


CC2800 Cloud Compute Node

Doc. Rev. 1.3



CC2800 CLOUD COMPUTE NODE - USER AND MAINTENANCE GUIDE

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Revision History

Revision	Brief Description of Changes	Date of Issue
1.0	Initial Issue	2016-Sept-16
1.1	Added Safety Warnings	2016-Nov-02
1.2	Added Safety Warnings	2016-Dec-06
1.3	Web GUI default username and password corrected to match implementation (same as before but in lower case) Typos corrected in Table 11 and 13 CPU v4/DIMM 2400MHz added	2017-Apr-10

Customer Service

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Customer Comments

If you have any difficulties using this guide, discover an error, or just want to provide some feedback, please send a message to Kontron. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user guide on our website. Thank you

Symbols

The following symbols may be used in this manual

▲ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

▲ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

▲ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

NOTICE indicates a property damage message.



Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.

Please refer also to the "High-Voltage Safety Instructions" portion below in this section.



ESD Sensitive Device!

This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.



HOT Surface!

Do NOT touch! Allow to cool before servicing.



This symbol indicates general information about the product and the user manual.

This symbol also indicates detail information about the specific product configuration.



This symbol precedes helpful hints and tips for daily use.

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Electrostatic Discharge



ESD Sensitive Device!

The CC2800 Cloud Compute Node is sensitive to electrostatic discharge (ESD). Users must take the appropriate precautions when handling ESD-sensitive devices.

Limited Warranty

Kontron grants the original purchaser of Kontron's products a TWO YEAR LIMITED HARDWARE WARRANTY as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

Kontron warrants their own products, excluding software, to be free from manufacturing and material defects for a period of 24 consecutive months from the date of purchase. This warranty is not transferable nor extendible to cover any other users or long-term storage of the product. It does not cover products which have been modified, altered or repaired by any other party than Kontron or their authorized agents. Furthermore, any product which has been, or is suspected of being damaged as a result of negligence, improper use, incorrect handling, servicing or maintenance, or which has been damaged as a result of excessive current/voltage or temperature, or which has had its serial number(s), any other markings or parts thereof altered, defaced or removed will also be excluded from this warranty.

If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation (see our safety instructions).

Kontron provides for repair or replacement of any part, assembly or sub-assembly at their own discretion, or to refund the original cost of purchase, if appropriate. In the event of repair, refunding or replacement of any part, the ownership of the removed or replaced parts reverts to Kontron, and the remaining part of the original guarantee, or any new guarantee to cover the repaired or replaced items, will be transferred to cover the new or repaired items. Any extensions to the original guarantee are considered gestures of goodwill, and will be defined in the "Repair Report" issued by Kontron with the repaired or replaced item.

Kontron will not accept liability for any further claims resulting directly or indirectly from any warranty claim, other than the above specified repair, replacement or refunding. In particular, all claims for damage to any system or process in which the product was employed, or any loss incurred as a result of the product not functioning at any given time, are excluded. The extent of Kontron liability to the customer shall not exceed the original purchase price of the item for which the claim exists.

Kontron issues no warranty or representation, either explicit or implicit, with respect to its products reliability, fitness, quality, marketability or ability to fulfill any particular application or purpose. As a result, the products are sold "as is," and the responsibility to ensure their suitability for any given task remains that of the purchaser. In no event will Kontron be liable for direct, indirect or consequential damages resulting from the use of our hardware or software products, or documentation, even if Kontron were advised of the possibility of such claims prior to the purchase of the product or during any period since the date of its purchase.

Please remember that no Kontron employee, dealer or agent is authorized to make any modification or addition to the above specified terms, either verbally or in any other form, written or electronically transmitted, without the company's consent.

Safety Warnings

For your safety, please read and follow the following safety warnings:

NOTICE

Read this manual thoroughly before attempting to set up your CC2800.

NOTICE

Your CC2800 is a complicated electronic device. DO NOT attempt to repair it under any circumstances. In the case of malfunction, turn off the power immediately and have it repaired at a qualified service center.
Contact your vendor for details.

NOTICE

DO NOT allow anything to rest on the power cord and DO NOT place the power cord in an area where it can be stepped on. Carefully place connecting cables to avoid stepping or tripping on them.

⚠ CAUTION

This unit usually has more than one power supply cord. Disconnect all power supply cords before servicing to avoid electric shock.

⚠ CAUTION

Installation of this product must be in accordance with national wiring codes and conform to local regulations. Different types of line cord sets may be used for connections to the mains supply circuit and must comply with the electrical code requirements of the country of use.

⚠ CAUTION

The AC power supply plug is intended to serve as a power disconnect device. The socket outlet must be installed near the equipment and must be easily accessible.

⚠ CAUTION

Disconnect all power by turning off the power and unplugging the power cords before installing or removing a chassis or working near power supplies.
Débranchez toute l'alimentation en mettant l'appareil hors tension et en débranchant les cordons d'alimentation avant d'installer ou de retirer un châssis ou de travailler près de sources d'alimentation.

NOTICE

Ensure that the CC2800 is provided with the correct supply voltage. Plugging the CC2800 to an incorrect power source could damage the unit.

NOTICE

Do NOT expose the CC2800 to dampness, dust, or corrosive liquids.

NOTICE

Do NOT place the CC2800 on any uneven surfaces.

NOTICE

DO NOT place the CC2800 in direct sunlight or expose it to other heat sources.



DO NOT use chemicals or aerosols to clean the CC2800. Unplug the power cord and all connected cables before cleaning.

NOTICE

DO NOT place any objects on the CC2800 or obstruct its ventilation slots to avoid overheating the unit.

⚠ WARNING

Keep packaging out of the reach of children.



If disposing of the device, please follow your local regulations for the safe disposal of electronic products to protect the environment.

⚠ WARNING

Risk of explosion if battery is replaced by an incorrect type.
Il y a risque d'explosion si la batterie est remplacée par une batterie de type incorrect.



Dispose of used batteries according to the instructions.
Mettre au rebut les batteries usagées conformément aux instructions.

1/ Component Identification

Figure 1: General device view

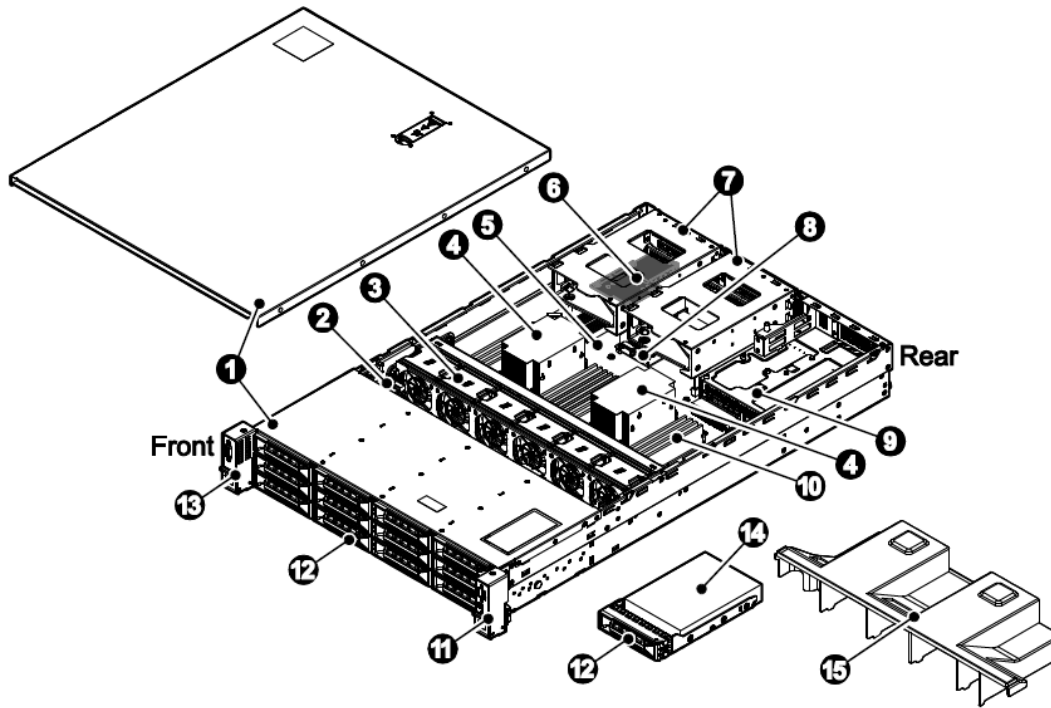


Table 1: Description of general components

Item	Description
1	2U chassis and top cover
2	HDD backplane
3	Syetem fan (6)
4	CPU & heat sink (2)
5	System board
6	OCP NIC mezzanine card (SFP+ port x2)
7	Riser assembly (2)
8	SAS HBA mezzanine card
9	800W redundant PSUs (2)
10	DIMM slot (16)
11	Front control board
12	3.5\"/>
13	Front VGA cable
14	HDD carrier (12)
15	Air baffle

1.1. Front Panel Components

Figure 2: Front panel components

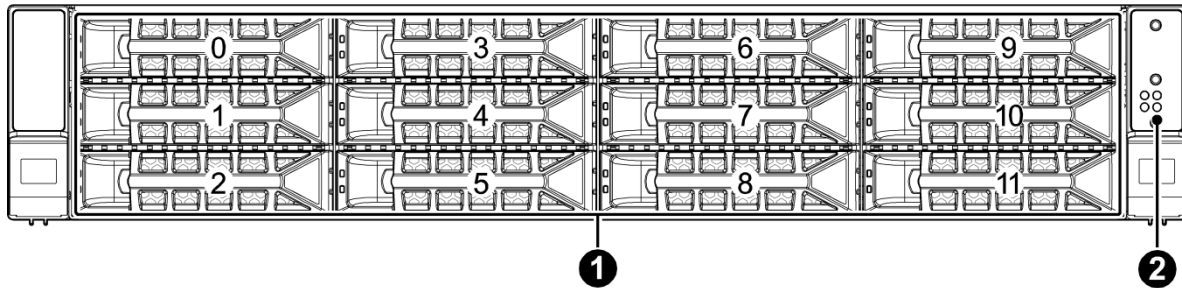


Table 2: Front panel components

Item	Description
1	3.5"/2.5" SATA/SAS HDD carriers (12)
2	Front control board

1.2. Front Panel LEDs and Buttons

Figure 3: Front panel LEDs and buttons

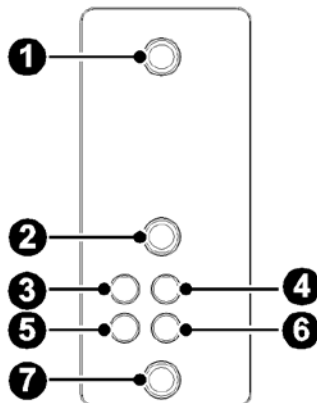


Table 3: Front panel LEDs and buttons

Item	Description
1	Power button
2	UID button and LED (BMC reset)
3	Ethernet 1 LED
4	Ethernet 2 LED
5	IPMI LED
6	System health LED
7	Reset button

Table 4: Front panel LED indicators

LED Indicator	LED Color	Description
Power	Green	<ul style="list-style-type: none"> ▶ On: System powered on and running ▶ Off: System powered off
Ethernet 1~2	Green	<ul style="list-style-type: none"> ▶ On: LAN link no access ▶ Off: No Link ▶ Flashing: LAN access
Management*	Green	<ul style="list-style-type: none"> ▶ On: LAN link no access ▶ Off: No Link ▶ Flashing: LAN access
UID	Blue	<ul style="list-style-type: none"> ▶ On: Server was located for identification ▶ Off: Server is operating normally
System Health	Green Orange	<ul style="list-style-type: none"> ▶ Green: The server is operating normally ▶ Orange: Fault present on server

