating BMC firmware.	Unplug the power cord, wait for at least 30 seconds, then restart the server. If the same error is detected repeatedly, contact your sales representative.
C10D	Internal Use Area of BMC FRU corrupted.	An illegality was detected in FRU containing the device information.	
C10E	BMC SDR Repository empty.	An error was detected on BMC SDR.	
C10F	IPMB signal lines do not respond.	Failure of Satellite Management Controller was detected.	
C110	BMC FRU device failure.	An error was detected in FRU that contains device information.	
C111	BMC SDR Repository failure.	Failure was detected in SROM that stores the SDR.	
C112	BMC SEL device failure.	Device failure was detected in BMC SEL.	
C113	BMC RAM test error.	An error was detected in BMC RAM.	
C114	BMC Fatal hardware error.	A hardware error was detected in BMC.	
C115	Management controller not responding	Management controller does not respond.	Update the BMC firmware. If the same error is detected repeatedly, contact your sales representative.
C116	Private I2C bus not responding.	Private I2C bus does not respond.	Unplug the power cord, wait for at least 30 seconds, then restart the server. If the same error is detected repeatedly, contact your sales representative.
C117	BMC internal exception	BMC internal error was detected.	
C118	BMC A/D timeout error.	BMC A/D timeout error was detected.	
C119	SDR repository corrupt.	BMC error or illegal SDR data was detected.	
C11A	SEL corrupt.	BMC error or illegal system event log data was detected.	

Error Message		Cause	Solution
C11B	BMC Mezzanine card is not found.	BMC Mezzanine card is not installed.	Contact your sales representative.
C11C	BMC Mezzanine partition is invalid.	A format error was detected in BMC Mezzanine card.	
C11D	BMC is in Forced Boot Mode.	Detected that BMC is in Forced Boot Mode.	Unplug the power cord, wait for at least 30 seconds, then restart the server. At that time, check the jumper switch setting on motherboard. If the same error is detected repeatedly, contact your sales representative.
D483	BP SROM data invalid	An invalid data was detected in system backplane.	Contact your sales representative.
D484	BP SROM data read error	Failed to read data in system backplane.	
D485	MB SROM data invalid	An invalid data was detected in CPU/IO board.	
D486	MB SROM data read error	Failed to read data in CPU/IO board.	

(2) Error messages on a virtual LCD

In EXPRESSSCOPE Engine 3 web browser window, you can confirm virtual LCD error messages. For details on the virtual LCD, refer to "*EXPRESSSCOPE Engine 3 User's Guide*".

The table below shows the error messages displayed on upper and lower lines, cause, and solution.



Messages displayed on an upper LCD line

Message on Upper LCD Line	Description	Solution
XXXX BIOSXXXX	Displayed while POST is running.	This is not an error.
POST Completed Successfully	Displayed when POST completes normally.	This is not an error.
POST ERROR XXXX	Error XXXX was detected during POST.	Check the message displayed on LCD, and take an appropriate action.
System Simplex	The system is operating in simplex mode.	This is not an error.
System Duplex	CPU/IO module is operating in duplex mode.	This is not an error.
CPU Broken	A CPU failure was detected.	Contact your sales representative.
IO Broken	An I/O unit failure was detected.	Contact your sales representative.

Messages displayed on a lower LCD line

Message on Lower LCD Line	Description	Solution
VBAT Lower Non-Critical	A voltage abnormality was detected.	Contact your sales representative.
VBAT Upper Non-Critical		
VBAT Lower Critical		
VBAT Upper Critical		
Baseboard Temperature1 Lower Non-Critical	A temperature abnormality was detected.	It is possible that a fan has failed or is clogged. Contact your sales representative.
Baseboard Temperature1 Upper Non-Critical		
Baseboard Temperature1 Lower Critical		
Baseboard Temperature1 Upper Critical		
Baseboard Temperature2 Lower Non-Critical		
Baseboard Temperature2 Upper Non-Critical		
Baseboard Temperature2 Lower Critical		
Baseboard Temperature2 Upper Critical		
CPU1_DIMM Area Temperature Lower Non-Critical		
CPU1_DIMM Area Temperature Upper Non-Critical		
CPU1_DIMM Area Temperature Lower Critical		
CPU1_DIMM Area Temperature Upper Critical		
CPU2_DIMM Area Temperature Lower Non-Critical		
CPU2_DIMM Area Temperature Upper Non-Critical		
CPU2_DIMM Area Temperature Lower Critical		
CPU2_DIMM Area Temperature Upper Critical		
Processor1 Thermal Control Upper Non-Critical		
Processor1 Thermal Control Upper Critical		
Processor2 Thermal Control Upper Non-Critical		
Processor2 Thermal Control Upper Critical		
DUMP Request !	The dump button was pressed.	Wait until collecting the memory dump data has finished.
Power Supply1 Failure detected	A power supply unit abnormality occurred.	Make sure that the power cord is plugged in. If this does not resolve the problem, contact your sales representative.
Processor Missing	No CPU is installed.	Contact your sales representative.
Processor1 Thermal Trip	The power was forcibly turned off due to a CPU temperature abnormality.	Contact your sales representative.
Processor2 Thermal Trip		

Message on Lower LCD Line	Description	Solution
Sensor Failure Detected.	Abnormality in a sensor was detected.	Contact your sales representative.
SMI timeout	A timeout occurred while servicing system management interrupts.	
IPMI Watchdog timer timeout (Power off)	A watchdog timer timeout occurred.	
System Front FAN1 Lower Non-Critical	A fan alarm was detected.	It is possible that a fan has failed or is clogged. Contact your sales representative.
System Front FAN2 Lower Non-Critical		
System Front FAN3 Lower Non-Critical		
System Front FAN4 Lower Non-Critical		
System Front FAN5 Lower Non-Critical		

7. Collecting Failure Information

If the server fails, you can collect failure information by using the following method.

The failure information is to be collected only at the request of your sales representative.

Important **When the system restarts after a failure has occurred, a message may appear indicating virtual memory shortage. Ignore this message and proceed with starting the system. Restarting the system at this time may result in an inability to properly collect information.**

7.1 Collecting Failure Information Occurred on Server

This section describes how to collect system information.

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Run the following command to collect system information. Collected data is saved under "/home/BugPool"directory.

```
# /opt/ft/sbin/buggrabber
```

Note Verify that the partition of target disk has enough free space. If you change the destination to save, add the following option to the above command and run.

--bugpool=<*relative or absolute path to the destination*>

7.2 Collecting Memory Dump

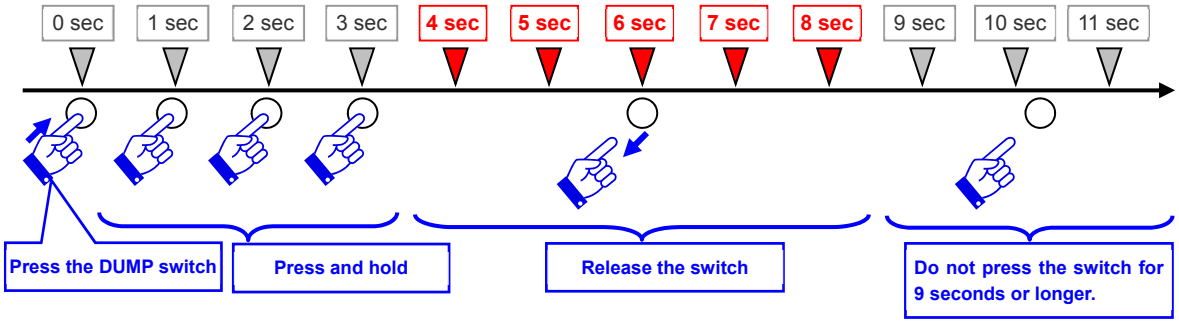
If an error occurs, the dump file can be saved to acquire necessary information.

Consult with your sales representative before dumping the memory. Dumping the memory while the server is in operating normally will affect the system operation.

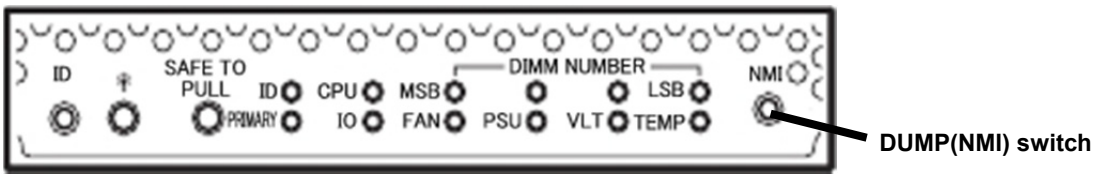
Important **Restarting the system after error has occurred may display a message indicating insufficient virtual memory. Ignore this message and proceed. Restarting the system at this time may result in dumping improper data.**

If a failure occurs and you want to collect memory dump, press the DUMP switch on CPU/IO module of primary side for 4 to 8 seconds. The PRIMARY LED blinks when pressing the DUMP switch. Release your finger when the LED goes off. Press the DUMP switch by inserting the pointed tool such as ballpoint pen into the switch hole.

<How to press the DUMP switch>



<Location of the DUMP switch>



Important

- **Pressing the DUMP switch excessively shorter or longer will fail to collect memory dump.**
- **Do not use anything that easily breaks such as pencil, toothpicks, or plastic.**

If you press the DUMP switch, system restarts automatically and returns to duplexed state. Wait until the memory dump finishes completely. The memory dump is stored in /var/crash/ directory. Memory dump is not collected depending on CPU status (e.g. CPU stall).

Tips Memory dump process of the server may continue until the system returns to duplexed state even after the restart. Wait for a while until duplication completes.

After executing memory dump using the DUMP switch, the server may fail to restart. In such a case, forcibly reset the server according to *Chapter 1 (9.2 Forced Shutdown)*.

8. Troubleshooting

If this system does not work correctly, check it according to the contents of the following checklist before sending it for repair. If an item in the checklist corresponds with a problem you are experiencing, follow the subsequent check and processing instructions.

- The server does not work normally.
  - → See "*8.1 Problems When Turning on the Server*".
  - → See "*8.3 Problems When Starting OS*".
  - → See "*8.4 Problems With Internal Devices and Other Hardware*".
  - → See "*8.5 Problems With OS Operation*".
  - → See "*8.8 Problems With Optical Disk Drive and Flash FDD*".
- Unable to start from EXPRESSBULDER.
  - → See "*8.2 Problems When Starting EXPRESSBUILDER*".
  - → See "*8.6 Problems When Starting EXPRESSBUILDER on Windows*".
- NEC ESMPRO does not work normally.
  - → See "*8.7 Problems With Bundled Software*".
  - → Refer to *NEC ESMPRO Agent Installation Guide (Linux)* stored in ft Server Control Software Install CD.

If the server still does not work normally, see the following topics in this chapter before suspecting failure.

- Error message
  - → See "*6. Error Messages*".
- NEC ESMPRO Manager
  - → Refer to *NEC ESMPRO Manager Installation Guide* stored in EXPRESSBUILDER.
- Collect failure information
  - → See "*7. Collecting Failure Information*".

If the trouble persists, contact your service representative.

8.1 Problems When Turning on the Server

[?] Fail to power on the server:

- ❑ Is the server properly supplied with power?
  - → Check if the power cord is connected to a power outlet (or UPS) that meets the power specifications for the server.
  - → Make sure to use the power cord provided with the server. Check the power cord for broken shield or bent plugs.
  - → Make sure the power breaker for the connected power outlet is on.
  - → If the power cord is plugged to a UPS, make sure the UPS is powered on and it supplies power. Refer to the manual that comes with the UPS for details.
    Check the linkage between power supply to the server and the connected UPS using the BIOS SETUP utility of the server
- ❑ Did you press the POWER switch?
  - → When power cord is connected, the initialization of management controller starts. During initialization, the POWER LED is unlit. To power on the server, press the POWER switch after the POWER LED is lit green. To power on the server, press the POWER switch after the Module POWER LED is lit green. (It may take about 1 minute until the Module POWER LED blinks in green after connecting the power cord.)
- ❑ Did you install the CPU/IO module properly?
  - → Check if the CPU/IO module is properly installed in the server. Secure the CPU/IO module with screw located on the module handle.

[?] The screen does not turn on:

- ❑ Wait until the NEC logo appears.

[?] The screen showing nothing (black screen) appears several times during POST execution.

- ❑ This sever may switch the screen to the black screen several times during POST execution, but there is not any problem.

[?] POST fails to complete:

- ❑ Are the DIMMs installed?
  - → Check if DIMMs are installed correctly.
- ❑ Is the memory size large?
  - → The memory check may take a time if the memory size is large. Wait for a while.
- ❑ Did you perform any keyboard or mouse operation immediately after you started the server?
  - → If you perform any keyboard or mouse operation immediately after start-up, POST may accidentally detect a keyboard controller error and stops proceeding. In such a case, restart the server. Do not perform any keyboard or mouse operation until the BIOS start-up message appears when you restart the server.
- ❑ Does the server have appropriate memory boards or PCI card?
  - → Operation of the server with unauthorized devices is not guaranteed.
- ❑ Did you install the CPU/IO module properly?
  - → Check if the CPU/IO module is properly installed in the server. Secure the CPU/IO module with screw located on the module handle.

8.2 Problems When Starting EXPRESSBUILDER

[?] Unable to start EXPRESSBUILDER:

- Did you insert EXPRESSBUILDER DVD?

  → Insert the DVD and restart the server.

- Are BIOS settings correct?

  → Configure the boot order in BIOS SETUP so that the optical disk drive will be the first to start up.

- Is an error message displayed?

  → Take an appropriate action according to the on-screen message.

  `Error [Message ID:Z3002] :`
  Description: Failed to detect a DVD drive or a flash drive.
  Action: Check if hardware is connected properly.

  `Error [Message ID:Z3003] :`
  Description: Failed to read a file.
  Action: Check if DVD is damaged.

- Is a message popped up?

  → Take an appropriate action according to the table below.

Message	Action
`This EXPRESSBUILDER is not for this computer. Insert the EXPRESSBUILDER disc for this computer and click` **`OK`** `to restart the computer.`	Use EXPRESSBUILDER provided with the server. If the same error occurs, contact your salses representative.
`Failed to get the hardware parameters on the motherboard. Check if EXPRESSBUILDER is for this computer, and check if the motherboard is broken. Click` **`OK`** `to restart the computer.`	Contact your sales representative.
`Failed to find a file. Click` **`OK`** `to restart the computer.`	Media may be defective or the optical disk drive may be faulty. Contact your sales representative.
`Failed to open a file. Click` **`OK`** `to restart the computer.`	
`Failed to get the parameters of a file. Click` **`OK`** `to restart the computer.`	
`An undefined error occurred. Click` **`OK`** `to restart the computer.`	

.

8.3 Problems When Starting OS

[?] Unable to start OS:

- ❑ Are Hard Disk Drives properly installed?

  → Install Hard Disk Drives properly.

- ❑ Is SAS cable connected correctly?

  → Connect the SAS cable properly.
  If the Hard Disk Drive is not recognized as connected although the above action has been taken, the Hard Disk Drive may be faulty. Contact your sales representative.

- ❑ Is the EXPRESSBUILDER DVD inserted?

  → Eject the EXPRESSBUILDER DVD and reboot.

- ❑ Is a Flash FDD connected to the server?

  → Take out the Flash FDD and restart the server.

[?] The server repeats rebooting at startup:

- ❑ Is the value of **OS Boot Monitoring Timeout** in the BIOS setting appropriate?

  → Change the value of **OS Boot Monitoring Timeout** to suit your environment. See *Chapter 3 (1. System BIOS)* for details.

- ❑ Is the system changed to maintenance mode during bootup?

  → The following message appears on screen.
  Give root password for maintenance (or type Control-D to continue):

- ❑ Did daemons or the driver start properly at startup or occurrence of trouble?

[?] Wake On LAN feature does not work:

- ❑ Is the AC power supplied to both CPU/IO modules?

  → If the AC power supplied to only one of the CPU/IO module, Wake On LAN may become unavailable. Supply the AC power to both of CPU/IO modules.

- ❑ Is Hub/Client fixed as 1000M?

  → Check the following configurations:
  – Set the Hub as "**Auto-Negotioation**".
  – Set the Client as "**Auto-negotiate best speed**".

Important **For both Hub/Client, you cannot use Wake On LAN feature from standby state with the 1000M fixed configuration.**

- ❑ Do you send Magic Packet to only one of the duplexed LAN?

  → If you use Wake On LAN under duplexed LAN, you need to send Magic Packets to all of the duplexed LAN pair(s).

- ❑ Did you send Magic Packet to 10G LAN port?

  → Wake On LAN feature is not supported for 10G LAN port .

[?] Fail to duplex CPUs:

→ Check the memory configuration is correct.

→ Check third-party CPUs or memory (DIMM) are not used.

[?] The following error or warning message appears at OS startup:

→ The following message appears on console window or syslog file . However, it does not affect the system operation.

"tsc: Fast TSC calibration failed"

"pci 0000:06:09.0: BAR 15: failed to assign [mem size 0x00200000 64bit pref]"

"i8042: Can't read CTR while initializing i8042"

"i8042: probe of i8042 failed with error -5"

"ACPI Error: Could not enable RealTimeClock event (20130517/evxfevnt-211)"

"ACPI Warning: Could not enable fixed event - RealTimeClock (4) (20130517/evxface-488)"

"Failed to parse ACL "d:group:adm:r-x,d:group:wheel:r-x": Invalid argument. Ignoring"

"scsi_hbas: module verification failed: signature and/or required key missing - tainting kernel"

"systemd: /usr/lib/systemd/system-generators/anaconda-generator failed with error code 1."

"rngd: Unable to open file: /dev/tpm0"

"rngd: can't open any entropy source"

"rngd: Maybe RNG device modules are not loaded"

"rngd.service: main process exited, code=exited, status=1/FAILURE"

"Unit rngd.service entered failed state."

"rngd.service failed."

"kdumpctl: Warning: There might not be enough space to save a vmcore."

8.4 Problems With Internal Devices and Other Hardware

[?] Fail to access the internal or external devices (or such devices fail to operate):

- ❑ Are cables properly connected?

  → Make sure that the interface cables and power cord are properly connected. Also make sure that the cables are connected in the correct order.

- ❑ Is the power-on order correct?

  → When the server has any external devices connected, power on the external devices first, then the server.

- ❑ Did you install drivers for connected optional devices?

  → Some optional devices require specific device drivers. Refer to the manual that comes with the device to install its driver.

- ❑ Is option board setting correct?

  → Usually, PCI device settings need not to be changed. However, depending on the board to be set, special setting may be required. Refer to the manual that comes with the board for details to make correct settings.

[?] The keyboard or mouse does not work:

- ❑ Is the cable properly connected?

  → Make sure that the cable is connected to the USB connector on the front or rear of the server.

- ❑ Are the keyboard and mouse are compliant with this server?

  → Operation of the server with unauthorized devices is not guaranteed.

[?] Screen freezes, keyboard and mouse are disabled:

→ If the amount of memory is large, it takes time to copy the memory in dual mode and the system stops working temporarily during the copying, but it is not system trouble.

[?] Unable to access the Hard Disk Drive

- ❑ Is the Hard Disk Drive supported by the server?

  → Operation of any device that is not authorized by NEC is not guaranteed.

- ❑ Is the Hard Disk Drive properly installed?

  → Check the Hard Disk Drive installation status and the cable connections.

[?] Unable to configure dual hard disk drives:

→ Unless you perform mirroring (including reconfiguration after failed disks are replaced) according to *Chapter 2*, (*2. Network Duplexing*) , the mirror may not be (re)configured. Check if the steps were correct.

[?] Disk ACCESS LEDs on the disks are off:

→ The LEDs may seem to be off when an excessive amount of access causes the frequent blinking. Check if the LEDs are blinking green when the access is reduced.

8.5 Problems With OS Operation

[?] OS operation is unstable:

- ❑ Did you access to directory or file under /dev, /proc or /sys?

  → The server frequently saves and updates information related to system operation and management in the following directories. Because accessing any of these directories by a command or other means may impact fault tolerant features and make behavior of the system unstable, do not access them.
  /dev/mem
  /proc/kcore
  /proc/bus
  /sys

[?] The server is not found on the network:

- ❑ Is the cable connected properly?

  → Securely connect the proper cable to the network port on the rear of the server. Additionally, make sure that the cable conforms to the network interface standards.

- ❑ Are BIOS settings correct?

  → You can disable the internal network controller using the BIOS setup utility. Check the settings with BIOS setup utility.

- ❑ Is the transfer speed correct?

  → You can change the transfer speed or configure the setting for onboard LAN controller from OS. Be sure to specify the same transfer speed and duplex mode as those on connected hub. If you specify **Auto-Negotiation**, make sure that **Auto-Negotiation** is also specified for the connected hub.

- ❑ Is the transfer speed of 10G LAN port '100Mbps'?

  → If you specify 100Mbps, make sure that Auto-Negotiation is specified for the connected hub. Other than Auto-Negotiation is not supported by 10G LAN port.

[?] Power-saving feature does not work:

→ The server does not support power-saving feature specified in **Power Option**.

[?] A CPU/IO module cannot be integrated:

→ When a component fails and is reintegrated, the following message may be recorded to the system event log and the process is stopped.
Such event indicates that the component's MTBF is below the threshold and it is judged that repair is necessary. Thus the reintegration process cannot be completed. Generally replacement of the component will be required, so contact your sales representative. If reintegrating the component without repair is required for some reason, consult your sales agent. It is possible to perform reintegration forcefully.

ERROR - x is now STATE_BROKEN / REASON_BELOW_MTBF
(x denotes device ID.)

[?] The following error message appears:

→ The following messages about internal HDD appears on syslog file. However, it does not affect the system operation.

"multipathd: sds: spurious uevent, path not found"
"multipathd: uevent trigger error"

8.6 Problems When Starting EXPRESSBUILDER on Windows

[?] Unable to read the manuals:

- ❑ Have you installed Adobe Reader to your computer?

  → To read the manuals, install Adobe Reader in your computer.

- ❑ Does the “Internet explorer has stopped working” error appear?

  → Close the dialog box and continue with the operation. If the same error occurs, double-click the “version.xml” of the root folder on DVD, and then click **Yes** on the dialog box. After that, you can read the manual by clicking the link of manual again.

[?] The menu does not appear:

- ❑ Is the file association correct?

  → This menu is built based on “Microsoft HTML Application Host”. Make sure that the ".hta" file extension is associated to "Microsoft HTML application host".

- ❑ Is the OS in the proper state?

  → The menu does not appear depending on the system registry setting or the timing to set the DVD/CD. In such case, choose **Computer** from Explorer and double-click the icon of the set DVD drive.

- ❑ Did you run the menu on this computer?

  → The autorun feature is disabled on this computer. Run the following file on DVD directly.
  `\autorun\dispatcher_x64.exe`

[?] Some menu items are gray:

- ❑ Is your system environment correct?

  → Some software requires administrator privilege or needs to be operated on the server. Run on the appropriate environment.

8.7 Problems With Bundled Software

[?] ioremap error is sometimes output to syslog.

→ When an access by /sys/firmware/dmi/entries conflicts with an access by /dev/mem, the following messages may be output to syslog.
kernel: ioremap error for 0x7cadd000-0x7cadf000, requested 0x10, got 0x0

- This message may appear in the timing when service of NEC ESMPRO Agent for Linux initializes library (/opt/ft/lib/libft.so) included in ft Server Control Software at the time of start by our evaluation. Therefore it occurs by server start and service reboot (/opt/nec/esmpro_sa/bin/ESMRestart) of NEC ESMPRO Agent for Linux. There is not any problem with NEC ESMPRO Agent for Linux.

[?] NEC ESMPRO Agent (Linux):

→ For details of NEC ESMPRO Agent (Linux), see *"NEC ESMPRO Agent User's Guide (Linux)"* in ft Server Control Software Install CD.

Supplementary explanation for NEC ESMPRO Agent (Linux)

- Device ID in Alert Report

  → Some server alerts use unique device IDs which correspond to the devices listed in the table below as the device identification information.

Device name	Device ID
CPU module 0	0
DIMM slot 1 on CPU module 0	0/1
DIMM slot 2 on CPU module 0	0/2
DIMM slot 3 on CPU module 0	0/3
DIMM slot 4 on CPU module 0	0/4
DIMM slot 5 on CPU module 0	0/5
DIMM slot 6 on CPU module 0	0/6
DIMM slot 7 on CPU module 0	0/7
DIMM slot 8 on CPU module 0	0/8
DIMM slot 9 on CPU module 0	0/9
DIMM slot 10 on CPU module 0	0/10
DIMM slot 11 on CPU module 0	0/11
DIMM slot 12 on CPU module 0	0/12
DIMM slot 13 on CPU module 0	0/13
DIMM slot 14 on CPU module 0	0/14
DIMM slot 15 on CPU module 0	0/15
DIMM slot 16 on CPU module 0	0/16
CPU1 on CPU module 0	0/21
CPU2 on CPU module 0	0/22
CPU module 1	1
DIMM slot 1 on CPU module 1	1/1
DIMM slot 2 on CPU module 1	1/2
DIMM slot 3 on CPU module 1	1/3
DIMM slot 4 on CPU module 1	1/4
DIMM slot 5 on CPU module 1	1/5
DIMM slot 6 on CPU module 1	1/6
DIMM slot 7 on CPU module 1	1/7
DIMM slot 8 on CPU module 1	1/8
DIMM slot 9 on CPU module 1	1/9
DIMM slot 10 on CPU module 1	1/10
DIMM slot 11 on CPU module 1	1/11
DIMM slot 12 on CPU module 1	1/12
DIMM slot 13 on CPU module 1	1/13
DIMM slot 14 on CPU module 1	1/14
DIMM slot 15 on CPU module 1	1/15
DIMM slot 16 on CPU module 1	1/16
CPU1 on CPU module 1	1/21
CPU2 on CPU module 1	1/22
PCI module 0	10
PCI slot 1 on PCI module 0	10/1
PCI slot 2 on PCI module 0	10/2
PCI slot 3 on PCI module 0	10/3
PCI slot 4 on PCI module 0	10/4
SCSI adaptor on PCI module 0	10/5
Ethernet board 1 on PCI module 0	10/6
Ethernet board 2 on PCI module 0	10/12

Device name	Device ID
PCI module 1	11
PCI slot 1 on PCI module 1	11/1
PCI slot 2 on PCI module 1	11/2
PCI slot 3 on PCI module 1	11/3
PCI slot 4 on PCI module 1	11/4
SCSI adaptor on PCI module 1	11/5
Ethernet board 1 on PCI module 1	11/6
Ethernet board 2 on PCI module 1	11/12
SCSI enclosure 0	10/40
SCSI slot 1 on SCSI enclosure 0	10/40/1
SCSI slot 2 on SCSI enclosure 0	10/40/2
SCSI slot 3 on SCSI enclosure 0	10/40/3
SCSI slot 4 on SCSI enclosure 0	10/40/4
SCSI slot 5 on SCSI enclosure 0	10/40/5
SCSI slot 6 on SCSI enclosure 0	10/40/6
SCSI slot 7 on SCSI enclosure 0	10/40/7
SCSI slot 8 on SCSI enclosure 0	10/40/8
SCSI enclosure 1	11/40
SCSI slot 1 on SCSI enclosure 1	11/40/1
SCSI slot 2 on SCSI enclosure 1	11/40/2
SCSI slot 3 on SCSI enclosure 1	11/40/3
SCSI slot 4 on SCSI enclosure 1	11/40/4
SCSI slot 5 on SCSI enclosure 1	11/40/5
SCSI slot 6 on SCSI enclosure 1	11/40/6
SCSI slot 7 on SCSI enclosure 1	11/40/7
SCSI slot 8 on SCSI enclosure 1	11/40/8

* "SCSI" includes SAS.
* For R320e-E4, PCI slots 3, PCI slot 4, and Ethernet board 2 do not exist on the PCI module.

- Temperature/voltage error occurs on the CPU/PCI modules

  → At the time when a temperature or voltage error occurs on CPU/IO module, necessary actions will differ depending on their status as shown below. You can check the status of each module from the **Information of server state/constitution** of NEC ESMPRO Manager or ft Server Utility.

Status	Operation
Duplex	Stop the failed CPU/IO module.
Other than Duplex, Empty	Shutdown the system.

Tips

- If the status is "**Empty**", the module is not mounted. Sensor monitoring is not conducted.
- If disks are mounted on CPU/IO modules, the status of both modules is "**Simplex**" while the disks are synchronizing. Temperature or voltage error occurring during disk mirroring will result in the system to shutdown.

- The detail information of alert is displayed as "Unknown":

  → Detail information of some alert displayed on the AlertViewer may be displayed as "Unknown".

- The display of ft Server Utility is incorrect:

  → If you open ft Server Utility immediately after the system starts up, the tree under the CPU module, PCI module, and/or SCSI enclosure may not be displayed correctly because the data construction has not been completed. Wait for a while, and start ft Server Utility again.

- Module status is shown "Fault":

  → PCI modules (IO modules) and modules under the SCSI enclosure have impact on each other. For example, when the "Status" item of a module changes to "fault", it may be caused by other module error. Check the status of the other modules referring to alert message.

- Temperature/voltage error occurs on the CPU/PCI modules:

  → At the time when a temperature or voltage error occurs on CPU/PCI module (CPU/IO module), necessary actions will differ depending on their status as shown below. You can check the status of each module from the **Information of server state/constitution** of NEC ESMPRO Manager or ft Server Utility.

Status	Operation
Duplex	Stop the failed CPU/PCI module (CPU/IO module).
Simplex	Shutdown the system.

  → Remove the disk in the following procedure.

  1. If the status is "Empty", the module is not mounted. Sensor monitoring is not conducted.
  2. If disks are mounted on PCI modules (I/O modules), the status of both modules is "Simplex" while the disks are mirrored. Temperature or voltage error occurring during disk mirroring will result in the system to shutdown.

- The status of network port is displayed as an error:

  → For the network ports, connect the unused port of both PCI modules (IO modules) with a cross cable.

- Alert notification of monitored events

  → In SNMP alert, the message text length is limited to 511 bytes. If the message text exceeds 512 bytes is sent, you need to verify the full length message on Event Viewer of sender machine. To display the message text exceeding 512 bytes on Alert Viewer, use TCP/IP In-Band.

[?] NEC ESMPRO Manager:

→ For details of NEC ESMPRO Manager, see *"NEC ESMPRO Manager Installation Guide"* in EXPRESSBUILDER or its help.

Supplementary explanation about Information of server state/constitution of NEC ESMPRO Manager

- Status Color after Mounting a Hard Disk Drive

  → When creating a new mirror, the status of **SCSI Enclosure** and **SCSI Slot** of **Information of server state/constitution** will continue to change frequently after you mount a hard disk until the mirror is completed. During this process, the status color may turn to abnormal, but when the mirror is created successfully, it will return normal.

- CPU Information

  → The CPU information can be viewed by selecting **System** – **CPU** in the **Information of server state/constitution** screen.

  → If you select **CPU Module** – **CPU** in the **ft System** tree, unknown or incorrect information appears in some information items.
  * Selecting **CPU** in the **ft System** tree may fail to confirm the correct information.

- Change of hardware configuration

  → If you dynamically change the configuration of the CPU or PCI module (IO module), Information of **server state/constitution** tree may not be displayed correctly. In such a case, wait for about 5 minutes, open Information of server state/constitution again.

- Display immediately after system startup

  → If you open **Information of server state/constitution** immediately after the system starts up, the tree or the state may not be displayed correctly due to high load of the system. In about 20 minutes after the system startup, open **Information of server state/constitution** again.

- Display when the PCI module (IO module) is running in the simplex mode.

  → When only the PCI modules (IO modules) is running in the simplex mode (non-duplexed mode), the **Information of server state/constitution** cannot display the status of the **SCSI Enclosure** and **Mirror Disk** correctly. To check if the duplex mode is changed to the simplex mode, check the event log or AlertViewer log, or the status color of the PCI module by the **Information of server state/constitution**.

- SCSI Status while PCI module is Starting or being Stopped:

  → While the PCI module is starting or being stopped, the status of **SCSI Enclosure**, **SCSI Slot**, and **Mirror Disk** in **Information of server state/constitution** may become unstable, and incorrect status may be displayed temporarily. When Starting or Stopping of module completes, the status will be displayed correctly.

- Display of an Unmounted Sensor

  → An unmounted sensor is indicated as "Unknown" on **Information of server state/constitution**.

  Ex: **Information of server state/constitution** - **Enclosure** - **Temperature**

Temperature information	
Location:	DIMM2 Temp#0
Temperature:	Unknown
Threshold:	Disabled
Status:	Unknown

- Pop-up "Constitution Information has changed." is displayed.

  → If you are seeing **Information of server state/constitution**, pop-up is displayed when hardware constitution on the monitored server is changed (such as attaching or removing CPU module or PCI module). The information on the screen is updated afterwards.

- System Environment Monitoring

  → Monitoring of temperature, fan and voltage under **Enclosure** in **Information of server state/constitution** is set to enable by default and cannot be changed to disable.
  Information of server state/constitution - **Enclosure** - **Temperature**
  Information of server state/constitution - **Enclosure** - **Fan**
  Information of server state/constitution - **Enclosure** - **Voltage**

- Information of the keyboard/mouse

  → When plugging or unplugging CPU/IO module, the keyboard information under the **I/O Device** in the **Information of server state/constitution** may be displayed incorrectly. Restart the system.

- Status of SCSI Slots and Mirrored Disks at High Load:

  → When the system load is high, the status of SCSI slots and mirror disks may not be obtained, and incorrect status may be displayed temporarily.

8.8 Problems With Optical Disk Drive and Flash FDD

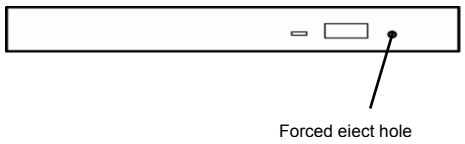
[?] Unable to access or play optical disks such as CD-ROMs/DVD-ROMs:

- ❑ Is the DVD/CD-ROM supported by the server?
  - → For a disk such as a CD with copy guard which does not conform to the CD standard, the playback of such a disk with the optical disk drive is not guaranteed.
  - → The DVD/CD-ROM for Macintosh is not supported.
- ❑ Is the CD-ROM properly set in the optical disk drive tray?
  - → There is a holder in the tray to secure the disk. Make sure that the disk is securely placed in the holder.

[?] Unable to eject a disk using the eject button:

→ Eject the disk in the following procedure.

1. Press the POWER switch to turn off the server (System POWER LED is off).
2. Use a 100 mm long metal pin that is 1.2 mm in diameter (or uncoil a thick paper clip) and insert it into the forced eject hole at the front of the tray. Keep pressing slowly until the tray comes out.



Important

- **Do not use anything that easily breaks such as toothpicks or plastic.**
- **If you still cannot eject the disk, contact the maintenance service company.**

3. Pull the tray out with your hands.
4. Remove the disk.
5. Push the tray back to its original position.

[?] Fail to access (read or write) to the Flash FDD:

- ❑ Is the Flash FDD write-protected?
  - → Place the write-protect switch on the Flash FDD to the "Write-enabled" Position.
- ❑ Is the Flash FDD formatted?
  - → Use a formatted Flash FDD. Refer to the manual that comes with the OS for formatting.
- ❑ Is another Flash FDD connected to this server?
  - → One Flash FDD can only be connected to a USB connector of this server.

