Fujitsu SPARC M12-1

Service Manual

FUJITSU

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Contents

Preface

This document describes the maintenance procedures for the Oracle or Fujitsu
SPARC M12-1.
This document can also be used as a disassembly procedure for disposal or recycling.
The maintenance work should be performed by service engineers and/or field
engineers.

Fujitsu SPARC M12 is sold as SPARC M12 by Fujitsu in Japan.
Fujitsu SPARC M12 and SPARC M12 are identical products.

Audience

This document is intended for trained technicians and authorized service personnel
who have been instructed on the hazards within the equipment and are qualified to
remove and replace hardware. They may be called service engineers or field engineers.

Related Documentation

All documents for your server are available online at the following locations.

- Sun Oracle software-related documents (Oracle Solaris, etc.)
  https://docs.oracle.com/en/

- Fujitsu documents
  Global site

  https://www.fujitsu.com/global/products/computing/servers/unix/sparc/
  downloads/manuals/

  Japanese site

https://www.fujitsu.com/jp/products/computing/servers/unix/sparc/downloads/manual/

The following table lists documents related to SPARC M12 systems.

Documentation Related to the SPARC M12

Manual Names (*1)
Fujitsu SPARC M12 Product Notes
Fujitsu SPARC M12 Quick Guide
Fujitsu SPARC M12 Getting Started Guide (*2)
Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Important Legal and Safety Information (*2)
Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Safety and Compliance Guide
Software License Conditions for Fujitsu SPARC M12 and Fujitsu M10/SPARC M10
Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Security Guide
Fujitsu SPARC Servers/SPARC Enterprise/PRIMEQUEST Common Installation Planning Manual
Fujitsu SPARC M12-1 Installation Guide
Fujitsu SPARC M12-2 Installation Guide
Fujitsu SPARC M12-2S Installation Guide
Fujitsu SPARC M12 PCI Card Installation Guide
Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide
Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Domain Configuration Guide
Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 RCIL User Guide (*3)
Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 XSCF Reference Manual
Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 XSCF MIB and Trap Lists
Fujitsu SPARC M12-1 Service Manual
Fujitsu SPARC M12-2/M12-2S Service Manual
Crossbar Box for Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Service Manual
PCI Expansion Unit for Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Service Manual
Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Glossary
External USB-DVD Drive user guide

*1 The listed manuals are subject to change without notice.
*2 Printed manuals are provided with the product.
*3 This document applies specifically to the SPARC M12/M10 and FUJITSU ETERNUS disk storage system.

Notes on Safety

Read the following documents thoroughly before using or handling the SPARC M12.

- *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Important Legal and Safety Information*
- *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Safety and Compliance Guide*

Text Conventions

This manual uses the following fonts and symbols to express specific types of information.

Font/Symbol	Meaning	Example
AaBbCc123	What you type, when contrasted with on-screen computer output. This font is used to indicate an example of command input.	XSCF> **adduser jsmith**
AaBbCc123	The names of commands, files, and directories; on-screen computer output. This font is used to indicate an example of command output in the frame.	XSCF> **showuser -P** User Name: jsmith Privileges: useradm auditadm
Italic	Indicates the name of a reference manual.	See the *Fujitsu SPARC M12-2S Installation Guide*.
" "	Indicates the names of chapters, sections, items, buttons, or menus.	See "Chapter 2 Network Connection."

Command Syntax in the Text

While the XSCF commands have a section number of (8) or (1), it is omitted from the text.
For details on the commands, see the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 XSCF Reference Manual*.

Syntax of the Command-Line Interface (CLI)

The command syntax is as follows:

- A variable that requires the input of a value is in Italics.

- An optional element is enclosed in [].

- A group of options for an optional keyword is enclosed in [] and delimited by |.

Document Feedback

If you have any comments or requests regarding this document, please take a moment to share them with us. Along with the manual code, manual title, and page number, state your points specifically at one of the following websites:

- Global site
  https://www.fujitsu.com/global/contact/

- Japanese site
  https://www.fujitsu.com/jp/products/computing/servers/unix/sparc/contact/

Chapter 1

Before Starting Maintenance Work

This chapter describes the safety precautions that must be observed before starting any maintenance work.
Note the meanings of each of the following symbols and labels to ensure that the work is done correctly.

- Warning/Caution Indications
- Labels/Tags
- Safety Precautions
- Precautions on Static Electricity
- Other Precautions
- Emergency Power Off

1.1　Warning/Caution Indications

This manual uses the following conventions to indicate warning and alert messages, which are intended to prevent injury to the user and others as well as damage to property.

Warning - "WARNING" indicates a potential hazard that could result in death or serious personal injury if the user does not perform the procedure correctly.

Caution - "CAUTION" indicates a potential hazard that could result in minor or moderate personal injury if the user does not perform the procedure correctly. This also indicates that damage to the unit itself or other property may occur if the user does not perform the procedure correctly.

1.2 Labels/Tags

This section describes the labels and tags attached to the SPARC M12-1.
Observe the precautions of the standard labels attached to the SPARC M12-1 when performing maintenance.

⚠ **Caution -** Do not remove the labels or tags.

Note - The contents of the labels and tags described here may differ from those that are actually affixed to the chassis.

- The system name plate label (A in Figure 1-1) describes the model number, serial number, manufacture date, rated voltage/current, number of phases, frequency, and weight required for maintenance and management.
- The standard label (B in Figure 1-1) describes precautions and the following certification standards.
  - Safety: NRTL/C, BIS
  - Radio wave: VCCI, FCC, ICES, KCC
  - Safety and radio wave: CE, CCC, BSMI, RCM, EAC

Figure 1-1   Locations of the System Name Plate Label and Standard Label
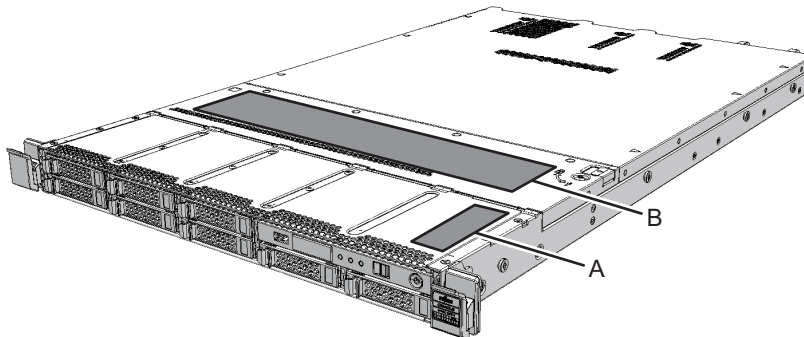
- The RFID tag carries an Asset ID. The RFID tag is affixed to the operation panel.

Figure 1-2   RFID Tag
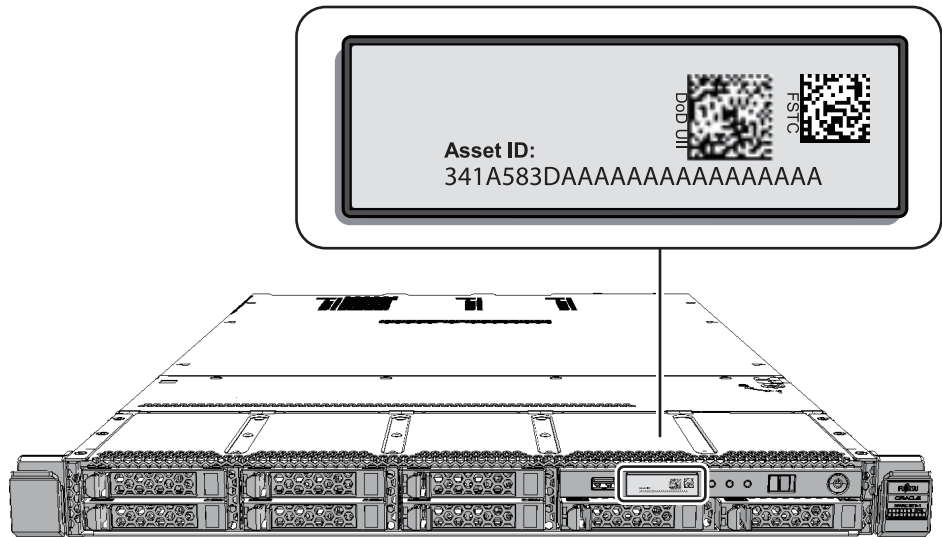
1.3   Safety Precautions

Caution - Observe the following precautions to protect yourself when performing maintenance.

- Observe all the precautions, warnings, and instructions described on the SPARC M12-1.
- Do not insert foreign objects into the openings in the SPARC M12-1. Any such foreign object could come into contact with high-voltage circuitry or could short circuit the components, causing a fire or an electric shock.
- Contact our service engineer to inspect the SPARC M12-1.

Safety precautions on electricity

- Confirm that the voltage and frequency of your input power supply match the electric rating described on the system name plate label affixed on the server.
- Wear a wrist strap when handling internal storage (HDD/SSD), a motherboard unit, memory, or other printed boards.
- Use grounded power outlets.

- Do not attempt to make any mechanical or electrical modifications. Fujitsu shall not be responsible for the regulatory compliance of a SPARC M12-1 that has been modified.

Rack-related safety precautions

- The racks should be fixed on the floor, ceiling, or the adjacent frame.
- The racks may be supplied with a quakeresistant options kit. The use of the quakeresistant options kit prevents the rack from falling over when the SPARC M12-1 slides out on slide rails, either for installation or maintenance.
- Prior to installation or maintenance, a safety assessment should be conducted by our service engineer in the following cases:
  - When the quakeresistant options kit is not supplied and the rack is not fixed to the floor with bolts: Confirm safety by checking whether the rack could fall over, etc. when the SPARC M12-1 is pulled out on the slide rails.
  - When the rack is to be installed on a raised floor: Confirm that the raised floor can bear the load when the SPARC M12-1 is pulled out on the slide rails.
- If the SPARC M12-1 is mounted at the 20U level or higher, use a step ladder.
- If multiple SPARC M12-1 machines are mounted in a rack, perform maintenance for each of them.

For details on the rack, see "Chapter 2   Planning and Preparing for System Installation" in the *Fujitsu SPARC M12-1 Installation Guide*.

1.4   Precautions on Static Electricity

Caution - Observe the precautions related to electrostatic discharge (ESD) as described in Table 1-1 to ensure the safety of personnel and the system.

Table 1-1   Precautions on ESD

Item	Precaution
Wrist strap	Wear an antistatic wrist strap when handling printed boards and components with electronic components mounted.
ESD mat	An approved ESD mat provides protection from static damage when used with a wrist strap. The mat also acts as a cushion to protect the small parts that are attached to printed boards.
Antistatic bag/ ESD safe packaging box	After removing a printed board or component, place it in the antistatic bag or ESD safe packaging box.

How to use a wrist strap

Wear a wrist strap in such a way that the inner metal surface (A in Figure 1-3) of the wrist strap band is in contact with your skin. Connect the clip (B in Figure 1-3) directly to the chassis.

⚠️ **Caution** - Do not connect the wrist strap clip to the ESD mat. By connecting the wrist strap clip to the chassis, the operator and components have the same electrical potential, thus eliminating the danger of static damage.

Figure 1-3   Wrist Strap Connection Destinations
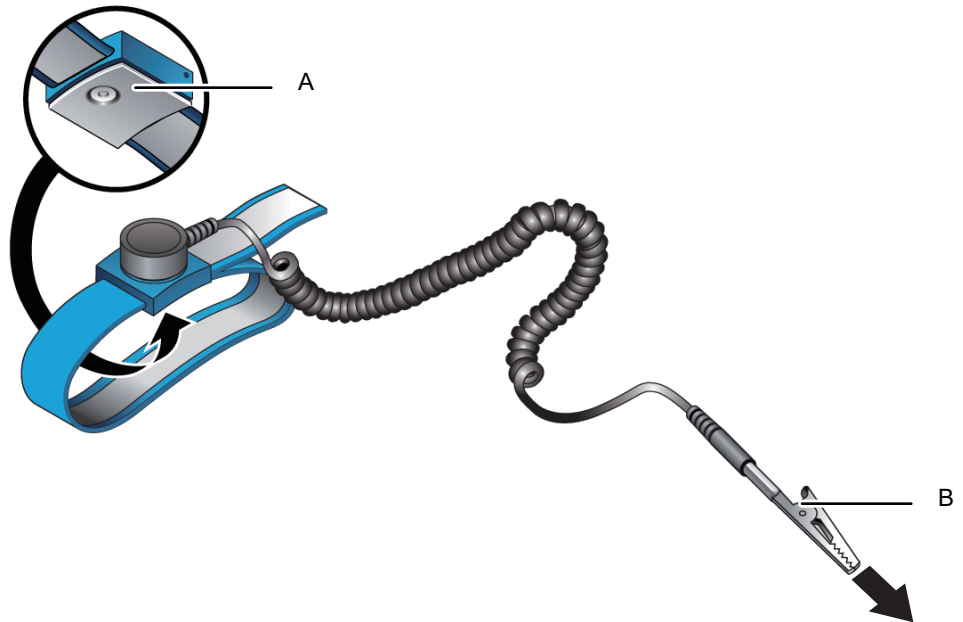
1.5   Other Precautions

⚠️ **Caution** - Observe the following precautions to ensure the safety of the system.

- The printed boards in the SPARC M12-1 can be easily damaged by static electricity. To prevent damage to the printed boards, wear a wrist strap and ground it to the SPARC M12-1 prior to starting maintenance.

- If excessive force is applied to the motherboard unit, the components mounted on the printed boards could be damaged. When handling the motherboard unit, observe the following precautions:
  - Handle the motherboard unit by holding it by the handle.
  - When removing the motherboard unit from its packaging, keep it horizontal until you lay it on the cushioned ESD mat.
  - Connectors and components on the motherboard unit have thin pins that bend easily. Therefore, do not place the motherboard unit on a hard surface.
  - Be careful not to damage the small parts mounted on both sides of the motherboard unit.
- The heat sinks can be damaged by incorrect handling. Do not touch the heat sinks with your hands or other objects while replacing or removing motherboard units. If a heat sink becomes disconnected or is broken, obtain a replacement motherboard unit. When storing or carrying a motherboard unit, ensure that the heat sinks are sufficiently protected.
- When removing a cable such as a LAN cable, if you cannot reach the latch lock of the connector, use a flathead screwdriver to push the latch and release the cable. If you use force to remove the cable, the LAN port of the motherboard unit or a PCI Express (PCIe) card may be damaged.
- Do not use any power cords other than those specified.
- Check the appearance of the products before starting work. When unpacking them, confirm that no unit is deformed, no connector is damaged, and there are no other such defects.
  Do not mount the products that have a defect in the appearance. Mounting a product that has a defect in appearance may damage the SPARC M12-1.

1.6   Emergency Power Off

This section describes the procedure for powering off the system in an emergency.

Caution - In an emergency (such as when smoke or flames are coming from the SPARC M12-1), immediately stop using the machine and turn off the input power. Regardless of the operation you are performing, give top priority to fire prevention.

1. **Remove all the power cords from the power supply units.**
   For details, see "5.8.1   Removing the Power Cords."

Figure 1-4   Removing the Power Cords
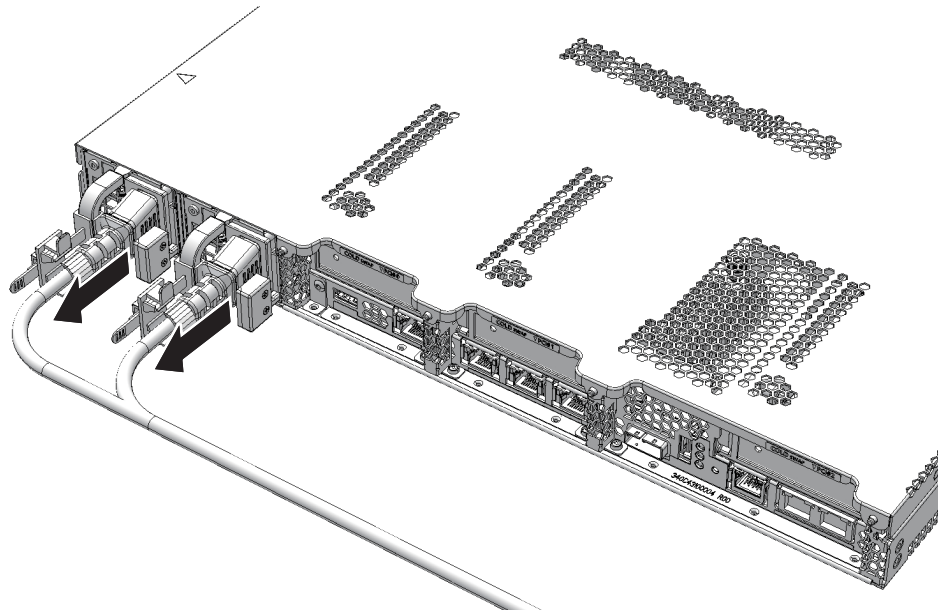
Chapter 2

Understanding the System Components

This section describes the components mounted in the SPARC M12-1.
Before starting any maintenance work, you need to confirm and fully understand the configurations of the components mounted in the SPARC M12-1 and also the indications by LEDs.

- Identifying the Names and Locations of Components
- Checking the Memory Configuration Rules
- Confirming the Functions of the Operation Panel
- Checking the Indications by LEDs

For the specifications of each component, see "Appendix B   Component Specifications."

Note - In this manual, unless otherwise stated, "internal storage" refers to both a hard disk drive (HDD) and a solid state drive (SSD).

2.1   Identifying the Names and Locations of Components

This section describes the names and locations of the components mounted in the SPARC M12-1.

Components that can be accessed from the front

Figure 2-1   Locations of Components That Can be Accessed From the Front

(1)
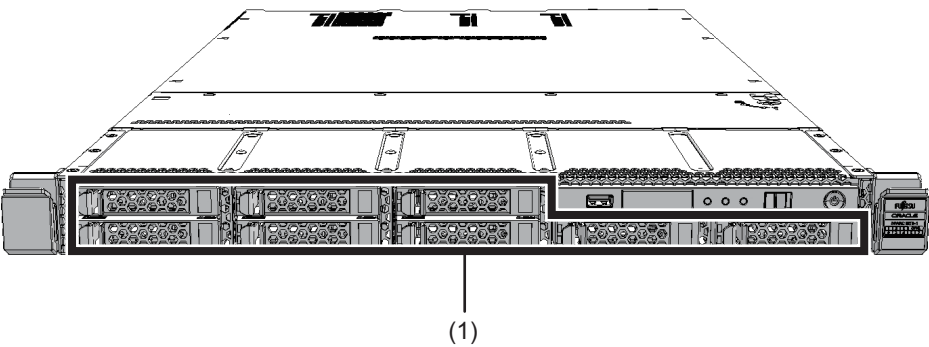
Location No.	Component
1	Internal storage

Letters in parentheses are an abbreviation for the component. Below, each component is represented by its abbreviation unless otherwise noted.

Components that can be accessed from the rear

Figure 2-2   Locations of Components That Can be Accessed From the Rear

(1)
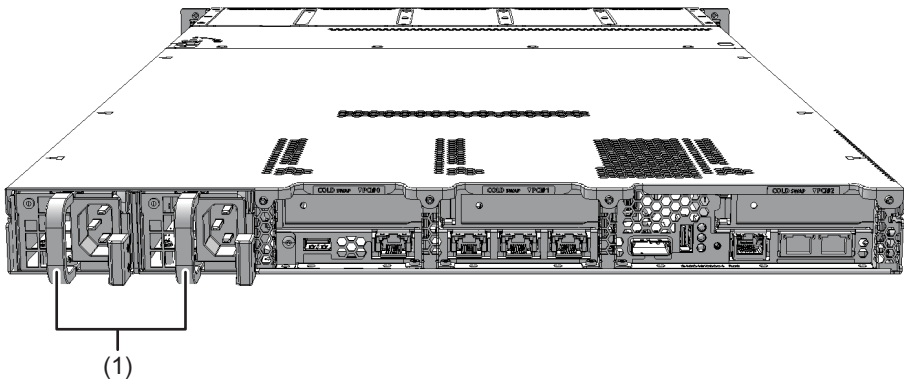
Location No.	Component
1	Power supply unit (PSU)

Letters in parentheses are an abbreviation for the component. Below, each component is represented by its abbreviation unless otherwise noted.

Internal components

To access the internal components, open the fan cover and remove the upper cover. For details on how to remove the covers, see "5.8.4 Opening the Fan Cover" or "5.8.5 Removing the Upper Cover."

Figure 2-3　Locations of Internal Components
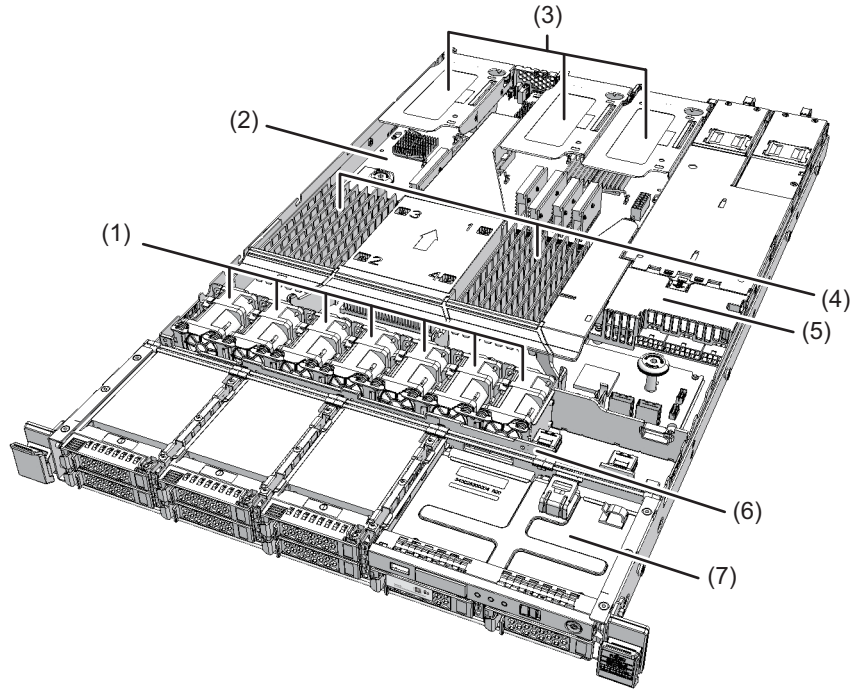
Location No.	Component
1	Fan unit (FANU)
2	Motherboard unit (MBU)
3	PCI Express card (PCIe card)
4	Memory (MEM)
5	PSU backplane (PSUBP)
6	HDD backplane (HDDBP)
7	Operation panel (OPNL)

Letters in parentheses are an abbreviation for the component. Below, each component is represented by its abbreviation unless otherwise noted.

2.2 Checking the Memory Configuration Rules

This section describes the memory installation rules and the method for checking memory information.

2.2.1 Memory Installation Rules

Install the memory in accordance with the following rules:

- Install exactly 4, 8, or 16 memory modules.
- Install memory modules of the same capacity and rank in each of memory groups A and B.
- For memory groups A and B, you can install memory modules of different capacities between the groups.
  (For the permitted combinations of memory groups, see Table 2-1.)
- Install memory for group A first, then install memory for group B.
- To mount a 64 GB DIMM, see "Notes on Memory" in the latest version of the *Fujitsu SPARC M12 Product Notes*.

Table 2-1   Permitted Combinations of Memory Groups

-: Prohibited

DIMM Capacity Installed for Memory Group A	DIMM Capacity Installed for Memory Group B			
	8 GB	16 GB	32 GB	64 GB
8 GB	OK	OK	OK	-
16 GB	OK	OK	OK	-
32 GB	OK	OK	OK	OK
64 GB	-	-	OK	OK

Figure 2-4 shows all memory installation locations. Groups a to d represent memory installation units. Table 2-2 lists the supported memory installation configurations. Memory for group B cannot be installed until no more memory can be installed for group A.

When configuring memory mirroring, install all the memory in group A or group B. A combination of mirrored memory is a unit of eight modules as shown in Figure 2-4.
For example, in the memory on the right side of CPU#0 in Figure 2-4, the four-module set of MEM#00B, MEM#00A, MEM#01B, and MEM#01A mirrors the four-module set of MEM#10B, MEM#10A, MEM#11B, and MEM#11A.

Figure 2-4   Memory Installation Locations and Units
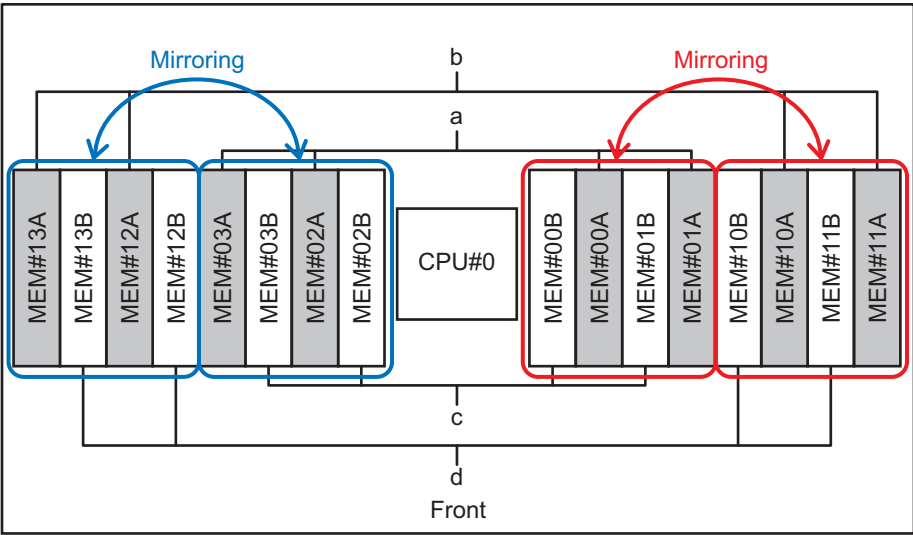
Table 2-2   Memory Installation Configurations

Memory Module Count	Installed Memory			
4	a in Figure 2-4	-	-	-
8	a in Figure 2-4	b in Figure 2-4	-	-
16	a in Figure 2-4	b in Figure 2-4	c in Figure 2-4	d in Figure 2-4

2.2.2   Checking Memory Information

Check the type and size of memory by using the showhardconf command of the XSCF firmware.

1. **Log in to the XSCF shell.**

2. **Execute the showhardconf command to check the memory information.**
   The capacity and rank of memory are displayed.

```
XSCF> showhardconf
SPARC M12-1;
    + Serial:TZ41702014; Operator_Panel_Switch:Service;
    + System_Power:On; System_Phase:Cabinet Power On;
    Partition#0 PPAR_Status:Running;
    MBU Status:Normal; Ver:3025h; Serial:TZ1701D01B  ;
        + FRU-Part-Number:CA08208-D001 A0   /9999999            ;
        + Power_Supply_System:Dual;
        + Memory_Size:64 GB; Type: C ;
```

```
CPU#0 Status:Normal; Ver:4242h; Serial:00070376;
    + Freq:3.200 GHz; Type:0x30;
    + Core:6; Strand:8;
MEM#00A Status:Normal;
    + Code:2c800f18ASF1G72PZ-2G3B1   31-11D6F48F;
    + Type:81; Size:8 GB;
MEM#01A Status:Normal;
    + Code:2c800f18ASF1G72PZ-2G3B1   31-11D6F463;
    + Type:81; Size:8 GB;
MEM#02A Status:Normal;
    + Code:2c800f18ASF1G72PZ-2G3B1   31-11D6F51E;
    + Type:81; Size:8 GB;
MEM#03A Status:Normal;
    + Code:2c800f18ASF1G72PZ-2G3B1   31-11D6F51F;
    + Type:81; Size:8 GB;
MEM#10A Status:Normal;
    + Code:2c800f18ASF1G72PZ-2G3B1   31-11D6F471;
    + Type:81; Size:8 GB;
MEM#11A Status:Normal;
    + Code:2c800f18ASF1G72PZ-2G3B1   31-11D6F487;
    + Type:81; Size:8 GB;
```

Figure 2-5   How to Read the Memory Information

```
MEM#00A Status:Normal;                              ——— Memory slot

+ Code:2c800f18ASF2G72PZ-2G3B1   31-1221E918;

+ Type:83; Size:16 GB;                              ——— Capacity and rank
                                                    81: R-DIMM (8GB 1rank)
                                                    83: R-DIMM (16GB 1rank)
                                                    85: R-DIMM (32GB 2rank)
                                                    87: R-DIMM (64GB 4rank)
                                                    91: R-DIMM (64GB 2rank)
```

2.3   Confirming the Functions of the Operation Panel

This section describes the functions of the operation panel.
The operation panel provides the system's display and control functions. The field engineer and system administrator can specify the operation mode or control start/stop of the system while checking the LEDs indicating the system operation status.

Figure 2-6   Location of the Operation Panel
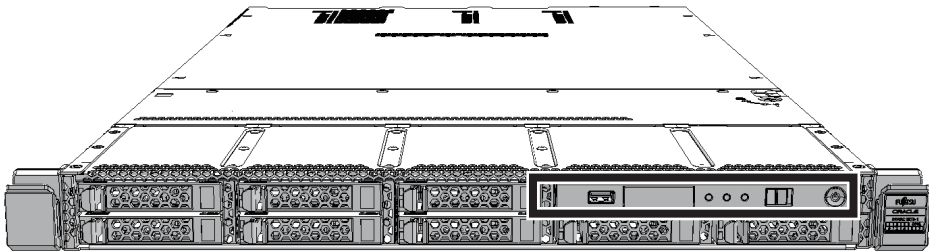
Figure 2-7   Appearance of the Operation Panel

(1)   (2)   (3)   (4)   (5)
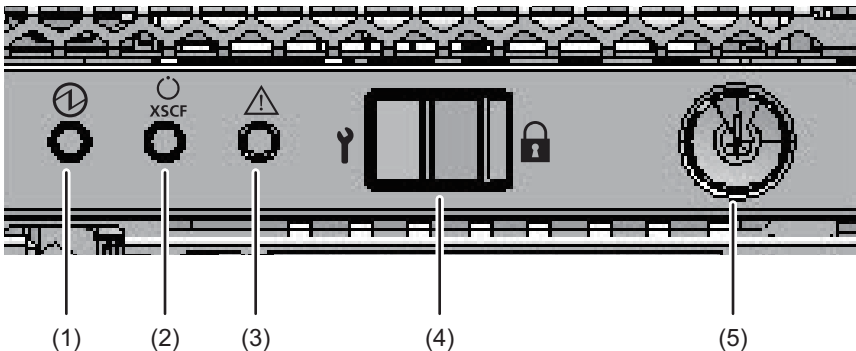
Location No.	LED/Switch
1	POWER LED
2	XSCF STANDBY LED
3	CHECK LED
4	Mode switch
5	Power switch

2.3.1   Display Function of the Operation Panel

The operation panel has three LED indicators as a display function. The LED indicators show the following. For details, see "2.4.1   Operation Panel LEDs."

- General system status

- System error warning

- System error location

Figure 2-8   Operation Panel LEDs
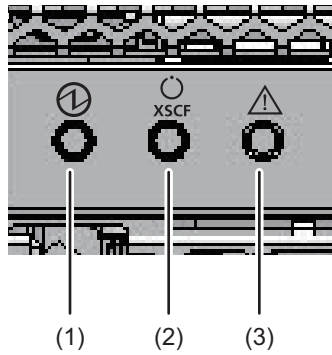
Location No.	LED
1	POWER LED
2	XSCF STANDBY LED
3	CHECK LED

2.3.2   Control Function of the Operation Panel

The operation panel has the following switches to implement its control function:

- Mode switch (slide switch)
  Specifies the mode for either operation or maintenance.

- Power switch
  Controls start/stop of the system.

Figure 2-9   Operation Panel Switches
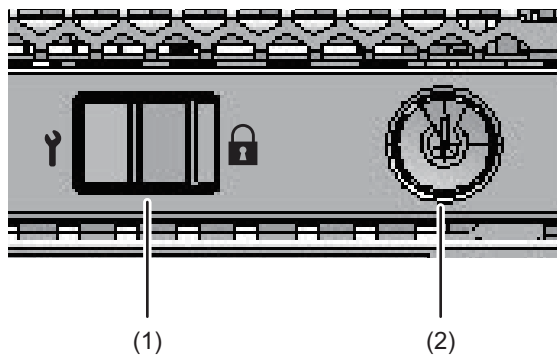
Location No.	Switch
1	Mode switch
2	Power switch

The mode switch sets the operation mode for the system. The Locked and Service operation modes can be switched by sliding the mode switch.
Table 2-3 describes the difference between the modes.

Table 2-3   Functions of the Mode Switch

Icon	Name	Description
🔒	Locked mode	Mode used for normal operation - The power switch can be used to start the system but not to stop it.
🔧	Service mode	Mode used for maintenance - The power switch cannot be used to start the system but can be used to stop it. - Place the system in Service mode to perform maintenance work with the system stopped.

Use the power switch to start or stop the system. The system starts/stops differently depending on how the power switch is pressed.
Table 2-4 describes how system starts/stops vary depending on how the power switch is pressed.

Table 2-4   Functions of the Power Switch

Icon	Operation	Description	
⏻	Brief press (For 1 second or more and less than 4 seconds)	If the system has been started in Service mode:	Operation is ignored.
		If the system is stopped in Service mode:	Operation is ignored.
		If the system has been started in Locked mode:	Operation is ignored.
		If the system is stopped in Locked mode:	Starts the system. If a wait time for air conditioning facilities or a warmup time is set on the XSCF, the process of waiting for the facilities to power on and for the warmup to complete is omitted at this time.
	Long press (For 4 seconds or more)	If the system has been started in Service mode:	Perform the system shutdown process to stop the system.
		If the system startup process is in progress in Service mode:	Cancels the system startup process and stops the system.
		If the system stop process is in progress in Service mode:	Continues the system stop process.

Table 2-4   Functions of the Power Switch *(continued)*

Icon	Operation	Description	
		If the system is stopped in Service mode:	Operation is ignored. Even a long press does not start the system.
		If the system is stopped in Locked mode:	Starts the system. If a wait time for air conditioning facilities or a warmup time is set on the XSCF, the process of waiting for the facilities to power on and for the warmup to complete is omitted.
		If the system is not stopped in Locked mode:	Operation is ignored.

Table 2-5 describes the functions of the mode switch.

Table 2-5   Functions of the Mode Switch

Function	Mode Switch	
	Locked	Service
Start/Stop of the system by the power switch	Only system startup is enabled.	A long press powers off the system.
Suppression of break signal reception	Enabled. Using the setpparmode command, you can specify whether to receive break signals or suppress their reception for each physical partition.	Disabled

2.4 Checking the Indications by LEDs

This section describes the indications by LEDs on the SPARC M12-1.
LEDs are mounted on the operation panel on the front of the SPARC M12-1, on the rear panel of the SPARC M12-1, and on those components that can be maintained. If an error occurs, the LED indication enables you to determine the system that requires maintenance.

2.4.1 Operation Panel LEDs

The three LEDs on the operation panel indicate the operation status of the entire system. In addition, the LEDs enable you to check the system status by their combination of being on, blinking, or off. For the locations of the LEDs, see Figure 2-8.
Table 2-6 lists the system operation status indicated by the LEDs, while Table 2-7 lists the system status indicated by the combination of LEDs.

Table 2-6   System Operation Status Indicated by LEDs

Icon	Name	Color	State	Description
⏻	POWER	Green	On	The system is running.
			Blinking	The system is being stopped.
		-	Off	The system is stopped.
⏻ XSCF	XSCF STANDBY	Green	On	The XSCF is functioning normally.
			Blinking	The XSCF is being initialized.
		-	Off	The XSCF is stopped.
⚠	CHECK	Amber	On	Hardware has detected an error.
			Blinking	The SPARC M12-1 specified at execution of the XSCF command instructing the blinking. This (locator) is used to identify the location of the SPARC M12-1 requiring maintenance.
		-	Off	Normal state, or the power is disconnected or otherwise not being supplied.

Table 2-7   System Status Indicated by a Combination of LEDs

LED State			Description
POWER	XSCF STANDBY	CHECK	
⏻	⏻ XSCF	⚠	
Off	Off	Off	The power is disconnected.
Off	Off	On	The XSCF has detected an error before system start or after system stop.
Off	Blinking	Off	The XSCF is being initialized.
Off	On	Off	The XSCF is in the standby state. Or the system is waiting for power-on of the air conditioning facilities (in the data center).
On	On	Off	Warm-up standby processing is in progress. After the end of this processing, the system starts up. Or the system startup processing is in progress. Or the system is in operation.
On	On	On	Although the system is operating normally, an error has been detected.
Blinking	On	Off	System stop processing is in progress. After the end of processing, the fan unit stops.

2.4.2 LEDs on the Rear Panel (System Locator)

The field engineer or system administrator can identify the SPARC M12-1 requiring maintenance by using the CHECK LED (A in Figure 2-10) on the rear panel. The CHECK LED on the rear panel is referred to as the system locator, and has the same function as the CHECK LED on the operation panel.

Figure 2-10   Location of the System Locator
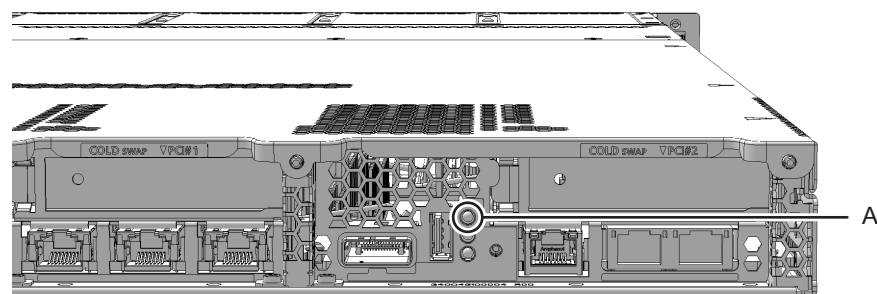
Table 2-8   Status of the System Locator

Icon	Name	Color	State	Description
⚠	CHECK	Amber	On	Hardware has detected an error.
			Blinking	SPARC M12-1 specified at execution of the XSCF command instructing the blinking. This (locator) is used to identify the location of the SPARC M12-1 requiring maintenance.
		-	Off	The system is in the normal state, or the power is disconnected or otherwise not being supplied.

2.4.3 LEDs on Each Component

Each component incorporates LEDs. If a component experiences an error, check the LEDs to see which component requires maintenance. Check the LEDs before starting maintenance work.
The LEDs on each component and the states that they indicate are as follows.

Figure 2-11   LED Locations of the MBU

(1) (2)
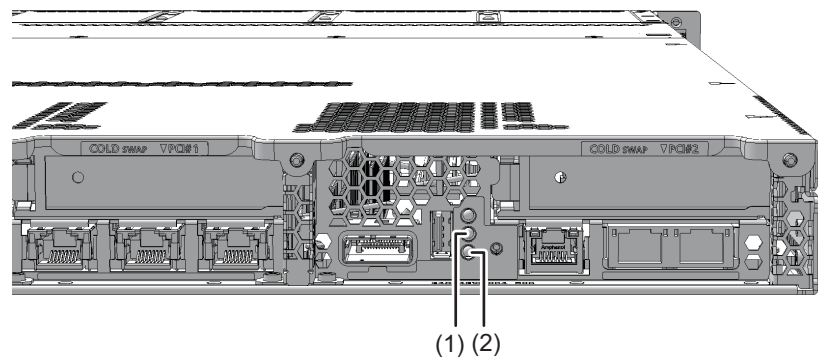
Table 2-9   MBU LEDs and Their States

Location No.	Name	Color	State	Description
1	READY	Green	On	The XSCF is running.
			Blinking	The XSCF is being started.
		-	Off	The XSCF is stopped.
2	CHECK	Amber	On	Indicates that an error has occurred. (Normal if the LED is turned off after it is on for a few seconds when the power is turned on)
		-	Off	Indicates the normal state.

Figure 2-12   LED Locations of the XSCF-LAN Ports
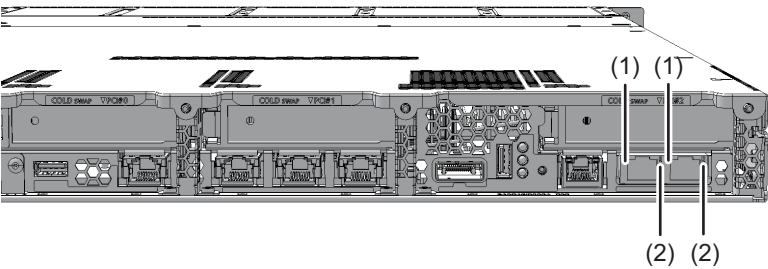
Table 2-10   XSCF-LAN Port LEDs and Their States

Location No.	Name	Color	State	Description
1	LINK SPEED	Amber	On	Indicates that the communication speed is 1 Gbps.
		Green	On	Indicates that the communication speed is 100 Mbps.
		-	Off	Indicates that the communication speed is 10 Mbps.
2	ACT	Green	Blinking	Indicates that communication is being performed.
		-	Off	Indicates that communication is not being performed.

Figure 2-13   LED Locations of the On-Board LAN Ports
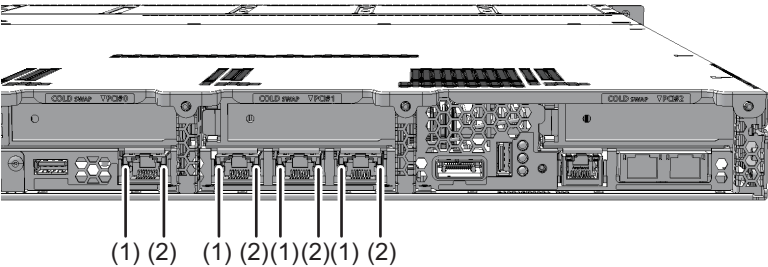
Table 2-11   On-Board LAN Port LEDs and Their States

Location No.	Name	Color	State	Description
1	LINK SPEED	Green	On	Indicates that the communication speed is 10 Gbps.
		Amber	On	Indicates that the communication speed is 1 Gbps.
		-	Off	Indicates that the communication speed is 100 Mbps.
2	ACT	Green	Blinking	Indicates that communication is being performed.
		-	Off	Indicates that communication is not being performed.

Figure 2-14   Locations of FANU LEDs (on the MBU)
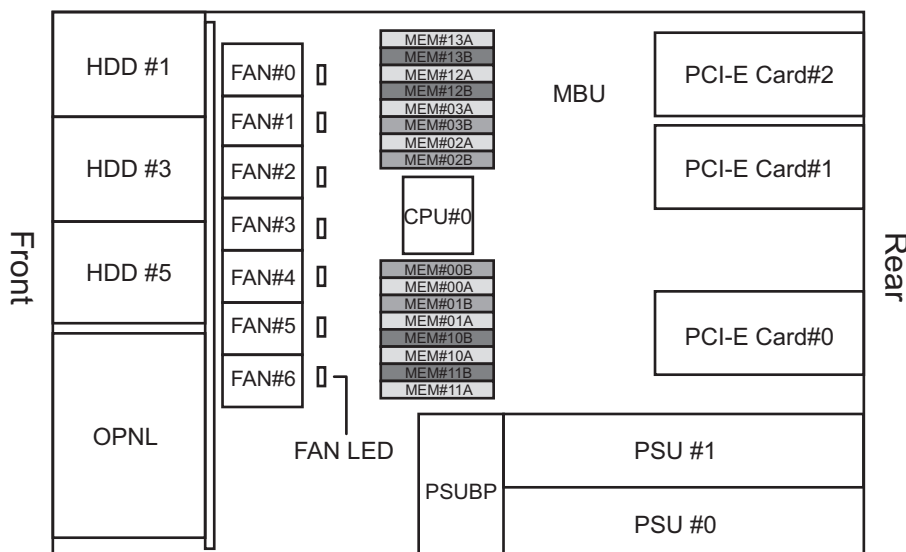
Table 2-12   FANU LEDs and Their States

Name	Color	State	Description
CHECK	Amber	On	Indicates that an error has occurred.
		Blinking	Indicates that the component requires maintenance. (This function is also referred to as the locator.)
	-	Off	Indicates the normal state.

Figure 2-15　　Locations of PSU LEDs

LED
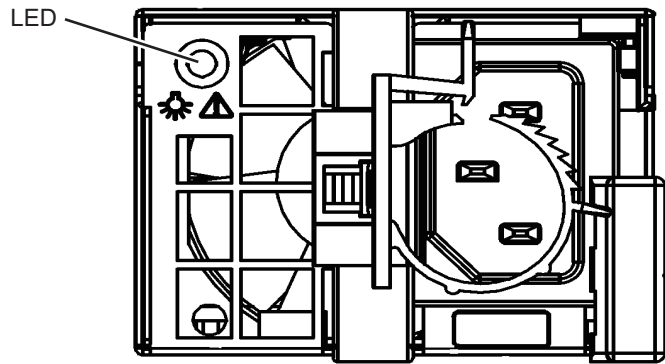
Table 2-13　　PSU LEDs and Their States

Name	Color	State	Description
CHECK	Green	On	The input power is on, and power is being supplied normally.
		Blinking	The input power is on, but the system is stopped.
	Amber	On	A hardware error has occurred. The input power to this power supply unit (PSU) is turned off in redundant operation.
		Blinking	A hardware error has occurred, but this power supply unit (PSU) is operating.
	-	Off	Indicates that power is not being supplied.

Figure 2-16　　LED Locations on the HDD/SSD

READY

CHECK
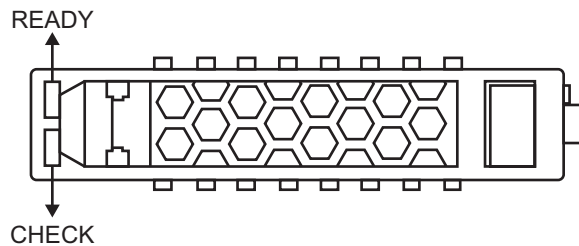
Table 2-14   HDD/SSD LEDs and Their States

Name	Color	State	Description
READY	Green	Blinking	Indicates that the disk is being accessed. This LED is normally on, but it blinks while the disk is being accessed. While the LED is blinking, maintenance such as removal of the disk cannot be performed.
	-	Off	Indicates that maintenance such as removal of the disk can be performed.
CHECK	Amber	On	Indicates that an error has occurred.
		Blinking	Indicates that the component requires maintenance. (This function is also referred to as the locator.)
	-	Off	Indicates the normal state.

Chapter 3

Types of Maintenance

This section describes the types of maintenance performed on the SPARC M12-1.

