



Cisco C880 M5 Installation Manual

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Preface

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Contents

1	Preface	6
1.1	<i>Concept and target groups for this manual</i>	6
1.2	<i>Notational conventions</i>	7
2	Functional overview	8
2.1	<i>Features</i>	8
2.2	<i>Server specification</i>	14
3	Installation steps, overview	21
4	Important information	22
4.1	<i>Safety instructions</i>	22
4.2	<i>CE conformity</i>	27
4.3	<i>FCC Class A Compliance Statement</i>	27
4.4	<i>Transporting the server</i>	28
4.5	<i>Environmental protection</i>	29
5	Hardware installation	30
5.1	<i>Setup Workflow</i>	31
5.1.1	<i>Advance preparation performed by the user</i>	31
5.1.2	<i>Work performed by the user</i>	31
5.1.3	<i>Work performed by a field engineer</i>	32
5.2	<i>Unpacking the server</i>	33
5.3	<i>Rack installation/removal of server</i>	33
5.3.1	<i>Rack system requirements</i>	33
5.4	<i>Connecting devices to the server</i>	37
5.5	<i>Connecting the server to the mains</i>	38
5.5.1	<i>Installation requirements</i>	38
5.5.2	<i>Input power connection specification</i>	41
5.5.3	<i>Connecting diagram of the power cord</i>	42
5.5.4	<i>Connecting procedure of the power cord</i>	44
5.6	<i>Notes on connecting/disconnecting cables</i>	45

5.7	<i>Notes on inserting/removing units</i>	45
6	Starting up and operation	46
6.1	<i>Control elements and indicators</i>	46
6.1.1	Front of server.....	46
6.1.2	Rear of server.....	55
6.2	<i>Switching the server on and off</i>	60
6.3	<i>Configuring the server</i>	62
6.3.1	Configuring Fast Boot.....	62
6.3.2	Configuring Memory Mirror.....	63
6.3.3	Back up and restore RAID configuration via REST API.....	66
6.3.4	Configuring the server and installing the operating system.....	71
6.3.5	Configuring Cougar5(EP540i).....	71
6.4	<i>Cleaning the server</i>	72
6.5	<i>Setting of Boot Watchdog before and after Firmware Update of I/O card</i>	73
6.5.1	Before Firmware Update.....	73
6.5.2	After Firmware Update.....	73
6.6	<i>Rebuilding Software RAID after exchanging M.2 SSD</i>	73
6.7	<i>Hot-plug Procedure</i>	74
6.7.1	Replacement procedure.....	74
6.7.2	Addition procedure.....	75
7	Property and data protection	76
7.1	<i>Mechanical access protection</i>	76
7.2	<i>BIOS Setup security functions</i>	76
8	Troubleshooting and tips	77
8.1	<i>System Power indicator remains unlit</i>	77
8.2	<i>Screen remains blank</i>	78
8.3	<i>Flickering stripes on monitor screen</i>	78
8.4	<i>No screen display or display drifts</i>	79
8.5	<i>Incorrect date and time</i>	79
8.6	<i>Drives reported as "dead" when starting system</i>	79
8.7	<i>Added drive reported as defective</i>	80
9	Appendix	81

9.1	<i>Bus Number</i>	81
9.2	<i>Correspondence between PHP Slot and Slot Numbers</i>	84
9.3	<i>Device Path</i>	84
9.4	<i>Replacement of PCIe SSD SFF Slot Number</i>	85
9.5	<i>DIMM installation order</i>	86
9.6	<i>Component Layout</i>	87

1 Preface

The scalable Cisco C880 M5 is an Intel-based rack server for critical company scenarios, e.g. as database management system for medium or large-sized databases or as a consolidation basis to run an immensely large number of different applications using virtualization technologies.

Thanks to its highly developed hardware and software components, the server offers a high level of data security and availability. These include hot-plug HDD/SSD modules, hot-plug system fans, and also hot-plug power supply units and Automatic Server Reconfiguration and Restart (ASR&R).

Security functions in the BIOS Setup and on the System Board protect the data on the server against manipulation. Additional security is provided by the lockable rack door.

The server occupies 5 height units (HU) in the rack.

1.1 Concept and target groups for this manual

This operating manual describes how to install, set up and operate your server.



This operating manual is intended for those responsible for installing the hardware and ensuring that the system runs smoothly. It contains all the information you need to put your Cisco C880 M5 into operation.

To understand the various expansion options, you will need to be familiar with the fields of hardware and data transmission and you will require a basic knowledge of the underlying operating system.

1.2 Notational conventions

The following notational conventions are used in this manual:

Table 1.1 notational conventions

<i>Text in italics</i>	indicates commands or menu items.
"Quotation marks"	indicate names of chapters and terms that are being emphasized.
➤	describes activities that must be performed in the order shown.
 CAUTION!	pay particular attention to texts marked with this symbol. Failure to observe this warning may endanger your life, destroy the system or lead to the loss of data.
	indicates additional information, notes and tips.

2 Functional overview

This section provides information on the features and technical data of Cisco C880 M5. For information on key characteristics and layout of the System Board, see "Cisco C880 M5 Administration Guide".

2.1 Features

Customer Self Service (CSS)

Customer Self Service (CSS) concept enables you to identify and replace the affected component yourself in the case of certain error scenarios.

In the CSS concept, you can replace the following components yourself in the event of an error:

- Hot-plug HDD/SSD modules
- Hot-plug power supply units

For information on replacing these components, see "Cisco C880 M5 Administration Guide".

CSS indicators on the control panel and on the back of Cisco C880 M5 server provide you with information if a CSS event arises.

System Board

The features of the System Board are described in "Cisco C880 M5 Administration Guide", the setup possibilities are described in "Cisco C880 M5 BIOS Setup Guide".

Hard disk drives

The server can be equipped with eight HDD/SSD modules, eight PCIe SSD SFF modules, or a mixture of four HDD/SSD and four PCIe SSD SFF. Each module can accommodate an drive with a 2.5-inch format. The modules are connected to the SAS/PCIe backplane wirelessly.

This allows HDD/SSD modules or PCIe SSD SFF modules to be plugged in or pulled out easily.

The hard disk system is designed for SAS with one channel for each hard disk drive.

If the server has the corresponding RAID configuration, the HDD/SSD modules

or the PCIe SSD SFF modules can also be replaced during operation.

SAS controller card (optionally with RAID controller)

The SAS controller card for operating up to four SAS hard disk drives can be alternately without or with RAID functionality. In case of RAID functionality the levels 0, 1, 1E, 5, 6 and 10 are supported.

Flash Backup Units

Up to two Flash Backup Units (FBUs) back up the memory contents of their corresponding RAID controllers in the event of power failure (option).

Power supply

The server has up to six hot-plug power supply units, a 1600 watt version of type "DPS-2200" for mains voltages 200 - 240 V. This guarantees a redundant power supply.

If one power supply unit is defective, the other(s) then guarantee(s) unimpaired operation. The faulty power supply unit can be replaced during operation.

High level of availability and data security

When memory data is accessed, 1-bit errors in the main memory are identified and automatically corrected with the ECC (Error Correcting Code) method.

The memory modules used support SDDC+1 and ADDDC-MR technology (Chipkill™), which further increases the effectiveness of memory error monitoring and correction.

Support is likewise provided for hot-spare memory technology, in which a memory module is used like a replacement module. If a memory module fails, the module with the defective memory is automatically deactivated and the replacement module is activated (provided it has been configured appropriately in the BIOS). The deactivated memory module is no longer used and the faulty memory module can be replaced at the next opportunity.

Memory modules can be protected against failure through full mirroring or address range mirroring (memory mirroring requires eight memory modules).

ASR&R (Automatic Server Reconfiguration and Restart) restarts the system in the event of an error and automatically "hides" the defective system components.

The PDA (Prefailure Detection and Analyzing) technology analyzes and monitors all components that are critical for system reliability.

The SAS controller card supports the RAID levels 0, 1, 1E, 5, 6, 10, 50 and 60 thus increasing system availability and improving reliability.

Additional reliability is provided by the hot-plug HDD/SSD modules, fans and power supply units.

iRMC S5 with integrated management LAN connector

The iRMC S5 (integrated **R**emote **M**anagement **C**ontroller) is a Baseboard Management Controller (BMC) with integrated management LAN connector and expanded functionality that was previously only available with additional plug-in cards. In this way, the iRMC S5 enables complete control of Cisco C880 M5, regardless of system status, and thus particularly the control of Cisco C880 M5 that are in the "out-of-band" system status.

Major functions supported by the iRMC S5 include the following:

- Browser access via iRMC S5's own Web server
- Secure communication (SSH, SSL)
- Power Management for the managed server (depending on its system status)
- Power Consumption Management
- Connecting virtual drives as remote storage
- Text-based and graphic console bypass (Advanced Video Redirection)
- Remote Storage
- Command Line Interface (CLI)
- Simple, interactive or script-based iRMC S5 configuration
- Customer Self Service (CSS)
- iRMC S5's own user management
- Multi-computer, global iRMC S5 user administration using anLDAP Directory Service
- Automatic network configuration via DNS / DHCP
- Power supply of the iRMC S5 via the system standby supply
- Full-coverage alarm management
- System Event Log (SEL) reading and processing
- IPMI support
- CIM / WS-MAN support
- Internal Event Log for user login / logout auditing
- Redfish



More information about the iRMC S5 can be found in the following manuals.

- Cisco C880 M5 Configuration Guide

-
- Cisco C880 M5 User Interface Guide
 - Cisco C880 M5 Administration Guide

Service and support

Cisco C880 M5 are easy to maintain and modular, thus enabling quick and simple maintenance.

The handles and locks (touch points) used to exchange components are colored green to ensure simple and immediate recognition.

In order to prevent the components from being damaged by incorrect handling when they are being installed and removed, the areas of all components that can be touched without damaging them are also marked green.

The Flash EPROM program utilities supports a fast BIOS update.

With the iRMC (integrated Remote Management Controller) on the System Board, Cisco C880 M5 can also be maintained and served remotely. This enables remote diagnosis for system analysis, remote configuration and remote restart should the operating system or hardware fail.

Remote Management

Remote Management is the remote management solution for Cisco C880 M5. Remote Management and the relevant hardware components integrated on the System Board allow remote monitoring and maintenance as well as fast restoration of operation in the event of errors.

Remote monitoring and maintenance avoids time-consuming and costly on-site repairs and reduces service costs. This leads to a reduction in the total cost of ownership and an excellent return on investment for the remote management solution.

The administrator can access all system information and information from the sensors such as fan speeds or voltages via the iRMC S5's Web interface (see section "[iRMC S5 with integrated management LAN connector](#)" on page 11). You can also start the text-based or graphic console bypass (Advanced Video Redirection, AVR) and connect virtual drives as remote storage.



More information about the iRMC S5 can be found in the following manuals.