1.3. Rear Panel Components

Figure 4: Rear panel components

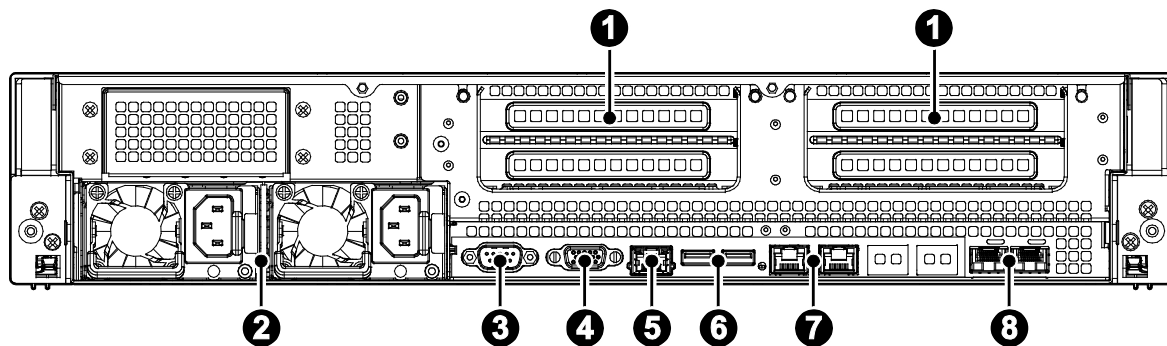


Table 5: Rear panel components

Item	Description
1	Riser assembly (2)
2	800W redundant PSUs (2)
3	COM
4	VGA
5	IPMI
6	USB 3.0 (2)
7	RJ45 (2)
8	SFP+10G Ethernet connectors (2)

1.4. Power Supply LEDs

The 800W power supply comes with one LED and the LED is visible from the rear of the power supply.

Table 6: Power supply LEDs

LED State	LED Color	Description
AC Power	Green	<ul style="list-style-type: none"> ▶ On: Normal work ▶ Off: No AC power to all power supplies ▶ Blink (1Hz): AC present / Only 12VSB on (PS off) or PS in CR state
	Red	<ul style="list-style-type: none"> ▶ On: <ul style="list-style-type: none"> ▶ AC cord unplugged; with a second power supply in parallel still with AC input power ▶ Power supply critical event causing a shutdown; failure, OCP, OVP, Fan Fail ▶ Blink (1Hz): Power supply warning events where the power supply continues to operate; high temp, high power, high current, slow fan, input voltage lower than 90Vac (not warning above 90V condition, must be warning state below 85V condition)

1.5. Storage Drive LEDs

Table 7: Storage drive LEDs

LED Indicator	LED Color	Description
Alert	Red	<ul style="list-style-type: none"> ▶ On: The system detected a fault with the drive ▶ Off: Normal operation ▶ Blink (4Hz): The drive is being located ▶ Blink (1Hz): The drive is being rebuilt
Activity	Green	<p>SAS drive:</p> <ul style="list-style-type: none"> ▶ On: Power on with no drive activity ▶ Blink: Power on with drive activity /power on drive spinning up ▶ Off: Power on with drive spin down <p>SATA drive:</p> <ul style="list-style-type: none"> ▶ On: Power on with no drive activity ▶ Blink: Power on with drive activity/power on drive spinning up

1.6. Board LEDs

See the following illustrations to locate the LED indicator for IPMI and RJ45 (management network).

Figure 5: IPMI

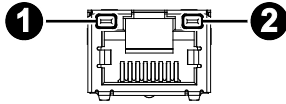


Table 8: IPMI

Item	Description
1	NIC Link/Activity LED
2	NIC Link Speed LED

Figure 6: RJ45

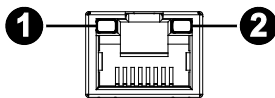


Table 9: RJ45

Item	Description
1	NIC Link/Activity LED
2	NIC Link Speed LED

See the following illustration to locate the system board LED indicator:

Figure 7: Board LEDs

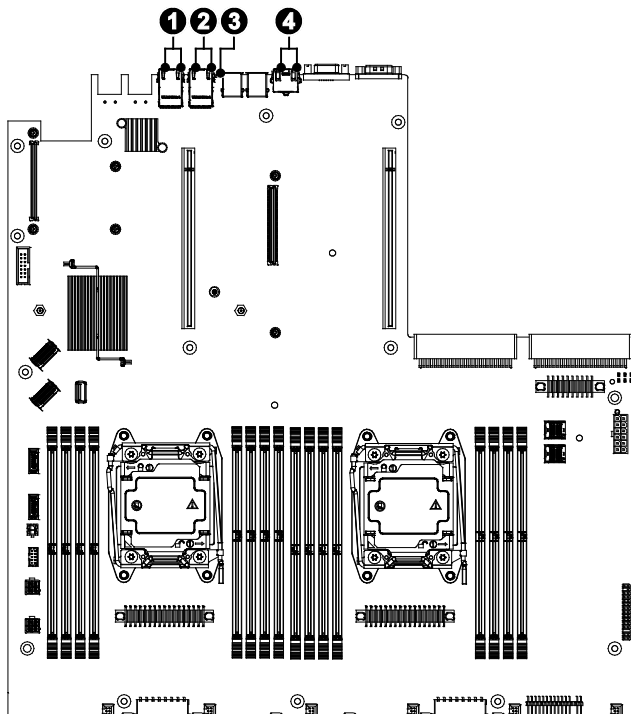


Table 10: Board LEDs

Item	Description
1	LAN_1
2	LAN_0
3	UID LED
4	MGMT LAN LED

Table 11: LED color states

LED NAME	VOLTAGE SOURCES	LED COLOR STATE		DESCRIPTION
AUX LED	P3V3_AUX	Green	On	AC on
		—	Off	AC off
UID LED	P5V_AUX	Blue	On	Unit selected for identification
		—	Off	Unit not selected
SYS LED	P3V3_AUX	Green	On	System health OK
		Yellow	On	Error occurred
BMC Heartbeat LED	P3V3_AUX	Green	Blink	BMC is ready
		—	Off	BMC is not ready
LAN0, LAN1	P3V3_AUX	Green (Left)	On	LAN links up, but no activity
		Green (Left)	Blink	LAN links up with activity
		— (Left)	Off	LAN link down
		Green (Right)	On	Link speed is 1000Mbps
		Amber (Right)	On	Link speed is 100Mbps
		— (Right)	Off	Link speed is 10Mbps
MGMT LAN LED	P3V3_AUX	Green (Right)	On	Link speed is 100Mbps
		Amber (Right)	On	Link speed is 10Mbps
		Green (Left)	Blink	LAN link up and activity
		Green (Left)	On	LAN link up but no activity
		— (Left and Right)	Off	Disconnected

1.7. System Board Components

Figure 8: System board components

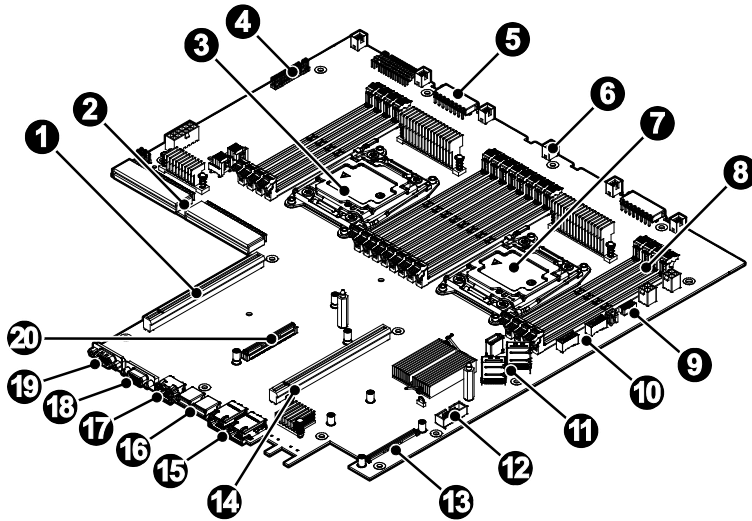
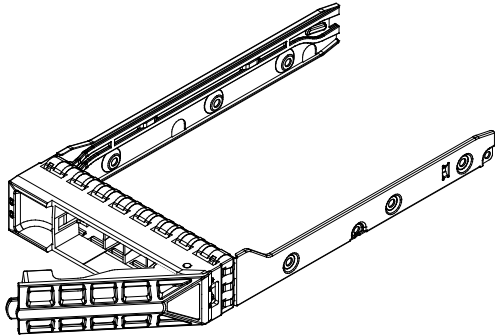


Table 12: System board components

Item	Description
1	Riser 2
2	PSU connector (2)
3	CPU 1
4	Front control connector
5	HDD backplane connector (2)
6	System fan header (6)
7	CPU 0
8	DIMM slot (16)
9	FP USB 2.0 (2)
10	SATA connector (2)
11	MiniSAS connector (2)
12	Front VGA connector
13	OCP mezzanine slot
14	Riser 1
15	NIC 1 & 2
16	USB 3.0 (2)
17	MGMT port
18	VGA port
19	Serial port
20	SAS HBA mezzanine slot

1.8. HDD Carrier LED Definitions

Figure 9: HDD carrier LED definitions



Each drive tray supports two light pipes to direct light from the drive status LEDs on the backplane to the face of the tray, allowing it to be viewable from the front of the system.

Table 13: HDD carrier LED definitions

State	Description
Green on, red off	HDD detected
Green blink, red off	HDD active
Green off , red on	HDD fault
Green off, red blink	HDD rebuilt or located

Important: The fault LED function is only supported when a HBA/RAID card is installed.

1.9. System Components

The following figure shows specific components of the server system. See the following figure and table to become familiar with the server components.