- Types of Maintenance Supported by the SPARC M12-1
- Active Maintenance
- System-Stopped Maintenance (Inactive Maintenance)

Note that the terms used in this manual are defined as follows.

Table 3-1   Definitions of Terms

Term	Definition
Physical partition requiring maintenance	Physical partition to which the SPARC M12-1 belongs that has the Field Replaceable Unit (FRU) requiring maintenance mounted in it
SPARC M12-1 requiring maintenance	SPARC M12-1 that has the Field Replaceable Unit (FRU) requiring maintenance mounted in it

3.1   Types of Maintenance Supported by the SPARC M12-1

The types of maintenance supported by the SPARC M12-1 depend on the system operation status during maintenance. The supported maintenance is divided into two types: active maintenance and system-stopped (inactive) maintenance.

- Active maintenance
  Type of maintenance performed while Oracle Solaris is operating

- System-stopped maintenance (inactive maintenance)
  Type of maintenance performed with the physical partition stopped

  The SPARC M12-1 has only one physical partition. Thus, the state in which the physical partition requiring maintenance is stopped is the same as the state in

which the entire system is stopped.

Each of the above two maintenance types is divided into two further types: hot maintenance and cold maintenance.

- Hot maintenance
  Type of maintenance performed with the power cords connected to the SPARC M12-1 requiring maintenance

- Cold maintenance
  Type of maintenance performed with the power cords removed from the SPARC M12-1 requiring maintenance

3.2 Active Maintenance

The type of maintenance performed with Oracle Solaris operating on the physical partition is referred to as active maintenance. Note that active/cold maintenance is not supported by the SPARC M12-1.

Table 3-2 shows whether active maintenance is enabled for each FRU.

Table 3-2   Whether Active Maintenance (Replacement/Addition/Removal) is Enabled for Each FRU

-: Maintenance cannot be performed.

FRU	Active/Hot Maintenance	Reference
PCIe card	- (*1)	(*1)
HDD/SSD	OK (*2)	Chapter 9
HDDBP	-	
PSU	OK (*3)	Chapter 11
PSUBP	-	
Cable kit	-	
OPNL	-	
FANU	OK	Chapter 15
MBU	-	
Memory	-	

*1 Active/Hot maintenance can be performed on the PCIe cards mounted in the PCI expansion unit. For details, see "3.3 Types of Maintenance for the PCIe Card" in the *PCI Expansion Unit for Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Service Manual*.
*2 Only internal storage in devices other than the boot device can be replaced or removed. However, if the boot device has a redundant configuration (hardware RAID configuration), active/hot maintenance can be performed also on the HDD in the boot device.
*3 If the XSCF startup mode is high-speed mode, hardware cannot be replaced using the replacefru command. Perform system-stopped (inactive)/cold maintenance.

3.3 System-Stopped Maintenance (Inactive Maintenance)

The type of maintenance performed with the physical partition stopped is referred to as system-stopped maintenance (inactive maintenance). The SPARC M12-1 has only one physical partition. Thus, the state in which the physical partition requiring maintenance is stopped is the same as the state in which the entire system is stopped.

Table 3-3 shows whether system-stopped maintenance (inactive maintenance) is enabled for each FRU.

Table 3-3   Whether System-Stopped Maintenance (Inactive Maintenance) (Replacement/Addition/Removal) is Enabled for Each FRU

-: Maintenance cannot be performed.

FRU	System-Stopped (Inactive)/ Hot Maintenance	System-Stopped (Inactive)/ Cold Maintenance	Reference
PCIe card	- (*1)	OK	Chapter 8
HDD/SSD	OK	OK	Chapter 9
HDDBP	-	OK	Chapter 10
PSU	OK (*2)	OK	Chapter 11
PSUBP	-	OK	Chapter 12
Cable kit	-	OK	Chapter 13
OPNL	-	OK	Chapter 14
FANU	OK	OK	Chapter 15
MBU	-	OK	Chapter 16
Memory	-	OK	Chapter 16

*1 System-stopped (inactive)/hot maintenance can be performed on the PCIe cards mounted in the PCI expansion unit. For details, see "3.3　Types of Maintenance for the PCIe Card" in the *PCI Expansion Unit for Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Service Manual*.
*2 If the XSCF startup mode is high-speed mode, hardware cannot be replaced using the replacefru command. Perform system-stopped (inactive)/cold maintenance.

Chapter 4

Preparation and Precautions for Maintenance

This chapter describes the preparations that must be completed prior to performing any maintenance as well as the types of maintenance.

- Confirming the System Configuration
- Troubleshooting
- Maintenance Precautions

4.1 Confirming the System Configuration

This section describes how to check the hardware and software configurations. The system configuration must be the same before and after maintenance work. If an error occurs in the system, record the system configuration and the FRU state before starting maintenance. After maintenance, confirm that the system configuration is the same as that before maintenance.

4.1.1 Confirming the Hardware Configuration

Execute the showhardconf command to confirm the configuration and status of the FRU mounted in the SPARC M12-1. Before performing any maintenance work, be sure check and record the hardware configuration.

1. **Log in to the XSCF shell.**

2. **Execute the showhardconf command to confirm the hardware configuration information.**

The following information appears:

- Current configuration and status
- Number of mounted Field Replaceable Units (FRUs)
- Status of the unit in which a physical partition error or degradation occurred
- Information on the PCI expansion unit
- Name property of the PCIe card

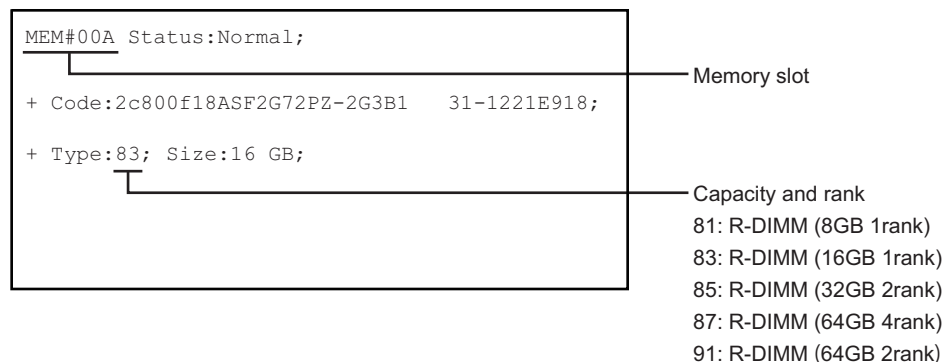The following is an example of executing the showhardconf command.

```
XSCF> showhardconf
SPARC M12-1;
    + Serial:TZ41702002; Operator_Panel_Switch:Service;
    + System_Power:Off; System_Phase:Cabinet Power Off;
    Partition#0 PPAR_Status:Powered Off;
    MBU Status:Normal; Ver:900eh; Serial:TZ1701D01A  ;
        + FRU-Part-Number:CA08208-D001 A0   /9999999                  ;
        + Power_Supply_System: ;
        + Memory_Size:64 GB; Type: C ;
        CPU#0 Status:Normal; Ver:4242h; Serial:00070390;
            + Freq:3.200 GHz; Type:0x30;
            + Core:6; Strand:8;
        MEM#00A Status:Normal;
            + Code:2c800f18ASF2G72PZ-2G3B1   31-1221E918;
            + Type:83; Size:16 GB;
        MEM#01A Status:Normal;
            + Code:2c800f18ASF2G72PZ-2G3B1   31-1221E8E3;
            + Type:83; Size:16 GB;
        MEM#02A Status:Normal;
            + Code:2c800f18ASF2G72PZ-2G3B1   31-1221E917;
            + Type:83; Size:16 GB;
        MEM#03A Status:Normal;
            + Code:2c800f18ASF2G72PZ-2G3B1   31-1221E8E1;
            + Type:83; Size:16 GB;
```

4.1.2   Confirming the Software and Firmware Configurations

The software and firmware configurations and versions affect system operation. To change the configuration or investigate a problem, check the latest state and check for any problems in the software.

Confirming the software configuration

Use Oracle Solaris commands to check the software configuration.
If you are logged in to the XSCF console, switch to the control domain console by executing the console command beforehand.
Table 4-1 lists the commands used for checking the software configuration.

Table 4-1   Commands for Checking the Software Configuration

Command	Description
pkg (Oracle Solaris 11) showrev (Oracle Solaris 10)	Displays Oracle Solaris correction information and the version.
ldm	Displays logical domain configuration information.

1.   **Log in to the control domain console of the physical partition where the FRU**

requiring maintenance is mounted.

For details on logging in to the control domain console, see "8.3 Switching to the Control Domain Console From the XSCF Shell" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.

2. **Execute the pkg command to display Oracle Solaris correction information and version.**

For Oracle Solaris 11, execute the pkg command.

```
# pkg info entire
          Name: entire
       Summary: entire incorporation including Support Repository Update
(Oracle Solaris 11.1.12.5.0).
```

For Oracle Solaris 10, execute the showrev command.

```
# showrev -p
```

To display the version of Oracle VM Server for SPARC, execute the ldm command.

```
# ldm -V
Logical Domains Manager (v 3.4.0.3.x)
                            (*1)

        (Omitted)
```

*1 Version of Oracle VM Server for SPARC

The following is examples of executing commands to check logical domain configuration information.

When checking from Oracle Solaris on the control domain

```
# ldm list-spconfig
factory-default (*1)
confirm_service_manual [current] (*2)
#
```

*1 factory-default configuration

*2 Currently running logical domain configuration

When checking from the XSCF shell

```
XSCF> showdomainconfig -p 0
PPAR-ID     :0
Booting config
```

```
 (Current)   :confirm_service_manual   (*1)
 (Next)      :confirm_service_manual
-------------------------------------------------------------------------
Index       :1
config_name :factory-default          (*2)
domains     :1
date_created:-
-------------------------------------------------------------------------
Index       :2
config_name :config_develop_env
domains     :3
date_created:'2016-05-24 19:40:55'
XSCF>
```

*1 Currently running logical domain configuration

*2 factory-default configuration

Confirming the firmware configuration

Check the XCP firmware version by using the version command, which is an XSCF shell command.

1. **Log in to the XSCF shell.**

2. **Execute the version command to confirm the firmware version information.**
   In the following example, "-c xcp" is entered to confirm the overall XCP version.

```
XSCF> version -c xcp
BB#00-XSCF#0 (Master)
XCP0 (Reserve): 3060    (*1)
XCP1 (Current): 3060    (*2)
```

*1 XCP firmware version installed at Reserve for the SPARC M12-1

*2 XCP firmware version running on the SPARC M12-1

Check the firmware version of the PCI expansion unit by using the ioxadm command, which is an XSCF shell command.

1. **Log in to the XSCF shell.**

2. **Identify the mounting locations of the PCI expansion unit and link card.**

```
XSCF> ioxadm list
PCIBOX                    Link
PCIBOX#6002               BB#00-PCI#00  (*1)
```

*1 Mounting locations of the PCI expansion unit and link card

3. **Execute the ioxadm command to check the firmware version information for the PCI expansion unit and link card.**

```
XSCF> ioxadm -v list
Location                    Type      FW Ver    Serial Num      Part Num
                            State
PCIBOX#6002                 PCIBOX    -         PZ21242007
                            On
PCIBOX#6002/PSU#0           PSU       -         FEJD1212000530  CA01022-
0750-D/                     On
PCIBOX#6002/PSU#1           PSU       -         FEJD1212000529  CA01022-
0750-D/                     On
PCIBOX#6002/IOB             IOBOARD   1330      PP123300E5      CA20365-
B66X 008AG                  On
(*1)
PCIBOX#6002/LINKBD          BOARD     -         PP141900V0      CA20365-
B60X 008AD/7061035          On
PCIBOX#6002/FANBP           FANBP     -         PP123203NT      CA20365-
B68X 004AC                  On
BB#00-PCI#00                CARD      1330      PP133200UF      CA20365-
B59X 008AD/7061040          On
(*2)
```

*1 I/O board firmware version

*2 Link card firmware version

4.1.3   Confirming FRU Information

FRU information includes detailed information on hardware. Log in to the XSCF shell and confirm FRU information when arranging for additional or replacement hardware, such as for hardware configuration changes or replacement of faulty hardware.

The examples in this section show commands for checking FRU information. For details on each command, see the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 XSCF Reference Manual* of the XCP firmware version used.

Checking the number of mounted FRUs

```
XSCF> showhardconf -u
SPARC M12-1; Memory_Size:128 GB; (*1)
    +-----------------------------------+-----------+
    |                FRU                | Quantity  |
    +-----------------------------------+-----------+
    | MBU                               |     1     |
    |     Type:G                        |    ( 1)   |
    |     CPU                           |     1     |
    |         Freq:3.200 GHz;           |    ( 1)   |
    |     MEM                           |     8     |
    |         Type:83; Size:16 GB;      |    ( 8)   |
    | PCICARD                           |     0     |
    | LINKCARD                          |     0     |
```

```
                     |   PCIBOX                          |        0   |
                     |       IOB                         |        0   |
                     |       LINKBOARD                   |        0   |
                     |       PCI                         |        0   |
                     |       FANBP                       |        0   |
                     |       PSU                         |        0   |
                     |       FAN                         |        0   |
                     |   OPNL                            |        1   |
                     |       Type:A                      |   (    1)  |
                     |   PSUBP                           |        1   |
                     |       Type:A                      |   (    1)  |
                     |       PSU                         |        2   |
                     |          Type:B                   |   (    2)  |
                     |   FANU                            |        7   |
                     |   HDDBP                           |        1   |
                     +-----------------------------------+------------+
                 XSCF>
```

*1 System model information and total capacity of mounted memory

Checking the FRU type

```
XSCF> showhardconf
SPARC M12-1;
     (Omitted)
    MBU Status:Normal; Ver:4016h; Serial:TZ2238D00B  ;
        + FRU-Part-Number:CA08208-D041 A0   /8214923                    ;
        + Power_Supply_System: ;
        + Memory_Size:128 GB; Type: G ;
        CPU#0 Status:Normal; Ver:4242h; Serial:00189870;
            + Freq:3.200 GHz; Type:0x30;
            + Core:6; Strand:8;
        MEM#00A Status:Normal;
            + Code:ce8002M393A2K40BB1-CRC    00-31C056F2;
            + Type:83; Size:16 GB;
     (Omitted)
XSCF>
```

Table 4-2 lists combinations of the SPARC M12-1 (Fujitsu Product ID SPNAAAAxxx) and MBU types.

Table 4-2   Combinations of Servers and MBU Types

Server	Fujitsu Product ID (Oracle Product ID)	MBU Type Indicator
SPARC M12-1	SPNAAAA1xx (7118228), SPNAAAA2xx (7602945)	C
	SPNAAAA3xx (7605161)	F
	SPNAAAA4xx (7605940)	G

Table 4-3 shows the correspondence between memory mounted in the SPARC M12-1 and FRU types.

Table 4-3   Correspondence Between Memory and Types

FRU	Type Indicator	Configuration
Memory	81	DDR4 R-DIMM 8 GB 1 Rank
	83	DDR4 R-DIMM 16 GB 1 Rank
	85	DDR4 R-DIMM 32 GB 2 Rank
	87	DDR4 R-DIMM 64 GB 4 Rank
	91	DDR4 R-DIMM 64 GB 2 Rank

Note - The FRU type indicator may vary depending on the hardware configuration. See the information about the hardware in the *Fujitsu SPARC M12 Product Notes* for the latest XCP version.

4.2   Troubleshooting

This section describes suspected failure conditions. Use the flow to confirm whether there is a failure and identify the failure location in the following cases. For details on the flow for confirming whether there is a failure, see "4.2.1   Confirming Whether There is a Failure."

- When the CHECK LED is on
- When an error message is displayed on the console
- When an error is displayed as a result of executing a command for checking the status
- When an error is displayed in the error log

4.2.1   Confirming Whether There is a Failure

This section describes the flow for confirming whether there is a failure. Also apply this flow to identify failures in the PCI expansion unit.

Figure 4-1   Troubleshooting Flow
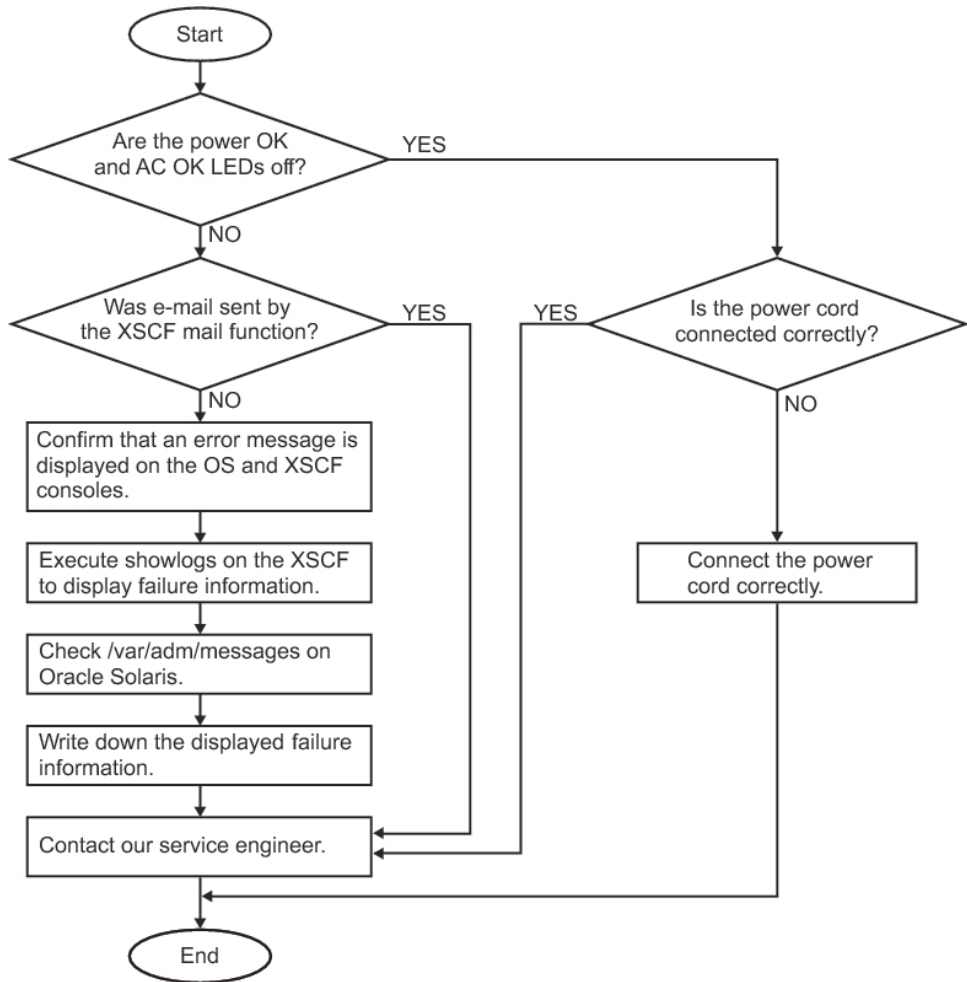
4.2.2   Identifying a Failure

This section describes how to identify a failure. Use the flow described in "4.2.1 Confirming Whether There is a Failure" to determine the appropriate way of checking for a failure.

Checking the LED indications

Check the LEDs on the operation panel, rear panel, and each component to identify the FRU requiring maintenance. Check the status of a FRU from its LED before starting maintenance work on the FRU.

■ Operation panel LEDs

You can determine the status of the system by checking the LEDs on the operation panel. For details, see "2.4.1   Operation Panel LEDs."

- Rear panel LED
  You can determine the status of the system by checking the CHECK LED on the rear panel of the SPARC M12-1, which duplicates the CHECK LED on the operation panel. For details, see "2.4.2   LEDs on the Rear Panel (System Locator)."

- LED of each FRU
  If an error occurs in the hardware in the server, you can determine the location of the error by checking the LED of the FRU that incorporates the failed hardware. For details, see "2.4.3   LEDs on Each Component."

  Note that some FRUs, such as memory, do not have mounted LEDs. To check the status of a FRU that does not have an LED, execute XSCF shell commands such as the showhardconf command from the maintenance terminal. For details, see "Checking the FRU status."

Checking error messages

Display error messages to check log information and an error overview.
You can use either of the following two methods to check the error messages:

- Checking error log information with the XSCF shell
  For details, see "12.1   Checking a Log Saved by the XSCF" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.

- Checking messages on Oracle Solaris
  For details, see "12.2   Checking Warning and Notification Messages" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.

Checking the FRU status

Execute XSCF firmware commands to determine the system hardware configuration and the status of each FRU.

showhardconf command

Execute the showhardconf command to check the FRU-related information.

1. **Log in to the XSCF shell.**

2. **Execute the showhardconf command to check the FRU list.**
   A failed component is indicated by an asterisk (*) at the beginning of the line.

```
XSCF> showhardconf
SPARC M12-1;
    + Serial:TZ41702002; Operator_Panel_Switch:Service;
    + System_Power:Off; System_Phase:Cabinet Power Off;
    Partition#0 PPAR_Status:Powered Off;
    MBU Status:Normal; Ver:900eh; Serial:TZ1701D01A  ;
        + FRU-Part-Number:CA08208-D001 A0   /9999999                 ;
```

```
        + Power_Supply_System: ;
        + Memory_Size:64 GB; Type: C ;
      CPU#0 Status:Normal; Ver:4242h; Serial:00070390;
           + Freq:3.200 GHz; Type:0x30;
           + Core:6; Strand:8;
      MEM#00A Status:Normal;
           + Code:2c800f18ASF2G72PZ-2G3B1   31-1221E918;
           + Type:83; Size:16 GB;
      MEM#01A Status:Normal;
----------------------Omitted----------------------
           + Connection:PCIBOX#X07P;
*          PCIBOX#X0DF Status:Faulted; Ver:0512 Serial:XCX0DF;
               + FRU-Part-Number:CF00541-0314 05   /501-6937-05;
             IOB Status:Normal; Serial:XX00KA; Type:PCI-X;
                  + FRU-Part-Number:CF00541-0316 03   /501-6938-05;
           LINKBORAD Status:Faulted; Ver:0512 Serial:XCX0DF;
                  + FRU-Part-Number:CF00541-0314 05   /501-6937-05;
             PCI#0 Name_Property:fibre-channel;
                  + Vendor-ID:14e4; Device-ID:1648;
                  + Subsystem_Vendor-ID:10cf; Subsystem-ID:13a0;
                  + Model: LPe1250-F8-FJ;
```

showstatus command

Execute the showstatus command to check the FRU status.

1. **Log in to the XSCF shell.**

2. **Execute the showstatus command to check the status.**
   A faulty FRU is indicated by an asterisk (*) at the beginning of the line.

```
XSCF> showstatus
    MBU Status:Normal;
*       MEM#0A Status:Faulted;
```

The FRU status is displayed after the "Status:" string.
Table 4-4 describes the FRU status.

Table 4-4   FRU Status

Display	Description
Normal	The unit is in the normal state.
Faulted	The unit is faulty and is not operating.
Degraded	A part of the unit has failed or degraded, but the unit is running.
Deconfigured	Due to the failure or degradation of another unit, the target unit and components of its underlying layer has been degraded, though there is no problem in them.
Maintenance	Maintenance is being performed. The replacefru or addfru command is being executed.

Checking the status of a PCI expansion unit

If a PCI expansion unit is connected, execute the ioxadm command to check the status of the PCI expansion unit.

ioxadm command

Execute the ioxadm command to determine the environmental conditions (temperature, voltage, etc.) or LED indications of the PCI expansion unit.

1. **Log in to the XSCF shell.**

2. **Execute the ioxadm command to check the environmental conditions of the specified PCI expansion unit.**
   To specify a PCI expansion unit, check the serial number of the PCI expansion unit with the ioxadm list command, and then enter the number.

   The following example shows the environmental conditions for PCIBOX#2008. "2008" is the last four digits of the serial number of the PCI expansion unit.

```
XSCF> ioxadm env -te PCIBOX#2008
Location                   Sensor            Value Resolution Units
PCIBOX#2008                AIRFLOW         180.000      0.000 CHM
PCIBOX#2008                P_CONSUMPTION    68.000      0.000 W
PCIBOX#2008/PSU#0          FAN            3936.000      0.000 RPM
PCIBOX#2008/PSU#1          FAN            3584.000      0.000 RPM
PCIBOX#2008/FAN#0          FAN            3374.000      0.000 RPM
PCIBOX#2008/FAN#1          FAN            3374.000      0.000 RPM
PCIBOX#2008/FAN#2          FAN            3374.000      0.000 RPM
PCIBOX#2008/IOBT           T_INTAKE         26.000      0.000 C
PCIBOX#2008/IOBT           T_PART_NO0       31.500      0.000 C
PCIBOX#2008/IOBT           T_PART_NO1       30.750      0.000 C
PCIBOX#2008/IOBT           T_PART_NO2       31.500      0.000 C
PCIBOX#2008/IOBT           V_12_0V          12.069      0.000 V
PCIBOX#2008/IOBT           V_3_3_NO0         3.293      0.000 V
PCIBOX#2008/IOBT           V_3_3_NO1         3.295      0.000 V
PCIBOX#2008/IOBT           V_3_3_NO2         3.291      0.000 V
PCIBOX#2008/IOBT           V_3_3_NO3         3.300      0.000 V
PCIBOX#2008/IOBT           V_1_8V            1.804      0.000 V
PCIBOX#2008/IOBT           V_0_9V            0.900      0.000 V
```

Checking log information

Execute the showlogs command to check error log information.

1. **Log in to the XSCF shell.**

2. **Execute the showlogs command to determine the error log information.**
   The log information is listed in order of date, with the oldest appearing first.

   The following example shows that an Alarm occurred in PSU#1 at 12:45:31 on Oct 20, and the status changed to Warning at 15:45:31 on the same day.

```
XSCF> showlogs error
Date: Oct 20 12:45:31 JST 2012
     Code: 00112233-445566778899aabbcc-8899aabbcceeff0011223344
     Status: Alarm                      Occurred: Oct 20 12:45:31.000 JST 2012
     FRU: /PSU#1
     Msg: ACFAIL occurred (ACS=3)(FEP type = A1)
Date: Oct 20 15:45:31 JST 2012
     Code: 00112233-445566778899aabbcc-8899aabbcceeff0011223344
     Status: Warning                    Occurred: Oct 20 15:45:31.000 JST 2012
     FRU: /PSU#1
     Msg: ACFAIL occurred (ACS=3)(FEP type = A1)
```

Table 4-5 shows operands of the showlogs command and the log to be displayed.

Table 4-5   Operands of the showlogs Command and Displayed Logs

Operand	Description
error	Lists the error log.
event	Lists the event log.
power	Lists the power log.
env	Lists the temperature history.
monitor	Lists the monitoring message log.
console	Lists the console message log.
ipl	Lists the IPL message log.
panic	Lists the panic message log.

Checking the messages output by the predictive self-repairing tool

Check the messages output from the Oracle Solaris Fault Manager predictive self-repairing tool, running on Oracle Solaris. Oracle Solaris Fault Manager supports the following functions:

- Receives telemetry information about errors.
- Performs troubleshooting.
- Disables the FRU where an error occurred.
- Turns on the LED of the FRU where an error occurred and displays details in a system console message.

Table 4-6 lists typical messages generated at error occurrence. These messages indicate that the fault has already been diagnosed. If corrective actions can be taken by the system, this indicates that they have already been taken. In addition, if the system is running, corrective actions continue to be applied.
Messages are displayed on the console and are recorded in the /var/adm/messages file.

Table 4-6   Predictive Self-Repairing Messages

Displayed Output	Description
EVENT-TIME: Thu Apr 19 10:48:39 JST 2012	EVENT-TIME: Time stamp of the diagnosis
PLATFORM: ORCL,SPARC64-X, CSN: PP115300MX, HOSTNAME: 4S-LGA12-D0	PLATFORM: Description of the server where the error occurred
SOURCE: eft, REV: 1.16	SOURCE: Information on the diagnosis engine used to identify the error
EVENT-ID: fcbb42a5-47c3-c9c5-f0b0-f782d69afb01	EVENT-ID: Universally unique event ID for this error
DESC: The diagnosis engine encountered telemetry from the listed devices for which it was unable to perform a diagnosis - ereport.io.pciex.rc.epkt@chassis0/cpuboard0/chip0/hostbridge0/pciexrc0 class and path are incompatible.	DESC: Basic description of the error
AUTO-RESPONSE: Error reports have been logged for examination.	AUTO-RESPONSE: What the system has done (if anything) to alleviate any subsequent problems
IMPACT: Automated diagnosis and response for these events will not occur.	IMPACT: Description of the assumed impact of the failure
REC-ACTION: Use 'fmadm faulty' to provide a more detailed view of this event. Use 'fmdump -eV' to view the unexpected telemetry. Please refer to the associated reference document at http://support.oracle.com/msg/SUNOS-8000-J0 for the latest service procedures and policies regarding this diagnosis.	REC-ACTION: Brief description of the corrective action the system administrator should apply

Identifying the location of the SPARC M12-1 requiring maintenance

Execute the setlocator command to identify the location of the SPARC M12-1 requiring maintenance by causing the CHECK LED on the operation panel and the CHECK LED (locator) on the rear panel to blink.

1. **Log in to the XSCF shell.**

2. **Execute the setlocator command to blink the CHECK LED of the SPARC M12-1 requiring maintenance, and determine its location.**
   The CHECK LEDs on the operation and rear panels blink.

```
XSCF> setlocator blink
```

For the locations of the CHECK LEDs and details on how to check them, see "2.4 Checking the Indications by LEDs."

4.2.3 Downloading Error Log Information

This section describes the operations for downloading error log information.
To download error log information, use the XSCF log fetch function. The XSCF has a USB port specifically for maintenance, allowing maintenance information such as error logs to be easily obtained.
For details, see "12.1.15   Saving a Log to a File With Snapshot" and "12.1.16   Saving a Log to a Local USB Device" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.

In the following execution example, detailed error log information is downloaded to USB memory connected to a USB port.

```
XSCF> snapshot -d usb0 -L F -r -a -v
Testing writability of USB device....SUCCESS
About to remove all files from device 'usb0'. Continue? [y|n] : y
.
.
Collecting data into /media/usb_msd/<hostname>_<ipaddress>_<date>.zip
Data collection complete.
```

4.3 Maintenance Precautions

This section describes the precautions for maintenance.

4.3.1 Replacement Precautions

This section describes the precautions for replacement.
When replacing a FRU, replace it with a part with the same part number or a succeeding part.

Precautions for MBU replacement

- Do not replace the MBU and the PSUBP at the same time. If you replace the MBU and the PSUBP at the same time, the system may fail to operate correctly. Replace the MBU or PSUBP, execute the showhardconf or showstatus command, and confirm that the replacement Field Replaceable Unit (FRU) is fully operational. Then, replace the other FRU.

- Do not mount and use any of the following SD cards in the MBU in another chassis:
  - the one currently mounted in the SPARC M12-1, or
  - one that was once used as a maintenance part

  This is because these SD cards store device identification information.

- The CPU and XSCF on the MBU cannot be replaced individually. Replace the MBU.

- When replacing the MBU, you need to remove memory from the old unit and reinstall it on the new unit. Always install the memory modules at the same locations as on the old motherboard unit.

- Before replacing the MBU, execute the dumpconfig command to save the system setting information. When the MBU is replaced, CPU Activation setting information and CPU Activation keys may be deleted. To restore the CPU Activation setting information and CPU Activation keys that have been saved with the dumpconfig command, execute the restoreconfig command. For details, see "10.10   Saving/Restoring XSCF Settings Information" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.

- Set the system time.
  After replacing the MBU, you need to set the system time. For details, see "Notes on Maintenance of a CPU Memory Unit, Motherboard Unit, XSCF Unit, PSU Backplane, or Crossbar Backplane Unit" in the *Fujitsu SPARC M12 Product Notes* for the latest XCP version.

- If you replace the SD card along with the MBU, dispose of the SD card mounted on the old MBU by appropriate means such as cutting it with cutting pliers.
  The old SD card stores the user information, IP address, and other information set in the XSCF firmware.

Precautions for memory replacement

- When you replace a memory module, make sure that you install the new module in the same position as the original one.

Precautions for PSUBP replacement

- If you replace the MBU and the PSUBP at the same time, the system may fail to operate correctly. Replace the MBU or PSUBP, execute the showhardconf or showstatus command, and confirm that the replacement Field Replaceable Unit (FRU) is fully operational. Then, replace the other FRU.

- Do not mount and use any of the following PSUBP in another chassis:
  - the one currently mounted in the SPARC M12-1, or

  - one that was once used as a maintenance part

  This is because the above PSUBP stores device identification information.

- Set the system time.
  After replacing the PSUBP, you need to set the system time. For details, see "Notes on Maintenance of a CPU Memory Unit, Motherboard Unit, XSCF Unit, PSU Backplane, or Crossbar Backplane Unit" in the *Fujitsu SPARC M12 Product Notes* for the latest XCP version.

Precautions for PSU replacement

⚠️ **Caution -** Do not forcibly push the PSU into its slot. Using excessive force may damage the PSU and server.

- There are two PSUs in the configuration. Thus, the system can continue operating even if one of the PSUs fails. Do not, however, operate the system for an extended period while one unit has failed.
- When there are multiple PSUs to replace, replace them one by one. If redundancy of the PSUs cannot be secured, system-stopped (inactive)/cold maintenance must be performed.

Precautions for FANU replacement

- When there are multiple FANUs to replace, replace them one by one. If redundancy of the FANUs cannot be secured, system-stopped (inactive)/cold maintenance must be performed.
- The FANUs have a redundant configuration. Thus, the system can continue operating even if one of the FANUs fails. Do not, however, operate the system for an extended period with one failed unit. Replace any failed FANU immediately.

Precautions for PCIe card replacement

- Before replacing a PCIe card, stop the system and remove the PCIe riser from the MBU.

Precautions for HDDBP/OPNL replacement

⚠️ **Caution -** When removing the HDDBP or the OPNL, be careful not to damage electronic components such as connectors.

4.3.2   Precautions for Expansion

Precautions for memory expansion

- Observe the memory installation rules when you expand memory. For details, see "2.2.1   Memory Installation Rules."
- To mount a 64 GB DIMM, see "Notes on Memory" in the latest version of the *Fujitsu SPARC M12 Product Notes*.

Precautions for HDD/SSD expansion

- In HDD/SSD expansion, to install an HDD/SSD in a slot, remove the internal storage filler unit from the slot.
- Keep the removed internal storage filler unit because it will be needed for any subsequent HDD/SSD reduction.

Precautions for PCIe card expansion

- In PCIe card expansion, remove the filler for a PCIe card from the PCIe riser. The PCIe card filler is easily removed. Be careful not to drop it.
- Store the removed PCIe card filler in a safe place because it will be needed for any subsequent PCIe card reduction.

4.3.3 Precautions for Reduction

Precautions for memory reduction

- Observe the memory installation rules when you reduce memory. For details, see "2.2.1 Memory Installation Rules."

Precautions for HDD/SSD reduction

- In HDD/SSD reduction, after removing an HDD/SSD from a slot, install an internal storage filler unit in the slot.

Precautions for PCIe card reduction

- In PCIe card reduction, remove a PCIe card from the PCIe riser, then install a filler for the PCIe card, and mount it in the MBU. The PCIe card filler is easily removed. Be careful not to drop it.

Chapter 5

Preparations Required for Maintenance

This chapter describes the procedures for the preparations before you physically remove a FRU. See this chapter, as required, when performing maintenance on each FRU described in Chapter 8 onward.

- Preparing Tools Required for Maintenance
- Switching the Mode Switch to Service Mode
- Checking the Operating Condition and Resource Usage Status
- Enabling the Removal of a HDD/SSD
- Stopping the Entire System
- Saving Setting Information and Configuration Information
- Releasing a FRU From the System With the replacefru Command
- Accessing a FRU

Caution - Do not operate the Field Replaceable Unit (FRU) requiring maintenance while OpenBoot PROM is running (the ok prompt is displayed). After turning off the physical partition (stopping the system) or starting Oracle Solaris, operate the FRU requiring maintenance.

5.1 Preparing Tools Required for Maintenance

This section describes the tools required for maintenance. Table 5-1 lists the tools required for maintenance.

Table 5-1	Maintenance Tools
Item	**Use**
Phillips screwdriver (No. 2)	For removing or installing screws
Wrist strap	For static grounding
ESD mat	For static grounding

5.2 Switching the Mode Switch to Service Mode

Note - The mode switch on the operation panel does not need to be changed in active maintenance.

1. **Switch the mode switch on the operation panel to Service mode.**
   For details, see "2.3.2   Control Function of the Operation Panel."

5.3 Checking the Operating Condition and Resource Usage Status

This section describes the checking of the operating condition of the logical domain and the resource usage status before maintenance is performed on each FRU.

5.3.1 Checking the Operating Condition of a Physical Partition or Logical Domain

In the following execution example, the operating condition of the physical partition and logical domain is checked from the firmware.

1. **Log in to the XSCF shell.**

2. **Execute the showpparstatus command to confirm the operating condition of the physical partition.**
   In the following example, [PPAR Status] of PPAR-ID 00 displays "Running", which indicates that the physical partition is operating.

```
XSCF> showpparstatus -p 0
PPAR-ID         PPAR Status
00              Running
```

3. **Execute the showdomainstatus command to confirm the operating condition of the logical domain.**
   In the following example, [Status] of the logical domains of PPAR-ID 00 displays "Solaris running," which indicates that Oracle Solaris is operating.

```
XSCF> showdomainstatus -p 0
Logical Domain Name   Status
primary               Solaris running
guest0                Solaris running
guest1                Solaris running
iodom0                Solaris running
iodom1                Solaris running
sdiodomain            Solaris running
sr-iodomain           Solaris running
```

5.3.2   Checking the Assignment Status of I/O Devices

In the following execution example, the operating condition of the logical domain, the resource usage status, and the assignment status of I/O devices are checked from Oracle Solaris on the logical domain. For details, see "3.2   Operations and Commands Related to Logical Domain Configurations" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Domain Configuration Guide*.

1. **Log in to Oracle Solaris on the logical domain.**

2. **Execute the following ldm list-domain command to check the operating condition of the logical domains.**

```
# ldm list-domain
```

Note - Record the output data of the ldm list-domain command. After memory expansion, you will need it to check the operating condition of the logical domain and the amount of memory assigned to the logical domain.

3. **Execute the following ldm list-devices command to check the resource usage status.**

```
# ldm list-devices -a
```

4. **Execute the following ldm list-io command to check the assignment status of I/O devices.**

```
# ldm list-io
```

For maintenance on a PCIe card, retain the output data of the ldm list-io command, since you will need it later when restoring the original configuration after maintenance.

5.3.3 Checking the Usage Status of the HDD/SSD

In the following execution example, the configurations and states of devices in pools and errors generated from the devices are checked.

1. **Log in to Oracle Solaris on the logical domain.**

2. **Execute the zpool status command to check the configurations and operating conditions of devices.**

```
# zpool status
  pool: rpool
 state: ONLINE
  scan: none requested
config:
        NAME                        STATE     READ WRITE CKSUM
        rpool                       ONLINE       0     0     0
          c1t50000393E802CC86d0     ONLINE       0     0     0
errors: No known data errors
  pool: testpool
 state: ONLINE
  scan: none requested
config:
        NAME                        STATE     READ WRITE CKSUM
        testpool                    ONLINE       0     0     0
          c1t500003930821CE9Ad0     ONLINE       0     0     0
          c1t500003930820AB02d0     ONLINE       0     0     0
errors: No known data errors
```

5.4 Enabling the Removal of a HDD/SSD

This section describes the procedure for enabling the removal of a HDD/SSD by using the hot plug function.

5.4.1 How to Identify the HDD/SSD Slot

To maintain an HDD/SSD, you need to know the physical device name or logical device name of the drive to be installed or removed. If a disk error occurs in the

system, you can normally check on the system console for messages regarding a disk that is likely to fail or that has already failed. This information is also recorded in the /var/adm/messages file.

In these error messages, a failed internal disk drive is normally indicated with a physical device name or logical device name. In addition, depending on the application, the slot number of the HDD/SSD may be reported.

The procedure to check information on HDD/SSD mounting locations varies depending on the operating system.

- **For Oracle Solaris 11**
  For details, see "Using the format command (Oracle Solaris 11)" or "Using the diskinfo command (Oracle Solaris 11)."

- **For Oracle Solaris 10**
  For details, see "Using the diskinfo command (Oracle Solaris 10)."

Using the format command (Oracle Solaris 11)

1. **Execute the format command to check the HDD/SSD slots.**
   (1) to (4) in the following example represent:

   (1): Logical path name of the disk

   (2): The disk is mounted in the HDD#0 slot

   (3): The disk is mounted in the HDD#1 slot

   (4): The disk is mounted in the HDD#2 slot

```
# format
Searching for disks...done
AVAILABLE DISK SELECTIONS:
       0. c2t50000393B81B3A36d0 <TOSHIBA-MBF2600RC-3706 cyl 46873 alt 2 hd 20
sec 625> <-- (1)
          /pci@8100/pci@4/pci@0/pci@0/scsi@0/iport@f/disk@w50000393b81b3a36,0
          /dev/chassis/SYS/HDD00/disk <-- (2)
       1. c2t500000E01FB332A2d0 <FUJITSU-MBD2600RC-3701 cyl 46873 alt 2 hd 20
sec 625> <-- (1)
          /pci@8100/pci@4/pci@0/pci@0/scsi@0/iport@f/disk@w500000e01fb332a2,0
          /dev/chassis/SYS/HDD01/disk <-- (3)
       2. c2t50000393B81B4D7Ad0 <TOSHIBA-MBF2600RC-3706 cyl 46873 alt 2 hd 20
sec 625> <-- (1)
          /pci@8100/pci@4/pci@0/pci@0/scsi@0/iport@f/disk@w50000393b81b4d7a,0
          /dev/chassis/SYS/HDD02/disk <-- (4)
Specify disk (enter its number):
```

Using the diskinfo command (Oracle Solaris 11)

1. **Execute the diskinfo command to check the HDD/SSD slots.**
   (1) to (3) in the following example represent:

   (1): Device path name and logical path name of the disk mounted in HDD#0

   (2): Device path name and logical path name of the disk mounted in HDD#1

(3): Device path name and logical path name of the disk mounted in HDD#2

```
# diskinfo
D:devchassis-path                            c:occupant-compdev
-------------------------------------------- --------------------
  :
/dev/chassis/SYS/HDD00/disk                  c0t50000393B81B3A36d0 <-- (1)
/dev/chassis/SYS/HDD01/disk                  c0t500000E01FB332A2d0 <-- (2)
/dev/chassis/SYS/HDD02/disk                  c0t50000393B81B4D7Ad0 <-- (3)
/dev/chassis/SYS/HDD03/disk
/dev/chassis/SYS/HDD04/disk
/dev/chassis/SYS/HDD05/disk
/dev/chassis/SYS/HDD06/disk
/dev/chassis/SYS/HDD07/disk
#
```

Using the diskinfo command (Oracle Solaris 10)

1. **Execute the diskinfo command to check the HDD/SSD slots.**
   (1) to (3) in the following example represent:

   (1): Device path name and logical path name of the disk mounted in HDD#0

   (2): Device path name and logical path name of the disk mounted in HDD#1

   (3): Device path name and logical path name of the disk mounted in HDD#2

```
# diskinfo -ap

Enclosure path:        TZ01232002-physical-hba-0
Chassis Serial Number: TZ01232002-physical-hba-0
Chassis Model:         ORCL,SPARC64-X

Enclosure path:        /dev/es/ses0
Chassis Serial Number: 500000e0e04901bf
Chassis Model:         FUJITSU-NBBEXP

Label      Disk name              Vendor    Product          Vers
---------- ---------------------- --------- ---------------- ----
HDD_0      c0t50000393B81B3A36d0  TOSHIBA   MBF2600RC        3706 <-- (1)
        Physical path
        -------------------------------
        0: /pci@8100/pci@4/pci@0/pci@0/scsi@0/iport@f/disk@w50000393b81b3a36,0
HDD_1      c0t500000E01FB332A2d0  TOSHIBA   MBF2600RC        3706 <-- (2)
        Physical path
        -------------------------------
        0: /pci@8100/pci@4/pci@0/pci@0/scsi@0/iport@f/disk@w500000e01fb332a2,0
HDD_2      c0t50000393B81B4D7Ad0  TOSHIBA   MBF2600RC        3706 <-- (3)
        Physical path
        -------------------------------
        0: /pci@8100/pci@4/pci@0/pci@0/scsi@0/iport@f/disk@w50000393b81b4d7a,0
```

5.4.2 Releasing an HDD/SSD From the System

To use the hot plug function, the hotplug service of Oracle Solaris needs to be enabled. Check the status of the service. If it is disabled, enable the hotplug service in the following procedure. The hot plug function is available only on the control domain and root domain.

Note - Unless the system has a redundant configuration, the data on the HDD/SSD will be lost. Thus, perform this operation only after backing up the data in advance. In addition, active/hot maintenance of the boot device in a non-redundant configuration cannot be performed.

```
# svcs hotplug ← If the STATE is disabled, enable the service.
# svcadm enable hotplug ← Enables the hotplug service.
```

For details on the cfgadm command used here, see "Chapter 2 Dynamically Configuring Devices" in the *Managing Devices in Oracle Solaris 11.2* or "Dynamically Configuring Devices (Tasks)" in the *Oracle Solaris Administration: Devices and File Systems*.

1. **Execute the cfgadm command to check the configuration of the internal storage.**
   In HDD/SSD replacement or reduction, use the cfgadm -a command to check the Ap_ID of the disk requiring maintenance, and make a note of it. The Ap_ID refers to a string such as "c4::dsk/c4t5000039428298FFEd0".

   In HDD expansion, use the cfgadm -a command to check the number of disks mounted.

```
# cfgadm -a
```

2. **Stop all applications from using the HDD/SSD.**

3. **Execute the cfgadm command to release the HDD/SSD requiring maintenance from the system.**
   Enter the Ap_ID you noted in advance.

```
# cfgadm -c unconfigure Ap_ID
```

4. **Execute the cfgadm command to confirm that the HDD/SSD requiring maintenance is disconnected.**
   The disconnected HDD/SSD is displayed as "unconfigured."

```
# cfgadm -a
```

5. **Execute the cfgadm command to blink the CHECK LED of the HDD/SSD requiring maintenance, and confirm its location.**
   Enter the Ap_ID you noted in advance.

```
# cfgadm -x led=fault,mode=blink Ap_ID
```

6. **Check the following LEDs to determine whether the HDD/SSD requiring maintenance can be removed:**
   - HDD/SSD READY LED (green): On

   - HDD/SSD CHECK LED (amber): Blinking

5.5   Stopping the Entire System

This section describes the procedure for stopping the entire system.
Stop the system in either of the following two ways.