- Cisco C880 M5 Configuration Guide
- Cisco C880 M5 User Interface Guide
- Cisco C880 M5 Administration Guide

2.2 Server specification

System Board

Table 2.1 Specification of System Board

System Board type	D3858
Chipset	Intel(R) C621 Chipset

Processor

Table 2.2 Specification of Processor

Processor quantity and type	2-8x Intel(R) Xeon(R) Platinum processor
Processor notes	A minimum of 2 processors must be configured, no mix of different processor types

Memory Modules Configuration

Table 2.3 Specification of Memory Modules Configuration

Memory slots	96 (distributed on 4 System Boards with 24 slots each)
Memory slot type	DIMM (DDR4) 1866/2133/2400/2666 RDIMM, LR-DIMM
Memory capacity (from - to)	Min. 32 GB - Max. 12 TB
Memory protection	SDDC+1, ADDDC-MR, Memory mirroring(full mirroring and address range mirroring), Memory sparing support
Memory notes	At least 4 DIMMs have to be installed on System Board. (24 DIMM slots per System Board).
Notes on memory module	Memory modules will be delivered in sets of 2 DIMMs per order code.

Interfaces

Table 2.4 Specification of Interfaces

USB connectors	5 x USB 3.0 (4x front, 1x internal)
Graphics (15-pin)	1 x VGA (1x front)
LAN / Ethernet (RJ-45)	1 x Management LAN port (1000 Mbit/s) 1 x Shared LAN port (1000 Mbit/s)

Onboard or integrated controllers

Table 2.5 Specification of Onboard or integrated controllers

RAID Controller	2 x 8 port RAID 0/1 or RAID 5/6 controller as option
Remote Management Controller	Integrated Remote Management Controller (iRMC S5, 32 MB attached memory incl. graphics controller), IPMI 2.0 compatible
Trusted Platform Module (TPM)	Infineon / separate module; TCG V2.0 compliant (options)

Onboard or integrated storages

Table 2.6 Specification of Onboard or integrated storages

M.2 SSD	2 x M.2 SSD as option connected by SATA interface RAID 0/1/10 support
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Slots

Table 2.7 Specification of Slots

PCI-Express Gen3 x8	8 x half length / Low Profile
PCI-Express Gen3 x16	8 x half length / Low Profile

Drive bays

Table 2.8 Specification of Drive bays

Drive bay configuration	8 x Drive bays They can load 8 x 2,5"SAS HDD/SSD, 8 x 2,5"PCIe SSD SFF, or a mixture of 4 x SAS HDD/SSD and 4 x PCIe SSD SFF
Accessible drive bays	1 x 5.25" SAS Slim drive
Notes on accessible drives	all possible options described in relevant system configurator

Fans

Table 2.9 Specification of Fans

Number of fans	6
Fan configuration	hot-plug
Air volume	Calculation formula of air volume: 1. Fan duty based formula y: air volume(m ³ /h) x: FAN duty(%) $y = 2E-06x^4 - 0.0006x^3 + 0.0413x^2 + 9.3239x + 96.029$ 2. Fan rotation speed based formula y: air volume(m ³ /h) x: Rotational speed of FAN#0(rpm) $y = 5E-06x^2 - 0.0203x + 113.26$

Operating Panel

Table 2.10 Specification of Operating Panel

Operating buttons	Power button
	Reset button
	Location button
	NMI button
Status LEDs	System Power (green)
	System Alarm (orange)

	System Location (blue)
	CSS (orange)
	AC-connected (green)
	Common HDD-Access (green)

Dimensions / Weight

Table 2.11 Specification of Dimensions / Weight

Rack (W x D x H)	482.0 mm(with bezel)/445.0mm(without bezel) x 820.0 mm(*1) x 219.1 mm (*1) it does not include projections
Mounting Depth Rack	820 mm
Height Unit Rack	5 U
19" rackmount	Yes
Mounting cable depth rack	100 mm (100mm rack recommended)
Weight	minimum 61 kg; maximum 80 kg (actual weight may vary depending on configuration)
Rack integration kit	

Ventilation clearance

At least 200 mm on the front and rear.

Ambient conditions

Table 2.12 Specification of Ambient conditions

Environment class 3K2	EN 60721 / IEC 721 Part 3-3
Environment class 2K2	EN 60721 / IEC 721 Part 3-2
Temperature:	
Operation (3K2)	5°C ... 35°C (without ATD) 5°C ... 40°C (with ATD)
Transport (2K2)	-25°C ...60°C
Humidity	10% ... 85% (non condensing)

Condensation during operation must be avoided!

Altitude and environmental temperature condition

Table 2.13 Specification of Altitude and environmental temperature condition

Altitude m (ft)	Environmental Temperature Condition °C (°F)
0 ~ 1,000 (0 ~ 3,281)	5 ~ 40 (41 ~ 104)
1,000 ~ 1,500 (3,281 ~ 4,921)	5 ~ 38 (41 ~ 100)
1,500 ~ 2,000 (4,921 ~ 6,562)	5 ~ 36 (41 ~ 96.8)
2,000 ~ 3,000 (6,562 ~ 9,843)	5 ~ 33 (41 ~ 91.4)

Noise level (depending on the configuration)

The acoustic noise values depend on the system configuration.

Table 2.14 Specification of Noise level

Sound power level L_{WAd} (ISO 9296, at < 25°C)	< 5.2 B (standby) < 8.0 B (operation)
Sound pressure level at bystander position L_{pAm} (ISO 9296, at < 25°C)	< 43 db(A) (standby) < 61 db(A) (operation)

Data on power supply (hot-plug power supply unit)

Table 2.15 Specification of Data on power supply (hot-plug power supply unit)

Electrical ratings*	200 - 240 V / 12.6 A
Frequency	50 Hz / 60 Hz
Current (basic configuration)	12.6 A
Max. current	24 A / 16 A (200 V)
Active power max. (max. configuration)	4167 W
Heat dissipation	4167 W = 14228 Btu/h
Main power fuse	12.6 A (200 - 240 V)
Protection class	I

*Depending on PSU model inserted. Please refer to your system's rating plate.

Connection to the mains

The server is connected to the mains with 2 cords as a minimum or up to 4 cords as a maximum for redundant operation. Each cord connection requires an appropriate fuse in building installation (see above). Earthed socket outlets have to be used (protection class I device).

Compliance with regulations and standards

Table 2.16 Specification of Compliance with regulations and standards

Product safety and ergonomics	
International	IEC60950-1 2ed+A2
Europe	
Safety	EN60950-1 2ed+A2 EN 62479
Ergonomics	
USA / Canada	CSA60950-1-07 2ed+A2 UL60590-1 2ed+A2
Taiwan	CNS 14336 -1
China	(Not covered)
Electromagnetic compatibility	
International	CISPR 32
Europe	EN55032 Class A EN55024 EN 55024 EN 61000-3-2 EN 61000-3-3 EN300 386
USA / Canada	47CFR/part15 sub part B Class A ICES-003 issue 5
Australia / New Zealand	AS/NZS CISPR32
Taiwan	CNS 13438: Class A
China	(Not covered)
Japan	VCCI Class A / JEITA
Korea	KN 32 / KN 25
CE marking to EU directives	Low Voltage Directive 2014/35/EU Electromagnetic compatibility 2014/30/EU Restriction of hazardous substances 2011/65/EU

3 Installation steps, overview

This chapter contains an overview of the steps necessary to install your server. The cross-references take you to the sections containing more detailed information on the relevant installation step:

- First, read the chapter "[Important information](#)" on page 22, particularly the section "[Safety instructions](#)" on page 22.
- Unpack the server, check the contents of the package for visible transport damage, and check whether the items delivered correspond to the details on the delivery note (see section "[Unpacking the server](#)" on page 33).
- Transport the server to the place where you want to set it up.
- Install the server in your system unit (see section "[Hardware installation](#)" on page 30).
- Familiarize yourself with the controls and indicators on the front of the server (see "[Starting up and operation](#)" on page 46).
- Install the operating system and applications on the server.

4 Important information

This chapter provides safety instructions which you must observe when handling your server.

4.1 Safety instructions

This device meets the relevant safety regulations for IT equipment. If you have any questions about whether you can install the server in the intended environment, please contact your sales outlet or our customer service team.

CAUTION!



- The actions described in this manual shall be performed by technical specialists. A technical specialist is a person who is trained to install the server including hardware and software.
- Repairs to the device that do not relate to CSS failures shall be performed by service personnel. Please note that unauthorized interference with the system will void the warranty and exempt the manufacturer from all liability.
- Any failure to observe the guidelines in this manual, and any improper repairs could expose the user to risks (electric shock, energy hazards, fire hazards) or damage the equipment.
- Before installing/removing internal options to/from the server, turn off the server, all peripheral devices, and any other connected devices. Also unplug all power cords from the power outlet. Failure to do so can cause electric shock.

Before starting up

CAUTION!



- During installation and before operating the device, observe the instructions on environmental conditions for your device (see "[Ambient conditions](#)" on page 17).
- If the server has been moved from a cold environment, condensation may form both inside and on the outside of the machine.
Wait until the server has acclimatized to room temperature and is absolutely dry before starting it up. Material damage may be caused to the server if this requirement is not met.
- Only transport the server in the original packaging or in packaging that protects it from impacts and jolts.

Installation and operation

CAUTION!



- If the device is integrated in an installation that receives power from an industrial (public) power supply network with the IEC309 connector, the (public) power supply protection must comply with the requirements for non-industrial (public) power supply networks for the type A connector.
- Power button or the main power switch (if there is one) does not disconnect the device from the mains voltage. To completely disconnect it, you must remove all the power plugs from the power outlets.
- Data cables must be adequately shielded to avoid interference.
- Do not connect or disconnect any data transmission cables during a thunderstorm (lightning hazard).
- Make sure that no objects (e.g. bracelets or paper clips) fall into or liquids spill into the device (risk of electric shock or short circuit).

CAUTION!



- In emergencies (e.g. damaged casing, control elements or power cable, penetration of liquids or foreign bodies), switch off the device immediately, unplug it from the grounded power outlets, and contact your customer service center.
- Proper operation of the device (in accordance with IEC 60950- 1/EN 60950-1) is only ensured if the casing is fully assembled and the rear covers for the installation bays are in place (electric shock, cooling, fire protection, interference suppression).
- Install only system extensions that satisfy the requirements and rules governing safety, electromagnetic compatibility, and telecommunications terminal equipment. If you install other extensions, you may damage the system or violate these safety regulations. You can find out which system extensions are suitable from the customer service center or your sales outlet.
- The components marked with a warning label (e.g. lightning symbol) may only be opened, removed or exchanged by authorized, qualified personnel. Exception: CSS components can be replaced.
- If you cause a defect on the device by installing or exchanging system extensions, the warranty will be invalidated.
- Only set the resolutions and refresh rates specified in the operating manual for your monitor. Otherwise, you may damage the monitor. If

you are in any doubt, contact your sales outlet or customer service center.

Batteries

- Incorrect replacement of batteries may lead to a risk of explosion. The batteries may only be replaced with identical batteries or with a type recommended by the manufacturer.
- Do not throw batteries into the trash can.
- Batteries must be disposed of in accordance with local regulations concerning special waste.
- Make sure that you insert the battery the right way round.
- The battery used in this device may present a fire or chemical burn hazard if mistreated. Do not disassemble, heat about 100 °C (212F), or incinerate the battery.
- All batteries containing pollutants are marked with a symbol (a crossed-out garbage can). In addition, the marking is provided with the chemical symbol of the heavy metal decisive for the classification as a pollutant:

Cd Cadmium

Hg Mercury

Pb Lead

Working with CDs/DVDs/BDs and optical drives

When working with devices with optical drives, these instructions must be followed.

CAUTION!



- Only use CDs/DVDs/BDs that are in perfect condition, in order to prevent data loss, equipment damage and injury.
- Check each CD/DVD/BD for damage, cracks, breakages etc. before inserting it in the drive.