Figure 10: System components

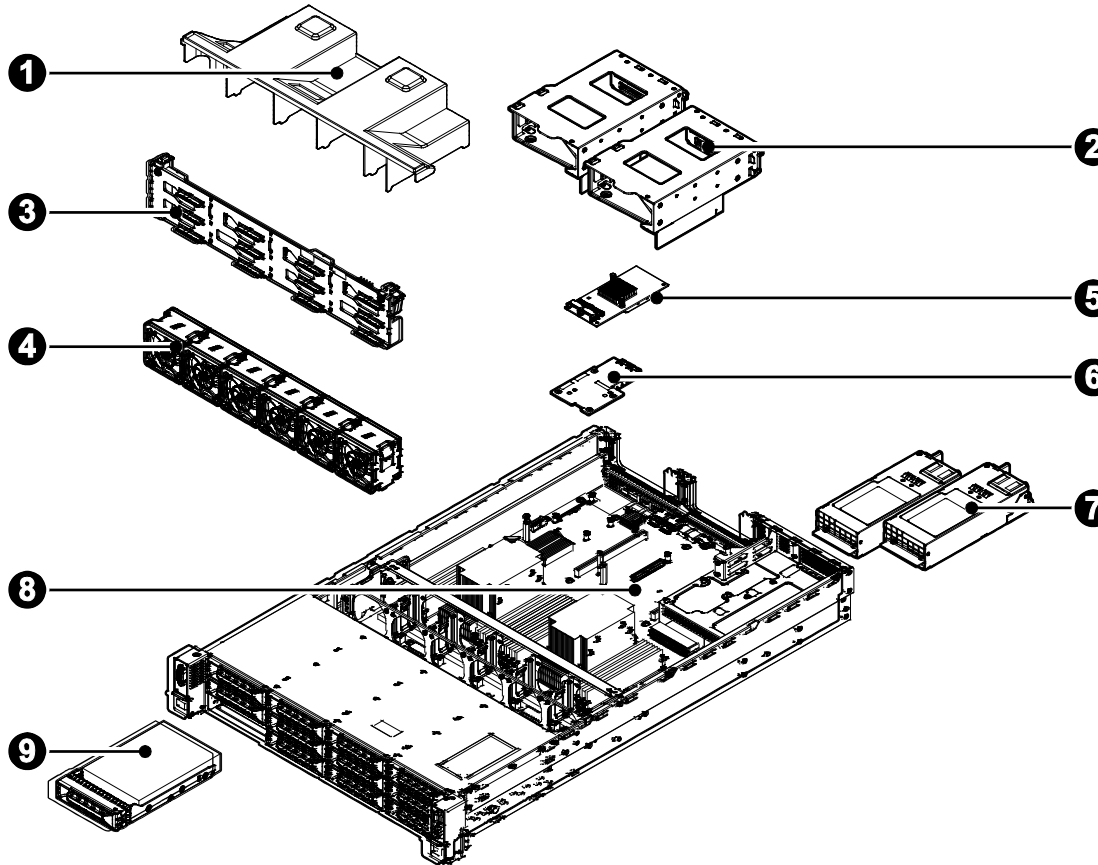


Table 14: System components

Item	Description
1	Air baffle
2	Riser assembly (2)
3	HDD backplane
4	System fan (6)
5	SAS HBA mezzanine card
6	OCP NIC mezzanine card (SFP+ port x2)
7	800W redundant PSUs (2)
8	System board
9	3.5"/2.5" SATA/SAS HDD (12)

2/ Operations

2.1. Powering Up the Server

The following procedure assumes that at least one power cord is connected to the server to supply power to the server and that the server has been previously powered on.

1. Verify the power cord, power supply LED indicator, and power LED indicator on front control panel. Turn the power supply LED on immediately to indicate the power is being supplied to the power supply and the system in the standby power state. Power LED off to indicate the server is not powered on or has been powered off in standby mode.
2. Power up the server
 - ▶ Local server power-on: Press and release the power button on the front control panel of the server to power up.
 - ▶ BMC web interface power-on: Log in to the BMC web interface and select power on from the power control action list box.
 - ▶ Log in to the BMC CLI and execute the IPMI command to power on system.

2.2. Powering Down the Server

The following procedures show how to shut down the server and verify the power status.

2.2.1. Shutting Down the Server

2.2.1.1. Graceful Shutdown

- ▶ To perform a graceful shutdown: Save all open files, network service, and close all applications prior to shut down.
- ▶ Stop or terminate all necessary system processes to bring down the operating system and power off the compute node.
- ▶ Press and release the power button on the front panel of ACPI-enabled (Advanced Configuration and Power Interface) operating systems to perform an orderly shutdown of the operating system.



Servers not running ACPI-enabled operating systems will shut down immediately.

2.2.1.2. Emergency Shutdown

To perform an emergency shutdown, press and hold down the power button on the front panel for at least five seconds to shut down and enter standby power mode.

NOTICE

All applications and files will be closed/terminated without saving changes, file system corruption might occur.

2.2.1.3. BMC CLI shutdown

Log in to the BMC and execute the IPMI command to shut down the server.

2.2.2. Verifying the Power Status

Verify all power LED indicators of the server and make sure the power LED light is off before replacing and removing the server components from the rack.

3/ Installation

3.1. Safety Measures

Static electricity discharges can damage computer components and electronic circuit boards. Working on servers that are still connected to a power supply can be extremely dangerous. Follow these guidelines to avoid self-injury and damage to the server:

- ▶ Always disconnect the server from the power outlet when working inside of the server case.
- ▶ If possible, wear a grounded wrist strap when working inside the server case. Alternatively, discharge any static electricity by touching the bare metal chassis of the server case, or the bare metal body of any other grounded appliance.
- ▶ Hold electronic circuit boards only by the edges. Do not touch the components on the board unless it is necessary to do so. Do not flex or stress the circuit board.
- ▶ Leave all components inside the static-proof packaging until ready to use the component for the installation.

3.2. Identifying the Contents of the Server Shipping Carton

Unpack the server shipping carton and locate the materials for installing the server.

The contents of the server shipping carton include:

- ▶ Server
- ▶ Power cord (optional)
- ▶ Rack-mounting hardware (optional)

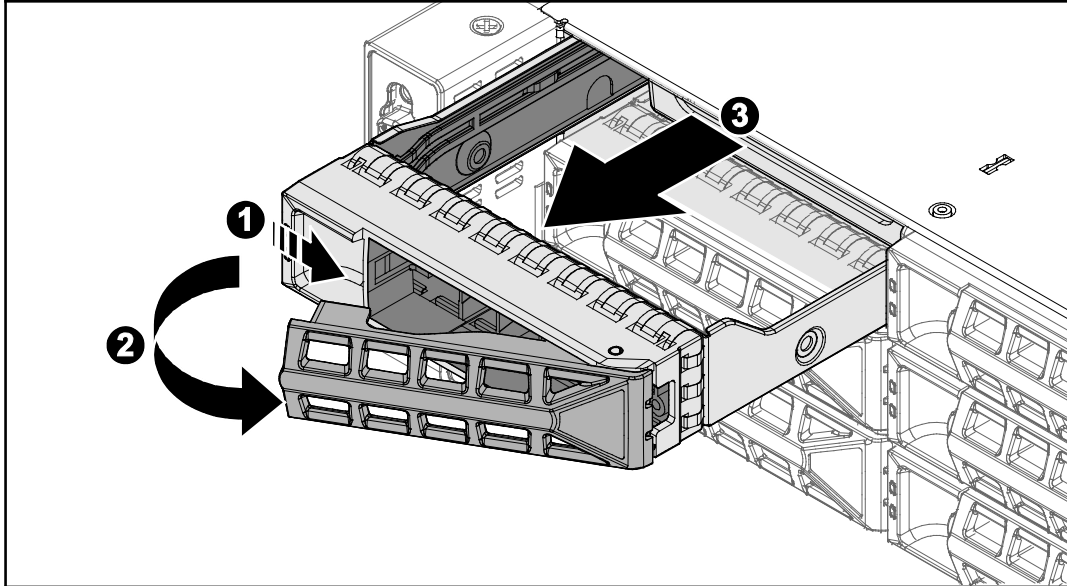
In addition to the supplied items, you might need:

- ▶ Operating system or application software
- ▶ Hardware options

3.3. Hard Disk Drives

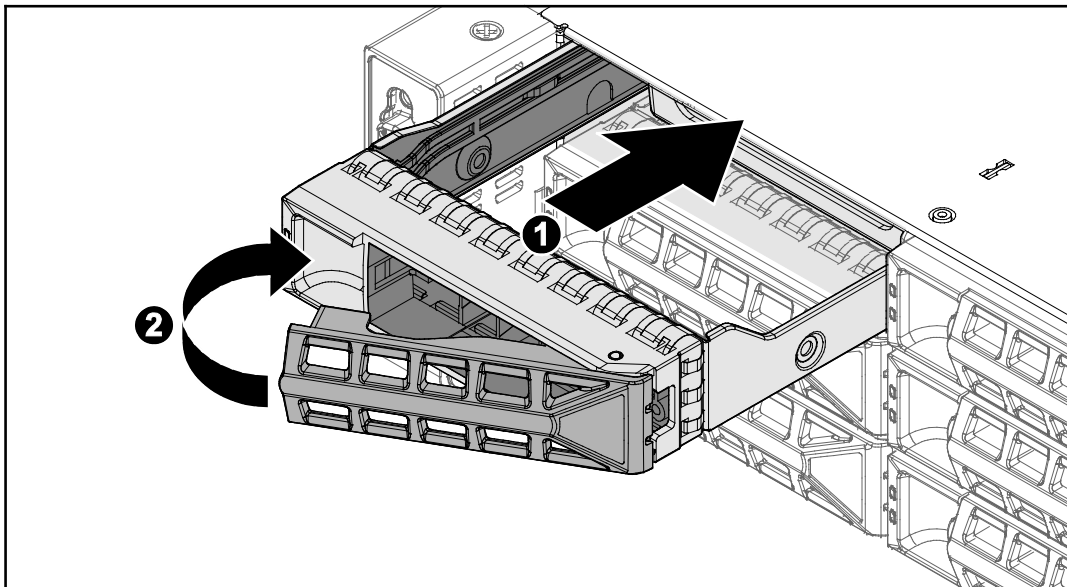
3.3.1. Removing the Hot-Swappable HDD Assembly

Figure 11: Hot-swappable HDD assembly removal



3.3.2. Installing the Hot-Swappable Hard Disk Drive Assembly

Figure 12: Hot-swappable hard disk drive assembly installation



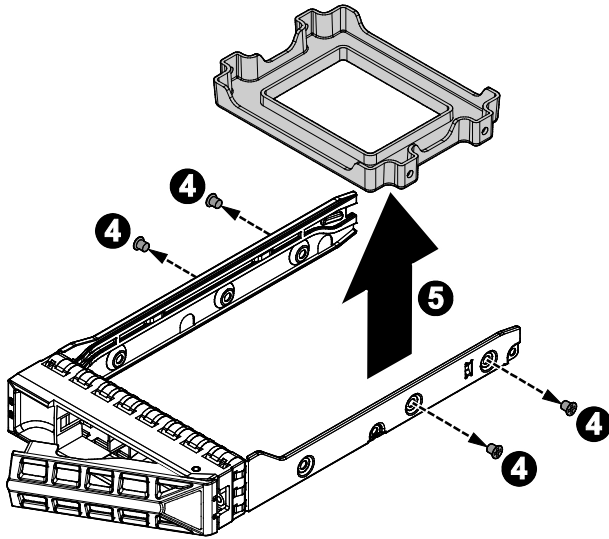
Verify that the drive is fully seated.

3.3.3. Installing the 3.5" Hard Disk Drive Module

To install the 3.5" hard disk drive module:

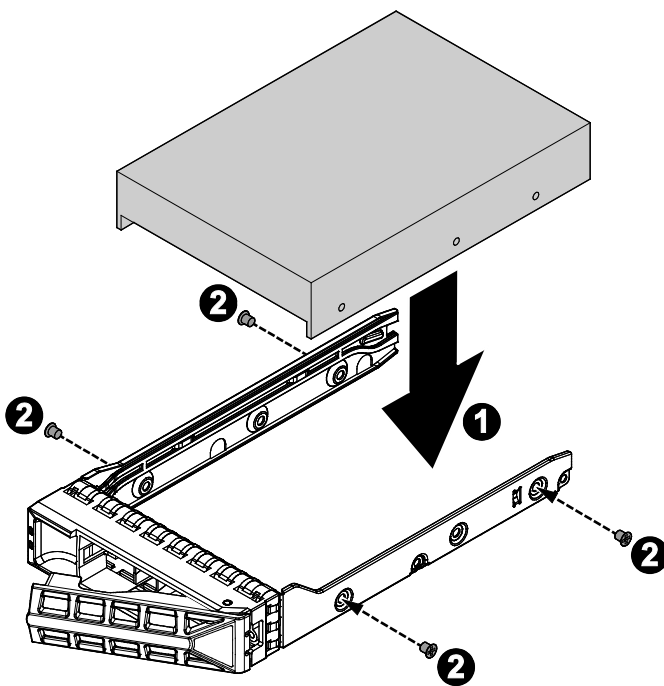
1. Remove the hot-swappable HDD assembly (see Section 3.3.1).
2. Remove the screws securing the filler panel from the HDD carrier.
3. Remove the filler panel from the HDD carrier.