- Stopping the System With the XSCF Command
- Stopping the System From the Operation Panel

Note - Before stopping the system, inform the users that the system will be stopped.

Note - When a physical partition is stopped by the operation of the XSCF command or the operation panel, all the logical domains on the physical partition are stopped. Stop applications as required.

5.5.1   Stopping the System With the XSCF Command

1. **Confirm that the mode switch on the operation panel is in Service mode.**

2. **Log in to the XSCF shell.**

3. **Execute the poweroff command.**
   Enter "y" in response to the confirmation message.

   In the following example, the displayed status of PPAR-ID 00 is "Powering off," so you can see that the power-off instruction for the physical partition completed successfully.

```
XSCF> poweroff -a
PPAR-IDs to power off:00
Continue? [y|n] :y
00 : Powering off
```

   The following processes are performed.

   - Oracle Solaris is completely shut down.

   - The system stops and enters the POWERON READY state (The XSCF is running).

Note - The order in which guest domains shut down depends on the shut-down group setting of Oracle VM Server for SPARC.

4. **Confirm that the POWER LED on the operation panel is off.**

5. **Execute the showpparstatus command to confirm that the power to the physical partition is turned off.**
   In the following example, [PPAR Status] of PPAR-ID 00 displays "Powered Off", which indicates that the power to the physical partition has been turned off.

```
XSCF> showpparstatus -a
PPAR-ID        PPAR Status
00             Powered Off
```

6. **Execute the showdomainstatus command to confirm the operating condition of the logical domain.**
   In the following example, [Status] of the logical domain displays "Solaris powering down," indicating the power-off processing of Oracle Solaris.

```
XSCF> showdomainstatus -p 0
Logical Domain Name   Status
primary               Solaris powering down
```

5.5.2   Stopping the System From the Operation Panel

1. **Confirm that the mode switch on the operation panel is in Service mode.**

2. **Press the power switch on the operation panel for 4 seconds or more.**
   For details, see "2.3.2   Control Function of the Operation Panel."

3. **Confirm that the POWER LED on the operation panel is off.**

4. **Execute the showpparstatus command to confirm that the power to the physical partition is turned off.**
   In the following example, [PPAR Status] of PPAR-ID 00 displays "Powered Off", which indicates that the power to the physical partition has been turned off.

```
XSCF> showpparstatus -a
PPAR-ID        PPAR Status
00             Powered Off
```

5. **Execute the showdomainstatus command to confirm the operating condition of the logical domain.**
   In the following example, [Status] of the logical domain displays "Solaris powering down," indicating the power-off processing of Oracle Solaris.

```
XSCF> showdomainstatus -p 0
Logical Domain Name    Status
primary                Solaris powering down
```

5.6 Saving Setting Information and Configuration Information

5.6.1 Saving XSCF Setting Information

This section describes how to save the following XSCF setting information:

- Network configuration information, advanced setting information, guest domain configuration information, etc.
- CPU Activation key, CPU Activation assignment, etc.
- PPAR operation mode, time zone setting, user information, etc.

The following example shows the command for saving the XSCF setting information on the USB device. For details, see "10.10 Saving/Restoring XSCF Settings Information" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.

```
XSCF> dumpconfig -v -V file:///media/usb_msd/backup-file.txt
```

5.6.2 Saving Logical Domain Configuration Information and OpenBoot PROM Environment Variables

You can save the logical domain configuration information for each physical partition in an XML file. To save the logical domain configuration information in an XML file, log in to the control domain of the physical partition to perform the work.

This section shows the procedure for saving logical domain configuration information.

1. **Switch to the control domain console of the target physical partition from the XSCF shell.**

2. **Execute the ldm ls-spconfig command to confirm that the current logical domain configuration information has already been saved on the XSCF.**
   In the following example, the current configuration information is set in test1.

```
primary# ldm ls-spconfig
factory-default
test1 [current]
test2
```

If the current configuration information has not been saved on the XSCF, save it with the ldm add-spconfig command.

In the following example, the configuration information is saved in test3 by the ldm add-spconfig command, and the ldm ls-spconfig command is used to confirm that the information is set in test3.

```
primary# ldm add-spconfig test3
primary# ldm ls-spconfig
factory-default
test1
test2
test3 [current]
```

3. **Execute ldm list-constraints -x to save the logical domain configuration information in an XML file.**
   This shows an example of saving it in /ldm-set1.xml.

```
primary# ldm list-constraints -x > /ldm-set1.xml
```

4. **Execute the more command or a command with a similar function to confirm that the configuration information is saved in an XML file.**

```
primary# more /ldm-set1.xml
<?xml version="1.0"?>
<LDM_interfaceversion="1.3" xmlns:xsi=http://www.w3.org/2001/
XMLSchema-instancce>
```

To be prepared in case the saved file is lost, back up the file on other media, etc.

5. **If the SR-IOV function was used to assign a virtual function (VF) to a domain, execute ldm list-io -l to record the following information that has been set for each VF:**
   - For a Fibre Channel HBA: port-wwn and node-wwn information that was set when the VF was created

   - For an Ethernet interface: MAC address that was set when the VF was created

```
[Example]
primary# ldm list-io -l
NAME                                    TYPE   BUS    DOMAIN   STATUS
----                                    ----   ---    ------   ------
  :
/SYS/PCI0/IOVFC.PF0.VF0                 VF     PCIE0   XXXXX
[pci@8100/pci@4/pci@0/pci@9/SUNW,qlc@0,2]
```

```
Class properties [FIBRECHANNEL]
port-wwn = 10:00:00:14:4f:f8:38:99
node-wwn = 20:00:00:14:4f:f8:38:99
bw-percent = 0
  :
/SYS/PCI1/IOVNET.PF0.VF0                    VF     PCIE1    XXXXX
[pci@8200/pci@4/pci@0/pci@8/network@0,80]
Class properties [NETWORK]
mac-addr = 00:14:4f:f8:b2:73
mtu = 1500
  :
```

6. **Stop the logical domains and put them in the OpenBoot PROM state.**
   Before powering off the system, follow the appropriate procedure to stop the logical domains, and execute the ldm unbind command to place them in the inactive state.

   ```
   primary# shutdown -i0 -g0 -y
   ```

7. **Execute the printenv command to confirm the OpenBoot PROM environment variables, and save the output data.**
   If there is any item omitted with "...", check the item again.

   ```
   {0} ok printenv boot-device
   boot-device = /pci@8100/pci@4/pci@0/pci@0/scsi@0/disk@p0,0
   ```

5.7 Releasing a FRU From the System With the replacefru Command

This section describes the procedure for releasing a FRU requiring maintenance from the system. The following FRUs can be maintained.
- PSU
- FANU

Note - If the XSCF startup mode is high-speed mode, hardware cannot be replaced using the replacefru command. Replace hardware with the input power turned off.

---

1. **Log in to the XSCF shell.**
2. **Execute the replacefru command to display the maintenance menu.**

   ```
   XSCF> replacefru
   ```

3. **With a number key, select the FRU requiring maintenance.**
   In the following example, since the FANU is selected, "1" is entered.

```
--------------------------------------------------------------------------------
Maintenance/Replacement Menu
Please select a type of model which has FRU to be replaced.

1. FAN        (Fan Unit)
2. PSU        (Power Supply Unit)
--------------------------------------------------------------------------------
Select [1,2|c:cancel] :1
```

4. **With a number key, select the FRU requiring maintenance.**
   In the following example, since FAN#6 is showing "Faulted" indicating an error,
   "7" is entered.

```
--------------------------------------------------------------------------------
Maintenance/Replacement Menu
Please select a FRU to be replaced.

No. FRU                 Status
--- ------------------ -------------
 1  /FAN#0                Normal
 2  /FAN#1                Normal
 3  /FAN#2                Normal
 4  /FAN#3                Normal
 5  /FAN#4                Normal
 6  /FAN#5                Normal
 7  /FAN#6                Faulted
--------------------------------------------------------------------------------
Select [1-7|b:back] :7
```

5. **After confirming that the selected FRU is displayed, enter [r].**

```
You are about to replace FAN#6.
Do you want to continue?[r:replace|c:cancel] : r
```

6. **Confirm that the CHECK LED of the FRU is blinking.**
   For the location of the CHECK LED, see "2.4.3   LEDs on Each Component."

```
Please execute the following steps:
1) Confirm the Check LED is blinking.
2) Remove FAN#6.
3) Execute either the following:
  3-1) After installing the exchanged device, please select 'finish'.
  3-2) If you want to suspend the maintenance without exchanging device,
       please select 'cancel'.
[f:finish|c:cancel] :
```

You can now start FRU maintenance. Do not enter "f" until you complete the

maintenance work.

After replacing the FRU, perform the work in "6.2 Incorporating a FRU Into the System With the replacefru Command" to incorporate the FRU into the system.

5.8 Accessing a FRU

This section describes the operations to be performed before accessing the FRU requiring maintenance. The required operations vary depending on the FRU requiring maintenance.

5.8.1 Removing the Power Cords

Remove the cable clamp from each power cord, and then remove the power cords.

1. **Release the tab of the cable clamp (A in Figure 5-1).**
   Pulling the cable clamp toward the rear facilitates the release of the latch.

Figure 5-1   Latch of the Cable Clamp
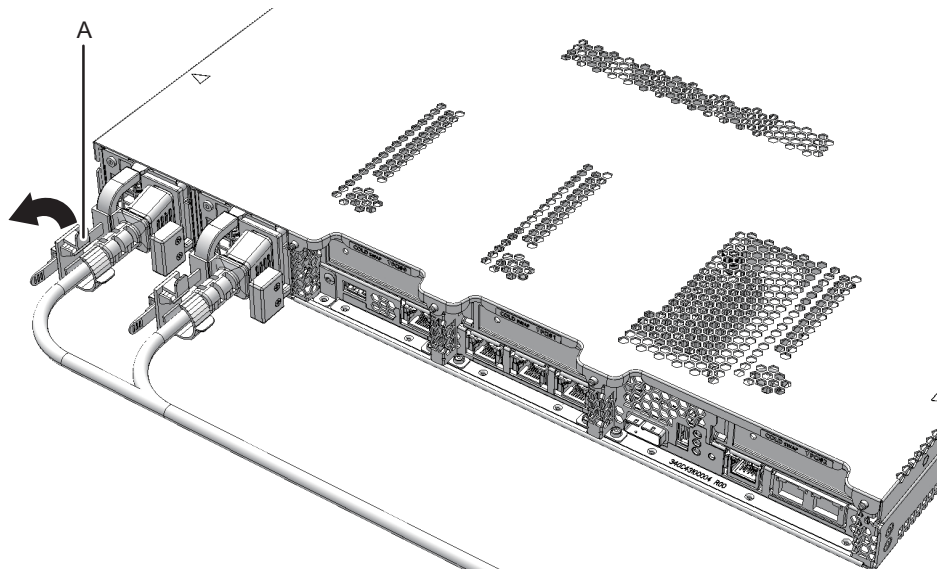
2.   **Remove the power cords from the PSU.**

Figure 5-2   Removing the Power Cords
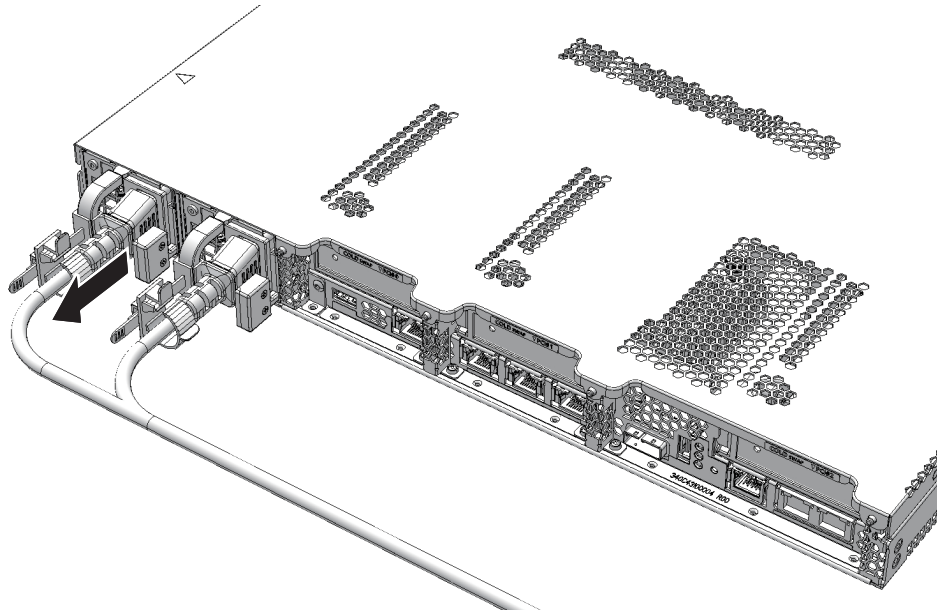
5.8.2   Removing the Cables

- **When maintaining a PCIe card**
  Disconnect all the cables connected to the PCIe card requiring maintenance.

- **When maintaining the MBU, memory, and PSUBP**
  Remove all the cables connected to the external interface on the rear of the device.

Note - Record the positions of the cables before removing them to ensure that they are reinstalled correctly.

5.8.3 Pulling the SPARC M12-1 Out From the Rack

To perform maintenance on an internal FRU in the SPARC M12-1, pull the SPARC M12-1 out of the rack.

Caution - If the rack is supplied with a quakeresistant options kit, install it. The quakeresistant options kit will prevent the rack from falling over when you pull the SPARC M12-1 out along the slide rails when performing maintenance.

1. **Pull the levers on the right and left sides of the SPARC M12-1 outward to release the lock.**

Figure 5-3   Levers on the Right and Left Sides
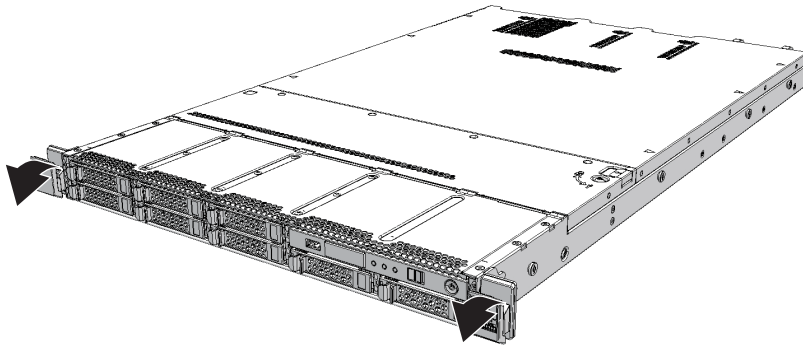
2. **While pulling the levers outward, pull the SPARC M12-1 out as far as possible.**
   Once the SPARC M12-1 has been completely pulled out, it is automatically locked into the prescribed position.

Figure 5-4   Pulling Out the SPARC M12-1
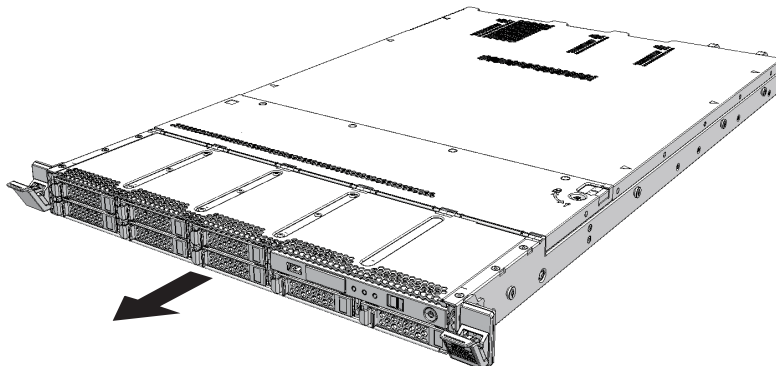
5.8.4　Opening the Fan Cover

To perform maintenance on an internal FRU in the SPARC M12-1, pull the SPARC M12-1 out of the rack, and then open the fan cover.

1. **Turn the locking screw to the Service position ( ) to release the lock.**

Figure 5-5　　Releasing the Lock
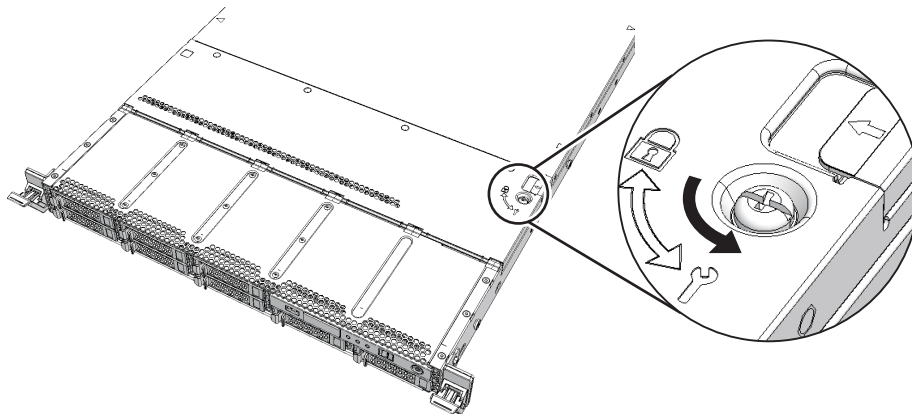
2. **While pressing the green slide button (A in Figure 5-6) toward the inside, hold the edge of the fan cover and open it in the direction of the arrows.**

Note - The fan cover does not open through 180 degrees.

Figure 5-6   Opening the Fan Cover
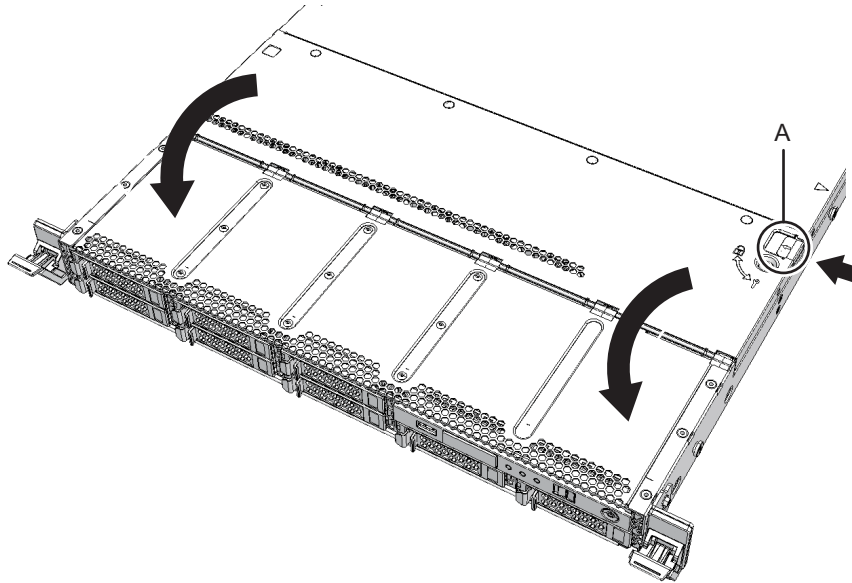
5.8.5   Removing the Upper Cover

To perform maintenance on an internal FRU in the SPARC M12-1, pull the SPARC M12-1 out of the rack, open the fan cover, and then remove the upper cover.

1.   **Slide the upper cover toward the rear to remove it.**

Figure 5-7   Opening the Upper Cover
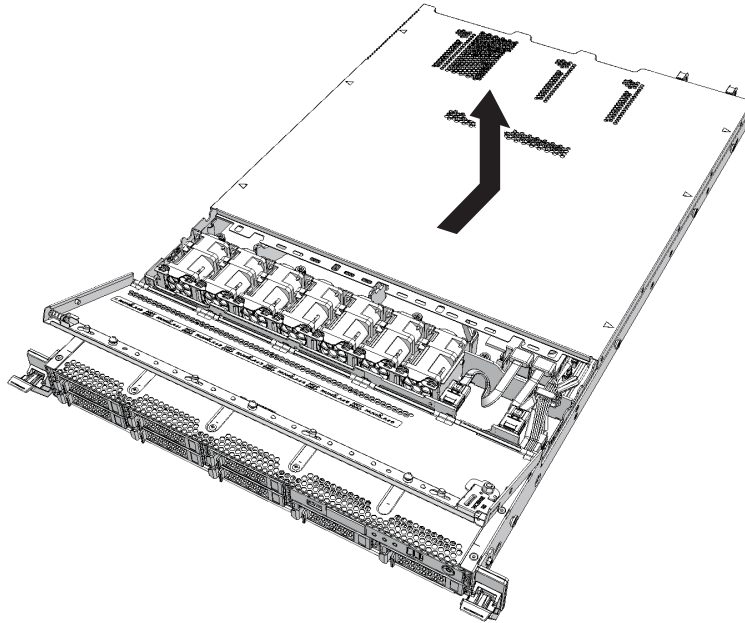
5.8.6   Removing the Air Duct and PSUBP Cover

To perform maintenance on the MBU, memory, or PSUBP, remove the air duct and PSUBP cover.

1. **Lift the air duct up by both sides to remove it.**

Figure 5-8   Removing the Air Duct
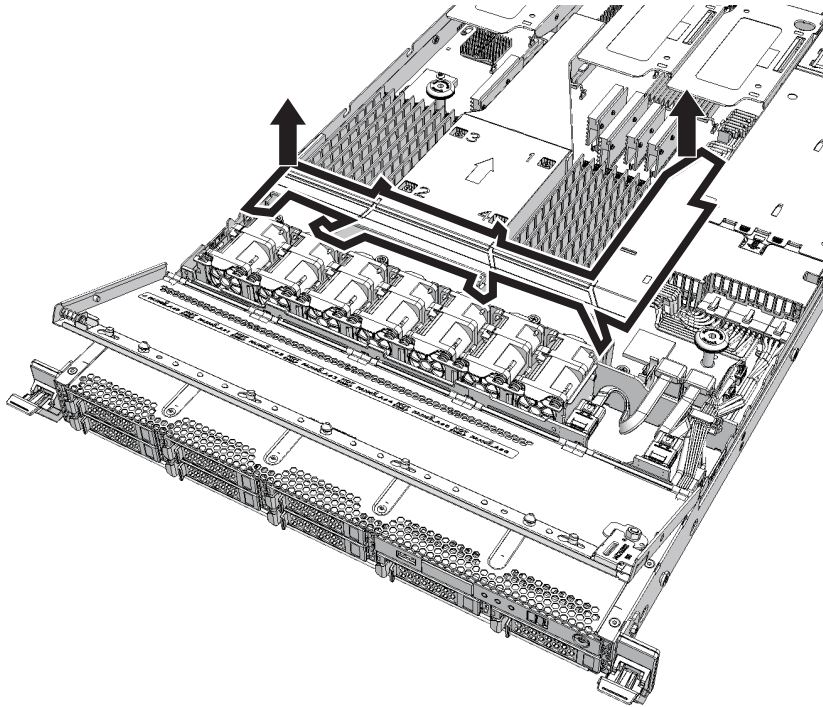
2. **Remove the PSUBP cover by sliding it to the front while pressing the latch of the PSUBP cover.**

Figure 5-9   Removing the PSUBP Cover
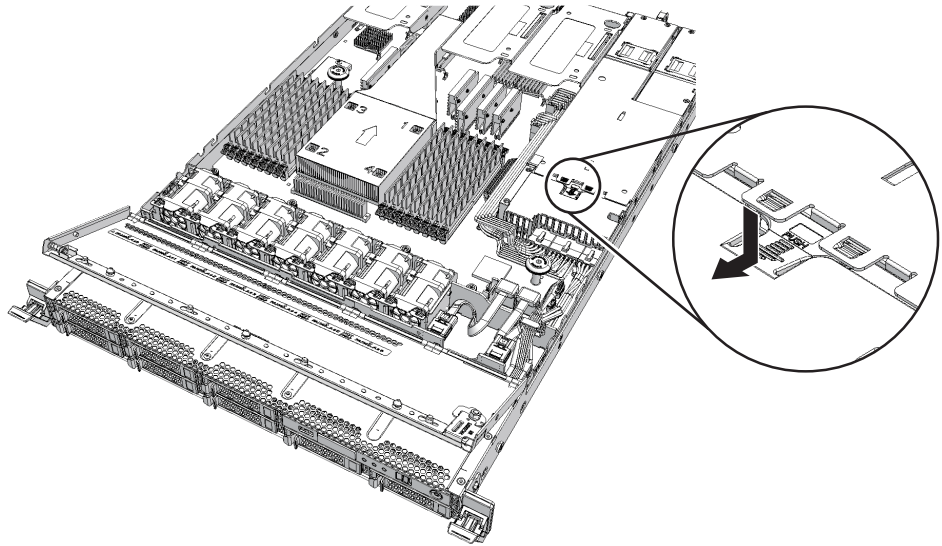
5.8.7   Releasing the Cable Guide Lock

To perform maintenance with the connected cables removed from the motherboard unit, release the cable guide lock to remove the cables.

1. **Release the cable guide lock by pressing the lock toward the inside (A in Figure 5-10).**

Figure 5-10   Releasing the Cable Guide Lock
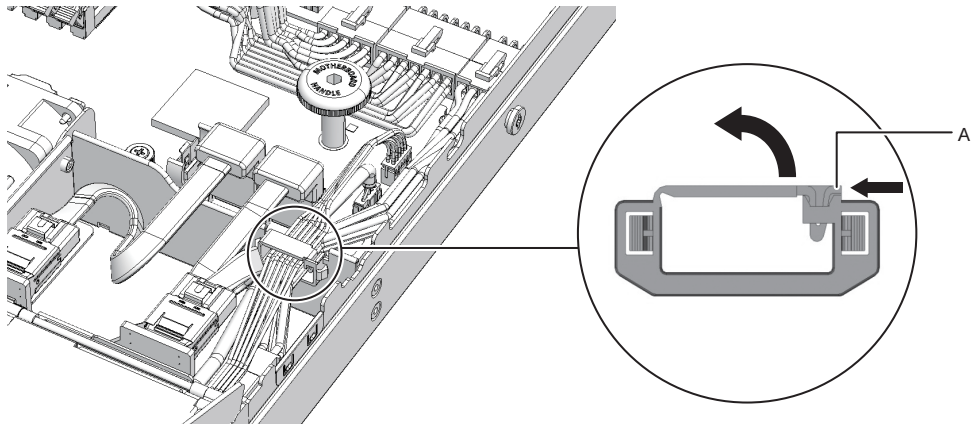
Chapter 6

Understanding the Preparations for Restoring the System

This chapter describes the procedures required to restore the system after FRU maintenance. See this chapter, as required, when performing maintenance on each FRU described in Chapter 8 onward.

- Restoring the Server
- Incorporating a FRU Into the System With the replacefru Command
- When Replacing the MBU/PSUBP
- Diagnosing a Replacement FRU
- Restoring Setting Information and Configuration Information
- Incorporating the HDD/SSD
- Checking the FRU Status After Maintenance
- Returning the Mode Switch to Locked Mode
- Starting the System

6.1 Restoring the Server

This section describes the procedures to restore the server after maintenance on the target FRU.

6.1.1 Locking the Cable Guide

If the maintenance has been done by removing the cables connected to the MBU, lock the cable guide after storing the cables in it.

1. **Lock the cable guide after storing the connected cables in the guide.**

Figure 6-1   Locking the Cable Guide
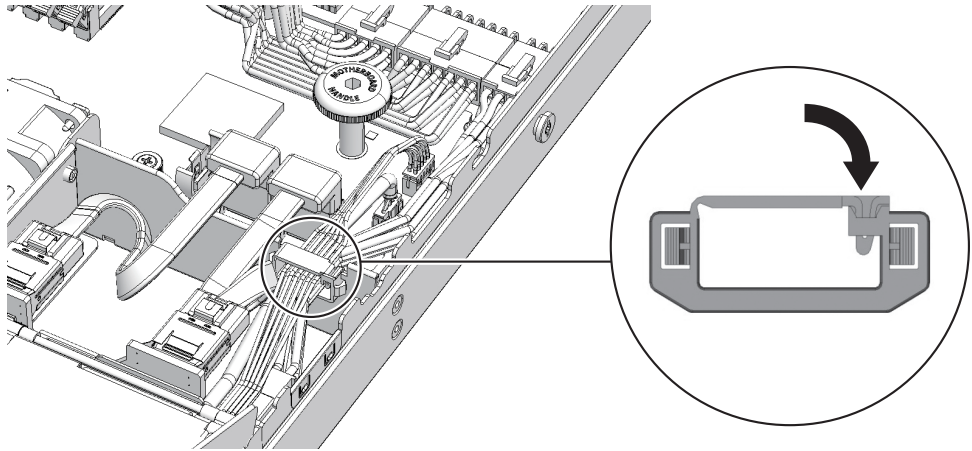
6.1.2   Installing the Air Duct and PSUBP Cover

If maintenance was performed on the MBU, memory, or PSUBP, install the air duct and PSUBP cover.

1. **Install the PSUBP cover by tilting it, inserting the latch (A in Figure 6-2), and sliding the cover to the rear.**

Note - Confirm that the latch of the PSUBP cover is secured.

Figure 6-2   Installing the PSUBP Cover
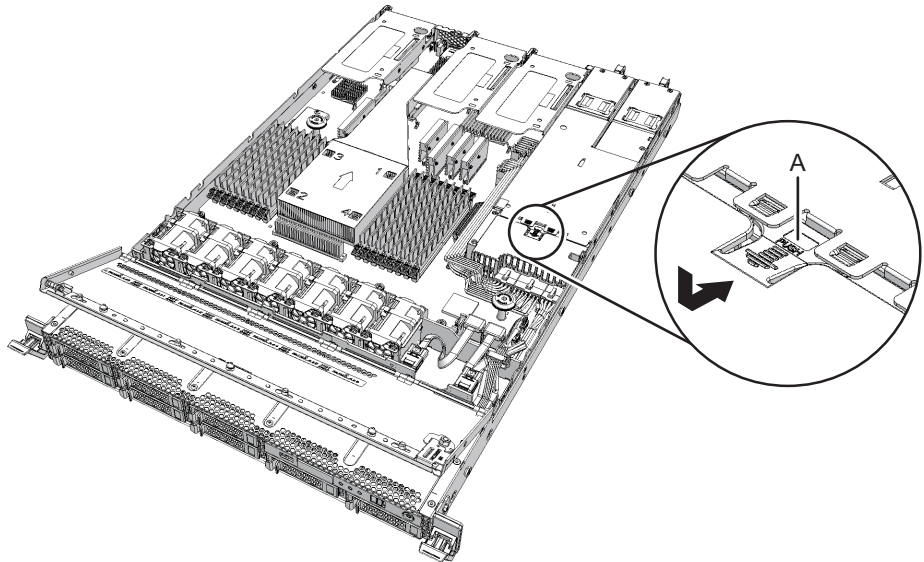
2. **Attach the air duct vertically.**
   Fit the air duct guides (four locations) (A in Figure 6-3) into the notches on the MBU, and secure them with the pins (two locations) (B in Figure 6-3).

Figure 6-3   Installing the Air Duct
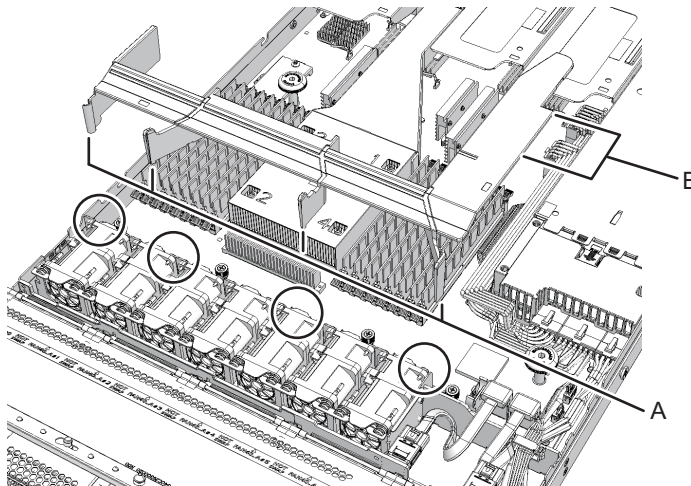
6.1.3　Installing the Upper Cover

If the maintenance was performed on an internal FRU in the SPARC M12-1, install the upper cover.

1.　**Install the upper cover by sliding it toward the front.**

Note - Confirm that the pins on the rear of the SPARC M12-1 (four locations) are inserted into the upper cover.

Figure 6-4　　Installing the Upper Cover
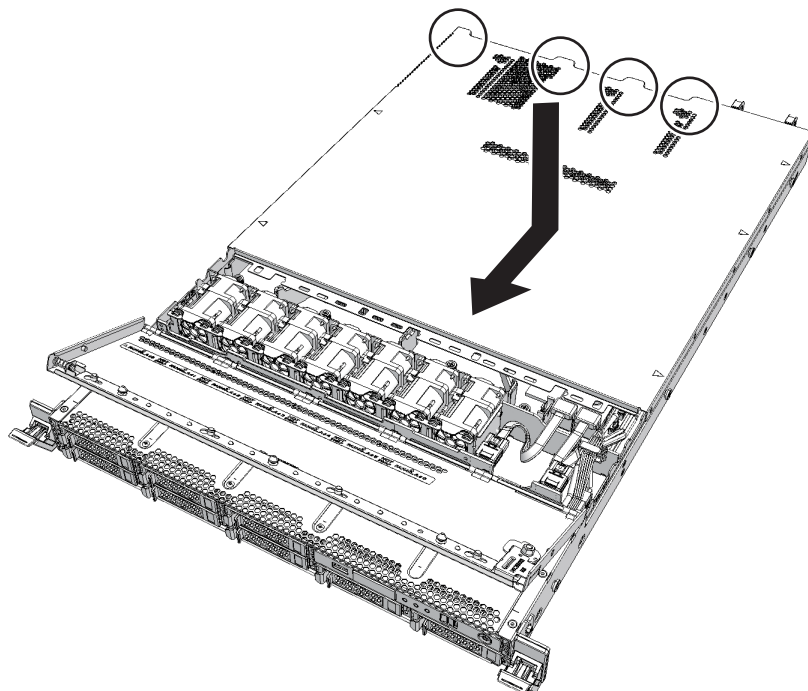
6.1.4   Closing the Fan Cover

If the maintenance was performed on an internal FRU in the SPARC M12-1, install the upper cover, and then close the fan cover.

1. **Hold the edge of the fan cover, and close it while pressing the green slide button toward the inside.**

Note - Confirm that the fan cover is firmly closed and secured.

Figure 6-5   Fan Cover
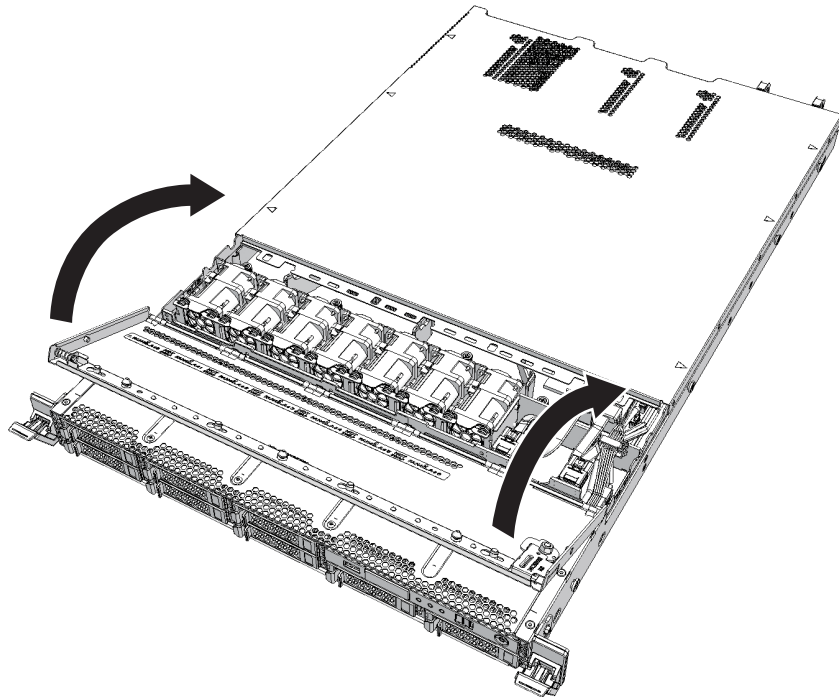
2. **Turn the locking screw to the Locked position (🔒) to lock.**

Figure 6-6　　Fixing with the Locking Screw
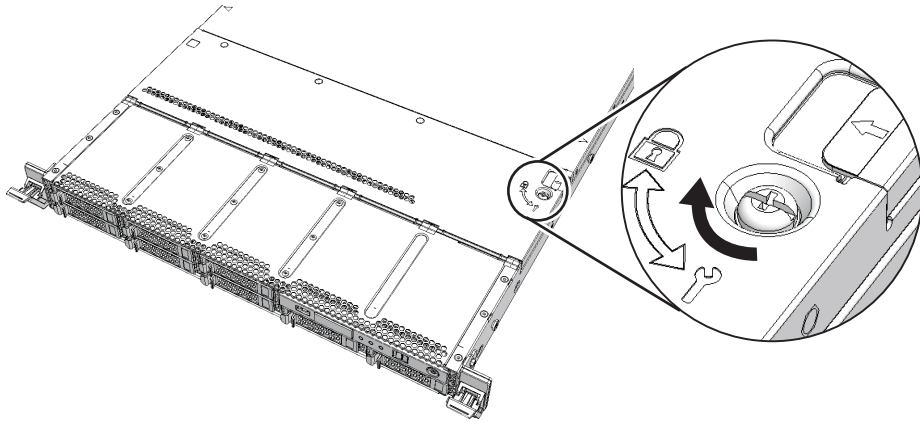
6.1.5　Putting the SPARC M12-1 Into the Rack

If the maintenance was performed on an internal FRU in the SPARC M12-1, install the upper cover, close the fan cover, and then put the SPARC M12-1 back into the rack.

1. **Carefully push the SPARC M12-1 all the way into the rack.**
   a. Align the edge of each inner rail attached to the SPARC M12-1 with the edge of a middle rail in the rack (A in Figure 6-7), and insert the SPARC M12-1.
   b. The rail locks with an audible click as you insert the server. Pull each green lock lever (B in Figure 6-7) of the inner rails to release the locks, and insert the SPARC M12-1 into the rack.
   Pull down both of the green levers at the front end of the SPARC M12-1, and push the SPARC M12-1 further until it goes in all the way. Then, take your hands off the levers to engage the locks.
   c. Shake the SPARC M12-1 a little to confirm that the SPARC M12-1 is secured to the rack.

Figure 6-7   Putting the SPARC M12-1 in the Rack
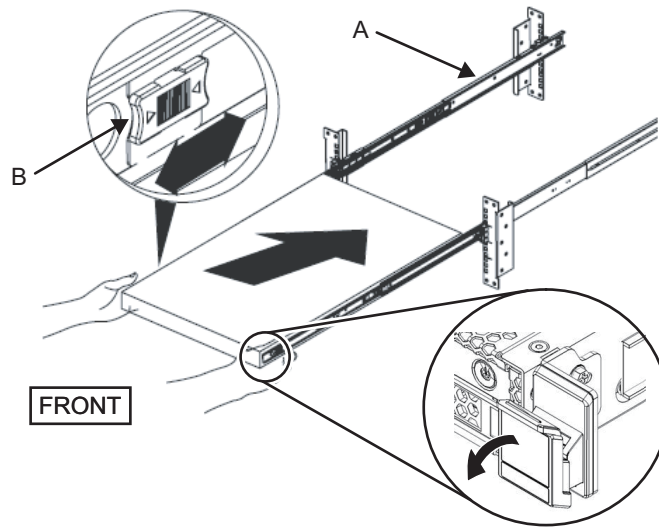
Note - Confirm that the SPARC M12-1 is securely mounted and that all the levers are locked.

Figure 6-8   SPARC M12-1 Levers
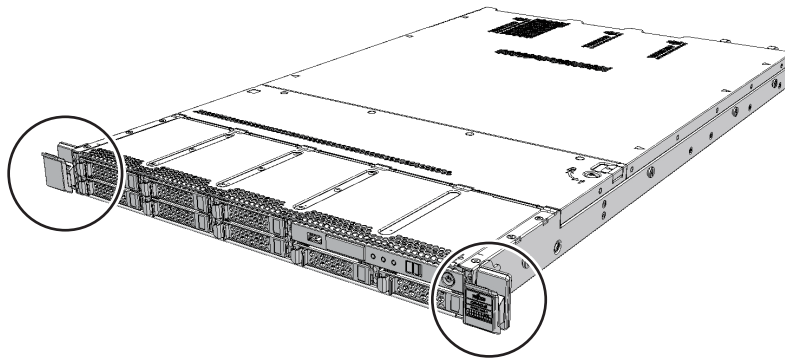
6.1.6　Installing the Power Cords

If the power cords were removed for maintenance, reinstall the power cords, and then set the cable clamp to them.

Note - In the case of a dual power feed, connect the power cords in their original positions by referring to the record that you made before the start of maintenance.

---

1. **Install the power cord to the PSU.**
   Insert the power cord all the way straight into the PSU.

Figure 6-9　　Installing the Power Cords
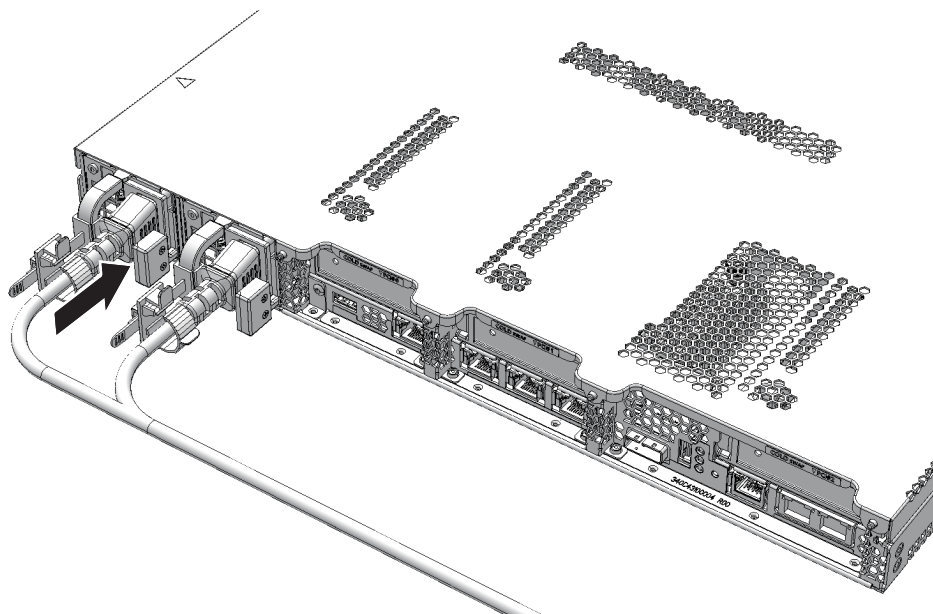
2. **Clip the power cords with the cable clamp, and secure the cable clamp.**
   Lock the latch (A in Figure 6-10) and then push the cable clamp toward the front
   to firmly secure the cable clamp.

Figure 6-10   Cable Clamp Lock
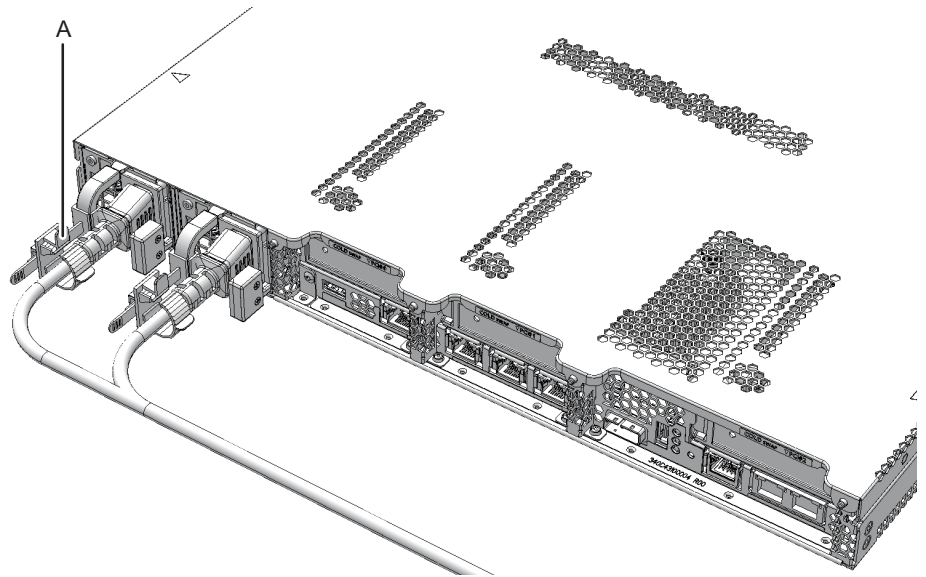
3. **If you unlocked and released the cable management arm, restore it to its original state.**

Note - Confirm that the cable management arm is locked with its tab (A in Figure 6-11).

Figure 6-11   Cable Management Arm Tab
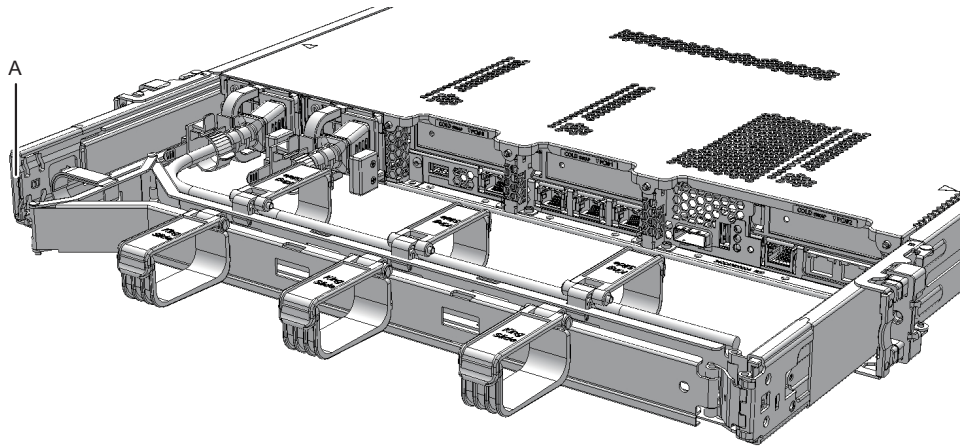
6.2   Incorporating a FRU Into the System With the replacefru Command

This section describes the procedure for incorporating a Field Replaceable Unit (FRU) into the system after maintenance. To do this, resume the replacefru command, which is running, to incorporate the FRU into the system. The following FRUs can be maintained.

