Fujitsu M10/ SPARC M10 Systems Quick Guide

FUJITSU

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Preface

This document describes the basic specifications and system configurations that users need to be familiar with when using Oracle or Fujitsu SPARC M10 Systems.
The document also provides an overview of the SPARC M10 Systems and indicates the reference manuals for different work phases or purposes.

The SPARC M10 Systems are equipped with the high-performance, high-reliability SPARC64 X+ or SPARC64 X processor.

The preface includes the following sections:

- Text Conventions
- Document Feedback

Text Conventions

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

Font/Symbol	Meaning	Example
Italic	Indicates the name of a reference manual, a variable, or user-replaceable text.	See the *Fujitsu M10/SPARC M10 Systems Installation Guide*.
" "	Indicates the name of a chapter, section, item, button, or menu.	See "Chapter 2 Network Connection."

Document Feedback

If you have any comments or requests regarding this document, please go to one of the following URLs.

Japanese site
http://jp.fujitsu.com/platform/server/sparc/manual/

Global site
http://www.fujitsu.com/global/services/computing/server/sparc/downloads/manual/

Understanding an Overview of the System

This section describes the lineup, features, external view, system configuration, and system specifications of SPARC M10 Systems.

SPARC M10 Systems are UNIX server systems designed with a building block (BB) configuration. You can flexibly configure a system to meet the purpose and scale of your business by combining a number of SPARC M10 Systems chassis.
You can use SPARC M10 Systems for a wide variety of purposes, including database servers that are suitable for data centers in the cloud-computing age and Web servers or application servers that have to meet high-throughput requirements.

Lineup

Server main unit

The SPARC M10 Systems lineup consists of the following models that meet various requirements.

SPARC M10-1

This compact model, which uses a single 1-CPU chassis, combines both space saving and high performance.

Reference **External Views of the Chassis and System Configuration Examples - SPARC M10-1**

SPARC M10-4

This model uses a single 4- or 2-CPU chassis.

Reference **External Views of the Chassis and System Configuration Examples - SPARC M10-4**

SPARC M10-4S

This model employs a building-block system to interconnect 4- or 2-CPU chassis. You can increase or decrease the number of connected SPARC M10-4S units according to your required processing capacity. SPARC M10-4S units can be directly connected for a configuration of up to four building blocks. Also, connecting SPARC M10-4S units via a crossbar box (XBBOX) allows a configuration of up to 16 building blocks, thereby ensuring scalability of up to 64 CPUs.

Reference **External Views of the Chassis and System Configuration Examples - SPARC M10-4S**

Options

PCI expansion unit

The SPARC M10 Systems offer a PCI expansion unit for I/O slot expansion. The above three models support the PCI expansion unit, which supports PCI Express (PCIe).

Reference **External Views of the Chassis and System**
Configuration Examples - PCI expansion unit

Features of SPARC M10 Systems

Hardware

CPU

The SPARC M10 Systems CPU is a SPARC64 X+ or SPARC64 X multi-core/multi-threaded processor that was developed by Fujitsu to provide high performance. One CPU includes 16 cores and each CPU core provides two threads, thereby ensuring high memory throughput performance.

The SPARC64 X+ and SPARC64 X processors have inherited the highly reliable technologies of former generations of SPARC64 processor. Furthermore, they include a number of functional enhancements. The processor includes a CPU-to-CPU interface, a memory controller, and PCI Express 3.0 and uses System on Chip (SoC) technology featuring reduced inter-LSI distances. Also, Software on Chip (SWoC) technology, which allows a part of software processes to be incorporated into hardware, is used to achieve high-speed processing. The decimal floating-point arithmetic unit, which performs high-speed arithmetic processing, is based on the typical floating-point arithmetic standard (IEEE 754) and Oracle Number types. It is therefore possible to increase the speeds of various database processes. In addition, an encryption/decryption arithmetic unit is implemented through the High Performance Computing Arithmetic Computational Extension (HPC-ACE) architecture enhanced for supercomputers.

Memory subsystem

SPARC M10 Systems achieve high-speed memory access by supporting DDR3 DIMMs and using memory interleaving configurations up to four ways. The memory subsystem of SPARC M10 Systems is designed with consideration given to both performance and reliability. Memory data is protected by ECC and extended ECC functions. Also, memory is duplicated to support memory mirroring for data protection.

I/O subsystem

SPARC M10 Systems achieve high-speed data transfer within the I/O subsystem via the PCI Express bus by using a PCI Express 3.0 protocol implemented in each processor. This protocol makes it possible to transfer data at up to 8 GB/s (unidirectional).

By using PCI expansion units, you can extend the PCI Express 3.0 bus and increase the number of PCI Express slots.

System interconnect

SPARC M10 Systems maintain low latency by interconnecting CPUs, memory, and I/O subsystems via multiple system controllers and crossbar units within the system. Also, since the system bus is unidirectional, you can transfer data streams without contention. You can thus have a bandwidth of up to 6,553 GB/s.

XSCF (eXtended System Control Facility)

This facility is the heart of the remote monitoring and management functions of SPARC M10 Systems. It consists of a dedicated processor that is independent of the server system and runs an XSCF control package.
The XSCF is placed in each chassis of SPARC M10-1, M10-4, and M10-4S, to interact with a logical domain, manage the entire system, and perform other operations. If the system consists of multiple SPARC M10-4S chassis mounted on an expansion rack, one service processor is placed in each SPARC M10-4S chassis and in each crossbar box connecting these chassis. The XSCF runs on the service processor.
In a building-block configuration where multiple SPARC M10-4S units are connected, one XSCF works as a master and one of the other XSCFs is in standby mode, so that the two monitor each other. If an error occurs on the master XSCF, the standby XSCF takes over the role of the master so that system operation and management can continue without interrupting the business operation.

System Configuration by Virtualization Function

SPARC M10 Systems can achieve server virtualization and system integration by using Oracle VM Server for SPARC or Oracle Solaris Zones. For SPARC M10-4S, in a building-block configuration that includes high-speed interconnect connection, physical partitions can be configured in each chassis. For SPARC M10-1 or M10-4, one chassis works as a physical partition.
Physical partitions and the virtualization function of Oracle VM Server for SPARC are made available by using the XSCF firmware, Hypervisor, and Oracle VM Server for SPARC.
Oracle Solaris Zones is an Oracle Solaris virtualization function used by SPARC M10 Systems.

XSCF firmware

On the XSCF, this firmware runs on a dedicated processor that is independent of the server processor. It monitors and manages the entire system. The XSCF firmware (referred to below as the XSCF) has two user interfaces, a command-line interface and a Web browser based interface. These interfaces help system administrators with their daily tasks.
For SPARC M10-4S in a building-block configuration, you can configure physical partitions in each chassis using the XSCF. In conjunction with Hypervisor, the XSCF controls the start and stop of physical partitions and manages the physical partition status.

Hypervisor

The Hypervisor firmware, which is placed between the XSCF and Oracle Solaris, provides an interface that transfers the setting information from the XSCF to the logical domains and reports the status of the logical domains to the XSCF.