Figure 13: Filler panel removal



4. Align the HDD in the HDD carrier with the connectors facing the opening of the carrier.
5. Secure the HDD and the HDD carrier with screws.

Figure 14: Hard disk drive installation



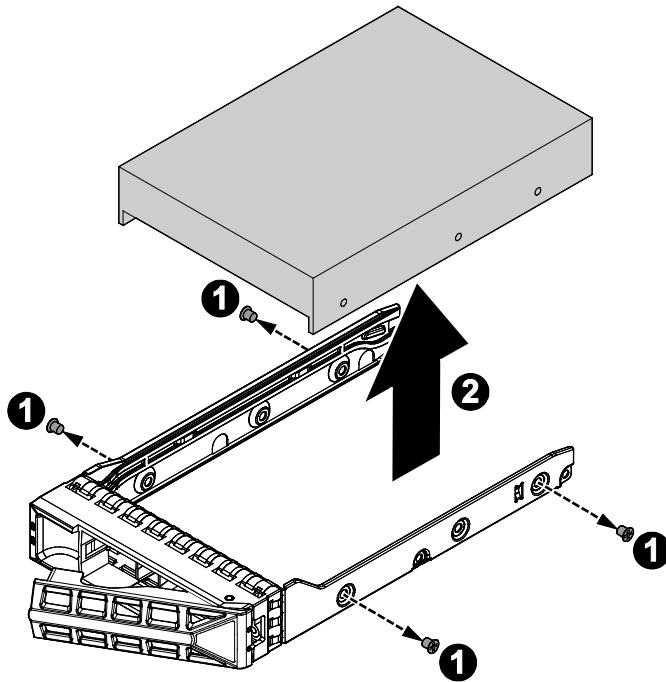
6. Install the hot-swappable HDD assembly.

3.3.4. Removing the 3.5" Hard Disk Drive Module

To remove the 3.5" hard disk drive module:

1. Remove the hot-swappable HDD assembly.
2. Remove the screws securing the HDD from the HDD carrier.
3. Remove the HDD from the HDD carrier.

Figure 15: Hard disk drive removal

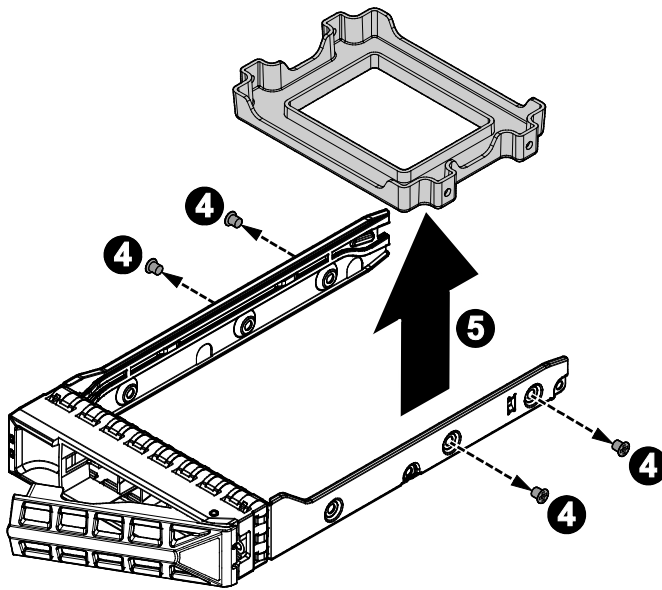


3.3.5. Installing the 2.5" Hard Disk Drive Module

To install the 2.5" hard disk drive module:

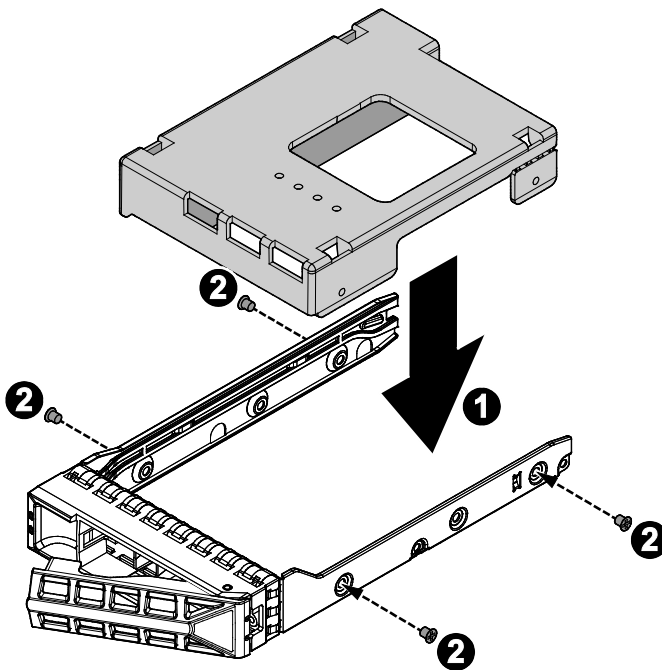
1. Remove the hot-swappable HDD assembly.
2. Remove the screws securing the filler panel from the HDD carrier.
3. Remove the filler panel from the HDD carrier.

Figure 16: Filler panel removal



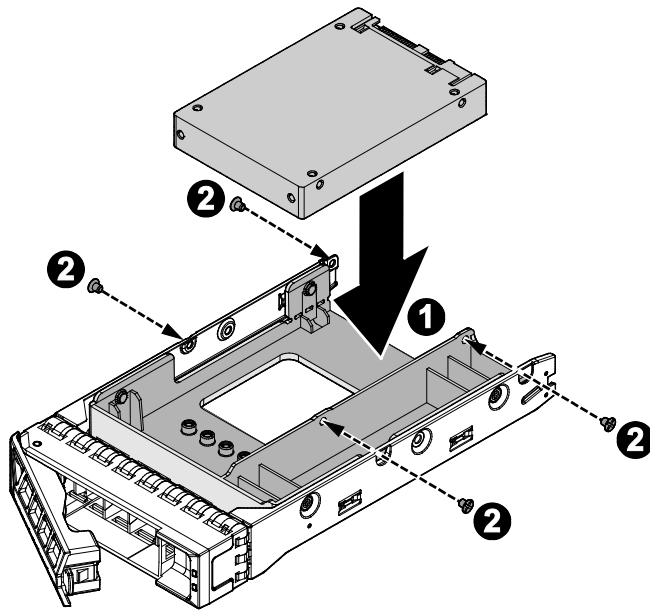
4. Align the holes on the HDD bracket with the holes on the HDD carrier.
5. Secure the HDD bracket and the HDD carrier with screws.

Figure 17: HDD bracket installation



6. Turn the HDD assembly over.
7. Align the HDD inside the HDD bracket, making sure the connector is facing the opening of the carrier (1).
8. Secure the HDD and the HDD bracket with screws (2).

Figure 18: Hard disk drive installation



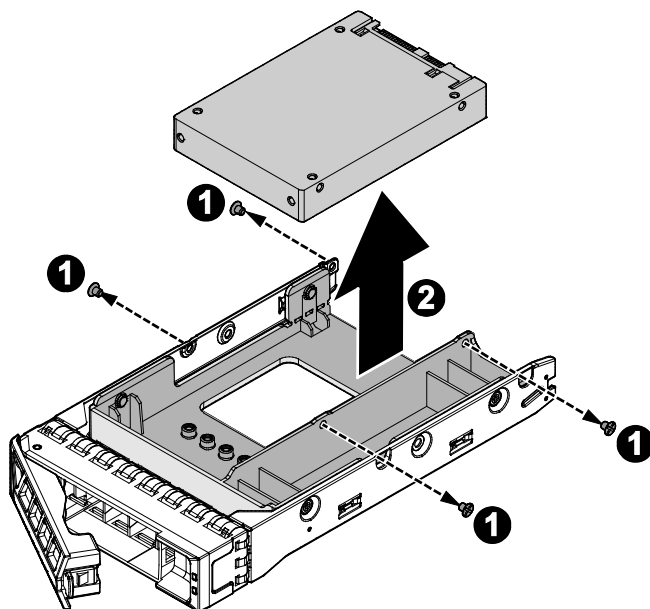
9. Install the hot-swappable HDD assembly.

3.3.6. Removing the 2.5" Hard Disk Drive Module

To remove the 2.5" hard disk drive module:

1. Remove the hot-swappable HDD assembly.
2. Turn the HDD assembly over.
3. Remove the screws securing the HDD from the HDD bracket.
4. Remove the HDD from the HDD bracket.