- PSU
- FANU

1. **After performing maintenance on the FRU, return to the operation of the XSCF firmware replacefru command, and enter "f".**

```
Please execute the following steps:
1) Confirm the Check LED is blinking.
2) Remove FAN#6.
3) Execute either the following:
  3-1) After installing the exchanged device, please select 'finish'.
  3-2) If you want to suspend the maintenance without exchanging device,
```

```
      please select 'cancel'.
[f:finish|c:cancel] :f
```

The following screen is displayed. Wait until the processing has completed.

```
Waiting for FAN#6 to enter install state.
[This operation may take up to 1 minute(s)]
(progress scale reported in seconds)
   0.. done

Diagnostic tests for FAN#6 have started.
[This operation may take up to 6 minute(s) 30 second(s)]
(progress scale reported in seconds)
   0.... 30.....  60.....  90. done
```

2. **Confirm that the status is normal ("Normal") after diagnosis, and then enter "f"**.

```
--------------------------------------------------------------------------------
Maintenance/Replacement Menu
Status of the replaced FRU.

FRU                 Status
------------------- --------------
/FAN#6              Normal
--------------------------------------------------------------------------------
The replacement of FAN#6 has completed normally.[f:finish] :f
```

3. **When the maintenance menu appears, enter "c" to exit the operation.**

```
--------------------------------------------------------------------------------
Maintenance/Replacement Menu
Please select a type of model which has FRU to be replaced.

1. FAN        (Fan Unit)
2. PSU        (Power Supply Unit)
--------------------------------------------------------------------------------
Select [1,2|c:cancel] :c
```

6.3   When Replacing the MBU/PSUBP

This section describes the procedure for restoring the system after reinstalling the MBU or PSUBP.

6.3.1 Setting the Time

1. **Confirm that the XSCF STANDBY LED on the operation panel is on.**

2. **Log in to the XSCF shell.**

3. **Execute the showdate command to display the XSCF time.**
   In the following example, the current local time is displayed.

```
XSCF> showdate
Mon Jan 1 09:17:24 JST 2001
```

4. **Execute the setdate command to set the XSCF time.**
   Specify the time in either of the following formats:

   yyyy.MM.DD-hh:mm:ss   year.month.day-hour (24-hour clock):minute:second

   MMDDhhmmyyyy.ss   monthdayhour (24-hour clock) minuteyear.second

   In the following example, "June 15, 2017 16:59:00" is specified.

```
XSCF> setdate -s 061516592017.00
```

6.3.2 Confirming the Firmware Version

1. **Log in to the XSCF shell.**

2. **Execute the version command to confirm the firmware version information.**
   If the XCP firmware version does not match that used before the replacement,
   update the firmware.

   For details, see "16.5   Updating Firmware" in the *Fujitsu SPARC M12 and Fujitsu
   M10/SPARC M10 System Operation and Administration Guide*.

```
XSCF> version -c xcp -v
BB#00-XSCF#0 (Master)
XCP0 (Reserve): 3025
XSCF          : 03.02.0005
XCP1 (Current): 3025
XSCF          : 03.02.0005
CMU           : 03.02.0005
    POST          : 5.15.0
    OpenBoot PROM : 4.38.5+3.1.0
    Hypervisor    : 1.5.13
CMU BACKUP
#0: 03.02.0005
#1: ..
XSCF>
```

6.3.3 When the System is Configured With a Hardware RAID

If you have replaced the MBU in a hardware RAID configuration, activate the RAID volume.

1. **Log in to the XSCF shell.**

2. **Execute the setpparparam command to suppress auto-boot.**

```
XSCF> setpparparam -p 0 -s bootscript "setenv auto-boot false"
```

3. **Start the system.**
   For details, see "6.9   Starting the System."

4. **The ok prompt appears.**

5. **Enable the RAID volume to check the status.**
   For details, see "14.2.11   Re-enabling a Hardware RAID Volume" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide.*

6. **Stop the system after returning the Auto boot setting to the original one.**

```
{0} ok setenv auto-boot? true
XSCF> poweroff -a
```

6.4 Diagnosing a Replacement FRU

This section describes the diagnosis function for checking whether a replacement FRU is operating normally. For details on the commands, see the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 XSCF Reference Manual* of the XCP firmware version used.

1. **Log in to the XSCF shell.**

2. **Execute the testsb command.**
   The testsb command is used to perform an initial diagnosis of the specified physical system board (PSB). The PSB is powered on and off during the diagnosis. You can check the mounting of HDDs, SSDs, and PCIe cards by specifying options.

   In the following example, an initial diagnosis of a PSB and a check of the connected I/O are performed.

   <Description of options>

-v: Additionally displays a detailed message from the initial diagnosis.

-p: During diagnosis processing, executes the "probe-scsi-all" command of the OpenBoot PROM and displays the result.

-s: During diagnosis processing, executes the "show-devs" command of the OpenBoot PROM and displays the result.

-a: Diagnoses all the mounted PSBs.

```
XSCF> testsb -v -p -s -a -y
Initial diagnosis is about to start, Continue?[y|n] :y
PSB power on sequence started.
POST Sequence 01 Banner
 :

<<Displayed execution results of "probe-scsi-all">>
/pci@8100/pci@4/pci@0/pci@0/scsi@0

FCode Version 1.00.56, MPT Version 2.00, Firmware Version 20.00.10.00

Target a
  Unit 0   Disk   TOSHIBA  AL13SEB600AL14SE 3702    1172123568 Blocks, 600 GB
  SASDeviceName 500003970830e04d  SASAddress 500003970830e04e  PhyNum 0
Target b
  Unit 0   Encl Serv device   FUJITSU  NBBEXP           1303
  SASAddress 500000e0e0d0097d  PhyNum 14
 :

<<Displayed execution results of "show-devs">>
/pci@8300/pci@4
/pci@8300/pci@4/pci@0
/pci@8300/pci@4/pci@0/pci@1
/pci@8200/pci@4
/pci@8200/pci@4/pci@0
/pci@8200/pci@4/pci@0/pci@8
/pci@8200/pci@4/pci@0/pci@0
/pci@8200/pci@4/pci@0/pci@0/network@0,1
/pci@8200/pci@4/pci@0/pci@0/network@0
 :
PSB  Test    Fault
---- ------- --------
00-0 Passed  Normal
```

3. **From the execution result of "probe-scsi-all", confirm that the mounted HDDs/SSDs are recognized.**

4. **From the execution result of "show-devs", confirm that the mounted PCIe cards are recognized.**

5. **From the execution result of the initial diagnosis, confirm that "Passed" and "Normal" are displayed for all the PSBs.**

6.5 Restoring Setting Information and Configuration Information

6.5.1 Restoring XSCF Setting Information

This section describes how to restore the XSCF setting information saved on the USB device in "5.6.1　Saving XSCF Setting Information."

1. **Log in to the XSCF shell.**

2. **Execute the restoreconfig command to restore the XSCF setting information.**

```
XSCF> restoreconfig -V file:///media/usb_msd/backup-file.txt
```

For details, see "10.10　Saving/Restoring XSCF Settings Information" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.

6.5.2 Restoring Logical Domain Configuration Information and OpenBoot PROM Environment Variables

Reflect the setting of the XML file saved in "5.6.2　Saving Logical Domain Configuration Information and OpenBoot PROM Environment Variables," execute the shutdown command, and restart the control domain.

The following shows the procedure for restoring the saved logical domain configuration information.

1. **Confirm that the current logical domain configuration is factory-default.**

```
primary# ldm list-config | grep "factory-default"
factory-default [current]
```

If [current] does not appear beside "factory-default," the current logical domain configuration is not factory-default. In such a case, follow the procedure below to change the current logical domain configuration to factory-default.

a. Execute the ldm set-spconfig command with "factory-default" specified.

```
primary# ldm set-spconfig factory-default
```

b. Execute the poweroff command of the XSCF firmware and turn off the power to the physical partition.

```
XSCF> poweroff -p ppar_id
```

2. **The OpenBoot PROM environment variables are initialized. So, reset it to the original values.**
   a. To stop in the OpenBoot PROM state, confirm "auto-boot?" out of the OpenBoot PROM environment variables.
      If the value is "true", change it to "false".

```
XSCF> setpparparam -p 0 -s bootscript "setenv auto-boot? false"
PPAR-ID of PPARs that will be affected:0
OpenBoot PROM variable bootscript will be changed.
Continue? [y|n] :y
```

   b. If you change the setting, confirm the OpenBoot PROM environment variables.

```
XSCF> showpparparam -p 0
use-nvramrc :-
security-mode :-
bootscript :
setenv auto-boot? false
```

   c. Execute the poweron command to restart the physical partition.

```
XSCF> poweron -p 0
```

   d. Execute the showdomainstatus command to check the status of the control domain.
      Confirm that the status of the control domain is displayed as "OpenBoot Running" indicating that it is in the OpenBoot PROM state.

```
XSCF> showdomainstatus -p 0
Logical Domain Name   Status
primary               OpenBoot Running
```

   e. Execute the console command to switch to the control domain console.

```
XSCF> console -p 0 -y
Console contents may be logged.
Connect to PPAR-ID 0?[y|n] :y
```

   f. Restore the OpenBoot PROM environment variables based on the record saved in "5.6.2   Saving Logical Domain Configuration Information and OpenBoot PROM Environment Variables."
      The following example restores the boot-device to "/pci@8100/pci@4/pci@0/pci@0/scsi@0/disk@p0,0".

```
{0} ok setenv boot-device /pci@8100/pci@4/pci@0/pci@0/scsi@0/disk@p0,0
boot-device = /pci@8100/pci@4/pci@0/pci@0/scsi@0/disk@p0,0
{0} ok printenv boot-device
boot-device = /pci@8100/pci@4/pci@0/pci@0/scsi@0/disk@p0,0
```

The following example restores "auto-boot?" to "true."

```
{0} ok setenv auto-boot? true
auto-boot? = true
{0} ok printenv auto-boot?
auto-boot? = true
```

3. **Boot Oracle Solaris.**

```
{0} ok boot
```

4. **On Oracle Solaris super user prompt, confirm that the system started with factory-default.**

```
primary# ldm ls-spconfig
factory-default [current]
```

5. **Execute the ldm init-system command to reflect the setting in the saved XML file.**
    This is an example of restoring configuration information saved in /ldm-set1.xml.

```
primary# ldm init-system -i /ldm-set1.xml
Initiating a delayed reconfiguration operation on the primary
domain.
All configuration changes for other domains are disabled until
the primary
domain reboots, at which time the new configuration for the
primary domain
will also take effect.
```

6. **Execute the shutdown command, and restart the control domain.**

```
primary# shutdown -y -g0 -i6
```

7. **Bind resources to a physical domain other than the control domain, and start the domain.**
    In the following example, the user binds resources to ldom1 and starts it.

```
primary# ldm bind ldom1
primary# ldm start ldom1
```

Note - If the virtual function (VF) is lent to the logical domains by using the SR-IOV function, the configuration of the virtual function may not be restored. Execute the ldm command to manually restore the virtual function that was not restored.
The following is an example.

```
primary# ldm create-vf /SYS/PCI1/IOVNET.PF0
primary# ldm add-io /SYS/PCI1/IOVNET.PF0.VF0 ldom1
```

8. **Execute the ldm add-spconfig command to save the logical domain configuration information.**
    To save configuration information under the same name, execute rm-config to delete it once, and then save it.

6.6   Incorporating the HDD/SSD

This section describes the flow of the procedure to incorporate a HDD/SSD by using the hot plug function.
To use the hot plug function, the hotplug service of Oracle Solaris needs to be enabled. Check the status of the service. If it is disabled, enable the hotplug service in the following procedure. The hot plug function is available only on the control domain and root domain.

```
# svcs hotplug ← If the STATE is disabled, enable the service.
# svcadm enable hotplug ← Enables the hotplug service.
```

For details on the cfgadm command used here, see "Chapter 2 Dynamically Configuring Devices" in the *Managing Devices in Oracle Solaris 11.2* or "Dynamically Configuring Devices (Tasks)" in the *Oracle Solaris Administration: Devices and File Systems*.

1. **Log in as a super user to Oracle Solaris on the logical domain (control domain or root domain) into which the target HDD/SSD is to be incorporated.**

2. **If the hotplug service is disabled for the logical domain (control domain or root domain) into which the target HDD/SSD is to be incorporated, execute the svcadm enable command to enable the hotplug service.**

```
# svcadm enable hotplug
```

3. **Execute the cfgadm command to check the status of the incorporated HDD/SSD.**
    With the cfgadm -al command, confirm that the Ap_ID of the replacement HDD/SSD has changed.

    Confirm that Occupant shows "configured." If it does not show "configured," perform step 4.

```
# cfgadm -al
Ap_Id                           Type       Receptacle Occupant
Condition
 <Omitted>
c2                              scsi-sas   connected configured
unknown
c2::dsk/c2t50000394281B50C6d0 disk         connected configured
unknown
c2::es/ses0                     ESI        connected configured
unknown
c2::smp/expd0                   smp        connected configured
unknown
c3                              scsi-sas   connected unconfigured
unknown
c4                              scsi-sas   connected unconfigured
unknown
c5                              fc         connected unconfigured
unknown
c6                              fc         connected unconfigured
unknown
c7                              scsi-sas   connected unconfigured
unknown
  <Omitted>
```

4. **If the system does not recognize the incorporated HDD/SSD, make it recognized in the system.**
   a. Execute the cfgadm -c configure command to incorporate the target HDD/SSD into the logical domain.

```
# cfgadm -c configure Ap_Id
```

   b. With the cfgadm -al command, check the status of the HDD/SSD.

5. **If the CHECK LED on the mounted HDD/SSD is not off, execute the cfgadm -x command to turn off the CHECK LED on that HDD/SSD.**

```
# cfgadm -x led=fault,mode=off Ap_Id
```

6. **If you enabled the hotplug service, execute the svcadm disable command to disable the hotplug service.**

```
# svcadm disable hotplug
```

7. **Assign the I/O device of the incorporated HDD/SSD to the logical domain.**
   To configure the hardware RAID by adding a new HDD/SSD, see "14.2 Configuring Hardware RAID" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.

6.7 Checking the FRU Status After Maintenance

This section describes the procedure for confirming that the FRU is operating normally after the completion of maintenance.

1. **Log in to the XSCF shell.**

2. **Execute the showstatus command.**
   Nothing is displayed in the normal state.

```
XSCF> showstatus
```

3. **Execute the showlogs error command.**
   Confirm that no new errors are displayed.

```
XSCF> showlogs error
```

4. **Execute the showhardconf command.**
   Confirm that no asterisk (*) is displayed in front of any FRU.

```
XSCF> showhardconf
SPARC M12-1;
    + Serial:TZ41702002; Operator_Panel_Switch:Service;
    + System_Power:Off; System_Phase:Cabinet Power Off;
    Partition#0 PPAR_Status:Powered Off;
    MBU Status:Normal; Ver:900eh; Serial:TZ1701D01A  ;
        + FRU-Part-Number:CA08208-D001 A0   /9999999
  ;
        + Power_Supply_System: ;
        + Memory_Size:64 GB; Type: C ;
        CPU#0 Status:Normal; Ver:4242h; Serial:00070390;
            + Freq:3.200 GHz; Type:0x30;
            + Core:6; Strand:8;
        MEM#00A Status:Normal;
            + Code:2c800f18ASF2G72PZ-2G3B1   31-1221E918;
            + Type:83; Size:16 GB;
        MEM#01A Status:Normal;
            + Code:2c800f18ASF2G72PZ-2G3B1   31-1221E8E3;
            + Type:83; Size:16 GB;
        MEM#02A Status:Normal;
            + Code:2c800f18ASF2G72PZ-2G3B1   31-1221E917;
            + Type:83; Size:16 GB;
```

6.8 Returning the Mode Switch to Locked Mode

1. **Return the mode switch of the operation panel to Locked mode.**
   For details, see "2.3.2　Control Function of the Operation Panel."

6.9 Starting the System

This section describes the procedure for starting the system.
The system can be started in either of the following two ways:

- Starting the System With an XSCF Command
- Starting the System From the Operation Panel

6.9.1 Starting the System With an XSCF Command

1. **Confirm that the XSCF STANDBY LED on the operation panel is on.**

2. **Log in to the XSCF shell.**

3. **Execute the poweron command.**
   Enter "y" in response to the confirmation message.

```
XSCF> poweron -a
PPAR-IDs to power on:00
Continue? [y|n] :y
00 : Powering on
```

4. **Confirm that the POWER LED on the operation panel is on.**

5. **Execute the showpparstatus command to confirm that the power to the physical partition is turned on.**

```
XSCF> showpparstatus -p 0
PPAR-ID PPAR Status
00      Running
```

6. **Execute the fmadm faulty command on the logical domains where an error is detected to confirm that no errors remain.**

```
# fmadm faulty
```

If any error remains, execute the fmadm repaired command to clear the error.

6.9.2 Starting the System From the Operation Panel

1. **Confirm that the XSCF STANDBY LED on the operation panel is on.**
2. **Press the power switch on the operation panel for 1 second or more (less than 4 seconds).**
   For details, see "2.3.2   Control Function of the Operation Panel."
3. **Confirm that the POWER LED on the operation panel is on.**
4. **Log in to the XSCF shell.**
5. **Execute the showpparstatus command to confirm that the power to the physical partition is turned on.**

```
XSCF> showpparstatus -p 0
PPAR-ID PPAR Status
00      Running
```

6. **Execute the fmadm faulty command on the logical domains where an error is detected to confirm that no errors remain.**

```
# fmadm faulty
```

If any error remains, execute the fmadm repaired command to clear the error.

Chapter 7

Maintenance Flow

This chapter describes the maintenance workflow.

Be sure to check the notes on FRUs requiring maintenance in the *Fujitsu SPARC M12 Product Notes* for the latest XCP version.

- Maintenance Workflow
- FRU Replacement Workflow
- FRU Addition Workflow
- FRU Removal Workflow

7.1 Maintenance Workflow

Table 7-1   Maintenance Workflow

Item	Procedure	Reference
1	Identifying the FRU to be replaced	"4.2.2 Identifying a Failure"
2	Checking the available maintenance types (*1)	"Table 7-2 Maintenance Types for FRUs"
3	Active maintenance	
3-a	Active replacement	"7.2.1 Active Replacement"
3-b	Active addition	"7.3.1 Active Addition"
3-c	Active removal	"7.4.1 Active Removal"
4	System-stopped maintenance	
4-a	System-stopped replacement	"7.2.2 System-Stopped Replacement"
4-b	System-stopped addition	"7.3.2 System-Stopped Addition"

Table 7-1 Maintenance Workflow *(continued)*

Item	Procedure	Reference
4-c	System-stopped removal	"7.4.2 System-Stopped Removal"

*1 The configuration of the system requiring maintenance and the FRU to be replaced may affect system operation, such as in maintenance time and in stopping the logical domains. Consult with the system administrator to decide the maintenance type to be used.

Table 7-2 Maintenance Types for FRUs

-: Maintenance cannot be performed.

FRU	Active/Hot Maintenance	System-Stopped (Inactive)/Hot Maintenance	System-Stopped (Inactive)/Cold Maintenance	Reference
PCIe card	- (*1)	- (*1)	OK	Chapter 8
HDD/SSD	OK (*2)	OK	OK	Chapter 9
HDDBP	-	-	OK	Chapter 10
PSU	OK (*3)	OK (*3)	OK	Chapter 11
PSUBP	-	-	OK	Chapter 12
Cable kit	-	-	OK	Chapter 13
OPNL	-	-	OK	Chapter 14
FANU	OK	OK	OK	Chapter 15
MBU	-	-	OK	Chapter 16
Memory	-	-	OK	Chapter 16

*1 Active/Hot maintenance and system-stopped (inactive)/hot maintenance can be performed on PCIe cards mounted in the PCI expansion unit. For details, see "3.3 Types of Maintenance for the PCIe Card" in the *PCI Expansion Unit for Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Service Manual*.
*2 Only internal storage in devices other than the boot device can be replaced or removed. However, if the boot device has a redundant configuration (hardware RAID configuration), active/hot maintenance can be performed also on the HDD in the boot device.
*3 If the XSCF startup mode is high-speed mode, hardware cannot be replaced using the replacefru command. Perform system-stopped (inactive)/cold maintenance.

7.2 FRU Replacement Workflow

This section describes the replacement workflow for the following FRUs of the SPARC M12-1:

- PCIe card
- MBU

- Memory

- HDD/SSD

- FANU

- PSU

- PSUBP

- HDDBP

- OPNL

- Cable kit

7.2.1 Active Replacement

This section describes the workflows for active/hot FRU replacement. References to detailed descriptions are written in the work procedure tables. See any of them as required.

Note - If the XSCF startup mode is high-speed mode, hardware cannot be replaced using the replacefru command. Replace hardware by performing system-stopped/cold replacement.

Active replacement on the SPARC M12-1 has the following patterns:

- Active/Hot replacement (PSU and FANU)
- Active/Hot replacement (for an HDD in a hardware RAID configuration)
- Active/Hot replacement (for an HDD/SSD not in a hardware RAID configuration)

Active/Hot replacement (PSU and FANU)

Active/Hot replacement can be performed on a PSU and FANU. Perform the following procedure to replace the unit.

Figure 7-1　　Active/Hot Replacement Flow (PSU and FANU)

Table 7-3　　Active/Hot Replacement Work Procedure (PSU and FANU)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Checking the operating condition of the system	"5.3.1　Checking the Operating Condition of a Physical Partition or Logical Domain"
3	Releasing a faulty FRU from the system	"5.7　Releasing a FRU From the System With the replacefru Command"
4	Replacing the faulty FRU	"Chapter 11　Maintaining the Power Supply Units" "Chapter 15　Maintaining the Fan Units"
5	Incorporating the replacement FRU into the system	"6.2　Incorporating a FRU Into the System With the replacefru Command"
6	Confirming that there is no problem with the replacement FRU	"6.7　Checking the FRU Status After Maintenance"
7	Closing the rack door	

Active/Hot replacement (for an HDD in a hardware RAID configuration)

Active/Hot replacement can be performed on an HDD. If the HDD is in a hardware RAID configuration, perform the following procedure to replace it.

Figure 7-2   Active/Hot Replacement Flow (for an HDD in a Hardware RAID Configuration)

Table 7-4   Active/Hot Replacement Work Procedure (for an HDD in a Hardware RAID Configuration)

Item	Work procedure	Reference
1	Opening the rack door	
2	Identifying a faulty HDD	"14.2.9 Checking for a Failed Disk Drive" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide* "14.2.3 Precautions Concerning Hardware RAID" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*
3	Checking whether the faulty HDD is disconnected from the hardware RAID volume	"14.2.8 Checking the Status of a Hardware RAID Volume and a Disk Drive" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*

Table 7-4 Active/Hot Replacement Work Procedure (for an HDD in a Hardware RAID Configuration) *(continued)*

Item	Work procedure	Reference
4	(If not disconnected from the hardware RAID volume) Disconnecting the faulty HDD from the hardware RAID volume (*1)	"F.9 Disconnecting a Disk Drive From the Hardware RAID Volume" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*
5	Replacing a faulty HDD	"14.2.10 Replacing a Failed Disk Drive" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide* "Chapter 9 Maintaining Internal Storage"
6	Confirming that there is no problem with the replacement HDD	"6.7 Checking the FRU Status After Maintenance"
7	Closing the rack door	

*1 Disconnect the HDD to be replaced from the hardware RAID volume by using the sas2ircu setoffline command of the SAS2IRCU utility. For the conditions to use the sas2ircu setoffline command, see "Notes on the SAS-2 Integrated RAID Configuration Utility" in the latest version of the *Fujitsu SPARC M12 Product Notes*.

Active/Hot replacement (for an HDD/SSD not in a hardware RAID configuration)

Active/Hot replacement can be performed on an HDD/SSD. If the HDD/SSD is not in a hardware RAID configuration, perform the following procedure to replace it.

Figure 7-3   Active/Hot Replacement Flow (for an HDD/SSD Not in a Hardware RAID Configuration)

```
┌─────────────────────────────────────────────┐
│ 1. Opening the rack door                     │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 2. Checking the operating condition of the   │
│    system and the I/O device usage status    │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 3. Releasing a faulty HDD/SSD from the system │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 4. Replacing the faulty HDD/SSD              │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 5. Incorporating the replacement HDD/SSD     │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 6. Confirming that there is no problem with the │
│    replacement HDD/SSD                       │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 7. Closing the rack door                     │
└─────────────────────────────────────────────┘
                      ↓
        (      Maintenance complete      )
```
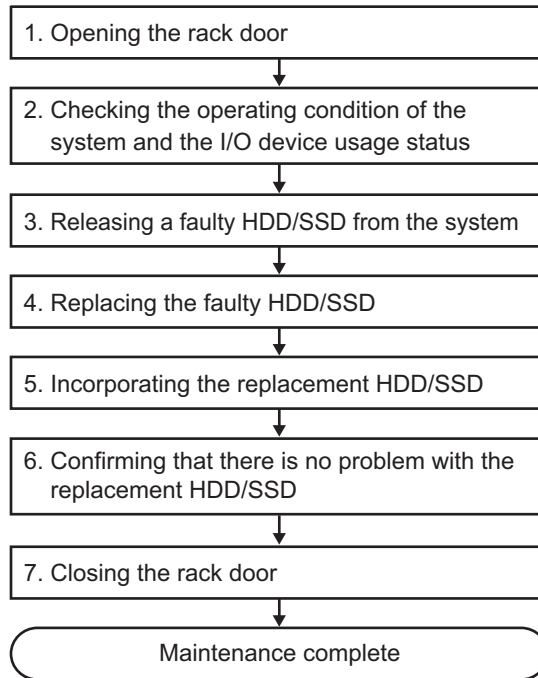
Table 7-5   Active/Hot Replacement Work Procedure (for an HDD/SSD Not in a Hardware RAID Configuration)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
3	Releasing the faulty HDD/SSD from the system	"5.4 Enabling the Removal of a HDD/SSD"
4	Replacing the faulty HDD/SSD	"Chapter 9 Maintaining Internal Storage"
5	Incorporating the replacement HDD/SSD	"6.6 Incorporating the HDD/SSD"
6	Confirming that there is no problem with the replacement HDD/SSD	"6.7 Checking the FRU Status After Maintenance"
7	Closing the rack door	

7.2.2 System-Stopped Replacement

This section describes the workflows for system-stopped/hot and system-stopped/cold FRU replacement. References to detailed descriptions are written in the workflow. See any of them as required.

Note - If the XSCF startup mode is high-speed mode, hardware cannot be replaced using the replacefru command. Replace hardware by performing system-stopped/cold replacement.

System-stopped replacement on the SPARC M12-1 has the following patterns:

- System-stopped/hot replacement (PSU and FANU)
- System-stopped/hot replacement (HDD/SSD)
- System-stopped/cold replacement

System-stopped/hot replacement (PSU and FANU)

System-stopped/hot replacement can be performed on a PSU and FANU. Perform the following procedure to replace the unit.

Figure 7-4   System-Stopped/Hot Replacement Flow (PSU and FANU)

```
┌─────────────────────────────────────────────┐
│ 1. Opening the rack door                     │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 2. Switching the mode switch on the operation│
│    panel to Service mode                     │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 3. Checking the operating condition of the system │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 4. Stopping the system                       │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 5. Releasing a faulty FRU from the system    │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 6. Replacing a faulty FRU                    │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 7. Incorporating the replacement FRU into the│
│    system                                    │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 8. Confirming that there is no problem with the │
│    replacement FRU                           │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 9. Returning the mode switch on the operation│
│    panel to Locked mode                      │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 10. Starting the system                      │
└─────────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────────┐
│ 11. Closing the rack door                    │
└─────────────────────────────────────────────┘
                    ↓
       (      Maintenance complete      )
```

Table 7-6 System-Stopped/Hot Replacement Work Procedure (PSU and FANU)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Switching the mode switch on the operation panel to Service mode	"5.2 Switching the Mode Switch to Service Mode"
3	Checking the operating condition of the system	"5.3.1 Checking the Operating Condition of a Physical Partition or Logical Domain"
4	Stopping the system	"5.5 Stopping the Entire System"
5	Releasing a faulty FRU from the system	"5.7 Releasing a FRU From the System With the replacefru Command"
6	Replacing the faulty FRU	"Chapter 11 Maintaining the Power Supply Units" "Chapter 15 Maintaining the Fan Units"
7	Incorporating the replacement FRU into the system	"6.2 Incorporating a FRU Into the System With the replacefru Command"
8	Confirming that there is no problem with the replacement FRU	"6.7 Checking the FRU Status After Maintenance"
9	Returning the mode switch on the operation panel to Locked mode	"6.8 Returning the Mode Switch to Locked Mode"
10	Starting the system	"6.9 Starting the System"
11	Closing the rack door	

System-stopped/hot replacement (HDD/SSD)

System-stopped/hot replacement can be performed on an HDD/SSD. Perform the following procedure to replace the unit.

Figure 7-5　　System-Stopped/Hot Replacement Flow (HDD/SSD)

```
┌─────────────────────────────────────────┐
│ 1. Opening the rack door                 │
└─────────────────────────────────────────┘
                   ↓
┌─────────────────────────────────────────┐
│ 2. Switching the mode switch on the      │
│    operation panel to Service mode       │
└─────────────────────────────────────────┘
                   ↓
┌─────────────────────────────────────────┐
│ 3. Checking the operating condition of   │
│    the system and the I/O device usage   │
│    status                                │
└─────────────────────────────────────────┘
                   ↓
┌─────────────────────────────────────────┐
│ 4. Stopping the system                   │
└─────────────────────────────────────────┘
                   ↓
┌─────────────────────────────────────────┐
│ 5. Replacing a faulty FRU                │
└─────────────────────────────────────────┘
                   ↓
┌─────────────────────────────────────────┐
│ 6. Performing a diagnosis test           │
└─────────────────────────────────────────┘
                   ↓
┌─────────────────────────────────────────┐
│ 7. Confirming that there is no problem   │
│    with the replacement FRU              │
└─────────────────────────────────────────┘
                   ↓
┌─────────────────────────────────────────┐
│ 8. Returning the mode switch on the      │
│    operation panel to Locked mode        │
└─────────────────────────────────────────┘
                   ↓
┌─────────────────────────────────────────┐
│ 9. Starting the system                   │
└─────────────────────────────────────────┘
                   ↓
┌─────────────────────────────────────────┐
│ 10. Closing the rack door                │
└─────────────────────────────────────────┘
                   ↓
        (  Maintenance complete  )
```

Table 7-7   System-Stopped/Hot Replacement Work Procedure (HDD/SSD)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Switching the mode switch on the operation panel to Service mode	"5.2 Switching the Mode Switch to Service Mode"
3	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
4	Stopping the system	"5.5 Stopping the Entire System"
5	Replacing the faulty FRU	"Chapter 9 Maintaining Internal Storage"
6	Performing a diagnosis test	"6.4 Diagnosing a Replacement FRU"
7	Confirming that there is no problem with the replacement FRU	"6.7 Checking the FRU Status After Maintenance"
8	Returning the mode switch on the operation panel to Locked mode	"6.8 Returning the Mode Switch to Locked Mode"
9	Starting the system	"6.9 Starting the System"
10	Closing the rack door	

System-stopped/cold replacement

System-stopped/cold replacement can be performed on the following FRUs:

- PCIe card
- MBU
- Memory
- HDD/SSD
- FANU
- PSU
- PSUBP
- HDDBP
- OPNL
- Cable kit

Perform the following procedure to replace the unit.

Figure 7-6   System-Stopped/Cold Replacement Flow

```
┌─────────────────────────────────────────┐
│ 1. Opening the rack door                 │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 2. Switching the mode switch on the operation │
│    panel to Service mode                 │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 3. Checking the operating condition of the │
│    system and the I/O device usage status │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 4. Stopping the system                   │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 5. Removing the power cords              │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 6. Replacing a faulty FRU                │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 7. Installing the power cords            │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 8. Restoring the system after replacing the MBU │
│    or PSUBP                              │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 9. Performing a diagnosis test           │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 10. Confirming that there is no problem with the │
│     replacement FRU                      │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 11. Returning the mode switch on the operation │
│     panel to Locked mode                 │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 12. Starting the system                  │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ 13. Closing the rack door                │
└─────────────────────────────────────────┘
                    ↓
          ( Maintenance complete )
```

Table 7-8   System-Stopped/Cold Replacement Work Procedure

Item	Work Procedure	Reference
1	Opening the rack door	
2	Switching the mode switch on the operation panel to Service mode	"5.2 Switching the Mode Switch to Service Mode"
3	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
4	Stopping the system	"5.5 Stopping the Entire System"
5	Removing the power cords	"5.8.1 Removing the Power Cords"
6	Replacing the faulty FRU	See the maintenance procedure for each FRU. "Chapter 8 Maintaining the PCI Express Cards" "Chapter 9 Maintaining Internal Storage" "Chapter 10 Maintaining the HDD Backplane" "Chapter 11 Maintaining the Power Supply Units" "Chapter 12 Maintaining the PSU Backplane" (*1) "Chapter 13 Maintaining the Cable Kit" "Chapter 14 Maintaining the Operation Panel" "Chapter 15 Maintaining the Fan Units" "Chapter 16 Maintaining the Motherboard Unit/Memory" (*1)(*2)
7	Installing the power cords	"6.1.6 Installing the Power Cords"
8	Restoring the system after replacing the MBU or PSUBP	"6.3 When Replacing the MBU/PSUBP" (*3)
9	Performing a diagnosis test	"6.4 Diagnosing a Replacement FRU"
10	Confirming that there is no problem with the replacement FRU	"6.7 Checking the FRU Status After Maintenance"
11	Returning the mode switch on the operation panel to Locked mode	"6.8 Returning the Mode Switch to Locked Mode"
12	Starting the system	"6.9 Starting the System"
13	Closing the rack door	

*1 Simultaneous replacement of the MBU and PSUBP is prohibited. To replace the MBU and PSUBP, first replace either of the units and perform the work up to "10. Confirming that there is no problem with the replacement FRU." Then, return to "6. Replacing the faulty FRU," and replace the other unit.
*2 If the motherboard unit is replaced in a system with an HDD used in a RAID volume configuration for a hardware RAID, you need to reactivate the hardware RAID volume before performing the work in "12. Starting the system." For details, see "14.2.11   Re-enabling a Hardware RAID Volume" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.
*3 For details, see "Notes on Maintenance of a CPU Memory Unit, Motherboard Unit, XSCF Unit, PSU Backplane, or Crossbar Backplane Unit" in the *Fujitsu SPARC M12 Product Notes* for the latest XCP version.

7.3　FRU Addition Workflow

This section describes the addition workflow for the following FRUs of the SPARC M12-1:

- PCIe card
- Memory
- HDD/SSD

7.3.1　Active Addition

This section describes the workflow for active/hot FRU addition. References to detailed descriptions are written in the workflow. See any of them as required.

Active addition on the SPARC M12-1 has the following patterns:

- Active/Hot addition (HDD/SSD)

Active/Hot addition (HDD/SSD)

Active/Hot addition can be performed on an HDD/SSD. Perform the following procedure to add the unit.

Figure 7-7　　Active/Hot Addition Flow (HDD/SSD)


```
┌─────────────────────────────────────┐
│ 1. Opening the rack door            │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│ 2. Checking the operating condition of the │
│    system and the I/O device usage status  │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│ 3. Mounting an HDD/SSD              │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│ 4. Incorporating the HDD/SSD by using the hot │
│    plug function                            │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│ 5. Confirming that there is no problem with the │
│    installed FRU                            │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│ 6. Closing the rack door            │
└─────────────────────────────────────┘
                  ↓
(         Addition complete          )
```
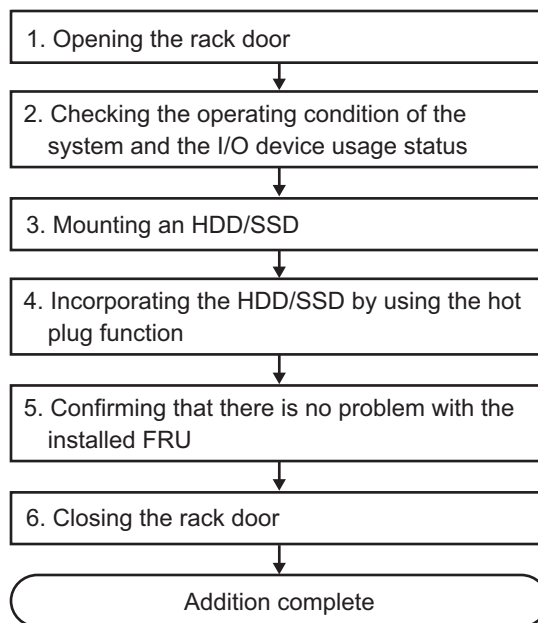
Table 7-9 Active/Hot Addition Work Procedures (HDD/SSD)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
3	Mounting the HDD/SSD	"Chapter 9 Maintaining Internal Storage"
4	Incorporating the HDD/SSD by using the hot plug function	"6.6 Incorporating the HDD/SSD"
5	Confirming that there is no problem with the added FRU	"6.7 Checking the FRU Status After Maintenance"
6	Closing the rack door	

7.3.2   System-Stopped Addition

This section describes the workflows for system-stopped/hot and system-stopped/cold FRU addition. References to detailed descriptions are written in the workflow. See any of them as required.

System-stopped addition on the SPARC M12-1 has the following patterns:

- System-stopped/hot addition (HDD/SSD)
- System-Stopped/Cold Addition (Memory)
- System-stopped/cold addition

System-stopped/hot addition (HDD/SSD)

System-stopped/hot addition can be performed on an HDD/SSD. Perform the following procedure to add the unit.
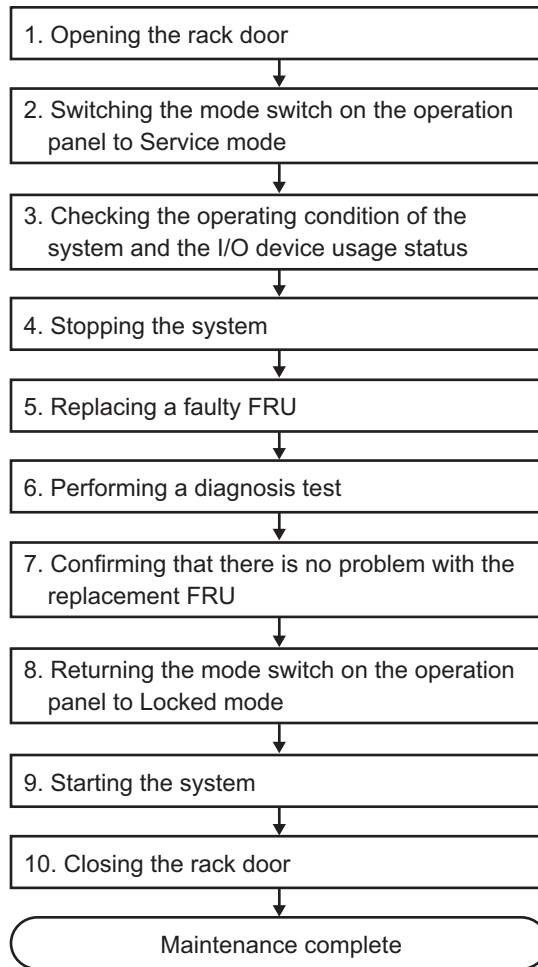
Figure 7-8   System-Stopped/Hot Addition Flow (HDD/SSD)

```
┌─────────────────────────────────────────────┐
│ 1. Opening the rack door                     │
└─────────────────────────────────────────────┘
                       ↓
┌─────────────────────────────────────────────┐
│ 2. Switching the mode switch on the operation│
│    panel to Service mode                     │
└─────────────────────────────────────────────┘
                       ↓
┌─────────────────────────────────────────────┐
│ 3. Checking the operating condition of the   │
│    system and the I/O device usage status    │
└─────────────────────────────────────────────┘
                       ↓
┌─────────────────────────────────────────────┐
│ 4. Stopping the system                       │
└─────────────────────────────────────────────┘
                       ↓
┌─────────────────────────────────────────────┐
│ 5. Adding an HDD/SSD                         │
└─────────────────────────────────────────────┘
                       ↓
┌─────────────────────────────────────────────┐
│ 6. Performing a diagnosis test               │
└─────────────────────────────────────────────┘
                       ↓
┌─────────────────────────────────────────────┐
│ 7. Confirming that there is no problem with  │
│    the installed FRU                         │
└─────────────────────────────────────────────┘
                       ↓
┌─────────────────────────────────────────────┐
│ 8. Returning the mode switch on the operation│
│    panel to Locked mode                      │
└─────────────────────────────────────────────┘
                       ↓
┌─────────────────────────────────────────────┐
│ 9. Starting the system                       │
└─────────────────────────────────────────────┘
                       ↓
┌─────────────────────────────────────────────┐
│ 10. Closing the rack door                    │
└─────────────────────────────────────────────┘
                       ↓
(          Addition complete          )
```

Table 7-10   System-Stopped/Hot Addition Work Procedure (HDD/SSD)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Switching the mode switch on the operation panel to Service mode	"5.2 Switching the Mode Switch to Service Mode"
3	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
4	Stopping the system	"5.5 Stopping the Entire System"
5	Adding an HDD/SSD	"Chapter 9 Maintaining Internal Storage"
6	Performing a diagnosis test	"6.4 Diagnosing a Replacement FRU"
7	Confirming that there is no problem with the added FRU	"6.7 Checking the FRU Status After Maintenance"
8	Returning the mode switch on the operation panel to Locked mode	"6.8 Returning the Mode Switch to Locked Mode"
9	Starting the system	"6.9 Starting the System"
10	Closing the rack door	

System-Stopped/Cold Addition (Memory)

System-stopped/cold addition can be performed on memory. Perform the following procedure to add the unit.

Figure 7-9   System-Stopped/Cold Addition Flow (Memory)

```
┌─────────────────────────────────────────────┐
│ 1. Opening the rack door                     │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 2. Switching the mode switch on the operation│
│    panel to Service mode                     │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 3. Checking the operation condition of the   │
│    system and the I/O device usage status    │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 4. Stopping the system                       │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 5. Removing the power cords                  │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 6. Installing memory                         │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 7. Installing the power cords                │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 8. Performing a diagnosis test               │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 9. Confirming that there is no problem with  │
│    the installed memory                      │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 10. Returning the mode switch on the operation│
│     panel to Locked mode                     │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 11. Starting the system                      │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐
│ 12. Closing the rack door                    │
└─────────────────────────────────────────────┘
                    │
                    ▼
        ╭─────────────────────────────╮
        │      Addition complete      │
        ╰─────────────────────────────╯
```

Table 7-11   System-Stopped/Cold Addition Work Procedure (Memory)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Switching the mode switch on the operation panel to Service mode	"5.2 Switching the Mode Switch to Service Mode"
3	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
4	Stopping the system	"5.5 Stopping the Entire System"
5	Removing the power cords	"5.8.1 Removing the Power Cords"
6	Expanding memory	"16.5.1 Accessing the MBU" "16.6.2 Installing Memory" "16.6.3 Restoring the Server"
7	Installing the power cords	"6.1.6 Installing the Power Cords"
8	Performing a diagnosis test	"6.4 Diagnosing a Replacement FRU"
9	Confirming that there is no problem with the expanded memory	"6.7 Checking the FRU Status After Maintenance"
10	Returning the mode switch on the operation panel to Locked mode	"6.8 Returning the Mode Switch to Locked Mode"
11	Starting the system	"6.9 Starting the System"
12	Closing the rack door	

System-stopped/cold addition

System-stopped/cold addition can be performed on a PCIe card and HDD/SSD. Perform the following procedure to add the unit.

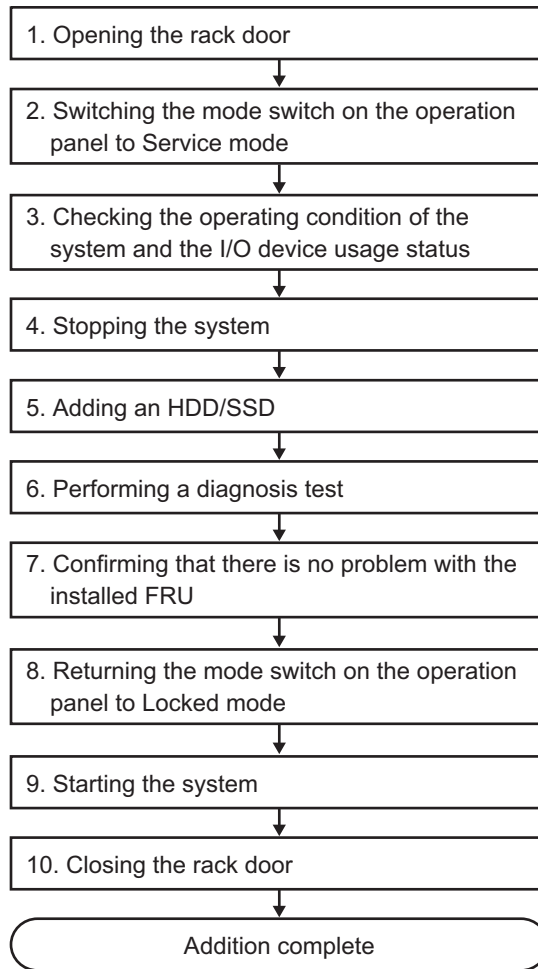Figure 7-10   System-Stopped/Cold Addition Flow

```
┌─────────────────────────────────────────────┐
│ 1. Opening the rack door                     │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 2. Switching the mode switch on the operation│
│     panel to Service mode                    │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 3. Checking the operating condition of the   │
│     system and the I/O device usage status   │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 4. Stopping the system                       │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 5. Removing the power cords                  │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 6. Installing the target FRU                 │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 7. Installing the power cords                │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 8. Performing a diagnosis test               │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 9. Confirming that there is no problem with the│
│     installed FRU                            │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 10. Returning the mode switch on the operation│
│      panel to Locked mode                    │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 11. Starting the system                      │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 12. Closing the rack door                    │
└─────────────────────────────────────────────┘
                      │
                      ▼
           (    Addition complete    )
```

Table 7-12   System-Stopped/Cold Addition Work Procedure

Item	Work Procedure	Reference
1	Opening the rack door	
2	Switching the mode switch on the operation panel to Service mode	"5.2 Switching the Mode Switch to Service Mode"
3	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
4	Stopping the system	"5.5 Stopping the Entire System"
5	Removing the power cords	"5.8.1 Removing the Power Cords"
6	Adding the target FRU	When adding a PCIe card: "Chapter 8 Maintaining the PCI Express Cards" When adding an HDD/SSD: "Chapter 9 Maintaining Internal Storage"
7	Installing the power cords	"6.1.6 Installing the Power Cords"
8	Performing a diagnosis test	"6.4 Diagnosing a Replacement FRU"
9	Confirming that there is no problem with the added FRU	"6.7 Checking the FRU Status After Maintenance"
10	Returning the mode switch on the operation panel to Locked mode	"6.8 Returning the Mode Switch to Locked Mode"
11	Starting the system	"6.9 Starting the System"
12	Closing the rack door	

7.4   FRU Removal Workflow

This section describes the removal workflow for the following FRUs of the SPARC M12-1:

- PCIe card
- Memory
- HDD/SSD

7.4.1   Active Removal

This section describes the workflow for active/hot FRU removal. References to detailed descriptions are written in the workflow. See any of them as required.