Note that any additional labels applied may change the mechanical properties of a CD/DVD/BD and cause imbalance.

Damaged and imbalanced CDs/DVDs/BDs can break at high drive speeds (data loss).

Under certain circumstances, sharp CD/DVD/BD fragments can pierce the cover of the optical drive (equipment damage) and can fly out of the device (danger of injury, particularly to uncovered body parts such as the face or neck).

-
- High humidity and airborne dust levels are to be avoided. Electric shocks and/or server failures may be caused by liquids such as water, or metallic items, such as paper clips, entering a drive.
 - Shocks and vibrations are also to be avoided.
 - Do not insert any objects other than the specified CDs/DVDs/BDs.
 - Do not pull on, press hard, or otherwise handle the CD/DVD/BD tray roughly.
 - Do not disassemble the optical drive.
 - Before use, clean the optical disk tray using a soft, dry cloth.
 - As a precaution, remove disks from the optical drive when the drive is not to be used for a long time. Keep the optical disk tray closed to prevent foreign matter, such as dust, from entering the optical drive.
 - Hold CDs/DVDs/BDs by their edges to avoid contact with the disk surface.
 - Do not contaminate the CD/DVD/BD surface with fingerprints, oil, dust, etc. If dirty, clean with a soft, dry cloth, wiping from the center to the edge. Do not use benzene, thinners, water, record sprays, antistatic agents, or silicone-impregnated cloth.
 - Be careful not to damage the CD/DVD/BD surface.
 - Keep the CDs/DVDs/BDs away from heat sources.
 - Do not bend or place heavy objects on CDs/DVDs/BDs.
 - Do not write with ballpoint pen or pencil on the label (printed) side.
 - Do not attach stickers or similar to the label side. Doing so may cause rotational eccentricity and abnormal vibrations.
 - When a CD/DVD/BD is moved from a cold place to a warm place, moisture condensation on the CD/DVD/BD surface can cause data read errors. In this case, wipe the CD/DVD/BD with a soft, dry cloth then let it air dry. Do not dry the CD/DVD/BD using devices such as a hair dryer.
 - To avoid dust, damage, and deformation, keep the CD/DVD/BD in its case whenever it is not in use.
 - Do not store CDs/DVDs/BDs at high temperatures. Areas exposed to prolonged direct sunlight or near heating appliances are to be avoided.



You can prevent damage from the optical drive and the CDs/DVDs/BDs,

as well as premature wear of the disks, by observing the following suggestions:

- Only insert disks in the drive when needed and remove them after use.
- Store the disks in suitable sleeves.
- Protect the disks from exposure to heat and direct sunlight.

CAUTION!



The optical drive contains a light-emitting diode (LED), which under certain circumstances produces a laser beam stronger than laser class 1. Looking directly at this beam is dangerous. Never remove parts of the optical drive casing!

Modules with Electrostatic-Sensitive Devices

Modules with electrostatic-sensitive devices are identified by the following sticker:

Figure 4.1 ESD lable



When you handle components fitted with ESD(ElectroStatic Discharge) label, you must always observe the following points:

- Switch off the system and remove the power plugs from the power outlets before installing or removing components with ESDs.
- You must always discharge static build-up (e.g. by touching a grounded object) before working with such components.
- Any devices or tools that are used must be free of electrostatic charge.
- Wear a suitable grounding cable that connects you to the external chassis of the system unit.
- Always hold components with ESDs at the edges or at the points marked green (touch points).
- Do not touch any connectors or conduction paths on an ESD.
- Place all the components on a pad which is free of electrostatic charge.



For a detailed description of how to handle ESD components, see the relevant European or international standards (EN 61340-5-1, ANSI/ESD S20.20).

Other important information:

- During cleaning, observe the instructions in section "[Cleaning the server](#)" on [page 72](#).
- Keep this operating manual and the other documentation (such as the Upgrade and Maintenance Manual, documentation DVD) close to the device. All documentation must be included if the equipment is passed on to a third party.

4.2 CE conformity



The system complies with the following requirements of the EC directives

- 2014/30/EU "Electromagnetic Compatibility"
- 2014/35/EU "Low Voltage Directive"
- 2014/65/EC "Restrictions on dangerous substances"

This is indicated by the CE marking (CE = Communauté Européenne).

4.3 FCC Class A Compliance Statement

If there is an FCC statement on the device, it applies to the products covered in this manual, unless otherwise specified herein. The statement for other products will appear in the accompanying documentation.

NOTE:

This equipment has been tested and found to comply with the limits for a "Class A" digital device, pursuant to Part 15 of the FCC rules and meets all requirements of the Canadian Interference-Causing Equipment Standard ICES-003 for digital apparatus. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not

installed and used in strict accordance with the instructions, may cause harmful interference to radio communications. However, there is no warranty that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Cisco is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Cisco. The correction of interferences caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

The use of shielded I/O cables is required when connecting this equipment to any and all optional peripheral or host devices. Failure to do so may violate FCC and ICES rules.

WARNING:

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

4.4 Transporting the server

CAUTION!



Only transport the server in its original packaging or in packaging that protects it from impacts and jolts. Do not unpack the server until it is at its installation location.

If you need to lift or transport the server, ask other people to help you.

4.5 Environmental protection

Energy-saving information

Devices that do not need to be constantly switched on should be switched off until they are needed as well as during long breaks and after completion of work.

Packaging information

Do not throw away the packaging. You may need it later for transporting the system. If possible, the equipment should only be transported in its original packaging.

Information on handling consumables

Please dispose of printer consumables and batteries in accordance with the applicable national regulations.

In accordance with EU directives, batteries must not be disposed of with unsorted domestic waste. They can be returned free of charge to the manufacturer, dealer or an authorized agent for recycling or disposal.

All batteries containing pollutants are marked with a symbol (a crossed-out garbage can). They are also marked with the chemical symbol for the heavy metal that causes them to be categorized as containing pollutants:

Cd Cadmium

Hg Mercury

Pb Lead

Labels on plastic casing parts

Please avoid sticking your own labels on plastic parts wherever possible, since this makes it difficult to recycle them.

Returns, recycling and disposal

Please handle returns, recycling and disposal in accordance with local regulations.



The device must not be disposed of with domestic waste. This device is labeled in compliance with European directive 2002/96/EC on waste electrical and electronic equipment (WEEE).

This directive sets the framework for returning and recycling used equipment and is valid across the EU. When returning your used device, please use the return and collection systems available to you.

5 Hardware installation

CAUTION!



- Follow the safety instructions in the chapter ["Important information" on page 22](#).
- Do not expose the server to extreme environmental conditions (see ["Ambient conditions" on page 17](#)). Protect the server from dust, humidity and heat.
- Make sure that the server is acclimatized for the time indicated in this table before putting it into operation.

Table 5.1 Acclimatization time

Temperature difference (°C)	Minimum acclimatization time (hours)
5	3
10	5
15	7
20	8
25	9
30	10

In [Table 5.1 on page 30](#), the temperature difference refers to the difference between the operating environment temperature and the temperature to which the server was previously exposed (outside, transport or storage temperature).

- Check environmental temperature conditions. the server can be installed as locations that satisfy the environmental conditions listed in [Table 2.12 on page 17](#) and [Table 2.13 on page 18](#).

5.1 Setup Workflow

5.1.1 Advance preparation performed by the user

The user have to perform the following advance preparation.

- Environmental preparation that satisfies the temperature and humidity conditions described in the product catalog, and the power supply preparation for the target server at the installation site.
- When connecting the target server to the network environment, establish the network environment which the server connects, Confirm the network environment works properly, and prepare for the network port for the server.
- The presence of the person in charge (responsible person) on the day of the work execution

5.1.2 Work performed by the user

The user performs the following tasks in the order given.

No.	Work Item Yes	Work tasks and description
1	Setup	- Connecting and configuring iRMC (operating environment) - Setting up the connection environment for actual operation. Set up iRMC connection environment, such as by setting the IP addresses for actual operation.
		- Initializing iRMC settings Set the parameters for the entire iRMC, such as the user account names or system names.
		- Setting various modes Set modes as needed.
		- Starting the system and confirming system startup Start the system and confirm that it has started normally.
		- Saving setting information Save the setting information for iRMC.
2	Installing the OS and bundled software.	Install the operating system and bundled software.

3	Work after installation	Specify the monitoring method, and save the specified information.
4	Configuring SNMP and security	Configure SNMP and security.

5.1.3 Work performed by a field engineer

A field engineer sets up the unit. This includes the following tasks:

- Checking mounted components
- Preparing for main unit installation
- Checking system... etc.

In addition, a field engineer performs the following periodic inspection.

- Checking error log and alarm
- Checking installation conditions and use conditions
- Cleaning of a server

The following works are out of the scope of a field engineer.

- Connection / setting other than our product
- Building a network environment
- Transport of target equipment and peripheral equipment
- Construction for connecting power supply and network
- Replacement of rack mounted server
- Installing a rack (installation of earthquake-resistant kits etc. is within the scope of field engineer's work)
- Rack mounting of the device of 20kg or more to a height of 25U or more, or rack mounting of the device of 60 kg or more

5.2 Unpacking the server

CAUTION!



Follow the safety instructions in ["Important information" on page 22](#).

Do not unpack the server until it is at its installation location.

- Transport the server to the place where you want to set it up.
- Unpack all individual parts.

Keep the original packaging in case you want to transport the server again (applies only to global market).

- Check the delivery for any damage during transport.
- Check whether the items delivered match the details on the delivery note.

When shipping from Japan, it is labeled on the front lower right. (see section ["ID card" on page 46](#)).

- Notify your supplier immediately should you discover that the items delivered do not correspond to the delivery note.

5.3 Rack installation/removal of server

CAUTION!



- Please observe the safety information and notes on rack mounting in chapter ["Important information" on page 22](#).
- At least four people are needed to install / remove the server in the rack.

5.3.1 Rack system requirements

The rack systems from Cisco R Series Racks and 19-inch standard rack support the installation of Cisco C880 M5. Installation in most current rack systems from other manufacturers (3rd party racks) is also supported.

To accommodate the ventilation concept and ensure proper ventilation, any unused areas in the rack must be sealed using dummy covers.

The power is supplied via the multiple socket outlets fitted in the rack.