[?] The Flash FDD doesn't operate normally after failover:

- ❑ Reconnect Flash FDD once after removing.
  - → When the server process failover with the Flash FDD connected, the Flash FDD is not normally recognized. In that case, once remove the Flash FDD, and reconnect to this server.

9. Resetting the Server and Clearing BIOS Settings

Refer to this section if the server does not work or if you want to set BIOS settings back to the factory settings.

9.1 Soft Reset

If the server halts before starting the OS, press <**Ctrl**> + <**Delete**> + <**Alt**> keys. This clears all the data in progress in memory, and restarts the server.

Note To reset the server when it is not frozen, make sure that no processing is in progress

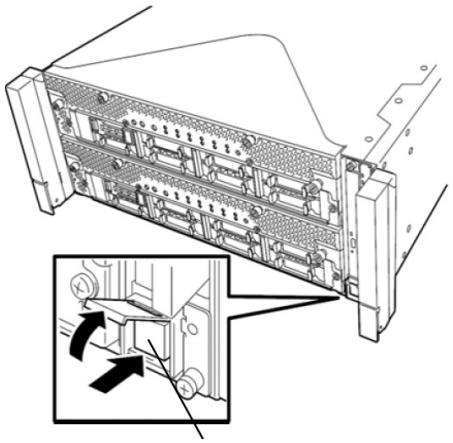
9.2 Forced Shutdown

Use this function when an OS command does not shut down the server, POWER Switch does not turn off the server, or software reset does not work.

Continue to hold POWER Switch of the server for at least 4 seconds. The power is forcibly turned off. **(To turn on the power back again, wait at least 30 seconds after turning off the power).**

Note If the remote power-on function is used, cycle the power once to load the OS after the power has been forcibly turned off, and then turn off the power again by shutting down the OS.

Press the POWER switch for 4 seconds or longer.
The server is forcedly powered off.



Press this switch for 4 seconds or longer.

9.3 Clearing BIOS Settings (CMOS Memory)

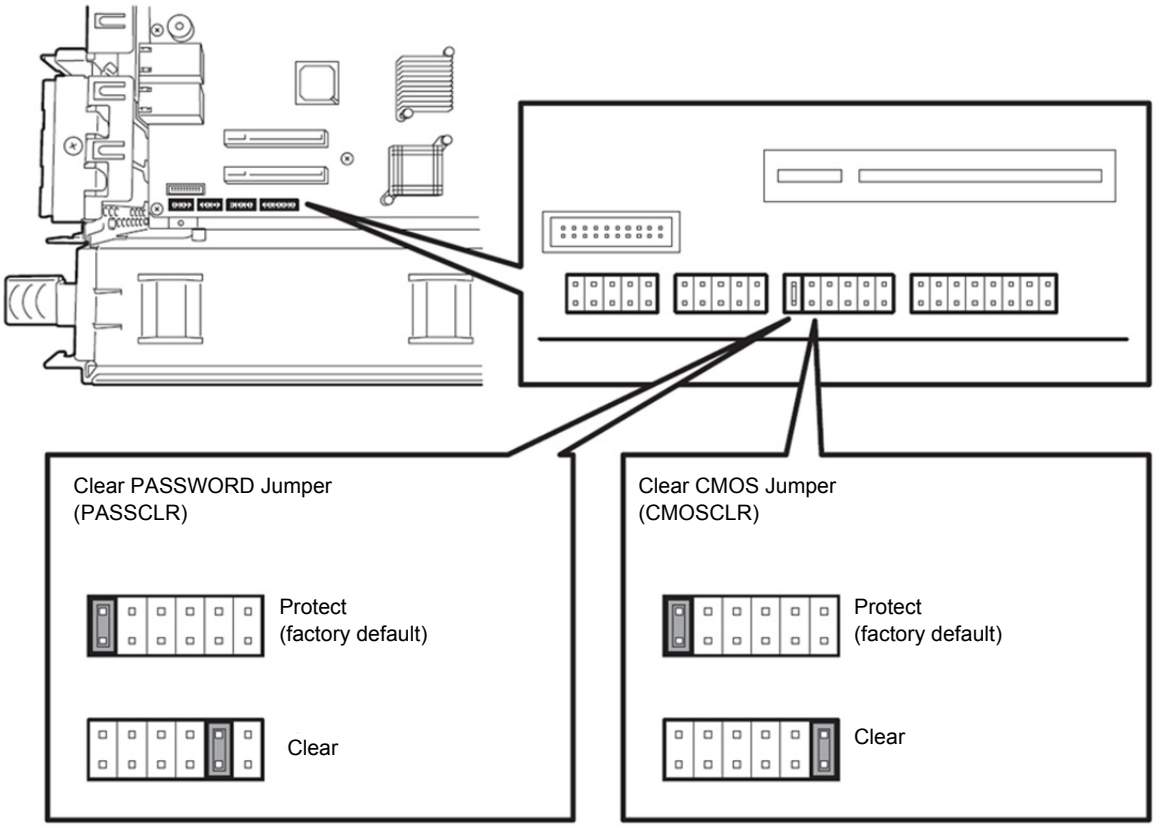
To set the BIOS settings back to the factory default settings (clearing CMOS memory), use the internal jumper switch.

You can also clear the password set in the BIOS Setup utility (SETUP) by using the same way.

Tips When the BIOS setup utility (SETUP) can be started,use “Load Setup Defaults” to return the settings to the factory defaults.

To clear the password or the CMOS memory, use the corresponding jumper switch illustrated in the figure below.

Important **Do not change any other jumper switch settings. Any change may cause the server to fail or malfunction.**



The following instructions show how to clear the CMOS memory and the password.

WARNING

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

- **Do not disassemble, repair, or alter the server.**
- **Do not remove lithium batteries.**
- **Disconnect the power plug before installing or removing the server.**

CAUTION

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

- **Make sure to complete installation.**
- **Do not get your fingers caught.**
- **Avoid installing under extreme temperature conditions.**

Important **Take anti-static measures before operating the server. For detailed information on static electricity, see *Chapter 1 (1.8 Anti-static Measures) in Safety Precautions* and *Regulatory Notices*.**

Clearing CMOS memory

1. Disconnect AC power cords from CPU/IO modules 0 and 1.
2. Remove CPU/IO module 0.
   Refer to *Chapter 2 (5.4 CPU/IO Module)*.
3. Remove the top cover.
4. Confirm the position of Clear CMOS Jumper.
5. Change jumper switch to "CMOS CLR" position.
6. Assemble the CPU/IO module 0 and install it to the server.
7. Connect AC power cords to CPU/IO modules 0 and 1 at the same time.
8. Confirm that PRIMARY LED of CPU/IO module 0 goes on after a while.
   If PRIMARY LED of CPU/IO module 1 is lit, disconnect AC power cords from both CPU/IO modules, wait for 30 seconds, and connect them at the same time.
9. When the POWER LEDs on CPU/IO modules 0 and 1 starts blinking, press the POWER switch to turn on the server.
10. If the following warning message appears, press the POWER switch to power off the server.
    (POST proceeds even when the warning message is displayed.)
    ```
    WARNING
    8006: System configuration data cleared by Jumper.
    ```
11. Disconnect AC power cords from CPU/IO modules 0 and 1.
12. Remove CPU/IO module 0, and remove its top cover.
13. Change jumper switch setting to its original position (Protect).
14. Assemble the CPU/IO module 0 and install it to the server.
15. Connect AC power cords to CPU/IO modules 0 and 1 at the same time.
16. Confirm that PRIMARY LED of CPU/IO module 0 goes on after a while.
    If PRIMARY LED of CPU/IO module 1 is lit, disconnect AC power cords from both CPU/IO modules, wait for 30 seconds, and connect them at the same time.
17. When the POWER LEDs on CPU/IO modules 0 and 1 starts blinking, press the POWER switch to turn on the server.
18. When the following message appears, press the <**F2**> key to start BIOS SETUP utility.
    ```
    Press <F2> SETUP, <F4> ROM Utility, <F12> Network
    ```
19. On **Save & Exit** menu of BIOS SETUP, select **Load Setup Defaults**, and then **Save Changes and Exit**.

Clearing a password

1. Disconnect AC power cords from CPU/IO modules 0 and 1.
2. Remove CPU/IO module 0.
   Refer to *Chapter 2 (5.4 CPU/IO Module).*
3. Remove the top cover.
4. Confirm the position of Clear Password Jumper.
5. Change jumper switch to "PASS CLR" position.
6. Assemble the CPU/IO module 0 and install it to the server.
7. Connect AC power cords to CPU/IO modules 0 and 1 at the same time.
8. Confirm that PRIMARY LED of CPU/IO module 0 goes on after a while.
   If PRIMARY LED of CPU/IO module 1 is lit, disconnect AC power cords from both CPU/IO modules, wait for 30 seconds, and connect them at the same time.
9. When the POWER LEDs on CPU/IO modules 0 and 1 starts blinking, press the POWER switch to turn on the server.
10. If the following warning message appears, press the POWER switch to power off the server.
    (POST proceeds even when the warning message is displayed.)

    ```
    WARNING
    8007:SETUP Menu Password cleared by Jumper.
    ```

11. Disconnect AC power cords from CPU/IO modules 0 and 1.
12. Remove CPU/IO module 0, and remove its top cover.
13. Change jumper switch setting to its original position (Protect).
14. Assemble the CPU/IO module 0.
15. Connect AC power cords to CPU/IO modules 0 and 1.

10. System Diagnostics

The System Diagnostics runs several tests on the server to check if the server works normally.

10.1 Test Items

The following items are tested in System Diagnostics.

- Memory
- CPU cache memory
- Hard disk drive

Important **To avoid affecting a network and storage system, disconnect a LAN cable, Fibre Channel, NEC Storage, and other external storage before running System Diagnostics. If the System Diagnostics is run while the devices described above, networks or storage systems may be affected.**

Tips On checking hard disk drives, no data is written to the disk.

10.2 Startup and Exit of System Diagnostics

Start up System Diagnostics in the following procedure. (If the server is running, shutdown the system.)

1. Start up EXPRESSBUILDER and select **Tool menu** from Boot menu.

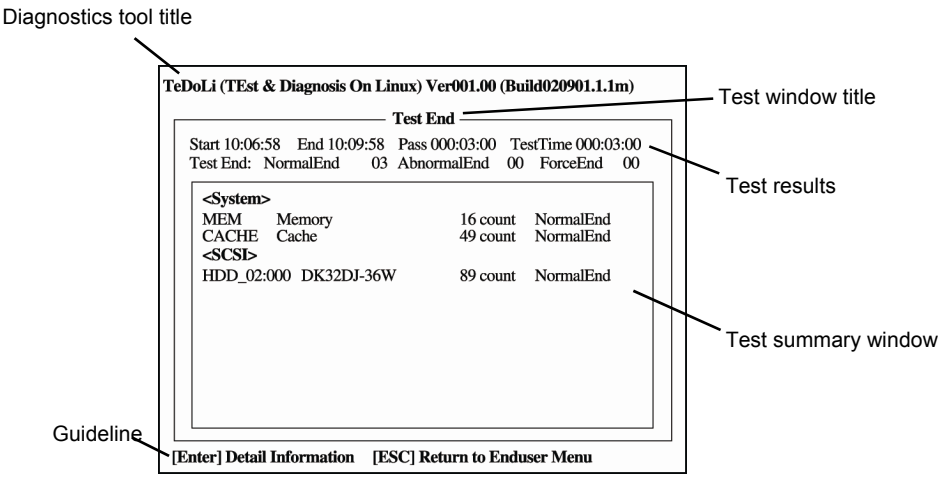
   For information on starting up EXPRESSBUILDER, see *Chapter 3 (5. Details of EXPRESSBUILDER)*.

   Note Choose English if Language Selection Menu appears.

2. Select **Test and diagnostics**.
3. Select **End-User Mode (Basic)** to start System Diagnostics. This process takes about three minutes. When the diagnostics is completed, the screen display changes as shown below.

   See *eupro_ug_en.pdf* in the \isolinux\diag folder of EXPRESSBUILDER for the **End-User Mode (Professional)** feature.

   Supervisor-Mode is intended for maintenance personnel.



Diagnostics tool title
Shows the name and version of the diagnostic tool.

Test window title
Shows the progress of the diagnostics. “Test End” is displayed when the diagnostics completes.

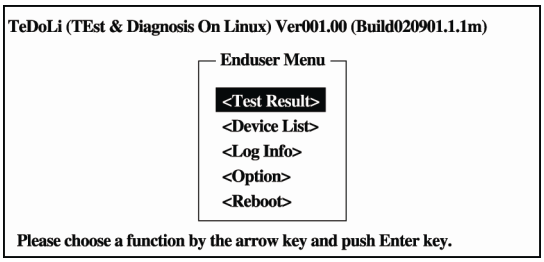
Test results
Shows the start, end, and elapsed time and completion status of the diagnostics.

Guideline
Shows the details of the keys to operate window.

Test summary window
Shows the results of each test. Move the cursor and press <**Enter**> key on the cursor line to display the details of the test.

When an error is detected by the System Diagnostics, the relevant test result in the Test summary window is highlighted in red, and “**Abnormal End**” is displayed in the result on the right side.
Move the cursor to the test that detected the error, and press <**Enter** > key. Take notes about the error message that has been output to the Detail Information screen and contact the store where you purchased the product or your maintenance service company.

4. Follow the guideline shown at the bottom of the screen, and press <**Esc**> key.
   The **Enduser Menu** below is displayed.



<Test Result>
Shows the diagnostics completion screen of the above diagnostics.

<Device List>
Shows a list of connected devices.

<Log Info>
Shows the log information of the diagnostics. Log information can be saved. To save it, connect a FAT formatted removable media, and then select **Save(F)**.

<Option>
Optional features can be used from this menu.

<Reboot>
Reboots the server.

5. Select **Reboot** in **Enduser Menu**.
   The server restarts. Remove EXPRESSBUILDER DVD from the drive.

System Diagnostics is now completed.

11. Offline Tools

Offline tools are used for maintenance, failure analysis, and the settings of the server.

11.1 Starting Offline Tools

Start up the offline tools at the following steps.

1. Turn on the peripheral devices and then the server.
2. Press <**F4**> key while the message below is displayed.

```
Press <F2> SETUP, <F4> ROM Utility, <F12> Network
```

3. Keyboard Selection Menu appears after POST completion.
   The following menu is displayed, after choosing a keyboard type.

Off-line TOOL MENU
Maintenance Utility
BMC Configuration
Exit

4. Choose **Maintenance Utility** or **BMC Configuration** to start each tool.

   See the next section "*11.2 Features of Offline Tools*" for more information.

11.2 Features of Offline Tools

The offline Tools offer the following features.

Note Disable RDX by setting RDX to hibernate mode before starting the offline tools.

Off-line Maintenance Utility

The Off-line Maintenance Utility is started when **Maintenance Utility** is chosen. The Off-line Maintenance Utility is used for preventive maintenance and failure analysis for the system. If you are unable to start NEC ESMPRO due to a failure, Off-line Maintenance Utility can be used to check the cause of the failure.

Note Off-line Maintenance Utility is intended for maintenance personnel. Consult with your sales representative if a trouble that requires Off-line Maintenance Utility occurred.

Off-line Maintenance Utility has the following features.

– IPMI Information Viewer
Displays System Event Log (SEL), Sensor Data Record (SDR), and Field Replaceable Unit (FRU) in Intelligent Platform Management Interface(IPMI) and also back up such logs.
Using this feature, system errors and events can be investigated to locate the component to be replaced. You can also clear the SEL area, and specify the operation when the SEL area becomes full.

Tips DIMM information (DIMMx FRU#y) displayed when you select **Display Most Recent IPMI Data** → **Field Replaceable Unit (FRU) List** is the one for CPU/IO module on primary side.

For the CPU/IO module on opposite side, the following message will be displayed, Ignore the message because this is not a failure

```
WARNING!
No Information.
The Device is not detected or it is broken.
```

– System Information Viewer
Displays and saves information on processor (CPU), BIOS.
System Information Management
Specifies Product data and other System data.

BMC Configuration

– Uses this utility to specify the alert notification feature by Baseboard Management Controller (BMC) and use the remote management feature by "PC for Management".
See *Chapter 3 (2. BMC Configuration)* for more information.

NEC Express5800 Series
Express5800/R320e-E4, R320e-M4

2

Configuring and Upgrading the System

This chapter describes procedure for change configuration and installing internal option devices.

1. **Hard Disk Drive Duplexing**
   Describes how to duplex hard disk drives.

2. **Network Duplexing**
   Describes how to configure duplex LAN.

3. **Configuring Video Mode**
   Describes how to change video mode settings.

4. **Service Programs**
   Describes service programs used for the server.

5. **Installing and Replacing Optional Devices**
   Describes procedure for installing, replacing, or removing internal option devices

1. Hard Disk Drive Duplexing

Hard disk drive duplexing is described here.

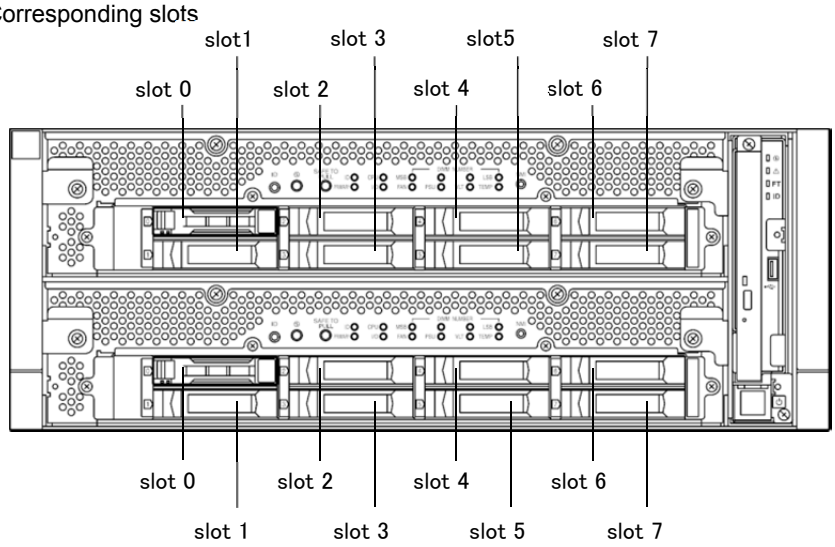
Important

- **To pull out and insert the hard disk drive, wait for 30 seconds or longer after pulling out the hard disk drive before inserting it.**
- **Use LVM after configuring RAID1 or RAID1+0. The configuration to create RAID furthermore on the LVM logical volume is not supported. LVM provides the advanced storage function. However, the procedure for management or recovery in case of a failure is complex. It is recommended to use LVC only if it is required.**

1.1 Available Disk Configuration

All the built-in hard disks must be duplicated in this system. The built-in hard disk of the slot corresponding to the following table creates the redundancy configuration by using the software RAID1.

Corresponding slots



Slots corresponding to the mirroring process

Corresponding slots
CPU/IO module 0 slot 0 ←→ CPU/IO module 1 slot 0
CPU/IO module 0 slot 1 ←→ CPU/IO module 1 slot 1
CPU/IO module 0 slot 2 ←→ CPU/IO module 1 slot 2
CPU/IO module 0 slot 3 ←→ CPU/IO module 1 slot 3
CPU/IO module 0 slot 4 ←→ CPU/IO module 1 slot 4
CPU/IO module 0 slot 5 ←→ CPU/IO module 1 slot 5
CPU/IO module 0 slot 6 ←→ CPU/IO module 1 slot 6
CPU/IO module 0 slot 7 ←→ CPU/IO module 1 slot 7

Use the ftdiskadm command for duplexing hard disk drives. Slot numbers of internal hard disk drives are allocated as follows;

Slot number of hardware	Slot number used in ftdiskadm
CPU/IO module 0 slot 0	1
CPU/IO module 0 slot 1	2
CPU/IO module 0 slot 2	3
CPU/IO module 0 slot 3	4
CPU/IO module 0 slot 4	5
CPU/IO module 0 slot 5	6
CPU/IO module 0 slot 6	7
CPU/IO module 0 slot 7	8
CPU/IO module 1 slot 0	9
CPU/IO module 1 slot 1	10
CPU/IO module 1 slot 2	11
CPU/IO module 1 slot 3	12
CPU/IO module 1 slot 4	13
CPU/IO module 1 slot 5	14
CPU/IO module 1 slot 6	15
CPU/IO module 1 slot 7	16

Tips The slot number of the ftdiskadm command can be checked in "2 List Internal Disks".

1.2 How to Duplicate the Hard Disk Drive

The ftdiskadm command duplicates the hard disk drive. Examples of duplicating Slot 2 and Slot 10 are described here.

Tips

- For the slot number, refer to "1.1 Available Disk Configuration".
- The ext4 file system can be created by default. The file system can be changed with the commands such as mkfs.

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Execute "3 Make Mirroring Arrays (RAID1)" of the ftdiskadm command, and set the desired partition in the hard disk drive for which the slot number has been specified. The hard disk drive is duplicated automatically after this setting.

```
# ftdiskadm

Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 3

[Make Mirroring Arrays   (RAID1)]
* Which scsi SLOT? [1-16] 2 ------------------------------------- (*1)

Making the disk partition table: SLOT=2 SIZE=286102(MB)
      Reserved for the last partition: SIZE=1024(MB)
  * How many partitions? [1-128] 3 ------------------------------ (*2)
    * Input the SIZE of partition 1  [1-285077(MB)] 100000
    * Input the SIZE of partition 2  [1-185078(MB)] 100000
                     partition 3                    86102
  * Input the LABEL [1-12 character(s)] ------------------------- (*3)
* Are you sure to create it? [y/n] y ---------------------------- (*4)
mdadm: Note: this array has metadata at the start and
    may not be suitable as a boot device.  If you plan to
    store '/boot' on this device please ensure that
    your boot-loader understands md/v1.x metadata, or use
    --metadata=0.90
Continue creating array? y ------------------------------------- (*5)
```

*1 Input the slot number (2). The slot number (10) of the pair disk can be input as well.

*2 Input the number of the partitions to be created, and input each partition size in MB unit. For the final partitions, all remaining ones are allocated automatically.

Tips

- The allowable partition size is smaller than the actual hard disk drive capacity.
- The actually secured partition size may be slightly different from the input value since the partition is secured in accordance with the border of the hard disk drive cylinder.
- Although division into up to 128 partitions is enabled, the load of the entire system increases and the performance is lowered as more partitions are secured.

*3 Input the volume label as required. For more than one partition, "<Input value>_s<Partition number> is set.

Tips The volume label can be changed with the commands such as e2label.

*4 Input "y" if there is no problem.
*5 If the confirmation message appears, input "y". This message appears as many as the number of the created partitions at a maximum.

3. Execute "1 List RAID Arrays" of the ftdiskadm command to check that the hard disk has been correctly duplicated.

```
Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 1

[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Mirroring Array (RAID1)   >
md0                   DUPLEX            (2)104002-part1      (10)114002-part1
md1                   DUPLEX            (2)104002-part2      (10)114002-part2
md2                   DUPLEX            (2)104002-part3      (10)114002-part3
md123 /var/crash      DUPLEX            (1)104001-part2       (9)114001-part2
md124 /boot/efi       DUPLEX            (1)104001-part5       (9)114001-part5
md125 swap            DUPLEX            (1)104001-part3       (9)114001-part3
md126 /boot           DUPLEX            (1)104001-part4       (9)114001-part4
md127 /               DUPLEX            (1)104001-part1       (9)114001-part1
```

<Descriptions>

Name RAID device name
Partition Mount point
Status RAID device status

Status	Description
DUPLEX	Duplicated normally.
SIMPLEX	Only one side of RAID is installed. The uninstalled member is not displayed. In this case, repair is required.
RECOVERY(XX.X%)	The device out of the redundancy configuration is being created again (resynchronization). If it is completed, the status changes to "DUPLEX".
RESYNC(XX.X%)	The redundancy configuration is being calculated again.
CHECK(XX.X%)	The data integrity is being checked.
REPAIR(XX.X%)	The data integrity is being checked/repaired.
RESYNC	Recovery or synchronization processing is being waited for. If "R" is added to the member, its recovery processing is being waited for.

Member The information of the member that forms RAID is displayed in the "(Slot number) device name" format as the number of the member. "F" is checked on the left side of the device name for the member out of the redundancy configuration in case of an abnormality. In this case, repair is required.

Member information	Meaning
Upper 2 digits of 6 digits at the head	10 means the disk installed to the CPU/IO module 0, while 11 means the disk installed to the CPU/IO module 1.
2 digits at the middle of 6 digits at the head	Fixed as "40".
Lower 2 digits of 6 digits at the head	Indicates the value +1 of the hardware slot number. (Any value among "01" to "08")
-part<X>	Partition number inside the disk.

Important **Do not pull out/insert the hard disk drive or stop/restart the system while each RAID device status is "RESYNC", "RECOVERY", "CHECK" or "REPAIR". Wait until each status changes to "DUPLEX".**

1.3 How to Create the Striping Array

The striping array (RAID0) is the RAID device that has the function to distribute the I/O request that was issued to the striping array to each member.
This function improves the I/O performance and the data reading/writing speed for the striping array becomes higher. In contrast to the RAID1 of the redundancy configuration, the disk capacity that can be used for the striping array is as large as that for the total of members. The member installed to the striping array must be separate hard disk drive. Otherwise, the I/O performance is not improved. Be careful of it.
If consisting only of the striping array and a failure occurs in any members, the entire array cannot be used and the fault tolerance is lowered However, if the RAID1 device is used for the members of the array, the device (RAID1+0) can be created so that it has the improved fault tolerance as well as the improved I/O performance.

Note

To take advantage of characteristics of the striping array effectively, 4 units or more of the hard disk drive must be added.

Tips

- For the striping array, a set of the RAID1 device that has been already created must be used. At this time, it is recommended to back up the user data as required since the data written in the RAID1 device is deleted.
- To take full advantage of the characteristics of the striping array, it is recommended that capacities of each RAID1 device should be even.

Create the striping array using the ftdiskadm command. The following describes how to create the striping array of md0 (the RAID1 device on Slot 2 and Slot 10) and md1 (the RAID1 device on Slot 3 and Slot 11).

Tips

- For the slot number, refer to "1.1 Available Disk Configuration" in this chapter.
- The ext4 file system can be created by default. The file system can be changed with the commands such as mkfs.

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Execute "1 List RAID Arrays" of the ftdiskadm command, and check that the status of the RAID1 devices md0 and md1 is "DUPLEX" and Partition is blank (not mounted).

```
# ftdiskadm

  (omitted)

Command: 1

[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Mirroring Array (RAID1)   >
md0                   DUPLEX           (2)104002-part1      (10)114002-part1
md1                   DUPLEX           (3)104003-part1      (11)114003-part1
md123 /var/crash      DUPLEX           (1)104001-part2       (9)114001-part2
md124 /boot/efi       DUPLEX           (1)104001-part5       (9)114001-part5
md125 swap            DUPLEX           (1)104001-part3       (9)114001-part3
md126 /boot           DUPLEX           (1)104001-part4       (9)114001-part4
md127 /               DUPLEX           (1)104001-part1       (9)114001-part1
```

3. Execute "7 Make Striping Array (RAID1+0)" of the ftdiskadm command, and install the RAID1 device to the striping array. If the RAID1 device is md0 or md1, input 0 or 1. The message to notify of execution of processing appears on the screen. If the main menu of the ftdiskadm command appears without any error, the striping array is normally created.

```
Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 7

[Make Striping Array     (RAID1+0)]
* Which raid1 device numbers? ['?' for help] => 0,1
mdadm: /dev/md0 appears to contain an ext2fs file system
       size=292836608K  mtime=Thu Jan  1 09:00:00 1970
mdadm: /dev/md1 appears to contain an ext2fs file system
       size=292836608K  mtime=Thu Jan  1 09:00:00 1970
Continue creating array? y  ※input "y"
```

4. Execute "1 List RAID Arrays" of the ftdiskadmcommand, and check that the striping array md2 (RAID device name is allocated automatically), and "ACTIVE" is displayed in Status and md0 or md1 in Member.

```
 [List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Striping Array  (RAID1+0) >
md2                   ACTIVE           md0 md1
< Mirroring Array (RAID1)   >
md0                   DUPLEX            (2)104002-part1      (10)114002-part1
md1                   DUPLEX            (3)104003-part1      (11)114003-part1
md123 /var/crash      DUPLEX            (1)104001-part2       (9)114001-part2
md124 /boot/efi       DUPLEX            (1)104001-part5       (9)114001-part5
md125 swap            DUPLEX            (1)104001-part3       (9)114001-part3
md126 /boot           DUPLEX            (1)104001-part4       (9)114001-part4
md127 /               DUPLEX            (1)104001-part1       (9)114001-part1
```

1.4 How to Locate Failed Disks

The hard disk drive in which a failure occurs can be identified. The following is an example of a failure in the hard disk drive inserted into Slot 9.

Tips For the slot number, refer to "1.1 Available Disk Configuration" in this chapter.

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Execute "1 List RAID Arrays" of the ftdiskadm command to check the hard disk in which a failure occurs according to the displayed information. If "F" appears at the head of "Member" of the displayed information, this indicates that the partition of the hard disk drive is abnormal. The number enclosed in parentheses is the slot number to indicate the problematic disk and partition.

```
# ftdiskadm

Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 1

[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Mirroring Array (RAID1)   >
md123 /var/crash      DUPLEX             (1)104001-part2       (9)114001-part2
md124 /boot/efi       DUPLEX             (1)104001-part5       (9)114001-part5
md125 swap            SIMPLEX            (1)104001-part3    F  (9)114001-part3
md126 /boot           DUPLEX             (1)104001-part4       (9)114001-part4
md127 /               DUPLEX             (1)104001-part1       (9)114001-part1
```

1.5 How to Recover the Failed Disk

The procedure for replacing the failed hard disk drive and duplicate the drive again is described here. The following is an example of the step starting from disconnection of the hard disk drive inserted into Slot 9 to its recovery.

Tips For the slot number, refer to "1.1 Available Disk Configuration" in this chapter.

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Execute "6 Remove Disk Partitions (RAID1)" of the ftdiskadm command, specify the slot number of the hard disk drive in which a failure occurs, and disconnect the drive.

```
# ftdiskadm

Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 6 ------------------------------------------------------ (*1)

[Remove Disk Partitions  (RAID1)]
* Which SCSI SLOT? [1-16] 9

mdadm : hot removed /dev/sdr2 from /dev/md123
mdadm : hot removed /dev/sdr5 from /dev/md124
mdadm : hot removed /dev/sdr3 from /dev/md125
mdadm : hot removed /dev/sdr4 from /dev/md126
mdadm : hot removed /dev/sdr1 from /dev/md127

  (omitted)

Command: 1 ------------------------------------------------------ (*2)

[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Mirroring Array (RAID1)   >
md123 /var/crash      SIMPLEX           (1)104001-part2
md124 /boot/efi       SIMPLEX           (1)104001-part5
md125 swap            SIMPLEX           (1)104001-part3
md126 /boot           SIMPLEX           (1)104001-part4
md127 /               SIMPLEX           (1)104001-part1
```

*1 Disconnect the hard disk drive to be specified by the slot number.
*2 Check that the hard disk drive is disconnected.

3. Replace the hard disk drive by referring to "5.3 2.5-inch Hard Disk Drive" in this chapter.
4. Execute "2 List Internal Disks" of the ftdiskadm command, and check that the new hard disk drive is recognized by the system.

```
[List Internal Disks]

Slot  Name [Use]       Information (Vendor/Model/Serial)          Path
================================================================================
   1  104001(sdq) [0]  HGST/HUC156030CSS200/#0TGR84RP             h1c0t0l0
   2  -
   3  -
   4  -
   5  -
   6  -
   7  -
   8  -
   9  114001(sdr) [0]  HGST/HUC156030CSS200/#0TGR63VP             h2c0t0l0
  10  -
  11  -
  12  -
  13  -
  14  -
  15  -
  16  -
```

5. Wait for about 5 minutes until the recovery process (resynchronization) starts automatically.

Tips If the hard disk drive is not recovered automatically, execute "4 Repair Mirroring Arrays (RAID1)" of the ftdiskadm command, and specify the slot number of the replaced hard disk drive.

6. Execute "1 List RAID Arrays" of the ftdiskadm command, and check the recovery (DUPLEX).

```
[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Mirroring Array (RAID1)   >
md123 /var/crash      DUPLEX             (1)104001-part2      (9)114001-part2
md124 /boot/efi       DUPLEX             (1)104001-part5      (9)114001-part5
md125 swap            DUPLEX             (1)104001-part3      (9)114001-part3
md126 /boot           DUPLEX             (1)104001-part4      (9)114001-part4
md127 /               DUPLEX             (1)104001-part1      (9)114001-part1
```

The following appears during the recovery process. Check this again after a while.

```
[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Mirroring Array (RAID1)   >
md123 /var/crash      RECOVERY(73.2%)    (1)104001-part2    R (9)114001-part2
md124 /boot/efi       RESYNC             (1)104001-part5    R (9)114001-part5
md125 swap            RESYNC             (1)104001-part3    R (9)114001-part3
md126 /boot           RESYNC             (1)104001-part4    R (9)114001-part4
md127 /               RESYNC             (1)104001-part1    R (9)114001-part1
```

1.6 How to Clear the Duplication of the Hard Disk Drive

The duplicated hard disk drive is cleared by using ftdiskadm command. Examples of clearing duplication of Slot 2 and Slot 10 are described here.

Tips For the slot number, refer to "1.1 Available Disk Configuration" in this chapter.

1. Log in to the server as the root user. If you login with graphical mode, select [Others...] to login.

2. Execute "1 List RAID Arrays" of the ftdiskadm command, and check the RAID1 device duplicated by Slot 2 and Slot 10. The following is an example of checking the RAID1 device. (The RAID1 devices are described as md0-md2 in below.)

```
# ftdiskadm

Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 1

[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Mirroring Array (RAID1)   >
md0   /data           DUPLEX             (2)104002-part1      (10)114002-part1
md1                   DUPLEX             (2)104002-part2      (10)114002-part2
md2   /work           DUPLEX             (2)104002-part3      (10)114002-part3
md123 /var/crash      DUPLEX             (1)104001-part2       (9)114001-part2
md124 /boot/efi       DUPLEX             (1)104001-part5       (9)114001-part5
md125 swap            DUPLEX             (1)104001-part3       (9)114001-part3
md126 /boot           DUPLEX             (1)104001-part4       (9)114001-part4
md127 /               DUPLEX             (1)104001-part1       (9)114001-part1
```

Important **If setting that the RAID devices are mounted automatically when system starts up in /etc/fstab, clear the setting by editing /etc/fstab. If the RAID device is deleted without above, the system may not start up normally.**

Note

- While each RAID device status is "RESYNC", "RECOVERY", "CHECK" or "REPAIR", the duplication of hard disk drive can not be cleared. Wait until status changes to "DUPLEX". If status is "SIMPLEX", you can clear duplication.
- Unmount RAID device, if mounted.
- If the RAID device is configured as physical volume in a part of LVM (Logical Volume Manager) or the striping array member, remove the RAID device from LVM or the striping array before clearing duplication of hard disk drive.
- It is recommended to back up the user data as required.

3. Execute "5 Delete Mirroring Arrays (RAID1)" of the ftdiskadm command, and clear duplication of the hard disk drive whitch the slot number has been specified.

```
Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 5

[Delete Mirroring Arrays (RAID1)]
* Which scsi SLOT? [1-16] 2 ------------------------------------ (*1)
mdadm: stopped /dev/md0
mdadm: stopped /dev/md1
mdadm: stopped /dev/md2
```

*1 Enter the slot number (2). The slot number (10) of the pair disk can be enterd as well.