Active removal on the SPARC M12-1 has the following patterns:

- Active/Hot removal (HDD/SSD)

Active/Hot removal (HDD/SSD)

You can perform the active/hot removal work for an HDD/SSD only in a RAID configuration. Perform the following procedure to remove the unit.
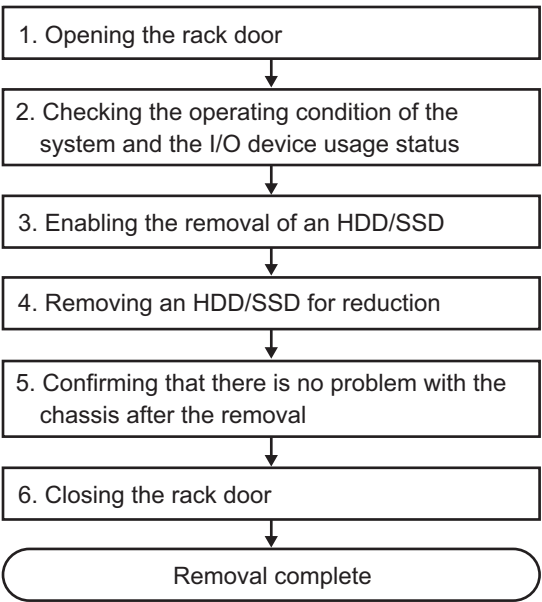
Figure 7-11   Active/Hot Removal Flow (HDD/SSD)

Table 7-13   Active/Hot Removal Work Procedure (HDD/SSD)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
3	Enabling the removal of an HDD/SSD	"5.4 Enabling the Removal of a HDD/SSD"
4	Removing the HDD/SSD for reduction	"Chapter 9 Maintaining Internal Storage"
5	Confirming that there is no problem with the reduced SPARC M12-1	"6.7 Checking the FRU Status After Maintenance"
6	Closing the rack door	

7.4.2 System-Stopped Removal

This section describes the workflows for system-stopped/hot and system-stopped/cold FRU removal. References to detailed descriptions are written in the workflow. See any of them as required.

System-stopped removal on the SPARC M12-1 has the following patterns:

- System-stopped/hot removal (HDD/SSD)
- System-stopped/cold removal (memory)
- System-stopped/cold removal

System-stopped/hot removal (HDD/SSD)

System-stopped/hot removal can be performed on an HDD/SSD. Perform the following procedure to remove the unit.

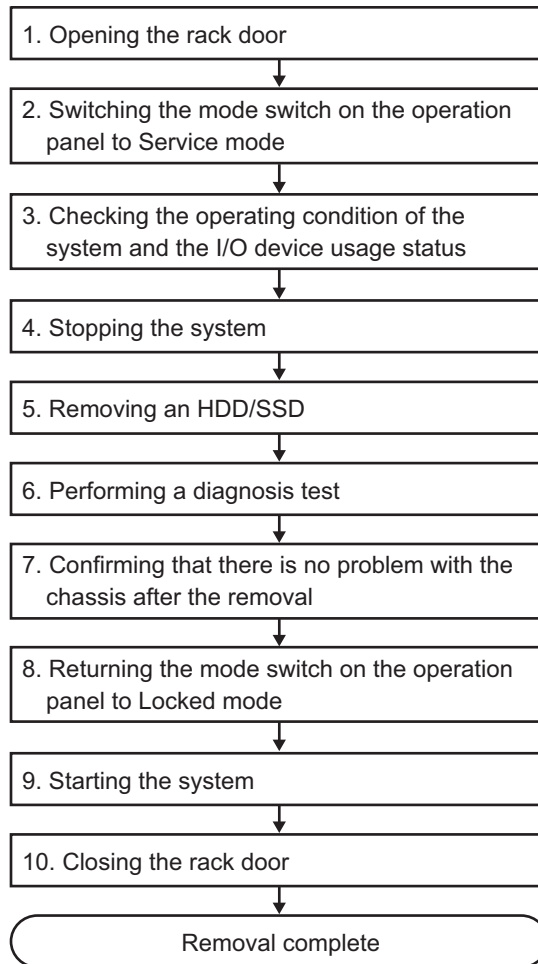Figure 7-12   System-Stopped/Hot Removal Flow (HDD/SSD)

```
┌─────────────────────────────────────────────┐
│ 1. Opening the rack door                      │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 2. Switching the mode switch on the operation │
│    panel to Service mode                      │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 3. Checking the operating condition of the    │
│    system and the I/O device usage status     │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 4. Stopping the system                        │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 5. Removing an HDD/SSD                         │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 6. Performing a diagnosis test                │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 7. Confirming that there is no problem with the│
│    chassis after the removal                  │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 8. Returning the mode switch on the operation  │
│    panel to Locked mode                       │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 9. Starting the system                        │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 10. Closing the rack door                     │
└─────────────────────────────────────────────┘
                      ↓
        (      Removal complete      )
```

Table 7-14　System-Stopped/Hot Removal Work Procedure (HDD/SSD)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Switching the mode switch on the operation panel to Service mode	"5.2　Switching the Mode Switch to Service Mode"
3	Checking the operating condition of the system and the I/O device usage status	"5.3　Checking the Operating Condition and Resource Usage Status"
4	Stopping the system	"5.5　Stopping the Entire System"
5	Removing an HDD/SSD	"Chapter 9　Maintaining Internal Storage"
6	Performing a diagnosis test	"6.4　Diagnosing a Replacement FRU"
7	Confirming that there is no problem with the reduced SPARC M12-1	"6.7　Checking the FRU Status After Maintenance"
8	Returning the mode switch on the operation panel to Locked mode	"6.8　Returning the Mode Switch to Locked Mode"
9	Starting the system	"6.9　Starting the System"
10	Closing the rack door	

System-stopped/cold removal (memory)

System-stopped/cold removal can be performed on memory. Perform the following procedure to remove the unit.

Note - If the memory configuration is changed when a logical domain is used in a configuration other than factory-default, the system may start in the factory-default state of the logical domain configuration of the physical partition. In this case, the OpenBoot PROM environment variables of the control domain will be initialized.
To prepare for this possibility, record the configuration information for the OpenBoot PROM environment variables in the control domain before reducing memory. After you reduce memory, if the logical domain configuration of the physical partition enters the factory-default state, set the OpenBoot PROM environment variables and logical domain configuration again by referring to the recorded information.

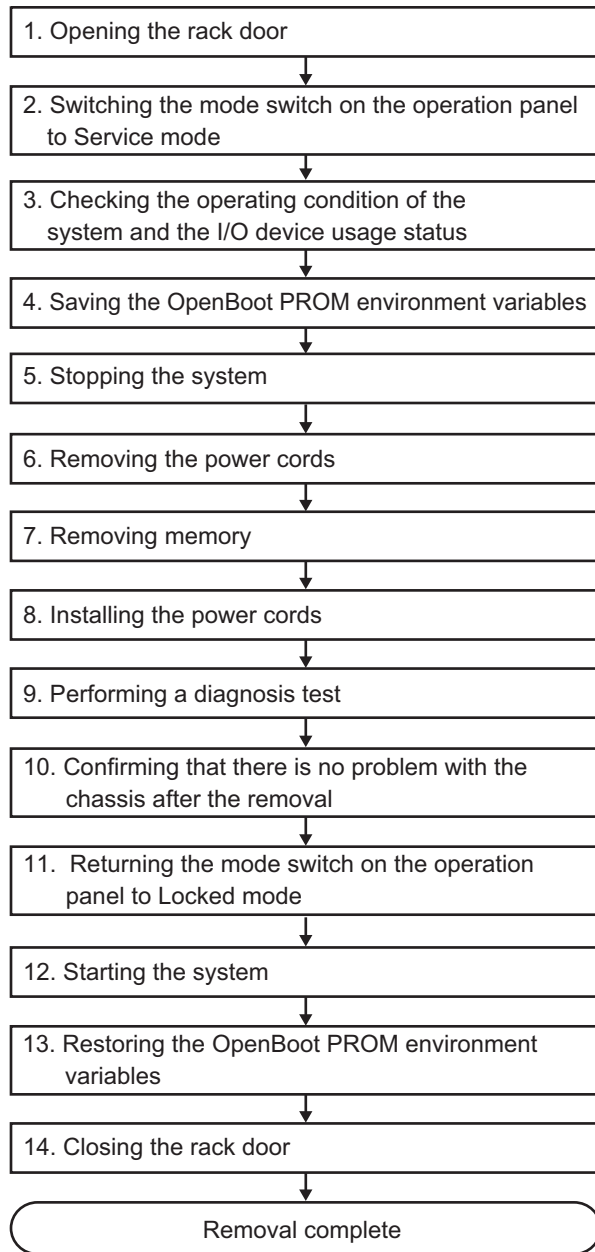Figure 7-13   System-Stopped/Cold Removal Flow (Memory)

```
┌─────────────────────────────────────────────────┐
│ 1. Opening the rack door                        │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 2. Switching the mode switch on the operation panel │
│     to Service mode                             │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 3. Checking the operating condition of the      │
│     system and the I/O device usage status      │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 4. Saving the OpenBoot PROM environment variables │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 5. Stopping the system                          │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 6. Removing the power cords                      │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 7. Removing memory                              │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 8. Installing the power cords                    │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 9. Performing a diagnosis test                   │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 10. Confirming that there is no problem with the │
│      chassis after the removal                  │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 11.  Returning the mode switch on the operation │
│       panel to Locked mode                      │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 12. Starting the system                         │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 13. Restoring the OpenBoot PROM environment     │
│      variables                                  │
└─────────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────────┐
│ 14. Closing the rack door                       │
└─────────────────────────────────────────────────┘
                      ↓
            (  Removal complete  )
```

Table 7-15   System-Stopped/Cold Removal Work Procedure (Memory)

Item	Work Procedure	Reference
1	Opening the rack door	
2	Switching the mode switch on the operation panel to Service mode	"5.2 Switching the Mode Switch to Service Mode"
3	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
4	Saving the OpenBoot PROM environment variables	"5.6.2 Saving Logical Domain Configuration Information and OpenBoot PROM Environment Variables"
5	Stopping the system	"5.5 Stopping the Entire System"
6	Removing the power cords	"5.8.1 Removing the Power Cords"
7	Reducing memory	"16.5.1 Accessing the MBU" "16.5.2 Removing Memory" "16.6.3 Restoring the Server"
8	Installing the power cords	"6.1.6 Installing the Power Cords"
9	Performing a diagnosis test	"6.4 Diagnosing a Replacement FRU"
10	Confirming that there is no problem with the reduced SPARC M12-1	"6.7 Checking the FRU Status After Maintenance"
11	Returning the mode switch on the operation panel to Locked mode	"6.8 Returning the Mode Switch to Locked Mode"
12	Starting the system	"6.9 Starting the System"
13	Restoring the OpenBoot PROM environment variables	"6.5.2 Restoring Logical Domain Configuration Information and OpenBoot PROM Environment Variables"
14	Closing the rack door	

System-stopped/cold removal

System-stopped/cold removal can be performed on a PCIe card and HDD/SSD.
Perform the following procedure to remove the unit.

Figure 7-14   System-Stopped/Cold Removal Flow

```
┌─────────────────────────────────────────────┐
│ 1. Opening the rack door                    │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 2. Switching the mode switch on the operation│
│    panel to Service mode                    │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 3. Checking the operating condition of the  │
│    system and the I/O device usage status   │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 4. Stopping the system                      │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 5. Removing the power cords                  │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 6. Removing the target FRU                   │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 7. Installing the power cords                │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 8. Performing a diagnosis test               │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 9. Confirming that there is no problem with the│
│    chassis after the removal                │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 10. Returning the mode switch on the operation│
│     panel to Locked mode                    │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 11. Starting the system                     │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ 12. Closing the rack door                   │
└─────────────────────────────────────────────┘
                      ↓
       (        Removal complete        )
```

Table 7-16   System-Stopped/Cold Removal Work Procedure

Item	Work Procedure	Reference
1	Opening the rack door	
2	Switching the mode switch on the operation panel to Service mode	"5.2 Switching the Mode Switch to Service Mode"
3	Checking the operating condition of the system and the I/O device usage status	"5.3 Checking the Operating Condition and Resource Usage Status"
4	Stopping the system	"5.5 Stopping the Entire System"
5	Removing the power cords	"5.8.1 Removing the Power Cords"
6	Removing the target FRU	When removing a PCIe card: "Chapter 8 Maintaining the PCI Express Cards" When removing an HDD/SSD: "Chapter 9 Maintaining Internal Storage"
7	Installing the power cords	"6.1.6 Installing the Power Cords"
8	Performing a diagnosis test	"6.4 Diagnosing a Replacement FRU"
9	Confirming that there is no problem with the reduced SPARC M12-1	"6.7 Checking the FRU Status After Maintenance"
10	Returning the mode switch on the operation panel to Locked mode	"6.8 Returning the Mode Switch to Locked Mode"
11	Starting the system	"6.9 Starting the System"
12	Closing the rack door	

Chapter 8

Maintaining the PCI Express Cards

This chapter describes the maintenance procedures for PCI Express (PCIe) cards. PCIe cards can be replaced, expanded, and reduced.

- Before Maintenance on a PCIe Card
- PCIe Card Configuration
- Removing a PCIe Card
- Installing a PCIe Card

8.1 Before Maintenance on a PCIe Card

This chapter only has descriptions of the PCIe card configuration and the work of removing and installing PCIe cards.
Before removing a FRU, see "Chapter 7 Maintenance Flow" and perform the necessary work items.
For the types of maintenance on PCIe cards, also see "PCIe card" in "Table 7-2 Maintenance Types for FRUs."

8.2 PCIe Card Configuration

This section describes the configuration and locations of the PCIe cards.
Up to three PCIe cards can be mounted.

Figure 8-1   Locations of the PCIe Cards
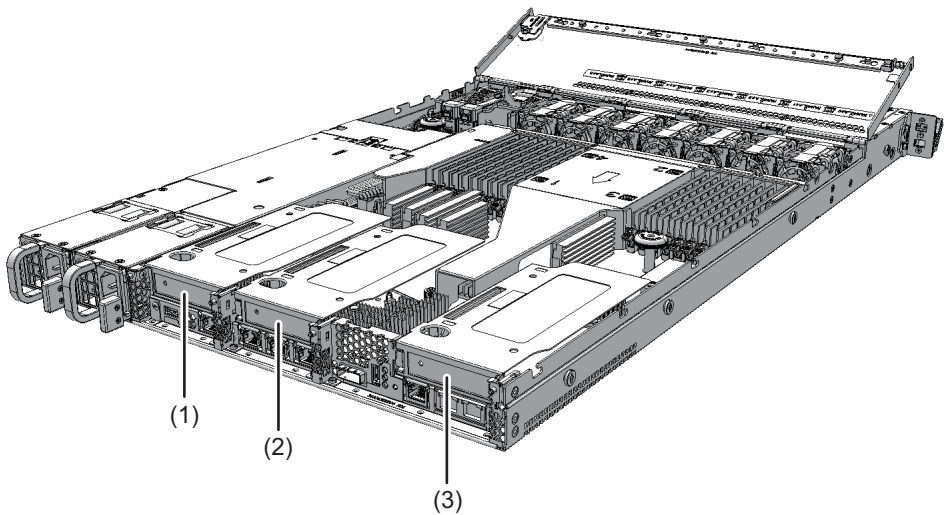
Location No.	Component
1	PCIe card (PCI#0)
2	PCIe card (PCI#1)
3	PCIe card (PCI#2)

8.3   Removing a PCIe Card

This section describes the procedure for removing a PCIe card. Use the same procedure for reduction too.
For expansion, remove the PCIe card filler instead of the PCIe card itself.
Enable removal of the PCIe card before attempting to remove it. For details, see "Chapter 7   Maintenance Flow."

⚠ **Caution -** Before you handle any components, wear a wrist strap to ground any static electricity. If you perform this procedure without a wrist strap, individual components or the overall system may be damaged. For details, see "1.4   Precautions on Static Electricity."

8.3.1   Accessing a PCIe Card

1. **Disconnect all the cables connected to the PCIe card requiring maintenance.**

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

---

2. **Pull the server out of the rack.**
    For details, see "5.8.3   Pulling the SPARC M12-1 Out From the Rack."

3. **Open the fan cover.**
    For details, see "5.8.4   Opening the Fan Cover."

4. **Remove the upper cover.**
    For details, see "5.8.5   Removing the Upper Cover."

8.3.2   Removing a PCIe Riser

1. **Hold the PCIe riser (PCI Express riser) at two points and remove it.**

Note - Place the removed PCIe riser on a grounded antistatic ESD mat.

Figure 8-2   Removing a PCIe Riser
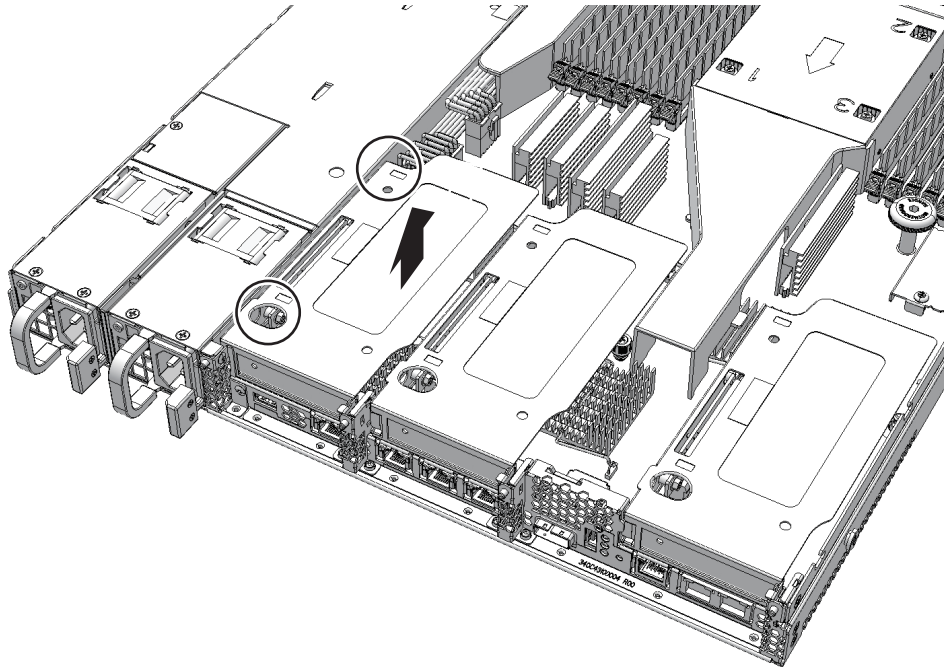
8.3.3   Removing a PCIe Card

1. **Remove the PCIe card from the PCIe riser connector.**
   In PCIe card expansion, you do not have to perform this step. Remove the PCIe card filler from the PCIe riser.

⚠ **Caution** - Do not forcibly remove a PCIe card from a PCIe riser. The use of excessive force may damage the PCIe card.

Note - Place the removed PCIe card on a grounded antistatic ESD mat.

Note - The PCIe card filler is easily removed. Be careful not to drop it.

Figure 8-3   Removing a PCIe Card
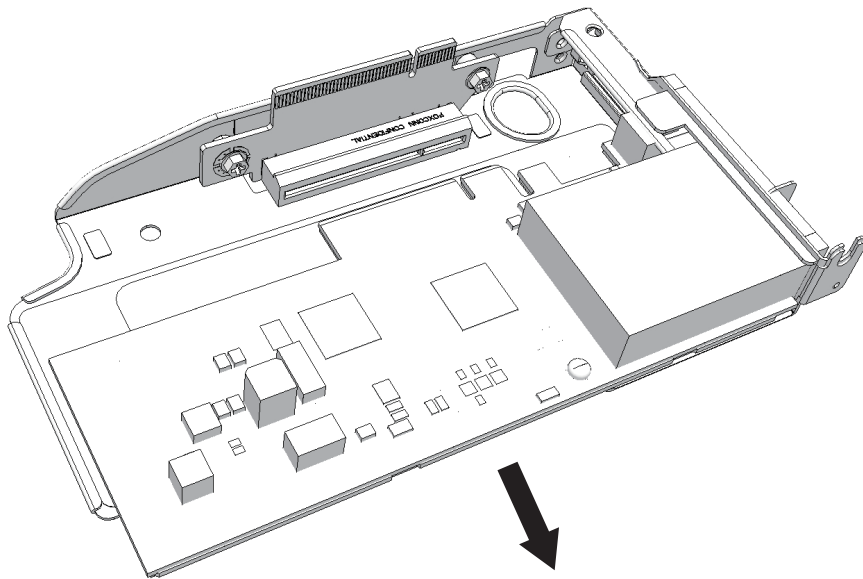
8.4   Installing a PCIe Card

This section describes the procedure for installing a PCIe card. Use the same procedure for expansion too. For reduction, install a PCIe card filler instead of a PCIe card.

8.4.1   Installing a PCIe Card

1. **Insert the PCIe card into the connector of the PCIe riser.**
   In PCIe card reduction, you do not have to perform this step. Install the PCIe card filler in the PCIe riser.

Note - Confirm that the tab (A in Figure 8-4) of the PCIe card or the tab of the PCIe card filler is inserted in the notch (B in Figure 8-4) of the PCIe riser.

Note - The PCIe card filler is easily removed. Be careful not to drop it.

Figure 8-4   Installing a PCIe Card
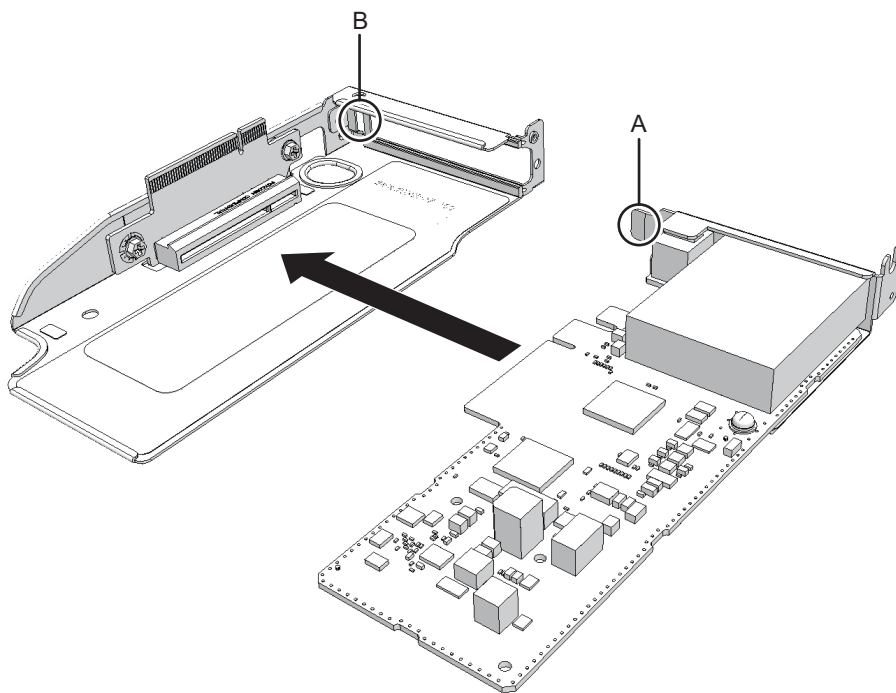
8.4.2   Installing a PCIe Riser

1. **Hold the PCIe riser at two points and install it on the MBU.**

8.4.3 Restoring the Server

1. **Install the upper cover.**
   For details, see "6.1.3   Installing the Upper Cover."

2. **Close the fan cover.**
   For details, see "6.1.4   Closing the Fan Cover."

3. **Put the SPARC M12-1 into the rack.**
   For details, see "6.1.5   Putting the SPARC M12-1 Into the Rack."

4. **Connect all the cables to the PCIe card.**

Note - Connect the cables in their original positions by referring to the record that you made before the start of maintenance.

The FRU installation work is completed. See "Chapter 7   Maintenance Flow" to continue maintenance work.

Chapter 9

Maintaining Internal Storage

This chapter describes the maintenance procedures for internal storage (HDD/SSD). HDDs/SSDs can be replaced, expanded, and reduced.

- Before Maintenance on an HDD/SSD
- HDD/SSD Configuration
- Removing an HDD/SSD
- Installing an HDD/SSD

9.1   Before Maintenance on an HDD/SSD

This chapter only has descriptions of the HDD/SSD configuration and the work of removing and installing HDDs/SSDs.
Before removing a FRU, see "Chapter 7   Maintenance Flow" and perform the necessary work items.
For the types of maintenance on the HDD/SSD, also see "HDD/SSU" in "Table 7-2 Maintenance Types for FRUs."

9.2   HDD/SSD Configuration

This section describes the configuration and locations of the HDDs/SSDs.
The SPARC M12-1 has eight slots for mounting HDDs/SSDs. You can expand the functionality of system memory by installing additional HDDs or SSDs in these slots.

Figure 9-1   Locations of the HDDs/SSDs
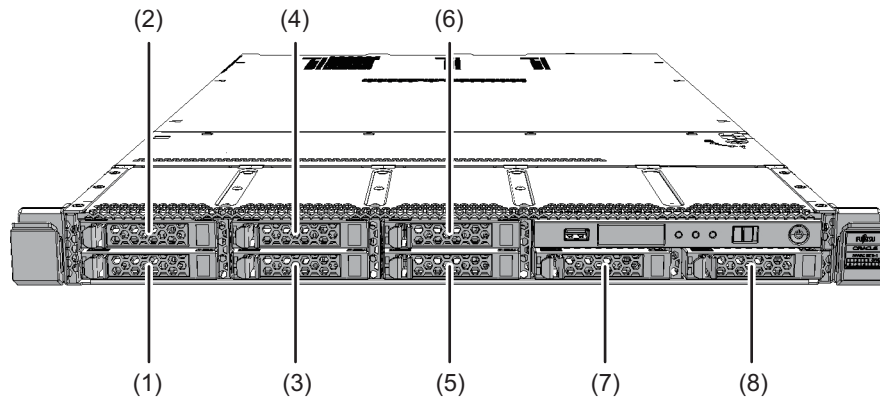
Location No.	Component
1	HDD/SSD (HDD#0)
2	HDD/SSD (HDD#1)
3	HDD/SSD (HDD#2)
4	HDD/SSD (HDD#3)
5	HDD/SSD (HDD#4)
6	HDD/SSD (HDD#5)
7	HDD/SSD (HDD#6)
8	HDD/SSD (HDD#7)

9.3　Removing an HDD/SSD

This section describes the procedure for removing an HDD/SSD. Use the same procedure for reduction too.
In HDD/SSD expansion, to install an HDD/SSD in a slot, first remove the internal storage filler unit from the slot.
Enable removal of the HDD/SSD before attempting to remove it. For details, see "Chapter 7　Maintenance Flow."

Caution - Before you handle any components, wear a wrist strap to ground any static electricity. If you perform this procedure without a wrist strap, individual components or the overall system may be damaged. For details, see "1.4　Precautions on Static Electricity."

---

1. **Push the latch (A in Figure 9-2) of the HDD/SSD to release the lock and open the lever.**

Figure 9-2　　HDD/SSD Latch
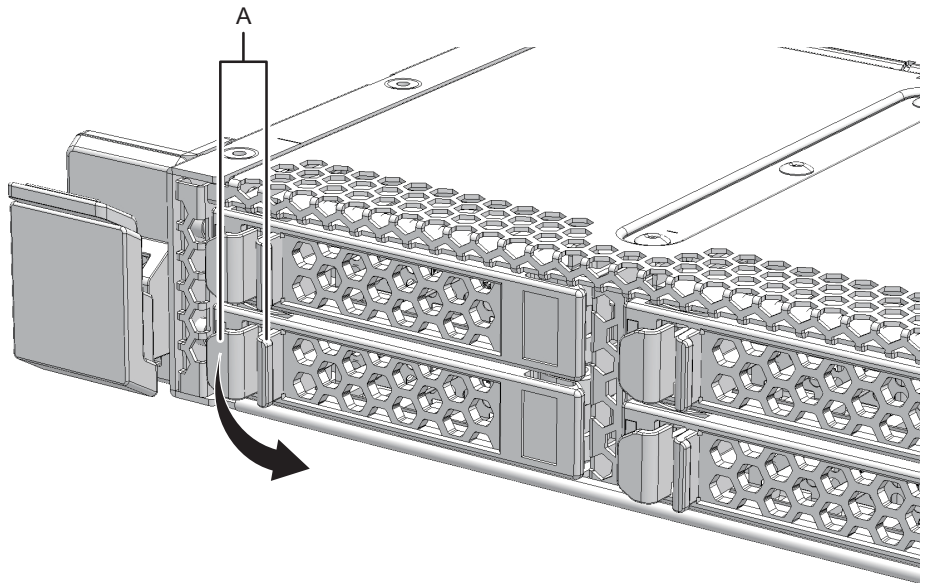
2. **Hold the lever and pull the HDD/SSD out about 2 to 3 cm (0.8 to 1.2 in.).**

Note - When performing active/hot maintenance, hold this position until the motor rotation stops (about 1 minute).

Figure 9-3   Removing an HDD/SSD
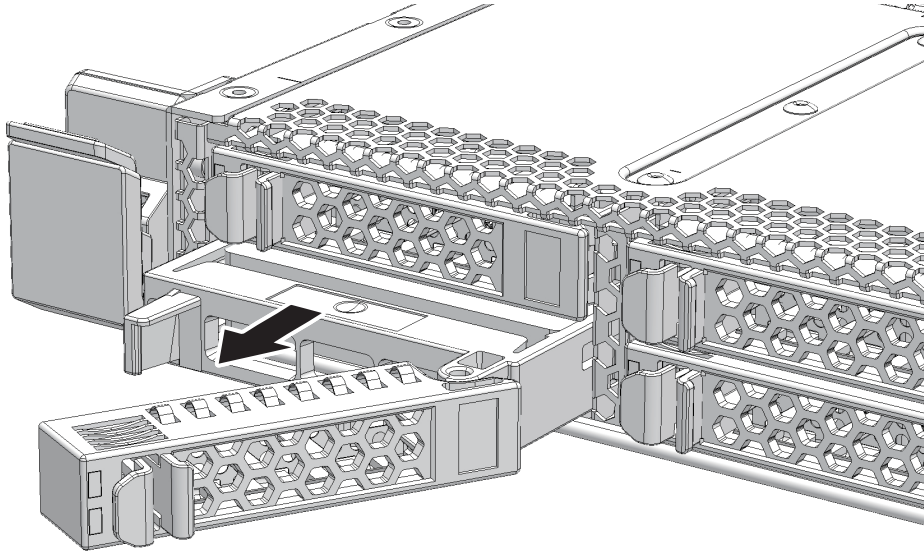
3. **Carefully remove the HDD/SSD from its slot.**

Note - Place the removed HDD/SSD on a grounded ESD mat to ground any static electricity.
Note - In HDD/SSD reduction, after removing an HDD/SSD from a slot, install an internal storage filler unit in the slot.

9.4 Installing an HDD/SSD

This section describes the procedure for installing an HDD/SSD. Use the same procedure for expansion too.

Caution - Do not attempt to insert an HDD/SSD into a slot when the lever is closed. Otherwise, the internal storage could jam and prove difficult to remove.

Note - In HDD/SSD expansion, to install an HDD/SSD in a slot, first remove the internal storage filler unit from the slot.

1. **Open the lever and hold the HDD/SSD.**
2. **Carefully insert the HDD/SSD into the slot.**

Caution - Do not forcibly push the HDD/SSD into its slot. Using excessive force may damage the HDD/SSD and server.

3. **Secure the HDD/SSD by closing the lever.**

The FRU installation work is completed. See "Chapter 7   Maintenance Flow" to continue maintenance work.

Chapter 10

Maintaining the HDD Backplane

This chapter describes the maintenance procedures for the HDD backplane (HDDBP).

- Before Maintenance on the HDDBP
- Location of the HDDBP
- Removing the HDDBP
- Installing the HDDBP

10.1 Before Maintenance on the HDDBP

This chapter only has descriptions of the HDDBP location and the work of removing and installing the HDDBP.
Before removing a FRU, see "Chapter 7   Maintenance Flow" and perform the necessary work items.
For the types of maintenance on the HDDBP, also see "HDDBP" in "Table 7-2 Maintenance Types for FRUs."

10.2 Location of the HDDBP

This section describes the location of the HDDBP.
The HDDBP has connectors to connect multiple internal storage units.

Figure 10-1   Location of the HDDBP

(1)
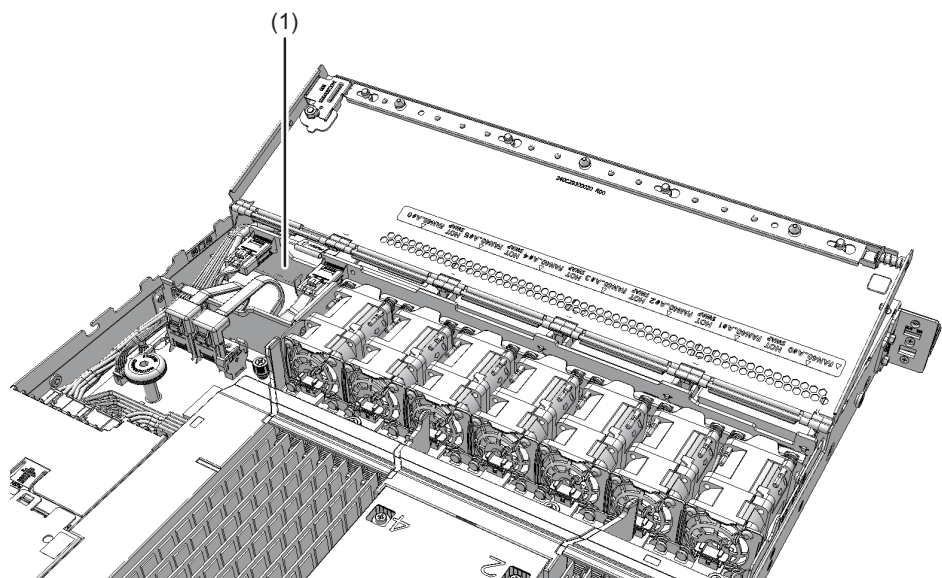
Location No.	Component
1	HDD backplane (HDDBP)

10.3   Removing the HDDBP

This section describes the procedure for removing the HDDBP.
Enable removal of the HDDBP before attempting to remove it. For details, see
"Chapter 7   Maintenance Flow."

Caution - Before you handle any components, wear a wrist strap to ground any static electricity. If you perform this procedure without a wrist strap, individual components or the overall system may be damaged. For details, see "1.4   Precautions on Static Electricity."

10.3.1   Accessing the HDDBP

1. **Pull the SPARC M12-1 out of the rack.**
   For details, see "5.8.3   Pulling the SPARC M12-1 Out From the Rack."

2. **Remove all the HDDs/SSDs and internal storage filler units mounted in the chassis.**
   For details, see "9.3   Removing an HDD/SSD."

Note - Record the mounting locations of the HDDs/SSDs before removing them, to ensure that they are reinstalled correctly.

---

3. **Open the fan cover.**
   For details, see "5.8.4   Opening the Fan Cover."

4. **Remove the upper cover.**
   For details, see "5.8.5   Removing the Upper Cover."

10.3.2   Removing the HDDBP

1. **Remove the three cables connected to the HDDBP.**

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

Figure 10-2   HDDBP Cables
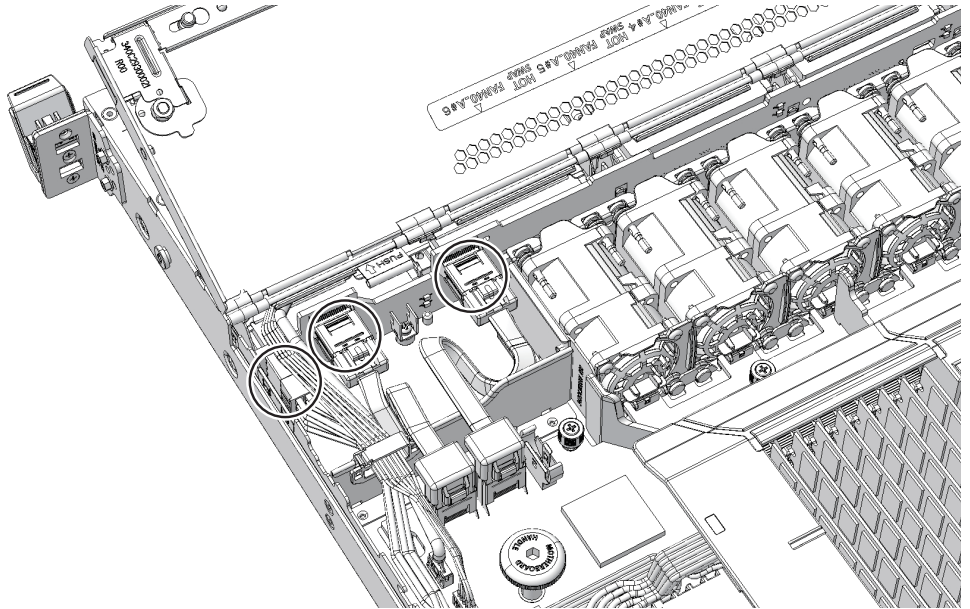
2. **Release the cable guide lock.**
   For details, see "5.8.7   Releasing the Cable Guide Lock."

   If the cable guide does not have a lock, proceed to step 3.

3. **Remove the two cables connecting the OPNL to the MBU.**

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

Figure 10-3   OPNL Cables
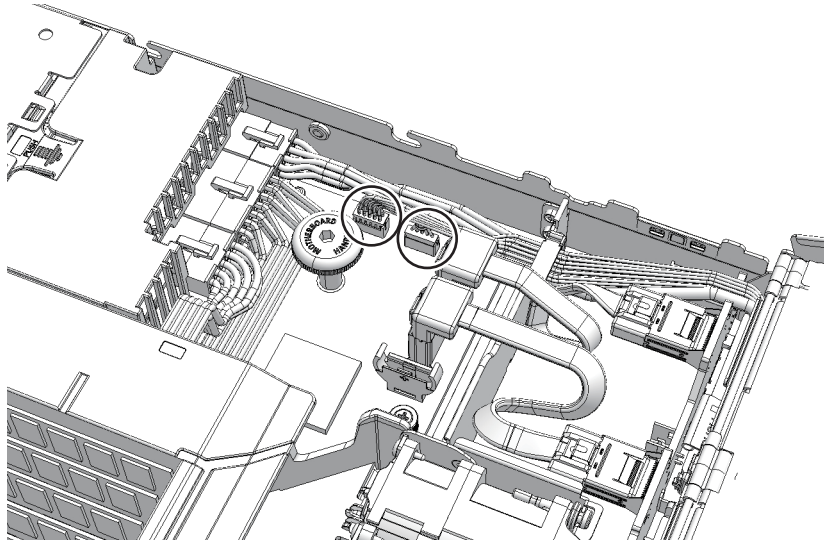
4. **Loosen the two screws of the HDDBP.**

Figure 10-4   HDDBP Screws
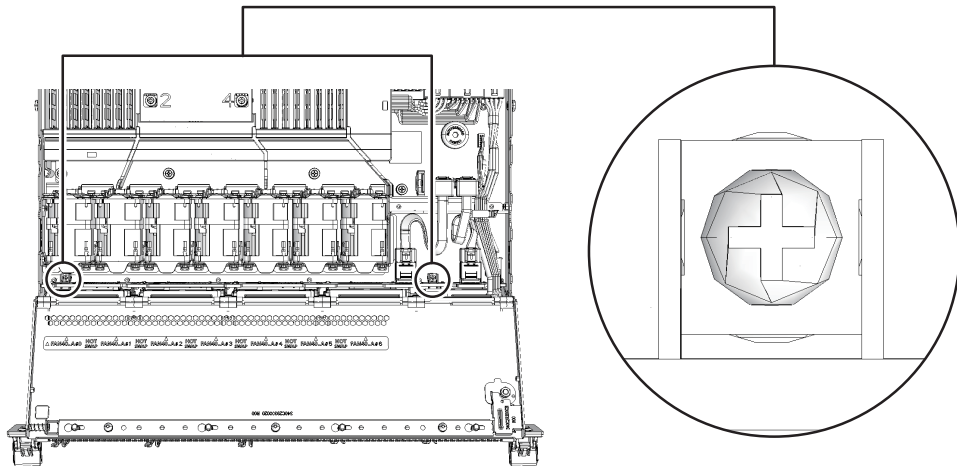
5. **Hold both ends of the HDDBP and lift to release it from the hooks (three places).**

Figure 10-5   Hooks on the Chassis
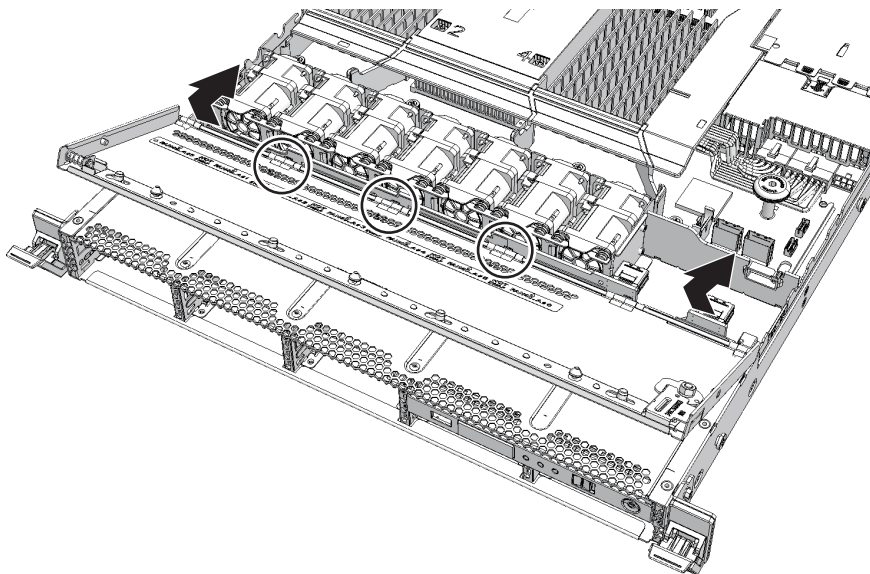
6. **Remove the HDDBP.**

Note - Place the removed HDDBP on a grounded ESD mat to ground any static electricity.

10.4 Installing the HDDBP

10.4.1 Installing the HDDBP

This section describes the procedure for installing the HDDBP.

1. **Install the HDDBP by aligning the notches on both sides.**

Figure 10-6   HDDBP Notches
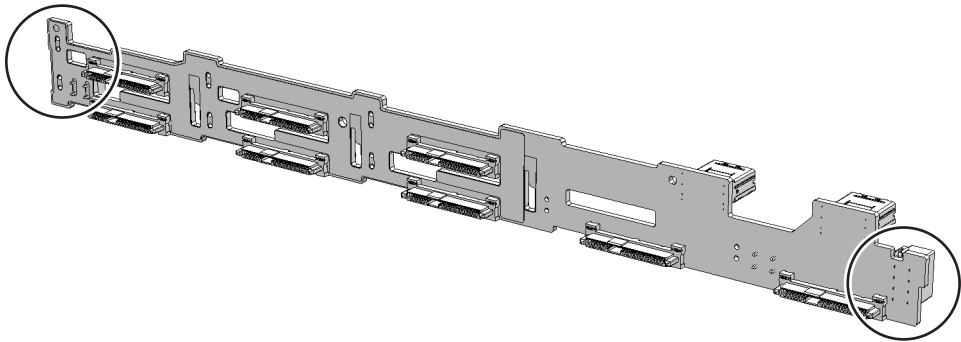
2. **Align the HDDBP with hooks on the chassis (three places) and push the HDDBP into place.**

Figure 10-7   Hooks on the Chassis
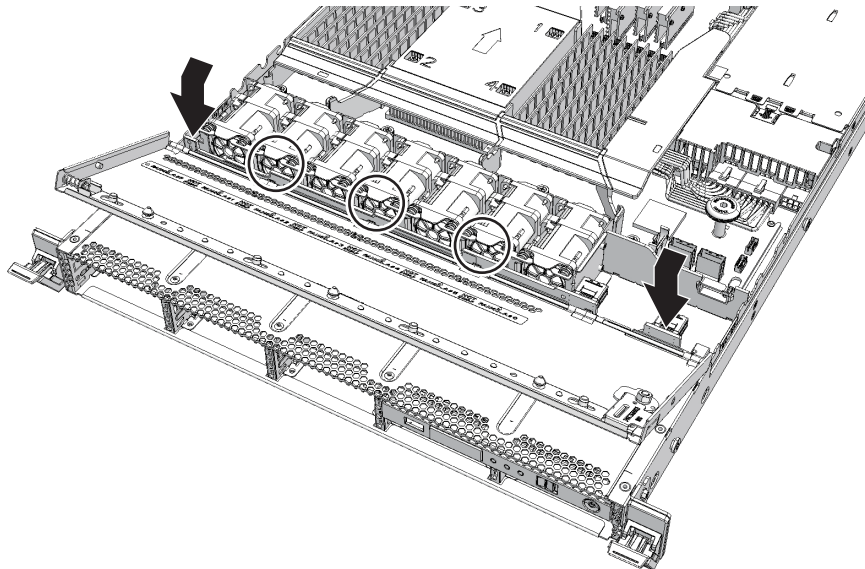
3. **Tighten the two screws of the HDDBP.**

4. **Connect the two cables from the OPNL to the MBU.**

Note - Connect the cables in their original positions by referring to the record that you made before the start of maintenance.