3rd party racks

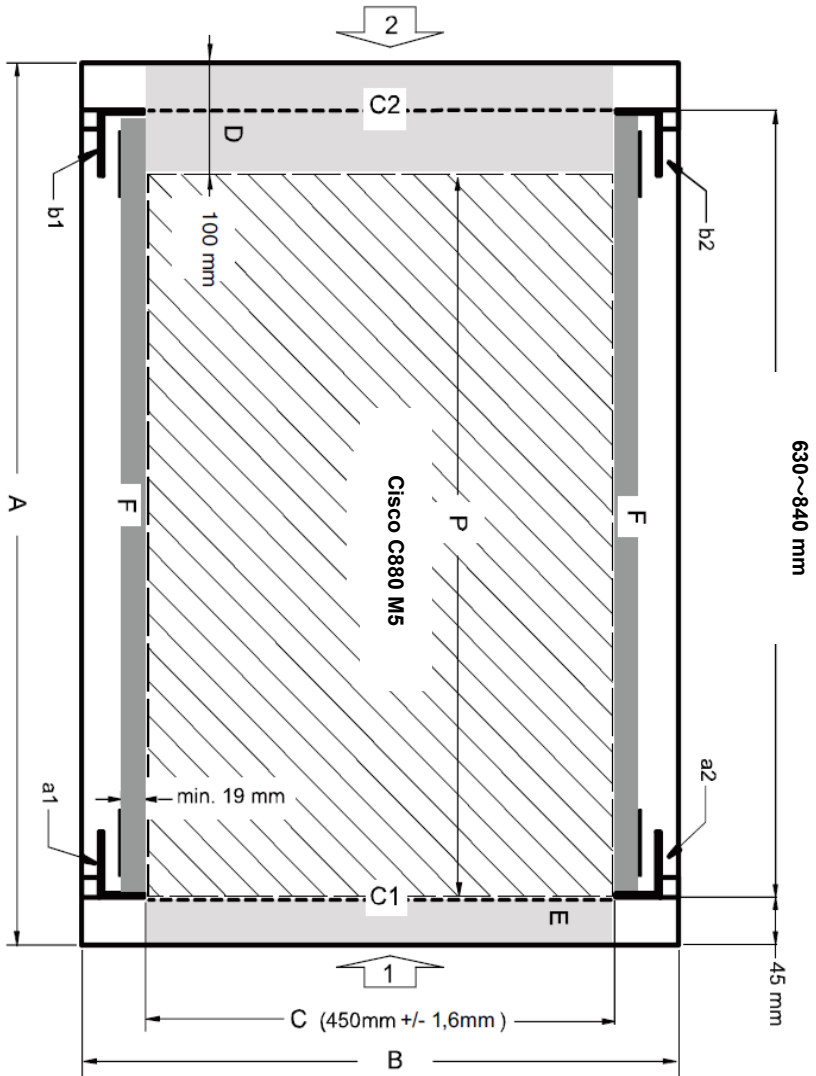
Certain general conditions must be met:

- Installation dimensions (see the dimensions shown in [Figure 5.1 on page 35](#)):

Table 5.2 description of points

1	Front of rack Yes
2	Rear of rack
A	Rack depth
B	Rack width
C	Clearance for 19" installation level
C1	Front 19" installation level
C2	Rear 19" installation level
D	Cable routing area (cable area depth) and ventilation
E	Space for front panel and ventilation
F	Space for right and left support systems
P	Cisco C880 M5 rack installation depth
a1	Front left support upright
a2	Front right support upright
b1	Rear left support upright
b2	Rear right support upright

Figure 5.1 Mechanical requirement



-
- You must ensure that the safety mechanisms on the server, e.g. stoppers or retaining systems, are functioning correctly.
 - The shape of the rack support uprights must ensure that the support systems can be bolted to the front.

The support systems have a linear alignment feature to ensure that they can be adjusted to different rack depths.

- No cable management support (delivered with the mounting kit).
- Climatic conditions: An unobstructed air intake in the rack front and air discharge in the rear cover of the rack are essential for ventilation of the installed server.

In general, the ventilation concept ensures that the necessary cooling is achieved by the horizontal self-ventilation of the installed devices (air flow from the front to the rear).

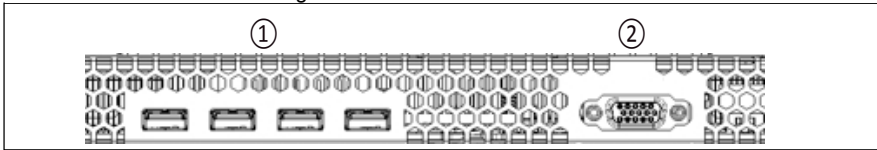
- Power supply: For installation in third party racks, you must ensure that the appropriate socket strips are present.

5.4 Connecting devices to the server

The connectors for external devices are on the front of the server. The additional connectors available on your server depend on the expansion cards installed (e.g. optional SAS connector).

i Some of the devices that can be connected may require special software, e.g. drivers (see the documentation for the connected device).

Figure 5.2: Connectors on the front



On the front of SB#0, there are four USB connectors ① and a video connector ②.

Connecting the monitor

- Plug the data cable for the monitor into the video connector on the front of SB#0.
- Connect the power cord of the monitor to a grounded mains outlet of the in-house mains and/or into the mains socket strip of the rack.

5.5 Connecting the server to the mains

CAUTION!



The server is automatically set to a mains voltage in the range 200 – 240 V. You may only operate the server if its rated voltage range corresponds to the local mains voltage.

5.5.1 Installation requirements

The power subsystem consists of:

- Power supply modules (PSU)
- A power distribution board (PDB)

The power supply subsystem can support up to four PSUs which all connect to the PDB. The total system is rated 200-240V, 12.6A, 50-60Hz. The minimum system configuration requires installation of at least two PSUs. The PSU is considered hot-swappable only when PSUs are redundant. The system can be configured to support

*True AC redundancy or non-AC redundancy.



*True AC redundancy is recommended for systems used for critical business applications. This will result in the system to continue operation during a power failure as the redundant part of the subsystem is plugged into a separate AC source (e.g. uninterruptable power supply (UPS)).



Refer to tables below for maximum DC loading for both AC redundant and AC non redundant configurations.

Installation requirements for AC redundant configurations

The AC redundant configuration is with two PSU plugged into a main AC source and two other PSUs plugged into a separate AC source (e.g. UPS).

Table 5.3 Maximum DC Loading Requirements for AC redundant configurations

PSU Configuration	Max. DC Loading	DC Redundancy
2+2 (4 PSUs)	(200-240V): 3222W	Yes

Installation requirements for AC non redundant configurations

For systems not requiring AC redundancy, the power supply subsystem can be installed with up to 4 PSUs. The PSUs can be connected to a single or multiple AC sources.

Table 5.4 Maximum DC Loading Requirements for AC non redundant configurations

PSU Configuration	Max. DC Loading	DC Redundancy
2+0 (2 PSUs)	(200-240V): 3222W	Yes
2+1 (3 PSUs)		
2+2 (4 PSUs)		

Two power supply modules are capable of handling the maximum power requirements for a fully configured Cisco C880 M5 server system, which include the following:

- Eight processors
- 12 TB of memory
- 16 PCIe add-in cards (including the SAS RAID controller card)
- Eight SAS HDD/SSD, eight PCIe SSD SFF, or a mixture of four SAS HDD/SSD and four PCIe SSD SFF

System power supply configuration and system load limits for 1200W PSU

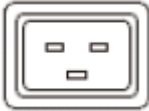
The system configuration and load is limited by the number of AC mains power sources available as indicated in the following table.

Table 5.5 System power supply configuration and system load limits for 1200W PCU

Number of power supply modules installed	AC redundant systems (requires 2 AC sources)		AC non-redundant systems (connected to 1 AC source)	
	Max. DC loading to support AC redundancy	Installation requirements	Max. DC loading for AC non-redundant systems	Installation requirements
2	N/A	N/A	(200-240V): 3222W	2 PSUs connected to mains (2+0)
3	N/A	N/A	(200-240V): 3222W	3 PSUs connected to mains (2+1)
4	(200-240V): 3222W	2 PSUs connected to mains 2 PSUs connected to an isolated AC source e.g. UPS (2+2)	(200-240V): 3222W	4 PSUs connected to mains (2+2)

5.5.2 Input power connection specification

Table 5.6 Input power connection specification

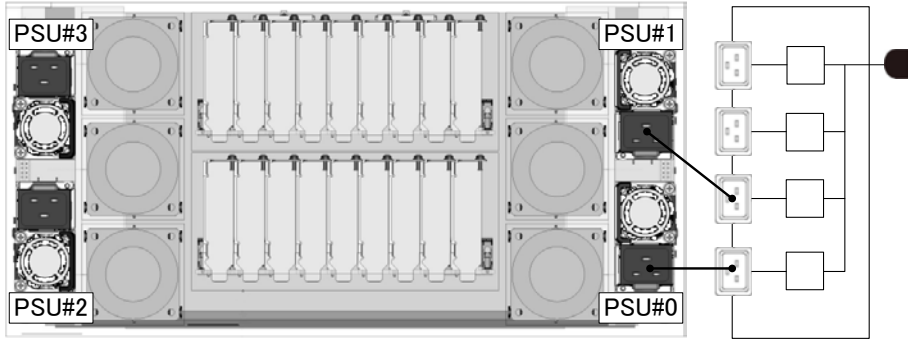
Plug format	Destination	Recipient outlet format
IEC60320-C20 type	Power distribution box	IEC60320-C19 type 

5.5.3 Connecting diagram of the power cord

PSU Non-Redundant

To make the power supply non-redundant, it is necessary to arrange two PSUs and two power supply cables (200 V NEMA L 6 - 20 P).

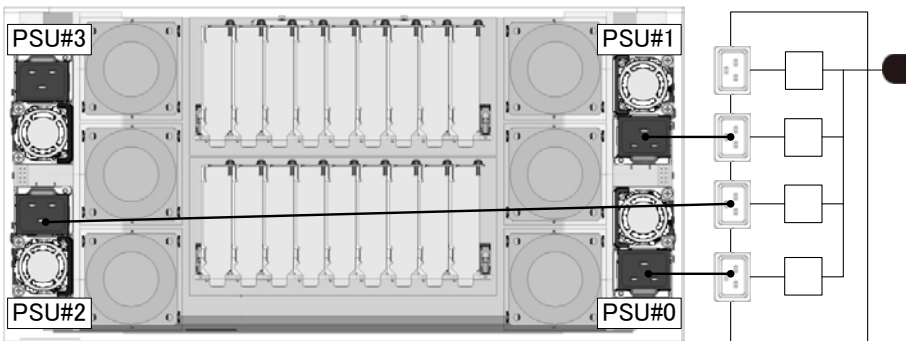
Figure 5.3 Connecting Diagram of PSU Non-Redundant



PSU Redundant(2+1)

To make the power supply redundant, it is necessary to arrange three PSUs and three power supply cables (200 V NEMA L 6 - 20 P).

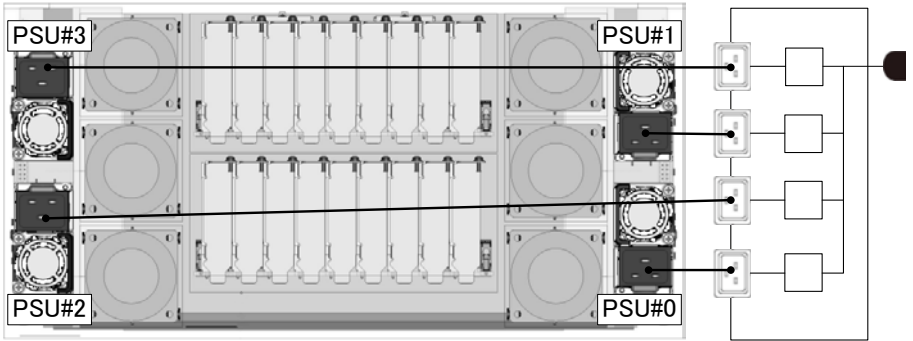
Figure 5.4 Connecting Diagram of PSU Redundant(2+1)



PSU Redundant(2+2)

To make the power supply redundant, it is necessary to arrange four PSUs and four power supply cables (200 V NEMA L 6 - 20 P).