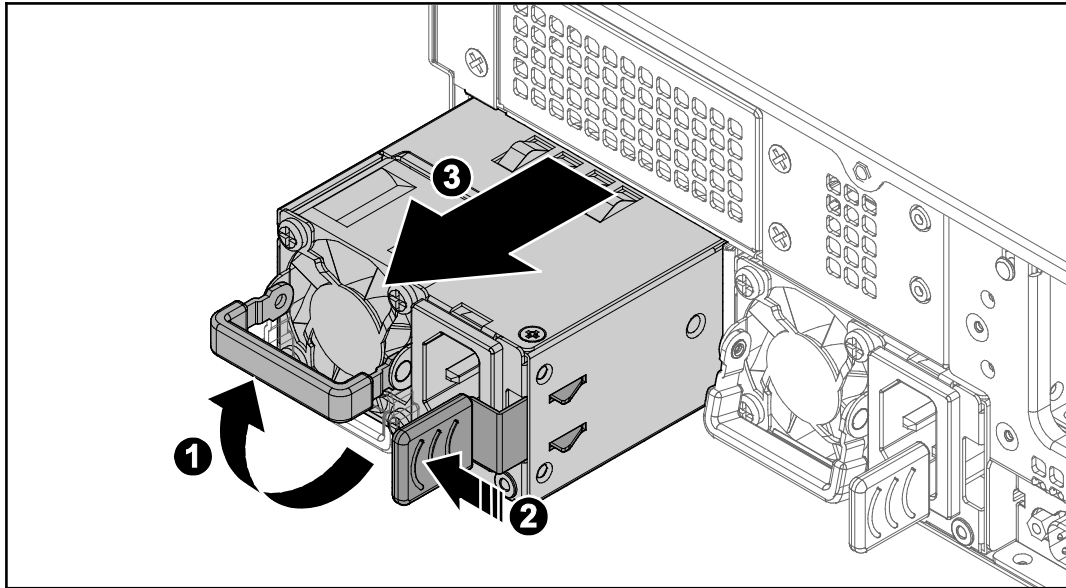
Figure 19: Hard disk drive removal



3.4. Redundant Power Supply Unit

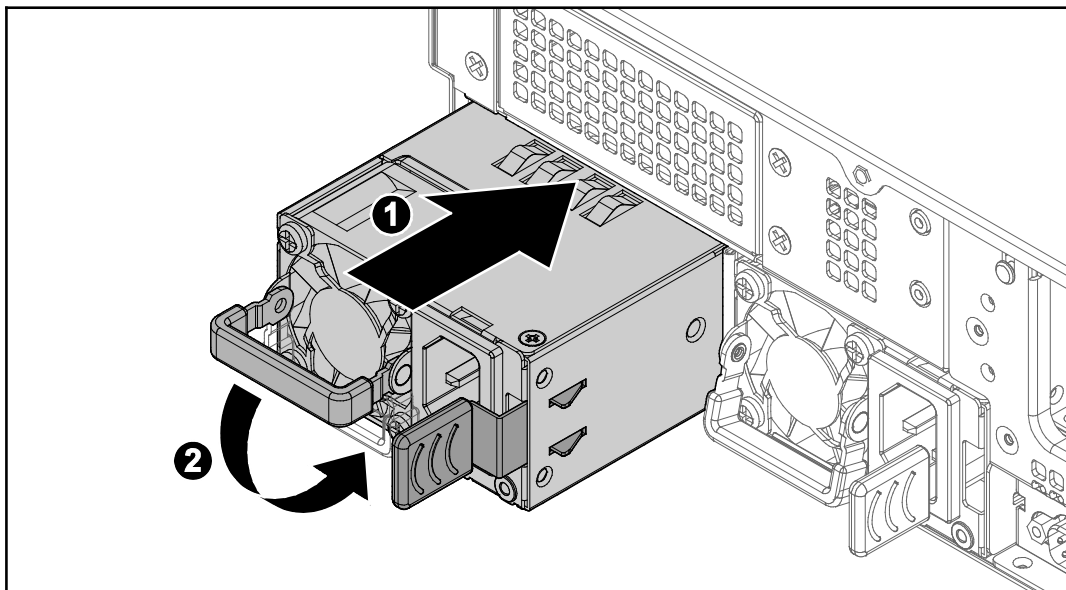
3.4.1. Removing the Redundant Power Supply Unit

Figure 20: Redundant power supply unit removal



3.4.2. Installing the Redundant Power Supply Unit

Figure 21: Redundant power supply unit installation



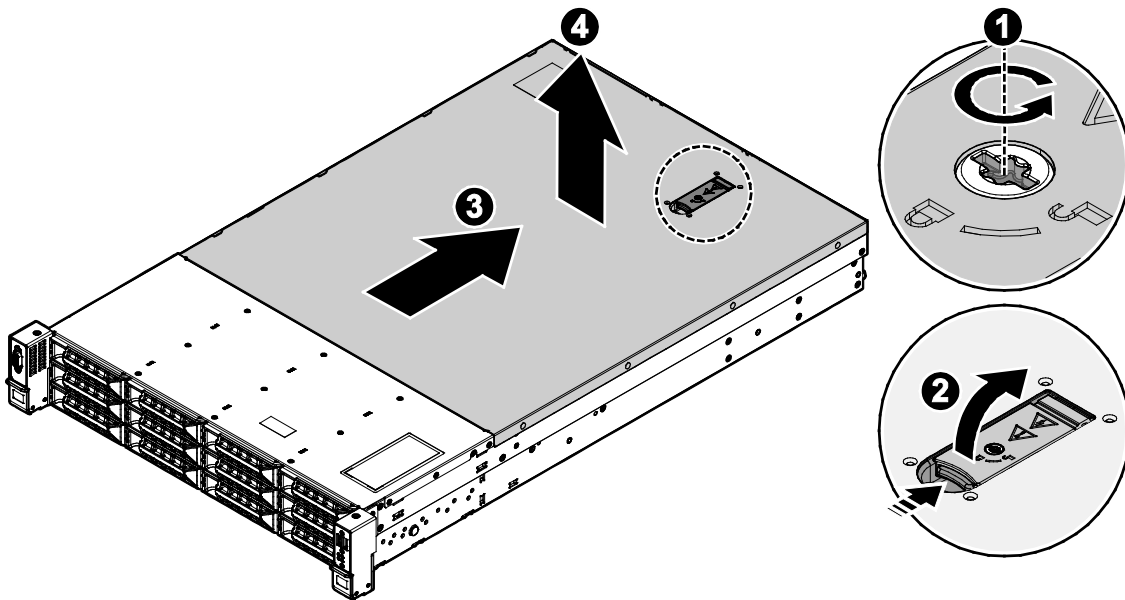
3.5. Access Panel

3.5.1. Removing the Access Panel



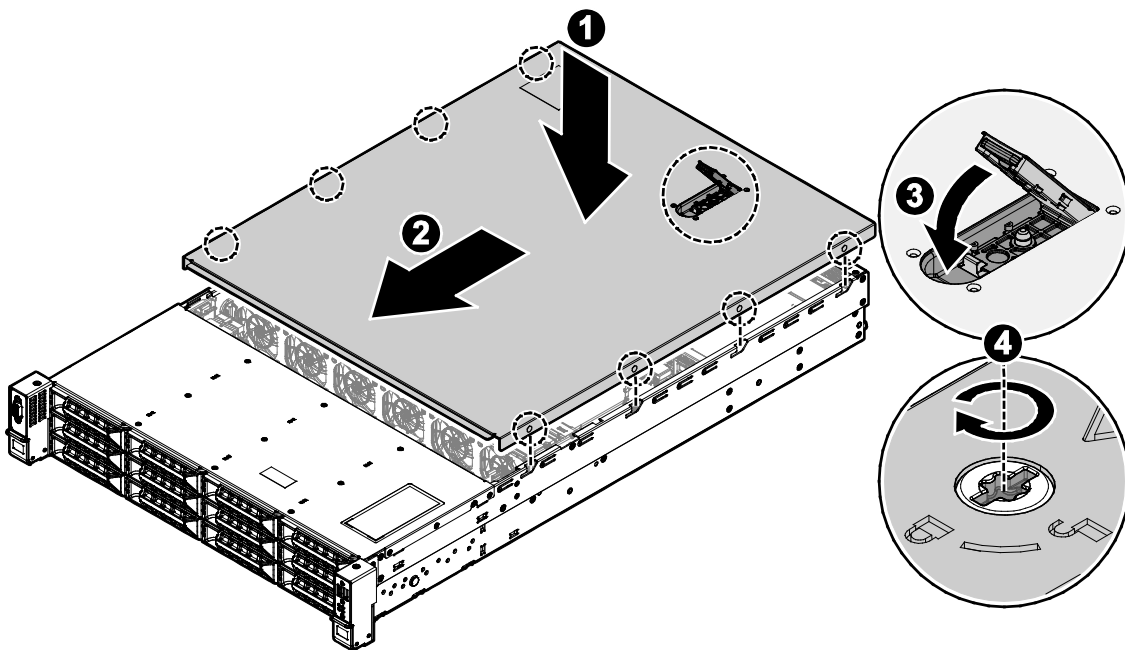
Be sure that the server is powered down and the AC power cords are disconnected from the server power supplies.

Figure 22: Access panel removal



3.5.2. Installing the Access Panel

Figure 23: Access panel installation



3.6. Air Baffle

3.6.1. Removing the Air Baffle

To remove the air baffle:

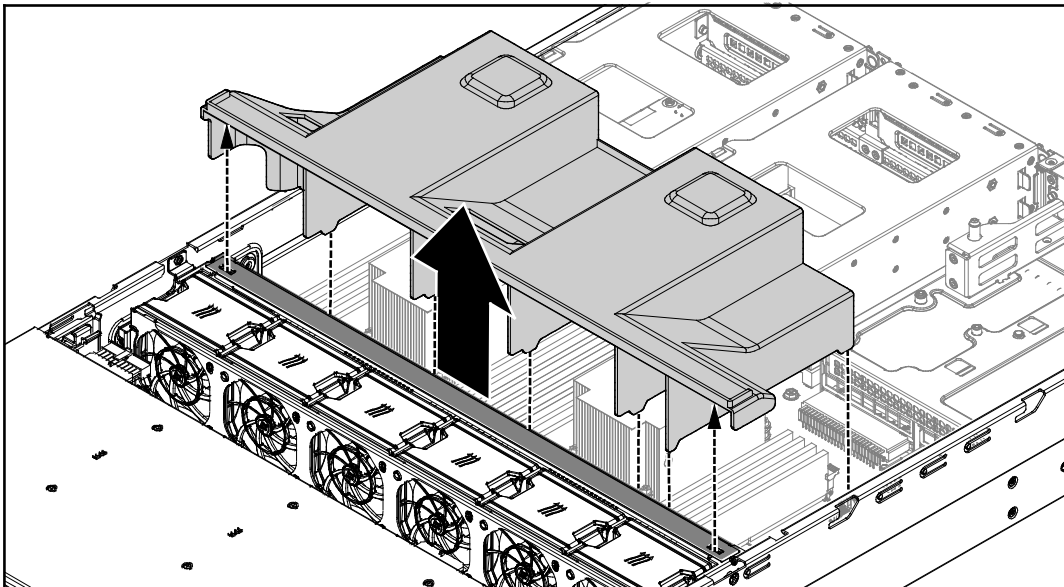
1. Power off the server and detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Locate the air baffle.

NOTICE

To avoid damaging the server components, do not use force when removing the air baffle.

4. Gently lift the air baffle out of the chassis.

Figure 24: Air baffle removal



3.6.2. Installing the Air Baffle

To install the air baffle:

1. Position the air baffle in the chassis, see the following figure.

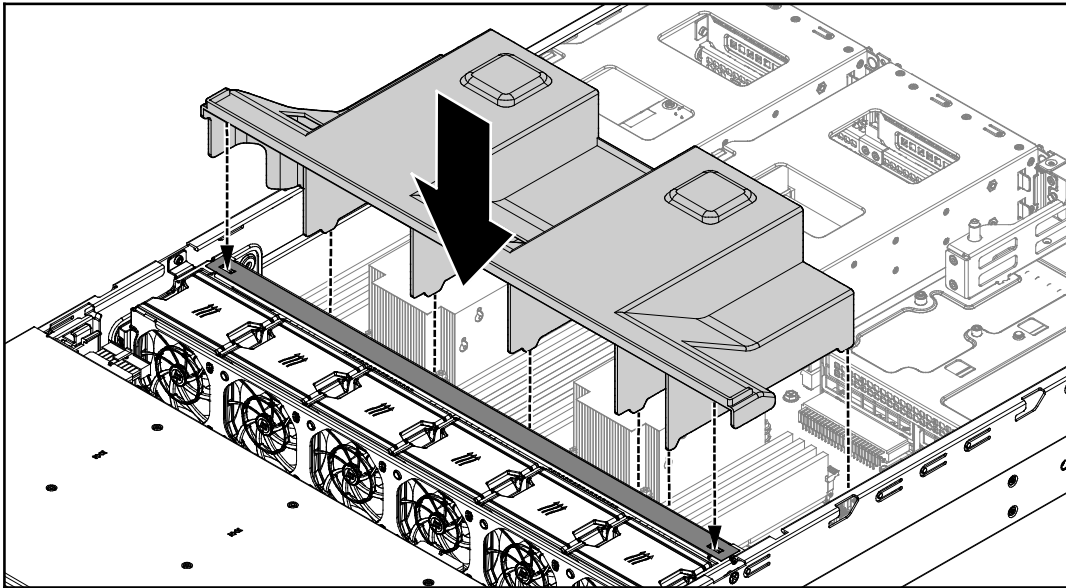
NOTICE

To avoid damaging the server components, do not use force when removing the air baffle.