Note - When connecting the cables, insert them firmly. If there is a loose connection, the MBU will be unable to access the OPNL, resulting in an XSCF startup error.

Figure 10-8   OPNL Cables
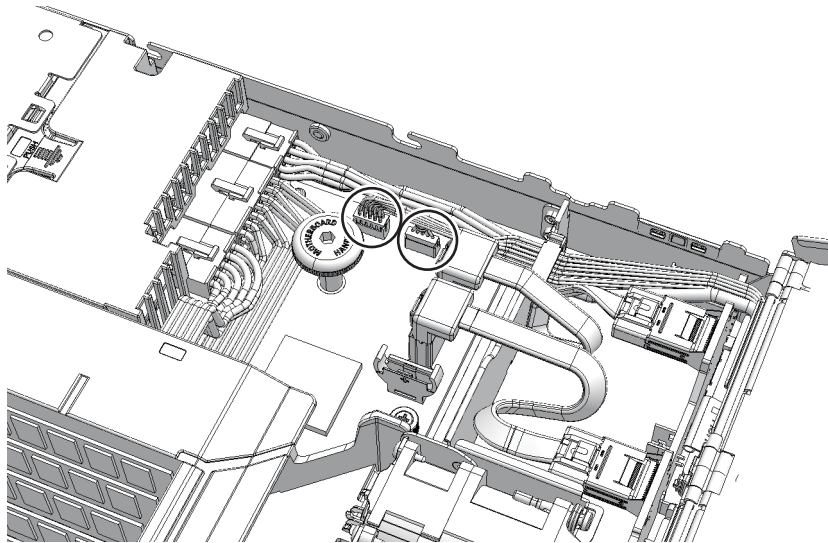
5. **Store the connected cables in the cable guide, and lock the guide.**
   For details, see "6.1.1   Locking the Cable Guide."

   If the cable guide does not have a lock, proceed to step 6.

6. **Connect the three cables to the HDDBP.**

Note - Connect the cables in their original positions by referring to the record that you made before the start of maintenance.

Note - Connect the SAS cable with the metal part facing up.

Figure 10-9   HDDBP Cables
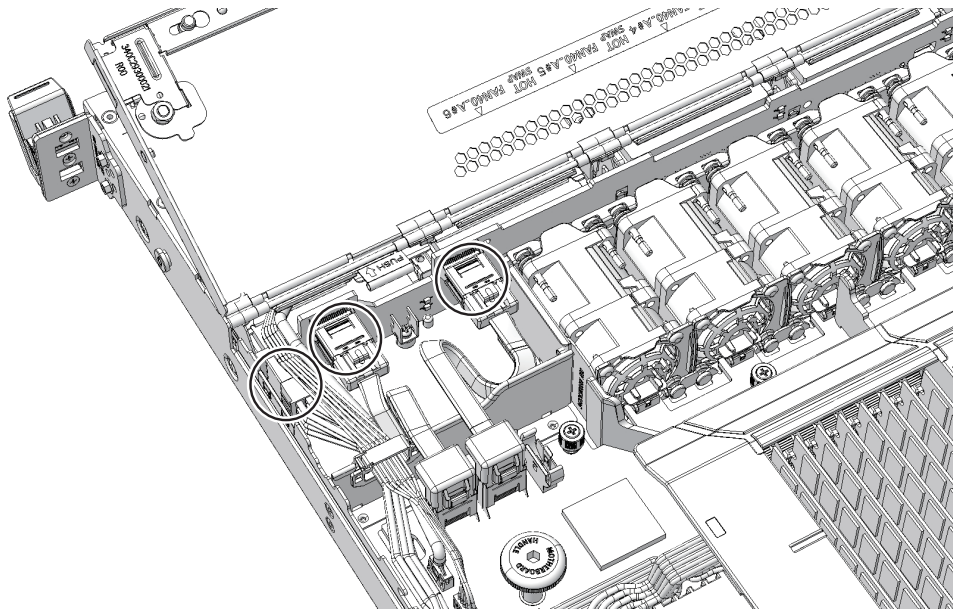
10.4.2   Restoring the Server

1. **Install the upper cover.**
    For details, see "6.1.3   Installing the Upper Cover."

2. **Close the fan cover.**
    For details, see "6.1.4   Closing the Fan Cover."

3. **Install all the HDDs/SSDs or internal storage filler units.**
    For details, see "9.4   Installing an HDD/SSD."

Note - Reinstall the HDDs/SSDs at their original locations by referring to the record that you made before the start of maintenance.

4. **Put the SPARC M12-1 into the rack.**
    For details, see "6.1.5   Putting the SPARC M12-1 Into the Rack."

The FRU installation work is completed. See "Chapter 7   Maintenance Flow" to continue maintenance work.

Chapter 11

Maintaining the Power Supply Units

This chapter describes the maintenance procedures for the power supply units (PSUs).

- Before Maintenance on a PSU
- PSU Configuration
- Removing a PSU
- Installing a PSU

11.1   Before Maintenance on a PSU

This chapter only has descriptions of the PSU configuration and the work of removing and installing PSUs.
Before removing a FRU, see "Chapter 7   Maintenance Flow" and perform the necessary work items.
For the types of maintenance on PSUs, also see "PSU" in "Table 7-2   Maintenance Types for FRUs."

11.2   PSU Configuration

This section describes the configuration and locations of the PSUs.
The PSUs supply power to the system components. The components can have the 1+1 redundant configuration. Active/hot maintenance can be performed.

Figure 11-1　　Locations of the PSUs
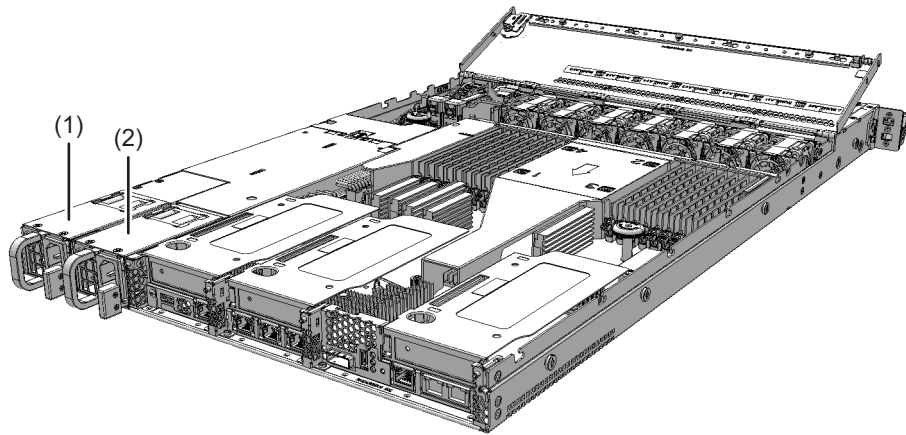
Location No.	Component
1	Power supply unit (PSU#0)
2	Power supply unit (PSU#1)

11.3　Removing a PSU

This section describes the procedure for removing a PSU.
Enable removal of the PSU before attempting to remove it. For details, see "Chapter 7 Maintenance Flow."

⚠ **Caution -** Before you handle any components, wear a wrist strap to ground any static electricity. If you perform this procedure without a wrist strap, individual components or the overall system may be damaged. For details, see "1.4　Precautions on Static Electricity."

11.3.1 Accessing a PSU

1. **Release the cable management arm.**
   Release the lock by pressing the cable management arm tab (A in Figure 11-2)
   toward the outside of the SPARC M12-1 to unlock the cable management arm.

Figure 11-2   Releasing the Cable Management Arm
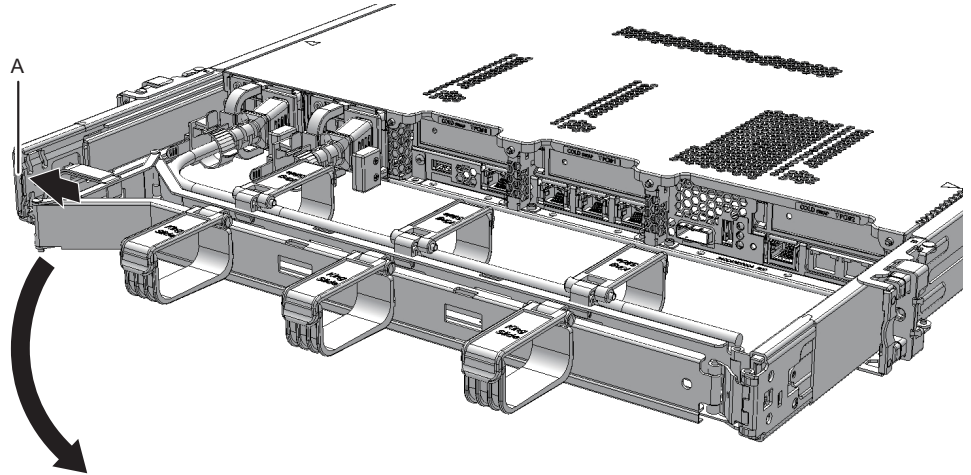
2. **Remove the power cords from the PSU requiring maintenance.**
   For details, see "5.8.1   Removing the Power Cords."

11.3.2 Removing a PSU

1. **While pushing the lever (A in Figure 11-3) of the PSU requiring maintenance, grab the handle (B in Figure 11-3) to pull the PSU out.**

Figure 11-3   Removing a PSU
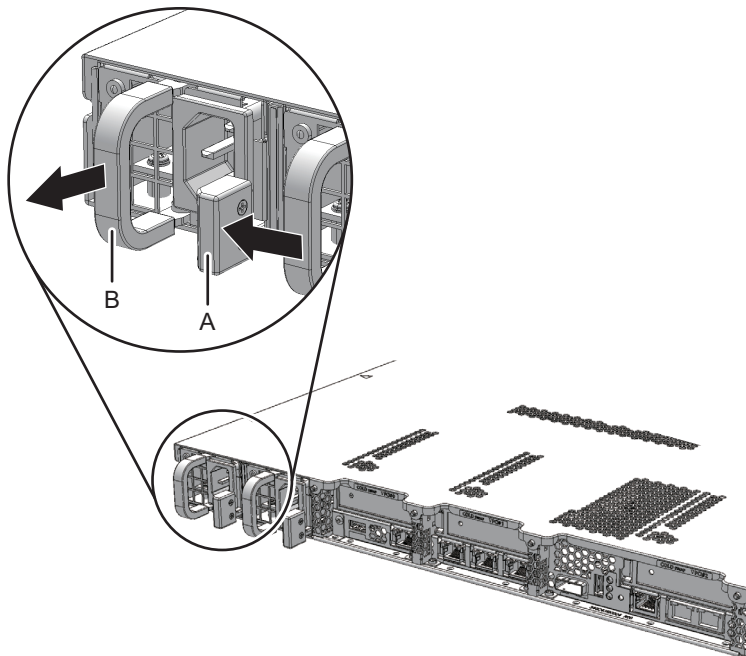
2. **Support the PSU with one hand from below, and carefully pull it out of the slot.**

Note - Place the removed PSU on a grounded ESD mat to ground any static electricity.

11.4   Installing a PSU

11.4.1 Installing a PSU

This section describes the procedure for installing a PSU.

1. **Support the PSU from below with one hand, and insert it carefully into its slot.**

> ⚠️ **Caution** - Do not forcibly push the PSU into its slot. Using excessive force may damage the PSU and server.

2. **Push the PSU firmly into place at the mounting location.**

Note - Make sure that the PSU is firmly inserted and fixed.

11.4.2 Restoring the Server

1. **Connect the power cords to the PSU requiring maintenance.**
    For details, see "6.1.6   Installing the Power Cords."

2. **Close the cable management arm.**

Note - Confirm that the cable management arm is locked with its tab (A in Figure 11-4).

Figure 11-4   Cable Management Arm Tab
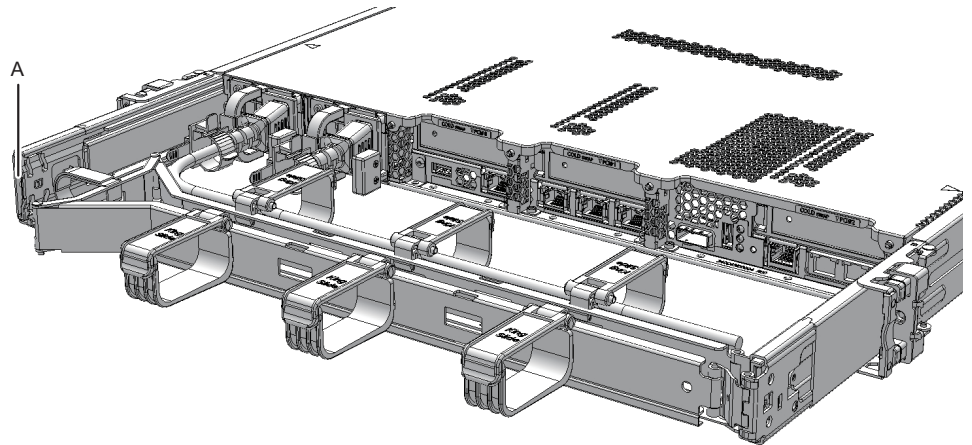
The FRU installation work is completed. See "Chapter 7   Maintenance Flow" to continue maintenance work.

Chapter 12

Maintaining the PSU Backplane

This chapter describes the maintenance procedures for the PSU backplane (PSUBP).

- Before Maintenance on the PSUBP
- Location of the PSUBP
- Precautions for PSUBP Maintenance
- Removing the PSUBP
- Installing the PSUBP

12.1   Before Maintenance on the PSUBP

This chapter only has descriptions of the PSUBP location and the work of removing and installing the PSUBP.
Before removing a FRU, see "Chapter 7   Maintenance Flow" and perform the necessary work items.
For the types of maintenance on the PSUBP, also see "PSUBP" in "Table 7-2 Maintenance Types for FRUs."

12.2   Location of the PSUBP

This section describes the location of the PSUBP.
The PSUBP has connectors to connect multiple PSUs.

Figure 12-1   Location of the PSUBP
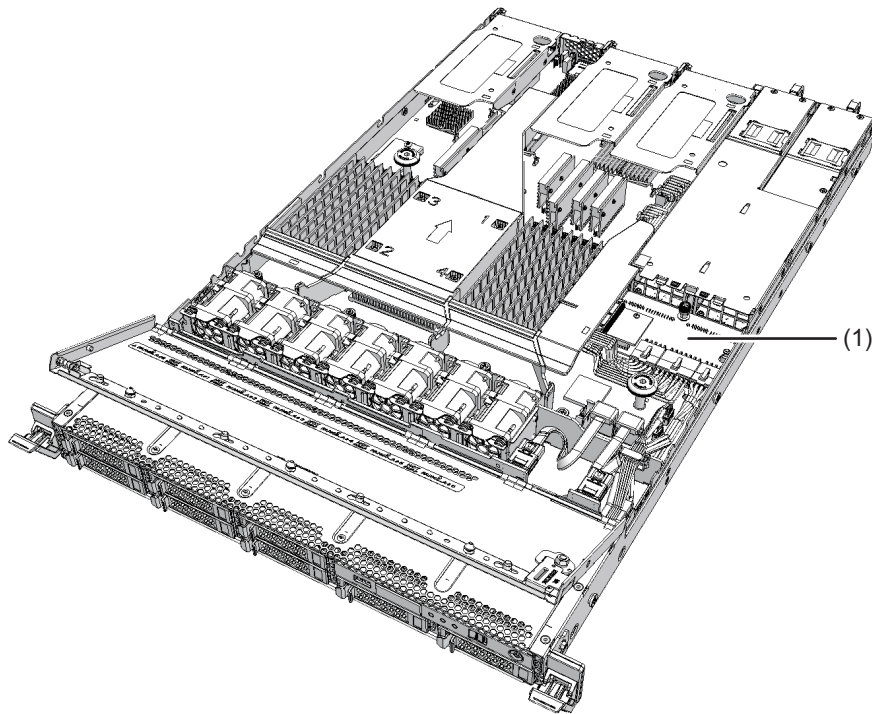
Location No.	Component
1	PSU backplane (PSUBP)

12.3   Precautions for PSUBP Maintenance

Note the following points when replacing the PSUBP.

- If you replace the MBU and the PSUBP at the same time, the system may fail to operate correctly. Replace the MBU or PSUBP, execute the showhardconf or showstatus command, and confirm that the replacement Field Replaceable Unit (FRU) is fully operational. Then, replace the other FRU.

- Do not mount and use any of the following PSUBP in another chassis:
  - the one currently mounted in the SPARC M12-1, or

  - one that was once used as a maintenance part

  This is because the above PSUBP stores device identification information.

- Set the system time.
  After replacing the PSUBP, you need to set the system time. For details, see "Notes

on Maintenance of a CPU Memory Unit, Motherboard Unit, XSCF Unit, PSU Backplane, or Crossbar Backplane Unit" in the *Fujitsu SPARC M12 Product Notes* for the latest XCP version.

12.4 Removing the PSUBP

This section describes the procedure for removing the PSUBP.
Enable removal of the PSUBP before attempting to remove it. For details, see "Chapter 7 Maintenance Flow."

⚠ **Caution -** Before you handle any components, wear a wrist strap to ground any static electricity. If you perform this procedure without a wrist strap, individual components or the overall system may be damaged. For details, see "1.4 Precautions on Static Electricity."

12.4.1 Accessing the PSUBP

1. **Remove all the PSUs.**
   For details, see "11.3 Removing a PSU."

2. **Pull the SPARC M12-1 out of the rack.**
   For details, see "5.8.3 Pulling the SPARC M12-1 Out From the Rack."

3. **Open the fan cover.**
   For details, see "5.8.4 Opening the Fan Cover."

4. **Remove the upper cover.**
   For details, see "5.8.5 Removing the Upper Cover."

5. **Remove the air duct and PSUBP cover.**
   For details, see "5.8.6 Removing the Air Duct and PSUBP Cover."

12.4.2 Removing the PSUBP

1. **Three cables connect the PSUBP to the MBU. Remove these cables from the MBU connectors.**

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

Figure 12-2   MBU Cables
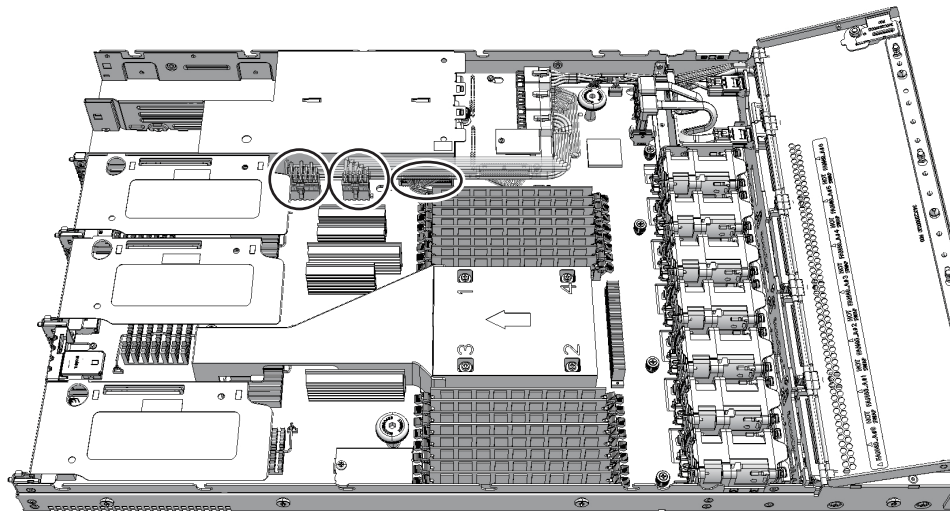
2. **Release the cable guide lock.**
   For details, see "5.8.7   Releasing the Cable Guide Lock."

   If the cable guide does not have a lock, proceed to step 3.

3. **One cable connects the PSUBP to the HDDBP. Remove this cable from the HDDBP connector.**

Figure 12-3   HDDBP Cable
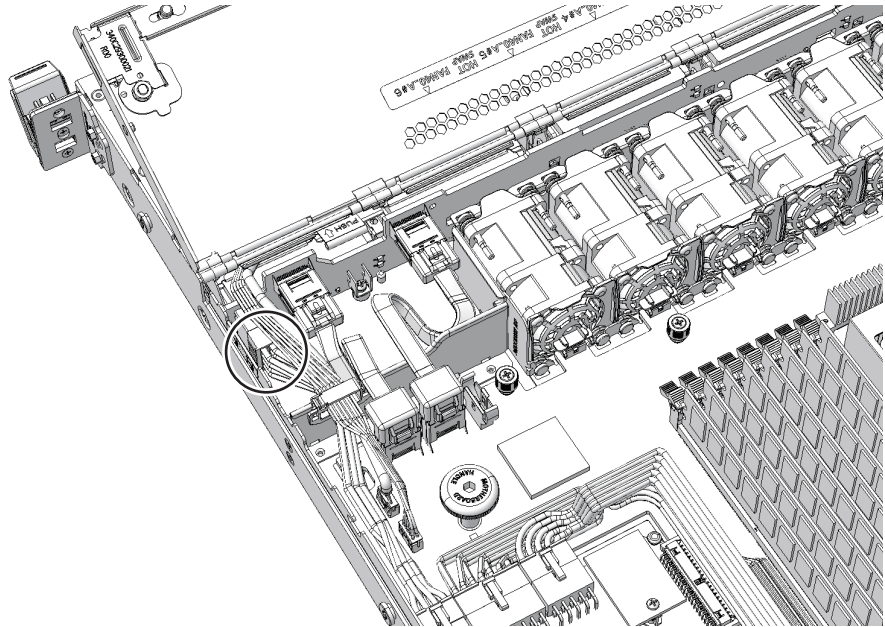
4. **Loosen the one screw of the PSUBP.**

Figure 12-4   PSUBP Screw
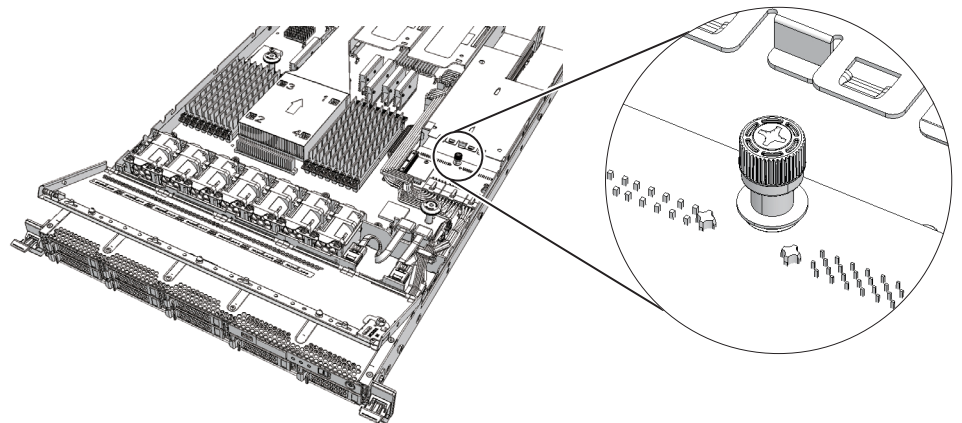
5. **Slide the PSUBP toward the rear of the SPARC M12-1 to release it from two fixing pins (A in Figure 12-5).**

Figure 12-5   Fixing Pins of the PSUBP
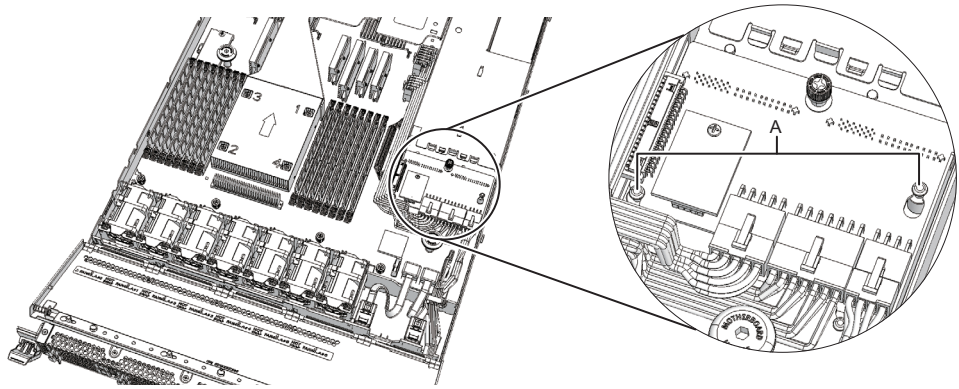
6. **Lift the PSUBP, and disconnect the four cables (A in Figure 12-6) connected to the PSUBP.**

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

Note - Place the removed PSUBP on a grounded ESD mat to ground any static electricity.

Figure 12-6   PSUBP Cables
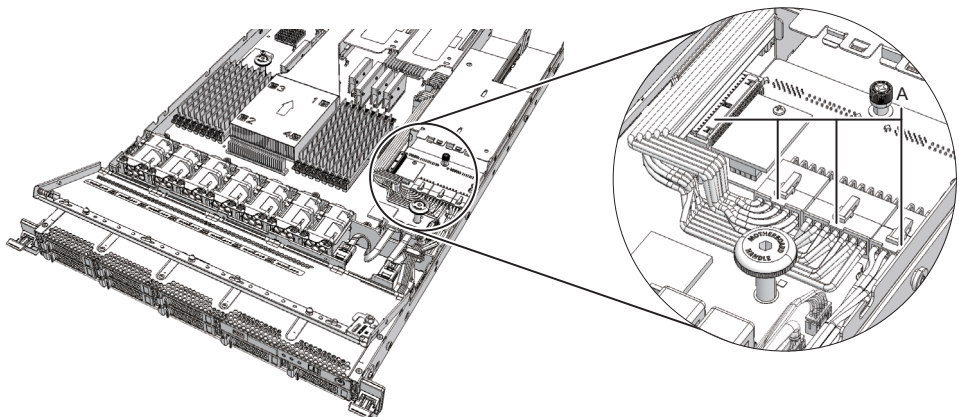
12.5 Installing the PSUBP

12.5.1 Installing the PSUBP

This section describes the procedure for installing the PSUBP.

1. **Lift the PSUBP, and connect the four cables (A in Figure 12-7) to the PSUBP.**

Figure 12-7   PSUBP Cables
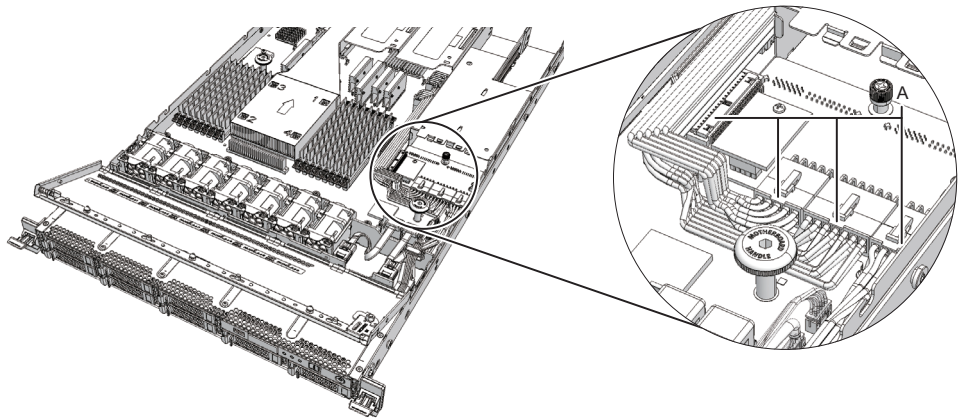
2. **Install the PSUBP.**
3. **Confirm that the two fixing pins are inserted into the PSUBP, and then slide the PSUBP toward the front of the SPARC M12-1.**
4. **Tighten the one screw of the PSUBP.**

5. **Connect the one cable that connects the PSUBP to the HDDBP.**

Figure 12-8   HDDBP Cable
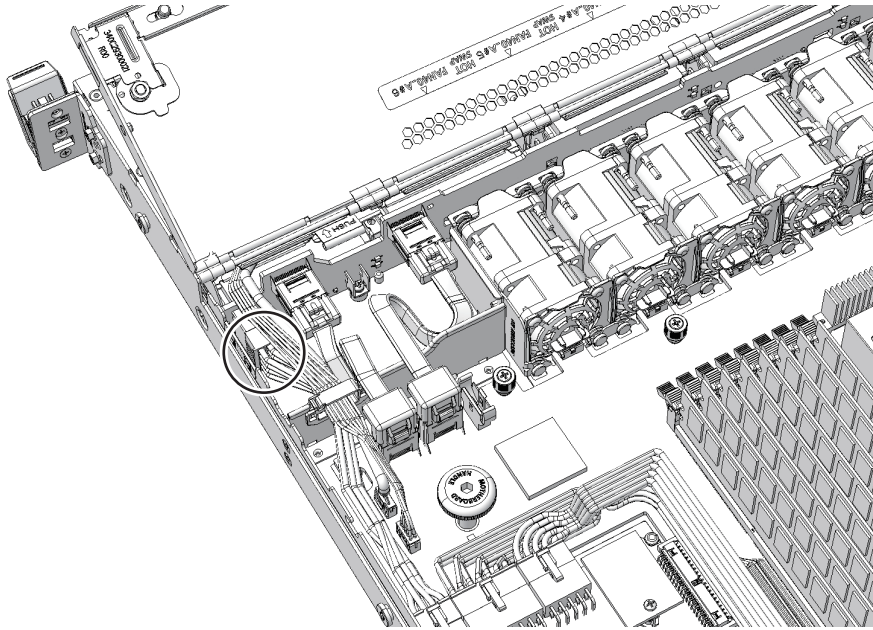
6. **Store the connected cables in the cable guide, and lock the guide.**
   For details, see "6.1.1   Locking the Cable Guide."

   If the cable guide does not have a lock, proceed to step 8.

7. **Connect the three cables that connect the PSUBP to the MBU.**

Note - Connect the cables in their original positions by referring to the record that you made before the start of maintenance.

Note - Make sure that each cable is firmly inserted.

Figure 12-9　MBU Cables
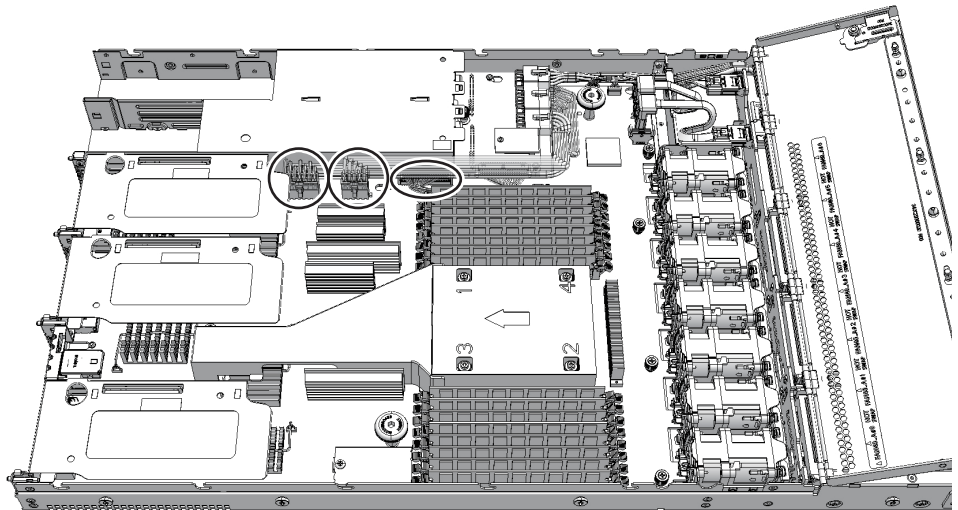
12.5.2　Restoring the Server

1. **Install the air duct and the PSUBP cover.**
   For details, see "6.1.2　Installing the Air Duct and PSUBP Cover."

2. **Install the upper cover.**
   For details, see "6.1.3　Installing the Upper Cover."

3. **Close the fan cover.**
   For details, see "6.1.4　Closing the Fan Cover."

4. **Install all the PSUs.**
   For details, see "11.4　Installing a PSU."

The FRU installation work is completed. See "Chapter 7　Maintenance Flow" to continue maintenance work.

Chapter 13

Maintaining the Cable Kit

This section describes the maintenance procedures for the cable kit.

- Before Maintaining the Cable Kit
- Location of the Cable Kit
- Removing the Cable Kit
- Installing the Cable Kit

13.1　Before Maintaining the Cable Kit

This chapter only has descriptions of the cable kit location and the work of removing and installing the cable kit.
Before removing a FRU, see "Chapter 7　Maintenance Flow" and perform the necessary work items.
For the types of maintenance on the cable kit, also see "Cable kit" in "Table 7-2 Maintenance Types for FRUs."

13.2　Location of the Cable Kit

This section describes the location of the cable kit.
The cable kit contains three cables for connecting the MBU to the PSUBP and one cable for connecting the PSUBP to the HDDBP.

Figure 13-1   Location of the Cable Kit
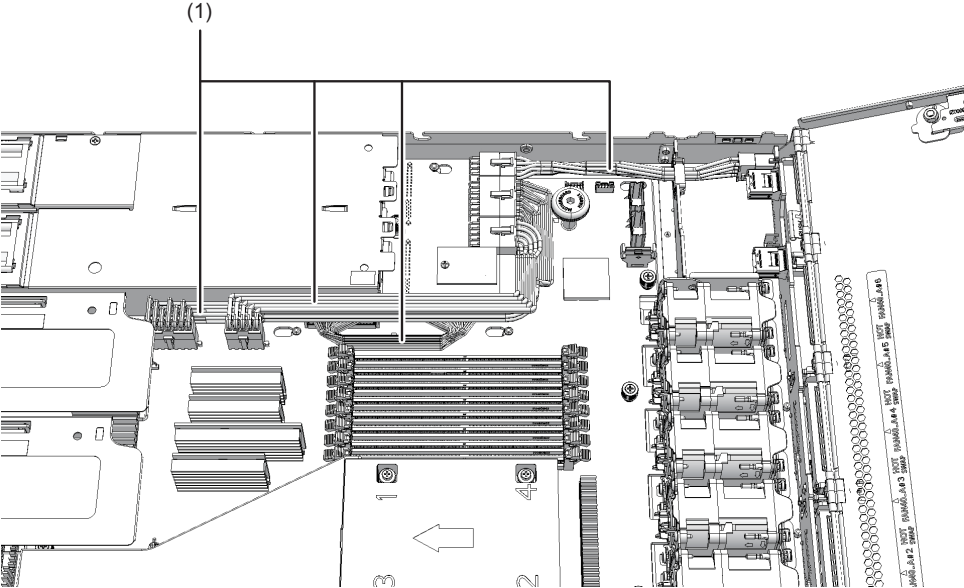
Location No.	Component
1	Cable kit

13.3   Removing the Cable Kit

This section describes the procedure for removing the cable kit.
Enable removal of the cable kit before attempting to remove it. For details, see
"Chapter 7   Maintenance Flow."

⚠️ **Caution -** Before you handle any components, wear a wrist strap to ground any static
electricity. If you perform this procedure without a wrist strap, individual
components or the overall system may be damaged. For details, see "1.4   Precautions
on Static Electricity."

13.3.1   Accessing the Cable Kit

1. **Remove all the PSUs.**
   For details, see "11.3   Removing a PSU."

2. **Pull the SPARC M12-1 out of the rack.**
   For details, see "5.8.3   Pulling the SPARC M12-1 Out From the Rack."

3. **Open the fan cover.**
   For details, see "5.8.4   Opening the Fan Cover."

4. **Remove the upper cover.**
   For details, see "5.8.5   Removing the Upper Cover."

5. **Remove the air duct and PSUBP cover.**
   For details, see "5.8.6   Removing the Air Duct and PSUBP Cover."

13.3.2   Removing the Cable Kit

1. **Three cables connect the PSUBP to the MBU. Remove these cables from the MBU connectors.**

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

Figure 13-2   MBU Cables
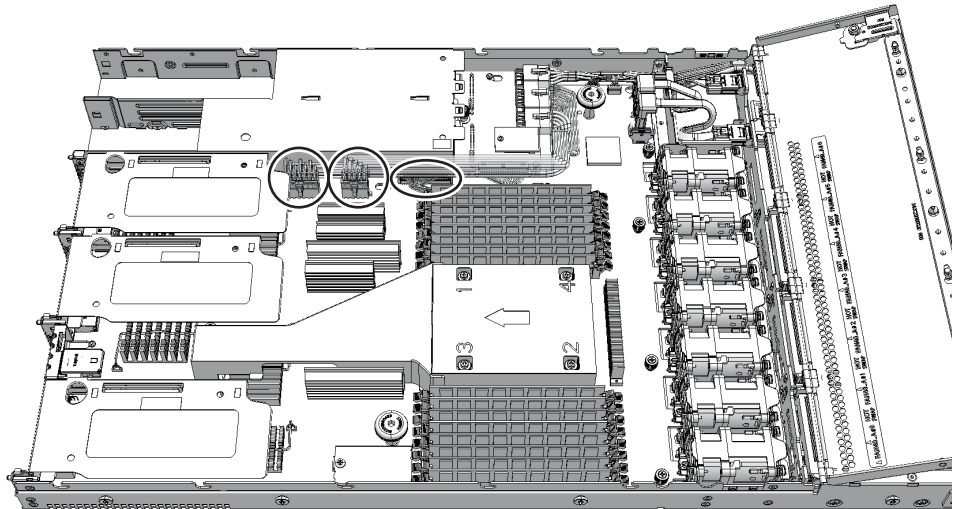
2. **Release the cable guide lock.**
   For details, see "5.8.7   Releasing the Cable Guide Lock."

   If the cable guide does not have a lock, proceed to step 3.

3. **One cable connects the PSUBP to the HDDBP. Remove this cable from the HDDBP connector.**

Figure 13-3   HDDBP Cable
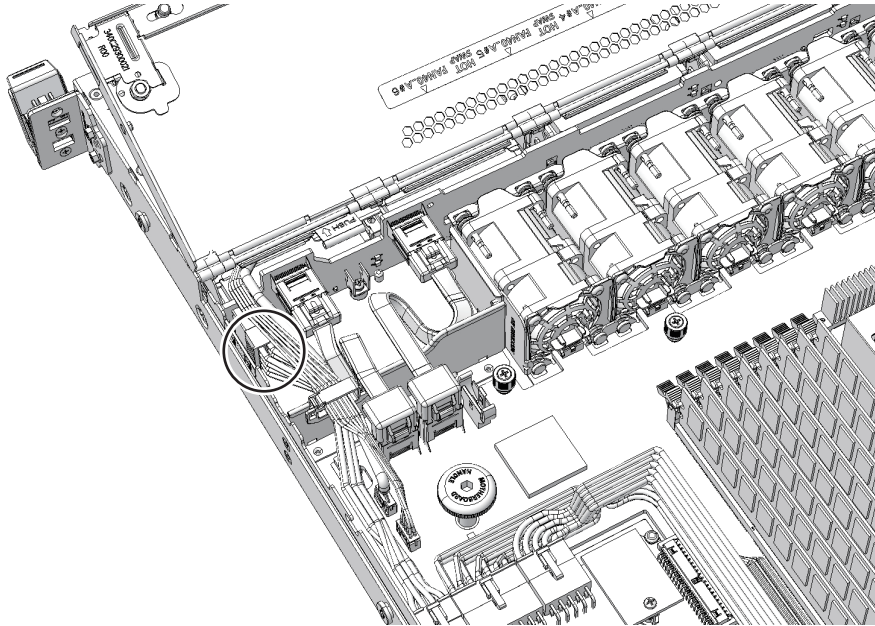
4. **Loosen the one screw of the PSUBP.**

Figure 13-4   PSUBP Screw
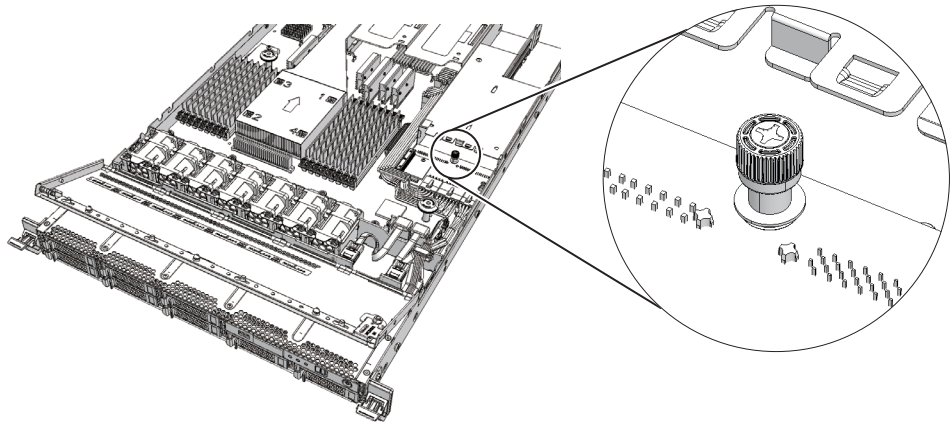
5. **Slide the PSUBP toward the rear of the SPARC M12-1 to release it from two fixing pins (A in Figure 13-5).**

Figure 13-5   Fixing Pins of the PSUBP
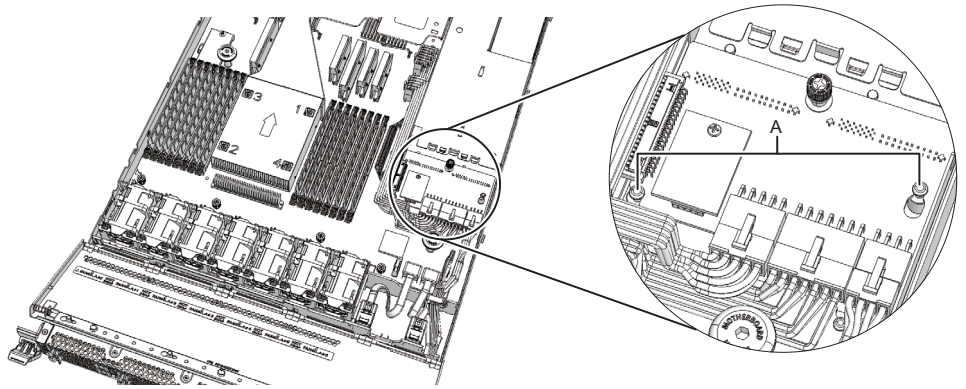
6. **Lift the PSUBP, and disconnect the four cables (A in Figure 13-6) connected to the PSUBP.**

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

Note - Place the removed PSUBP on a grounded ESD mat to ground any static electricity.

Figure 13-6   PSUBP Cables
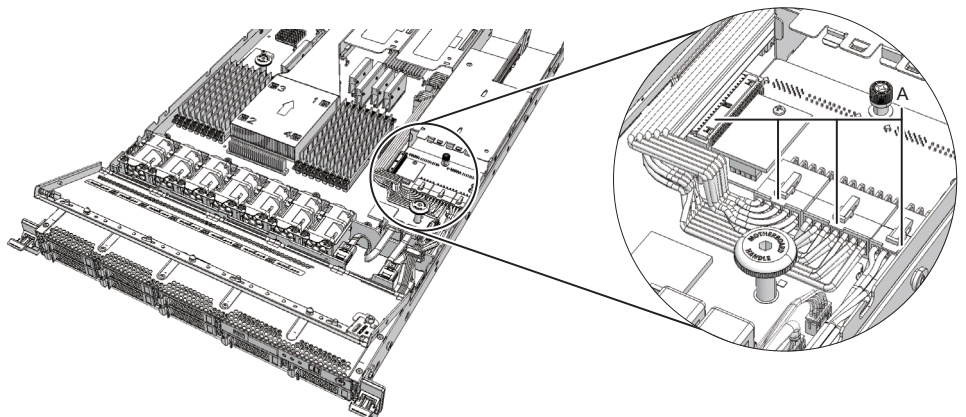
13.4 Installing the Cable Kit

This section describes the procedure for connecting the cable kit.

13.4.1 Installing the Cable Kit

1. **Lift the PSUBP, and connect the four cables (A in Figure 13-7) to the PSUBP.**

Figure 13-7   PSUBP Cables
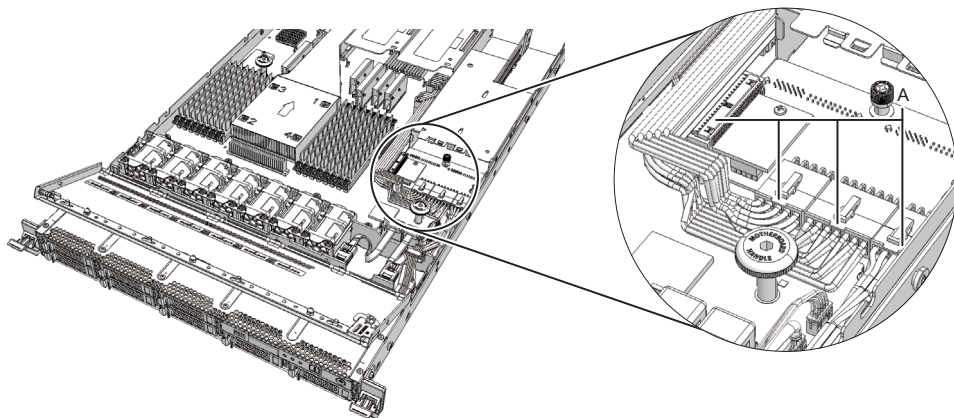
2. **Install the PSUBP.**
3. **Confirm that the two fixing pins are inserted into the PSUBP, and then slide the PSUBP toward the front of the SPARC M12-1.**
4. **Tighten the one screw of the PSUBP.**

5. **Connect the one cable that connects the PSUBP to the HDDBP.**

Figure 13-8   HDDBP Cable
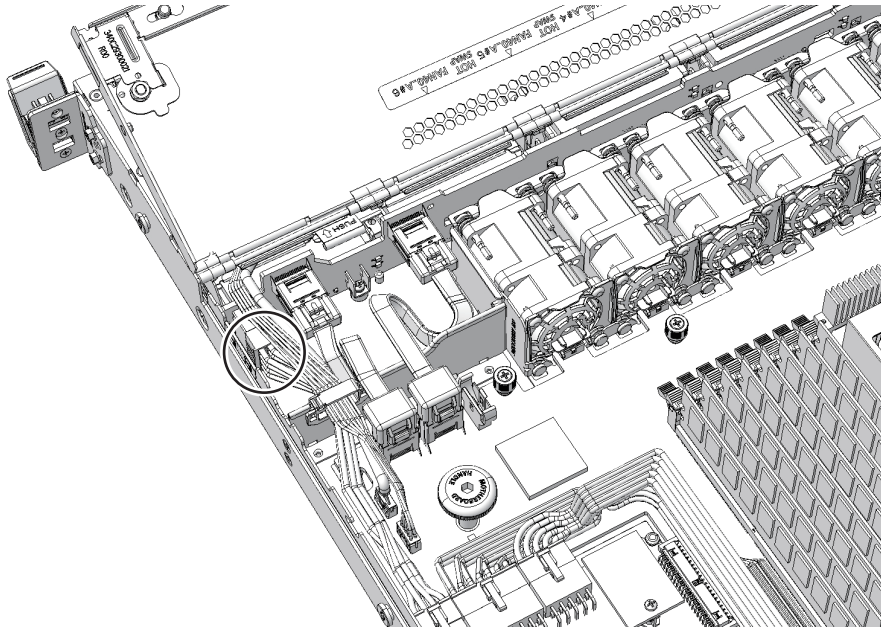
6. **Store the connected cables in the cable guide, and lock the guide.**
For details, see "6.1.1   Locking the Cable Guide."