Figure 5.5 Connecting Diagram of PSU Redundant(2+2)



PSU Redundant(2+2) with AC Redundant

To make the power supply redundant, it is necessary to arrange four PSUs and four power supply cables (200 V NEMA L 6 - 20 P).

Figure 5.6 Connecting Diagram of PSU Redundant(2+2) with AC Redundant



5.5.4 Connecting procedure of the power cord

- Connect the power cord to the server power supply unit.
- Secure the power cords in the cable clamps so the insulated connectors cannot be accidentally disconnected from the server.

Figure 5.7: Cable clamps to secure the power cords



- Thread the cable through the cable clamp as shown in [Figure 5.7 on page 44](#).
- Pull the cable clamp tight to secure the power cord.

Now the insulated connector cannot be accidentally disconnected from the server.

- Connect the mains plug to a grounded mains outlet in the in-house power supply network or a power outlet of the socket strip in the rack (see Technical Manual for the rack).

5.6 Notes on connecting/disconnecting cables

CAUTION!



Always read the documentation supplied with the device you wish to connect.

Never connect, or disconnect cables during a thunderstorm.

Never pull on a cable when disconnecting it. Always take hold of the cable by the plug.

Follow the sequence described below to connect or disconnect external devices to or from the server:

Be sure to wait for 10 seconds or more after shutdown before turning the server on.

Connecting cables

- Turn off all power and equipment switches.
- Disconnect all power plugs from the properly grounded power outlets.
- Connect all cables to the server and peripherals.
- Plug all data communication cables into the utility sockets.
- Plug all power cords into the properly grounded power outlets.

Disconnecting cables

- Turn off all power and equipment switches.
- Disconnect all power plugs from the properly grounded power outlets.
- Unplug all data communication cables from the utility sockets.
- Disconnect the relevant cables from the server and all the peripherals.



For connecting or disconnecting LAN cables, the server needs not be powered off. To avoid loss of data teaming/bonding function has to be enabled.

5.7 Notes on inserting/removing units



Please power off the system and remove the power cords from PSUs in the chassis before inserting or removing System Board, IOUB, DU_SAS, DU_PCIE, MGMT-LANU or PCIe card except PHP slot to/from the chassis.

6 Starting up and operation

CAUTION!



Follow the safety instructions in chapter ["Important information"](#) on [page 22](#).

6.1 Control elements and indicators

6.1.1 Front of server

Figure 6.1 Front of server

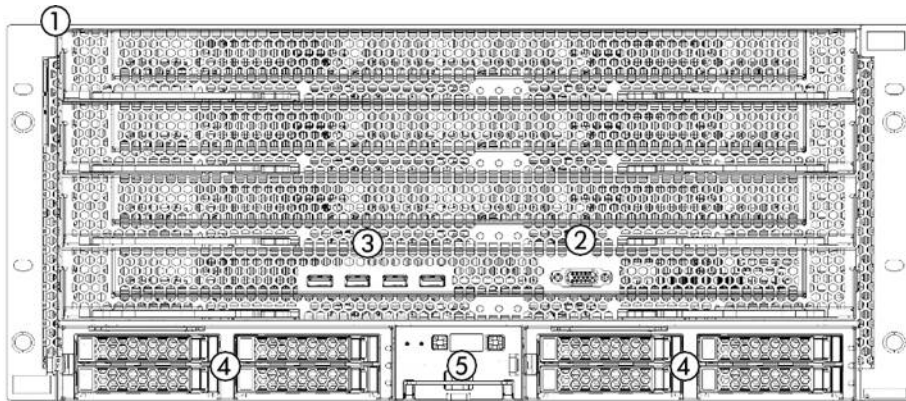


Table 6.1 Points of front of server

1	ID card	4	SAS HDD/SSD or PCIe SSD SFF slots
2	Video connector	5	Operation panel (for details see Figure 6.2 on page 47)
3	4x USB connector		

ID card

You can pull out the ID card (see [Figure 6.1 on page 46](#)) as far as it will go and push it back in again.

The ID card contains various system information, such as the product name, serial number, order number, MAC addresses and DNS name.

6.1.1.1 Buttons and Indicators on Operation Panel

Figure 6.2 Buttons and Indicators on Operating Panel

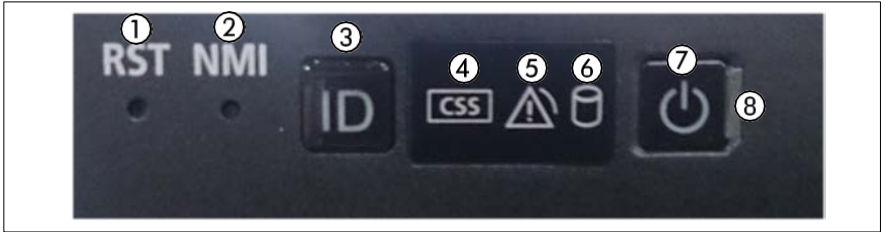




Table 6.2 Points of Operation Panel

1	Reset button	5	System Alarm
2	NMI button	6	Common HDD-Access
3	Location button / System Location	7	Power button / System Power
4	CSS	8	AC-connected

Functions of each button are shown below.


Table 6.3 Functions of buttons

Pos.	Button	Function
1	Reset button	<p>This button is used to reboot the system. It can be pressed using the end of a paper clip.</p> <p>CAUTION!</p> <p> Risk of data loss!</p>
2	NMI button	<p>This button is used to troubleshoot software and device driver errors. It can be pressed using the end of a paper clip.</p> <p>CAUTION!</p> <p> Use this button only if directed to do so by qualified certified maintenance personnel!</p>
3	Location button	This button highlights System Location indicator on the front and I/O panels for easy server identification.
7	Power button	<p>This button is used to switch the server on or off.</p> <p>If the system is running an ACPI-compliant operating</p>

Pos.	Button	Function
		system, the pressing Power button will performs a graceful shutdown.

Status and description of each indicator are shown below.

Table 6.4 Status and description of indicators

Pos.	Indicator	Status	Description
3	System Location	blue on	Server has been highlighted using iRMC web frontend or the Location button on the front panel for easy identification
4	CSS	orange on	Warning occurs in components which user can maintain
		orange flashing	Error(Critical) occurs in components which user can maintain
5	System Alarm	orange on	Warning occurs in components which user cannot maintain
		orange flashing	Error(Critical) occurs in components which user cannot maintain
6	Common HDD-Access	green flashing	data access in progress
7	System Power	off	is off in the following case: – the system is in power-off mode but connected to the mains (AC-connected)
		green on	is on in the following cases: – the system has been switched on and is in power-on delay – the system is powered on and in normal operation (S0)
		flashes slowly (1/2 Hz)	iRMC S5 is not ready
8	AC-connected	green on	is on in the following cases: – the system is in power-off mode but connected to the mains (AC-connected) – the system has been switched on and is in power-on delay  After connecting the server to the mains it takes about 60 seconds

Pos.	Indicator	Status	Description
			until the server enters the standby mode.
		off	is off in the following cases: <ul style="list-style-type: none">– the system is not connected to the mains– the system is powered on and in normal operation (S0)

6.1.1.2 Indicators on System Board

Figure 6.3 Indicators on System Board



Table 6.5 Operations of indicators on System Board

1	Power (green) <ul style="list-style-type: none">– Lights up: System Board Power On– Does not light: System Board Power Off
2	Alarm (orange) <ul style="list-style-type: none">– Does not light: no System Board error– Lights up: System Board error
3	Location (Blue) <ul style="list-style-type: none">– Lights up: System Board Identification

6.1.1.3 Indicators on DU_SAS

Figure 6.4 Indicators on DU_SAS



Table 6.6 Operations of indicators on DU_SAS

1	Power (green) <ul style="list-style-type: none">– Lights up: DU_SAS Power On– Does not light: DU_SAS Power Off
2	Alarm (orange) <ul style="list-style-type: none">– Does not light: no DU_SAS– Lights up: DU_SAS error
3	Location (Blue) <ul style="list-style-type: none">– Lights up: DU_SAS Identification.

6.1.1.4 Indicators on DU_PCIE

Figure 6.5 Indicators on DU_PCIE



Table 6.7 Operations of indicators on DU_PCIE

1	Power (green) <ul style="list-style-type: none">– Lights up: DU_PCIE Power On– Does not light: DU_PCIE Power Off
2	Alarm (orange) <ul style="list-style-type: none">– Does not light: no DU_PCIE error– Lights up: DU_PCIE error
3	Location (Blue) <ul style="list-style-type: none">– Lights up: DU_PCIE Identification

6.1.1.5 Indicators on the hot-plug HDD/SSD modules

Figure 6.6 Indicators on a hot-plug SAS HDD/SSD module

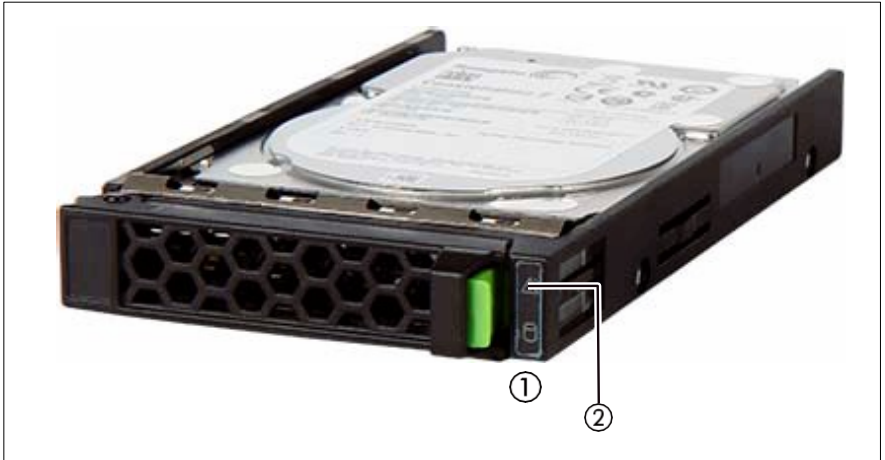


Table 6.8 Operations of indicators on a hot-plug SAS HDD/SSD module

1	SAS HDD/SSD Access (green) <ul style="list-style-type: none">– Lights up: HDD/SSD in active phase (drive active, drive being accessed)– Does not light: HDD/SSD inactive (drive inactive)
2	SAS HDD/SSD Alarm (orange) <ul style="list-style-type: none">– Does not light: no HDD/SSD error– Lights up: HDD/SSD Faulty or Rebuild Stopped (drive defective/needs replacing, a rebuild process was stopped or the HDD/SSD module is not correctly inserted)– Slow flashing: HDD/SSD Rebuild (the data is being restored after changing a drive)

If a hard disk drive or solid state disk continuously indicates an error, the drive should be replaced as soon as possible. This can be done during operation.

6.1.1.6 Indicators on the hot-plug PCIe SSD SFF modules

Figure 6.7 Indicators on a hot-plug PCIe SSD SFF module



1	<p>PCIe SSD SFF Access (green)</p> <ul style="list-style-type: none">– Lights up: PCIe SSD SFF in active phase (drive active, drive being accessed)– Flashing (2 fast blinks @ 4Hz): PCIe SSD SFF inactive (drive inactive)
2	<p>PCIe SSD SFF Alarm (orange)</p> <ul style="list-style-type: none">– Does not light: no PCIe SSD SFF error– Lights up: PCIe SSD SFF Faulty or Rebuild Stopped (drive defective/needs replacing, a rebuild process was stopped or the PCIe SSD SFF module is not correctly inserted)– Flashing: PCIe SSD SFF location identification

If a PCIe SSD SFF module continuously indicates an error, the drive should be replaced as soon as possible. This can be done during operation.