Be sure that all DIMM latches are locked to avoid damaging the components

2. Lower the air baffle into the chassis.

Figure 25: Air baffle installation



3. Install the access panel (see Section 3.5.2).

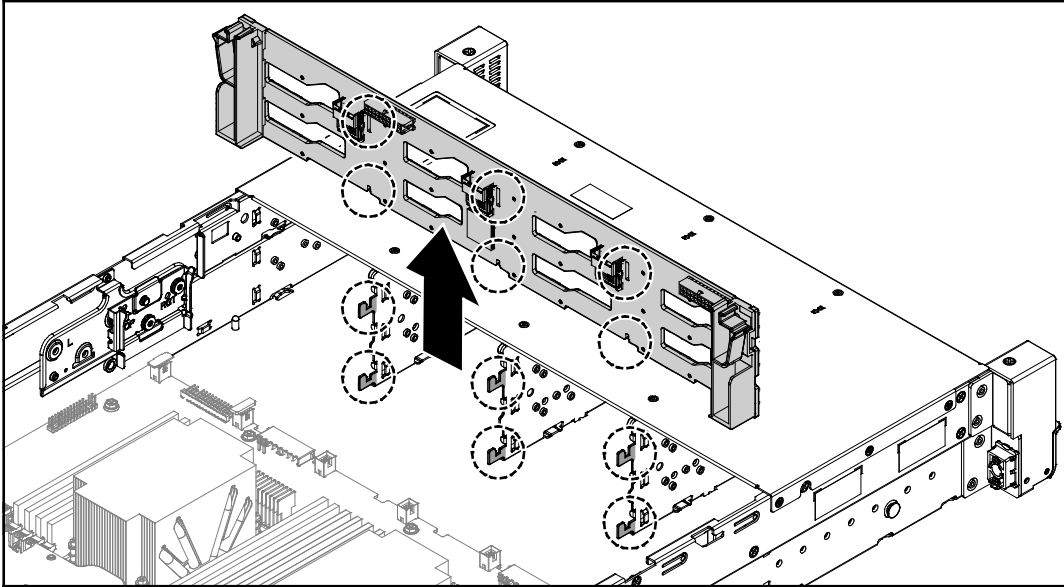
3.7. Hard Disk Drive Backplane

3.7.1. Removing the Hard Disk Drive Backplane

To remove the HDD backplane:

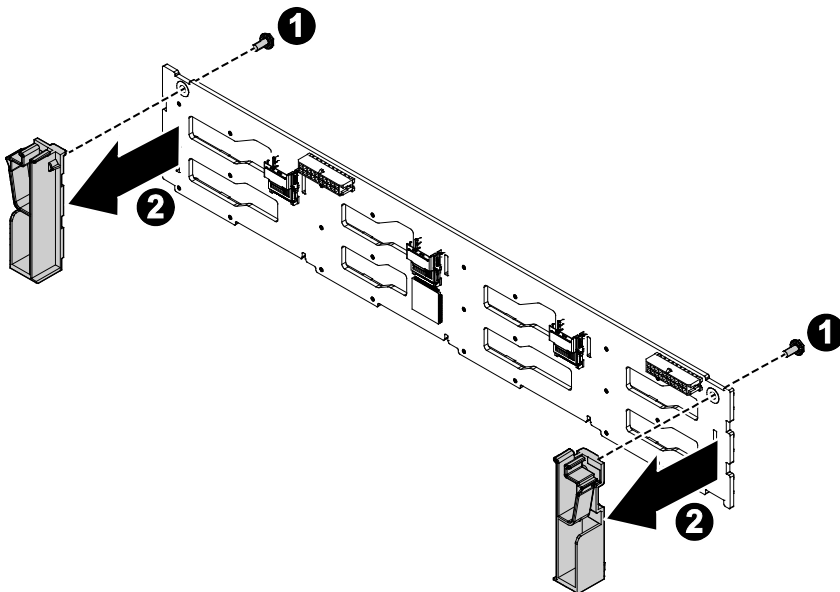
1. Power off the server and detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Remove the hot-swappable HDD assembly (see Section 3.3.1).
4. Disconnect the cables from the HDD backplane assembly.
5. Release the HDD backplane assembly from the guide tabs on the chassis, and then remove the HDD backplane.

Figure 26: HDD backplane assembly removal



6. Remove the screws securing the HDD backplane to the assembly bracket (1).
7. Remove the HDD backplane (2).

Figure 27: HDD backplane removal

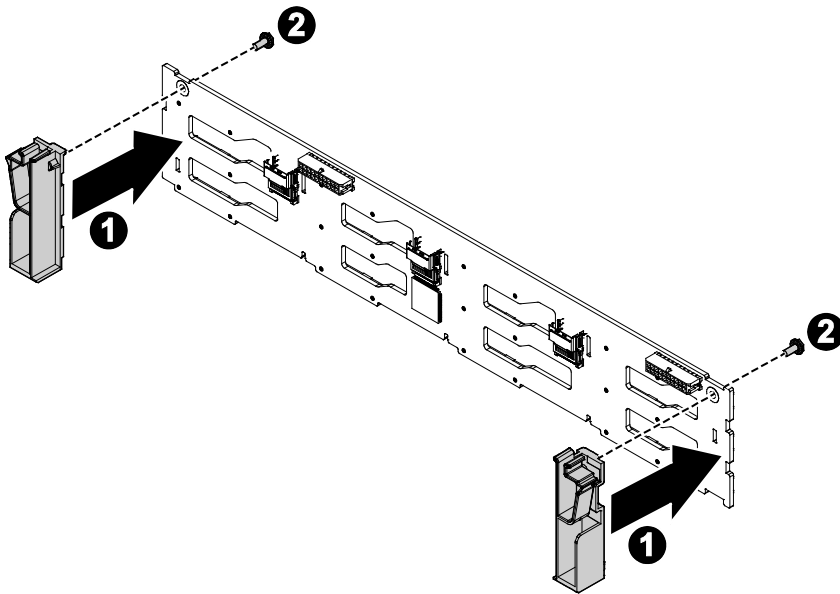


3.7.2. Installing the Hard Disk Drive Backplane

To install the hard disk drive backplane:

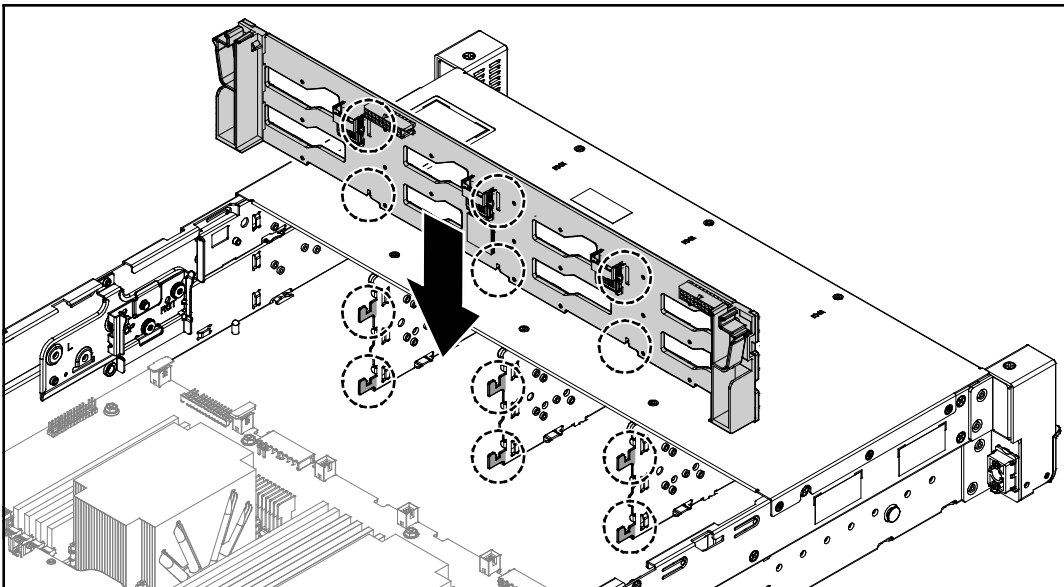
1. Align the screw holes on the HDD backplane with the screw holes on the assembly bracket (1).
2. Install the HDD backplane to the assembly bracket.
3. Install and secure the HDD backplane with the screws (2).

Figure 28: HDD backplane bracket installation



4. Align the HDD backplane assembly to the guide tabs on the chassis.
5. Install the HDD backplane assembly.

Figure 29: HDD backplane assembly installation



6. Connect the cables to the assembly.
7. Install the hot-swappable HDD assembly (see Section 3.3.2).
8. Install the access panel (see Section 3.5.2).

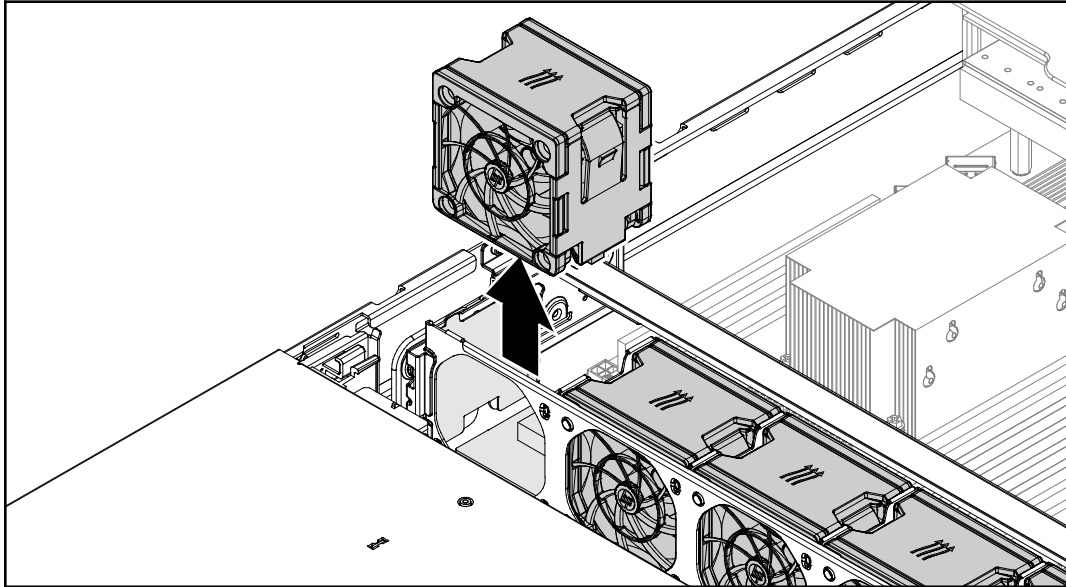
3.8. System Fans

3.8.1. Removing the System Fan Assembly

To remove a system fan assembly:

1. Power off the server and detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Lift the fan module from the chassis.