7. **Connect the three cables that connect the PSUBP to the MBU.**

Note - Connect the cables in their original positions by referring to the record that you made before the start of maintenance.

Note - Make sure that each cable is firmly inserted.

Figure 13-9   MBU Cables
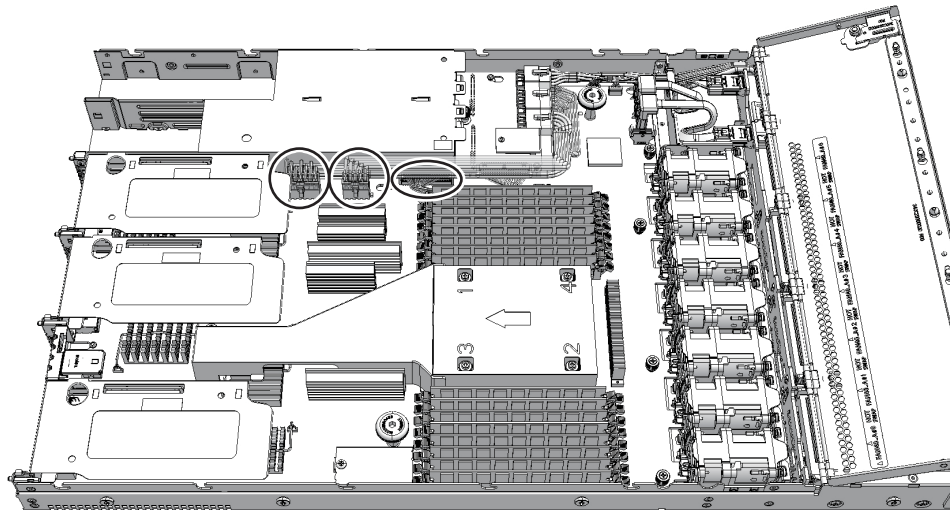
13.4.2   Restoring the Server

1. **Install the air duct and the PSUBP cover.**
   For details, see "6.1.2   Installing the Air Duct and PSUBP Cover."

2. **Install the upper cover.**
   For details, see "6.1.3   Installing the Upper Cover."

3. **Close the fan cover.**
   For details, see "6.1.4   Closing the Fan Cover."

4. **Install all the PSUs.**
   For details, see "11.4   Installing a PSU."

The FRU installation work is completed. See "Chapter 7   Maintenance Flow" to continue maintenance work.

Chapter 14

Maintaining the Operation Panel

This chapter describes the maintenance procedures for the operation panel (OPNL).

- Before Maintenance on the OPNL
- Location of the OPNL
- Removing the OPNL
- Installing the OPNL

14.1   Before Maintenance on the OPNL

This chapter only has descriptions of the OPNL location and the work of removing and installing the OPNL.
Before removing a FRU, see "Chapter 7   Maintenance Flow" and perform the necessary work items.
For the types of maintenance on the OPNL, also see "OPNL" in "Table 7-2 Maintenance Types for FRUs."

14.2   Location of the OPNL

This section describes the location of the OPNL.

Figure 14-1   Location of the OPNL
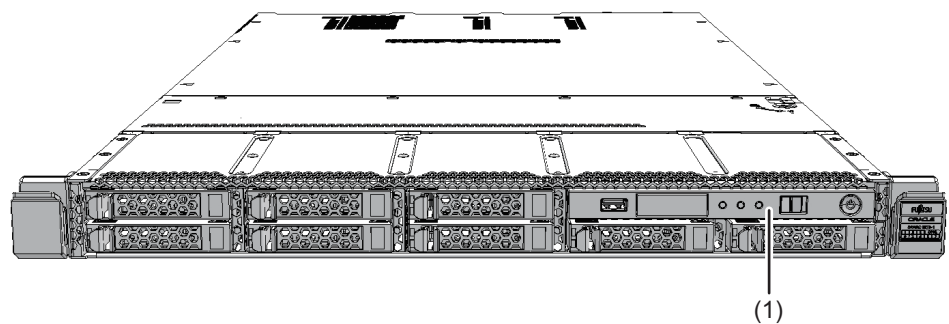
Location No.	**Component**
1	Operation panel (OPNL)

14.3   Removing the OPNL

This section describes the procedure for removing the OPNL.
Enable removal of the OPNL before attempting to remove it. For details, see "Chapter 7   Maintenance Flow."

Caution - Before you handle any components, wear a wrist strap to ground any static electricity. If you perform this procedure without a wrist strap, individual components or the overall system may be damaged. For details, see "1.4   Precautions on Static Electricity."

14.3.1   Accessing the OPNL

1. **Pull the SPARC M12-1 out of the rack.**
   For details, see "5.8.3   Pulling the SPARC M12-1 Out From the Rack."

2. **Open the fan cover.**
   For details, see "5.8.4   Opening the Fan Cover."

3. **Remove the upper cover.**
   For details, see "5.8.5   Removing the Upper Cover."

14.3.2   Removing the OPNL

1. **Two cables connect the OPNL to the MBU. Remove these cables from the MBU connectors.**

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

Figure 14-2   OPNL Cables
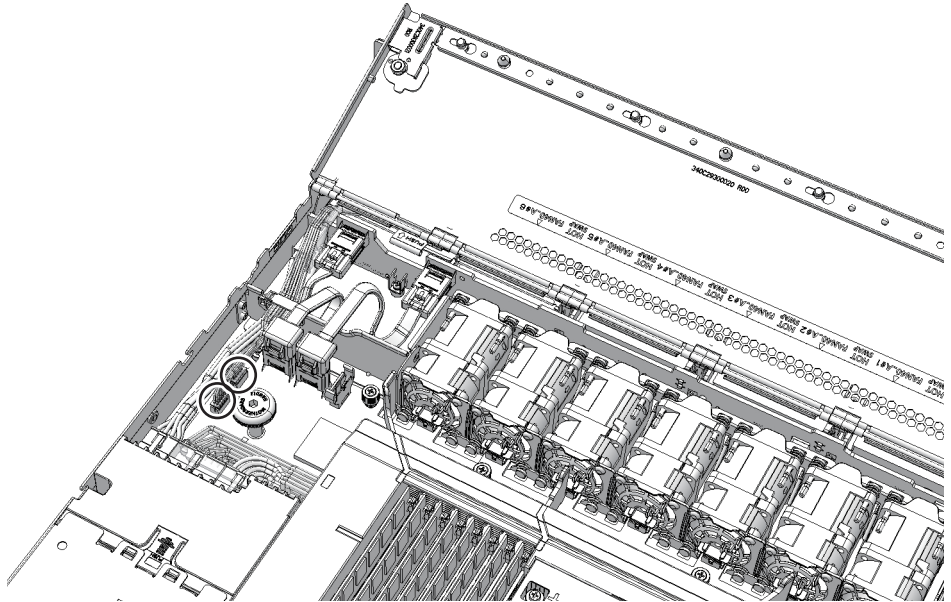
2. **Pull the OPNL toward the front of the SPARC M12-1 while pressing the lever (A in Figure 14-3) on the back of the OPNL.**

Figure 14-3   OPNL Lever
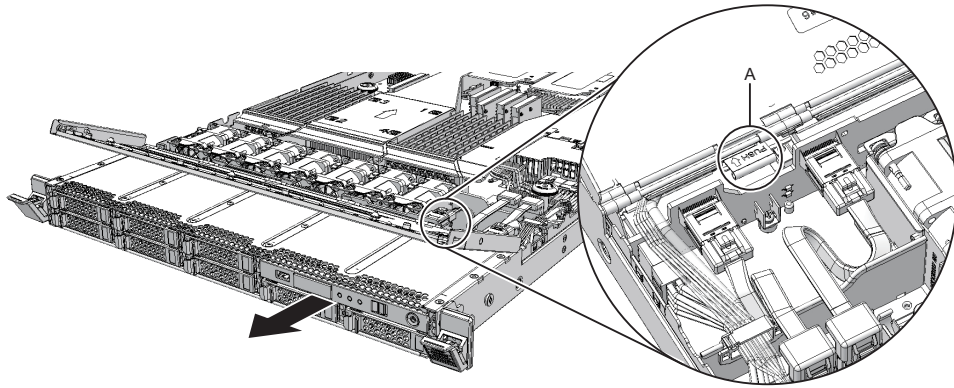
3. **Remove the OPNL while being careful not to damage any cables.**

Note - Place the removed OPNL on a grounded ESD mat to ground any static electricity.

14.4   Installing the OPNL

This section describes the procedure for installing the OPNL.

14.4.1   Installing the OPNL

1. **Switch the mode switch on the OPNL to Service mode.**
2. **Place the OPNL at the mounting location, and then run and insert cables from the front of the SPARC M12-1.**
3. **Push the OPNL firmly into place.**

Note - Confirm that the OPNL is firmly installed and secured.

4. **Connect the two cables from the OPNL to the MBU.**

Note - Connect the cables in their original positions by referring to the record that you made before the start of maintenance.

Figure 14-4　　OPNL Cables
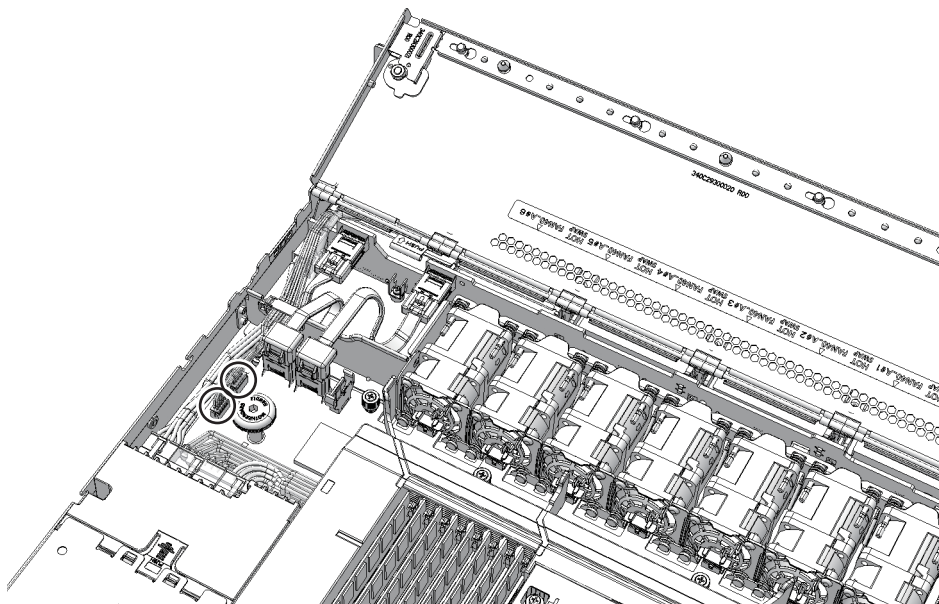
14.4.2　Restoring the Server

1. **Install the upper cover.**
   For details, see "6.1.3　Installing the Upper Cover."

2. **Close the fan cover.**
   For details, see "6.1.4　Closing the Fan Cover."

3. **Put the SPARC M12-1 into the rack.**
   For details, see "6.1.5　Putting the SPARC M12-1 Into the Rack."

The FRU installation work is completed. See "Chapter 7　Maintenance Flow" to continue maintenance work.

Chapter 15

Maintaining the Fan Units

This chapter describes the maintenance procedures for the fan units (FANUs).

- Before Maintenance on the FANU
- FANU Configuration
- Removing a FANU
- Installing a FANU

15.1 Before Maintenance on the FANU

This chapter only has descriptions of the FANU configuration and the work of removing and installing the FANU.
Before removing a FRU, see "Chapter 7   Maintenance Flow" and perform the necessary work items.
For the types of maintenance on the FANU, also see "FANU" in "Table 7-2 Maintenance Types for FRUs."

15.2 FANU Configuration

This section describes the configuration and locations of the FANUs.
Seven FANUs are installed in the SPARC M12-1. If an error occurs in a FANU, the XSCF detects the error. The 6+1 redundant configuration of the FANUs allows the system to continue operating even if one FANU fails.

Figure 15-1   Locations of the FANUs
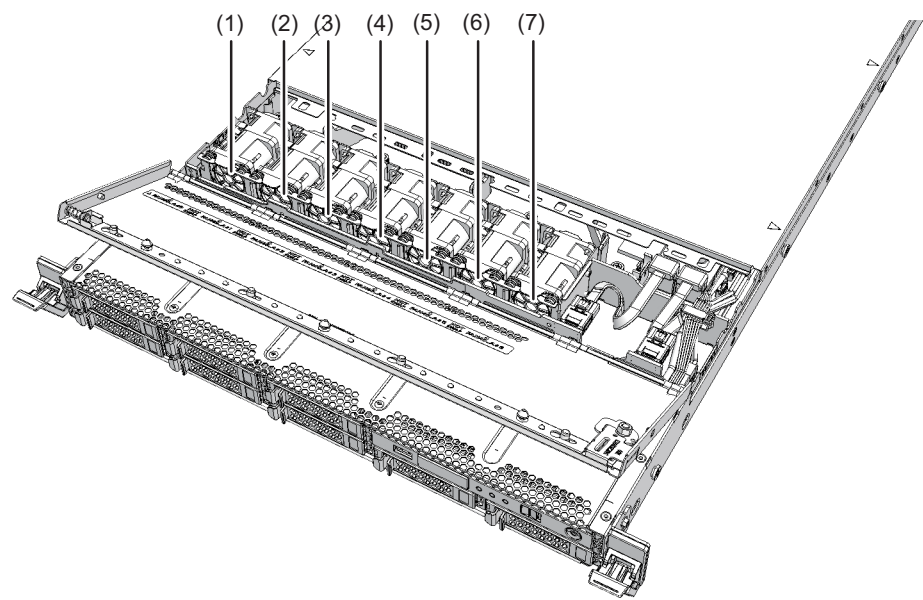
Location No.	Component
1	Fan unit (FAN#0)
2	Fan unit (FAN#1)
3	Fan unit (FAN#2)
4	Fan unit (FAN#3)
5	Fan unit (FAN#4)
6	Fan unit (FAN#5)
7	Fan unit (FAN#6)

15.3   Removing a FANU

This section describes the procedure for removing a FANU.
Enable removal of the FANU before attempting to remove it. For details, see
"Chapter 7   Maintenance Flow."

Caution - Before you handle any components, wear a wrist strap to ground any static
electricity. If you perform this procedure without a wrist strap, individual
components or the overall system may be damaged. For details, see "1.4   Precautions

15.3.1 Accessing a FANU

1. **Pull the SPARC M12-1 out of the rack.**
   For details, see "5.8.3 Pulling the SPARC M12-1 Out From the Rack."

2. **Open the fan cover.**
   For details, see "5.8.4 Opening the Fan Cover."

15.3.2 Removing a FANU

1. **With fingers on the front and rear, grip and pull up the FANU to remove it.**

Note - Place the removed FANU on a grounded ESD mat to ground any static electricity.

Figure 15-2 Removing a FANU
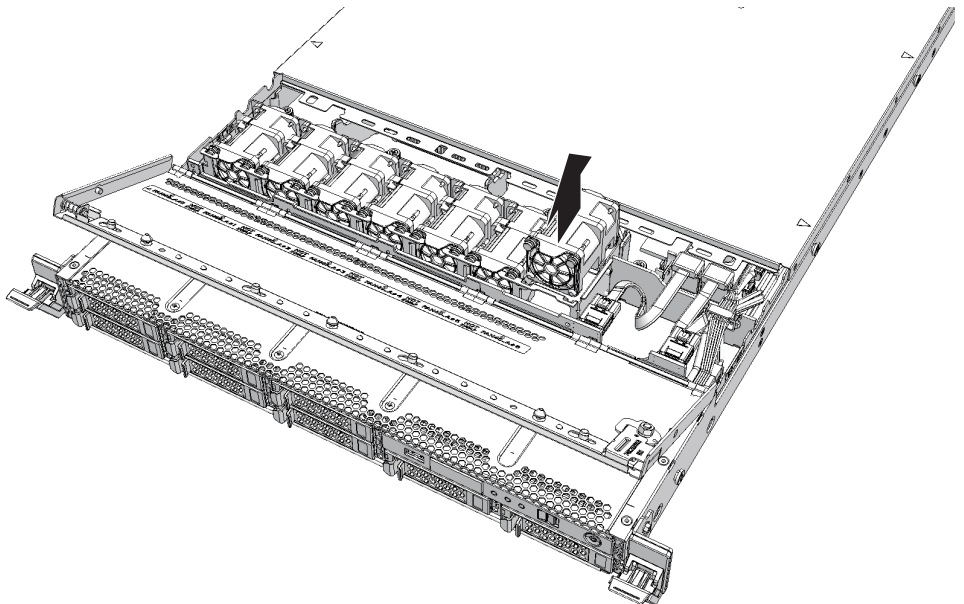
15.4 Installing a FANU

This section describes the procedure for installing a FANU.

15.4.1 Installing a FANU

1. **Install a FANU straight down into its slot.**

⚠ **Caution** - Do not forcibly push the FANU into its slot. Using excessive force may damage the FANU and server.

2. **Push the FANU firmly, with the connector on the back of the FANU aligned with the connector on the MBU.**

Note - Make sure that the FANU is firmly inserted and fixed.

15.4.2 Restoring the FANUs and Server

1. **Close the fan cover.**
   See "6.1.4   Closing the Fan Cover."

2. **Put the SPARC M12-1 into the rack.**
   See "6.1.5   Putting the SPARC M12-1 Into the Rack."

The FRU installation work is completed. See "Chapter 7   Maintenance Flow" to continue maintenance work.

Chapter 16

Maintaining the Motherboard Unit/Memory

This chapter describes the procedures for maintaining the motherboard unit (MBU) and memory.

- Before Maintenance on the MBU and Memory
- Location of the MBU
- Memory Locations
- Precautions for MBU Replacement
- Removing the MBU and Memory
- Installing the MBU and Memory

16.1 Before Maintenance on the MBU and Memory

This chapter only has descriptions of the MBU/memory locations and the work of removing and installing the MBU/memory.
Before removing a FRU, see "Chapter 7   Maintenance Flow" and perform the necessary work items.
For the types of maintenance on the MBU/memory, also see "MBU" and "Memory" in "Table 7-2   Maintenance Types for FRUs."

16.2 Location of the MBU

This section describes the location of the MBU.
One MBU is mounted in the SPARC M12-1.

Figure 16-1   Location of the MBU
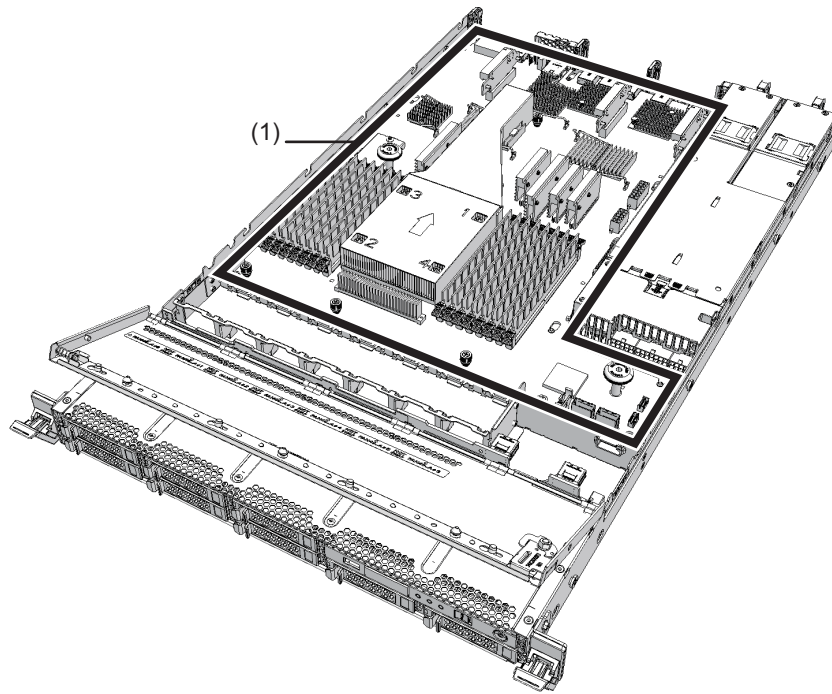
Location No.	Component
1	Motherboard unit (MBU)

16.3   Memory Locations

This section describes the configuration and locations of memory.
Memory is installed on the MBU and divided into group A and group B. Up to eight
memory modules can be installed for each group, up to a total of 16 memory modules.

Figure 16-2   Locations of Memory
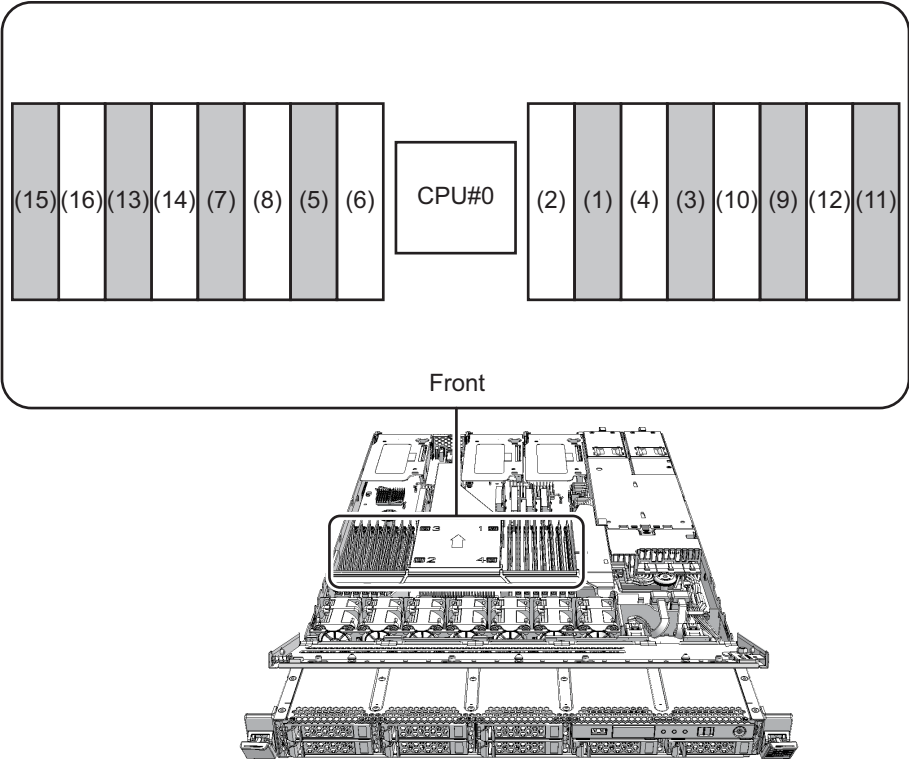
Location No.	Component	Group
1	Memory (MEM#00A)	A
2	Memory (MEM#00B)	B
3	Memory (MEM#01A)	A
4	Memory (MEM#01B)	B
5	Memory (MEM#02A)	A
6	Memory (MEM#02B)	B
7	Memory (MEM#03A)	A
8	Memory (MEM#03B)	B
9	Memory (MEM#10A)	A
10	Memory (MEM#10B)	B
11	Memory (MEM#11A)	A
12	Memory (MEM#11B)	B
13	Memory (MEM#12A)	A
14	Memory (MEM#12B)	B

Location No.	Component	Group
15	Memory (MEM#13A)	A
16	Memory (MEM#13B)	B

16.4   Precautions for MBU Replacement

Note the following points when replacing the MBU.

- Do not replace the MBU and the PSUBP at the same time. If you replace the MBU and the PSUBP at the same time, the system may fail to operate correctly. Replace the MBU or PSUBP, execute the showhardconf or showstatus command, and confirm that the replacement Field Replaceable Unit (FRU) is fully operational. Then, replace the other FRU.

- Do not mount and use any of the following SD cards in the MBU in another chassis:
  - the one currently mounted in the SPARC M12-1, or

  - one that was once used as a maintenance part

  This is because these SD cards store device identification information.

- The CPU and XSCF on the MBU cannot be replaced individually. Replace the MBU.

- When replacing the MBU, you need to remove memory from the old unit and reinstall it on the new unit. Always install the memory modules at the same locations as on the old motherboard unit.

- Before replacing the MBU, execute the dumpconfig command to save the system setting information. When the MBU is replaced, CPU Activation setting information and CPU Activation keys may be deleted. To restore the CPU Activation setting information and CPU Activation keys that have been saved with the dumpconfig command, execute the restoreconfig command. For details, see "10.10 Saving/Restoring XSCF Settings Information" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.

- Set the system time.
  After replacing the MBU, you need to set the system time. For details, see "Notes on Maintenance of a CPU Memory Unit, Motherboard Unit, XSCF Unit, PSU Backplane, or Crossbar Backplane Unit" in the *Fujitsu SPARC M12 Product Notes* for the latest XCP version.

- If you replace the SD card along with the MBU, dispose of the SD card mounted on the old MBU by appropriate means such as cutting it with cutting pliers.
  The old SD card stores the user information, IP address, and other information set in the XSCF firmware.

16.5 Removing the MBU and Memory

This section describes the procedure for removing the MBU.
Enable removal of the MBU before attempting to remove it. For details, see "Chapter 7 Maintenance Flow."

⚠️ **Caution -** Before you handle any components, wear a wrist strap to ground any static electricity. If you perform this procedure without a wrist strap, individual components or the overall system may be damaged. For details, see "1.4   Precautions on Static Electricity."

16.5.1 Accessing the MBU

1. **Remove all the cables connected to the external interface.**

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

2. **Pull the SPARC M12-1 out of the rack.**
   For details, see "5.8.3   Pulling the SPARC M12-1 Out From the Rack."

3. **Open the fan cover.**
   For details, see "5.8.4   Opening the Fan Cover."

4. **Remove the upper cover.**
   For details, see "5.8.5   Removing the Upper Cover."

5. **Remove the air duct and PSUBP cover.**
   For details, see "5.8.6   Removing the Air Duct and PSUBP Cover."

16.5.2   Removing Memory

This section describes the procedure for removing memory. Use the same procedure for reduction too.

When replacing the MBU, you need to remove memory from the old unit and reinstall it on the new unit. Mount the memory at the same memory mounting locations as those before replacement.

To reduce memory, see "2.2   Checking the Memory Configuration Rules."

⚠️ **Caution -** Before you handle any components, wear a wrist strap to ground any static electricity. If you perform this procedure without a wrist strap, individual components or the overall system may be damaged. For details, see "1.4   Precautions on Static Electricity."

1. **Move the latch of the memory slot outward, and then remove the memory by pulling it straight up.**

Note - Record the mounting locations of the memory before removing them, to ensure that they are reinstalled correctly.

Note - Place the removed memory on a grounded antistatic ESD mat.

Figure 16-3   Removing Memory
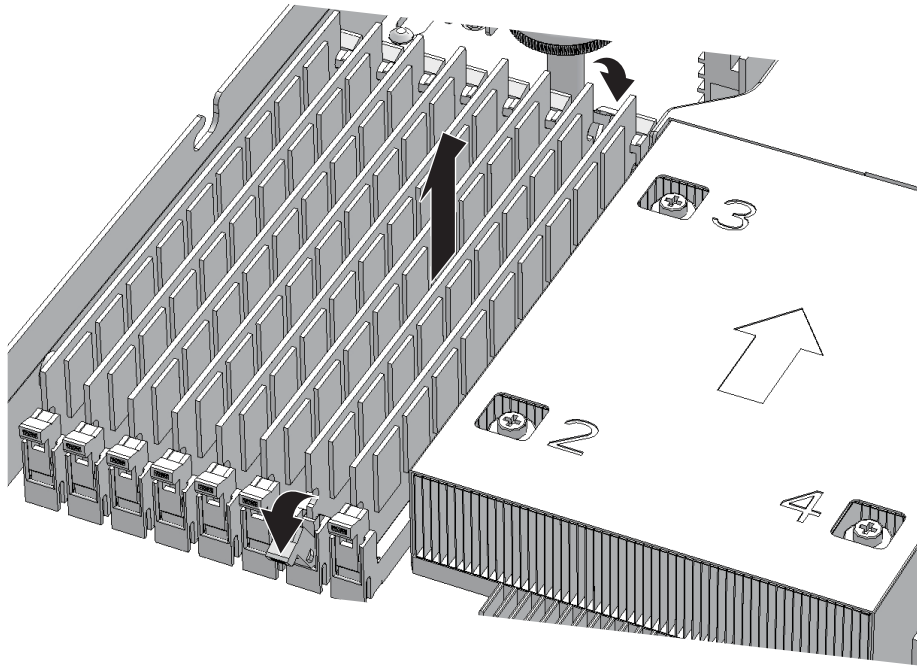
16.5.3 Removing the MBU

⚠️ **Caution -** Remove all the memory before removing the MBU. Otherwise, the memory may be damaged.

1. **Remove all the FANUs.**
   For details, see "15.3.2   Removing a FANU."

Note - Record the mounting locations of the FANUs before removing them, to ensure that they are reinstalled correctly.

2. **Remove all the PCI Express (PCIe) risers.**
   For details, see "8.3.2   Removing a PCIe Riser."

   Removing the PCIe risers enables you to easily remove the cables from the PSUBP.

Note - Record the mounting locations of the PCIe risers before removing them, to ensure that they are reinstalled correctly.

3. **Remove all the memory.**
   For details, see "16.5.2   Removing Memory."

Note - Record the mounting locations of the memory before removing them, to ensure that they are reinstalled correctly.

4. **Release the cable lock guide.**
   For details, see "5.8.7   Releasing the Cable Guide Lock."

   If the cable guide does not have a lock, proceed to step 3.

5. **Remove the cables connected to the MBU.**
   The following cables are to be removed:

   a. Three cables connecting the PSUBP to the MBU

   b. One cable connecting the PSUBP to the HDDBP
      The cable does not have to be removed from the HDDBP.

   c. Two cables connecting the HDDBP to the MBU
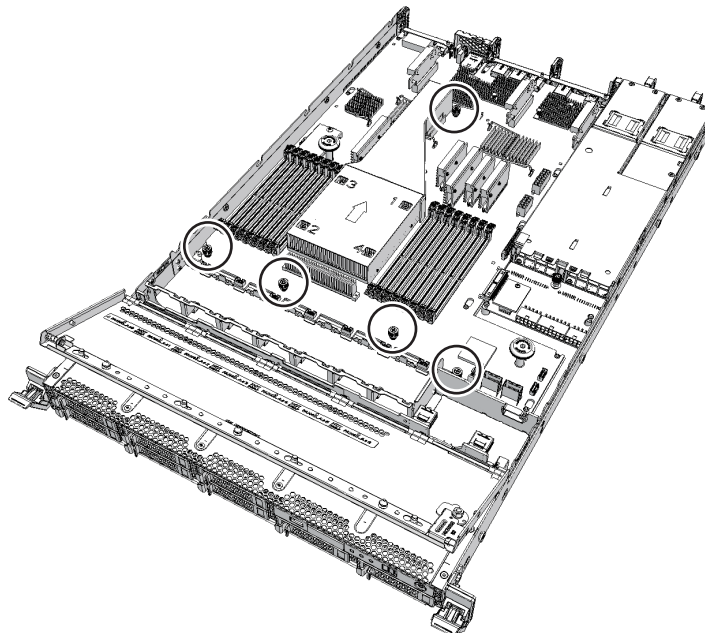
   d. Two cables connecting the OPNL to the MBU

Note - Record the positions of the cables before removing them, to ensure that they are reinstalled correctly.

Figure 16-4   MBU Cables
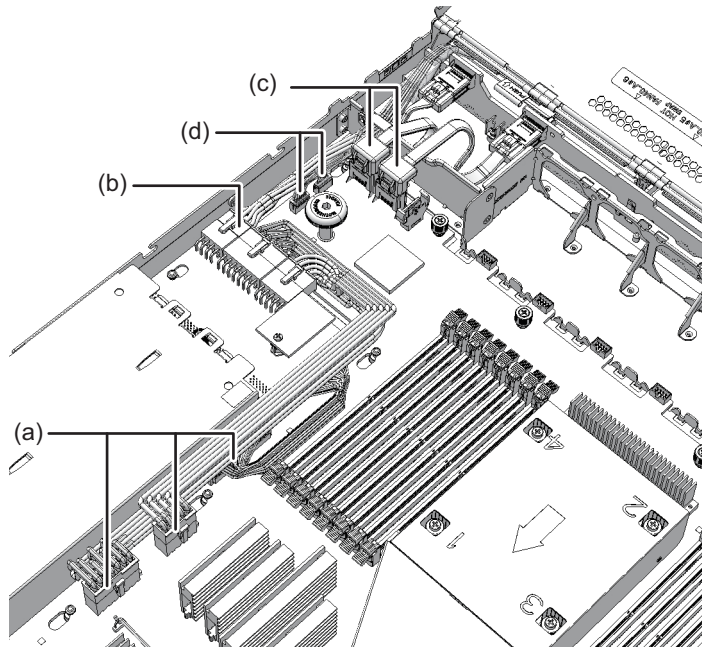
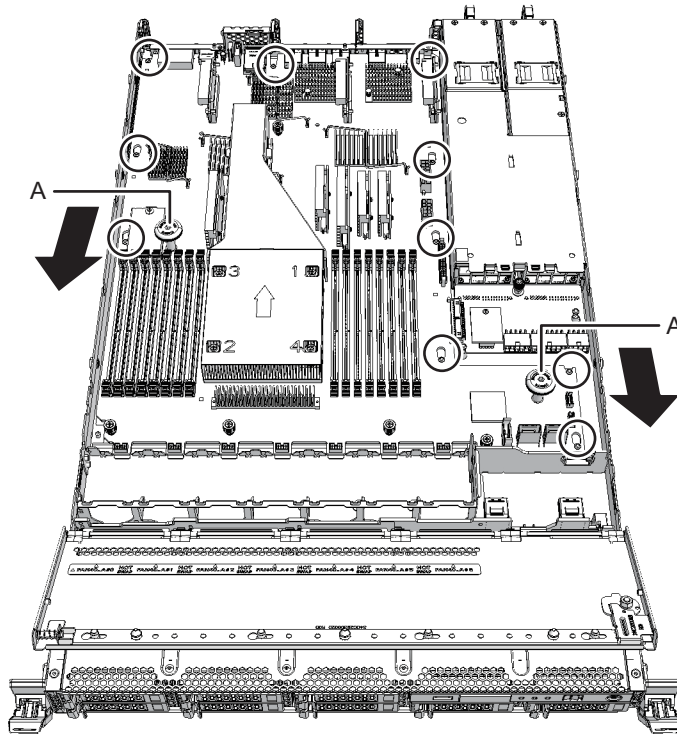6. **Loosen the five screws of the MBU.**

Figure 16-5   MBU Screws

7. **Hold the handles (A in Figure 16-6) of the MBU and slide it out toward the front of the SPARC M12-1.**

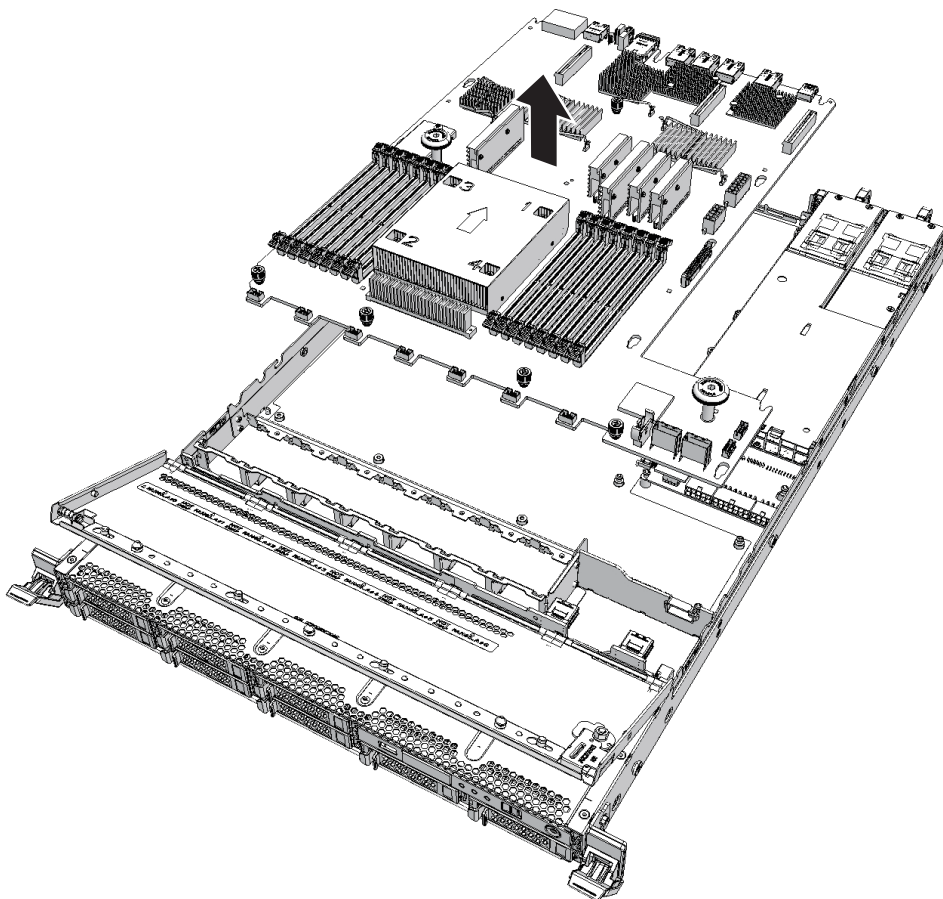Confirm that the MBU disengages from 10 fixing pins.

Figure 16-6   Fixing Pins of the MBU

8. **Pull up the MBU to remove it.**

Note - Place the removed MBU on a grounded ESD mat to ground any static electricity.
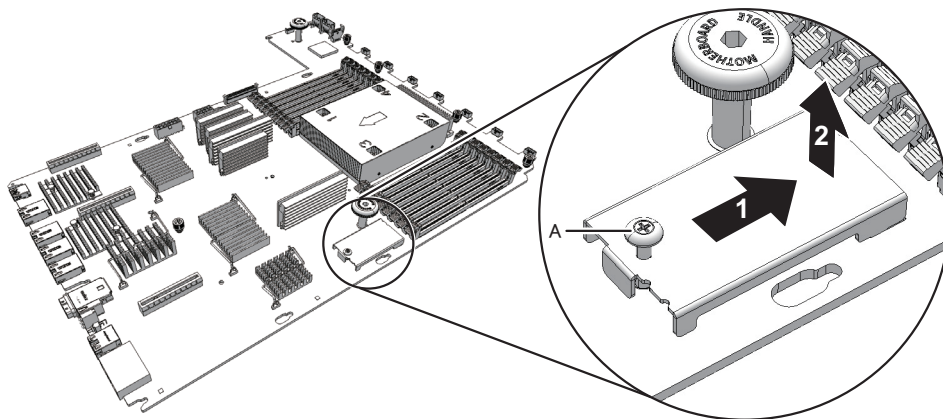
Figure 16-7   Removing the MBU

16.5.4   Switching the SD Card

If you replace the MBU, the firmware version may be different from that used before the replacement. To use the same firmware version as that used before the replacement, remove the SD card from the replaced MBU, and install it in the replacement MBU.

1. **Loosen the screw (A in Figure 16-8) securing the SD card protection cover fixed to the removed MBU, then slide the protection cover towards the memory, and lift up to remove the cover.**
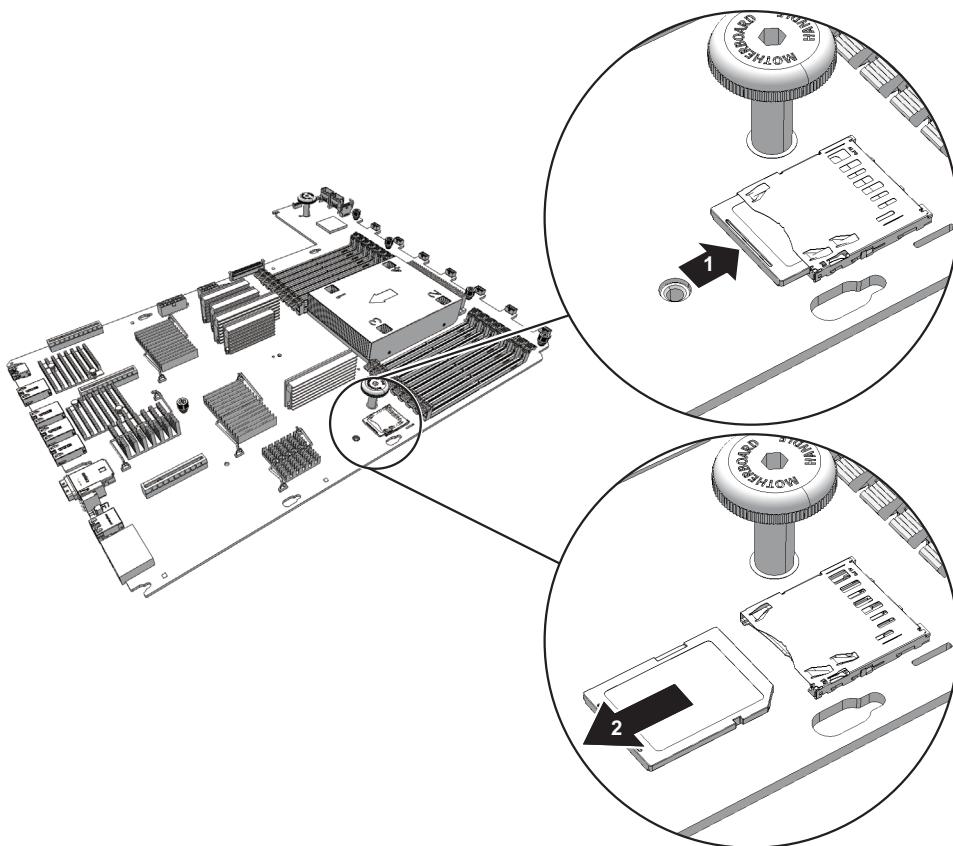
Figure 16-8   Removing the SD Card Protection Cover

2. **Remove the SD card.**
   Release the lock by pressing the SD card (1 in Figure 16-9), and then remove the card from the MBU (2 in Figure 16-9).
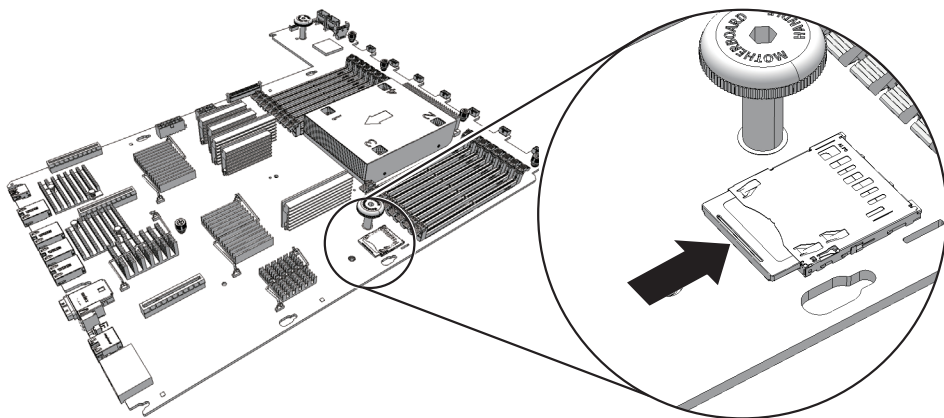
Figure 16-9   Removing the SD Card

Note - Be careful not to mix up the removed SD card with the SD card installed in the replacement part.

---

3. **Install an SD card.**
Insert the SD card that contains the XSCF firmware to be used into the socket of the MBU. Secure the SD card by pushing it until its latch locks into place.
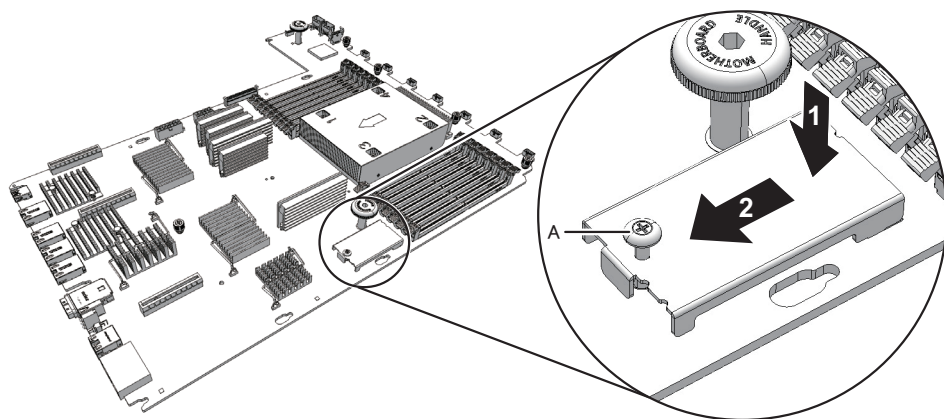
Figure 16-10   Installing an SD Card

![Caution icon] **Caution** - Be careful not to damage the SD card connector by pushing in the SD card too hard.

4. **Install the SD card protection cover.**
Install the protection cover on the MBU, and secure it with the screw (A in Figure 16-11).

Figure 16-11   Installing the SD Card Protection Cover

Note - Return the SD card supplied with the new MBU by installing it in the removed MBU.