6.1.2 Rear of server

6.1.2.1 Indicators on IOUB

Figure 6.8 Indicators on IOUB

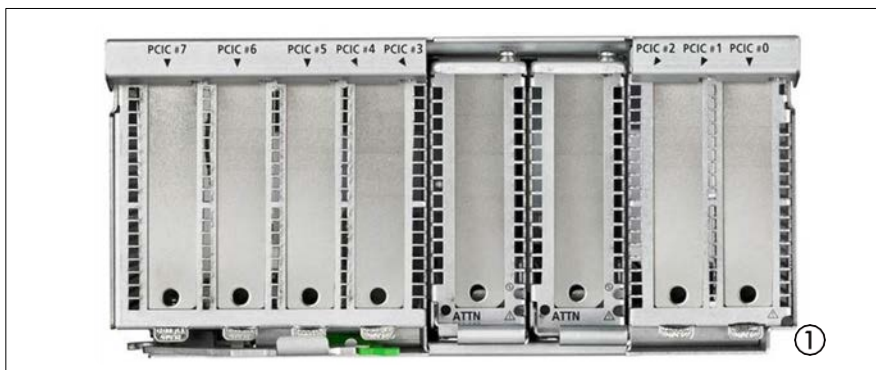
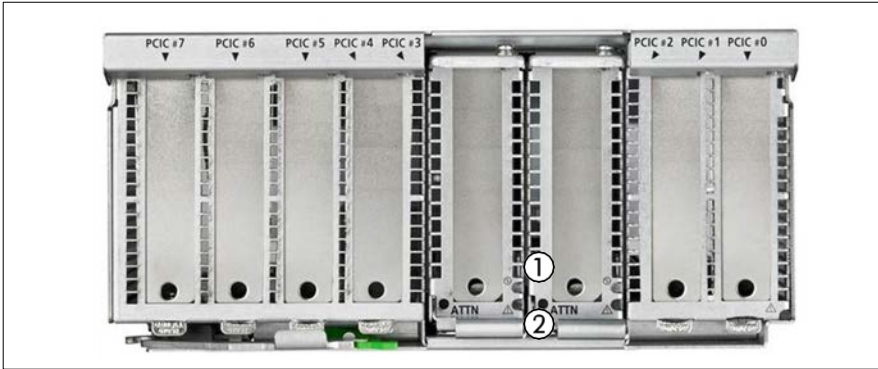


Table 6.9 Operations of indicators on IOUB

1	Alarm (Orange) <ul style="list-style-type: none">– Lights up: IOUB error– Does not light up: no IOUB error
---	---

6.1.2.2 Indicators on IOUB PCI card slot#2 and slot#3

Figure 6.9 Indicators on IOUB PCI card slot



Only Slot#2 and Slot#3 which support hot-plug have the following LEDs

Table 6.10 Operations of indicators on IOUB PCI card slot

1	PCI Slot Power (Green) <ul style="list-style-type: none">– Lights up: System Power On– Does not light up: AC Off and System Power Off
2	PCI Slot Alarm (Orange) <ul style="list-style-type: none">– Lights up: IOUB PCI card slot error– Does not light up: no IOUB card slot error

6.1.2.3 Indicators on MGMT_LANU

Figure 6.10 Indicators on MGMT_LANU

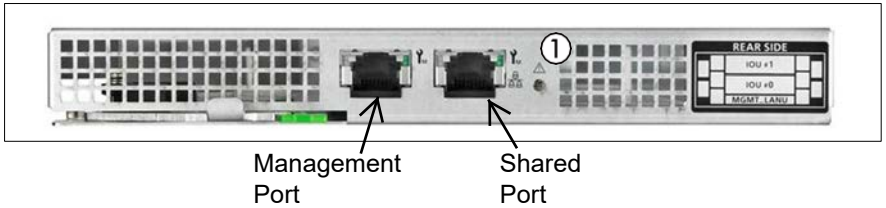




Table 6.11 Operations of indicators on MGMT_LANU

1	<p>Alarm (Orange)</p> <ul style="list-style-type: none"> - Lights up: MGMT_LANU error - Does not light up: no MGMT_LANU error
---	---

Icon	Meaning
	DedicatedService/Management LAN (port exclusively for the iRMC; with the iRMC a LAN speed up to 1000 MBit/s is available)
	Shared LAN (iRMC and system) LAN speed setting is only available on system.

6.1.2.4 Indicators on the hot-plug power supply units

Figure 6.11 Indicators on the power supply units



Table 6.12 Operations of indicators on the power supply units

1	<p>Power/Alarm (Green/Orange)</p> <ul style="list-style-type: none">- Lights up (Green): PSU error- Lights up (Orange): Non-Redundant Power supply system in PSU failed- Lights up (Orange): PSU identification- Flashing (Green): AC input On and System Power Off- Does not light up: AC input of PSU Off
---	---

6.1.2.5 Indicator on FANU

Figure 6.12 Indicators on FANU



Table 6.13 Operations of indicators on FANU

1	<p>Alarm (Orange)</p> <ul style="list-style-type: none">– Lights up (Orange): FANM error– Lights up (Orange): FANU identification– Does not light up: no FANM error
---	---

6.2 Switching the server on and off

CAUTION!



- If nothing appears on the screen but flickering stripes after switching on the server, switch the server off immediately (see chapter "[Troubleshooting and tips](#)" on page 77).
- Power button does not disconnect the server from the mains voltage. To completely disconnect it from the mains voltage, remove the power plugs from the sockets.
- Do not move, strike, or shake the server when it is turned on. This can damage the hard disk in the server and cause data loss.
- Turn the server on when the temperature is in its operating environment range (5 - 40°C). For details on the operating environment, refer to "Safety Precautions". When operating the device outside of this operating environment, the server may operate improperly, damage data etc. Furthermore, Cisco cannot be held responsible for any related damage, malfunction, or loss of data, etc.
- Be sure to wait for 10 seconds or more after shutdown before turning the server on.
- After connecting the power cords, press Power button after it passes for more than 10 seconds.

Switching the server on

AC-connected indicator (see [Figure 6.2 on page 47](#)) lights up green (standby mode) when the server is connected to the mains.

Starting up for the first time:

- Press Power button (see [Figure 6.2 on page 47](#)).
- Follow the on-screen instructions (see also section "[Configuring the server and installing the operating system](#)" on page 71).

System already installed:

- Press Power button (see [Figure 6.2 on page 47](#)).



The server is switched on, performs a system test and boots the operating system.

It might take several minutes to start up depending on the hardware configuration.

Switching the server off

Shut down the operating system properly. The server is switched off automatically and goes into standby mode.



If the operating system does not switch the server off automatically, press Power button for at least four seconds and/or send a corresponding control signal.

Other On/Off options

Besides Power button, the server can be switched ON and OFF in the following ways:

Timer-controlled switch-on/off

Using iRMC, you can configure that the server is switched on/off controlled by timer.

Wake up On LAN (WOL)

The server is switched on by a command via the LAN (Magic Packet™).

After power failure

The server automatically reboots following a power failure (depending on the settings in the BIOS or in iRMC).

Power button override

The system can be switched off by pressing and holding down Power button (for approximately 4 - 5 seconds).

CAUTION!



There is a risk that data may be lost.

iRMC S5

iRMC S5 offers various options for switching the server on and off, e.g. via the *Power On Off* page of the iRMC S5 Web interface.

6.3 Configuring the server

This section contains information about configuring the server and installing the operating system.

i Make sure that the energy saving functions are disabled in the BIOS Setup during server operation.

6.3.1 Configuring Fast Boot

i If Fast Boot is set to Enable in BIOS setup, startup times may differ even on the same device.

6.3.2 Configuring Memory Mirror

In Cisco C880 M5, Full Mirror Mode and Address Range Mirror Mode are supported as the memory mirror, in which the function with the CPU is used. Full Mirror/Address Range Mirror can be selected from iRMC Web-UI.

Table 6.14 Memory Mirror Mode

Mirror Type	Description
Full Mirror	Memory Mirroring is executed to memories on all SBs included in a chassis.
Address Range Mirror	Memory Mirroring is partially executed to memories included in a chassis. Memory size to be mirrored is specified by BIOS or OS.

Memory Mirror Conditions

Install DIMMs by reference to ["DIMM installation order" on page 86](#).

6.3.2.1 Configuring Address Range Mirror

This section describes how to use Address Range Mirror in Red Hat Enterprise Linux/ SUSE Linux Enterprise Server. You must select "OS Request" to specify mirror size in BIOS menu.

Maximum and Minimum Mirror Size

You can set percentage to <Percentage of mirror size> in "Setting Procedure". The maximum value is 50. The minimum value is shown below. (*1)

(*1) Minimum value

There are following two rules;

1. Mirror size must be 16GB and more.

e.g) for installed memory size = 128GB: 13%, for installed memory size = 256GB: 7%.

2. Percentage of mirror size must be 3% and more.

e.g) for installed memory size = 1TB: 3%, for installed memory size = 2TB: 3%.
--

In these rules, calculated by 1GB = 1024 x 1024 x 1024B.

Setting procedure

1. Stop the system.
2. In iRMC Web-UI, select Memory Operation to change to Address Range Mirror Mode in [Settings] -> [Server Management] -> [Memory Operation Mode] window.
3. Start the system.
4. Execute following command on the OS.

```
# efibootmgr -m t -M <Percentage of mirror size>
```

For percentage of mirror size, see [“Maximum and Minimum Mirror Size” on page 63](#).

5. Reboot the system.

```
# systemctl reboot
```

6. Confirm following message is output in /var/log/message.

```
efi: Memory: XXXM/YYYY mirrored memory
```

The number is displayed in XXX and YYY.

7. Modify /etc/default/grub as follows;

```
Add "kernelcore=mirror numa_zonelist_order=zone" in the line of GRUB_CMDLINE_LINUX
```

8. Execute following command.

- For Red Hat Enterprise Linux

```
# grub2-mkconfig -o /boot/efi/EFI/redhat/grub.cfg
```

- For SUSE Linux Enterprise Server

```
# grub2-mkconfig -o /boot/grub2/grub.cfg
```

9. Reboot the system.

```
# systemctl reboot
```

Note

- If you use Address Range Mirror mode, you must boot OS with UEFI. If you boot OS with Legacy, OS does not aware Address Range Mirror mode.
- There is no setting about Memory Mirror RAS for Address Range Mirror mode.

-
- If the way to specify mirror size is set to “OS Request” in BIOS menu, memory size to be mirrored cannot be reflected by BIOS menu.
 - If the way to specify mirror size is set to “BIOS Menu Setting” in BIOS menu, memory size to be mirrored specified by OS cannot be reflected.
 - When you add or remove SB, or you add or remove memory, the setting of memory size to be mirrored remains the same as before adding or removing SB/memory.
 - When you remove SB, or you remove memory, check whether the setting of mirror size in Address Range Mirror does not exceed the maximum memory size being able to mirror. When the way to specify mirror size is set to “BIOS Menu Setting” in BIOS menu, check whether mirror size setting of memory under CPU of each SB does not exceed the maximum memory size being able to mirror.
 - Actual mirror capacity may be up to "the number of CPU * 3 GB" smaller than the specified mirror capacity. Therefore specify the mirror capacity or percentage as follows.