4. Execute "1 List RAID Arrays" of the ftdiskadm command, and check that the duplicated hard disk has been correctly cleared.

```
Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 1

[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Mirroring Array (RAID1)   >
md123 /var/crash      DUPLEX            (1)104001-part2      (9)114001-part2
md124 /boot/efi       DUPLEX            (1)104001-part5      (9)114001-part5
md125 swap            DUPLEX            (1)104001-part3      (9)114001-part3
md126 /boot           DUPLEX            (1)104001-part4      (9)114001-part4
md127 /               DUPLEX            (1)104001-part1      (9)114001-part1
```

1.7 How to Delete the Striping Array

The ftdiskadm command deletes the striping array.

Tips For the slot number, refer to "1.1 Available Disk Configuration".

1. Log in to the server as the root user. If you login with graphical mode, select [Others…] to login.

2. Execute “1 List RAID Arrays” of the ftdiskadm command, and check the RAID1+0 devices.
   The following is an example of checking the RAID1+0 devices.
   (The RAID1+0 device is described as md2 in below.)

```
# ftdiskadm

Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 1

[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Striping Array (RAID1+0)   >
md2   /data           ACTIVE           md0 md1
< Mirroring Array (RAID1)   >
md0                   DUPLEX             (2)104002-part1      (10)114002-part1
md1                   DUPLEX             (3)104003-part1      (11)114003-part1
md123 /var/crash      DUPLEX             (1)104001-part2       (9)114001-part2
md124 /boot/efi       DUPLEX             (1)104001-part5       (9)114001-part5
md125 swap            DUPLEX             (1)104001-part3       (9)114001-part3
md126 /boot           DUPLEX             (1)104001-part4       (9)114001-part4
md127 /               DUPLEX             (1)104001-part1       (9)114001-part1
```

Important **If setting that the RAID1+0 devices are mounted automatically when system starts up in /etc/fstab, clear the setting by editing /etc/fstab. If the RAID1+0 device is deleted without above, the system may not start up normally.**

Note

- Unmount the RAID1+0 device, if mounted
- If the RAID device is configured as physical volume in a part of LVM (Logical Volume Manager), remove the RAID1+0 device from LVM before clearing the striping array.
- It is recommended to back up the user data as required.

3. Execute "8 Delete Striping Array (RAID1+0)" of the ftdiskadm command, and clear the striping array.

```
Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 8

[Delete Striping Array   (RAID1+0)]
* Which raid1+0 device number? ['?' for help] => 2 ------- (*1)
mdadm: stopped /dev/md2
```

*1 Enter numeric portion of RAID1+0 device. (For example, If the RAID1+0 device is md2, enter 2.)

4. Execute "1 List RAID Arrays" of the ftdiskadm command, and check that the striping array has been correctly deleted.

```
Command action
   1  List RAID Arrays
   2  List Internal Disks
   3  Make Mirroring Arrays   (RAID1)
   4  Repair Mirroring Arrays (RAID1)
   5  Delete Mirroring Arrays (RAID1)
   6  Remove Disk Partitions  (RAID1)
   7  Make Striping Array     (RAID1+0)
   8  Delete Striping Array   (RAID1+0)
   c  Configurations
   q  Quit

Command: 1

[List RAID Arrays]

Name  Partition       Status           Member
================================================================================
< Mirroring Array (RAID1)   >
md0                   DUPLEX             (2)104002-part1      (10)114002-part1
md1                   DUPLEX             (3)104003-part1      (11)114003-part1
md123 /var/crash      DUPLEX             (1)104001-part2       (9)114001-part2
md124 /boot/efi       DUPLEX             (1)104001-part5       (9)114001-part5
md125 swap            DUPLEX             (1)104001-part3       (9)114001-part3
md126 /boot           DUPLEX             (1)104001-part4       (9)114001-part4
md127 /               DUPLEX             (1)104001-part1       (9)114001-part1
```

2. Network Duplexing

Network duplexing is described here.

Important

- **Do not change the network interface name.**
- **IPv6 is not supported.**
- Do not set each network from the commands (nmcli, etc.) related to NetworkManager that comes with OS. Be sure to use the vndctl command as subsequently described if setting the IP address, subnet mask, default gateway, etc. Set other network setting items manually by referring to the online manual of the man command.

Tips

If the unused network port is displayed as an abnormal in the monitoring software, connect the pair of unused ports by the LAN cable, and set the dummy fixed IP address to enable the coupled interface. Refer to "Chapter 1 (8.7 Problems With Bundled Software)".

2.1 Overview

This system duplicates the network by using the bonding function.

Tips

The bonding mode is not limited. The default setting is active-backup(mode=1).

Network duplication is achieved by pairing network interfaces of PCI slots in CPU/IO module 0 and network interfaces in the same PCI slots in CPU/IO module 1. For this server, network interface names are based on the naming convention as described in the table below.

PCI slot and network interface name

PCI slot	Port	CPU/IO module 0	CPU/IO module 1	Slot number in the vndctl command
1G LAN connector	#1	eth100600 (1)	eth110600 (1)	1
	#2	eth100601 (2)	eth110601 (2)	2
10G LAN connector *	#1	eth101200 (3)	eth111200 (3)	3
	#2	eth101201 (4)	eth111201 (4)	4
PCI slot 1	#1	eth100100 (5)	eth110100 (5)	5
	#2	eth100101 (6)	eth110101 (6)	6
PCI slot 2	#1	eth100200 (7)	eth110200 (7)	7
	#2	eth100201 (8)	eth110201 (8)	8
PCI slot 3 *	#1	eth100300 (9)	eth110300 (9)	9
	#2	eth100301 (10)	eth110301 (10)	10
PCI slot 4 *	#1	eth100400 (11)	eth110400 (11)	11
	#2	eth100401 (12)	eth110401 (12)	12

* R320e-E4 model does not have 10G LAN connector, PCI slot 3, and PCI slot 4.

2.2 How to Duplicate Network

Set duplexing by using the vndctl command. An example of setting the following <Setting contents> is described here.

<Setting contents>

Slot number of the vndctl command: 5

Network interface name (CPU/IO module 0) : eth100100

Network interface name (CPU/IO module 1) : eth110100

IP address: 192.168.0.101

Subnet mask: 255.255.255.0

Default gateway: 192.168.0.1

1. Log in by using the root user. For logging in by using the graphical target (graphical login mode), select [Are you sure to create it?] to log in.

Note

To change the settings of the network that is being operated, disable the coupled interface by the following command, and proceed to step 3.
vndctl down <Slot number>

2. Execute the following command to create each network interface (eth100100 and eth110100) installed to Slot 5 as the coupled interface.

```
# vndctl add 5
```

3. Execute the following command to set the network. Items marked with * must be input by a user. The default gateway can be omitted by pressing the <ENTER> key without inputting.

```
# vndctl config 5
[Virtual Network Setting]
*Boot Protocol? [none/dhcp/bootp] none
*IP address? 192.168.0.101
*Netmask? 255.255.255.0
*Default gateway (IP)? 192.168.0.1

*Are you sure to set it? [y/n] y

NAME=bond2
DEVICE=bond2
TYPE=Bond
BONDING_MASTER=yes
ONBOOT=yes
```

```
BOOTPROTO=none
BONDING_OPTS="miimon=100 mode=active-backup"
IPADDR=192.168.0.101
NETMASK=255.255.255.0
GATEWAY=192.168.0.1
```

4. Execute the following command to enable the coupled interface.

```
# vndctl up 5
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkMa
nager/ActiveConnection/8
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkMa
nager/ActiveConnection/10
```

5. Execute the following command to check that bond2 is configured in Slot 5 and Status of eth100100 and eth110100 is DUPLEX.

```
# vndctl status
--Virtual Network Status-
BondingDevice Slot Status  InetAddress     RXErrors TXErrors Collisions -------- (*1)
bond0         1    ONLINE  10.10.1.151     0        0        0
bond1         2    ONLINE  172.16.40.51    0        0        0
bond2         5    ONLINE  192.168.0.101   0        0        0

Slot        RealDevice Status           Interface LinkState LinkSpeed -------- (*2)
1    Top    eth100600  DUPLEX           UP        LINK      1000Mb/s-FD
     bottom eth100600  DUPLEX           UP        LINK      1000Mb/s-FD
2    Top    eth100601  DUPLEX           UP        LINK      1000Mb/s-FD
     Bottom eth110601  DUPLEX           UP        LINK      1000Mb/s-FD
5    top    eth100100  DUPLEX           UP        LINK      1000Mb/s-FD
     bottom eth110100  DUPLEX           UP        LINK      1000Mb/s-FD
6    top    -
     bottom -
```

*1 Only BondingDevice being operated (ONLINE status) appears. (InetAddress of bond0 and bond1 is an example of displaying.)

*2 All individual interfaces recognized by the system are displayed.

<Descriptions>

[Coupled interface]

BondingDevice Coupled interface name

Slot Number allocated by the vndctl command

Status Status of the coupled interface name

Status	Description
ONLINE	Online
OFFLINE	Offline
BROKEN	Failure in both systems, or disconnected

InetAddress IP address

RXErrors Error packet count (At receiving)

TXErrors Error packet count (At sending)

Collisions Packet collision count

[Network interface]

Slot Number allocated by the vndctl command

RealDevice Network interface name

Status Network interface status

Status	Description
DUPLEX	Duplicated normally.
SIMPLEX	One-side communication
BROKEN	Failure or disconnected

Interface Startup status of interface (UP/DOWN)

LinkState LAN cable connection status (LINK/NOLINK)

LinkSpeed LAN communication speed [Mb/s-FD]

2.3 Clearing Duplexing

The duplicated network is cleared.

1. Run the following command to stop the bonding interfaces corresponding to the slot number <slot>.

```
# vndctl down <slot>
Device 'bondX' successfully disconnected.
```

2. Run the following command to delete the bonding interfaces corresponding to the slot number <slot>.

```
# vndctl del <slot>
```

2.4 Using Shared Directory with Samba

Add directio option to mount command when you use the share of Windows or Samba of Unix OS.

<Example of mount command >

```
# mount -t cifs //<machine name>/<share name> -o username=<user name>,directio <mount point>
```

3. Configuring Video Mode

You cannot use xrandr to change the resolution because the xrandr function is not supported. You cannot change the resolution and the number of colors from application menu due to hardware specification. Take the steps below to change resolution and number of colors.

1. Login with the user having root privilege, and open /etc/X11/xoorg.conf.d/00-ftserver.conf.

Important **00-ftserver.conf is a very important file for the X Window System. It is recommended to make a backup file because corrupting xorg.conf can result in failure to start up the X Window System in the worst case. When you make a backup file, use a different file name for the backup since the file name /etc/X11/xorg.conf.backup is used by the system.**

2. Modify the following configuration in 00-ftserver.conf.

   In the figure below, the resolution is set to 1024x768, refresh rate is set to 70Hz, and the number of colors is set to 16bpp.

   <Changing the numbers of colors>
   Change the value indicated by (1) to the number of colors you want (16bpp or 24bpp).

   * Use of 8 bpp of RHEL7.2 is not allowed. Do not set it.

```
Section "Screen"
        Identifier      "Screen0"
        Device          "Videocard0"
        Monitor         "Monitor0"
        DefaultDepth    16
        SubSection "Display"
                Viewport        0 0
                Depth           16
#               Choose one 16 bpp video mode from the list below
                Modes           "1024x768 @ 70Hz"
#               Modes           "1024x768 @ 75Hz"
#               Modes           "1024x768 @ 85Hz"
#               Modes           "1024x768 @ 70Hz"
#               Modes           "1024x768 @ 60Hz"
#               Modes           "800x600 @ 85Hz"
#               Modes           "800x600 @ 75Hz"
#               Modes           "800x600 @ 72Hz"
#               Modes           "800x600 @ 60Hz"
#               Modes           "1280x1024 @ 85Hz"
#               Modes           "1280x1024 @ 75Hz"
#               Modes           "1280x1024 @ 72Hz"
#               Modes           "1280x1024 @ 60Hz"
#               Modes           "1280x800 @ 60Hz"
#               Modes           "1600x1200 @ 70Hz"
#               Modes           "1600x1200 @ 60Hz"
#               Modes           "640x480 @ 60Hz"
#               Modes           "1280x1024 @ 70Hz"
#               Modes           "1440x900 @ 60Hz"
#               Modes           "1440x900 @ 75Hz"
#               Modes           "1366x768 @ 60Hz"
        EndSubSection
        SubSection "Display"
                Viewport        0 0
                Depth           24
#               Choose one 24 bpp video mode from the list below
                Modes           "1024x768 @ 75Hz"
#               Modes           "1024x768 @ 75Hz"
#               Modes           "1024x768 @ 85Hz"
#               Modes           "1024x768 @ 70Hz"
#               Modes           "1024x768 @ 60Hz"
#               Modes           "800x600 @ 85Hz"
#               Modes           "800x600 @ 75Hz"
#               Modes           "800x600 @ 72Hz"
#               Modes           "800x600 @ 60Hz"
#               Modes           "1280x1024 @ 85Hz"
#               Modes           "1280x1024 @ 75Hz"
#               Modes           "1280x1024 @ 72Hz"
#               Modes           "1280x1024 @ 60Hz"
#               Modes           "1280x1024 @ 70Hz"
#               Modes           "1600x1200 @ 60Hz"
#               Modes           "1440x900 @ 60Hz"
        EndSubSection
        SubSection "Display"
                Viewport        0 0
                Depth           8
#               Choose one 8 bpp video mode from the list below
                Modes           "1024x768 @ 60Hz"
#               Modes           "1024x768 @ 60Hz"
#               Modes           "800x600 @ 60Hz"
#               Modes           "640x480 @ 60Hz"
#               Modes           "1280x1024 @ 60Hz"
        EndSubSection
EndSection
```

<Modify the resolution>
Select a combination of resolution and refresh rate among the list shown by (3), enter the value in Modes shown by (2).

Select the combination of the resolution that can be set by the value (1) in the above figure and refresh rate from (3) in the SubSection as the same as (2) including the same value as (1), and delete "#" at the left edge of the line of the combination of the resolution and refresh rate to be used (applied).

Add "#" to the left edge of the line (combination of the currently-used resolution and refresh rate) that does not have "#" originally.

* Check that only 1 line does not have "#" for the combination of the resolution and refresh rate in the same SubSection.

3. If the X Window System is started, select Logout from the system menu to quit X Window System.
4. The mode is switched to the console mode (CUI), start up the X Window System by entering "startx".

4. Service Programs

This server provides the following service programs in addition to the dedicated drivers.

Service program name
evlog.service
ft-prep.service
ft-retrieveChipsetDumps.service
ft-verify.service
ft.service
kdump.service
network.service
NetworkManager.service
osm.service
rblog.service
snmpd.service
rpcbind.service
ESMntserver.service
ESMamvmain.service
ESMftreport.service

Important **The programs listed in "Service program name" are necessary for the server operation. Do not stop these services.**

5. Installing and Replacing Optional Devices

This section describes procedures to add/remove optional devices and replace failed components.

Important

- **It is recommended that the staff who possesses expertise in this system and belongs to the maintenance and service company approved by NEC handles this system.**
- **If the optional device is added, removed, and replaced according to the procedures other than that described in this chapter, NEC does not assume any liability for the damages to the device and parts, and for the effect on the result of the operation. You will be charged even within the warranty period.**

5.1 Precautions

5.1.1 Safety precautions

Observe the following notes to install or remove optional devices safely and properly.

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 look into the optical disk drive.
- Do not remove the lithium battery, NiMH battery, or Li-ion battery.

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* in *User's Guide*.

- Do not install CPU/IO module with its cover removed.
- Make sure to complete component installation.
- Do not pinch your finger(s).
- Pay attention to hot components.

5.1.2 Check Before Adding an Optional Device

The optional device that can be added may be limited by the version of the ft server control software of this system.

If the optional device requires specific version number, take the following procedure before adding the devices.

1. Confirm the required ft Server Control Software's version, Refer to the *User's Guide* provided with the device, check the NEC website, or contact your sales representative.
2. Verify the version of the ft Server Control Software on your system.
3. After confirming that the version of ft Server Control Software is appropriate to the optional device, add the device onto the server.

For more information on how to verify the working ft Server Control Software version, refer to *Chapter 1 (2.6 Installing Bundled Software)* in *Installation Guide*.

5.1.3 Installing, Removing and Replacing Devices

Note the following, when installing or replacing devices, to improve the performance of this server.

- With this server, optional devices can be replaced during the continuous operation.
  Take extreme care for electric shock and damage to the component due to short-circuit.
- Optional devices cannot be installed or removed during continuous operation.
  After shutting down OS, check that the server is powered off, disconnect all power cords and interface cables from the server before installing or removing the optional devices.
- To remove the CPU/IO module during the continuous operation, disable the intended module (place the module off-line) by using either of the following methods:
  - ft server utility of the NEC ESMPRO Agent
  - NEC ESMPRO Manager from the management PC on the network

  After a new module is installed to the server, enable the module using the ft server utility or the NEC ESMPRO Manager.

Tips The system is defaulted to automatically boot the module, once installed.

- Make sure to provide the same hardware configuration on both CPU/IO modules (except SAS board and internal USB cable).
- Install or remove the optional device so that the both CPU/IO modules have the same configuration also at the slot and socket positions.
- Do not install those devices having different specifications, performance, or features.
- Before removing the set screws from the CPU/IO modules, place the desired module off-line using the ft server utility or the NEC ESMPRO Manager.

5.2 Available Option Devices

Option devices that can be added, removed, or replaced when a failure occurs are as follows:

- 2.5-inch hard disk drive
  The server can contain up to 8 hard disk drives for one CPU/IO module.
  Install hard disk drives in 2.5-inch hard disk drive bay at front of the server.

- DIMM
  Up to 16 devices can be installed per CPU/IO module.
  After removing the CPU/IO module, install DIMMs in DIMM sockets on motherboard of the server.

- Processor (CPU)
  Up to two CPUs can be installed on a CPU/IO module in addition to standard CPU.
  After removing the CPU/IO module, install CPU in CPUs sockets of the server.

- PCI card
  Up to two cards can be installed on a CPU/IO module for R320e-E4 model, or up to 4 cards for R320e-M4 model.
  After removing the CPU/IO module, install PCI card in PCI card slot of the server.
- Internal USB cable
  Installation of the internal USB cable enables you to add up to two USB ports compatible with USB3.0 per CPU/IOmodule. Remove the CPU/IO module installed to this system, and install/remove the cable.

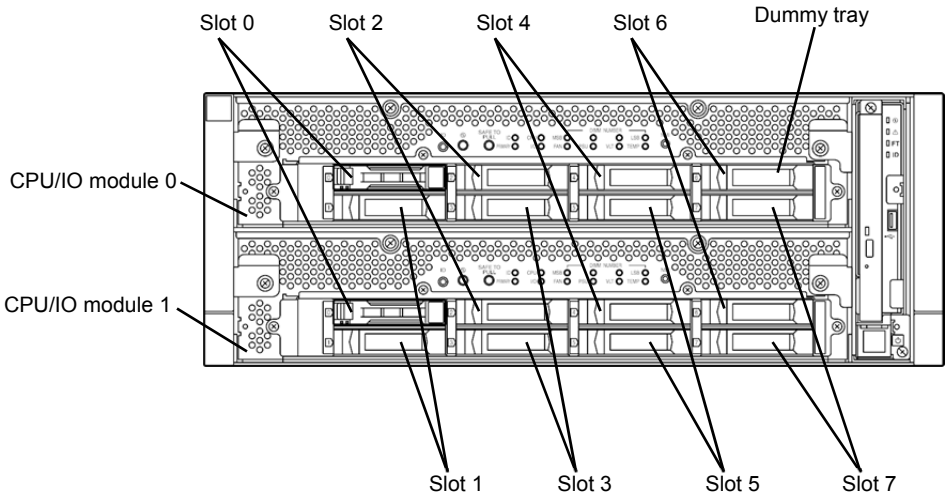
5.3 2.5-inch Hard Disk Drive

The 2.5-inch hard disk drive bays in front of the server can mount up to 8 hard disk drives with the 2.5 inch width exclusive trays for one CPU/IO module.

Important

- **Do not use any hard disks that are not authorized by NEC. Installing a third-party hard disk may cause a failure of the server as well as the hard disk.**
- **Purchase hard disks of the same model in pair. Contact your sales agent for hard disk drives optimum for your server.**

The operation is executed on the created mirror volume with installed hard disk drive pairs such as slot 0 on CPU/IO module 0/1, slot 1 on CPU/IO module 0/1, slot 2 on CPU/IO module 0/1. (The OS is installed on the mirror volumes that consist of the hard disks in the slot 0.)



Slots to execute the mirroring process

Empty slots in the 2.5-inch hard disk drive bay contain dummy trays. The dummy trays are inserted to improve the cooling effect in the server. Always insert the dummy trays in the slots with no hard disks drive installed.

5.3.1 Installing 2.5-inch Hard Disk Drive

Follow the procedure below to install the hard disk drives. Install the hard disk drives from a smaller slot number to larger number on CPU/IO module 0/1, from slot 0 to slot through slot 7.

Important

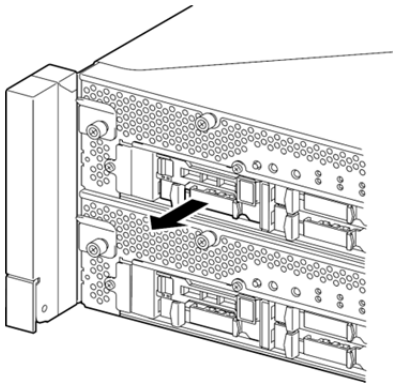
- **See *Chapter 2 (*"5.1.3 Installing, Removing and Replacing Devices"*)* and *Chapter 1 (1.8 Anti-Static Measures)in Safety Precautions and Regulatory Notices* before starting installing or removing options.**
- **If you install the hard disk drives with the system turned off, mount a pair of two hard disk drives that form dual disk configuration before starting the system. After the system started up, see *Chapter 2* (*1. Hard Disk Drive Duplexing*) to set the dual disk configuration**

Below is procedure with the system started.

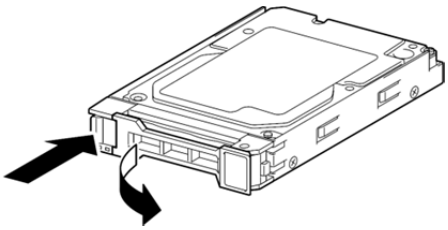
1. Remove the front bezel.
2. Identify the slot to which you want to install a hard disk drive.
3. If a dummy tray is inserted in a slot you want to install the hard disk drive, remove the dummy tray.

Important

Keep and store the dummy tray for future use.



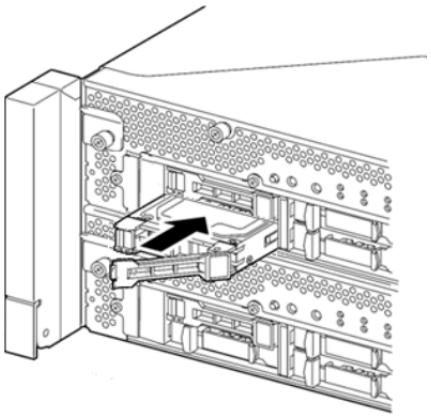
4. Unlock the hard disk drive.



5. Firmly hold the handle of the hard disk drive to install and insert the drive into the slot.

Note

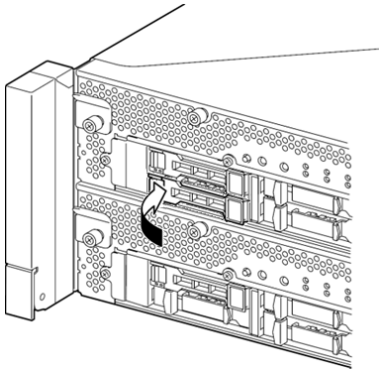
- Insert the hard disk drive until the lever hook touches the server frame.
- Check the direction of the lever. Insert the hard disk drive with the lever unlocked.



6. Slowly close the lever. When the lever is locked, you will hear a click sound.

Important **Be careful not to pinch your finger(s) between the lever and tray.**

Note Check the hook of the lever is engaged with the frame.



7. Also insert other hard disk drive paired in same procedure. See *Chapter2 (1.1 Available Disk Configuration)* about the hard disk drive paired.
8. See *Chapter 2* (*1. Hard Disk Drive Duplexing*) to set the dual disk configuration.
9. Install the front bezel.

5.3.2 Removing 2.5-inch Hard Disk Drive

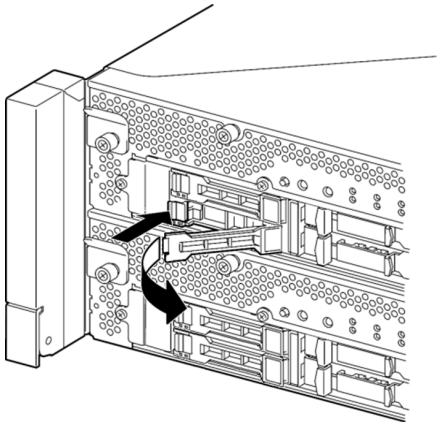
Follow the procedure below to remove the hard disk drive.

Important

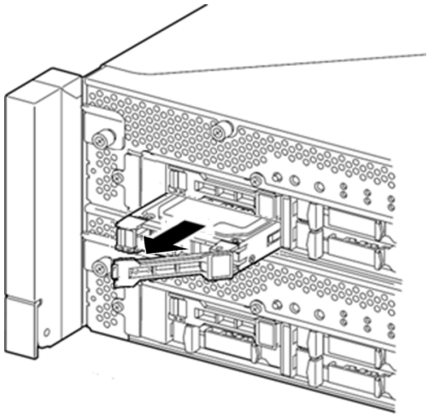
- **See *Chapter 2 (*"5.1.3 Installing, Removing and Replacing Devices"*)* and *Chapter 1 (1.8 Anti-Static Measures)in Safety Precautions and Regulatory Notices*before starting installing or removing options.**
- **Make sure that the dual disk configuration is cleared by referring to *Chapter 2 (1.6 How to Clear the Duplication of the Hard Disk Drive)* before removing the hard disk drives.**
- **If the RAID device of which you will remove the hard disk drives is set to mount automatically, clear the setting by editing /etc/fstab in advance.**
- **If you remove the hard disk drive with the system turned off, clear the setting to mount the RAID device automatically by editing /etc/fstab on OS in advance. If the RAID device is deleted without above, the system may not start up normally.**

Below is procedure with the system started.

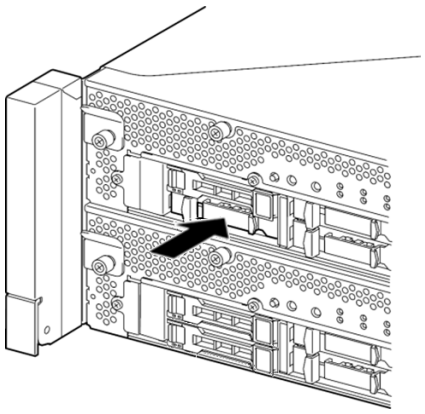
1. Clear the dual disk configuration by referring to *Chapter 2 (1.6 How to Clear the Duplication of the Hard Disk Drive*).
2. Remove the front bezel.
3. Push the lever of the hard disk to unlock the drive, and pull the handle toward you.



4. Hold the handle and hard disk drive to pull them off.



5. Install the dummy tray in an empty slot.



6. Also remove the other hard disk drive paired and install the dummy tray in same procedure. See Chapter2 (1.1 Available Disk Configuration) about the hard disk drive paired.

7. Install the front bezel.

5.3.3 Replacing 2.5-inch Hard Disk Drive

Follow the procedure below to remove the failed hard disk drive. The hard disk drive is replaced with new device while the server is continuously running.

Important **See *Chapter 2 (*"5.1.3 Installing, Removing and Replacing Devices"*)* and *Chapter 1 (1.8 Anti-Static Measures)in Safety Precautions and Regulatory Notices* before starting installing or removing options.**

Replacing the Hard Disk Drive

1. Locate the failed hard disk drive.
   When a hard disk drive fails, the DISK ACCESS LED on the hard disk drive's handle lights amber. Refer to *Chapter 2 (1.4 How to Locate Failed Disks)*.
2. Remove the failed hard disk according to *Chapter 2 (1.5 How to Recover the Failed Disks)* and *(5.3.2 Removing 2.5-inch Hard Disk Drive)*.
3. Wait at least 30 seconds, and then gollow the steps in *Chapter 2 (5.3.1 Installing 2.5-inch Hard Disk Drive)* to install a new hard disk drive.

Note

- The hard disk drive to be installed for replacement must have the same specifications as its mirroring hard disk drive.
- Use unsigned hard disk drive for replacement. To use the signed hard disk drive, it is necessary to restore the duplex configuration according to *Chapter 2* (*1.5 How to Recover the Failed Disks)* after formatting the disk physically.
  As to physical format, see *Chapter 3* (*3.3 Physical Formatting of the Hard Disk Drive*).

4. Restore the redundant configuration.

   See *Chapter 2 (1.5 How to Recover Failed Disks)*.

5.4 CPU/IO Module

To replace a CPU (processor), DIMM (memory), or PCI card, you need to remove the CPU/IO module.

Important

- **See *Chapter 2 (*"5.1.3 Installing, Removing and Replacing Devices"*)* and *Chapter 1 (1.8 Anti-Static Measures)in Safety Precautions and Regulatory Notices)* before starting installing or removing options.**
- **To install or remove CPU or DIMM, first power off the server before removing the CPU/IO module.**
- **Removing the module being operating may cause unexpected trouble. Use the management software (e.g., ft server utility or NEC ESMPRO Manager) to isolate the CPU/IO module to be removed so that the module is removed when it is stopped, without fail.**
  Then remove the relevant module after verifying the Status LED on the CPU/IO module. See *Chapter 1 (6.1 Error Messages by LED Indication)* for details of the Status LED.
- **When replacing both CPU/IO modules, replace one module and wait until dual configuration is established to replace the other module. If you replace the both modules simultaneously, establishing dual CPU/IO module configuration can result in interruption of the whole system.**

5.4.1 Removing CPU/IO Module

Follow the procedure below to remove the CPU/IO module.

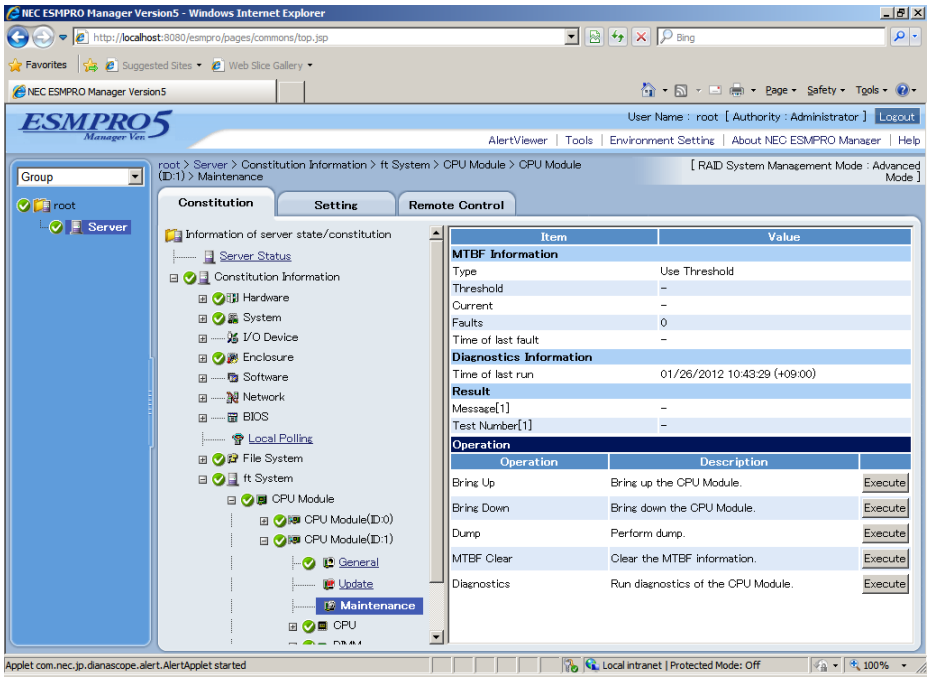
1. Stop the CPU/IO module you want to remove.

   To this end, use the ft server utility of the NEC ESMPRO Agent installed to your server or the **Information of server state/constitution** of the NEC ESMPRO Manager.

   For the detailed procedure, see *Chapter 1 (4. Maintenance of the Server)*.

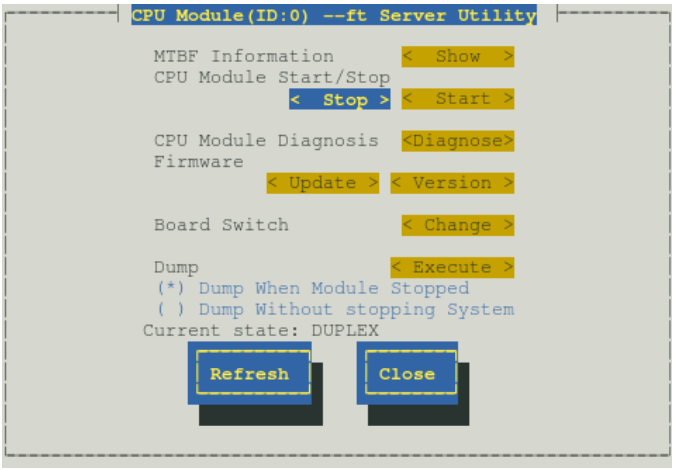
   NEC ESMPRO Manager

   Select **ft System** - **CPU Module** - **CPU Module (to be removed)** - **Maintenance** - **Bring Up/Bring Down** - **Bring Down**.



ft server utility

Select **ftServer** - **CPU Module** - **CPU Module (to be removed)** - **CPU Module Start/Stop – Stop**.

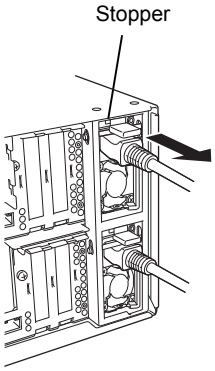


Repeat the steps above for the PCI module and confirm that the status of the CPU/IO module and the IO module (PCI module) are "**Removed**".

Tips

When removing CPU/IO module 0, select **Stop** for CPU module (ID:0) and PCI module (ID:10)

2. Remove the front bezel
3. Disconnect the power cord of a module to be removed.
   The stopper will go down when you disconnect the cable.



Note

Check whether the stopper goes down after disconnecting the power cord. If you disconnect the cable and the stopper does not go down, you cannot pull out the CPU/IO module in the next step.