16.6 Installing the MBU and Memory

This section describes the procedure for installing the MBU.

16.6.1 Installing the MBU

⚠ **Caution** - Be careful not to damage the connectors when installing the MBU in the SPARC M12-1.

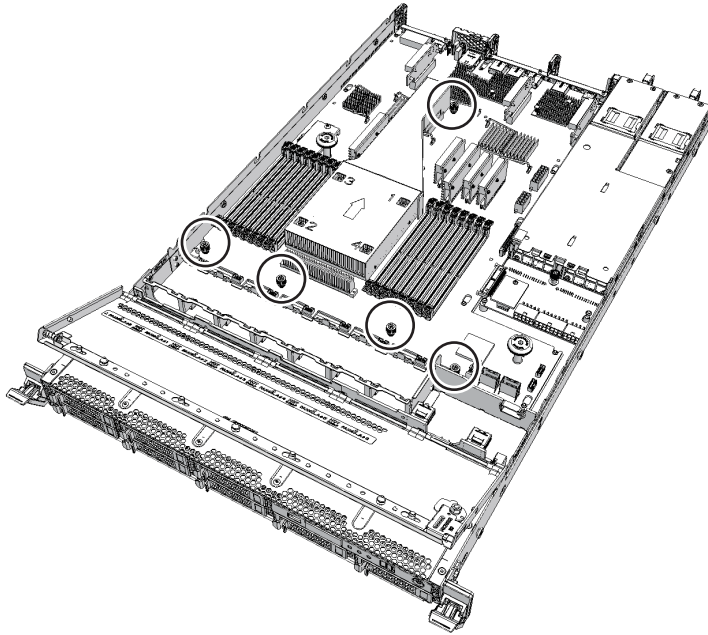1. **Hold the handles on the MBU, and install the MBU in the SPARC M12-1.**
   Install it from the front of the SPARC M12-1, aligning it with the mounting location.

2. **Confirm that the 10 fixing pins are inserted into the MBU, and then slide the MBU toward the rear of the SPARC M12-1.**

Figure 16-12   Fixing Pins of the MBU
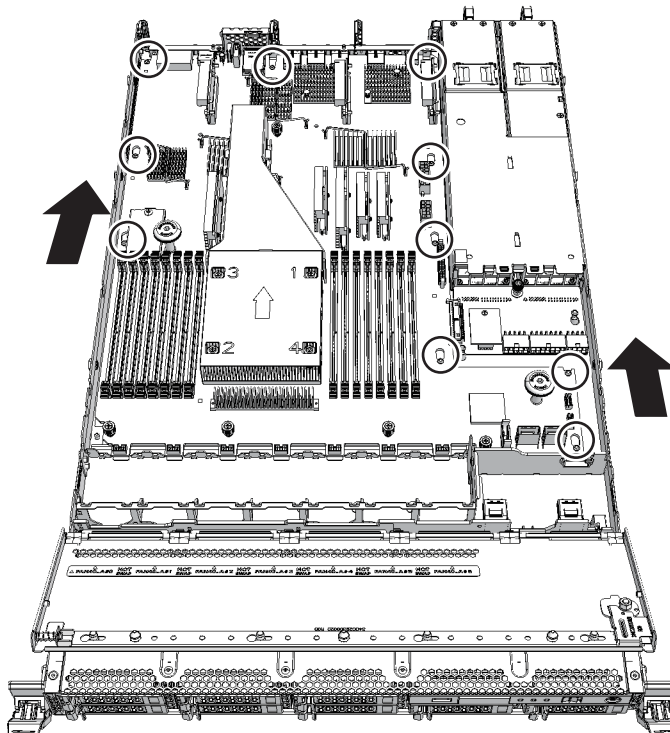
3. **Tighten the five screws of the MBU.**

Figure 16-13   MBU Screws

4. **Connect the cables to the MBU.**

The following cables are to be installed:

a. Three cables connecting the PSUBP to the MBU

b. One cable connecting the PSUBP to the HDDBP
   Connect the cable to the PSUBP.

c. Two cables connecting the HDDBP to the MBU

d. Two cables connecting the OPNL to the MBU
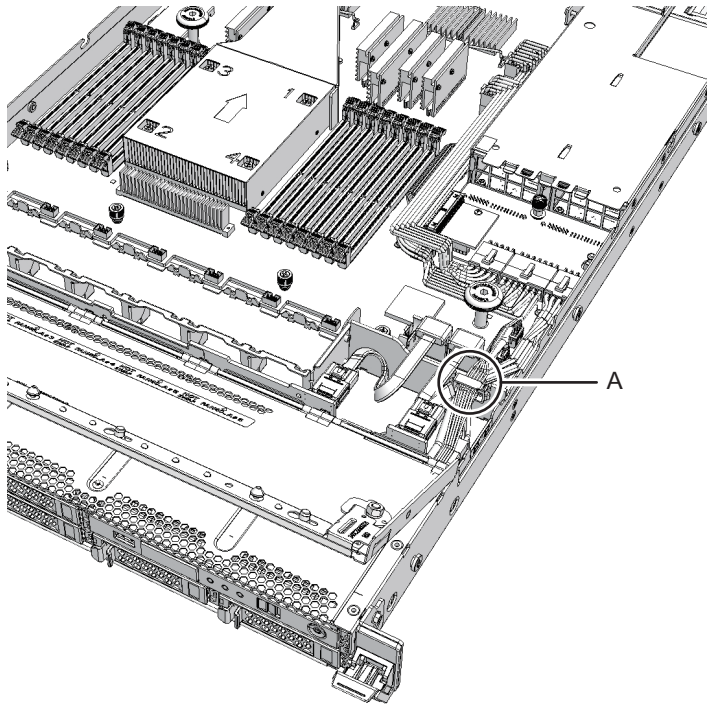
Note - Reinstall the cables in their original positions by referring to the record that you made before the start of maintenance.

Figure 16-14   MBU Cables
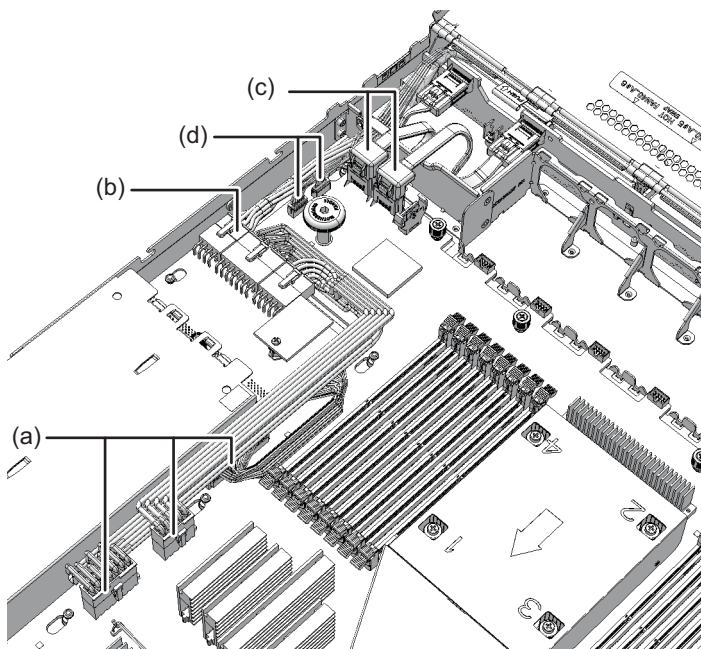
5.   **Store the MBU cables in the cable guide (A in Figure 16-15).**

Figure 16-15   Location of the Cable Guide

a. Store in the cable guide one cable (red/black) connecting the PSUBP to the HDDBP and two cables (black and black/yellow/white) connecting the OPNL to the MBU.

b. Lock the cable guide.
   For details, see "6.1.1   Locking the Cable Guide."

6.   **Install the removed memory on the new MBU.**
     For details, see "16.6.2   Installing Memory."

Note - Reinstall the memory at their original locations by referring to the record that you made before the start of maintenance.

---

7.   **Install all the PCIe risers.**
     For details, see "8.4.2   Installing a PCIe Riser."

Note - Reinstall the PCIe risers at their original locations by referring to the record that you made before the start of maintenance.

---

8.   **Install all the FANUs.**
     For details, see "15.4.1   Installing a FANU."

Note - Reinstall the FANUs at their original locations by referring to the record that you made before the start of maintenance.

16.6.2   Installing Memory

This section describes the procedure for installing memory.
To expand memory, see "2.2   Checking the Memory Configuration Rules," and install memory.

1.   **Put the memory in place.**
     To install memory in a memory slot, confirm that the latches on both sides of the slot are open. Align the key notch with the slot key of the memory, and put the memory into the memory slot.

Figure 16-16   Installing Memory
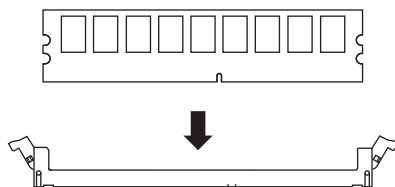
Note - Reinstall the memory at their original locations by referring to the record that you made before the start of maintenance.

2.   **Secure the memory.**
     Evenly push both ends of the memory until the memory slot latch closes.

Figure 16-17   Securing the Memory

Note - Confirm that the memory slot latch has returned to its original position.

16.6.3   Restoring the Server

1.   **Install the air duct and the PSUBP cover.**
     For details, see "6.1.2   Installing the Air Duct and PSUBP Cover."

2. **Install the upper cover.**
   For details, see "6.1.3   Installing the Upper Cover."

3. **Close the fan cover.**
   For details, see "6.1.4   Closing the Fan Cover."

4. **Put the SPARC M12-1 into the rack.**
   For details, see "6.1.5   Putting the SPARC M12-1 Into the Rack."

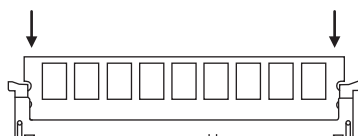5. **Connect all the cables of the external interface.**

Note - Reinstall the cables in their original positions by referring to the record that you made before the start of maintenance.

---

6. **Disconnect the XSCF LAN cables, and connect the serial cable.**

7. **Connect the power cords of the SPARC M12-1 requiring maintenance at their original positions.**

Note - Reinstall the power cords in their original positions by referring to the record that you made before the start of maintenance.

Note - The XSCF STANDBY LED (green) on the operation panel blinks when the power cords are connected. As the LED blinks, wait a moment for it to stay on. This indicates that XSCF initialization completed successfully.

---

8. **Log in to the XSCF via the serial port.**

9. **Set the XSCF time.**
   For details on the procedure, see "6.3.1   Setting the Time."

10. **Confirm that the XSCF reboots, and then connect the XSCF LAN cable.**

Note - Reinstall the cables in their original positions by referring to the record that you made before the start of maintenance.

---

11. **Match the XCP firmware version with the pre-replacement version.**
    For details on the procedure, see "6.3.2   Confirming the Firmware Version."

The FRU installation work is completed. See "Chapter 7   Maintenance Flow" to continue maintenance work.

Appendix A

Component List

This appendix describes the components constituting the SPARC M12-1.
Figure A-1 shows the locations of the components mounted in the SPARC M12-1.

Figure A-1   Locations of Components
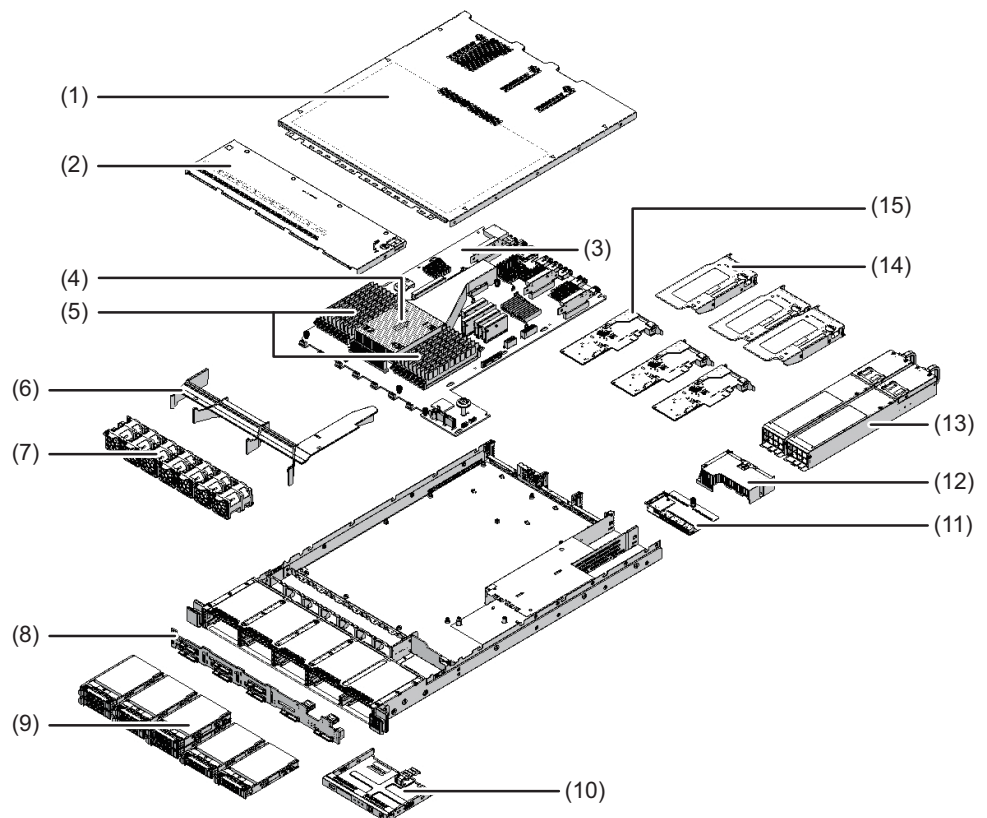
Location No.	Component
1	Upper cover
2	Fan cover
3	Motherboard unit (MBU)
4	CPU
5	Memory (MEM)
6	Air duct
7	Fan unit (FANU)
8	HDD backplane (HDDBP)
9	Internal storage (HDD/SSD)
10	Operation panel (OPNL)
11	PSU backplane (PSUBP)
12	PSU backplane cover (PSUBP cover)
13	Power supply unit (PSU)
14	PCI Express riser (PCIe riser)
15	PCI Express card (PCIe card)

Appendix B

Component Specifications

This appendix provides the specifications of the components.

- MBU
- PSU
- FANU
- HDD/SSD
- PCIe Card
- Backplanes
- OPNL

B.1   MBU

The MBU consists of the following components:

- CPU
- Memory
- XSCF
- PCIe card
- FANU

Power is supplied from a PSU to the MBU. Stop the system before performing any maintenance work on the MBU. Perform maintenance work from the top of the SPARC M12-1.
For the maintenance procedure, see "Chapter 16   Maintaining the Motherboard Unit/Memory."

B.2   PSU

The PSUs take input power and supply it to the system. The redundant configuration of the PSUs allows the system to continue operating even if one of the units fails. Table B-1 lists the specifications of the PSU.

Table B-1   PSU Specifications

Item	Description
Number of PSUs	2
Redundancy	1+1 redundant configuration
Location	Rear of SPARC M12-1
Active/Hot maintenance	Supported
System-stopped (inactive)/Hot maintenance	Supported
System-stopped (inactive)/Cold maintenance	Supported

For the maintenance procedure, see "Chapter 11   Maintaining the Power Supply Units."

B.3   FANU

The SPARC M12-1 is fitted with seven FANUs for cooling. If an error occurs in one FANU, the XSCF detects the error. The redundant configuration of the FANUs allows the system to continue operating even if one of the FANUs fails. Table B-2 lists the specifications of the FANU.

Table B-2   FANU Specifications

Item	Description
Number of FANUs	7
Redundancy	6+1 redundant configuration
Location	Rear of HDDs/SSDs
Active/Hot maintenance	Supported
System-stopped (inactive)/Hot maintenance	Supported
System-stopped (inactive)/Cold maintenance	Supported

For the maintenance procedure, see "Chapter 15   Maintaining the Fan Units."

B.4   HDD/SSD

The SPARC M12-1 supports the mounting of up to eight hard disk drives (HDDs) or solid state drives (SSDs).
Table B-3 lists the specifications of the HDD/SSD.

Table B-3   HDD/SSD Specifications

Item	Description
Number of HDDs/SSDs	8
Interface	SAS
Location	Front of SPARC M12-1
Active/Hot maintenance	Supported (Possible with any device other than the boot device. With a redundant configuration, however, this is also possible with the boot device.)
System-stopped (inactive)/Hot maintenance	Supported
System-stopped (inactive)/Cold maintenance	Supported

For the maintenance procedure, see "Chapter 9   Maintaining Internal Storage."

B.5   PCIe Card

The SPARC M12-1 supports the mounting of up to three low-profile PCIe cards.
Table B-4 lists the specifications of the PCIe card.

Table B-4   PCIe Card Specifications

Item	Description
Maximum number of PCIe cards	3
Location	Rear of SPARC M12-1
Active/Hot maintenance	Unsupported
System-stopped (inactive)/Hot maintenance	Unsupported
System-stopped (inactive)/Cold maintenance	Supported

For the maintenance procedure, see "Chapter 8   Maintaining the PCI Express Cards."

B.6   Backplanes

There are the following two types of backplane:

- HDDBP (A in Figure B-1)
- PSUBP (B in Figure B-1)

The backplane is a unit with connectors for mounting replaceable units in the SPARC M12-1. The PSUBP houses memory that stores identification information and user setting information.

Figure B-1   Locations of the Backplanes
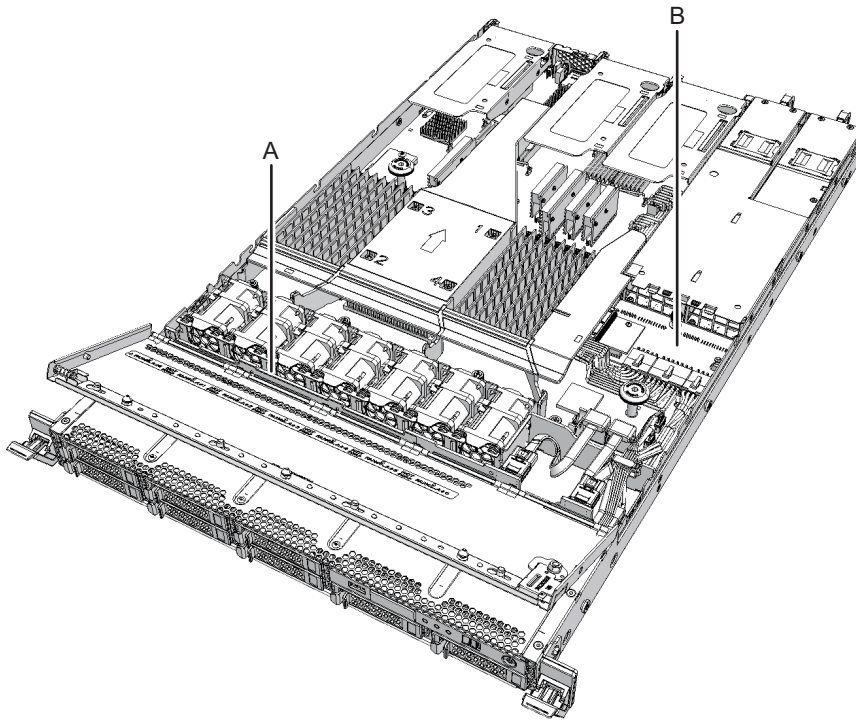
Table B-5 lists the specifications of the HDDBP. Table B-6 lists the specifications of the PSUBP.

Table B-5　　HDDBP Specifications

Item	Description
Number of HDDBPs	1
Location	Inside SPARC M12-1
Active/Hot maintenance	Unsupported
System-stopped (inactive)/Hot maintenance	Unsupported
System-stopped (inactive)/Cold maintenance	Supported

Table B-6　　PSUBP Specifications

Item	Description
Number of PSUBPs	1
Location	Inside SPARC M12-1
Active/Hot maintenance	Unsupported
System-stopped (inactive)/Hot maintenance	Unsupported
System-stopped (inactive)/Cold maintenance	Supported

For the maintenance procedure, see "Chapter 12　Maintaining the PSU Backplane" or "Chapter 10　Maintaining the HDD Backplane."

B.7　OPNL

The OPNL is installed on the front of the SPARC M12-1. It displays the system status and is used to operate the system.
Table B-7 lists the specifications of the OPNL.

Table B-7　　OPNL Specifications

Item	Description
Number of OPNLs	1
Location	Front of SPARC M12-1
Active/Hot maintenance	Unsupported
System-stopped (inactive)/Hot maintenance	Unsupported
System-stopped (inactive)/Cold maintenance	Supported

For the maintenance procedure, see "Chapter 14　Maintaining the Operation Panel."

Appendix C

Oracle Solaris Troubleshooting Commands

This appendix describes how to use Oracle Solaris commands to display fault diagnosis information and to take countermeasures. The commands listed here are useful for determining whether there are problems in the system, the network, or some other system connected through the network.

- iostat Command
- prtdiag Command
- prtconf Command
- netstat Command
- ping Command
- ps Command
- prstat Command

C.1 iostat Command

The iostat command is used to regularly report the CPU usage status, as well as the terminal status, drive status, and I/O status.
Table C-1 lists the options of the iostat command and how these options are useful for troubleshooting the system.

Table C-1   iostat Command Options

Option	Description	Application
No options	Reports the status of the local I/O device.	Allows you to view the device status concisely in 3 lines.
-c	Reports, as ratios, the length of time that the system has been in user mode, in system mode, waiting for I/O, and idling.	Allows you to view the CPU status as a concise report.

Table C-1 iostat Command Options *(continued)*

Option	Description	Application
-e	Displays a summary of statistics on device errors. The displayed items are the total number of errors, hardware errors, software errors, and transfer errors.	Allows you to view the accumulated number of errors as a concise table and identify potentially failed I/O devices.
-E	Displays statistics on all the device errors.	Allows you to view device information (manufacturer, model number, serial number, size, and errors).
-n	Displays the names in a descriptive form.	Allows you to identify devices with a descriptive display.
-x	Reports the extended drive statistics of individual drives. Statistics are output in table format. Similar to the -e option, but differs in that it provides rate information.	Allows you to find internal devices and other I/O devices on the network whose performance is low.

The following example shows the output from the iostat command.

```
# iostat -En
c5t50000393D85129FAd0 Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: TOSHIBA  Product: MBF2300RC      Revision: 3706 Serial No:
EB25PC201AL6
Size: 300.00GB <300000000000 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
c3t50000393D851FDAAd0 Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: TOSHIBA  Product: MBF2300RC      Revision: 3706 Serial No:
EB25PC201AMS
Size: 300.00GB <300000000000 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
c4t50000393D822D2B6d0 Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: TOSHIBA  Product: MBF2300RC      Revision: 3706 Serial No:
EB25PC2015P8
Size: 300.00GB <300000000000 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
c2t50000393E8001BB6d0 Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: TOSHIBA  Product: MBF2300RC      Revision: 3706 Serial No:
EB25PC301AV6
Size: 300.00GB <300000000000 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
#
```

C.2 prtdiag Command

The prtdiag command displays the system settings and diagnosis information. The diagnosis information shows any FRUs that experienced errors in the system.
The prtdiag command is in the following directory: /usr/platform/platform-name/sbin/.
The prtdiag command may display a slot number that differs from those supposed to be displayed according to other parts of this manual. This does not indicate a fault.
Table C-2 lists the options of the prtdiag command and how these options are useful for troubleshooting.

Table C-2 prtdiag Command Options

Option	Description	Application
No options	Displays a list of components.	Allows you to check the CPU information, the memory configuration, the mounted PCI Express (PCIe) cards, the OpenBoot PROM version, the mode switch status, and the CPU operational mode.
-v	Displays information in detailed (Verbose) mode.	In addition to the content displayed when no option is specified, this option allows you to check detailed information of the PCIe card.

The following example shows the output from the prtdiag command.

```
# prtdiag -v
System Configuration:  Oracle Corporation  sun4v SPARC M12-1
Memory size: 62976 Megabytes
=============================== Virtual CPUs ===============================
CPU ID Frequency Implementation          Status
------ --------- ---------------------- -------
0      3200 MHz  SPARC64-XII             on-line
1      3200 MHz  SPARC64-XII             on-line
2      3200 MHz  SPARC64-XII             on-line
3      3200 MHz  SPARC64-XII             on-line
4      3200 MHz  SPARC64-XII             on-line
5      3200 MHz  SPARC64-XII             on-line
6      3200 MHz  SPARC64-XII             on-line
7      3200 MHz  SPARC64-XII             on-line
8      3200 MHz  SPARC64-XII             on-line
9      3200 MHz  SPARC64-XII             on-line
10     3200 MHz  SPARC64-XII             on-line
11     3200 MHz  SPARC64-XII             on-line
----------------------Omitted------------------------
43     3200 MHz  SPARC64-XII             on-line
44     3200 MHz  SPARC64-XII             on-line
45     3200 MHz  SPARC64-XII             on-line
46     3200 MHz  SPARC64-XII             on-line
```

```
47     3200 MHz  SPARC64-XII             on-line
===================== Physical Memory Configuration =======================
Segment Table:
----------------------------------------------------------
Base                 Segment  Interleave  Bank     Contains
Address              Size     Factor      Size     Modules
----------------------------------------------------------
0x7e0000000000       64 GB    4           16 GB    /SYS/MBU/CMP0/MEM00A
                                                   /SYS/MBU/CMP0/MEM01A
                                          16 GB    /SYS/MBU/CMP0/MEM02A
                                                   /SYS/MBU/CMP0/MEM03A
                                          16 GB    /SYS/MBU/CMP0/MEM10A
                                                   /SYS/MBU/CMP0/MEM11A
                                          16 GB    /SYS/MBU/CMP0/MEM12A
                                                   /SYS/MBU/CMP0/MEM13A
===================================== IO Devices
=====================================
Slot +               Bus   Name +                              Model      Max Speed
  Cur Speed
Status               Type  Path                                           /Width
  /Width
---------------------------------------------------------------------------
-------------
/SYS/MBU/NET0        PCIE  network-pciex8086,1528                         5.0GT/x8
  5.0GT/x8
                           /pci@8000/pci@4/pci@0/pci@1/network@0
/SYS/MBU/NET1        PCIE  network-pciex8086,1528                         5.0GT/x8
  5.0GT/x8
                           /pci@8000/pci@4/pci@0/pci@1/network@0,1
/SYS/MBU/SASHBA0     PCIE  scsi-pciex1000,87                   LSI,2308_2 5.0GT/x8
  5.0GT/x8
                           /pci@8100/pci@4/pci@0/pci@0/scsi@0
/SYS/MBU/USB         PCIE  usb-pciexclass,0c0330                          5.0GT/x1
  5.0GT/x1
                           /pci@8100/pci@4/pci@0/pci@8/usb@0
/SYS/MBU/NET2        PCIE  network-pciex8086,1528                         5.0GT/x8
  5.0GT/x8
                           /pci@8200/pci@4/pci@0/pci@0/network@0
/SYS/MBU/NET3        PCIE  network-pciex8086,1528                         5.0GT/x8
  5.0GT/x8
                           /pci@8200/pci@4/pci@0/pci@0/network@0,1
========================== Environmental Status ===========================
========================== FRU Status ==========================
Location                         Name      Status
----------------------------------------------------
                                 SYS       enabled
========================== FW Version ==========================
Version
----------------------------------------------------------
3026
==================== System PROM revisions ======================
Version
----------------------------------------------------------
OBP 4.38.5 2017/01/04 14:38
Chassis Serial Number
```

C.3   prtconf Command

The prtconf command displays the configured devices.
The prtconf command identifies hardware units recognized by Oracle Solaris.
When a software application experiences a hardware-related issue even though there
is no hardware error, this command allows you to check whether Oracle Solaris
recognizes the hardware and whether the hardware drivers are loaded.
Table C-3 lists the options of the prtconf command and how these options are useful
for troubleshooting.

Table C-3   prtconf Command Options

Option	Description	Application
No options	Displays the device tree for the devices recognized by Oracle Solaris.	A hardware device is regarded as operating normally if it is recognized. If the message "(driver not attached)" is displayed for a device or a sub-device, the driver for the device is corrupted or does not exist.
-D	Outputs content similar to that of no options but differs in that the displayed content contains device driver names.	Allows you to check the driver necessary for Oracle Solaris to enable the device, or to view a list of drivers to be used.
-p	Outputs content similar to that of no options but differs in that the display is simpler.	Allows you to view the devices as a simple list.
-V	Displays the version and date of the OpenBoot PROM firmware.	Allows you to quickly check the firmware version.

The following example shows the output from the prtconf command.

```
# prtconf
System Configuration:  Oracle Corporation  sun4v
Memory size: 62976 Megabytes
System Peripherals (Software Nodes):
ORCL,SPARC64-X
    scsi_vhci, instance #0
        disk, instance #1
        disk, instance #0 (driver not attached)
    packages (driver not attached)
        SUNW,builtin-drivers (driver not attached)
        SUNW,probe-error-handler (driver not attached)
```

```
        deblocker (driver not attached)
        disk-label (driver not attached)
        terminal-emulator (driver not attached)
        dropins (driver not attached)
        SUNW,asr (driver not attached)
        kbd-translator (driver not attached)
        obp-tftp (driver not attached)
        zfs-file-system (driver not attached)
        hsfs-file-system (driver not attached)
    chosen (driver not attached)
    openprom (driver not attached)
        client-services (driver not attached)
    options, instance #0
    aliases (driver not attached)
    memory (driver not attached)
    virtual-memory (driver not attached)
    iscsi-hba (driver not attached)
        disk (driver not attached)
    reboot-memory (driver not attached)
    virtual-devices, instance #0
        rtc (driver not attached)
        flashprom (driver not attached)
        channel-devices, instance #0
            virtual-channel, instance #0
            virtual-channel-client, instance #1
            virtual-channel-client, instance #2
            virtual-channel, instance #3
            virtual-domain-service, instance #0
        console, instance #0
    cpu (driver not attached)
    cpu (driver not attached)
    cpu (driver not attached)
    cpu (driver not attached)
    cpu (driver not attached)
-----------------------Omitted-----------------------
    cpu (driver not attached)
    cpu (driver not attached)
    cpu (driver not attached)
    pci, instance #0
        pci, instance #0
            pci, instance #1
                pci, instance #2
                    network, instance #0 (driver not attached)
                    network, instance #1 (driver not attached)
    pci, instance #1
        pci, instance #3
            pci, instance #4
                pci, instance #5
                    scsi, instance #0
                        iport, instance #1
                            smp, instance #0 (driver not attached)
                            enclosure, instance #0
                        iport, instance #2
                pci, instance #6
                    usb, instance #0
```

```
                    hub, instance #0
                    hub, instance #1
            pci, instance #7
pci, instance #2
    pci, instance #8
        pci, instance #9
            pci, instance #10
                network, instance #2
                network, instance #3 (driver not attached)
            pci, instance #11
pci, instance #3
    pci, instance #12
        pci, instance #13
            pci, instance #14
pci-performance-counters, instance #0
pci-performance-counters, instance #1
pci-performance-counters, instance #2
pci-performance-counters, instance #3
ramdisk-root (driver not attached)
fcoe, instance #0
iscsi, instance #0
pseudo, instance #0
```

C.4   netstat Command

The netstat command displays the network status and protocol statistics.
This command allows you to view a list of connections maintained by the host and
their status. The command also allows you to check the IP, TCP, and UDP packet
statistics and error conditions.
Table C-4 lists the options of the netstat command and how these options are useful
for troubleshooting.

Table C-4   netstat Command Options

Option	Description	Application
-i	Displays the interface status. The displayed content includes information on incoming and outgoing packets, incoming and outgoing errors, collisions, and queues.	Allows you to view a concise overview of the network status.
-i interval	Executes the netstat command at the interval of the number of seconds specified with a numeric value after the -i option.	Identifies intermittent or long-term network events. You can view nighttime events at a glance by piping the netstat output to a file.
-p	Displays the media table.	Allows you to check the MAC addresses of the host on the subnetwork.

Table C-4	netstat Command Options *(continued)*	
Option	**Description**	**Application**
-r	Displays the routing table.	Allows you to check the routing information.
-n	Converts a host name into an IP address and displays it.	Allows you to check the IP address instead of the host name.

The following example shows the output from the netstat command.

```
# netstat -p
Net to Media Table: IPv4
Device   IP Address                    Mask         Flags       Phys Addr
------ ------------------- --------------- -------- ---------------
net0    4S-111-D0               255.255.255.255 SPLA      b0:99:28:98:30:36
net0    10.24.187.1             255.255.255.255           00:0a:b8:50:cd:42
net0    224.0.0.22              255.255.255.255 S         01:00:5e:00:00:16

Net to Media Table: IPv6
 If    Physical Address    Type       State       Destination/Mask
----- ---------------- ------- ------------ ----------------------------
net0  33:33:00:00:00:01  other    REACHABLE    ff02::1
net0  33:33:00:00:00:02  other    REACHABLE    ff02::2
net0  33:33:00:01:00:02  other    REACHABLE    ff02::1:2
net0  33:33:00:00:00:16  other    REACHABLE    ff02::16
net0  b0:99:28:98:30:36  local    REACHABLE    fe80::b299:28ff:fe98:3036
net0  33:33:ff:98:30:36  other    REACHABLE    ff02::1:ff98:3036

#
```

C.5 ping Command

The ping command sends the ICMP ECHO_REQUEST packet to network hosts. In certain configurations of the ping command, the command output allows you to identify a network link or a node that has experienced a problem. The destination host is specified by the variable: *hostname*.
Table C-5 lists the operands/options of the ping command and how they are useful for troubleshooting.

Table C-5   ping Command Options

Operand/Option	Description	Application
hostname	When you send a probe packet to *hostname*, a message is returned.	Allows you to confirm that a host is active on the network.
-g *hostname*	Forces the probe packet to go through the specified gateway.	Allows you to test the quality of individual routes by sending packets to the target host via the various specified routes.
-i *interface*	Specifies the interface to be used for sending and receiving a probe packet.	Allows you to easily check the secondary network interface.
-n	Converts a host name into an IP address and displays it.	Allows you to check the IP address instead of the host name.
-s	ping is repeated at an interval of 1 second. Pressing the [Ctrl] + [C] keys stops ping, and then displays the statistics.	Allows you to check intermittent or long-term network events. You can view nighttime network events at a glance by piping the ping output to a file.
-svR	Displays the routes that probe packets have passed through at an interval of 1 second.	Displays the routes and hop counts of probe packets, allowing you to compare multiple routes to identify any bottleneck.

The following example shows the output from the ping command.

```
# ping -s 10.24.187.50
PING 10.24.187.50: 56 data bytes
64 bytes from 10.24.187.50: icmp_seq=0. time=0.555 ms
64 bytes from 10.24.187.50: icmp_seq=1. time=0.400 ms
64 bytes from 10.24.187.50: icmp_seq=2. time=0.447 ms
^C
----10.24.187.50 PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms)  min/avg/max/stddev = 0.400/0.467/0.555/0.079
#
```

C.6   ps Command

The ps command displays a list of process statuses. When no options are specified, the command outputs information on those processes that have the same execution user ID as the user executing the command and the same control terminal.
If you specify an option, output information is controlled by the option.
Table C-6 lists the options of the ps command and how these options are useful for troubleshooting.

Table C-6　　ps Command Options

Option	Description	Application
-e	Displays information on various processes.	Allows you to view process IDs and files that can be executed.
-f	Generates a complete list.	Allows you to view process information such as user IDs, parent process IDs, execution times, and paths to executed files.
-o *option*	Selects any items from those that can be configured as outputs. The pid, pcpu, pmem, and comm options display the process ID, CPU usage, memory usage, and corresponding executable files, respectively.	Allows you to check only the most important information. By determining the resource usage rate, you can identify those processes that could potentially affect system performance or even cause a hang.

The following example shows the output from the ps command.

```
# ps -eo pcpu,pid,comm|sort -rn
%CPU   PID COMMAND
 0.0   674 sort
 0.0   673 ps
 0.0   637 -bash
 0.0   636 login
 0.0   634 /usr/sbin/in.telnetd
 0.0   629 -bash
 0.0   613 /usr/bin/login
 0.0   602 /usr/lib/devchassis/devchassisd
 0.0   600 /opt/SUNWldm/bin/ldmd
 0.0   581 /usr/lib/inet/in.ndpd
 0.0   580 /sbin/dhcpagent
 0.0   577 /usr/lib/rmvolmgr
 0.0   548 /usr/sbin/auditd
 0.0   519 /usr/sbin/syslogd
 0.0   508 /usr/lib/ssh/sshd
 0.0   497 /usr/lib/fm/fmd/fmd
 0.0   487 /usr/lib/hal/hald-addon-cpufreq
 0.0   472 /usr/lib/autofs/automountd
 0.0   470 /usr/lib/autofs/automountd
 0.0   468 /usr/lib/inet/inetd
 0.0   458 hald-runner
 0.0   453 /usr/lib/hal/hald
 0.0   450 /usr/sbin/rpcbind
 0.0   421 /usr/lib/inet/proftpd
 0.0   413 /usr/sbin/cron
 0.0   382 /lib/svc/method/iscsid
 0.0   369 /usr/lib/efcode/sparcv9/efdaemon
 0.0   332 /usr/sbin/nscd
 0.0   297 /usr/lib/picl/picld
 0.0   272 /lib/inet/nwamd
 0.0   179 /usr/lib/devfsadm/devfsadmd
 0.0   176 /usr/lib/zones/zonestatd
```

```
0.0    171 /usr/lib/ldoms/drd
0.0    164 /usr/lib/ldoms/ldmad
0.0    161 /usr/lib/utmpd
0.0    158 /usr/lib/dbus-daemon
0.0    128 /usr/lib/sysevent/syseventd
0.0    112 /usr/lib/pfexecd
0.0     98 /lib/inet/in.mpathd
0.0     74 /lib/crypto/kcfd
0.0     73 /lib/inet/ipmgmtd
0.0     59 /usr/sbin/dlmgmtd
0.0     38 /lib/inet/netcfgd
0.0     13 /lib/svc/bin/svc.configd
0.0     11 /lib/svc/bin/svc.startd
0.0      8 vmtasks
0.0      7 intrd
0.0      6 kmem_task
0.0      5 zpool-rpool
0.0      3 fsflush
0.0      2 pageout
0.0      1 /usr/sbin/init
0.0      0 sched
#
```

C.7   prstat Command

The prstat command repeatedly tests all the active processes on the system, and provides statistics based on the specified output mode and sorting order. The output from the prstat command is similar to that from the ps command.
Table C-7 lists the options of the prstat command and how these options are useful for troubleshooting.

Table C-7   prstat Command Options

Option	Description	Application
No options	Displays a list of processes sorted in descending order of CPU resource consumption. The list is restricted by the height of the terminal window and the number of processes. The output is automatically updated every 5 seconds, and is stopped by pressing the [Ctrl] + [C] keys.	Allows you to view process IDs, user IDs, memory usage, the status, CPU usage, and command names in the output.
-n *number*	Restricts the number of lines in the output.	Limits the amount of displayed data, so that you can identify those processes that are consuming excessive amounts of resources.

Table C-7   prstat Command Options *(continued)*

Option	Description	Application
-s *key*	Sorts the list by key parameter.	The list can be sorted by cpu (default), time, and size.
-v	Displays the information in detailed mode.	Allows you to view other parameters.

The following example shows the output from the prstat command.

```
# prstat -n 5 -s size
   PID USERNAME  SIZE   RSS STATE   PRI NICE      TIME  CPU PROCESS/NLWP
   497 root       55M   49M sleep    59    0   0:01:12 0.0% fmd/37
   600 root       41M   36M sleep    59    0   0:09:13 0.0% ldmd/13
    11 root       37M   33M sleep    59    0   0:00:17 0.0% svc.startd/12
   468 root       24M   12M sleep    59    0   0:00:00 0.0% inetd/4
    13 root       20M   19M sleep    59    0   0:00:37 0.0% svc.configd/24
Total: 49 processes, 669 lwps, load averages: 0.05, 0.05, 0.04
#
```

Appendix D

External Interface Specifications

This appendix provides the specifications of the external interface connectors and XSCF switch mounted on the server.

The following external interface connectors are mounted on the server:

- Serial Port
- USB Port
- SAS Port
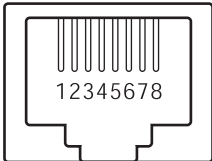
The following XSCF switch is mounted on the server:

- RESET Switch

D.1 Serial Port

Table D-1 lists the specifications of the serial port.

Table D-1   Serial Port

Pin Arrangement	Pin Number	Signal Name	Input/Output	Description
12345678	1	RTS	Output	Transmission request
	2	DTR	Output	Data terminal ready
	3	TXD	Output	Transmitted data
	4	GND	---	Ground
	5	GND	---	Ground
	6	RXD	Input	Received data
	7	DSR	Input	Data set ready
	8	CTS	Input	Transmission possible

D.1.1 Wire Connection Chart for Serial Cables

Figure D-1   Wire Connection Chart for Serial Cables

RJ45   D-sub 9pin

1 RTS	8 CTS
	1 CD
2 DTR	6 DSR
7 DSR	4 DTR
3 TXD	2 RXD
4 GND	5 GND
5 GND	
6 RXD	3 TXD
8 CTS	7 RTS
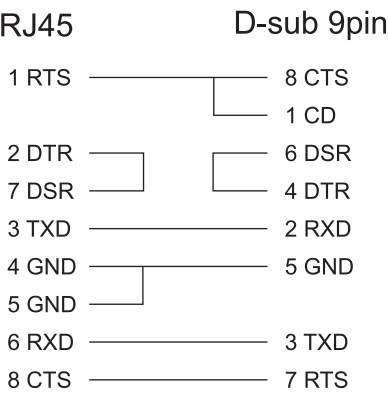
D.2 USB Port

Table D-2, Table D-3, and Table D-4 list the specifications of the USB port.

Table D-2   USB 2.0 Port (Front)

Pin Arrangement	Pin Number	Signal Name	Input/Output	Description
	1	VBUS	Output	Power supply
	2	-DATA	Input/Output	Data
1 2 3 4	3	+DATA	Input/Output	Data
	4	GND	---	Ground

Table D-3   USB 3.0 Port (Rear)
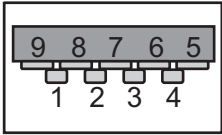
Pin Arrangement	Pin Number	Signal Name	Input/Output	Description
	1	VBUS	Output	Power supply
9 8 7 6 5	2	-DATA	Input/Output	Data
1 2 3 4	3	+DATA	Input/Output	Data

Table D-3   USB 3.0 Port (Rear) *(continued)*

Pin Arrangement	Pin Number	Signal Name	Input/Output	Description
	4	GND	---	Ground
	5	-SSRX	Input	SuperSpeed data
	6	+SSRX	Input	SuperSpeed data
	7	GND	---	Ground
	8	-SSTX	Output	SuperSpeed data
	9	+SSTX	Output	SuperSpeed data

Table D-4   USB Port for Maintenance (Rear)

Pin Arrangement	Pin Number	Signal Name	Input/Output	Description
	1	VBUS	Output	Power supply
	2	-DATA	Input/ Output	Data
	3	+DATA	Input/ Output	Data
	4	GND	---	Ground

D.3   SAS Port

The SAS port is used to connect external devices with an SAS interface, such as a tape drive. The chassis has one SAS port on the rear.
Consult our service engineer about compatible equipment.

D.4   RESET Switch

The RESET switch is an emergency switch to reboot the XSCF. For details on how to use the RESET switch, see "18.2   Precautions Concerning Using the RESET Switch" in the *Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide*.
Figure D-2 shows the location of the RESET switch. The RESET switch (A in Figure D-2) is mounted on the rear of the chassis.

Figure D-2　　Location of the RESET Switch

A
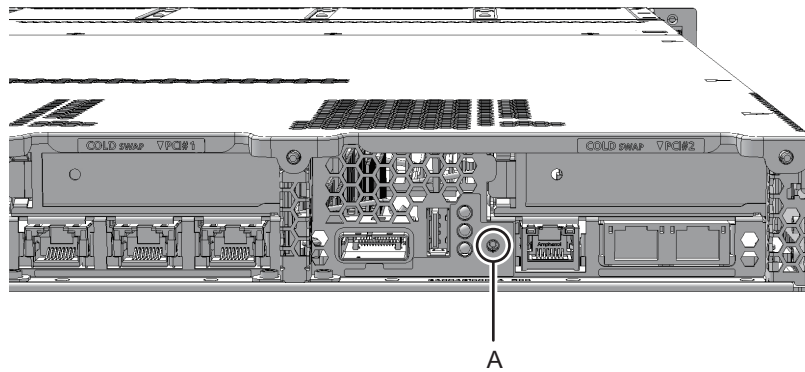
Appendix E

Removing the Lithium Battery

This appendix describes the procedure for removing the lithium battery mounted in the motherboard unit.

Note - Perform this work only when disassembling the product for disposal or recycling.

- Location of the Lithium Battery
- Removing the Lithium Battery

E.1 Location of the Lithium Battery

This section describes the location of the lithium battery.
One lithium battery is mounted in the SPARC M12-1 motherboard unit.
For details on removing the fan cover and upper cover, see "5.8.4   Opening the Fan Cover" and "5.8.5   Removing the Upper Cover," respectively.

Figure E-1   Location of the Lithium Battery
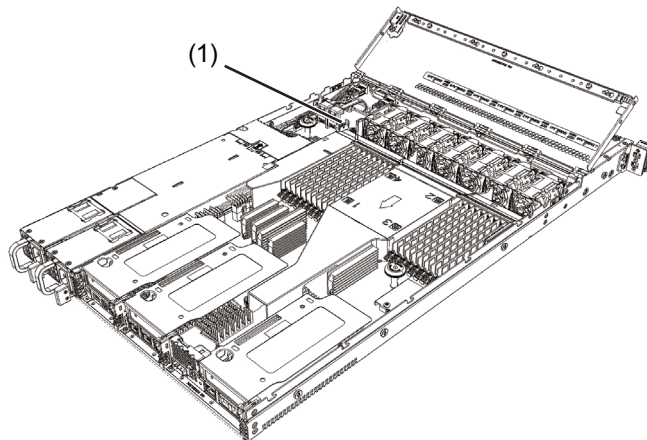
Location No.	Component
1	Lithium battery

E.2 Removing the Lithium Battery

This section describes the procedure for removing the lithium battery.

1. **Gripping the lithium battery at the top (A in Figure E-2) with needle-nose pliers or another fine-tipped tool, pull up the lithium battery to remove it.**

Figure E-2   Removing the Lithium Battery

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