Oracle VM Server for SPARC

Oracle VM Server for SPARC is software that divides a physical server into virtual servers via Hypervisor in the firmware layer to configure logical domains in which Oracle Solaris environments run independently.

It allocates CPUs, memory, and I/O devices using Logical Domain Manager that can run in Oracle Solaris 11 or 10.

To use Oracle VM Server for SPARC, install it in an Oracle Solaris environment.

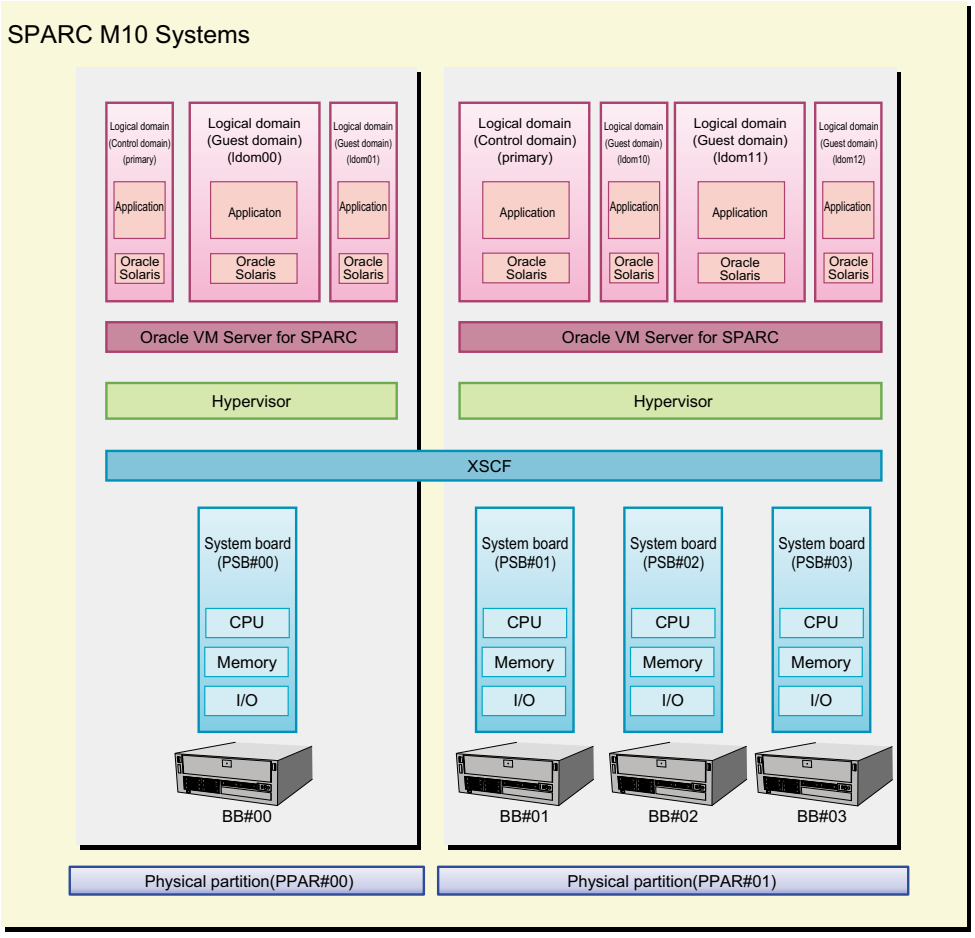
Logical domains

A domain is a virtual machine that is configured on SPARC M10 Systems and works as an independent system. You can configure multiple virtual machines of the required sizes by appropriately allocating hardware resources to SPARC M10 Systems.

The benefits of domains are as follows:

- Easy operation and management of many servers
  By configuring servers as domains, you can manage many servers on SPARC M10 Systems in a unified manner.
- Maintenance of independence of individual services
  Each domain works as an independent virtual machine, separated from other domains. Therefore, system failure in one domain does not affect other domains.
- Effective use of hardware resources
  Hardware resources in SPARC M10 Systems can be flexibly allocated to domains according to the processing load. This means that you can use hardware resources effectively.

The following figure shows the architecture of SPARC M10 Systems.
Logical domains are configured on a physical partition (PPAR). Oracle Solaris runs on each configured logical domain. To users, a logical domain appears as an independent computer system.



A logical domain consists of virtual CPUs, virtual memory, and virtual I/Os.

- Virtual CPUs
  CPU resources can be allocated to a logical domain in units of virtual CPUs (threads). In SPARC M10 Systems, one physical CPU (one socket) has multiple cores, each of which has threads. This means that one physical CPU includes as many virtual CPUs as there are threads. You can allocate these virtual CPUs to a logical domain.
- Virtual memory
  Memory can be allocated to a logical domain in units of 256 MB.

- Virtual I/Os

  I/Os can be allocated to a logical domain in units of virtual I/Os. For example, you can use the following entities as virtual devices which are virtual I/Os:

  - Physical disk
  - Physical disk slice
  - File in a ZFS, UFS, or other file system
  - Volumes clipped from ZFS

Logical domains are divided into the following types according to their roles:

- Control domain

  A control domain is a logical domain that creates and manages other logical domains and allocates resources to other logical domains.

  Only one control domain exists in each physical partition. In a control domain, Oracle VM Server for SPARC is installed and Logical Domains Manager, which is management software, runs.

- Root domain

  A root domain is an I/O domain to which a PCIe root complex is assigned. The PCIe root complex means the entire PCIe bus. It consists of a PCIe bus, all PCI switches, and devices. The root domain owns the physical I/O devices and directly accesses them.

- I/O domain

  An I/O domain is a domain that can directly access physical I/O devices, such as network cards for the PCI Express (PCIe) controller.

  It uses the direct I/O (DIO) function or the Single Root I/O Virtualization (SR-IOV) function of Oracle VM Server for SPARC.

  For the direct I/O function, see whichever of the following documents applies:

  - For Oracle VM Server for SPARC 3.1

    "Creating an I/O Domain by Assigning PCIe Endpoint Devices" in the *Oracle VM Server for SPARC 3.1 Administration Guide*

  - For Oracle VM Server for SPARC 3.0

    "Assigning PCIe Endpoint Devices" in the *Oracle VM Server for SPARC 3.0 Administration Guide*

  For virtualization of single root I/Os, see "SR-IOV Overview" in the *Oracle VM Server for SPARC Administration Guide*.

  With the dynamic reconfiguration function for PCIe endpoint devices, you can assign and remove PCIe endpoint devices without having to reboot the root domain or stop the I/O domain. This function is supported only for SPARC M10.

For the procedure for using the dynamic reconfiguration function for PCIe endpoint devices, see "15.3 Dynamic Reconfiguration Function for PCIe Endpoint Devices" in the *Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide*.