Specified mirror capacity \geq Requested mirror capacity + The number of CPU * 3 GB

e.g) If you demand 256GB as memory capacity in the system four SBs (eight CPUs) are all installed, specify 280GB (256GB + 8CPUs * 3GB) or more as mirror capacity in setting of address range mirror.

When 8GB DIMMs are installed in all slots and total memory capacity is 768GB, if you specify 37% or more as memory region, at least 256 GB of mirror region will be secured.

Note in Red Hat Enterprise Linux/ SUSE Linux Enterprise Server

- If percentage of mirror size lower than minimum value, it is possible that OS cannot start up.
- Memory region used by the kernel is limited to mirrored region.
- Depending on the system operation, memory which can be used by the kernel may be insufficient and system may not run normally. In that case, increase mirror size.

6.3.2.2 Memory Mirror RAS

This section describes the operation when there is an error in DIMM in the Memory Mirror status. The Memory operation when using the Memory Mirror is selected from the iRMC Web-UI.

Mirror keep mode (the default)

When restarting the system, the failed DIMM and the paired DIMM are not incorporated. The other normal DIMMs will maintain the Memory Mirror.

- The Memory Mirror status will be maintained because only the normal DIMM would be used.
- Since the DIMM area suspected to have failed will be degraded, the memory capacity seen from the operating system will be reduced.

Capacity keep mode

The Memory Mirror status of the memory mirror group in which the memory suspected to have failed will be deleted after the system is restarted. Up to six DIMMs, including the failure suspected memory, are not incorporated. The remained memory mirror group maintains the status of the Memory Mirror. At this time, the memory capacity visible from OS may exceed the original memory capacity.

6.3.3 Back up and restore RAID configuration via REST API

Following description shows back up and restore RAID configuration via REST API.



Using curl in following example.

If changed the RAID configuration after back up, please back up again, and restore with the same RAID configuration when backing up.

6.3.3.1 Back up RAID configuration via REST API

1. Create the Sub-Profile specified by the Server/HWConfigurationIrmc/Adapters/RAIDAdapter. Profile is created in the Profile Store by the following command. The format will be JSON.



Be careful not to misspell the command. Especially take care of Big/Small letters.

Suit user:password (admin:admin) and the part of IP address (172.17.167.219) shown in the command example to the customer's environment.

Example:

[Command]

```
C:\curl -u admin:admin -H "Accept: application/json" -X POST -i
http://172.17.167.219/rest/v1/Oem/eLCM/ProfileManagement/get?PARAM_
PATH=Server/HWConfigurationIrmc/Adapters/RAIDAdapter
```

[Response]

```
HTTP/1.1 202 Accepted
rest/v1/Oem/eLCM/ProfileManagement/RAIDAdapter
Data: Tue, 08 Dec 2015 09:18:49 GMT
Server: iRMC S5 Webserver
Content-Length: 139
Content-Type: application/json; charset=UTF-8

{
  "Session":{
    "id":5,
    "WorkSequence":"obtainProfileParameters",
    "Start":"","
    "Duration":0,
    "Status":"activated"
  }
}
```

-
2. You can get the Profile content by the following command. To save the content to a file, add -o option and output path. (e.g C:\RaidConfig.json)

Example:

[Command]

```
C:\>curl -u admin:admin -H "Accept: application/json" -X GET -i
http://172.17.167.219/rest/v1/Oem/eLCM/ProfileManagement/RAIDAdapter
-o C:\RaidConfig.json
```

[Response]

```
HTTP/1.1 200 OK
Data: Tue, 08 Dec 2015 09:28:54 GMT
Server: iRMC S5 Webserver
Content-Length: 865
Content-Type: application/json; charset=UTF-8
Content-disposition: attachment;
filename="rest/v1/Oem/eLCM/ProfileManagement/RAIDAdapter"
{
  "Server":{
    "HWConfigurationIrmc":{
      "Adapters":{
        "RAIDAdapter":[
          {
            "@AdapterId":"RAIDAdapter1",
            "@ConfigurationType":"Addressing",
            .
            .
            PhysicalDisks:{
              PhysicalDisk:[
                {
                  "@Number":"0",
                  "Slot":"0",
                  "PDStatus":"Available",
                  "Interface":"SAS",
                  .
                  .
                }
              ]
            }
          }
        ]
      }
    }
  }
}
```

-
3. Delete only the following part from the content of the previous file and overwrite it.

```
HTTP/1.1 200 OK
Data: Tue, 08 Dec 2015 09:28:54 GMT
Server: iRMC S5 Webserver
Content-Length: 865
Content-Type: application/json; charset=UTF-8
Content-disposition: attachment;
filename="rest/v1/Oem/eLCM/ProfileManagement/RAIDAdapter"
```

4. Then, we need to take care about the cleaning session and Profile store.
 - A) To delete the Session you should use.

[Command]

```
C:\>curl -u admin:admin -H "Accept: application/json" -X DELETE -i
http://172.17.167.219/session Information/5/remove
```

[Response]

```
HTTP/1.1 200 OK
Date: Tue, 08 Dec 2015 09:18:55 GMT
Server: iRMC S5 Webserver
Transfer-Encoding: chunked
Content-Type: application/json; charset=UTF-8
```

- B) To delete the profile from the profile store you should use.

[Command]

```
C:\>curl -u admin:admin -H "Accept: application/json" -X DELETE -i
http://172.17.167.219/rest/v1/Oem/eLCM/ProfileManagement/RAIDAdapter
```

[Response]

```
HTTP/1.1 200 OK
Date: Tue, 08 Dec 2015 09:18:56 GMT
Server: iRMC S5 Webserver
Transfer-Encoding: chunked
Content-Type: application/json; charset=UTF-8
```

6.3.3.2 Restore RAID configuration via REST API

1. Prepare a Sub-Profile for Raid configuration you backed up from the section ["Back up RAID configuration via REST API" on page 67](#). (e.g. RaidConfig.json)
2. The command to apply the profile is the following.

[Command]

```
C:\>curl -u admin:admin -H "Accept:application/json" -X POST -i http://172.17.167.219/rest/v1/Oem/eLCM/ProfileManagement/set -data@C:\RaidConfig.json
```

[Response]

```
HTTP/1.1 202 Accepted
Data: Tue, 08 Dec 2015 09:18:59 GMT
Server: iRMC S5 Webserver
Content-Length: 128
Content-Type: application/json; charset=UTF-8
```

```
{
  "Session":{
    "id":5,
    "WorkSequence":"applyProfile",
    "Start":",
    "Duration":0,
    "Status":"activated"
  }
}
```

3. You will create a Raid profile in the Profile store again, and retrieve it. Then, you will find a new configuration according to the result of your Raid operation.



The profile is reflected immediately when the command is executed. Rebooting is unnecessary.

6.3.4 Configuring the server and installing the operating system

Installing the operating system

- Connect the CD/DVD/BD for the operating system you want to install by Virtual Media.
- Reboot the server.
- Follow the instructions on screen and in the manual for the operating system.

6.3.5 Configuring Cougar5(EP540i)

When using Cougar5 in Legacy mode, please set "Launch Storage OpROM policy" in BIOS menu to "UEFI Only".

6.4 Cleaning the server

CAUTION!



Switch off the server and disconnect the power plugs from the properly grounded power outlets.

Do not clean any interior parts yourself; leave this job to a service technician.

Do not use any cleaning agents that contain abrasives or may corrode plastic.

Ensure that no liquid enters the system. Ensure that the ventilation areas of the server and the monitor are clear.

Do not use any cleaning sprays (including flammable types). It may cause a device failure or a fire.

Clean the keyboard and the mouse with a disinfecting cloth.

Wipe the server and monitor casing with a dry cloth. If particularly dirty, use a cloth that has been moistened in a mild domestic detergent and then carefully wrung out.

6.5 Setting of Boot Watchdog before and after Firmware Update of I/O card

Please disable Boot Watchdog before firmware update of I/O card to prevent executing Boot Watchdog while updating. For procedure, see the following chapters.

6.5.1 Before Firmware Update

Please disable Boot Watchdog according to the following procedure.

1. Log in to iRMC Web-UI
2. Click [Settings], [Server Management], and then [Boot Watchdog]
3. Uncheck the box for [Enable Boot Watchdog] if checked.

6.5.2 After Firmware Update

If the box for [Enable Boot Watchdog] was checked before firmware update, enable Boot Watchdog again according to the following procedure.

1. Log in to iRMC Web-UI.
2. Click [Settings], [Server Management], and then [Boot Watchdog].
3. Check the box for [Enable Boot Watchdog].

6.6 Rebuilding Software RAID after exchanging M.2 SSD

To rebuild Software RAID of M.2 SSD after exchanging one of them in Red Hat Enterprise Linux, please use mdadm command.

6.7 Hot-plug Procedure

Slot#2 and slot#3 on IOUB support hot-plug. PCIe Slot supporting PHP on IOUB has Attention Button. Attention Button is pressed in hot-plug procedure.

6.7.1 Replacement procedure

6.7.1.1 Replacement procedure of Red Hat Enterprise Linux/ SUSE Linux Enterprise Server

1. Confirm slot number of the target PCI card with reference to ["Correspondence between PHP Slot and Slot Numbers" on page 84](#).
2. Check the power status of a PCI Express slot.
 - a. Using slot number confirmed in step1, confirm that the `/sys/bus/pci/` slots directory contains a directory for this slot information, which will be referenced and otherwise used. Below, the PCI Express slot number confirmed in Confirming the slot number of a PCI Express slot is shown at `<slot number>` location in the directory path in the following format, where the directory is the operational target.

```
/sys/bus/pci/slots/<slot number>
```

- b. Confirm that the PCI Express card in the slot is enabled or disabled by displaying the "power" file contents in this directory.

```
# cat /sys/bus/pci/slots/<slot number>/power
```

- c. When displayed, "0" means disabled, and "1" means enabled.
3. Power off PCI Express slots
 - a. Write "0" to the "power" file in the directory corresponding to the target slot.
 - b. The PCI Express card is disabled, the LED turns off, and then has become to be ready for removal. By this operation, you can remove the device associated with the relevant adapter from the system.

Example: Making the PCI Express slot with PCI Express slot number 20 power off

```
# echo 0 > /sys/bus/pci/slots/20/power
```

4. Replace the PCI card.

-
5. Press Attention Button again.
 6. Confirm the power status of the replaced PCI card by the procedure of step2.

6.7.2 Addition procedure

6.7.2.1 Addition procedure of Red Hat Enterprise Linux/ SUSE Linux Enterprise Server

1. Confirm the mounting PCI slot of the PCI card.
2. Install the PCI card.
3. Press Attention Button on the PCI slot where the target PCI card is installed.
4. Confirm the power status of the added PCI card by the procedure of step2 in "[Replacement procedure of Red Hat Enterprise Linux/ SUSE Linux Enterprise Server](#)" on page 74.

7 Property and data protection

7.1 Mechanical access protection

The lockable rack door protects the server against unauthorized access.

7.2 BIOS Setup security functions

The *Security* menu in BIOS Setup offers various options for protecting your data from unauthorized access. For example, you can assign passwords for users and administrators. By combining these options you can achieve optimum protection for your system.