Figure 30: System fan assembly removal



3.8.2. Installing the System Fan Assembly

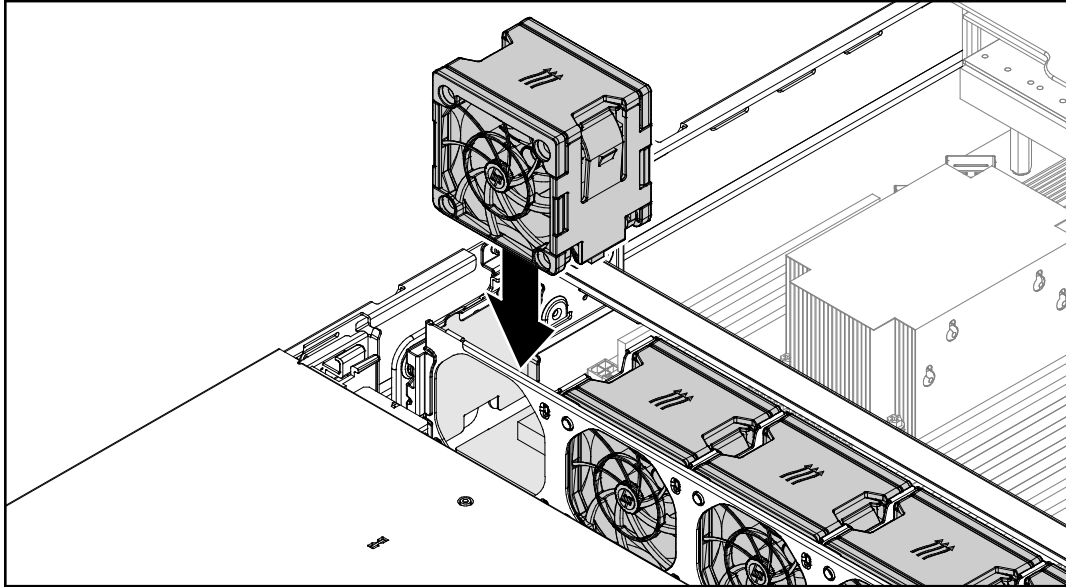
To install the system fan assembly:

NOTICE

Avoid damaging the fan cable.

1. Align the guide pins on the fan assembly with the guide pin holes in the chassis.
2. Hold the fan assembly at an angle and insert the guide pins on the fan assembly into the guide pin holes on the chassis.
3. Press to secure the guide pins into the guide pin holes.

Figure 31: System fan assembly installation



4. Install the access panel (see Section 3.5.2).

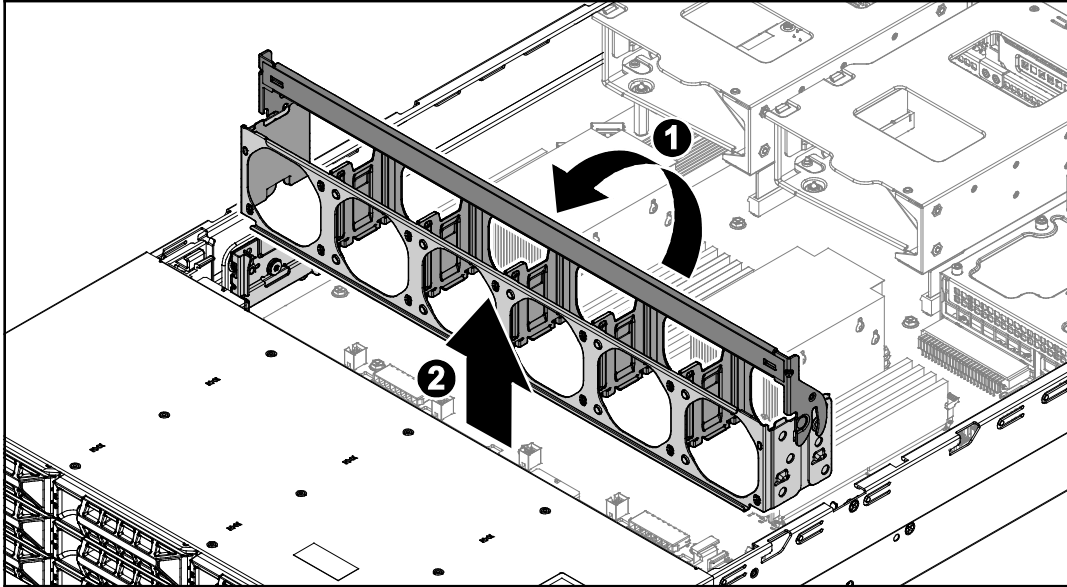
3.9. System Fan Cage

3.9.1. Removing the System Fan Cage

To remove a system fan assembly:

1. Power off the server and detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Remove the system fan assembly (see Section 3.8.1).
4. Flip the handle to release the fan cage.
5. Remove the fan cage from the system board.

Figure 32: Fan cage removal

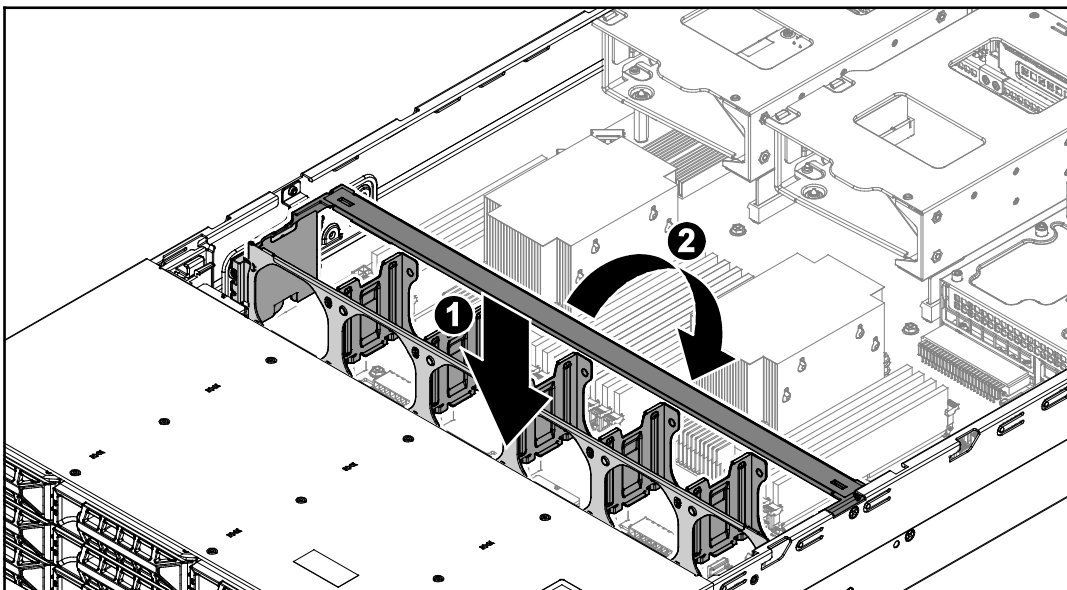


3.9.2. Installing the System Fan Cage

To install the system fan assembly:

1. Align the fan cage with the system board.
2. Flip the handle to secure the fan cage.

Figure 33: Fan cage installation



3. Install the system fan assembly (see Section 3.8.2).
4. Install the access panel (see Section 3.5.2).

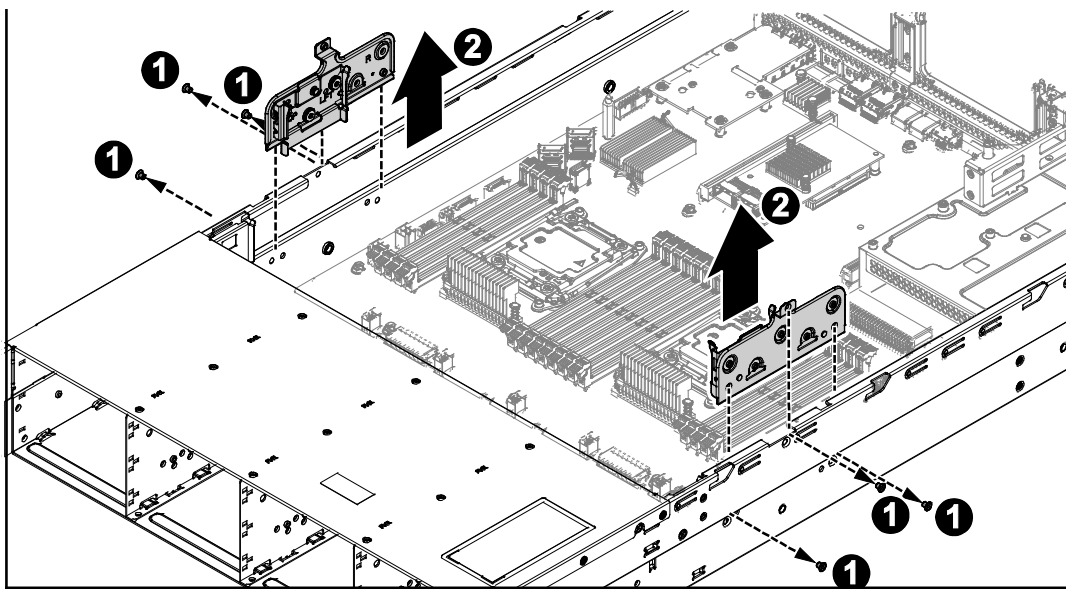
3.10. System Fan Cage Support Bracket

3.10.1. Removing the System Fan Cage Support Bracket

To remove the system fan cage support bracket:

1. Power off the server and detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Remove the system fan assembly (see Section 3.8.1).
4. Remove the system fan cage (see Section 3.9.1).
5. Remove the screws securing the support bracket.
6. Remove the support bracket.

Figure 34: System fan cage support bracket removal

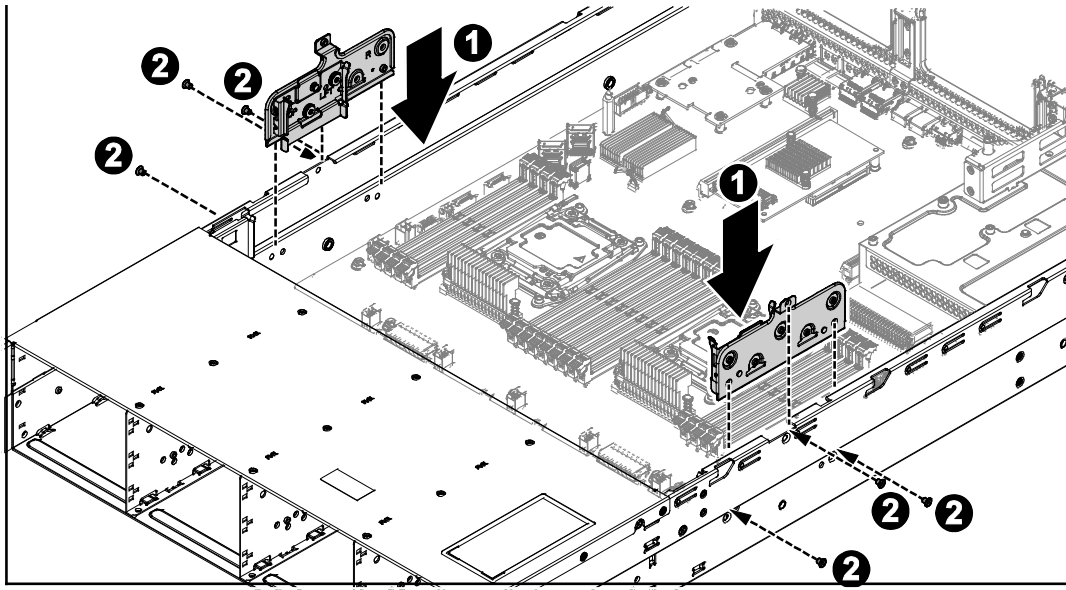


3.10.2. Installing the System Fan Cage Support Bracket

To install the system fan cage support bracket:

1. Make sure the front VGA, MiniSAS and front control cables are tucked under the support bracket.
2. Secure the support bracket and the chassis with screws.