- Guest domain

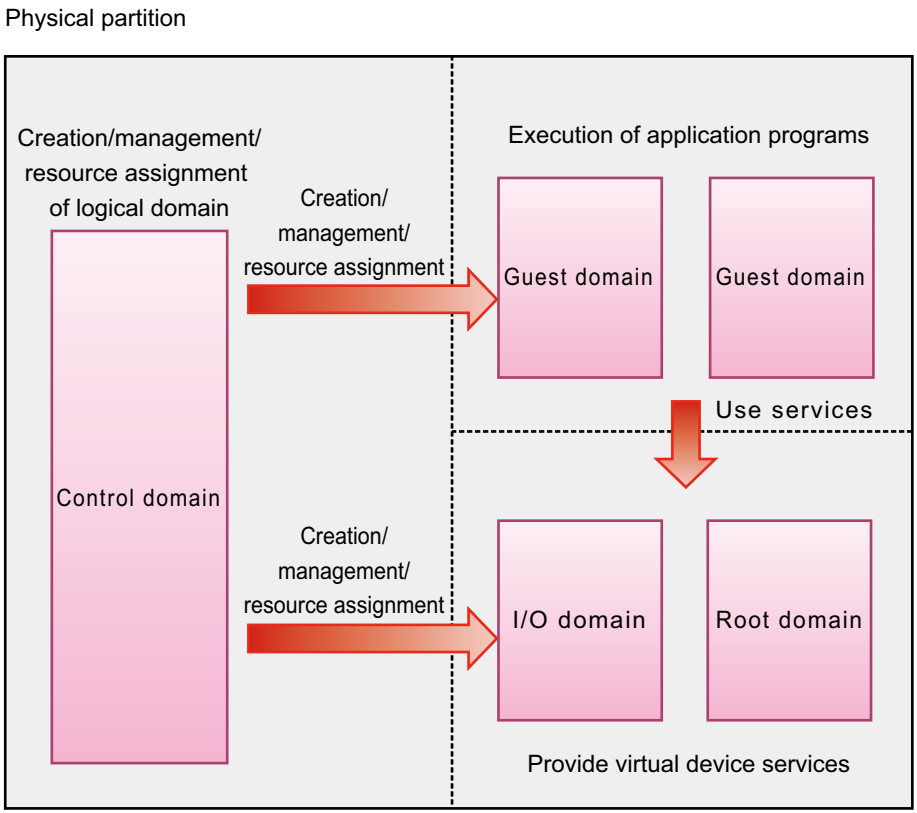
  A guest domain is a logical domain that is managed by a control domain and uses the virtual device services of I/O domains. Generally, middleware or an application program runs on a guest domain.

  An independent instance of Oracle Solaris runs on a guest domain. Therefore, you can start and stop a guest domain without affecting other guest domains. You can dynamically add or delete virtual CPUs, virtual memory, and virtual I/Os to or from a guest domain.

- Service domain

  Service domain is a generic term for a domain that is used by a guest domain. The service domain includes an I/O domain and root domain.

The following figure is a conceptual illustration of the relationship between logical domains.



Resource Management

CPU Activation

SPARC M10 Systems provide a function called CPU Activation that allows you to purchase CPU resources in CPU-core units that have finer granularity than CPU-chip units.
The CPU Activation feature allows you to purchase CPU resources in units of two CPU cores. These CPU cores can be activated at any time -- not only when the server is initially installed, but also while the production system is running. With the CPU Activation feature, you can always add and register CPU resources in units of one set (two-core) or more.
In addition, you can also migrate unused CPU Activations to another system. If you use multiple instances of SPARC M10 Systems, you can export unused CPU Activations from one instance of SPARC M10 Systems and register them with another instance. In this case, the model of the migration source and target servers needs to be the same.

Oracle Solaris ZFS

SPARC M10 Systems provide a storage virtualization function called Oracle Solaris ZFS as a standard feature. Oracle Solaris ZFS manages multiple physical storage devices by using a storage pool. By allocating a required area from the storage pool, you can create a virtualized volume.

Dynamic reconfiguration (DR) of physical partitions

In SPARC M10-4S, a single physical (hardware) partition can be configured with one or more chassis. Dynamic reconfiguration (DR) of physical partitions is a function that allows you to dynamically add or remove CPUs, memory, I/O devices, and other hardware resources without stopping the logical domains. With this function, you can add resources timely (active addition) as required to add new business or expand business or to perform active maintenance for hardware.

- When you need to expand business or deal with increasing system loads, you can add system boards without stopping Oracle Solaris in the physical partition.
- If a system board is degraded due to a failure, it can be temporarily disconnected so that the faulty component can be replaced without stopping Oracle Solaris in the physical partition.
- You can move a resource from one physical partition to another while the physical partitions are active, without physically removing/inserting the system board. This helps ensure that multiple physical partitions have loads balanced or share common I/O resources.

PCI Hot Plug

The PCI Hot Plug function allows you to install or remove PCIe cards in or from the Oracle Solaris without restarting the system.

You can use this function for the following purposes:

- Replacing or removing a PCIe card that has become or may become faulty, during system operation
- Adding a new PCIe card during system operation

RAS

RAS is a term that refers to functions concerning reliability, availability, and serviceability. The features of RAS functions include providing error checking facilities at appropriate locations and monitoring/controlling these facilities in a centralized manner to minimize business downtime. RAS functions also minimize system downtime by appropriately identifying failure locations so that faulty components can be replaced during operation.

SPARC M10 Systems allow their RAS functions to be used in combination with clustering software or centralized management software to increase the effectiveness of RAS functions. You can thus ensure that business can continue more securely.

In addition, because you can maintain the system periodically or change the system configuration without affecting the system while it is running, you can ensure improved service uptime.

Reliability

SPARC M10 Systems provide the following functions to achieve high reliability:

- Periodic diagnostics (heartbeat function (host watchdog)), performed in conjunction with the XSCF to judge whether the software (including Oracle Solaris) is operating in the domain
- Periodic memory patrol, which is performed to detect memory software errors and permanent failures even in memory areas that are not usually used
  This prevents the system from failing by avoiding the use of faulty memory areas.
- A hardware error correction function implemented by automatic data resending upon CRC error detection (bit data error occurrence) on an interconnect that connects the processor, memory, and I/O of SPARC M10 Systems or connects SPARC M10-4S units
  Data in arithmetic units, registers, cache memory, and other data important for system functions are protected by ECC or CRC.
  If an error cannot be corrected (occurrence of permanent failure), the faulty lane is degraded so that business continues with a half bandwidth.

Availability

SPARC M10 Systems provide the following functions to achieve high availability. The use of these functions in combination with clustering software or operation management software ensures further improved availability.

- Redundant configuration and active/hot replacement of power supply units and fan units
- Redundant configuration and active/hot replacement of hard disk drives, based on hardware RAID technology
- Expansion of the automatic correction range of temporary failures found in memory, interconnects, LSI internal data, etc.
- Enhanced retry and degradation functions used at failure detection
- Automatic system restart for downtime reduction
- Failure information collection by the XSCF and preventive maintenance initiated by various warning message notifications
- Continuous processing by using extended ECC for memory subsystem, to correct 1-bit errors
- Memory mirroring
  Even when a permanent failure occurs in a DIMM on one memory bus, normal data processing is possible on the other memory bus. This helps prevent system failures.
- The memory patrol function installed on the hardware that can detect and correct memory errors without affecting software processing

Serviceability

SPARC M10 Systems provide the following functions to achieve high serviceability:

- Installation of status LEDs for components that can be actively replaced
- XSCF-based functions for remote recognition of server operation status and remote maintenance
- Function that indicates the maintenance target by flashing an LED
  The CHECK LED indicates the target. It is sometimes called a locator LED.
- Indication of notes and items to keep in mind for system administrators and field engineers, on various types of labels
- SNMP function that enables centralized monitoring from SNMP manager

Power-saving Functions

SPARC M10 Systems provide power saving functions that suppress wasteful power consumption by unused or low-utilization hardware components.