4. Loosen the screws securing the CPU/IO module handle to press down the handle.

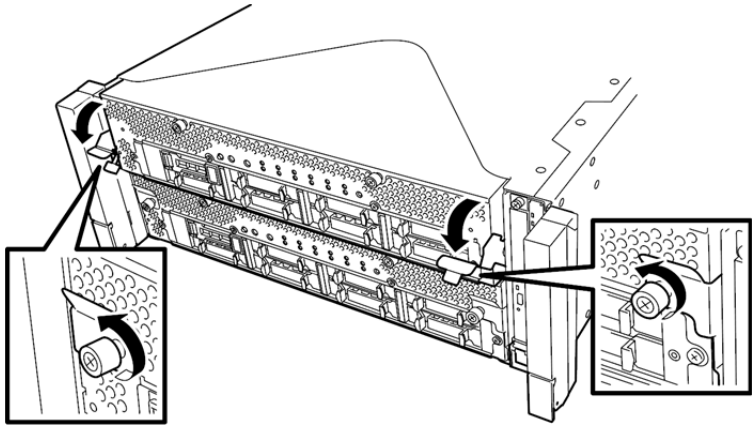
Important

Before you pull out a CPU/IO module, check the rear of the server to make sure cables for peripheral equipment or network are disconnected.

If any cables are connected, keep a record of where the cables are connected and disconnect all cables from the module you are going to remove.

Tips

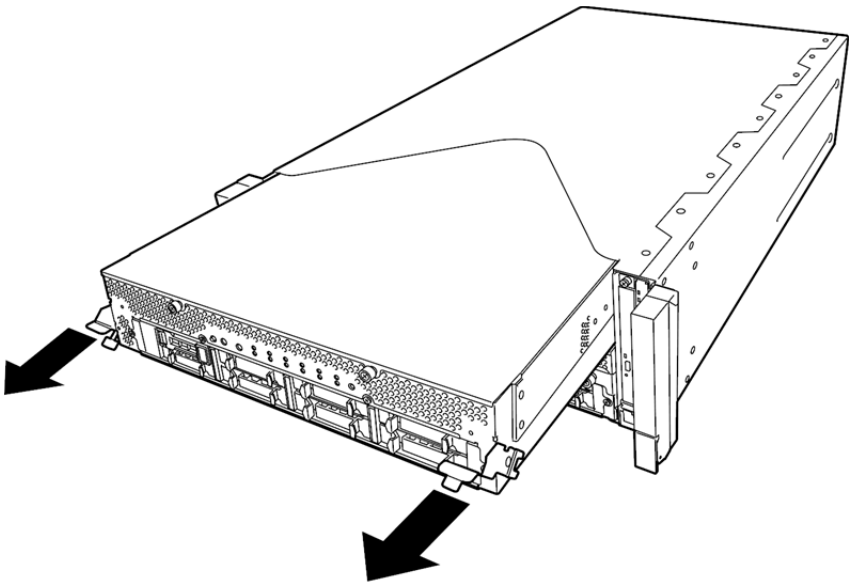
If you cannot disconnect the LAN cable easily, disconnect while pressing the latch with a slotted screwdriver.



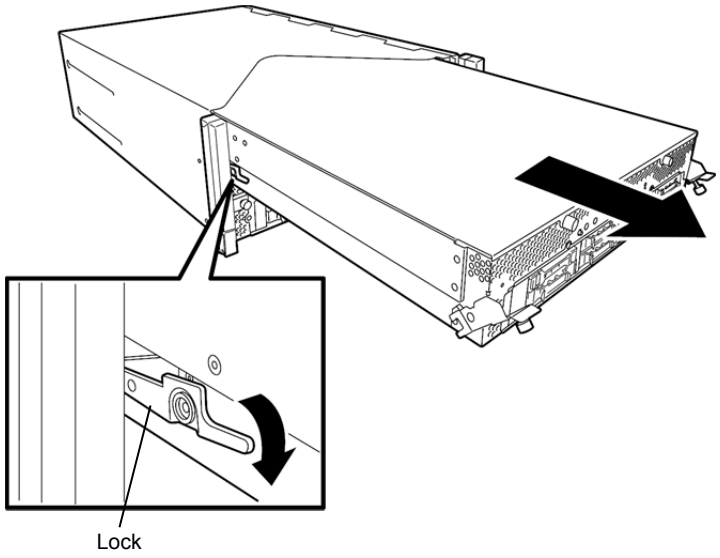
5. Hold the black levers of the CPU/IO module and pull it off.
   Pull it off until it is locked and stopped.

Important

- **Do not hold part other than the handle to pull the module.**
- **Handle the CPU/IO module carefully. Do not drop the module or bump it against parts in the device when you remove it.**



6. The CPU/IO module is locked on the way and cannot be pulled out. Lower the lock on the side of CPU/IO module to unlock it, and then pull it out.



7. Pull out the CPU/IO module gently and carefully, and place it on a flat and sturdy table.
   Avoid the dusty or humid place.

This allows you to access the devices in the CPU/IO module. For more information on how to handle these devices, see the associated sections.

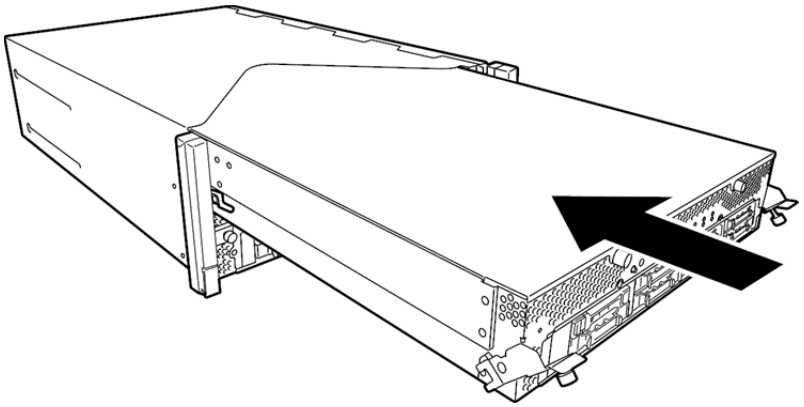
5.4.2 Installing CPU/IO Module

Follow the procedure below to install the CPU/IO module:

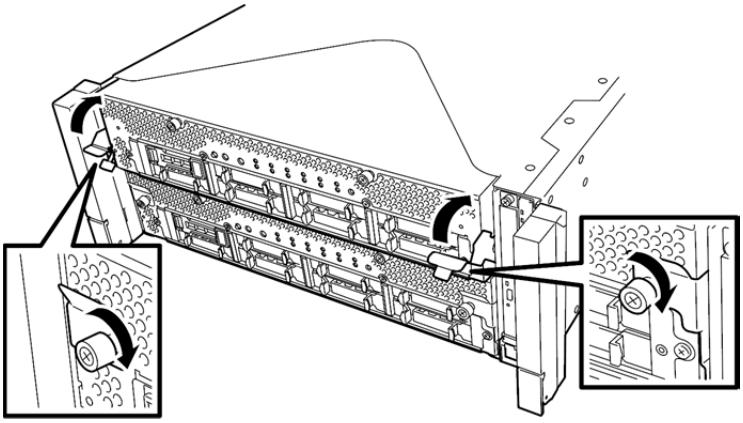
Important

- **See *Chapter 2 (*"5.1.3 Installing, Removing and Replacing Devices"*)* and *Chapter 1 (1.8 Anti-Static Measures)in Safety Precautions and Regulatory Notices)* before starting installing or removing options.**
- **Insert the black lever slowly and fasten the screws tightly. Be careful not to cause a shock to the device at this time.**

1. Firmly hold the CPU/IO module with both hands and insert it into the rack.
   Hold the CPU/IO module in such a way that its back panel connector faces the back of the rack and engage the guides of the module and chassis, and insert it slowly.



2. Push up the black levers placed on the left and right sides of the front of the CPU/IO module, and fasten them with screws.



Important

- **Secure the handle with the screws. If it is not secured by the screws, the operation of the CPU/IO module will be unstable.**
- **In some system statuses or settings, auto start up or integration does not take place when the module is connected. In such a case, check the status by using the ft server utility or "Information of server state/constitution" of NEC ESMPRO Manager, and then start up the CPU/IO modules.**

3. Connect the cables for connecting the peripheral devices and network.
4. Hold the stopper with your hand and insert the cable of the installed module.
5. The installed CPU/IO module will be automatically started.

5.5 DIMM

The DIMM (dual inline memory module) is installed to the DIMM socket on motherboard in the CPU/IO module of the server.

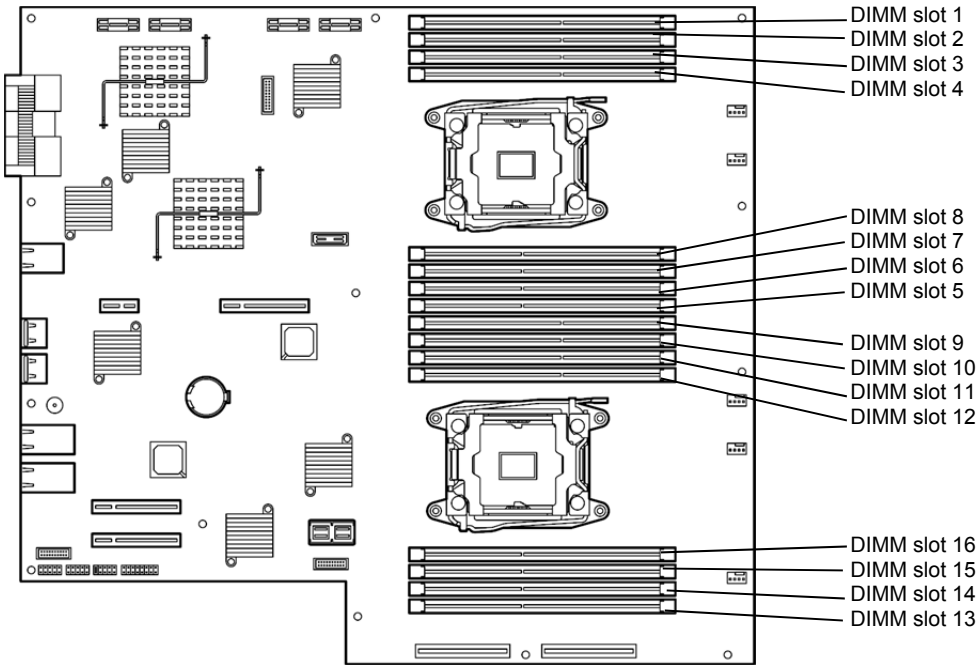
The motherboard of CPU/IO module has 16 sockets for DIMM.

Tips

- Maximum memory capacity depends on server model as follows:
  Up to 512GB (32GB x 16) R320e-E4, R320e-M4 model
- In the error messages and logs in POST, NEC ESMPRO, or Off-line Maintenance Utility, the DIMM connector may be described as "group". The number next to "group" corresponds to the slot number shown in the figure on the next page.

Important

- **Make sure to use the DIMM authorized by NEC. Installing a third-party DIMM may cause a failure of the DIMM as well as the server. Repair of the server due to failures or damage resulted from installing such a board will be charged.**
- **Before adding or removing DIMMs, power off the server and detach the CPU/IO module.**
- **See *Chapter 2 (*"5.1.3 Installing, Removing and Replacing Devices"*)* and *Chapter 1 (1.8 Anti-Static Measures)in Safety Precautions and Regulatory Notices)*before starting installing or removing options.**



CPU/IO board in the CPU/IO module

Precautions

Note the following to install, remove, or replace DIMM.

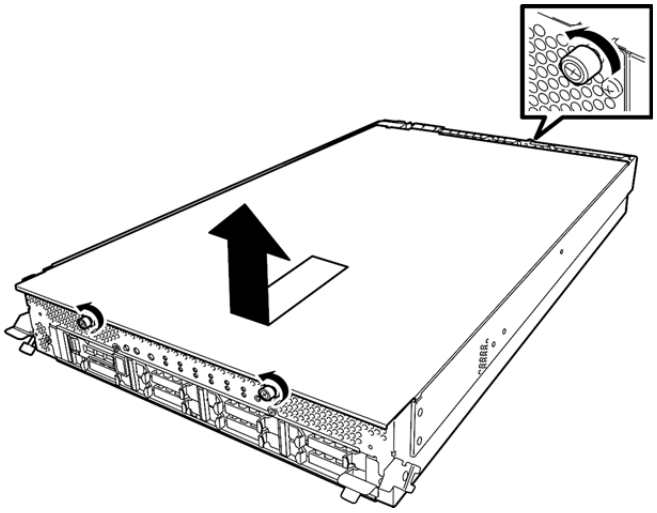
- DIMM 9 through 16 are available only when the processor #2 is installed.
- To install DIMM, install the product with the same model number to the same slots of the CPU/IO modules 0 and 1.
- See the following table to install additional DIMM.

Allowable DIMM capacity		Slot number to install DIMM (8GB/16GB/32GB)															
No. of CPUs	Capacity (GB)	1	2	3	4	8	7	6	5	9	10	11	12	16	15	14	13
1	8	8															
	16	8		8													
	24	8		8					8								
	32	8		8			8		8								
	48	8	8	8	8		8		8								
	64	8	8	8	8	8	8	8	8								
	64	16		16			16		16								
	96	16	8	16	8	8	16	8	16								
	128	16	16	16	16	16	16	16	16								
	128	32		32			32		32								
	256	32	32	32	32	32	32	32	32								
2	8	8															
	16	8								8							
	24	8		8						8							
	32	8		8						8		8					
	48	8		8					8	8		8					8
	64	8		8			8		8	8		8			8		8
	96	8	8	8	8		8		8	8	8	8	8		8		8
	128	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	128	16		16			16		16	16		16			16		16
	256	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
	256	32		32			32		32	32		32			32		32
	512	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

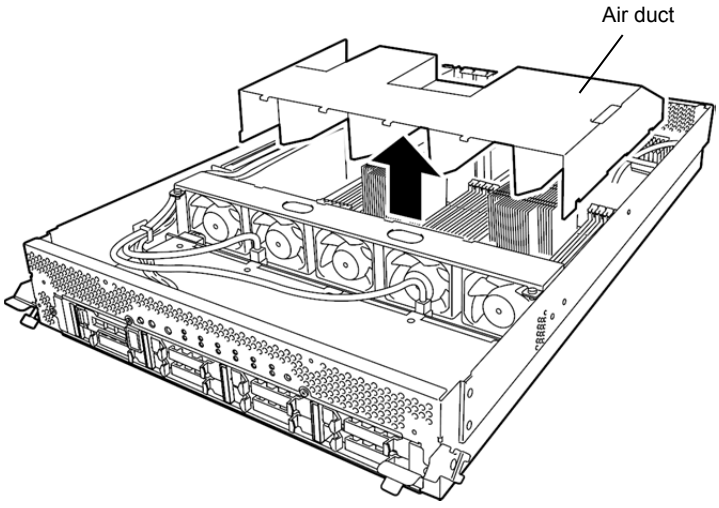
5.5.1 Installing DIMM

Follow the procedure below to install the DIMM.

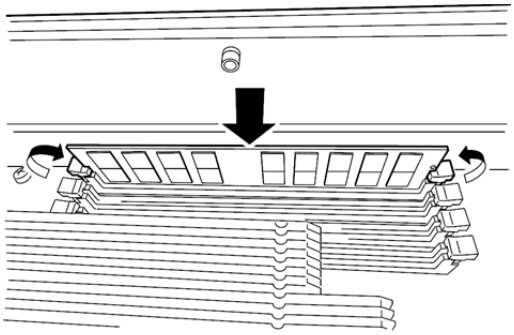
1. Shut down OS.
   The sever turns off automatically.
2. Disconnect the power cords from the outlets.
3. Remove the CPU/IO module according to *Chapter 2 (5.4.1 Removing CPU/IO Module)*.
4. Remove three screws (two on the front and one on the rear), and remove the top cover of the CPU/IO module.



5. Remove the air duct.

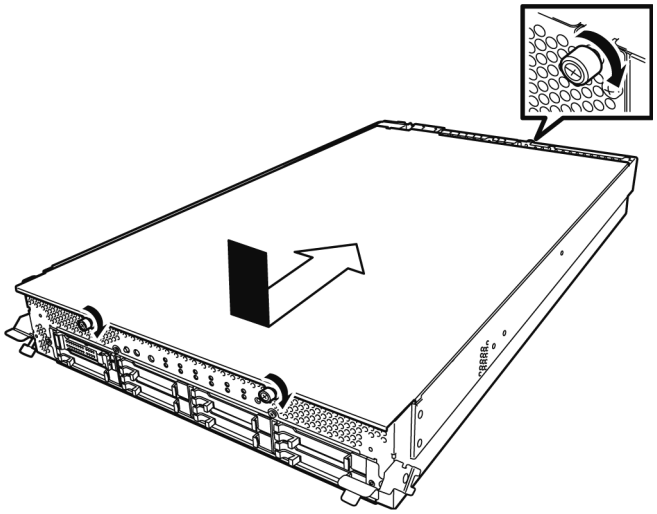


6. Push DIMM straight into the slot.
   When the DIMM is inserted into the DIMM slot, the lever automatically closes.



Note Pay attention to the DIMM direction. A notch is provided on the DIMM pin side to prevent DIMM from being inserted wrongly.

7. Install the air duct.
8. Install the top cover of the CPU/IO module, and fix it with screws (3 pieces).



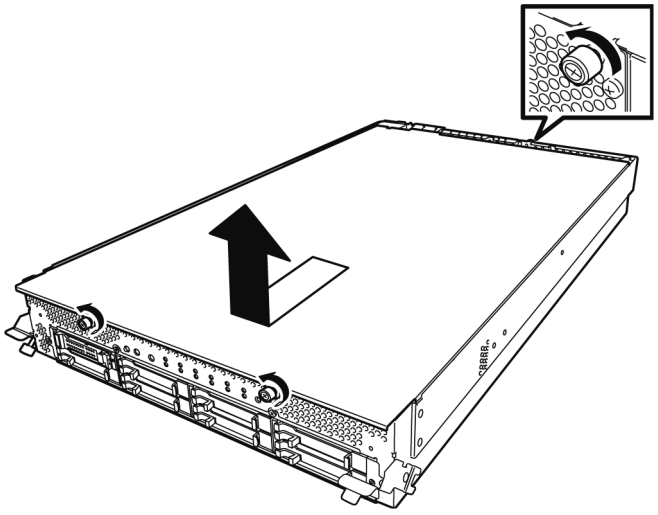
9. Install the CPU/IO module by referring to "5.4.2 Installing CPU/IO Module" in this chapter.
10. Connect the power cord.
11. Press the POWER switch, and turn the power ON.
12. Check the POST for an error message.
    If an error message appears, record the message, and then refer to "Chapter 1 (6.2 POST Error Message)".

5.5.2 Removing DIMM

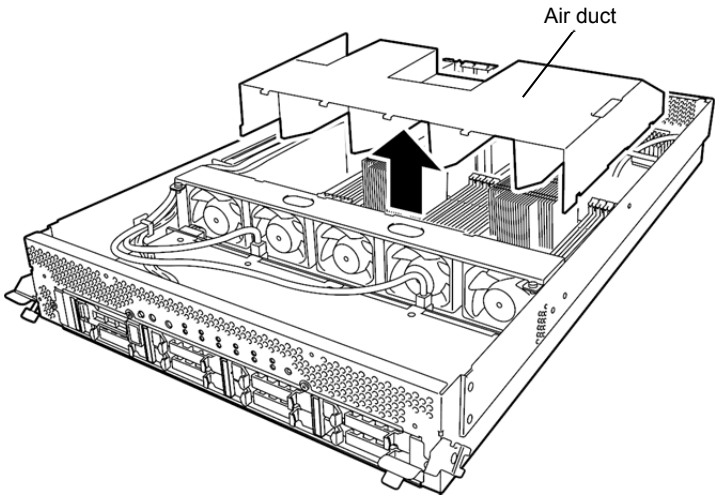
Follow the procedure below to remove the DIMM.

Important **At least one DIMM is required to operate the server.**

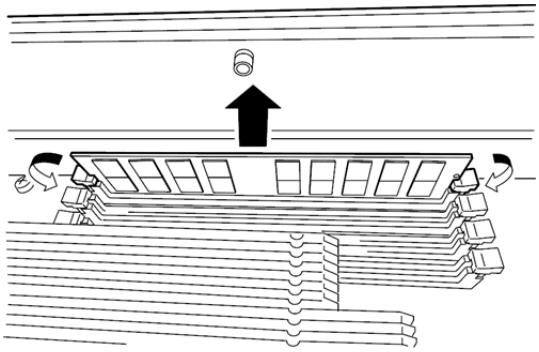
1. Shutdown OS.
   The system turns off automatically.
2. Disconnect the power cords from the outlets.
3. Remove the CPU/IO module according to *Chapter 2 (5.4.1 Removing CPU/IO Module)*.
4. Remove three screws (two on the front and one on the rear), and remove the top cover of the CPU/IO module.



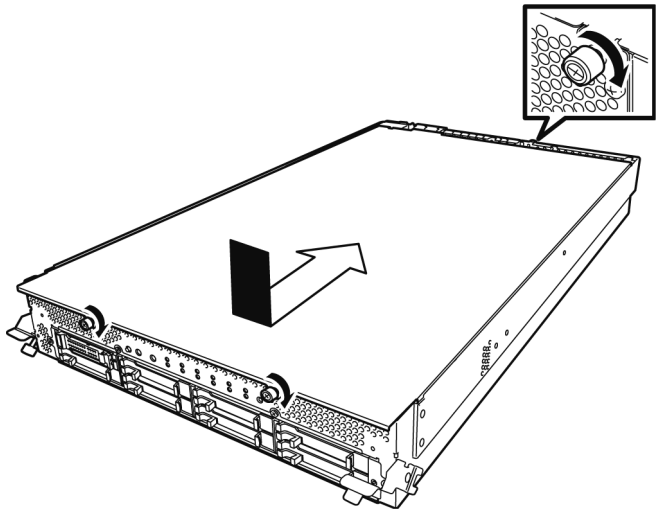
5. Remove the air duct.



6. Open the levers attached on both sides of the socket of the DIMM to be removed.
   It will be unlocked and the DIMM can be removed.



7. Install the air duct.
8. Place the top cover of the CPU/IO module and secure it with three screws.



9. See *Chapter 2 (5.4.2 Installing CPU/IO Module)* and install the CPU/IO module.
10. Connect the power cords.
11. Press the POWER switch to power on the server.
12. Verify that POST displays no error message.
    If POST displays an error message, write it down and see the POST error message list in *Chapter 1 (6.2 POST Error Message)*.

5.5.3 Replacing DIMM

Follow the procedure below to replace a failed DIMM.

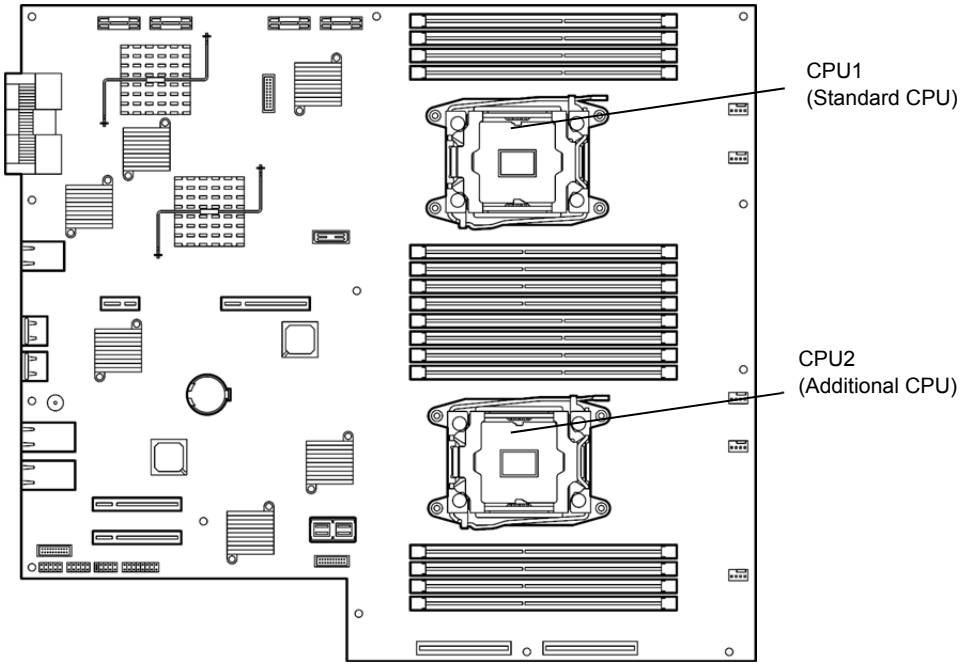
1. if the memory slot error LED lights, identify the failed DIMM, referring to Chapter 1, “6.1 Error Messages by LED Indication”.
2. Remove the CPU/IO module according to *Chapter 2 (5.4.1 Removing CPU/IO Module)*.
3. Replace the DIMM.
4. See *Chapter 2 (5.4.2 Installing CPU/IO Module)* and install the CPU/IO module.
5. Start up the CPU/IO module using NEC ESMPRO Manager or ft server utility.

5.6 Processor (CPU)

In addition to the standard CPU (Intel® Xeon® Processor), you can operate the system by adding one CPU to each CPU/IO module.

Important

- **Make sure to use the CPU specified by NEC. Installing a third-party CPU may cause a failure of the CPU as well as the server. Repairing the server due to failures or damage resulting from these products will be charged even if it is under guarantee.**
- **Before adding or removing a CPU, power off the server and then remove the CPU/IO module.**
- **See *Chapter 2 (*"5.1.3 Installing, Removing and Replacing Devices"*)* and *Chapter 1 (1.8 Anti-Static Measures)in Safety Precautions and Regulatory Notices* before starting installing or removing options.**

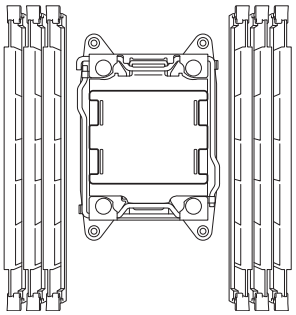


5.6.1 Installing CPU

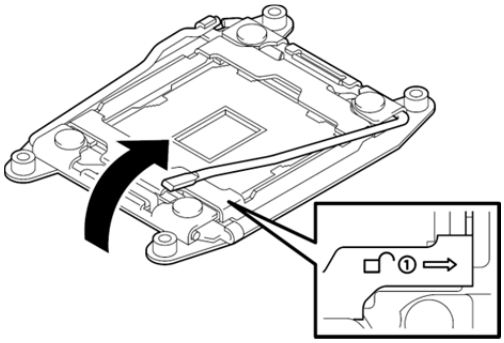
Follow the steps below to install a CPU and heat sink.

1. Shut down the OS.
   The server is automatically powered off.
2. Disconnect the power cords from the outlets.
3. Remove the CPU/IO module according to *Chapter 2 (5.4.1 Removing CPU/IO Module)*.
4. Remove the air duct according to *Chapter 2 (5.5.2* Removing DIMM*)*.
5. Verify the location of the CPU socket.
6. Remove the protective cover from processor (CPU) socket.

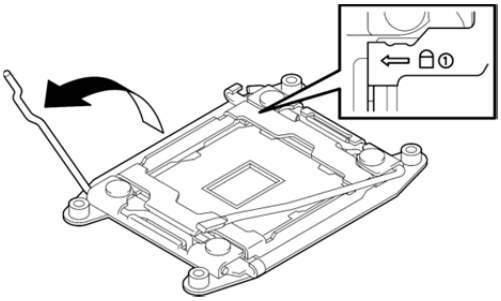
Important **Keep and store the removed protective cover with care.**



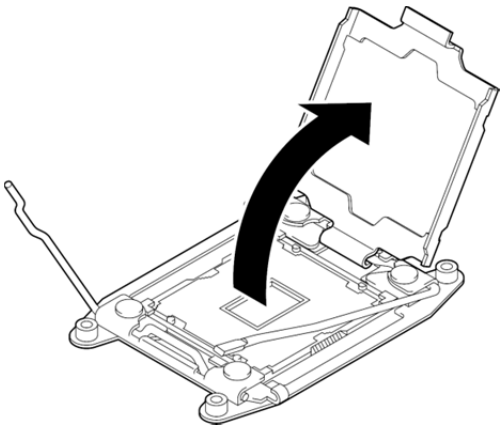
7. Push down the lever marked with "↶ ① →" to unlatch from the hook, and open the lever until it stops.



8. Push down the lever marked with "← ① " to unlatch from the hook, and open the lever until it stops.



9. Lift the plate.



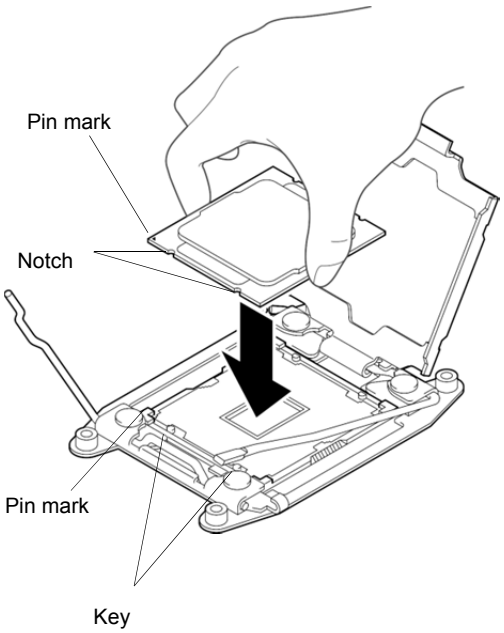
10. Place the CPU on the socket gently and carefully.
For easy installation, hold edges of CPU with your thumb and index fingers so that the notch is aligned with the key on the CPU socket.

Important

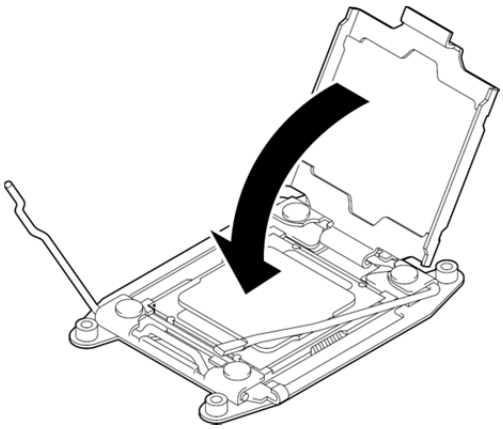
- **Be sure to hold the CPU only at the edges.**
- **Pay attention not to touch the bottom of the CPU (pin section).**

Note

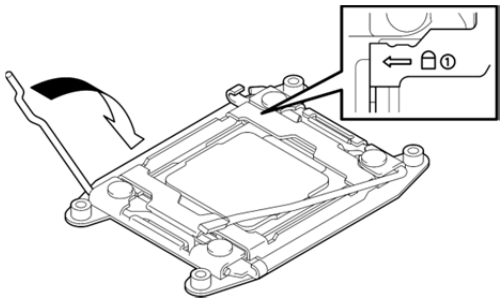
- Insert the CPU while aligning the notch on the processor with the key on the CPU socket.
- Bring down the CPU straight without tilting or sliding it in the socket.



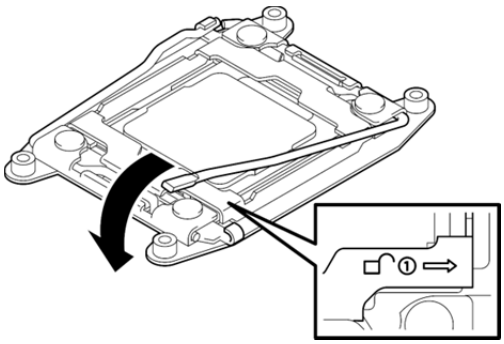
11. After pressing the CPU softly against the socket, and close the plate.



12. Fix the CPU by pushing down the lever marked with "←①"

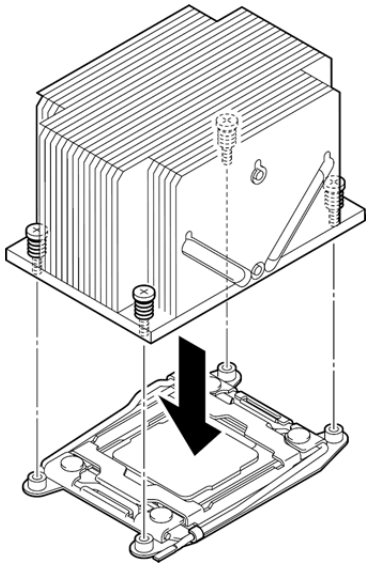


13. Fix the CPU by pushing down the lever marked with "①→"

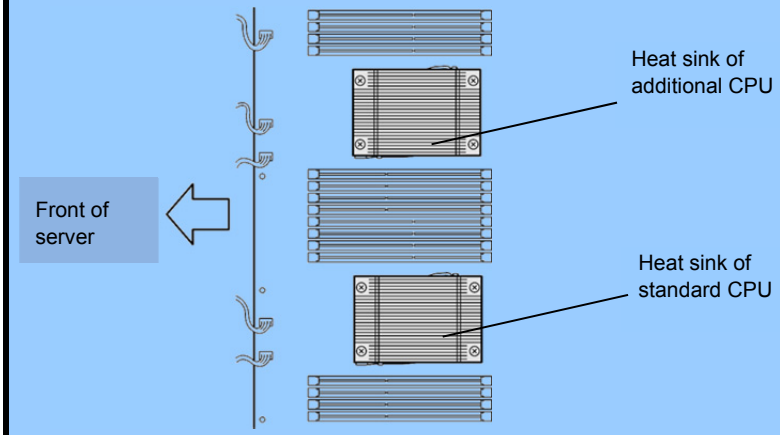


14. Place the heat sink on the CPU.

Important **Do not touch the cooling sheet that is attached on the back of the heat sink with your hand.**

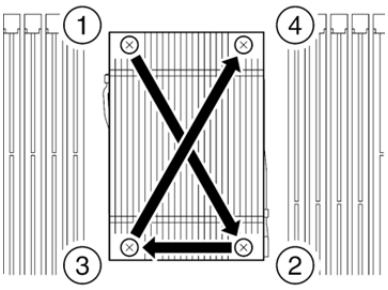


Important **If you install additional CPU, ensure that the fins of the additional CPU's heat sink are in the same direction as those of the standard CPU.**



15. Secure the heat sink with four screws.

Important **Tentatively secure the screws diagonally with the order as shown in the figure below, check that the heat sink is attached to the CPU socket in parallel, then tighten the screws diagonally.**



16. Install the air duct.
17. See *Chapter 2 (5.4.2 Installing CPU/IO Module)* and install the CPU/IO module.
18. Connect the power cords.
19. Press the POWER switch to power on the server.
20. Verify that POST displays no error message.
    If POST displays an error message, write it down and see the POST error message list in *Chapter 1 (6.2 POST Error Messages)*.

5.6.2 Removing CPU

Remove the heat sink and CPU in the reverse procedure of installation.

5.6.3 Replacing CPU

Take the steps below to replace the failed CPU.

1. Identify the failed CPU by viewing Event Log.
2. Remove the CPU/IO module according to *Chapter 2 (5.4.1 Removing CPU/IO Module)*.
3. Install the new heat sink and CPU according to *Chapter 2 (5.6.1 Installing CPU)*.
4. See *Chapter 2 (5.4.2 Installing CPU/IO Module)* and install the CPU/IO module.
5. Start the CPU/IO module from NEC ESMPRO Manager or ft server utility.