A detailed description of the *Security* menu and how to assign passwords can be found in "Cisco C880 M5 BIOS Setup Guide".

8 Troubleshooting and tips

CAUTION!

If a fault occurs, attempt to resolve it using the measures described:

- in this chapter.
- in the documentation for the connected devices.
- in the help systems of the software used.

If you fail to correct the problem, proceed as follows:

- Make a list of the steps performed and the circumstances that led to the fault. Also make a list of any error messages that were displayed.
- Switch off the server.
- Contact our customer service team.

8.1 System Power indicator remains unlit

System Power indicator remains dark after the server has been connected to mains.

Power cable incorrectly connected

- Make sure that the power cable(s) is/are correctly connected to the server and the grounded power outlet(s).

8.2 Screen remains blank

Monitor is switched off

- Switch on your monitor.

Screen has gone blank

- Press any key on the keyboard. or
- Deactivate screen saver. Enter the appropriate password.

Brightness control is set to dark

- Set the brightness control on the monitor to light. For detailed information, refer to the r supplied with your monitor.

Power cable or monitor cable not connected

- Switch off the monitor and the server.
- Check whether the power cable is properly connected to the monitor and to the grounded power outlet.
- Check whether the monitor cable is properly connected to the server and monitor (if it is plugged in with a connector).
- Switch on the monitor and the server.

8.3 Flickering stripes on monitor screen

CAUTION!



Switch off the server immediately. Risk of damaging the server.

Monitor does not support the set horizontal frequency

- Find out which horizontal frequency your monitor screen supports. You will find the horizontal frequency (also known as line frequency or horizontal deflection frequency) in the documentation for your monitor.
- Refer to the documentation for your operating system or the software for the screen controller for details of how to set the correct horizontal frequency for your monitor, and follow the procedure accordingly.

8.4 No screen display or display drifts

The wrong horizontal frequency or resolution has been selected for the monitor or for the application program.

- Find out which horizontal frequency your monitor screen supports. You will find the horizontal frequency (also known as line frequency or horizontal deflection frequency) in the documentation for your monitor.
- Refer to the documentation for your operating system or the software for the screen controller for details of how to set the correct horizontal frequency for your monitor, and follow the procedure accordingly.

8.5 Incorrect date and time

- Set the date and time in the operating system or in the BIOS Setup under the *Information* menu, using *System Date* and *System Time* respectively.



Note that the operating system may affect the system time. For example, the operating system time may deviate from the system time under Linux, and would overwrite the system time in the default setting on shutdown.

If the date and time are still wrong after the server has been switched off and back on again, replace the lithium battery (for a description refer to the "Cisco C880 M5 BIOS Setup Guide") or contact our customer service team.

8.6 Drives reported as "dead" when starting system

RAID controller configuration incorrect

- Check and correct the settings for the drives using the RAID controller utility. Further information is provided in the manual for the RAID controller.

8.7 Added drive reported as defective

RAID controller is not configured for this drive

The drive was probably installed when the system was switched off.

- Reconfigure the RAID controller for the drive using the corresponding utility. Information is provided in the documentation for the RAID controller.

or

- Remove and reinstall the drive while the system is switched ON. If the drive continues to be shown as defective, then replace it.

9 Appendix

9.1 Bus Number

Table 9.1 Bus Number (EFI)

Board	Port/Slot	Bus Number(Hex)
IOUB#0	Slot#0	S#00:B#09:D#00:F#00
	Slot#1	S#00:B#0d:D#00:F#00
	Slot#2	S#00:B#29:D#00:F#00
	Slot#3	S#00:B#31:D#00:F#00
	Slot#4	S#00:B#49:D#00:F#00
	Slot#5	S#00:B#4d:D#00:F#00
	Slot#6	S#00:B#51:D#00:F#00
	Slot#7	S#00:B#69:D#00:F#00
IOUB#1	Slot#0	S#00:B#89:D#00:F#00
	Slot#1	S#00:B#8d:D#00:F#00
	Slot#2	S#00:B#a9:D#00:F#00
	Slot#3	S#00:B#b1:D#00:F#00
	Slot#4	S#00:B#c9:D#00:F#00
	Slot#5	S#00:B#cd:D#00:F#00
	Slot#6	S#00:B#d1:D#00:F#00
	Slot#7	S#00:B#e9:D#00:F#00
DU_SAS#0	RAID Card	S#00:B#11:D#00:F#00
DU_PCIE#0	Switch Card	S#00:B#11:D#00:F#00
	PCIe SSD SFF#0	S#00:B#14:D#00:F#00
	PCIe SSD SFF#1	S#00:B#13:D#00:F#00
	PCIe SSD SFF#2	S#00:B#16:D#00:F#00
	PCIe SSD SFF#3	S#00:B#15:D#00:F#00
DU_SAS#1	RAID Card	S#00:B#71:D#00:F#00
DU_PCIE#1	Switch Card	S#00:B#71:D#00:F#00
	PCIe SSD SFF#0	S#00:B#74:D#00:F#00
	PCIe SSD SFF#1	S#00:B#73:D#00:F#00
	PCIe SSD SFF#2	S#00:B#76:D#00:F#00

Board	Port/Slot	Bus Number(Hex)
	PCIe SSD SFF#3	S#00:B#75:D#00:F#00

Table 9.2 Bus Number(Linux)

Board	Port/Slot	Bus Number(Hex)
IOUB#0	Slot#0	0000:09:00.0
	Slot#1	0000:0d:00.0
	Slot#2	0000:29:00.0
	Slot#3	0000:31:00.0
	Slot#4	0000:49:00.0
	Slot#5	0000:4d:00.0
	Slot#6	0000:51:00.0
	Slot#7	0000:69:00.0
IOUB#1	Slot#0	0000:89:00.0
	Slot#1	0000:8d:00.0
	Slot#2	0000:a9:00.0
	Slot#3	0000:b1:00.0
	Slot#4	0000:c9:00.0
	Slot#5	0000:cd:00.0
	Slot#6	0000:d1:00.0
	Slot#7	0000:e9:00.0
DU_SAS#0	RAID Card	0000:11:00.0
DU_PCIE#0	Switch Card	0000:11:00.0
	PCIe SSD SFF#0	0000:14:00.0
	PCIe SSD SFF#1	0000:13:00.0
	PCIe SSD SFF#2	0000:16:00.0
	PCIe SSD SFF#3	0000:15:00.0
DU_SAS#1	RAID Card	0000:71:00.0
DU_PCIE#1	Switch Card	0000:71:00.0
	PCIe SSD SFF#0	0000:74:00.0
	PCIe SSD SFF#1	0000:73:00.0
	PCIe SSD SFF#2	0000:76:00.0
	PCIe SSD SFF#3	0000:75:00.0

9.2 Correspondence between PHP Slot and Slot Numbers

Board	PHP Slot	Slot Number(Dec)
IOUB#0	Slot#2	18
	Slot#3	19
IOUB#1	Slot#2	34
	Slot#3	35

9.3 Device Path

Table 9.3 Device Path

Board	Port/Slot	Device Path (Hex)
IOUB#0	Slot#0	PcieRoot(0x1)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#1	PcieRoot(0x1)/Pci(0x2,0x0)/Pci(0x0,0x0)
	Slot#2	PcieRoot(0x11)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#3	PcieRoot(0x12)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#4	PcieRoot(0x21)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#5	PcieRoot(0x21)/Pci(0x2,0x0)/Pci(0x0,0x0)
	Slot#6	PcieRoot(0x22)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#7	PcieRoot(0x31)/Pci(0x0,0x0)/Pci(0x0,0x0)
IOUB#1	Slot#0	PcieRoot(0x41)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#1	PcieRoot(0x41)/Pci(0x2,0x0)/Pci(0x0,0x0)
	Slot#2	PcieRoot(0x51)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#3	PcieRoot(0x52)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#4	PcieRoot(0x61)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#5	PcieRoot(0x61)/Pci(0x2,0x0)/Pci(0x0,0x0)
	Slot#6	PcieRoot(0x62)/Pci(0x0,0x0)/Pci(0x0,0x0)
	Slot#7	PcieRoot(0x71)/Pci(0x0,0x0)/Pci(0x0,0x0)

9.4 Replacement of PCIe SSD SFF Slot Number

About installation location of PCIe SSD SFF installed in DU_PCIE, you need to replace the PCIe SSD SFF number displayed on iRMC Web-UI and SeverView with actual installation location.

Table 9.4 Replacement of PCIe SSD SFF Slot Number

PCIe SSD SFF Slot number	PCIe SSD SFF# (iRMC)
0	1
1	0
2	3
3	2

9.5 DIMM installation order

The order of DIMM installation is shown in the following tables. DIMMs are installed in order from one with small number.

Table. 9.5 DDR4 DIMM installation order at 1CPU/1SB

Memory Mode	Lockstep	CPU#0						Remark
		iMC#0			iMC#1			
		0A0	0B0	0C0	0D0	0E0	0F0	
Normal	Disabled	1	2	3(*1),5	1	2	3(*1),5	(*3)
		4	4(*2)	6	4	4(*2)	6	
	Enabled	1	3	5	2	4	6	(*3)
		1	3	5	2	4	6	
Spare	Disabled	1	3	5	2	4	6	(*3)
		1	3	5	2	4	6	
	Enabled	-	-	-	-	-	-	
		-	-	-	-	-	-	
Full Mirror/ Address Range Mirror	Disabled	1	1	3	1	1	3	
		2	2	3	2	2	3	
	Disabled (768GB CPU)	1	1	2	1	1	2	(*4)
		-	-	-	-	-	-	
	Enabled	-	-	-	-	-	-	
		-	-	-	-	-	-	

(*1)(*2) In the case of four DIMMs in iMC, remove DIMM installed in (*1) slot and then install DIMM to (*2) slot.

(*3) When the CPU which memory capacity is 768GB is installed, 128GB DIMM can be installed up to number 3 and cannot be installed after number 4.

(*4) Only when the CPU which memory capacity is 768GB and 128GB DIMM are installed together, this installation order is applied.

9.6 Component Layout

Figure 9.1 Component Layout (Front)

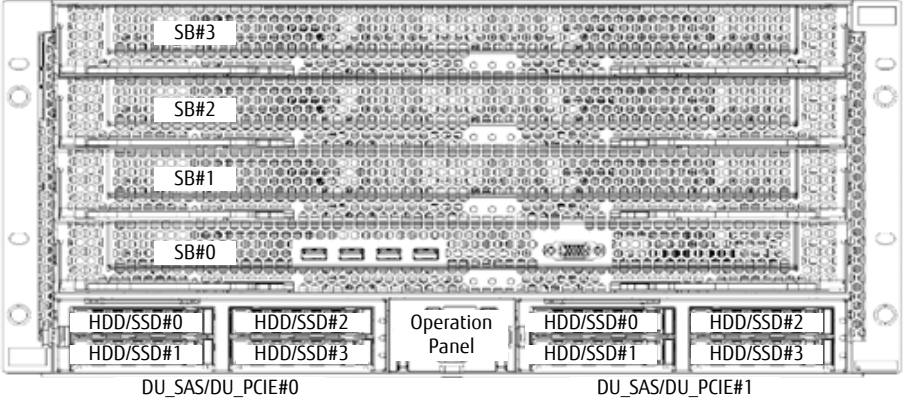


Figure 9.2 Component Layout (Rear)