- Lower power consumption of hardware components
  In designing SPARC M10 Systems, consideration is given to low power consumption when selecting hardware components.
- Reduction in the power consumption of unused hardware components
  CPUs and memory that are not assigned to any physical partition or logical domain in the system are automatically placed in the power-saving state.
- Reduction in the power consumption of low-utilization hardware components
  In some physical partition configurations, there may be internal controllers that are not used by the processor. System clock for these internal controllers is reduced and they are switched to power saving mode. In addition, the CPU core frequency is adjusted according to the utilization rate to reduce the power consumption.
  The memory access controller is also automatically controlled to enable or disable the low-power level setting, according to the utilization rate.
- Sensor monitoring function
  This function monitors and records the power consumption and air flow. The collected actual power consumption data can be used to optimize the power capacitance design of the data center. Similarly, the collected air flow data can be used to optimize the cooling facility design of the data center.
- Power capping function
  You can set an upper limit of system power consumption. The CPU frequency is automatically controlled so that the specified upper limit will not be exceeded. The system power consumption is thus controlled so that it is suitable for the data center facilities.

External Views of the Chassis and System Configuration Examples

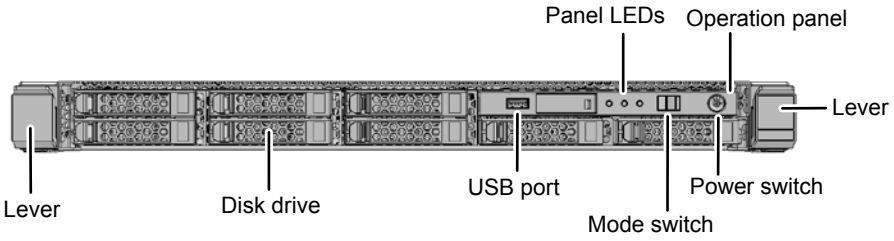
The following pages show external views of the chassis and system configuration examples for different models.

SPARC M10-1

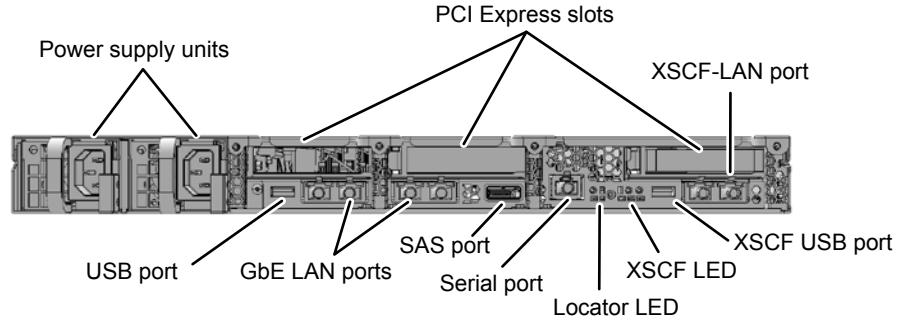
A single SPARC M10-1 is used in this configuration.
Up to two PCI expansion units can be connected to it.

External views of the SPARC M10-1 chassis

Front view



Rear view

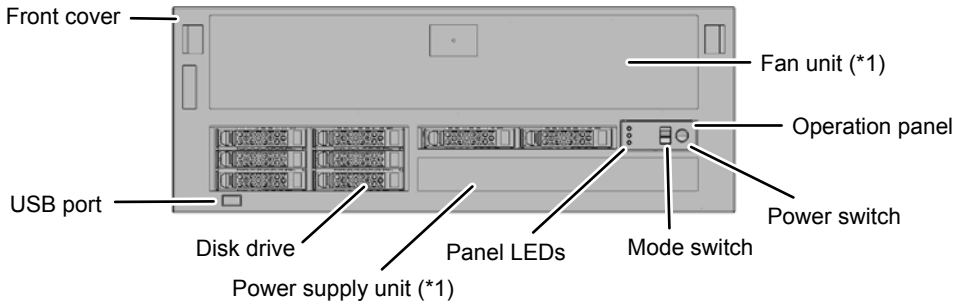


SPARC M10-4

A single SPARC M10-4 unit is used, not as a building block, in this configuration. Up to six (in four-CPU configuration) or three (in two-CPU configuration) PCI expansion units can be connected to it.

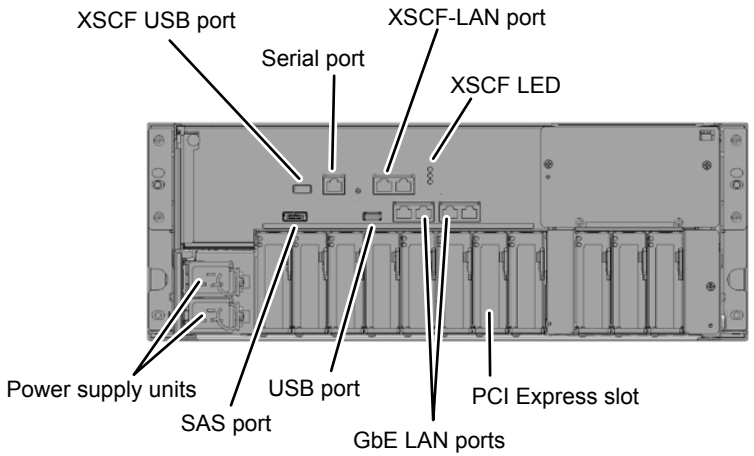
External views of the SPARC M10-4 chassis

Front view



*1: You can see the fan unit and the power supply unit by removing the front cover.

Rear view



SPARC M10-4S (1)

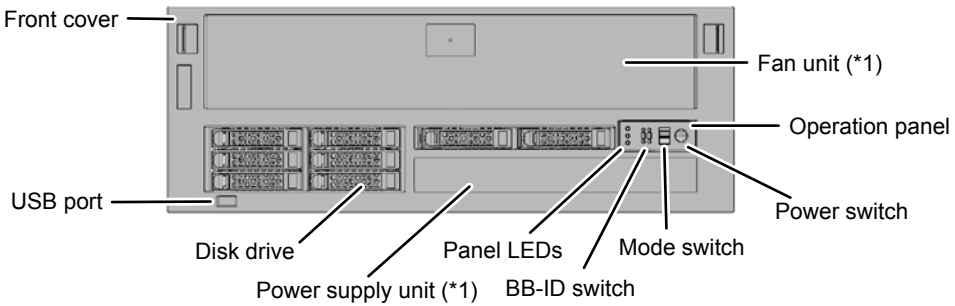
Multiple SPARC M10-4S units are connected in a building block configuration.
This model can start with a single-BB configuration and then be expanded to a multi-BB configuration with the addition of individual chassis.
The model contains a crossbar unit for logically switching the connections of CPU memory units and I/O units.