5.7 PCI Card

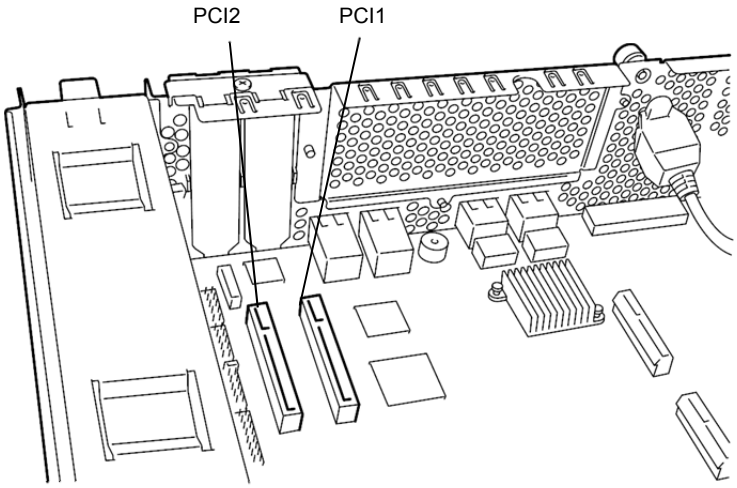
Either two or four PCI cards can be installed to the CPU/IO module.

Important **See *Chapter 2 ("5.1.3 Installing, Removing and Replacing Devices")* and *Chapter 1 (1.8 Anti-Static Measures)in Safety Precautions and Regulatory Notices* before starting installing or removing options.**

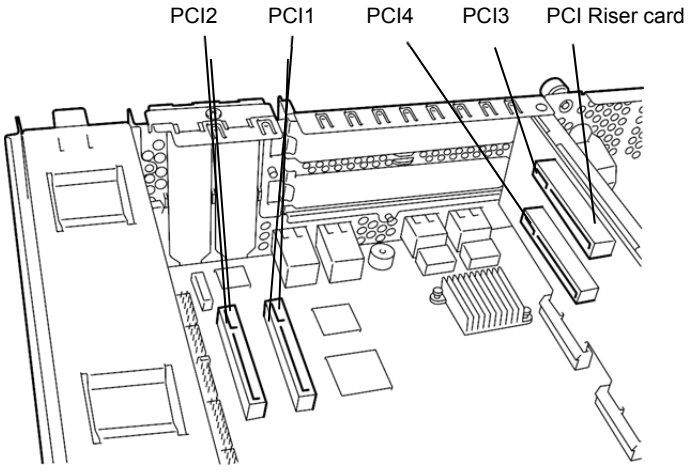
5.7.1 Precautions

Note the following to install, remove or replace PCI card.

- To make a dual PCI card configuration, install the same type of board (i.e., having the same specifications and performance) to the same slot for CPU/IO module.
  When a PCI card is installed to one CPU/IO module, another PCI card of same type should be installed to the same slot in another group. This rule is applied to the case of removal and replacement.



R320e-E4 model (without PCI riser card)



R320e-M4 model (with PCI riser card)

List of option PCI cards and installable slots (R320e-E4 model)

N code	Product name		PCI-1	PCI-2	Remarks
		PCI slot performance	PCIe 3.0 x4 lane		
		Slot size	Low Profile		
		PCI card type	x8 slot		
N8804-012	1000BASE-T 2ch board set		○	○	*1
N8804-011	10GBASE-T 1ch board set		○	○	*1 *2
N8803-040	Fibre Channel board set		○	○	*1
N8803-041	SAS board		○	○	*2

*1: Exact the same card must be mounted into the same slot for each CPU/IO module 0, 1.
*2: Up to one card can be installed for each CPU/IO module and up to two boards can be installed for each device.

Refer to the system configuration guide for the latest support conditions.

List of option PCI cards and installable slots (R320e-M4 model)

N-code	Product name		PCI-1	PCI-2	PCI-3	PCI-4	Remarks
		PCI slot performance	PCIe 3.0 x4 lane		PCIe 3.0 x8 lane		
		Slot size	Low Profile		Full Height		
		PCI card type	x8 slot				
N8804-012	1000BASE-T 2ch board set		○	○	○	○	*1,*3
N8804-011	10GBASE-T 1ch board set		–	–	○	○	*1, *2,*3
N8803-040	Fibre Channel board set		–	–	○	○	*1,*3
N8803-041	SAS board		○	○	○	○	*2,*3

*1: Exact the same board must be mounted into the same slot for each CPU/IO module 0, 1.
*2: Up to one board can be installed for each CPU/IO module and up to two boards can be installed for each device.
*3: The installation priority for PCI-3 and PCI-4 must be N8803-040 > N8804-011 > N8803-041 > N8804-012.

Refer to the system configuration guide for the latest support conditions.

5.7.2 Installing PCI Card

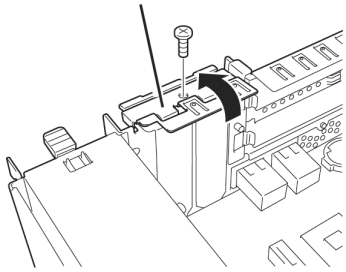
Follow the procedure below to install the board to be connected to the PCI card slot.

Note To install the PCI card, make sure the shape of the board connector matches with the shape of the PCI card slot connector.

(1) Installing Low Profile PCI Card

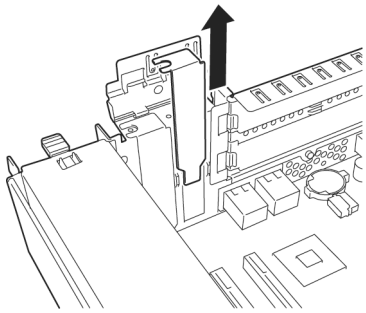
1. Shut down the OS.
   The server is automatically powered off.
2. Disconnect the power cords from the outlets.
3. Remove the CPU/IO module according to *Chapter 2 (5.4.1 Removing CPU/IO Module)*.
4. Remove one screw that secures the PCI retension latch and open the latch.

PCI retention latch

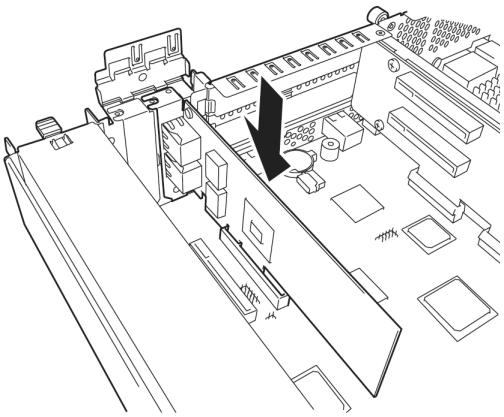


5. Remove the PCI bracket cover.

Important **Keep and store the removed PCI bracket cover with care.**



6. Install a PCI card in a PCI slot.

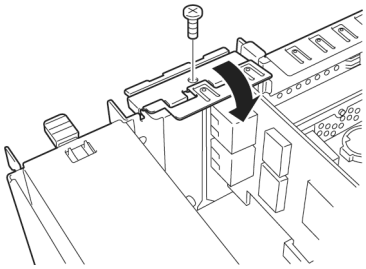


Important

When you attempt to install the Fibre channel card to the server, this may fail due to interference by the SFP+ module installed on the Fibre channel card.

In this case, remove the SFP+ module from the Fibre channel card beforehand, and install the Fibre channel before installing the SFP+ module.

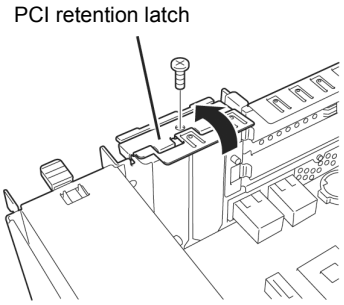
7. Close the latch and secure it with one screw removed in step4.



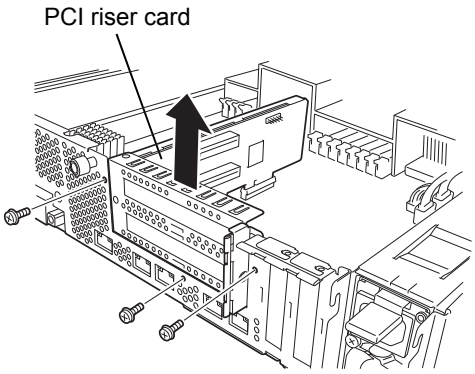
8. See *Chapter 2 (5.4.2 Installing CPU/IO Module)* and install the CPU/IO module.
9. Connect the power cords.
10. Press the POWER switch to power on the server.
11. Verify that POST displays no error message.
    If POST displays an error message, write it down and see the POST error message list in *Chapter 1 (6.2 POST Error Message)*.

(2) Installing Full Height PCI Card

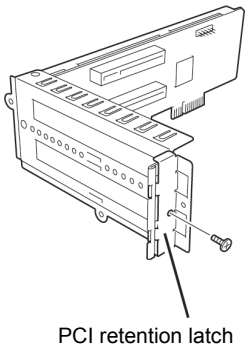
1. Shut down the OS.
   The server is automatically powered off.
2. Disconnect the power cords from the outlets.
3. Remove the CPU/IO module according to *Chapter 2 (5.4.1 Removing CPU/IO Module)*.
4. Remove one screw that secures the PCI retension latch and open the latch.



5. Remove three screws that secure the PCI riser card, and remove the PCI riser card from the motherboard.

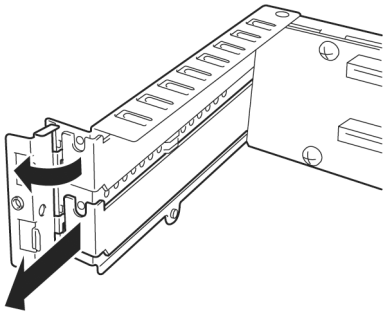


6. Remove one screw and open the PCI retention latch of the PCI riser Card.



7. Remove the PCI blank cover.

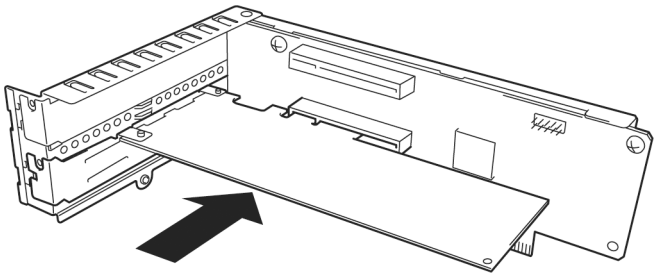
Important **Keep and store the removed PCI blank cover with care.**



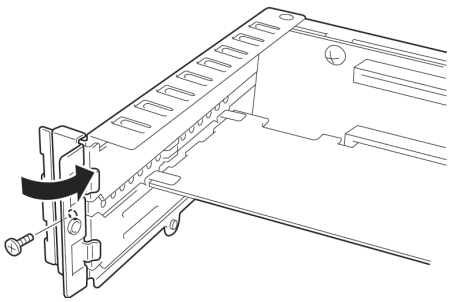
8. Install a PCI card in a PCI slot.

Important **When you attempt to install the Fibre channel card to the server, this may fail due to interference by the SFP+ module installed on the Fibre channel card.**

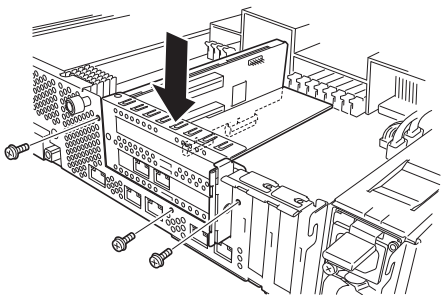
In this case, remove the SFP+ module from the Fibre channel card beforehand, and install the Fibre channel before installing the SFP+ module.



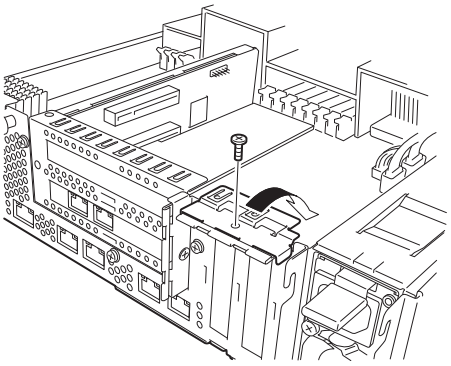
9. Close the latch and secure it with one screw removed in step6.



10. Install PCI riser card on the motherboard and secure it with three screws removed in step5.



11. Close the latch and secure it with one screw removed in step4.



12. See *Chapter 2 (5.4.2 Installing CPU/IO Module)* and install the CPU/IO module.
13. Connect the power cords.
14. Press the POWER switch to power on the server.
15. Verify that POST displays no error message.
    If POST displays an error message, write it down and see the POST error message list in *Chapter 1 (6.2 POST Error Message)*.

5.7.3 Removing PCI Card

To remove PCI card card, follow the reverse procedure of the installation and install the blank cover.

5.7.4 Replacing PCI Card

Follow the procedure below to replace the failed PCI card.

(1) N8804-011 10GBASE-T 1ch board set or N8804-012 1000BASE-T 2ch board set

1. Identify the failed board by viewing syslog.
2. Delete the LAN duplexing. (For how to delete duplexing, refer to "2.3 Clearing Duplexing" in this chapter.)
3. Remove the CPU/IO module by referring to "5.4.1 Removing CPU/IO Module" in this chapter.
4. Remove the PCI board.
5. Install the new PCI board, and fix it.
6. Install the CPU/IO module by referring to "5.4.2 Installing CPU/IO Module" in this chapter.
7. Check that the installed PCI board is correctly recognized on POST or OS.
8. Create the team again. (For how to set duplexing, refer to "2.2 How to Duplicate Network" in this chapter.)

(2) N8803-040 Fibre Channel board set

1. Identify the failed board by viewing syslog.
2. Remove the CPU/IO module according to *Chapter 2 (5.4.1 Removing CPU/IO Module)*.
3. Configure WWPN of Fibre Channel board to be installed (setting/confirming access control) by using control software such as iStorageManager.
4. Remove the PCI bracket, then remove the PCI card.
5. Replace the new board and secure it.
6. See *Chapter 2 (5.4.2 Installing CPU/IO Module)* and install the CPU/IO module.
7. Connect the cable to the network cable and optional device.
   The installed CPU/IO module starts up automatically.
8. Confirm that the PCI card is correctly recognized by POST and OS.
9. Configure multi path according to Chapter 2 (*5.7.5 (2)* N8803-040 Fibre Channel 1ch Board Set).

(3) N8803-041 SAS board

1. Identify the failed board by viewing syslog.
2. Remove the CPU/IO module according to *Chapter 2 (5.4.1 Removing CPU/IO Module)*.
3. Remove the PCI card.
4. Replace the new board and secure it.
5. See *Chapter 2 (5.4.2 Installing CPU/IO Module)* and install the CPU/IO module.
6. Connect the cable to the network cable and optional device.
   The installed CPU/IO module starts up automatically.
7. Confirm that the PCI card is correctly recognized by POST and OS.

5.7.5 Setup of Optional PCI Card

Important **To enable the fault-tolerant feature of the optional device, the identical PCI cards must be installed to the slots with the same number in CPU/IO module 0 and CPU/IO module 1.**
For the supported optional devices, contact your sales agent.

(1) N8804-011 10GBASE -T 1ch board set or N8804-012 1000BASE-T 2ch board set

Important **To use this board, use a LAN cable having RJ-45 connector which is compliant with IEC8877 standard. If any other connector is used, it may not be removed easily.**

- Slots to install optional PCI cards

  See *"List of option PCI cards and installable slots"* in *Chapter 2 (5.7.1 Precautions*).

- Driver installation procedure

  Install N8804-011 10GBASE-T 1ch board set or N8804-012 1000BASE-T 2ch board set, and restart the system.

  After starting the system, the driver will be installed automatically.

- Configure duplex LAN

  See *Chapter 2* (*2. Network Duplexing).*

(2) N8803-040 Fibre Channel 1ch Board Set

- Slots to install optional PCI cards

  See *"List of option PCI cards and installable slots"* in *Chapter 2 (5.7.1 Precautions)*.

- Driver installation procedure

  Install N8803-040 Fibre Channel 1ch board and start the system.
  After starting the system, the driver will be installed automatically.

- Configuring multi path

Important **This operation must be executed by only root user.**

1. Run the following command to start path watch daemon(multipathd).

   # systemctl start multipathd

   # systemctl enable multipathd

2. Run the following command to create multipath device.

   # multipath

   After executing this command, the dm device of dm-X (X indicating the number) is created under /dev while the dm-mp device (symbolic link to the dm device) of mpathN and mpathNM (N indicating an alphabetical character, M indicating the number 1 or more) is created under /dev/mapper. mpathN is Nth LUN, mpathNM is Mth partition in mpathN.

3. Run the following command to check the path condition. The path condition of each dm-mp device can be displayed. Check that there is no failed or faulty path.

   # multipath -ll

4. Create the partition and file system, and mount them. The dm device is internally used by Linux. Be sure to use the dm-mp device. Also adding the LUN entry to /etc/fstab, use the dm-mp device name. The server must be restarted to reflect the change in the partition to the system.

- **Procedures for changing the LUN allocation to the ft server (important)**

When allocating the LUN on iStorage to the ft server, or clearing the allocation, be sure to follow either of the procedure A or procedure B described below. Otherwise, the ft server may not be duplicated.

Procedure A at the local site

When the server starts up first after change of the LUN allocation, the following message is output to the local console of the ft server, and input may be prompted.

Comparing initramfs and rootfs storage config…

Missing or stale /etc/multipath/wwids in initramfs!

Missing or stale /etc/multipath/bindings in initramfs!

*** Syncronize these files by regenerating the initramfs? [Y/n]

If this screen appears, input [Y].

Then, the following screen appears. Input [Y] again. The server restarts.

Regenerating initramfs.

This may take a few minutes…

[REPAIR] prep_20-multipath

Done.

*** System reboot required to complete repair, reboot now [Y/n]

The description of the required work is completed here.

If the message to prompt you to input as shown above does not appear, there is no required work anymore.

Procedure B at the remote site

After the first startup of the server after change of the LUN allocation, log in to the ft server remotely, and execute the following command.

```
# /opt/ft/sbin/ft-prep
```

If the screen appears to prompt you to input similarly to the procedure A, input [Y] twice, and restart the server.

The description of the required work is completed here.

If the message to prompt you to input does not appear, there is no required work anymore.

(3) N8803-041 SAS Board

- Slots to install optional PCI cards

  See *"List of option PCI cards and installable slots"* in *Chapter 2 (5.7.1 Precautions)*.

- Driver installation procedure

  Install N8803-041 SAS board and start the system.
  After starting the system, the driver will be installed automatically.

5.8 Addition, Removal, and Replacement of the Internal USB Cable

5.8.1 Addition

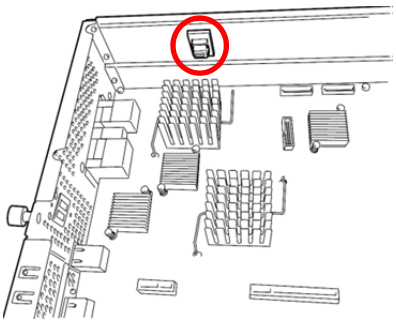
Follow the procedure described below to add the internal USB cable.

Important **See *Chapter 2 ("5.1.3 Installing, Removing and Replacing Devices)* and *Chapter 1 (1.8 Anti-Static Measures) in Safety Precautions and Regulatory Notices)* before starting installing or removing options.**

1. Shut down OS.

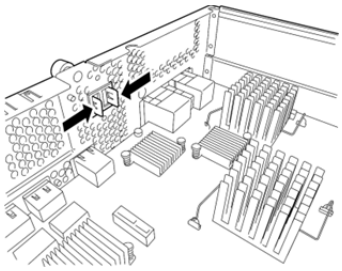
   The power of this system turns OFF automatically.
2. Remove the power cord from the outlet.
3. Remove the CPU/IO module by referring to "5.4.1 Removing CPU/IO Module" in this chapter.
4. Install the cable clamp.

   Important **Align the cable clamp with the mark to install it.**



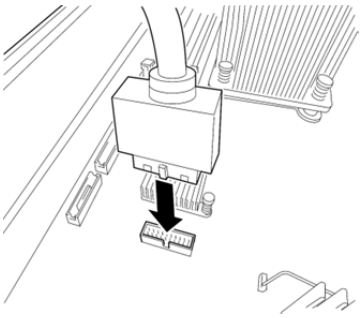
5. Hold the knob inside the device, and remove the cover of the USB port.

   Important **Keep the removed cover at hand.**



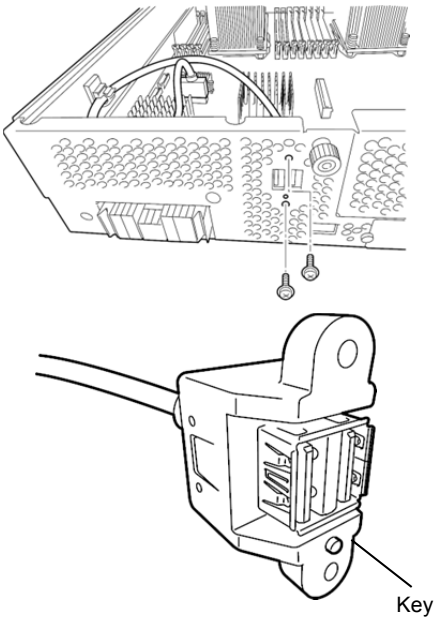
6. Install the internal USB cable to the connector on the CPU/IO board.

   Important **Align with the notch of the connector.**

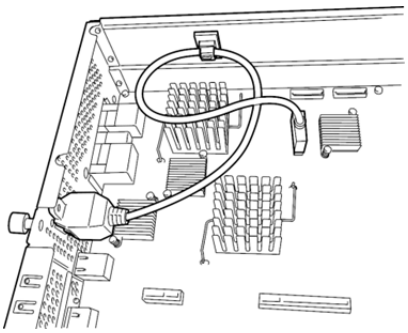


7. Install the intenal USB cable to the chassis, and tighten it with a screw.

Important **Align the cable connector key with the chassis.**



8. Fix the internal USB cable with the cable clamp.



9. Install the CPU/IO module by referring to "5.4.2 Installing CPU/IO Module" in this chapter.
10. Connect the cable to the network cable and optional device.
11. Connect the power cord.
12. Press the POWER switch, and turn the power ON.
13. Check the POST for an error message.

If an error message appears, record the message, and then refer to "Chapter 1 (6.2 (1) Error messages)".

5.8.2 Removal

Remove the internal USB cable in the order opposite to the addition of the cable.

5.8.3 Replace

Replace the failed internal USB cable according to following procedure.

1. Remove the CPU/IO module by referring to "5.4.1 Removing CPU/IO Module" in this chapter.
2. Replace the internal USB cable.
3. Install the CPU/IO module by referring to "5.4.2 Installing CPU/IO Module" in this chapter.

Start up the CPU/IO module from NEC ESMPRO Manager or the ft server utility.

NEC Express5800 Series
Express5800/R320e-E4, R320e-M4

3

Useful Features

This chapter describes convenient features for using the server. Refer to this chapter according to your purpose and need.

1. **System BIOS**
   Describes how to set the System BIOS settings and parameters.

2. **BMC Configuration**
   Describes the BMC Configuration Utility in Off-line Tool of the server.

3. **SAS Configuration Utility**
   Describes the SAS Configuration Utility of the server.

4. **Flash FDD**
   Describes the Flash FDD.

5. **Details of EXPRESSBUILDER**
   Describes the EXPRESSBUILDER attached to the server.

6. **EXPRESSSCOPE Engine 3**
   Describes EXPRESSSCOPE Engine 3.

7. **NEC ESMPRO**
   Describes NEC ESMPRO Agent and NEC ESMPRO Manager, applications to manage and monitor the server.

1. System BIOS

You can check and change the parameters using the BIOS Setup utility (SETUP).

1.1 Starting SETUP

Turn on the server and proceed with POST.

After a while, the following message appears at the bottom left of the screen.

```
Press <F2> SETUP, ...  (* a different message may appear depending on the environment)
```

If you press <**F2**>, SETUP will start after POST, and the Main menu appears. (You can also start SETUP by pressing <**F2**> key while expanding option ROM.)

1.2 Parameter Descriptions

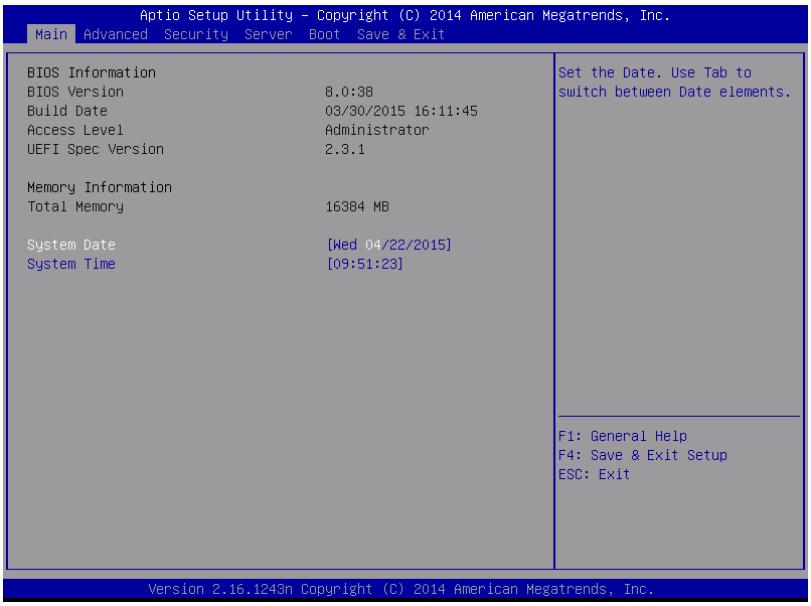
The SETUP utility has the following six major menus.

- Main
- Advanced
- Security
- Server
- Boot
- Save & Exit

These menus have submenus for relevant items. Selecting submenus allows you to configure further detailed parameters.

1.2.1 Main

If you start up the SETUP utility, the **Main** menu is displayed first.



For details about the options, see the table below.

Option	Parameter	Descriptions
BIOS Information	–	–
BIOS Version	–	The BIOS version is displayed (display only).
Build Date	MM/DD/YYYY	The BIOS build date is displayed (display only).
Access Level	[Administrator] User	The current access level (Administrator or User) is displayed (display only). If no password is set, **Administrator** is displayed.
Memory Information	–	–
Total Memory	–	The total capacity of installed memory is displayed (display only).
System Date	WWW MM/DD/YYYY	Set the system date.
System Time	HH:MM:SS	Set the system time

[ ]: Factory settings

Tips

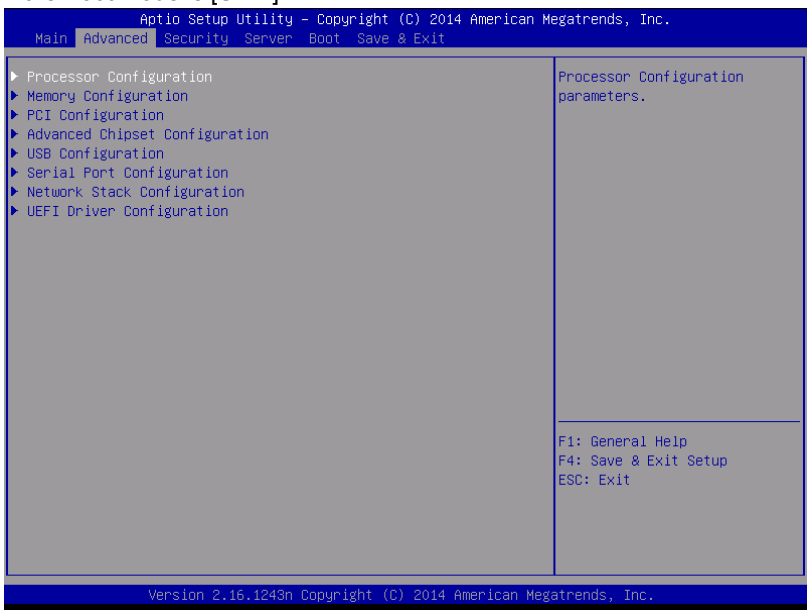
- Be sure to confirm that the date and time in the BIOS parameters are correctly configured.
- Check the system clock monthly. Additionally, if you implement the server in a system that requires highly accurate time, use of a time server (an NTP server) is recommended.
- If the system time becomes considerably slow or fast over time even though you regularly adjust it, contact the dealer where you purchased the server or the maintenance service company for maintenance.

1.2.2 Advanced

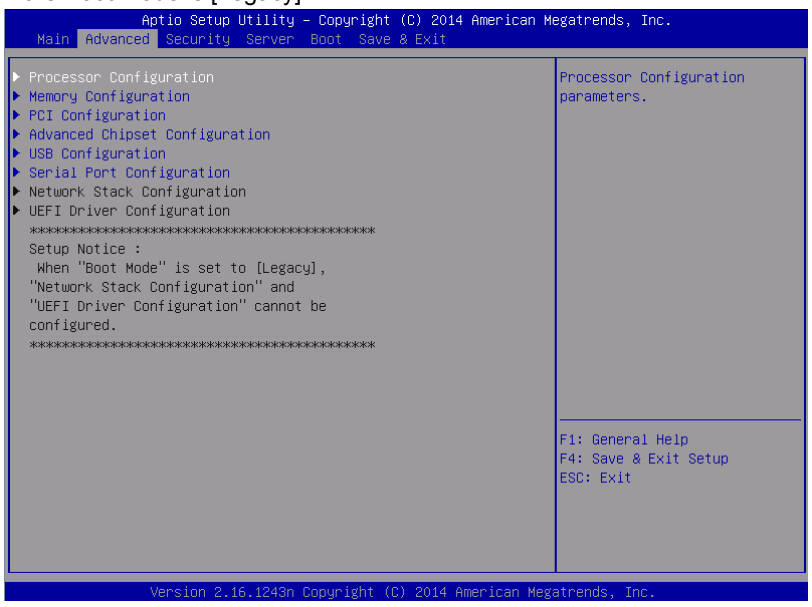
If you move the cursor to **Advanced**, the **Advanced** menu appears.

For the menus that show a "▶" to their left, select a menu and press the <**Enter**> key to display its submenu.

If the Boot Mode is [UEFI]:



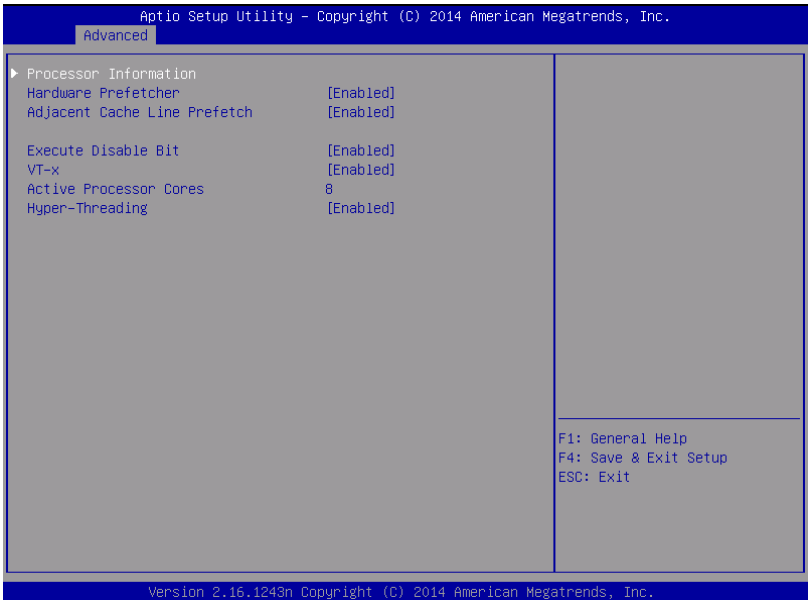
If the Boot Mode is [Legacy]:



Note The Network Stack Configuration or UEFI Driver Configuration submenu cannot be selected if the Boot Mode is [Legacy]; They are selectable only if the Boot Mode is [UEFI].

(1) Processor Configuration submenu

From the **Advanced** menu, select **Processor Configuration** and then press the <**Enter**> key to display the menu screen shown below. For the menu that has ▶ on the left, move the cursor to it and then press the <**Enter**> key to show its submenus.

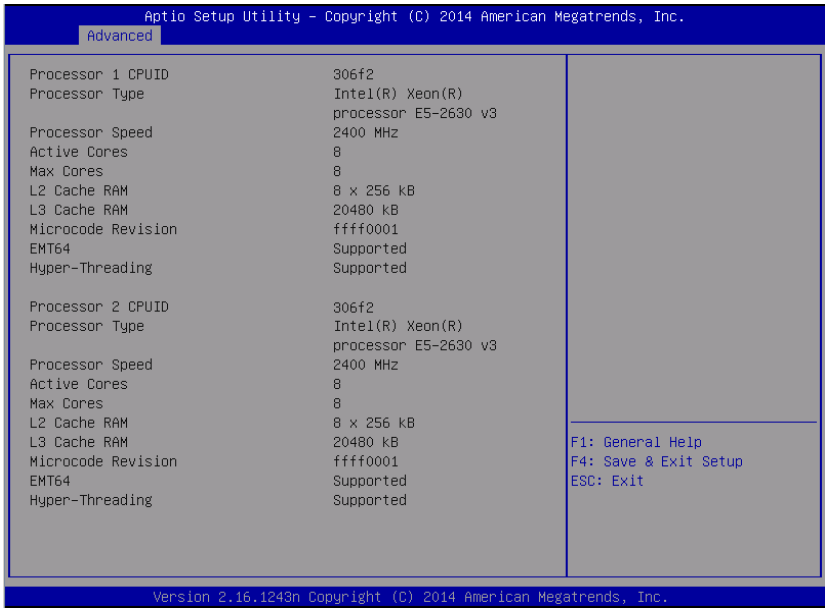


For details about the options, see the table below.

Option	Parameter	Descriptions
Processor Information	–	–
Hardware Prefetcher	Disabled [Enabled]	Enable or disable hardware prefetcher.
Adjacent Cache Line Prefech	Disabled [Enabled]	Enable or disable optimized access from memory to cache.
Execute Disabled Bit	Disabled [Enabled]	Enable or disable Execute Disable Bit feature. This option is displayed only when the installed processor supports this feature.
VT-x	Disabled [Enabled]	Enable or disable Intel Virtualization Technology (feature to virtualize processor).
Active Processor Cores	1-[x]	Specify the number of cores to enable in each processor package. The number of cores that can be specified depends on the processor installed. X (maximum number of cores) can be changed only if one processor is installed. It may be set only for the debugging purpose.
Hyper-Threading	Disabled [Enabled]	Enable or disable the feature to execute two threads with only one core. This option is displayed only when the installed processor supports this feature.

[ ]: Factory settings

(a) Processor Information submenu



For details about the options, see the table below (display only).

Option	Parameter	Descriptions
Processor 1 CPUID	Number	ID of Processor 1 is displayed by a numerical value.
Processor Type	–	Type of Processor 1 is displayed.
Processor Speed	–	Clock speed of Processor 1 is displayed.
Active Cores	–	The number of active cores in Processor 1 is displayed.
Max Cores	–	The maximum number of cores in Processor 1 is displayed.
L2 Cache RAM	–	The secondary cache size of Processor 1 is displayed.
L3 Cache RAM	–	The tertiary cache size of Processor 1 is displayed.
Microcode Revision	–	The revision of the microcode applied to Processor 1 is displayed.
EMT64	–	When the Intel 64 architecture is supported on Processor 1, [Supported] is displayed.
Hyper-Threading	–	When the Hyper-Threading Technology is supported on Processor 1, [Supported] is displayed.
Processor 2 CPUID	Number Not Installed	ID of Processor 2 is displayed by a numerical value. **Not Installed** indicates that no processor is installed in processor socket 2.
Processor Type	–	Type of Processor 2 is displayed.
Processor Speed	–	Clock speed of Processor 2 is displayed.
Active Cores	–	The number of active cores in Processor 2 is displayed.
Max Cores	–	The maximum number of cores in Processor 2 is displayed.
L2 Cache RAM	–	The secondary cache size of Processor 2 is displayed.
L3 Cache RAM	–	The tertiary cache size of Processor 2 is displayed.
Microcode Revision	–	The revision of the microcode applied to Processor 2 is displayed.
EMT64	–	When the Intel 64 architecture is supported on Processor 2, [Supported] is displayed.
Hyper-Threading	–	When the Hyper-Threading Technology is supported on Processor 2, [Supported] is displayed.