Reference **System configuration example - building block configuration (connected through crossbar boxes)**

Up to five (in four-CPU configuration) or three (in two-CPU configuration) PCI expansion units can be connected to one SPARC M10-4S.

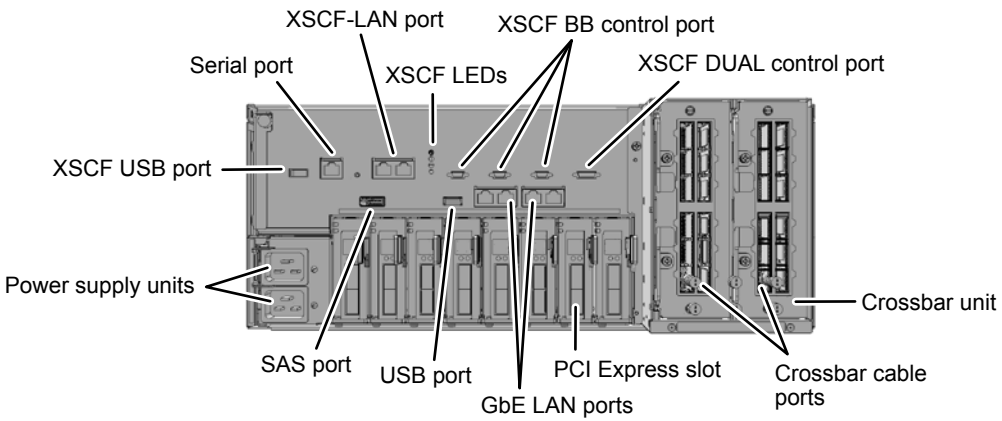
External views of the SPARC M10-4S chassis

Front view



*1: You can see the fan unit and the power unit by removing the front cover.

Rear view

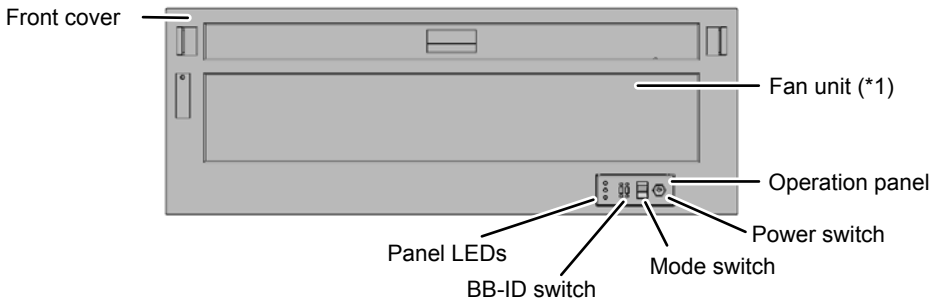


SPARC M10-4S (2)

External views of the crossbar box

The crossbar box is a switch used to logically connect the CPU and SPARC M10-4S.
There are two types of crossbar boxes: one has two mounted crossbar units, and the other has three mounted crossbar units.

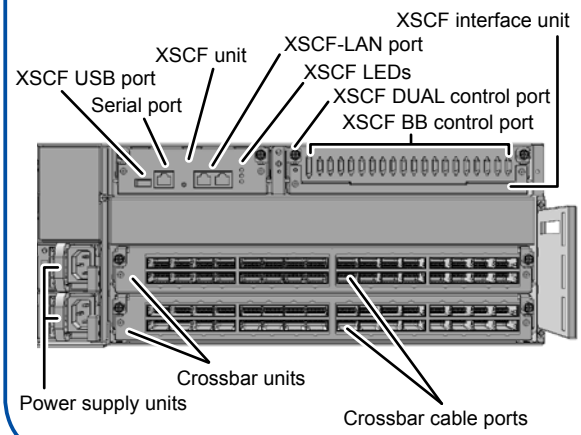
Front view
(common to both types, which have two/three mounted crossbar units)



*1: You can see the fan unit by removing the front cover.

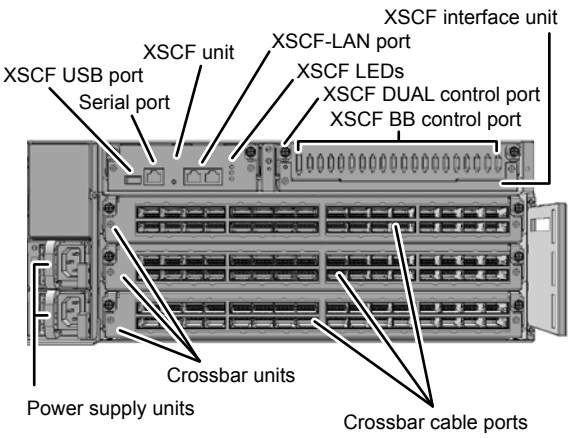
Rear view
(type containing two crossbar units)

This type is used in 2-BB to 8-BB configurations (the building blocks are connected through crossbar boxes).



Rear view
(type containing three crossbar units)

This type is used in 9-BB to 16-BB configurations (the building blocks are connected through crossbar boxes).



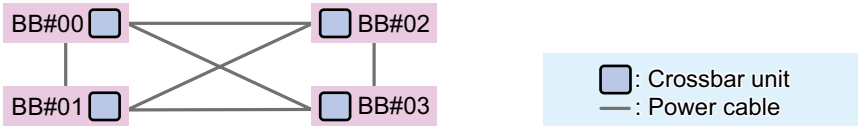
SPARC M10-4S (3)

System configuration example – building block configuration (directly connected chassis)

In this configuration, the SPARC M10-4S units are directly connected with electric cables without using crossbar boxes.

Four-BB configuration (1 BB to 4 BBs)

Up to four SPARC M10-4S units can be connected.



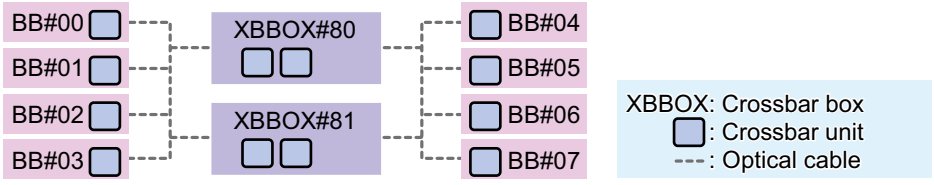
Building block numbers are identifiers (BB-IDs) that are numbered sequentially starting with 00.
For the connection procedure, see the *Fujitsu M10/SPARC M10 Systems Installation Guide*.

System configuration example – building block configuration (connected through crossbar boxes)

In this configuration, building blocks are connected with optical cables through crossbar boxes (XBBOXs).
Up to 16 SPARC M10-4S units can be connected. The number of SPARC M10-4S units that can be connected depends on the number of crossbar boxes and the number of crossbar units mounted in the crossbar boxes.