[ ]: Factory settings

(2) Memory Configuration submenu

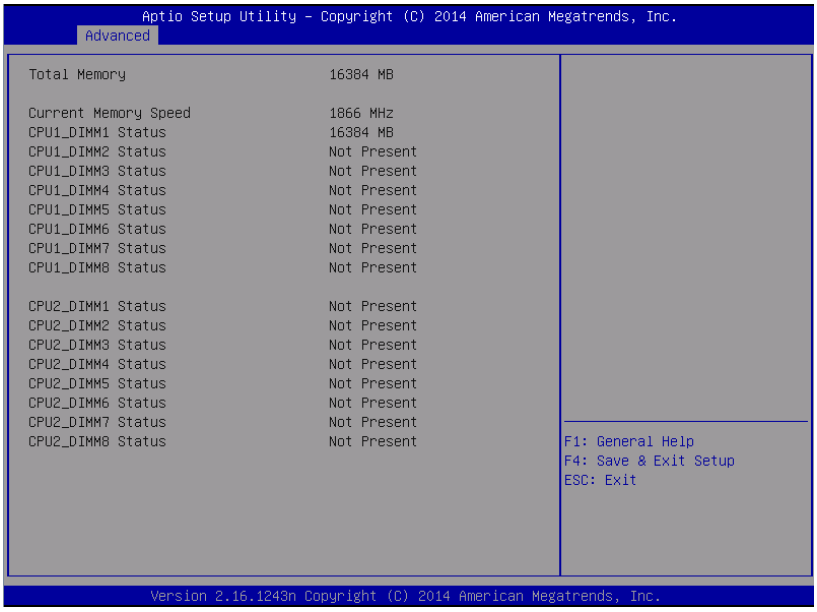
From the **Advanced** menu, select **Memory Configuration** and then press the <**Enter**> key to display the menu screen shown below. For the menu that has ▶ on the left, move the cursor to it and then press the <**Enter**> key to show its submenus.

For details about the options, see the table below.

Option	Parameter	Descriptions
Memory Information	–	–

[ ]: Factory settings

(a) Memory Information submenu



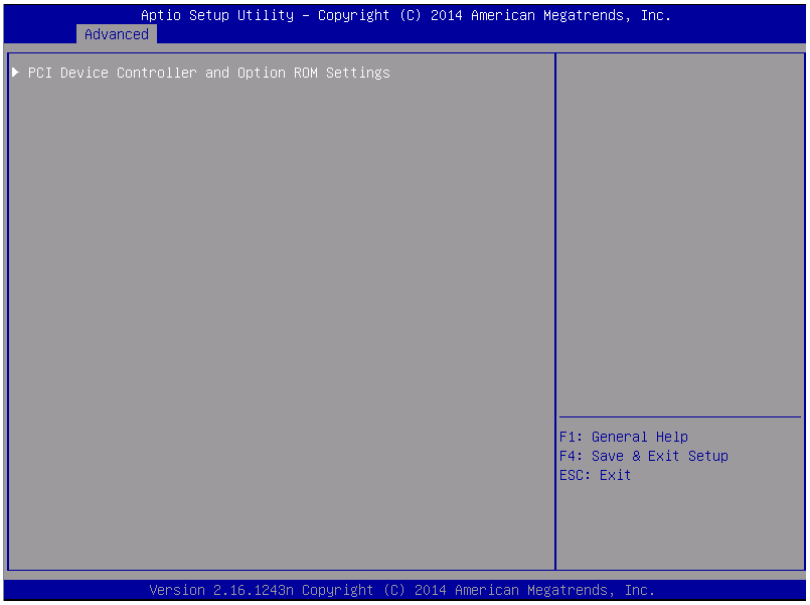
For details about the options, see the table below (display only).

Option	Parameter	Descriptions
Total Memory	–	The physical capacity of installed memory is displayed.
Current Memory Speed	–	Currently active memory clock.
CPU1_DIMM1-8 Status CPU2_DIMM1-8 Status	Number Not Present	Capacity and status of each DIMM is displayed. **Number**: indicates memory capacity and DIMM is working normally. **Not Present**: Indicates no DIMM is installed.

[ ]: Factory settings

(3) PCI Configuration submenu

From the **Advanced** menu, select **PCI Configuration** and then press the <**Enter**> key to display the menu screen as shown below.

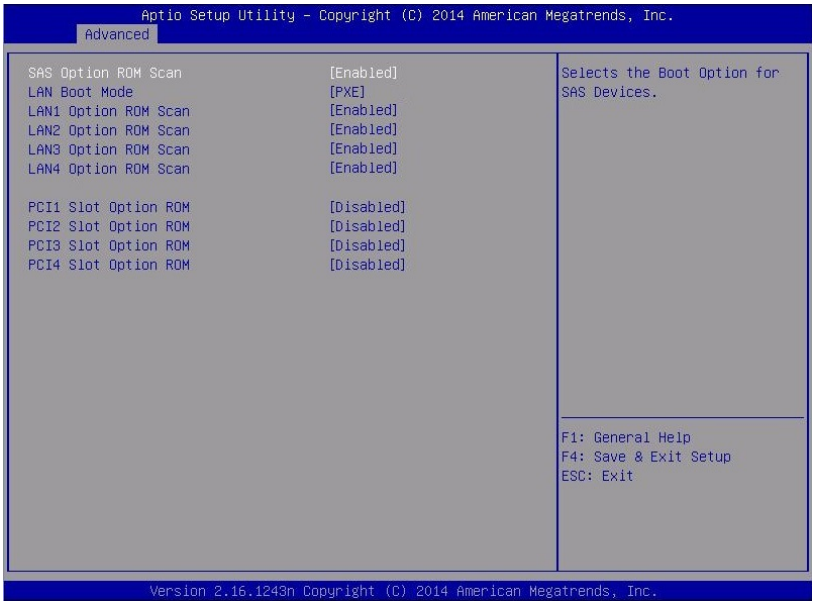


For details about the options, see the table below.

Option	Parameter	Descriptions
PCI Device Controller and Option ROM Settings	–	–

[ ]: Factory settings

(a) PCI Device Controller and Option ROM Settings submenu



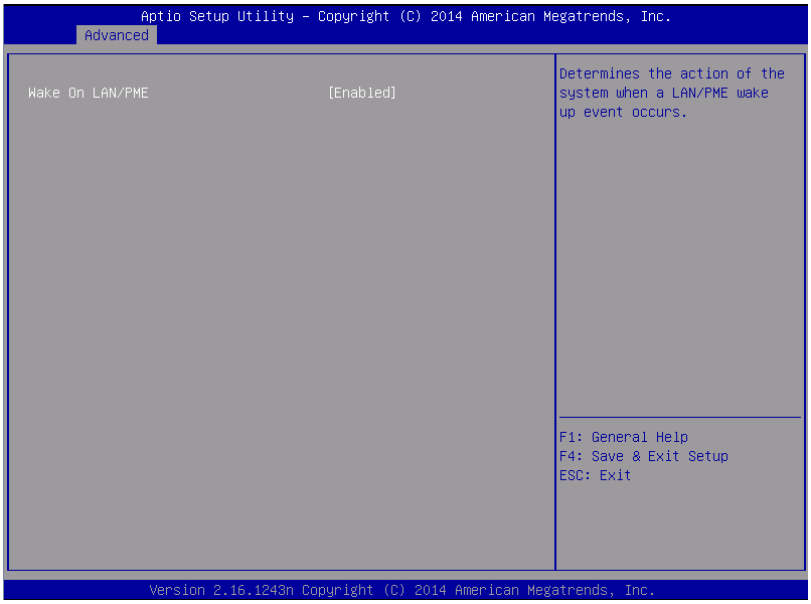
Option	Parameter	Descriptions
SAS Option ROM Scan	Disabled [Enabled]	Enable or disable the option ROM SCAN for onboard SAS.
LAN Boot Mode	[PXE] iSCSI	Select the option ROM where the onboard LAN is deployed. This appears only if the Boot Mode is [Legacy].
LANx Option ROM Scan	Disabled [Enabled]	Enable or disable the option ROM SCAN for onboard LAN. R320e-M4 x:1/2/3/4 R320e-E4 x:1/2
PCIx Slot Option ROM	[Disabled] Enabled	Enable or disable the option ROM on each PCI slot. R320e-M4 X:1/2/3/4 R320e-E4 X:1/2

[ ]: Factory settings

Note For a RAID Controller, LAN card (network boot), or Fibre Channel controller, if no Hard Disk Drive on which an OS is installed is connected, set the option ROM for that slot to **Disabled**.

(4) Advanced Chipset Configuration submenu

From the **Advanced** menu, select **Advanced Chipset Configuration** and then press the <**Enter**> key to display the menu screen as shown below.



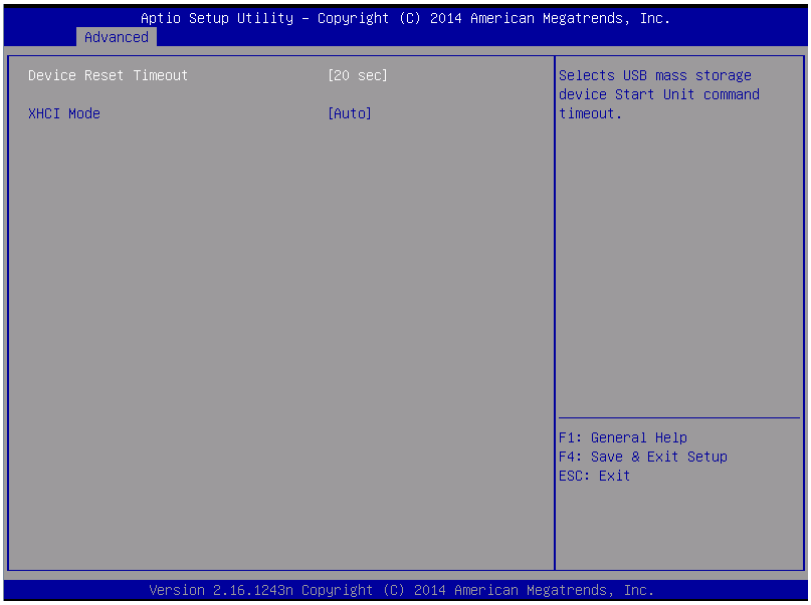
For details about the options, see the table below.

Option	Parameter	Descriptions
Wake On LAN/PME	Disabled [Enabled]	Enable or disable the feature that remotely powers on the server through a network.

[ ]: Factory settings

(5) USB Configuration submenu

From the **Advanced** menu, select **USB Configuration** and then press the <**Enter**> key to display the menu screen shown below.



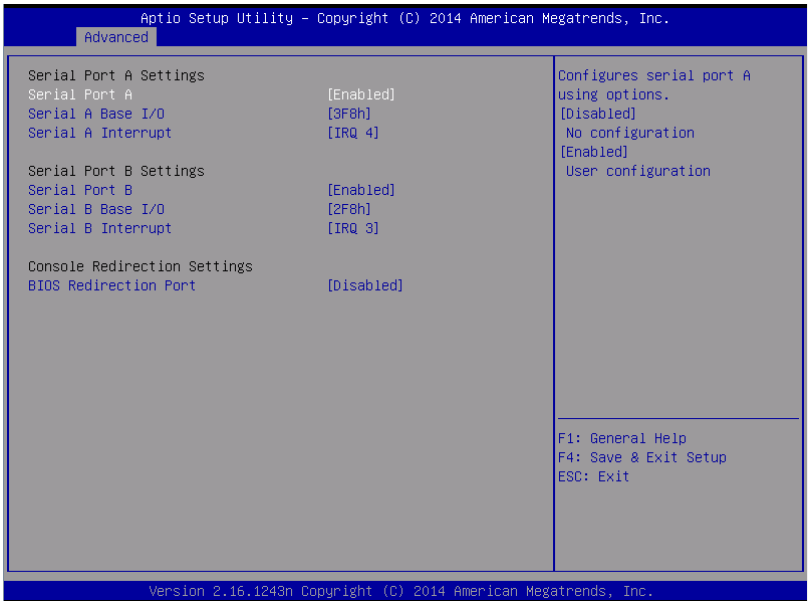
For details about the options, see the table below.

Option	Parameter	Descriptions
Device Reset Timeout	10 sec [20 sec] 30 sec 40 sec	Specify the timeout period when **Start Unit** command is issued to USB Mass Storage Device.
XHCI Mode	Smart Auto [Auto] Enabled Disabled	Set the USB 3.0 controller mode. For [Smart Auto], the USB 3.0 setting is inherited during POST according to the support of OS. For [Auto], USB 3.0 is enabled after the startup of the OS that supports USB 3.0. For [Enabled], USB 3.0 is enabled. For [Disabled], USB 3.0 is disabled.

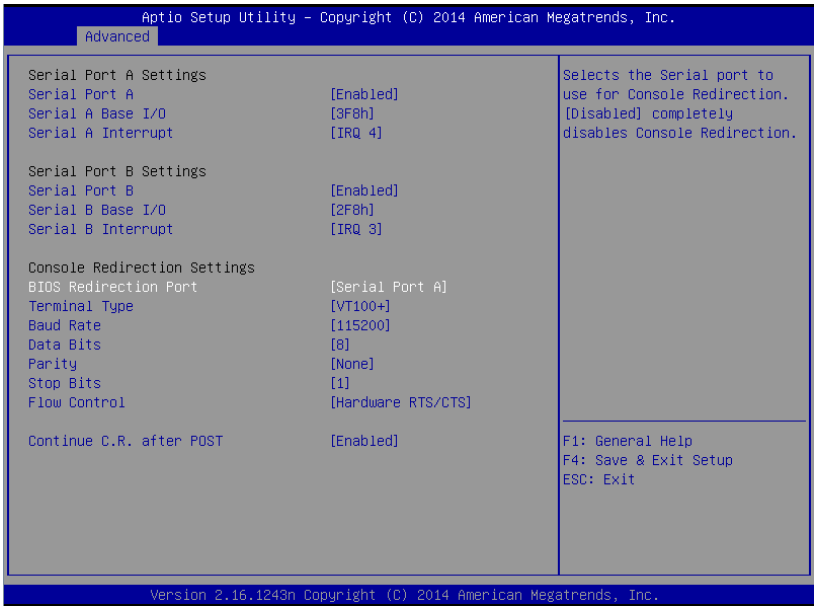
[ ]: Factory settings

(6) Serial Port Configuration submenu

From the **Advanced** menu, select **Serial Port Configuration** and then press the <**Enter**> key to display the menu screen shown below.



From **BIOS Redirection Port**, select **Serial Port A** or **Serial Port B** and then press the <**Enter**> key to display the menu screen shown below.



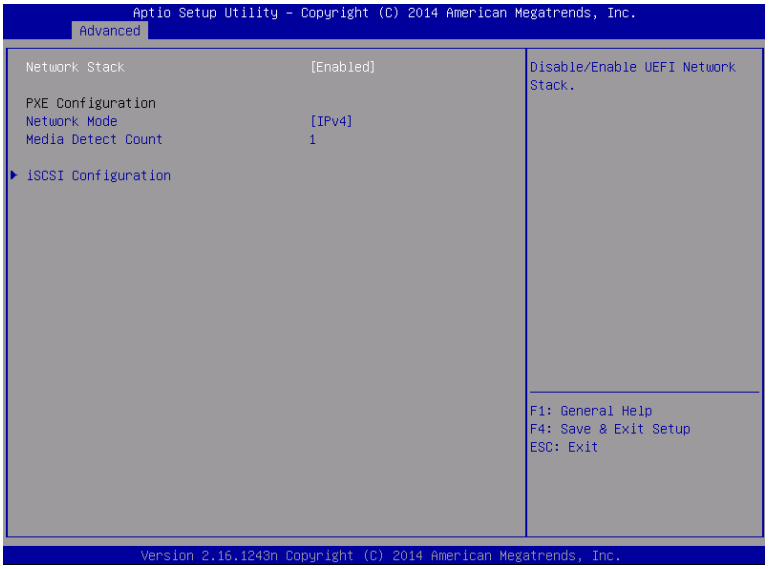
For details about the options, see the table below.

Option	Parameter	Descriptions
Serial Port A Settings	–	–
Serial Port A	Disabled [Enabled]	Enable or disable serial Port A.
Serial A Base I/O	[3F8h] 2F8h 3E8h 2E8h	Specify the base I/O address for serial port A.
Serial A Interrupt	IRQ 3 [IRQ 4]	Specify the interrupt for serial port A.
Serial Port B Settings	–	–
Serial Port B	Disabled [Enabled]	Enable or disable serial Port B.
Serial B Base I/O	3F8h [2F8h] 3E8h 2E8h	Specify the base I/O address for serial port B.
Serial B Interrupt	IRQ 4 [IRQ 3]	Specify the interrupt for serial port B.
Console Redirection Settings	–	–
BIOS Redirection Port	[Disabled] Serial Port A Serial Port B	Enable or disable the console redirection feature for the specified serial port. Specifying **Serial Port A** or **Serial Port B** allows direct connection via terminal unit such as NEC ESMPRO Manager, and options for connection shown below are displayed.
Terminal Type	[VT100+] VT-UTF8 PC-ANSI	Select the terminal type.
Baud Rate	9600 19200 57600 [115200]	Specify baud rate.
Data Bits	7 [8]	Specify data bit width.
Parity	[None] Even Odd	Specify parity type.
Stop Bits	[1] 2	Specify stop bits.
Flow Control	None [Hardware RTS/CTS]	Specify the flow control method.
Continue C.R. after POST	Disabled [Enabled]	Select whether the console redirection is continued after completion of POST or not.

[ ]: Factory settings

(7) Network Stack Configuration submenu

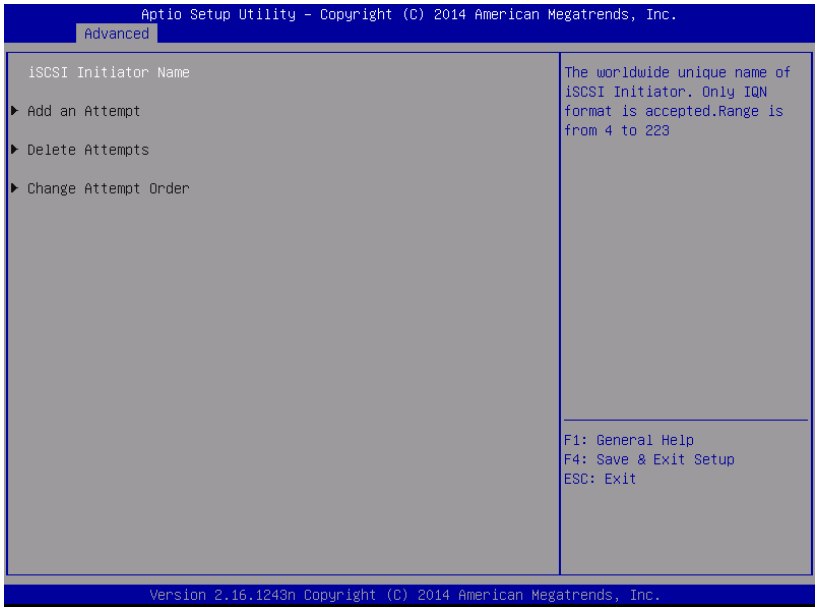
Select [Network Stack Configuration] from the Advanced menu, and press Enter to display the following screen.



Option	Parameter	Descriptions
Network Stack	Disabled [Enabled]	Enable or disable the UEFI network stack. The following menu items appear if this function was enabled.
PXE Configuration	–	–
Network Mode	Disabled [IPv4] IPv6	Set the PXE network mode.
Media Detect Count	[1]-50	Set the number of media detection retries that are performed during PXE connection.
iSCSI Configuration	–	–

[ ]: Factory settings

(a) iSCSI Configuration submenu

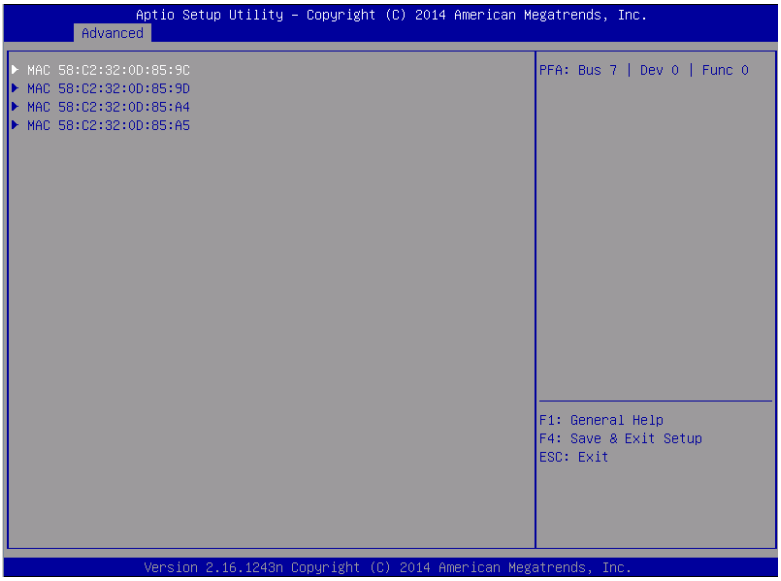


For details of the options, see the following table.

Option	Parameter	Descriptions
iSCSI Initiator Name	4 to 223 alphanumeric characters	Set the iSCSI initiator name In the format of “iSCSI qualified name (IQN)”. The following menu items can be selected if the iSCSI initiator name was set.
Add an Attempt	–	–
Attempt [XX]	–	–
Delete Attempts	–	–
Change Attempt Order	–	–

[ ]: Factory settings

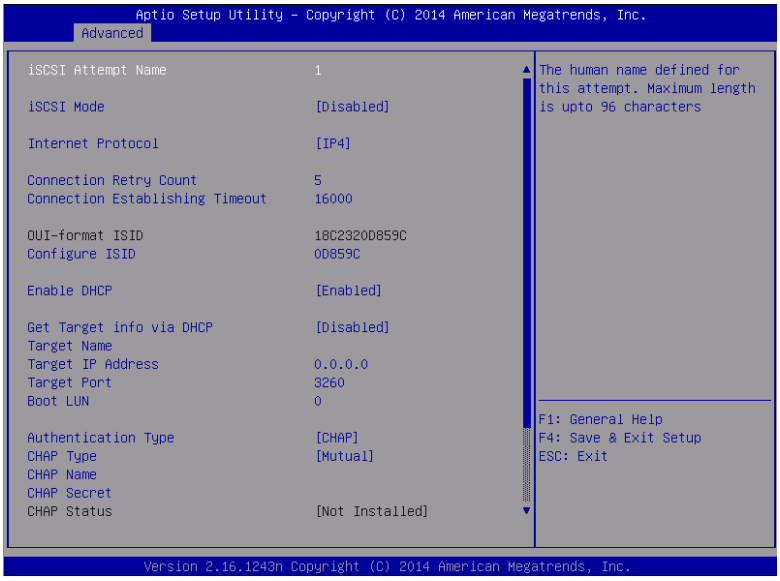
①. Add an Attempt submenu



Note The MAC address appears if the onboard LAN controller or the UEFI driver of each PCI device was loaded.

Option	Parameter	Descriptions
MAC [XX:XX:XX:XX:XX:XX]	–	–

②. MAC [XX:XX:XX:XX:XX:XX] submenu



Option	Parameter	Descriptions
iSCSI Attempt Name	Up to 96 alphanumeric characters	Set the iSCSI attempt name.
iSCSI Mode	[Disabled] Enabled Enabled for MPIO	Set the iSCSI mode.
Internet Protocol	[IP4] IP6	Set the iSCSI IP mode.
Connection Retry Count	0-[5]-16	Set the number of retries of iSCSI connection.
Connection Establishing Timeout	100-[16000]-20000	Set the timeout value of iSCSI connection In milliseconds.
OUI-format ISID	(Display only)	OUI-format ISID is displayed.
Configure ISID	6 digits	Set the lower three bytes of OUI-format ISID. For the default, store the MAC address value.
Enable DHCP	[Disabled] Enabled	Enable or disable the DHCP.
Initiator IP Address	IP Address	Set the initiator IP address. This option does not appear if Enable DHCP was enabled or Internet Protocol was set to [IP6].
Initiator Subnet Mask	IP Address	Set the initiator subnet mask. This option does not appear if Enable DHCP was enabled.

Option	Parameter	Descriptions
Gateway	IP Address	Set the gateway. This option does not appear if Enable DHCP was enabled.
Get target info via DHCP	[Disabled] Enabled	Enable or disable acquiring the target information via the DHCP. This option does not appear if Enable DHCP was disabled.
Target Name	4 to 223 alphanumeric characters	Set the target name. Set in the format of “iSCSI qualified name (IQN)”. This option does not appear if Get Target info via DHCP was enabled.
Target IP Address	IP Address	Set the target IP address. This option does not appear if Get Target info via DHCP was enabled.
Target Port	0-65535	Set the target port. This option does not appear if Get Target info via DHCP was enabled.
Boot LUN	Up to 20 alphanumeric characters	Set LUN. This option does not appear if Get Target info via DHCP was enabled.
Authentication Type	CHAP [None]	Set the authentication type.
CHAP Type	One way [Mutual]	Set the CHAP type. This option appears if Authentication Type was set to [CHAP].
CHAP Name	Up to 126 alphanumeric characters	Set the CHAP name. This option appears if Authentication Type was set to [CHAP].
CHAP Secret	12 to 16 alphanumeric characters	Set the CHAP secret. This option appears if Authentication Type was set to [CHAP].
CHAP Status	(Display only)	The CHAP secret setting is displayed. This option appears if Authentication Type was set to [CHAP].
Reverse CHAP Name	Up to 126 alphanumeric characters	Set the reverse CHAP name. This option appears if Authentication Type was set to [CHAP] and CHAP Type was set to [Mutual].
Reverse CHAP Secret	12 to 16 alphanumeric characters	Set the reverse CHAP secret. This option appears if Authentication Type was set to [CHAP] and CHAP Type was set to [Mutual].
Reverse CHAP Status	(Display only)	The reverse CHAP secret setting is displayed. This option appears if Authentication Type was set to [CHAP] and CHAP Type was set to [Mutual].
Save Changes	–	Save the changes.
Back to Previous Page	–	Return to the iSCSI Configuration submenu.

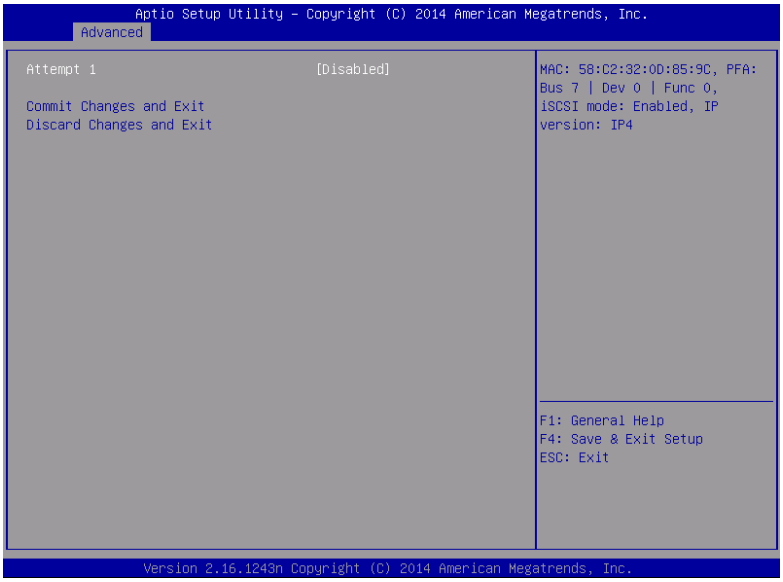
[ ]: Factory settings

③. Attempt[XX] submenu

The same options as the MAC [XX:XX:XX:XX:XX:XX] submenu are displayed or set.

See the MAC [XX:XX:XX:XX:XX:XX] submenu.

④. Delete Attempts submenu



Option	Parameter	Descriptions
Attempt [XX]	[Disabled] Enabled	Enable the iSCSI attempt to be deleted.
Commit Changes and Exit	–	Save the changes, and then return to the iSCSI Configuration submenu.
Discard Changes and Exit	–	Without save the changes, return to the iSCSI Configuration submenu.

[ ]: Factory settings

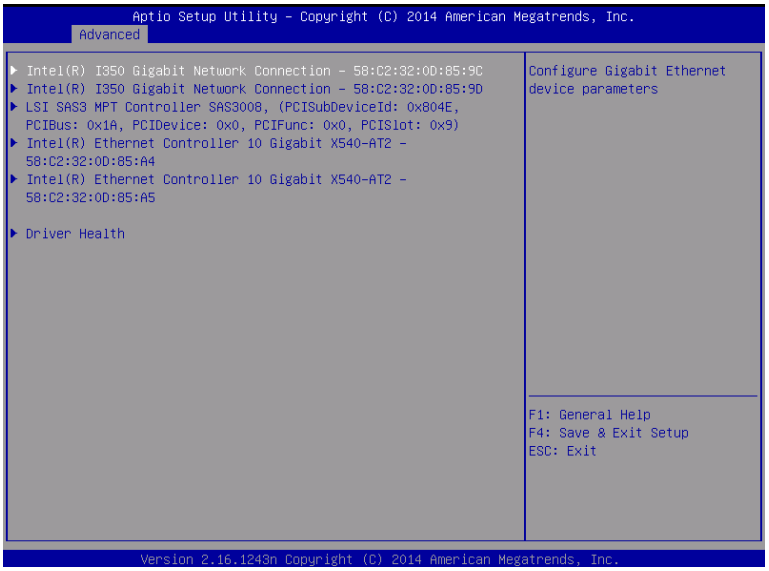
⑤. Change Attempt Order submenu

Option	Parameter	Descriptions
Change Attempt Order	Attempt [XX] Attempt [XX]	Set the iSCSI attempt priority. Display the pop-up window by pressing Enter. Then, use + or - key to change the priority.
Commit Changes and Exit	–	Save the changes, and then return to the iSCSI Configuration submenu.
Discard Changes and Exit	–	Without save the changes, return to the iSCSI Configuration submenu.

[ ]: Factory settings

(8) UEFI Driver Configuration submenu

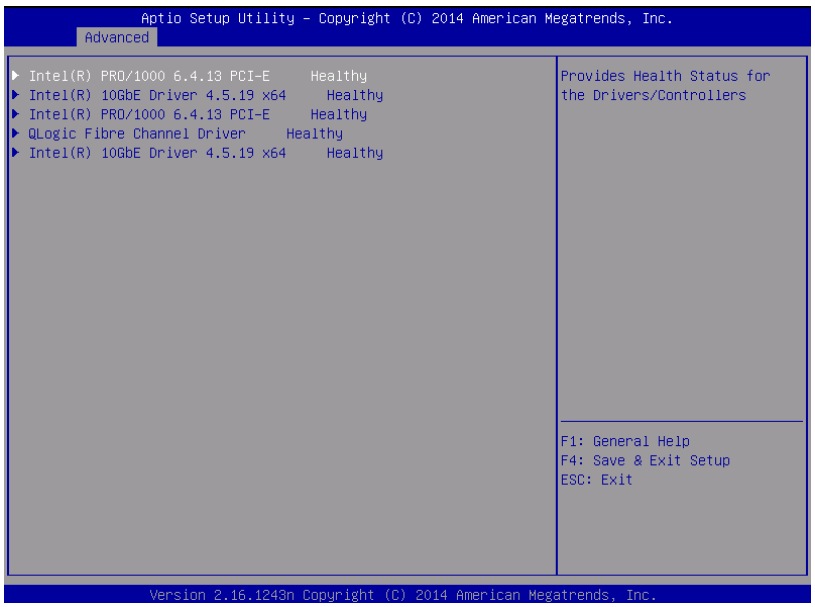
Select [UEFI Driver Configuration] from the Advanced menu, and press Enter to display the following screen.



Option	Parameter	Descriptions
(UEFI Driver Name)	–	The MAC address appears if the onboard LAN controller or the UEFI driver of each PCI device was loaded. This submenu varies depending on the UEFI driver.
Driver Health	–	–

[ ]: Factory settings

(a) Driver Health submenu



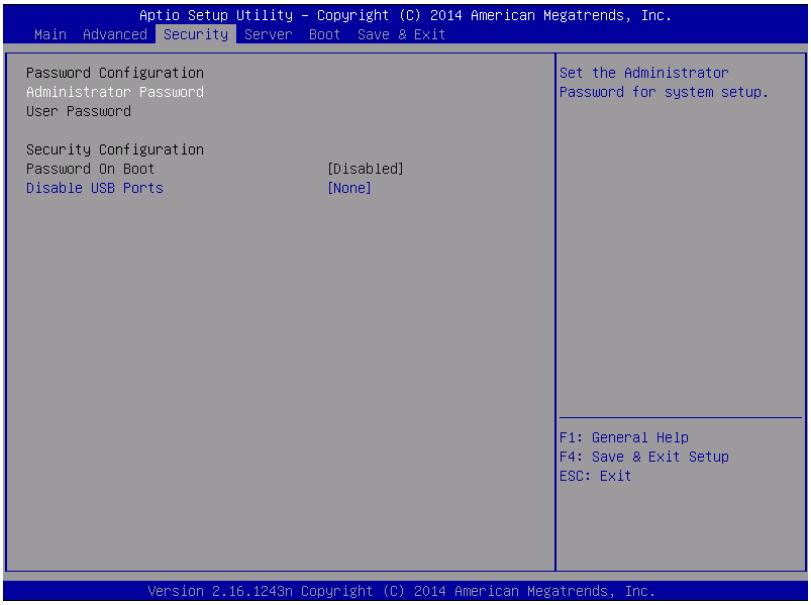
For details of the options, see the following table.

Option	Parameter	Descriptions
(UEFI Driver Name)	–	The state of UEFI Driver Health is displayed. This option appears if the onboard LAN controller or the UEFI driver of each PCI device was loaded if this driver corresponds to the Driver Health.

[ ]: Factory settings

1.2.3 Security

If you move the cursor to **Security**, the **Security** menu appears. For the menu that has ▶ on the left, move the cursor to it and then press the <**Enter**> key to show its submenus. Then configure the settings.



Select **Administrator Password** or **User Password**, and then press the <**Enter**> key to display the screen where you can register/change the password.

Tips

- User Password cannot be set without setting Administrator Password
- Do not set any password before installing OS.
- If you have forgotten any password, contact the store where you purchased the product or your maintenance service company. If you clear the password set in the BIOS Setup utility (SETUP), see *Chapter 1 (9 Resetting the Server and Clearing BIOS Settings)*.