Eight-BB configuration (2 BBs to 8 BBs)

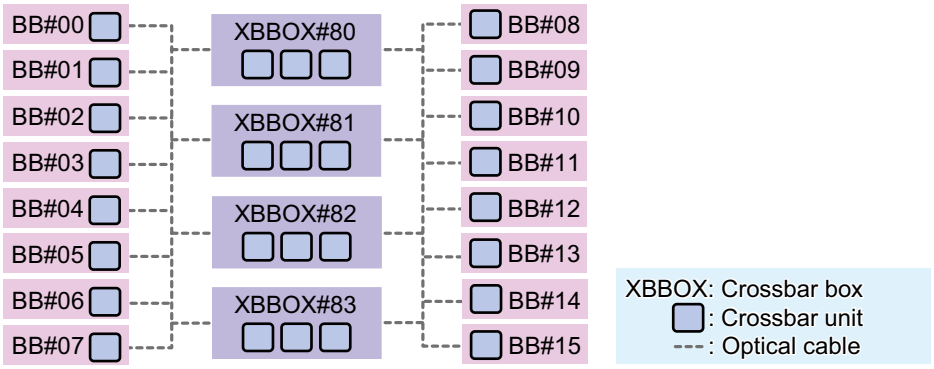
Up to eight SPARC M10-4S units can be connected through two crossbar boxes containing crossbar units (two units per box).



SPARC M10-4S (4)

Sixteen-BB configuration (9 BBs to 16 BBs)

Up to sixteen SPARC M10-4S units can be connected through four crossbar boxes containing crossbar units (three units per box).



Each number shown after BB# or XBBOX# is an ID (BB-ID) used for identification. Building block numbering begins with 00, and crossbar box numbering begins with 80. For the connection procedure, see the *Fujitsu M10/SPARC M10 Systems Installation Guide*.

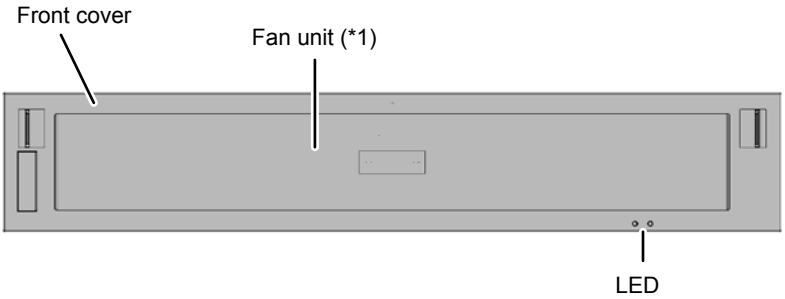
Crossbar boxes are shipped mounted in a dedicated rack (expansion rack) together with a dedicated power distribution unit (PDU) and crossbar cables.
An 8-BB configuration (2 BBs to 8 BBs) uses expansion rack 1, and a 16-BB configuration (9 BBs to 16 BBs) uses expansion racks 1 and 2.

PCI expansion unit (Option)

The optional PCI expansion unit can be connected to either the SPARC M10-1 chassis or the SPARC M10-4/M10-4S chassis.

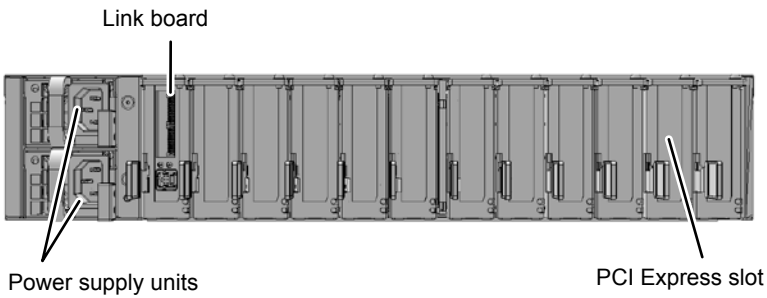
External views of the PCI expansion unit

Front view



*1: You can see the fan unit by removing the front cover.

Rear view



System Specifications

This section mainly describes the hardware specifications of Fujitsu SPARC M10 Systems. For details on firmware and software, see "Chapter 1 Understanding an Overview of the SPARC M10 Systems" in the *Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide*.

Model specifications (1/3)

Item		SPARC M10-1		SPARC M10-4		SPARC M10-4S	
External dimensions (*1)	Height	1U		4U		4U	
	Height x width x depth	42.5 mm x 431 mm x 721 mm (1.7 in. x 17.0 in. x 28.4 in.)		175 mm x 440 mm x 746 mm (6.9 in. x 17.3 in. x 29.4 in.)		175 mm x 440 mm x 810 mm (6.9 in. x 17.3 in. x 31.9 in.)	
Weight		18 kg		58 kg		60 kg	
Maximum number of connected units (Number of chassis)		-		-		16 (when using crossbar box) 4 (when not using crossbar box)	
CPU	Processor	SPARC64 X	SPARC64 X+	SPARC64 X	SPARC64 X+	SPARC64 X	SPARC64 X+
	Clock count	2.8 GHz	3.2 GHz	2.8 GHz	3.4 GHz	3.0 GHz	3.7 GHz
	Maximum number of CPUs	1		4		4	
	Number of cores (per CPU)	16		16		16	
	Number of threads (per core)	2		2		2	
	Primary cache (per core)	64 KB		64 KB		64 KB	
	Secondary cache (per chip)	22 MB		24 MB		24 MB	
Memory	Type	DDR3-DIMM		DDR3-DIMM		DDR3-DIMM	
	Maximum size	Japan: 1 TB Outside Japan: 512 GB		Japan: 4 TB Outside Japan: 2 TB		Japan: 4 TB per unit Outside Japan: 2 TB per unit	
	Maximum number of mounted memory modules	16		64		64	
	Unit of expansion	4 (8 when memory mirroring is enabled)		8		8	

Model specifications (2/3)

Item		SPARC M10-1	SPARC M10-4	SPARC M10-4S
Built-in I/O	Built-in disk (SAS)	8 (HDD/SSD)	8 (HDD/SSD)	8 (HDD/SSD)
	Built-in disk hardware RAID	Mounted	Mounted	Mounted
	Built-in CD-RW/ DVD-RW drive	Not mounted	Not mounted	Not mounted
	Built-in tape drive	Not mounted	Not mounted	Not mounted
	On-board interface	4 GbE LAN ports 1 SAS port 2 USB ports	4 GbE LAN ports 1 SAS port 2 USB ports	4 GbE LAN ports 1 SAS port 2 USB ports
	PCIe slot	3 slots	11 slots	8 slots
I/O slot (when using PCI expansion unit)	Maximum number of PCIe slots (built-in + PCI expansion unit)	23	71	58 slots for one SPARC M10-4S unit
	Maximum number of connected PCI expansion units	2	6 (in four-CPU configuration) 3 (in two-CPU configuration)	5 PCI expansion units for one SPARC M10-4S unit (in four-CPU configuration) 3 PCI expansion units for one SPARC M10-4S unit (in two-CPU configuration)
Redundant configuration		Built-in disk drive/fan unit/power supply unit/ power cord	Built-in disk drive/fan unit/power supply unit (*2)/power cord (*2)/ PCIe card (in multi-path configuration)/ LLC water cooling pump	Built-in disk drive/fan unit/power supply unit (*2)/power cord (*2)/ PCIe card (in multi-path configuration)/ LLC water cooling pump
Active replacement		Built-in disk drive/fan unit/power supply unit/ power cord	Built-in disk drive/fan unit/power supply unit (*2)/power cord (*2)/ PCIe card (*3)	Chassis (for 1 partition with a 2-BB configuration or larger)(*4)/built-in disk drive/fan unit/ power supply unit (*2)/ power cord (*2)/PCIe card (*3)
Supported operating systems (*5)		Oracle Solaris 11.1 and later Oracle Solaris 10 1/13	Oracle Solaris 11.1 and later Oracle Solaris 10 1/13	Oracle Solaris 11.1 and later Oracle Solaris 10 1/13

Model specifications (3/3)

Item		SPARC M10-1	SPARC M10-4	SPARC M10-4S
Virtualization	Physical partition	None	None	Supported
	Number of partitions	–	–	Up to 16 partitions
	Granularity	–	–	In building block (BB) units
	Logical domains	Supported	Supported	Supported
	Maximum number of domains	32	128	128 (for 1 partition with a 1-BB configuration) 256 (for 1 partition with a 2-BB configuration or larger)
	Granularity (CPU)	In units of threads	In units of threads	In units of threads
	Granularity (Memory)	In units of 256 MB	In units of 256 MB	In units of 256 MB
	Granularity (I/O)	In virtual I/O units	In virtual I/O units	In virtual I/O units
eXtended System Control Facility (*6)	External interface	2 XSCF-LAN ports 1 serial port 1 USB port	2 XSCF-LAN ports 1 serial port 1 USB port	2 XSCF-LAN ports 1 serial port 1 USB port 3 XSCF BB control ports 1 XSCF DUAL control port
	Redundant configuration	Not available	Not available	Supported (2-BB configuration or larger)
	Active replacement	Not available	Not available	Supported (2-BB configuration or larger)

*1: None of the dimensions includes the sizes of protrusions.
*2: A redundant configuration applies only when 200 VAC is used.
*3: Some PCIe card types do not support active replacement.
*4: See the " Notes and restrictions on dynamic reconfiguration of physical partitions" in the *Fujitsu M10/SPARC M10 Systems Product Notes* for the latest XCP version.
*5: The operating system is installed in the initial system state. For detailed software requirements, see the *Fujitsu M10/SPARC M10 Systems Product Notes*.
*6: Firmware is built into the eXtended System Control Facility. This firmware is installed on the service processor in the XSCF unit in the initial system state. For details, see the *Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide*.

Crossbar box specifications

Item		Crossbar box
External dimensions (*1)	Height	4U
	Height x width x depth	174 mm x 440 mm x 750 mm (6.9 in. x 17.3 in. x 29.5 in.)
Weight		40 kg
eXtended System Control Facility	External interface	2 XSCF-LAN ports 1 serial port 1 USB port 19 XSCF BB control ports 1 XSCF DUAL control port
	Redundant configuration	Available (only between SPARC M10-4S units)
	Active replacement	Available
Crossbar connection interface		- 2 crossbar units mounted 32 crossbar cable ports - 3 crossbar units mounted 48 crossbar cable ports
Redundant configuration		Power supply unit/fan unit
Active replacement		Power supply unit/fan unit/XSCF unit

*1: None of the dimensions includes the sizes of protrusions.

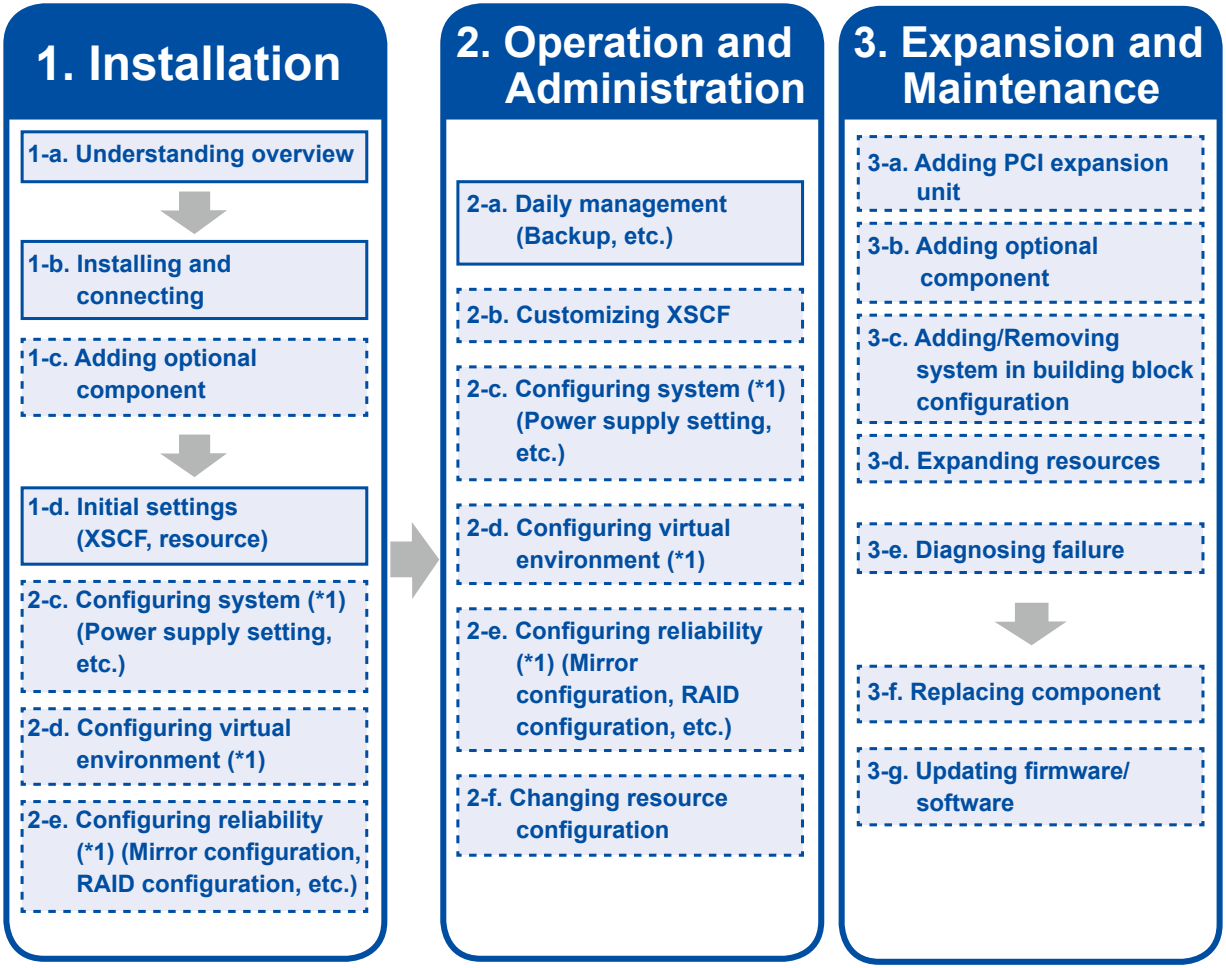
PCI expansion unit specifications

Item		PCI expansion unit
External dimensions (*1)	Height	2U
	Height x width x depth	86 mm x 440 mm x 750 mm (3.4 in. × 17.3 in. × 29.5 in.)
Weight		22 kg
Number of PCIe slots		11
Redundant configuration		Power supply unit/fan unit
Active replacement		Power supply unit/fan unit/PCIe card (*2)/link board (*3)

*1: None of the dimensions includes the sizes of protrusions.
*2: Some PCIe card types do not support active replacement.
*3: You can replace these units after disconnecting the link card when it is connected to a PCI expansion unit by using a PCI Hot Plug, or after disconnecting the physical partition with the link card mounted when it is connected to a PCI expansion unit by using the physical partition dynamic reconfiguration (DR).