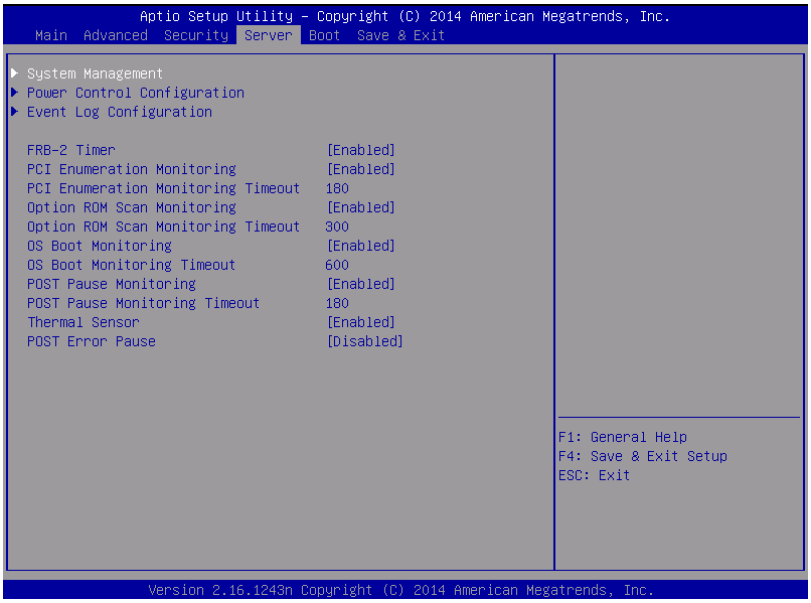
For details about the options, see the table below.

Option	Parameter	Descriptions
Password Configuration	–	–
Administrator Password	Up to 20 alphanumeric characters	When the <**Enter**> key is pressed, the password entry screen to set administrative right is displayed. This password can be used to access all SETUP menus. Password can be set only when SETUP is started by administrative right. If no password is set, SETUP starts with administrative right.
User Password	Up to 20 alphanumeric characters	When the <**Enter**> key is pressed, the password entry screen to set user right is displayed. With this password, access to SETUP menus is limited. The user password can be set when SETUP is started by administrative right or user right.
Security Configuration	–	–
Password On Boot	[Disabled] Enabled	Enable or disable the feature that requires a password entry on boot. This option can be selected when **Administrator Password** is set.
Disable USB Ports	[None] Front Rear Front + Rear	Select a USB port to be disabled.

[ ]: Factory settings

1.2.4 Server

If you move the cursor to **Server**, the **Server** menu screen appears. For the menu that has ▶ on the left, move the cursor to it and then press the <**Enter**> key to show its submenus.



The **Server** menu screen shows the options you can configure and their features. For the menu **System Management**, move the cursor to it and then press the <**Enter**> key to show its submenus.

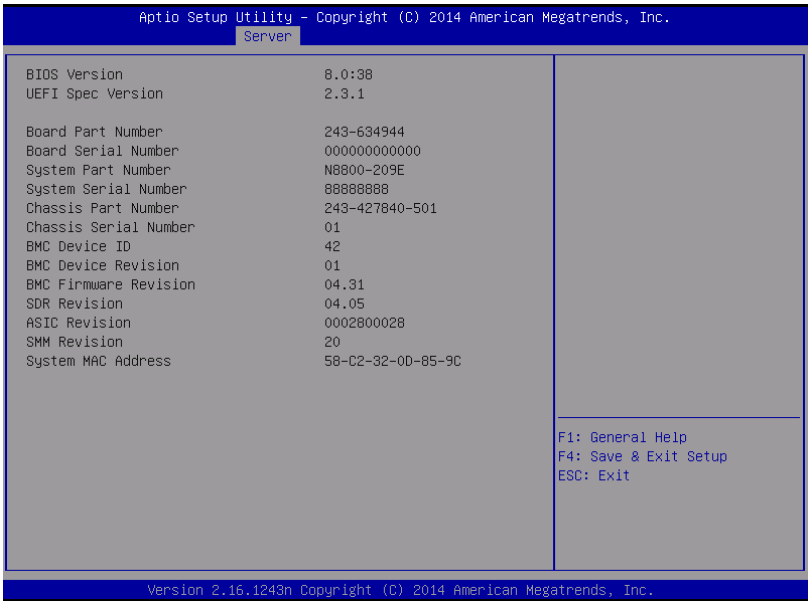
Option	Parameter	Descriptions
System Management	–	–
Power Control Conifiguration	–	–
Event Log Configuration	–	–
FRB-2 Timer	Disabled [Enabled]	Enable or disable FRB-2 timer.
PCI Enumeration Monitoring	Disabled [Enabled]	Enable or disable the feature to monitor PCI device scan.
PCI Enumeration Monitoring Timeout	60-[180]-1200	Specify the timeout period for PCI device scan (Unit: second).
Option ROM Scan Monitoring	Disabled [Enabled]	Enable or disable the feature to monitor option ROM scan.
Option ROM Scan Monitoring Timeout	60-[300]-1200	Specify the timeout period for option ROM scan (Unit: second).
OS Boot Monitoring	Disabled [Enabled]	Enable or disable the feature to monitor OS boot-up. If the NEC ESMPRO Agent is not installed on OS, disable this feature.
OS Boot Monitoring Timeout	60-[600]-1200	Specify the timeout period for OS boot-up (Unit: second).
POST Pause Monitoring	Disabled [Enabled]	Enable or disable the feature to monitor POST while the boot-up is suppressed.
POST Pause Monitoring Timeout	60-[180]-1200	Specify the timeout period for monitoring POST while the boot-up is suppressed (Unit: second).

Option	Parameter	Descriptions
Thermal Sensor	Disabled [Enabled]	Enable or disable the feature to monitor the thermal sensor.
POST Error Pause	[Disabled] Enabled	Enable or disable the feature to suppress OS booting when POST detects an error.

[ ]: Factory settings

(1) System Management submenu

From the **Server** menu, move the cursor to **System Management** and then press the <**Enter**> key to show its submenus.

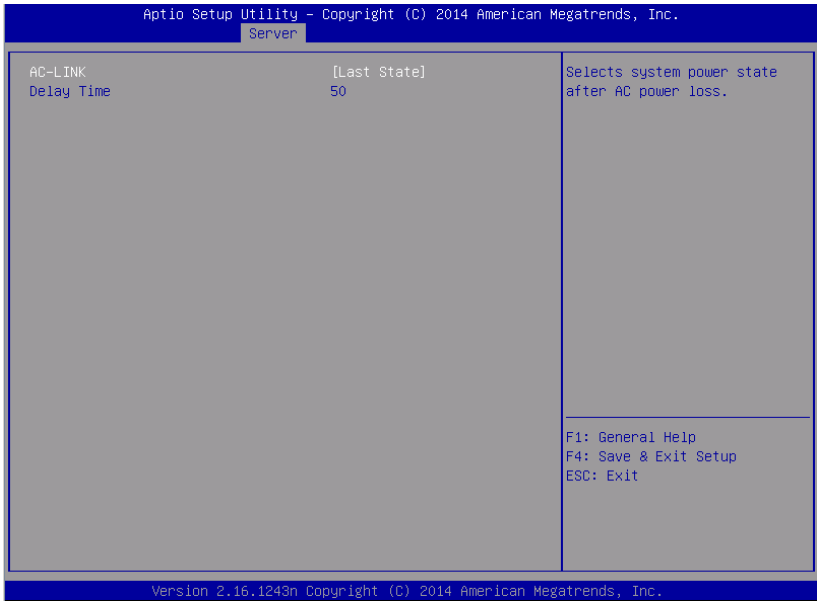


For details about the options, see the table below (display only).

Option	Parameter	Descriptions
BIOS Version	–	The current BIOS version is displayed.
UEFI Spec Version	–	The version of the UEFI specification supported by the BIOS.
Board Part Number	–	The part number of motherboard is displayed.
Board Serial Number	–	The serial number of motherboard is displayed.
System Part Number	–	The part number of the system is displayed.
System Serial Number	–	The serial number of the system is displayed.
Chassis Part Number	–	The part number of chassis is displayed.
Chassis Serial Number	–	The serial number of chassis is displayed.
BMC Device ID	–	The device ID of BMC is displayed.
BMC Device Revision	–	The revision of BMC is displayed.
BMC Firmware Revision	–	The firmware revision of BMC is displayed.
SDR Revision	–	The revision of Sensor Data Record is displayed.
ASIC Revision	–	The firmware revision of Fault-tolerant chipset is displayed.
SMM Revision	–	The firmware revision of System Management is displayed.
System MAC Address	–	The system MAC address is displayed.

(2) Power Control Configuration submenu

Select [Power Control Configuration] from the Server menu, and press Enter to display the following screen.



For details of the options, see the following table.

Option	Parameter	Descriptions
AC-LINK	Stay Off [Last State] Power On	Set the AC-LINK function. Set the server power state that results when the AC power is supplied again after being turned off once (see the table below). If Power On or Last State is set, the server starts after the CPU/IO modules of both systems are installed (up to 180 seconds) in addition to the delay time of Power On Delay Time.
Delay Time	[50]-600	Set the DC-ON delay time in seconds if the AC-LINK setting is Power On or Last State.

State exhibited before the AC power is turned off	AC-LINK setting		
	Stay Off	Last State	Power On
In operation (DC power is on.)	Off	On	On
Stopped (DC power is also off.)	Off	Off	On
Forced power-off*	Off	Off	On

* This is to press and hold down the POWER switch for 4 seconds or more. The power is forcibly turned off.

Tips If an uninterruptible power supply (UPS) is used for automatic operation, set the AC-LINK to [Power On].

(3) Event Log Configuration submenu

From the **Server** menu, move the cursor to **Event Log Configuration** and then press the <**Enter**> key to show its submenu.

For details about the options, see the table below.

Option	Parameter	Descriptions
Clear Online Event Logs	–	Press the <**Enter**> key then select **Yes** to clear event logs of active module.
Clear Offline Event Logs	–	Press the <**Enter**> key then select **Yes** to clear event logs of standby module.

1.2.5 Boot

If you move the cursor to **Boot**, the **Boot** menu where you can configure the boot order appears.

For details about the options, see the table below.

Option	Parameter	Descriptions
Boot Configuration	–	–
Quiet Boot	Disabled [Enabled]	Enable or disable the feature to display logo during POST. When this option is set to **Disabled**, the results of POST execution are displayed instead of the logo. If **BIOS Redirection Port** is enabled, this option is shown as **Unavailable** and inaccessible (run with **Disabled** state automatically)
Bootup NumLock State	On [Off]	Enable or disable NumLock feature of keyboard.
Setup Prompt Timeout	[0] - 65535	Set a value from 0 to 65535 seconds that specifies the F2 key input wait time required to start SETUP.
Boot Mode	Legacy [UEFI]	Set the boot mode.. If [Load Setup Defaults] in the Save & Exit mode was executed, this option is set to [UEFI]. For this server, set this option to [UEFI]. Set this option to [Legacy] before physically formatting a hard disk drive. After the formatting is done, set this option to [UEFI] again.
Boot Option Priorities	–	–
Boot Option #1	–	These items display the priority of boot devices.
Boot Option #2	–	
Boot Option #3	–	
Boot Option #4	–	

Option	Parameter	Descriptions
CD/DVD ROM Drive BBS Priorities	–	Specify the boot priority for each device type.
Hard Drive BBS Priorities	–	
Network Drive BBS Priorities	–	

[ ]: Factory settings

Changing the boot order

1. When BIOS detects a bootable device, information on the device is displayed in the designated area.
2. The boot priority (from first to fourth) of the registered boot devices can be changed using the arrow keys ↑/↓ and +/–.
   Move the cursor to a device using the arrow keys ↑/↓, and change the priority using the arrow keys +/–.

Boot order rules

(1) If a bootable device is newly connected, the priority lowest in its BBS Priorities is assigned to that device.

(2) If a bootable device is disconnected from the server, the relevant device is removed from BBS Priorities.

(3) When Load Setup Defaults is executed on Save & Exit menu, the Boot Option and BBS Priorities are changed as follows.

a) Boot Option Priorities

1. Boot Option #1 : CD/DVD
2. Boot Option #2 : Removable Device
3. Boot Option #3 : Hard Disk Drive
4. Boot Option #4 : Network Device

b) Priority of Priorities for each device type

・The priorities of the non-USB devices, including the SATA device and RAID, become higher, and the USB devices are registered subsequent to the non-USB devices.

c) Devices that can be started

・If these devices have been Disabled, the setting is reset and re-registered for Priorities of each device type.

1.2.6 Save & Exit

If you move the cursor to **Save & Exit**, the **Save & Exit** menu appears.

The options of this menu are described below.

(a) Save Changes and Exit

The SETUP utility closes with all the changes saved in NVRAM (Non-volatile memory). After the SETUP utility closes, the system automatically reboots.

(b) Discard Changes and Exit

The SETUP utility closes without saving the changes in NVRAM. The setting at startup of SETUP utility is retained.
After the SETUP utility closes, the system automatically reboots.

(c) Save Changes and Power Off

The utility closes after the changes are saved in NVRAM.
After closing, the server automatically turns off the power.

(d) Discard Changes and Power Off

The utility closes without saving the changes in NVRAM. The initial BIOS settings being set when the utility starts are inherited. After closing, the server automatically turns off the power.

(e) Load Setup Defaults

This option resets all values in the SETUP utility to the default settings.

Note

- The factory-set value may differ from the default value depending on your server model. Reconfigure each item according to your environment by referring to the list of settings in this section.
- The values in the iSCSI Configuration or UEFI Driver Configuration submenus do not return to the default settings.

2. BMC Configuration

BMC Configuration utility allows you to view or change system parameters.

2.1 Overview

2.1.1 Offline Tools

The server has the following offline tools:

- Maintenance Utility

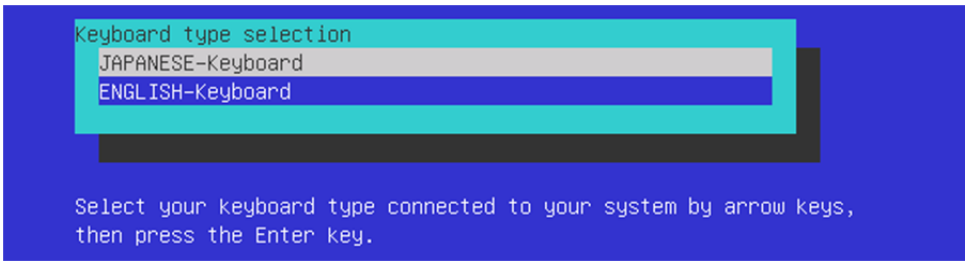
  Use this tool when maintaining the server.
- BMC Configuration

  Use this tool when setting system configuration information to BMC.

This section describes the features of BMC Configuration.

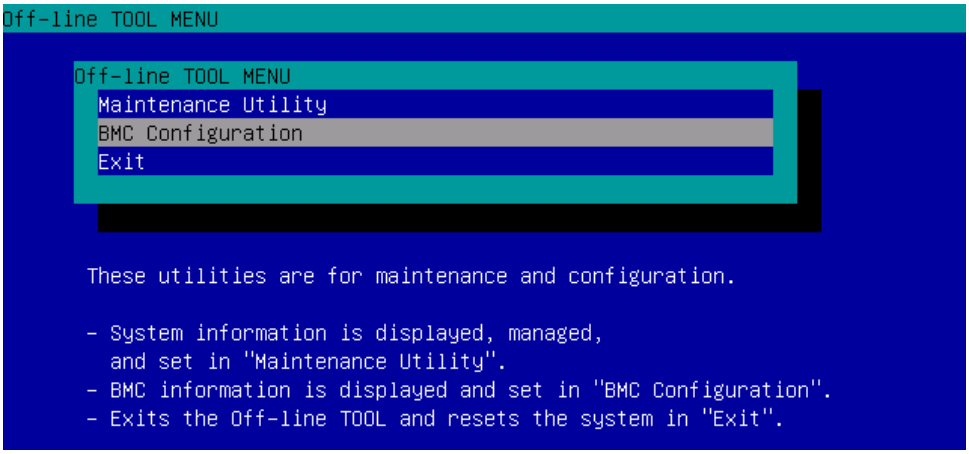
2.2 Activating BMC Configuration

1. Press <F4> key at POST to display **Keyboard type selection**.



Keyboard type selection

2. Select of the keyboard type connected with this server to display **Off-line TOOL MENU**.

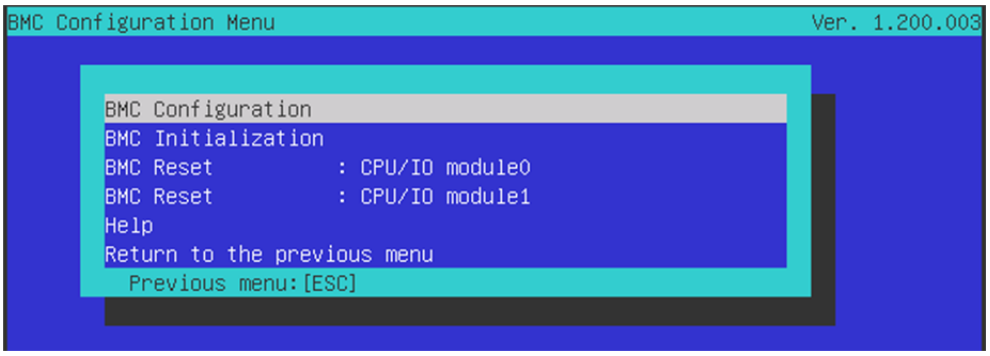


Off-line TOOL MENU

3. Select **BMC Configuration** from the menu to activate the BMC Configuration.

2.3 Main Menu of BMC Configuration

The Main Menu appears when you select **BMC Configuration** on **Offline Tools** menu.



Main Menu

The features are described below.

(a) BMC Configuration

You can set configuration information to BMC.
If you select **OK** after you change the values, the set values are applied to BMC.
See *(2.4 Setting BMC Configuration)* for details.

(b) BMC Initialization

You can restore the BMC Configuration information to the default value (except for some items).
Executing this item initializes both CPU/IO modules 0 and 1.
See *(2.5 BMC Initialization)* for details.

(c) BMC Reset : CPU/IO module X

You can reset BMC of CPU/IO module X (X = 0 or 1) without changing any settings.
See *(2.6 BMC Reset)* for details.

(d) Help

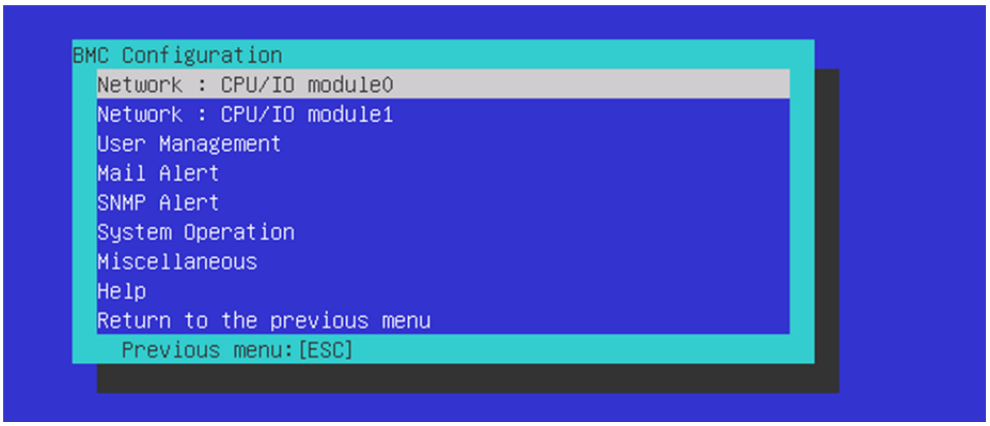
You can open BMC Configuration help window.

(e) Return to the previous menu

You can exit BMC Configuration, and return to **Offline Tools** menu.

2.4 Setting BMC Configuration

The Main Menu appears when you select **BMC Configuration** on Offline Tool menu.



BMC Configuration menu

The features are described below.

(a) Network : CPU/IO module X

You can view network environment and services of BMC LAN of CPU/IO module X (X = 0 or 1) and change parameter setting. Only the module that is installed appears on this menu.
See *(2.4.1 Network)* for details.

(b) User Management

You can manage users who use BMC.
See *(2.4.2 User Management)* for details.

(c) Mail Alert

You can view E-mail alert issued from BMC and change parameter setting.
See *(2.4.3 Mail Alert)* for details.

(d) SNMP Alert

You can view SNMP alert issued from BMC and change parameter setting.
See *(2.4.4 SNMP Alert)* for details.

(e) System Operation

You can set parameters for remote KVM console and remote media.
See *(2.4.5 System Operation)* for details.

(f) Miscellaneous

You can set various features of BMC.
See *(2.4.6 Miscellaneous)* for details.

(g) Help

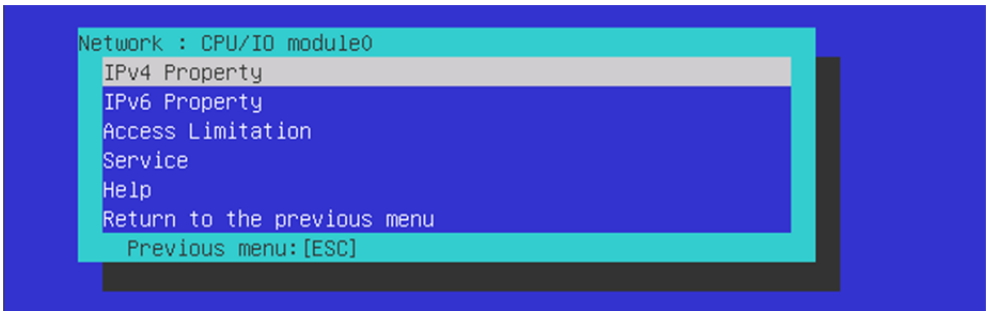
You can open BMC Configuration help window.

(h) Return to the previous menu

You can exit BMC Configuration, and return to **Offline Tools** menu.

2.4.1 Network

The **Network** menu appears when you select **Network : CPU/IO moduleX** on **BMC** Configuration menu.



Network menu

The table below shows details of parameters and their default value.

Item	Description	Default Value
IPv4 Property		
Management LAN	Specify and display LAN port to communicate with BMC. Management LAN : LAN port for BMC exclusive use. Shared BMC LAN : LAN port of System (OS) is shared and used. This item cannot be chosen for this server.	Management LAN
Connection Type	Specify and display the connection type of BMC LAN.*1 Auto Negotiation : Connecting by suitable setting. 100Mbps Full Duplex : Connecting by Full Duplex at speed of 100 Mbps. 100Mbps Half Duplex : Connecting by Half Duplex at speed of 100 Mbps. 10Mbps Full Duplex : Connecting by Full Duplex at speed of 10 Mbps. 10Mbps Half Duplex : Connecting by Half Duplex at speed of 10 Mbps.	Auto Negotiation
BMC MAC Address	MAC Address of BMC is displayed.	—
DHCP	Determine whether to dynamically obtain an IP address from a DHCP server. If the item is set to **Enable** and applied, BMC set the value **IP Address**, **Subnet Mask** and **Default Gateway** obtained from DHCP server.	Disable
IP Address	Specify the BMC LAN IP address.*2	192.168.1.1
Subnet Mask	Specify the Subnet Mask of BMC LAN. *1 *2	255.255.255.0
Default Gateway	Specify the Default Gateway IP address of the BMC LAN.*2 If you set this item, it is necessary for applying configuration information that the gateway is connected on network.	0.0.0.0
Dynamic DNS	Determine whether to enable/disable of Dynamic DNS. *3	Disable
DNS Server	Specify the DNS Server.	0.0.0.0
Host Name	Specify the Host Name.*4	Blank
Domain Name	Specify the Domain Name.*5	Blank

Item	Description	Default Value
IPv6 Property		
IPv6	Enable or disable IPv6.	Disable
Address Assignment Mode	Specify the mode to assign IPv6 address (Static or Dynamic). *6	Dynamic
Link Local Address	Display link local address. *6	―
Global Address	Display IPv6 address when Dynamic is specified for assignment mode. *6 *7	::
Static Address	Specify IPv6 address when Static is specified for assignment mode. *6	0::0
Prefix Length	Specify the prefix length when Static is specified for assignment mode. *6	64
Gateway Address	Specify the gateway address when Static is specified for assignment mode. *6	0:00
Access Limitation		
Limitation Type	Select the Access Limitation Type. Allow All : Access to BMC is not limited. Allow Address : Specify the IP Address that is allowed to access BMC. Deny Address : Specify the IP Address that denies accessing BMC.	Allow All
IP Address	Specify the IP Address to allow or deny to access with BMC. *8 *9	Blank
Service		
HTTP	Enable or disable HTTP service. *10	Enable
HTTP Port Number	Specify the HTTP port number. *11	80
HTTPS	Enable or disable HTTPS service. *10	Enable
HTTPS Port Number	Specify the HTTPS port number. *11	443
SSH	Enable or disable SSH service.	Enable
SSH Port Number	Specify the SSH port number. *11	22

*1: If an illegal value is specified for subnet mask, an error message is displayed and setting is disabled.

*2: Can be changed only when DHCP is set to "Disable".

*3: Can be changed only when DHCP is set to "Enable".

*4: Host Name should be within 63 characters.
Acceptable characters are: alphanumeric, hyphen (-), underscore (_), and period (.).

*5: Host Name and Domain Name should be within total of 255 characters.
Acceptable characters are: alphanumeric, hyphen (-), underscore (_), and period (.).

*6: Can be specified only when IPv6 is set to "Enable".

*7: Displayed only when "Dynamic" is specified for Address Assignment Mode.

*8: Can be specified when Access Limitation Type is "Allowed Address" or "Deny Address". The length must not exceed 255 characters.

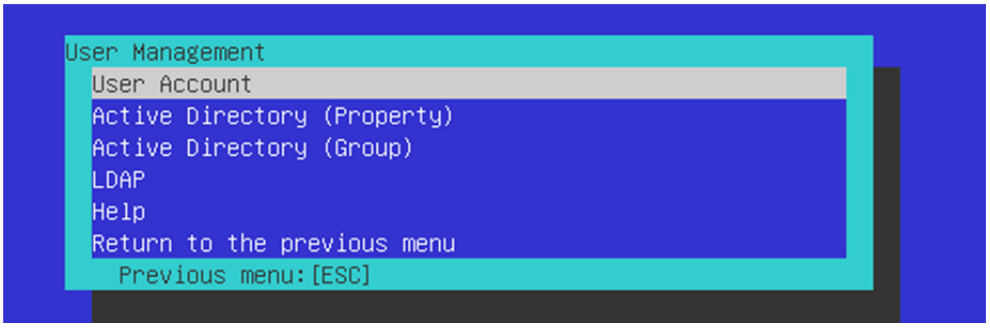
9: The range of IP address to "Allow" or "Deny" access is delimited by ",(Comma)". With regard to the setting of “Deny” access, "(Asterisk)" can be described as a wild-card. (ex: 192.168.1.*,192.168.2.1,192.168.2.254)

*10: If HTTP is set to "Enable", HTTPS is changed to "Enable" automatically. You are not allowed to set "Enable" to HTTP only.

*11: Port number can be specified only when the relevant port is set to "Enable". The port number must be unique.

2.4.2 User Management

The **User Management** menu appears when you select **User Management** on **BMC Configuration** menu.



User Management menu

The table below shows details of parameters and their default value.

Item	Description	Default Value
User Account		
User	Enable or disable the user. *1	Enable
User Name	Specify user name. *2	Blank
Password	Specify password. *3	Blank
Confirm Password	Specify the same character string used for "Password". *3	Blank
Privilege	Specify the privilege of the user. *4 Administrator Operator User	Administrator
Active Directory (Property)		
Active Directory Authentication	Enable or disable Active Directory authentication.	Disable
User Domain Name	Specify the user domain name. *5 *6	Blank
Timeout	Specify timeout period for connection with Domain Controller. *5	120
Domain Controller Server1	Enable or disable Domain Controller 1. *5 *7	Enable
Server Address1	Specify IP address of Domain Controller 1. *5 *8	Blank
Domain Controller Server2	Enable or disable Domain Controller 2. *5 *7	Disable
Server Address2	Specify IP address of Domain Controller 2. *5 *8	Blank
Domain Controller Server1	Enable or disable Domain Controller 3. *5 *7	Disable
Server Address3	Specify IP address of Domain Controller 3. *5 *8	Blank
Active Directory (Group)		
Group Name	Specify group name. *5 *6	Blank
Group Domain	Specify group domain. *6	Blank
Privilege	Specify privilege of group. *4 Administrator Operator User	Administrator

Item	Description	Default Value
LDAP		
LDAP Authentication	Enable or disable LDAP authentication.	Disable
IP Address	Specify the IP address. *9	0.0.0.0
Port Number	Specify the LDAP port number. *9	636
Search Base	Specify the search base used in LDAP authentication. *9 *10	Blank
Bind Domain Name	Specify the bind domain used in LDAP authentication. *9 *10	Blank
Bind Password	Specify the bind password used in LDAP authentication. *9 *11	Blank

*1: Can be specified if a user exists.

*2: Up to 15 characters including alphanumeric, hyphen (-), and underscore (_) can be used. Note, however, User Name must start start with hyphen (-). In addition, "root", "null", "MWA", "AccessByEM-Poem", and names which are already assigned for other number are not allowed.

*3: Up to 19 ASCII characters excluding " " (blank), " (quotation), & (ampersand), ? (question mark), = (equal sign), #, and ¥, can be used.

*4: Privileges are defined as follows:

Administrator : User who has administrator right. All operations are allowed.

Operator : User who can operate the machine. Session management, license registration, remote KVM/media, configuration, and update are not allowed.

User : General user. Viewing IPMI information only is allowed.

*5: Can be specified only when Active Directory authentication is set to "Enable".

*6: Up to 255 characters including alphanumeric, hyphen, underscore, and period can be used.

*7: If Active Directory authentication is set to "Enable", at least one domain controller server must be enabled.

*8: Can be specified only when domain controller server is set to "Enable".

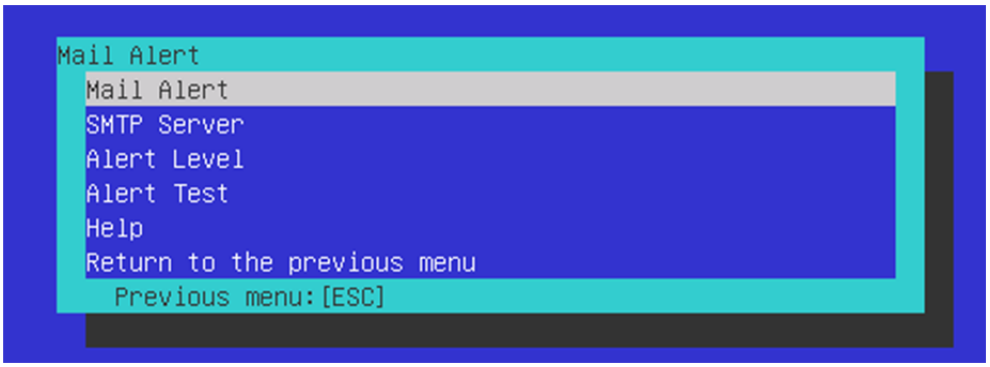
*9: Can be specified only when LDAP authentication is set to "Enable".

*10: Characters in the range between 4 and 62 including alphanumeric, hyphen, underscore, period, comma, and equal sign can be used.

*11: Alphanumeric characters in the range between 4 and 31 excluding ", #, and ¥ can be used.

2.4.3 Mail Alert

The **Mail Alert** menu appears when you select **Mail Alert** on **BMC Configuration** menu.



Mail Alert menu

The table below shows details of parameters and their default value.

Item	Description	Default Value
Mail Alert		
Mail Alert	Enable or disable Mail Alert.	Disable
Response of SMTP Server	Specify the timeout period until when the connection to SMTP server succeeds by E-mail transmission.	30
To:1	Select Enable/Disable of To:1. *1	Enable
To:1 E-Mail Address	Specify the mail address of To:1. *2 *3	Blank
To:2	Select Enable/Disable of To:2. *1	Disable
To:2 E-Mail Address	Specify the mail address of To:2. *2 *3	Blank
To:3	Select Enable/Disable of To:3. *1	Disable
To:3 E-Mail Address	Specify the mail address of To:3. *2 *3	Blank
From:	Specify the mail address of From. *3	Blank
Reply-To:	Specify the mail address of Reply-To. *3	Blank
Subject:	Specify the Subject. *4	Blank
SMTP Server		
SMTP Server	Specify the SMTP Server. *5	0.0.0.0
SMTP Port Number	Specify the SMTP port number.	25
SMTP Authentication	Select Enable/Disable of SMTP Authentication.	Disable
CRAM-MD5	Select Enable/Disable of CRAM-MD5. *6 *7	Enable
LOGIN	Select Enable/Disable of LOGIN authentication. *6 *7	Enable
PLAIN	Select Enable/Disable of PLAIN authentication. *6 *7	Enable
User Name	Specify the SMTP User Name. *6 *8	Blank
Password	Specify the SMTP User Password. *6 *9	Blank

Item	Description	Default Value
Alert Level		
Alert Level	Specify the kind of event to alert. *10	Error, Warning
	Error : When "Error" is detected in each sensor type, the alert is sent to the checked address.	
	Error, Warning : When "Error" or "Warning" is detected in each sensor type, the alert is sent to the checked address.	
	Error, Warning, Information : When "Error", "Warning" or "Information" is detected in each sensor type, the alert is sent to the checked address.	
	Separate Setting : You can arbitrarily select the event and the address (To:X) to alert in each sensor type.	
Alert Test	Execute test by sending an alert by setup content and mail. *11	–

*1: When Mail Alert is enabled, at least one addresses should be enabled.

*2: Can be specified only when To:X is set to "Enable".

*3: Up to 255 characters including alphanumeric, hyphen, underscore, period, and @ (at mark) can be used.

*4: Up to 63 alphanumeric characters excluding +, ", ?, =, <, >, #, and ¥ can be used.

*5: Up to 255 alphanumeric characters, hyphen, underscore, and period can be used for full domain name or IP address.

*6: Can be specified only when SMTP Authentication is set to "Enable".

*7: When SMTP Authentication is set to "Enable", at least one of the authentic method should be enabled.

*8: Up to 64 alphanumeric characters excluding " " (blank), ",?, =, <, >, #, and ¥, can be used.

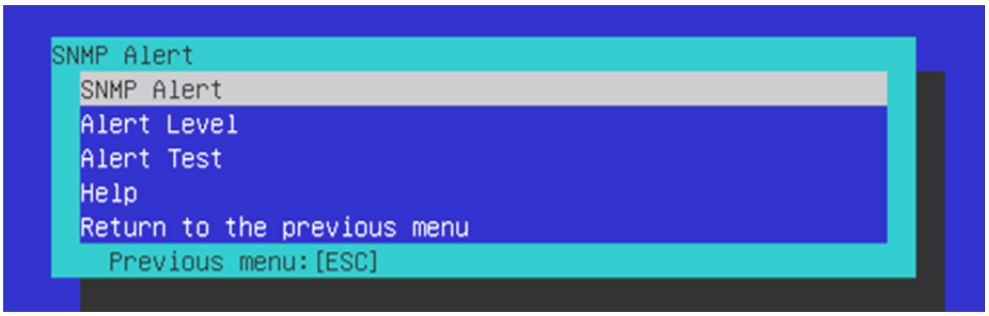
*9: Up to 20 alphanumeric characters excluding " " (blank), ",?, =, <, >, #, and ¥, can be used.