What Do I Do Now?
Reference Guide (by Phase/Purpose)

This section describes the work for each phase, from system installation to expansion and maintenance, and the reference manuals for each work item.
[ ] indicates a required work item, and [ ] indicates a work item to be performed as required.



*1: You can configure these items as required, when configuring the initial system settings. You can also change the settings and set values after starting operation.

1. Installation

a. Understanding an overview of the system

Check the SPARC M10 Systems overview.

Reference **"Understanding an Overview of the System" (This document)**

b. Installing the system - Connecting a chassis

Before installing the system, confirm that the installation location meets the requirements. After confirmation, install and connect the chassis required for the system configuration.

Reference ***Fujitsu M10/SPARC M10 Systems Installation Guide***

"1.1 Workflow for the SPARC M10-1"
"1.2 Workflow for the SPARC M10-4"
"1.3 Workflow for the SPARC M10-4S"
"1.4 Workflow when Connecting the PCI Expansion Unit"

c. Adding an optional component

If you have ordered any option, such as a memory module or PCIe card, mount the additional component during installation.

Reference ***Fujitsu M10-1/SPARC M10-1 Service Manual***
Fujitsu M10-4/Fujitsu M10-4S/SPARC M10-4/SPARC M10-4S Service Manual
Crossbar Box for Fujitsu M10/SPARC M10 Systems Service Manual
PCI Expansion Unit for Fujitsu M10/SPARC M10 Systems Service Manual

d. Configuring the initial system settings

Before starting the system, configure the initial settings of the eXtended System Control Facility (XSCF). Use the CPU Activation function to also configure the use of resources according to the number of purchased CPU cores activated.

Reference ***Fujitsu M10/SPARC M10 Systems Installation Guide***

"Chapter 6 Performing an Initial System Diagnosis"
"Chapter 7 Making the Initial System Settings"

In addition, configure operation in, for example, a virtual environment configuration, as necessary.

2. Operation and Administration (1)

a. Conducting daily management

You should understand the basic operations, which include logging in/out from the management console and starting/stopping the system. These basic operations are required for system operation and management and for daily management work items, such as backup.

Reference ***Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide***

- **"Chapter 2 Logging In/Out of the XSCF"**
- **"Chapter 6 Starting/Stopping the System"**
- **"Chapter 9 Managing the SPARC M10 Systems Daily"**
- **"Chapter 13 Switching to Locked/Service Mode"**

b. Customizing eXtended System Control Facility (XSCF) settings

From the initial setup of the eXtended System Control Facility, you can customize the configuration according to your use environment.

Reference ***Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide***

- **"Chapter 3 Configuring the System"**

c. Configuring the system

Configure the entire system including power control. The green IT function minimizes the power consumption of the system.

Reference ***Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide***

- **"Chapter 4 Configuring the System to Suit the Usage Type"**

d. Configuring a virtual environment

You can configure a virtual environment by dividing the system into physical partitions or logical domains. You can run a standalone operating system in each logical domain.

Reference ***Fujitsu M10/SPARC M10 Systems Domain Configuration Guide***

- **"Chapter 4 Physical Partition Configuration Example"**
- **"Chapter 5 Logical Domain Configuration Example"**

2. Operation and Administration (2)

e. Configuring a highly reliable system

You can use memory mirroring or the hardware RAID function to improve system reliability.

Reference ***Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide***

"Chapter 14 Configuring a Highly Reliable System"

f. Changing the resource configuration

You can use the dynamic reconfiguration function of Oracle VM Server for SPARC to change the CPU or memory configuration.

Reference ***Fujitsu M10/SPARC M10 Systems Domain Configuration Guide***

"Chapter 6 Physical Partition Reconfiguration Example"

3. Expansion and Maintenance (1)

a. Adding a PCI expansion unit

You can use a PCI expansion unit to increase the number of PCIe slots.

Reference ***Fujitsu M10/SPARC M10 Systems Installation Guide***

"1.4 Workflow when Connecting the PCI Expansion Unit"

b. Adding an optional component

You can expand the system by adding an optional component such as a memory module or PCI card.

Reference ***Fujitsu M10-1/SPARC M10-1 Service Manual***

Fujitsu M10-4/Fujitsu M10-4S/SPARC M10-4/SPARC M10-4S Service Manual
Crossbar Box for Fujitsu M10/SPARC M10 Systems Service Manual

PCI Expansion Unit for Fujitsu M10/SPARC M10 Systems Service Manual

c. Adding/Removing a system in a building block configuration

You can flexibly expand or reduce the system by adding or removing a SPARC M10-4S in the building block system.

Reference ***Fujitsu M10/SPARC M10 Systems Installation Guide***

"Chapter 8 Before Installing/Removing a System with a Building Block Configuration"
"Chapter 9 Installing a System with a Building Block Configuration"
"Chapter 10 Removing a System with a Building Block Configuration"

Fujitsu M10/SPARC M10 Systems Domain Configuration Guide

"Chapter 6 Physical Partition Reconfiguration Example"

d. Expanding resources according to the load

You can use the CPU Activation function for CPU expansion in units of two cores when the load increases.

Reference ***Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide***

"Chapter 5 CPU Activation"

3. Expansion and Maintenance (2)

e. Diagnosing a failure

If an error message appears on the console or the CHECK LED on the chassis goes on, diagnose whether a failure has occurred.

Reference ***Fujitsu M10-1/SPARC M10-1 Service Manual***

Fujitsu M10-4/Fujitsu M10-4S/SPARC M10-4/SPARC M10-4S Service Manual
Crossbar Box for Fujitsu M10/SPARC M10 Systems Service Manual

PCI Expansion Unit for Fujitsu M10/SPARC M10 Systems Service Manual

f. Replacing faulty components

Replace faulty components. The maintenance method varies with the component. Our service engineers should perform the maintenance work.

Reference ***Fujitsu M10-1/SPARC M10-1 Service Manual***

Fujitsu M10-4/Fujitsu M10-4S/SPARC M10-4/SPARC M10-4S Service Manual
Crossbar Box for Fujitsu M10/SPARC M10 Systems Service Manual

PCI Expansion Unit for Fujitsu M10/SPARC M10 Systems Service Manual

g. Updating firmware/software

Update the firmware for Oracle VM Server for SPARC and Oracle Solaris.

Reference ***Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide***

"Chapter 16 Updating Firmware/Software"

PCI Expansion Unit for Fujitsu M10/SPARC M10 Systems Service Manual

"Appendix C Updating the Firmware of the PCI Expansion Unit"