*10: Can be specified only when SMTP Alert is set to "Enable".

*11: Be sure to perform Alert Test after all the parameters are configured appropriately. Alert feature may fail depending on configuration made for network or alert receiver.

2.4.4 SNMP Alert

The **SNMP Alert menu** appears when you select **SNMP Alert** on **BMC Configuration** menu.



SNMP Alert menu

The table below shows details of parameters and their default value.

Item	Description	Default Value
SNMP Alert		
SNMP Alert	Enable or disable SNMP Alert. *1	Disable
Computer Name	Specify the Computer Name. *2	Blank
Community Name	Specify the Community Name. *2	Public
Alert Process	Select One Alert Receiver or All Alert Receiver for Alert Process.	One Alert Receiver
Alert Acknowledge	Enable or disable Alert Acknowledge.	Enable
Alert Retry Count	Specify the count of Alert retry. *3	3
Alert Timeout	Specify the timeout period (in seconds) for alert. *3	6
Alert Reciever1	Enable or disable primary receiver. *4	Enable
IP Address1	Specify the IP Address of primary receiver. *5	0.0.0.0
Alert Reciever2	Enable or disable secondary receiver. *4	Disable
IP Address2	Specify the IP Address of secondary receiver. *5	0.0.0.0
Alert Reciever3	Enable or disable tertiary receiver. *4	Disable
IP Address3	Specify the IP Address of tertiary receiver. *5	0.0.0.0
Alert Level		
Alert Level	Specify the kind of event to alert. Error : When "Error" is detected in each sensor type, the alert is sent to the checked address. Error, Warning : When "Error" or "Warning" is detected in each sensor type, the alert is sent to the checked address. Error, Warning, Information : When "Error", "Warning" or "Information" is detected in each sensor type, the alert is sent to the checked address. Separate Setting : You can arbitrarily select the event to alert in each sensor type.	Error, Warning
Alert Test	Execute a test by SNMP alert. *6	–

*1: When PEF (Platform Event Filter) is set to "Disable" in Miscellaneous menu, SNMP alert is disabled.

*2: Up to 16 alphanumeric characters are accepted.

*3: Can be specified only when Alert Acknowledge is set to "Enable".

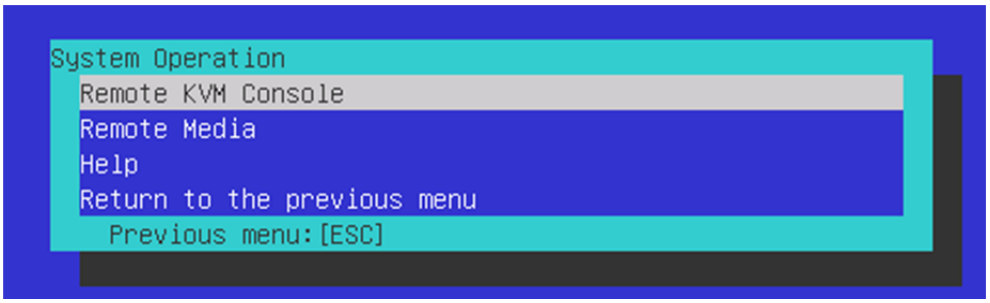
*4: When SNMP Alert is enabled, at least one alert receiver should be enabled.

*5: Can be specified only when each Alert Receiver is set to "Enable".

*6: Be sure to perform Alert Test after all the parameters are configured appropriately. Alert feature may fail depending on configuration made for network or alert receiver.

2.4.5 System Operation

The **System Operation** menu appears when you select **System Operation** on **BMC Configuration** menu.



System Operation menu

The table below shows details of parameters and their default value.

Item	Description	Default Value
Remote KVM Console		
Encryption	Enable or disable encryption.	Enable
Port Number (No Encryption)	Specify the port number when encryption is disabled. *1	7578
Port Number (Encryption)	Specify the port number when encryption is enabled *1	7582
Mouse Cursor Mode	Specify display mode of mouse cursor. Single Dual	Dual
Mouse Coordinate Mode	Select a mode to indicate coordinate when moving mouse cursor. Relative Absolute	Relative
Keyboard Language	Select a keyboard language. Japanese (JP) English (US) French (FR) German (DE)	English(US)
Remote Media		
Encryption	Enable or disable encryption.	Enable
Remote CD/DVD (No Encryption)	Specify the port number of remote CD/DVD port when encryption is disabled. *1	5120
Remote USB Memory (No Encryption)	Display the port number of remote USB memory when encryption is disabled. (Remote CD/DVD port number + 2)	–
Remote FD (No Encryption)	Display the port number of remote FD when encryption is disabled. (Remote CD/DVD port number + 3)	–
Remote CD/DVD (Encryption)	Specify the port number of remote CD/DVD port when encryption is enabled. *1	5124
Remote USB Memory (Encryption)	Display the port number of remote USB memory when encryption is enabled. (Remote CD/DVD port number + 2)	–
Remote FD (Encryption)	Display the port number of remote FD when encryption is enabled. (Remote CD/DVD port number + 3)	–

*1: Port numbers must be the unique one.

2.4.6 Miscellaneous

The **Miscellaneous** menu appears when you select **Miscellaneous** on **BMC Configuration menu.**

Item	Description	Default Value
Miscellaneous		
Behavior when SEL repository is Full	Specify the behavior when SEL repository is full. *1 Stop logging SEL : SEL is not recorded any more. Clear all SEL : Delete all SEL and record SEL newly. Overwrite oldest SEL*2 : Old SEL is overwritten with new SEL.	Stop logging SEL
Platform Event Filter	Enable or disable Platform Event Filter. *3	Enable
Management Software	Setting for remote management	–
ESMPRO Management	Enable or disable NEC ESMPRO Management. *4	Current set value
Authentication Key	Specify the Authentication Key. *5 *6	Guest
Redirection	Enable or disable Redirection feature. *5 *7	Enable

*1: When this item is changed to/from "Overwrite oldest SEL", all log records in the SEL Repository are cleared.

*2: However, even if you specify this setting, in the case that the Windows OS is started and ft control software detects SEL area is filled fully, all SEL are deleted and new SEL is recorded again.
In addition, the contents of SEL is recorded to event log of Windows OS by ft control software, so back up event log as needed according to your operation form.

*3: Disabling Platform Event Filter also disables SNMP alert.

*4: When BMC can be managed directly from NEC ESMPRO Manager (Ver.5.4 or later), this item must be set to "Enable". If it is set to "Enable", Authentication Key is required.

*5: Can be specified only when ESMPRO Management is set to "Enable".

*6: This Authentication key is used when NEC ESMPRO Manager (Ver.5.4 or later) manages the target server. Up to 16 alphanumeric characters are accepted.

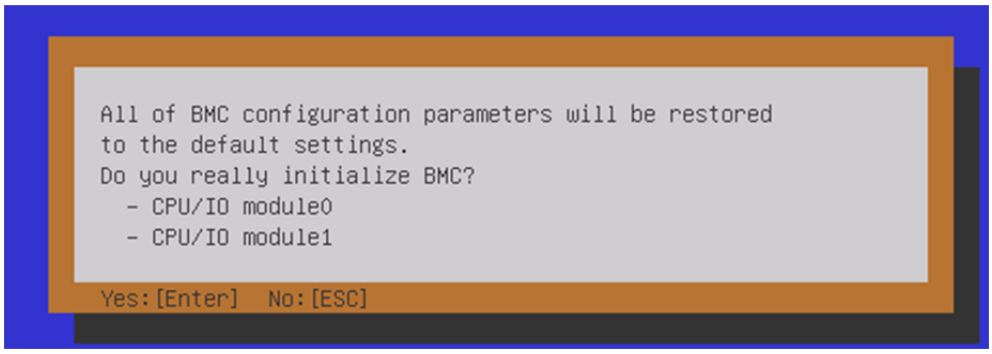
*7: If Redirection is set to "Enable", Console Redirection Configuration port in BIOS is set to "Serial Port B" at next boot.

Note If you do not use remote management feature by NEC ESMPRO, set to "Disable" for ESMPRO Management in Management Software. In this case, setting for relevant items are hidden and unnecessary.

2.5 BMC Initialization

If you select **BMC Initialization** on **Main** menu, the confirmation message as show below appears.

Only the CPU/IO module installed in the server appears on this menu.



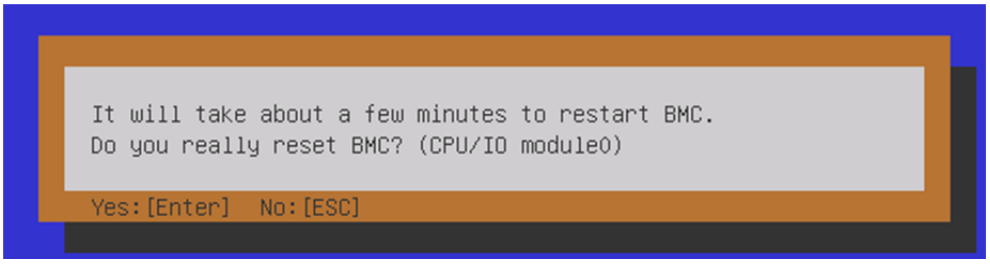
Confirmation message (BMC Initialization)

<**ESC**> key: Aborts processing and returns to **Main** menu.

<**Enter**> key: Initializes BMC configuration settings and restores the default value except for some items. After initialization, it takes about one minute to restart BMC.

2.6 BMC Reset

If you select **BMC Reset : CPU/IO module X** on **Main** menu, the confirmation message as show below appears. Only the CPU/IO module installed in the server appears on this menu.



Confirmation message (BMC Reset)

<**ESC**> key: Aborts processing and returns to Main menu.

<**Enter**> key: Resets BMC of CPU/IO module X (X = 0 or 1). It takes about one minute to restart BMC.

3. SAS Configuration Utility

SAS Configuration utility makes settings of the built-in SAS controller. You can start it up by simple key operation during POST execution.

Important

- **Because the server is installed with the latest version of the utility, your screen display may be different from the one described in this guide. For information on options different from those described in this guide, refer to the online help or ask your service representative.**
- **This utility is set for the CPU/IO module of the primary side. When you configure the CPU/IO module of the secondary side, first power off the server, plug out and plug in the AC power cord of the primary side. Then start the server.**
- **The SAS Configuration Utility is used for physical formatting. Do not change the settings on each utility menu, as doing so causes failure and malfunction of this server.**

3.1 Starting the SAS Configuration utility

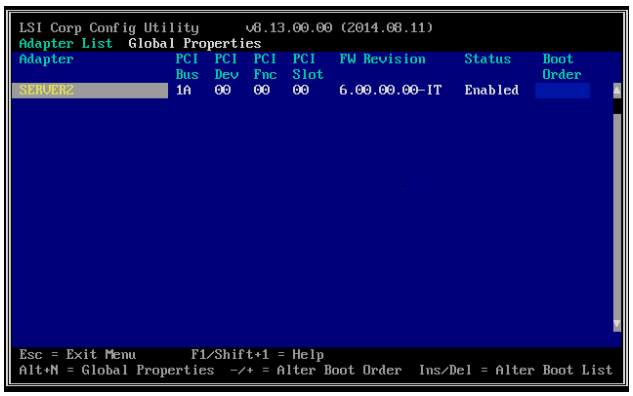
Take the following procedures to start the SAS/ Configuration utility.

1. Power on the server.
2. Start the BIOS Setup Utility according to *1.1 Starting SETUP* in *1. System BIOS* in *this Chapter*.
3. If [Boot mode] in the [Boot] menu is [UEFI], change the setting to [Legacy].
4. Select [Save Changes and Exit] in the [Save & Exit] menu, and restart the server.
5. After the following messages appear during POST, Press and hold down the **Ctrl** key and press the **C** key.

```
LSI Corporation MPT SAS3 BIOS
MPT3BIOS-x.xx.xx.xx (xxxx.xx.xx)
Copyright 2000-20xx LSI Corporation.

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

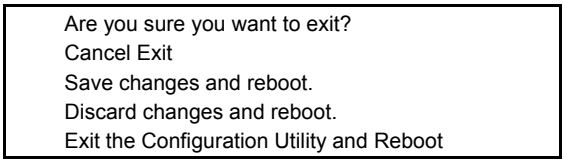
6. The SAS Configuration utility starts up with the **Adapter List** menu displayed.



3.2 Quitting the SAS Configuration Utility

Take procedures below to quit the SAS/ Configuration utility.

1. Keep pressing the <**Esc**> key until the **Adapter List** menu appears.



2. From the menu, select either “Discard changes and reboot” or “Exit the Configuration Utility and Reboot”, and press Enter.

Tips Do not use the SAS Configuration utility to change the setting. If you mistakenly changed the setting, you should select [Discard changes and reboot] before closing the utility.

3. Start the BIOS Setup Utility according to *1.1 Starting SETUP* in *1. System BIOS* in *this Chapter*.

4. Select [UEFI] in the [Boot mode] under the [Boot] menu.

5. Select [Save Changes and Exit] in the [Save & Exit] menu, and restart the server.

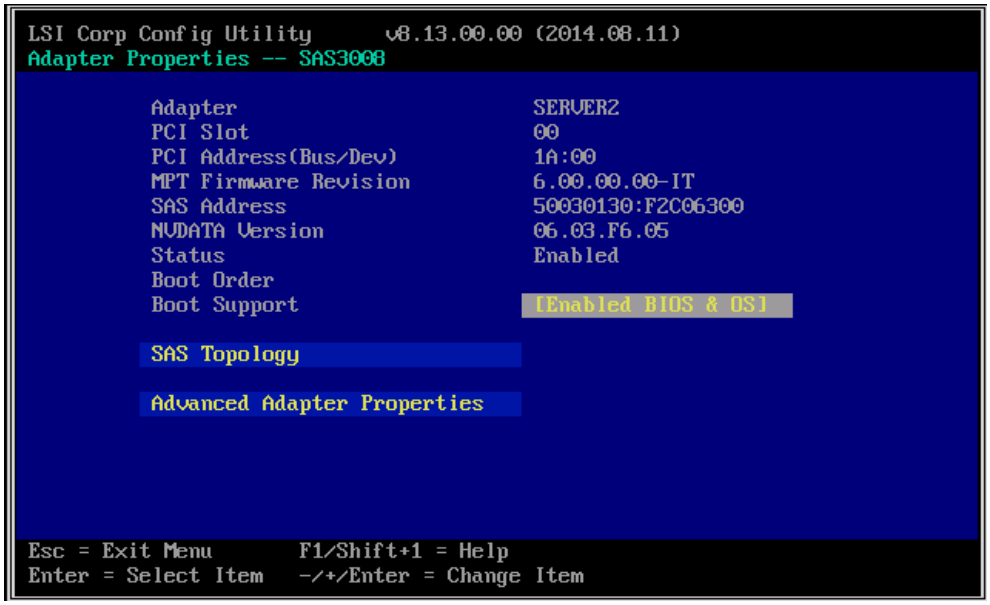
3.3 Physical Formatting of the Hard Disk Drive

Important **This utility is set for the CPU/IO module of the primary side. When you configure the CPU/IO module of the secondary side, first turn off the DC power to the server, plug out and plug in the AC power cord of the primary side. Then start the server.**

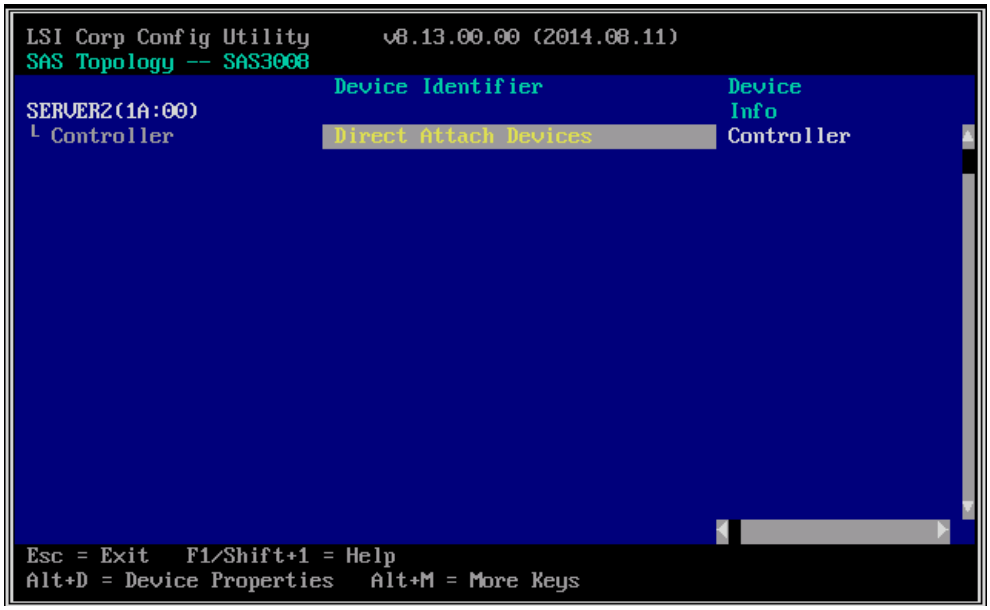
The following describes how to execute physical formatting of hard disk drive.

1. Press the <**Enter**> key on the **Adapter List** menu.

   Adapter Properties menu appears after a short while.

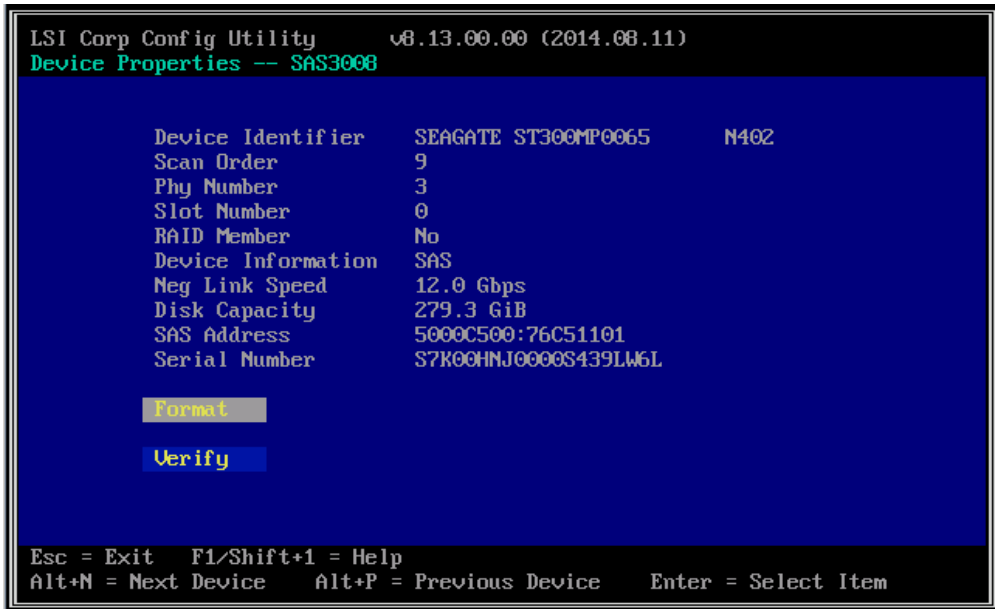


2. Select **SAS Topology** and press the <**Enter**> key.

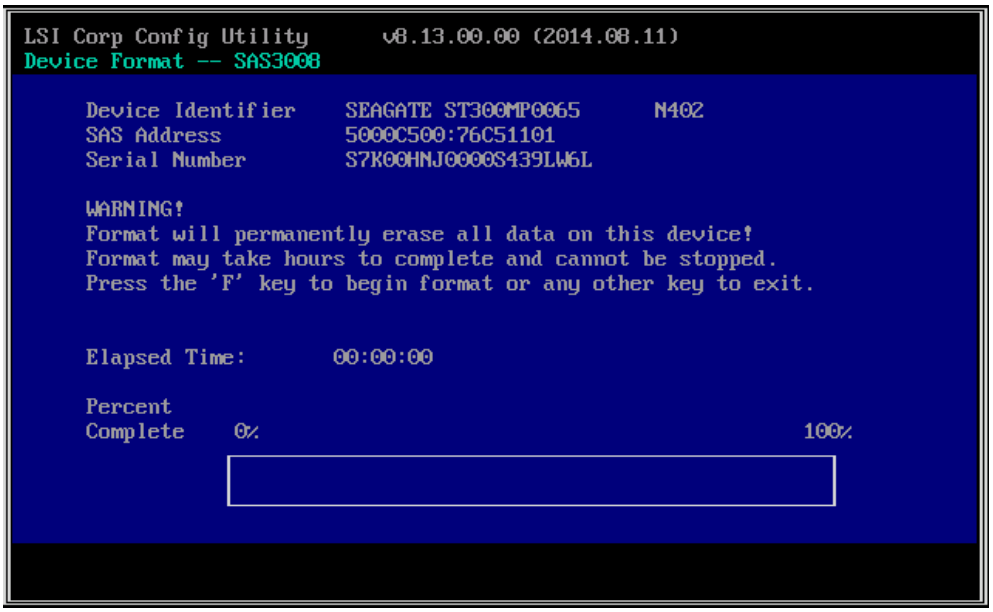


3. Hard disk drives that are installed on the primary CPU/IO module appear after a while. Select the hard disk drive to execute physical formatting and press the <**D**> key while pressing the <**Alt**> key.

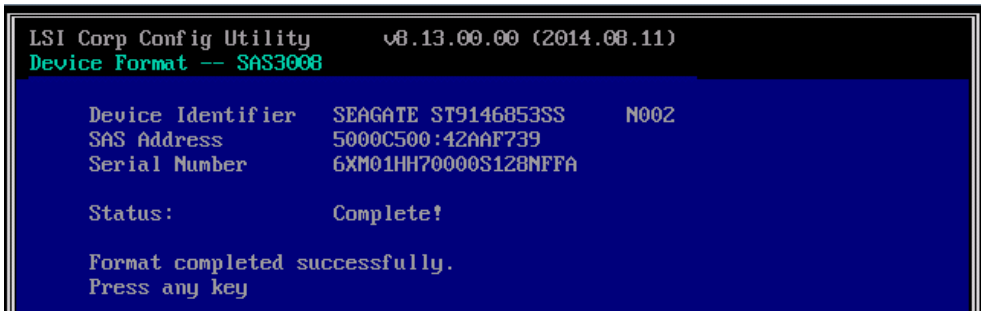
4. **Device Properties** menu appears after a while. Select **Format** and press the <**Enter**> key.



5. **Device Format** menu appears after a while. Press the <**F**> key to start formatting.



6. Once the following message appears, the formatting process is complete.
   Press any key to display **Device Properties** menu.



7. After formatting, close the utility according to *3.2 Quitting the SAS Configuration Utility* in *this Chapter.*

4. Flash FDD

Flash FDD is a device that is compatible with a floppy disk drive.

Flash FDD is used when collecting the hardware logs.
See *Chapter 1 (11. Offline Tools).*

Only one Flash FDD can be connected to a USB connector of this server. If another USB or floppy disk drive is connected to this server, be sure to disconnect it.

CAUTION

Be extremely careful not to lose Flash FDD or have it stolen.
If Flash FDD is lost, stolen, misappropriated, or fraudulently obtained, there is a risk of leaking confidential information to a third party. NEC assumes no responsibility for damages caused by leaking confidential information in this way.

If you want to change the write protection of Flash FDD, remove Flash FDD from the server, change the write protection switch, and then connect it again.

4.1 Notes on Using Flash FDD

Do not use Flash FDD to back up data. Flash FDD can be used to save temporary data.

4.1.1 Compensation for recorded data

NEC does not pay compensation for data recorded on Flash FDD even if the data is lost.

4.1.2 Handling Flash FDD

- Flash FDDs are consumables.
  If Flash FDD causes an error, replace with a new Flash FDD.
- Do not turn off the server while the access LED of Flash FDD is blinking.
  Doing so may cause failure of the device and damage to the data.
- Flash FDD cannot be connected to a USB hub.
  Directly connect Flash FDD to the server.
- Before handling Flash FDD, discharge static electricity from your body by touching a nearby metal object such as a doorknob or aluminum frame.
- Do not disassemble Flash FDD.
- Do not apply a strong force to Flash FDD.
- Do not place Flash FDD in an area directly exposed to sunlight or near a heater.
- Do not handle Flash FDD while eating, drinking, or smoking. Also, avoid contact with thinner, alcohol, or other corrosive substances.
- Be careful when connecting the Flash FDD to the server.

- Do not relocate the server with Flash FDD connected to USB connector.
- Remove Flash FDD from the server when not in use.

4.1.3 Using Flash FDD on EXPRESSBUILDER

- Connect Flash FDD after Home Menu of EXPRESSBUILDER appears.
- Remove Flash FDD from the server before closing EXPRESSBUILDER.

4.1.4 Using Flash FDD on Linux OS

Do not access Flash FDD by specifying “sd” device name if integration or separation occurred in one of the modules.
The device name may be changed due to integration or separation occurred on one of the modules. Specifying the sd device name might destroy the partition or other information on another disk.

Note It is a feature of this server that the device names of the device files change due to integration or separation of one of the modules.

5. Details of EXPRESSBUILDER

EXPRESSBUILDER helps you to install maintain the server (such as checking connection status). EXPRESSBUILDER also provides bundled software and instruction manuals.

5.1 Starting EXPRESSBUILDER

You can start EXPRESSBUILDER by using the EXPRESSBUILDER DVD as follows:

(1) Insert the DVD into the server, and then restart.

Boot Selection Menu shown in *Chapter 3 (5.2 Menus of EXPRESSBUILDER) - (1) Boot Selection Menu* will appear.

(2) Insert the DVD into a computer running Windows.

Autorun Menu shown in *Chapter 3 (5.2 Menus of EXPRESSBUILDER) - (4) Autorun Menu* will appear.

If the menu does not appear, run the following file on DVD.
`\autorun\dispatcher_x64.exe`.

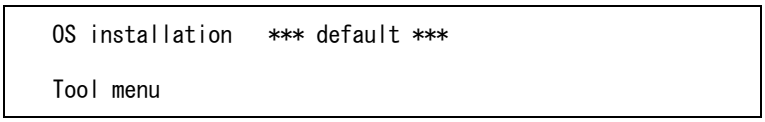
5.2 Menus of EXPRESSBUILDER

You can operate EXPRESSBUILDER by using onscreen menus.

(1) Boot Selection Menu

When the server starts from EXPRESSBUILDER, the following menu appears.

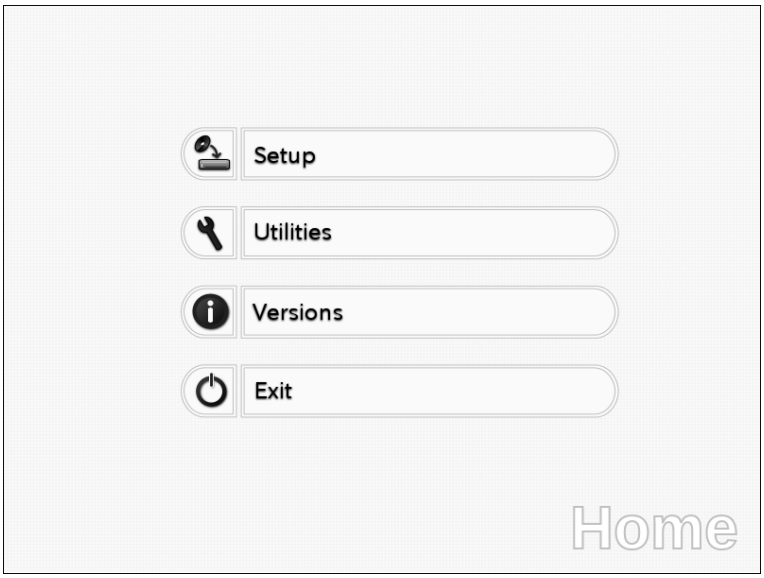
Choose an item by using arrow keys and <Enter> key.



When **OS installation** is chosen or no key is pressed, Home Menu shown in *(2) Home Menu* will appear.

When **Tool menu** is chosen, Tool Menu shown in *(3) Tool Menu* will appear.

(2) Home Menu



Operate Home Menu using the mouse or keyboard (Tab and Enter keys).

Home Menu includes the following items:

a) Setup

This feature is not available for Linux model.

b) Utilities

Starts a utility in EXPRESSBUILDER.

For details, see *Chapter 3 (5.3 Utility in EXPRESSBUILDER)*.

c) Versions

Shows the versions of software and drivers in EXPRESSBUILDER.

d) Exit

Closes EXPRESSBUILDER, and then shut down or restart the server.

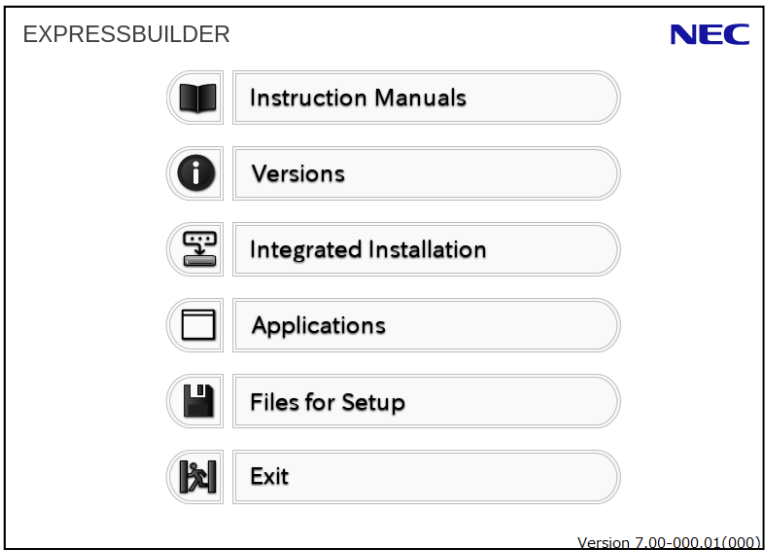
(3) Tool Menu

```
Test and diagnostics

Return to the previous menu
```

Choose **Test and diagnostics** to run System Diagnostics, which is used to analyze and diagnose the server and check the cable connection. For details, see *Chapter 1 (10. System Diagnostics)*.

(4) Autorun Menu



You can use the following features from the menu that starts by using the Windows autorun feature.

a) Instruction Manuals

Shows User's Guide, Installation Guide, and other instruction manuals.

Install Adobe Reader to your computer to read the manuals.

b) Versions

Shows the versions of the included software, drivers, and EXPRESSBUILDER.

c) Integrated Installation

This feature is not available for Linux model.

d) Applications

Installs or runs applications individually.

e) Files for Setup

This feature is not supported in Linux model.

f) Exit

Closes this menu.

5.3 Utility in EXPRESSBUILDER

You can run the following utility when choosing **Utilities** from Home Menu.

File Execution

Directly runs an external utility on removable media. Use this feature for utilities provided by NEC.

Note Do not run the file provided by a third party.

6. EXPRESSSCOPE Engine 3

EXPRESSSCOPE Engine 3 enables various features by using Baseboard Management Controller (BMC), which is the system management LSI.

EXPRESSSCOPE Engine 3 monitors statuses inside the server such as that of power supplies, cooling fans, temperature, and voltage. Connecting the management LAN port (see *Chapter 1, "4.3 Rear View"* in *User's Guide*) to your network enables you to do the following from a remote site through a web browser and SSH client;

- Managing the server
- Operating keyboard, video, and mouse (KVM) from a remote console (*)
- Accessing a CD-ROM, DVD ROM, floppy disk, ISO image, or USB flash drive in a remote console (*)

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

Tips

To reset BMC, use the Off-line Tool of the server.

See *Chapter 3 (2. BMC Configuration)* for details.

Note

EXPRESSSCOPE Engine 3 is mounted in both CPU/IO modules 0 and 1 of the server; the respective settings need to be set for both modules. In addition, set different IP addresses for CPU/IO modules 0 and 1.

7. NEC ESMPRO

7.1 NEC ESMPRO Agent (Linux)

For details of NEC ESMPRO Agent (Linux), see "*NEC ESMPRO Agent User's Guide (Linux)*" stored in ft Server Control Software Install CD.

7.2 NEC ESMPRO Manager

NEC ESMPRO Manager remotely controls and monitors the server hardware.

To use these features, install the bundled software such as NEC ESMPRO Agent on the server.

See "*NEC ESMPRO Manager Installation Guide*" or online help of NEC ESMPRO for details.

Glossary

Terms	Description
BIOS Setup Utility (SETUP)	Software for setting BIOS. You can run this software by pressing <F2> key during POST.
BMC	Baseboard Management Controller (BMC) is a built-in controller that supports the IPMI version 2.0 protocol. BMC can manage the server hardware.
BMC Configuration Utility	Software for setting BIOS or BMC. You can use as Windows application or run this software when pressing <F4> key during POST.
CPU module	A CPU subsystem logically configured in a CPU/IO module. It includes CPUs and memory.
CPU/IO module	A module that includes CPUs (processors), memory, PCI boards, a cooling fan, hard disk drives and power supply units.
DUMP Switch	A switch that is used for collecting the memory dump if an error occurs. You can specify the destination of the dump by using the OS function.
EXPRESSBUILDER	Standard software with a feature that makes it easier to install Windows OS in Windows model. This also includes several useful applications and instruction manuals. (When installing OS other than Windows in ft server, the feature that helps easy OS installation is not available.)
EXPRESSSCOPE ENGINE 3	A name of BMC for NEC Express5800 series.
Express Report Service	Software that can report the server failure to the contact center by E-mail or modem. This software is installed with NEC ESMPRO Agent to the server.
Express Report Service (HTTPS)	Software that can report the server failure to the contact center by HTTPS.
ExpressUpdate	A feature for updating BIOS, firmware, driver, or software of the server. This feature is available when NEC ESMPRO Manager cooperates with EXPRESSSCOPE ENGINE 3 and ExpressUpdate Agent.
ExpressUpdate Agent	Software for performing ExpressUpdate. This is installed to the server.
Flash FDD	An optional USB device that can use as a floppy disk drive.
NEC ESMPRO	Standard software for the server management. This consists of several applications for managing or monitoring.
NEC ESMPRO Agent	Software for monitoring the server. This works with NEC ESMPRO Manager and resides as the OS service.
NEC ESMPRO Agent Extension	Software for performing the scheduled operations. This works with NEC ESMPRO Manager.
NEC ESMPRO Manager	Software for managing plural servers on network.
OS standard installer	An installer that stored in Windows installation disc. Use this installer if you want to install the OS manually.
Offline tools	Software that can confirm or change IPMI data such as SEL, SDR, or FRU. You can start Offline tools when pressing <F4> key during POST.
PC for Management	A computer for managing the server on network. A general Windows/Linux computer can be used as "PC for Management".
PCI module	An I/O subsystem logically configured in a CPU/IO module. It includes hard disk drives, PCI cards, BMC and 1G/10G LAN.
Product Info Collection Utility	Software for collecting several hardware/software statuses or event logs. You can easily collect the data for the server maintenance by using this software.
Windows OS parameter file	A file that saved settings for installing Windows. You can install with the saved settings in this file when setting Windows with EXPRESSBUILDER.

Revision Record

Revision (Document Number)	Date Issued	Description
30.102.03-104.01	August 2016	Newly created

[MEMO]

NEC Express Server

Express5800/R320e-E4, R320e-M4
Maintenance Guide (Linux)

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