Figure 35: System fan cage support bracket installation



3. Install the system fan cage (see Section 3.9.2).
4. Install the system fan assembly (see Section 3.8.2).
5. Install the access panel (see Section 3.5.2).

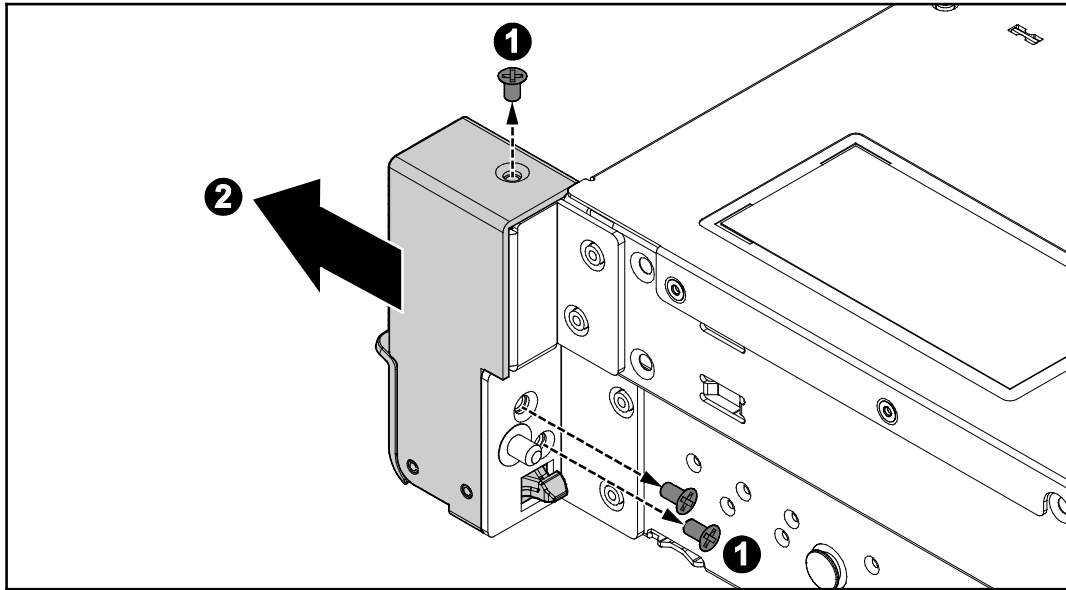
3.11. Front Control Board

3.11.1. Removing the Front Control Board

To remove the front control board:

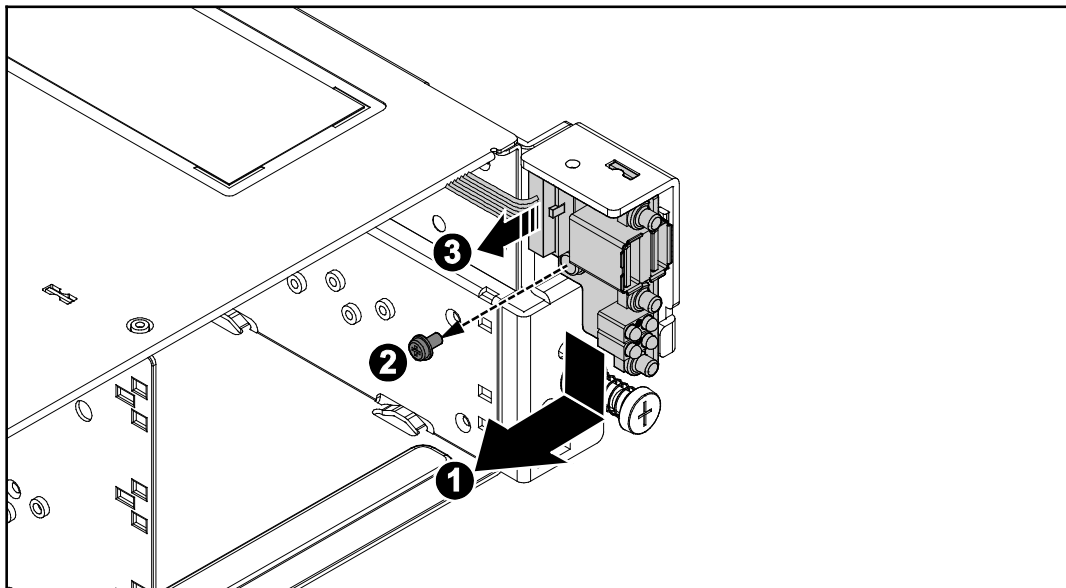
1. Power down the server and detach all of the power cords from the power supplies.
2. There are three screws securing the front control panel cover to the chassis. See the following figure to locate the screws, and then use a screwdriver to loosen and remove them (1).
3. Hold the front control panel, and then gently remove the cover from the chassis (2).

Figure 36: Cover removal



4. Detach the front control board cable from the connector (1).
5. Remove the screw that is securing the front control board (2), and then remove the front control board (3).

Figure 37: Front control board removal

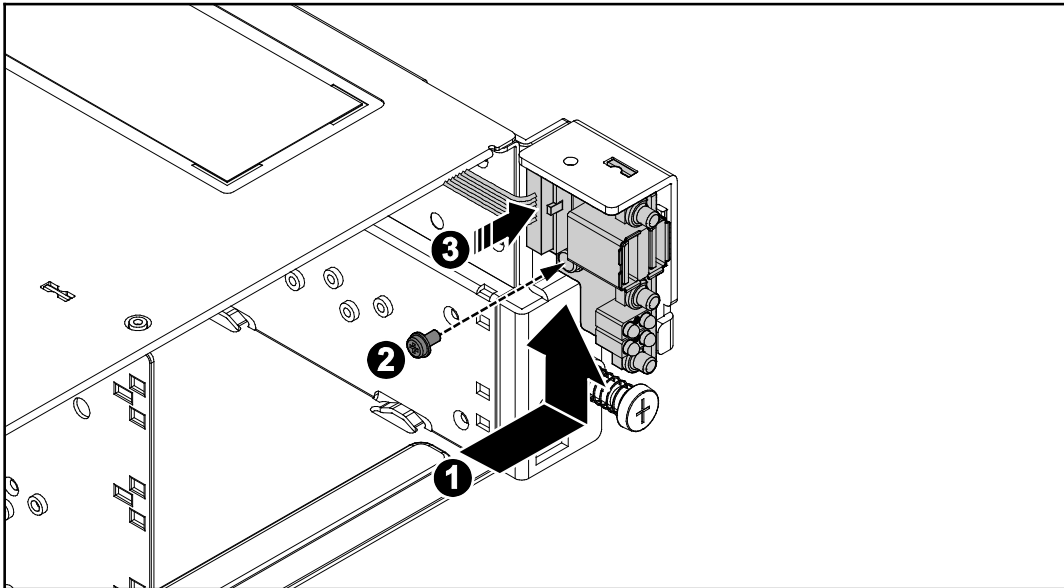


3.11.2. Installing the Front Control Board

To install the front control board:

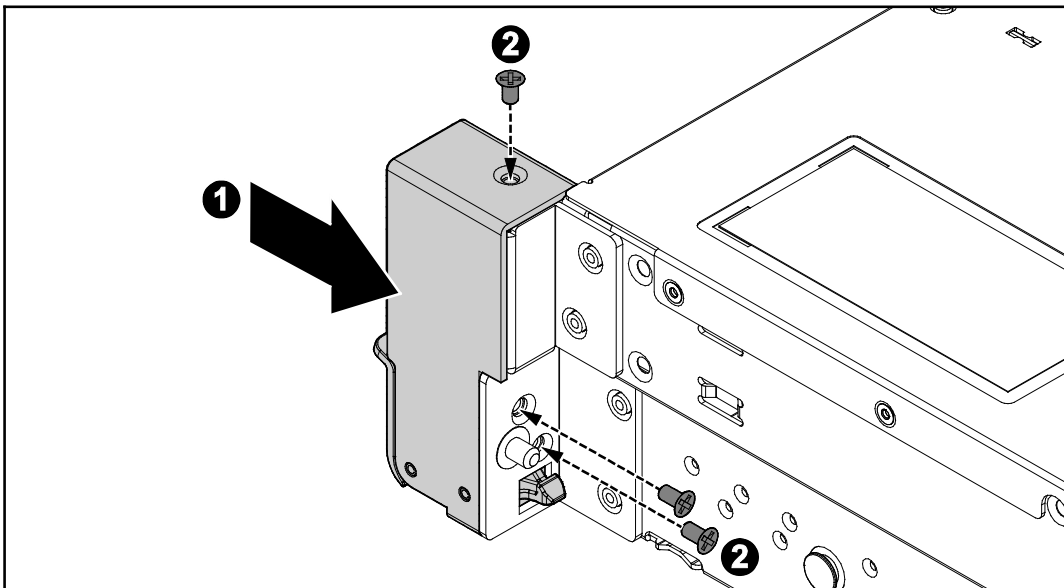
1. Connect the front control board with the front control board cable (3).
2. Secure the front control board to the chassis with the screw (2).

Figure 38: Front control board installation



3. Install the front control panel cover.
4. Secure the front control panel cover and the chassis with screws (2).

Figure 39: Cover installation



3.12. Heat Sinks

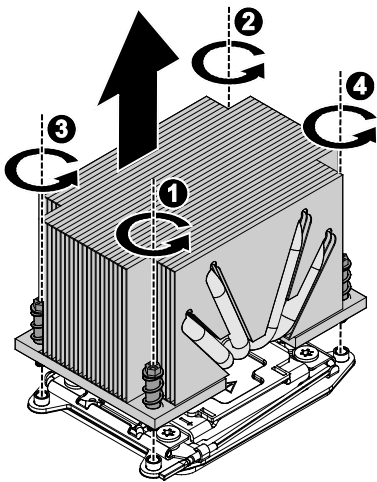
Passive heat sinks cool processors. To achieve optimal cooling performance, the underside of the heat sink must be properly attached to the processor with a thermal interface material (TIM). The mechanical performance of the heat sink is designed to meet the requirements of Intel processors. The heat sink is necessary to maintain chipset temperature at or below temperature limits.

3.12.1. Removing the Heat Sink

To remove the heat sink:

1. Power off the server, and then detach all power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Loosen the four screws in numerical order.
4. Remove the heat sink.

Figure 40: Heat sink removal



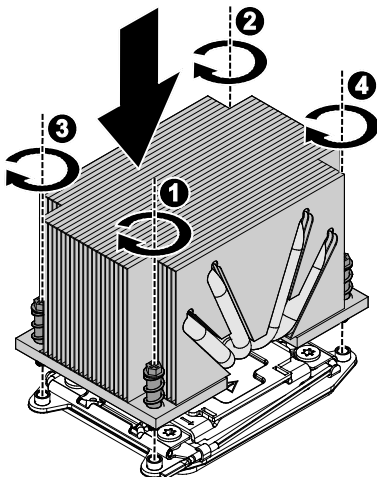
5. Repeat for the additional heat sink.

3.12.2. Installing the Heat Sink

To install the heat sink:

1. Apply thermal compound evenly on the top of the CPU.
2. Remove the protective cover from the underside of the heat sink.
3. Place the heat sink on top of the CPU, until it is seated firmly in place.
4. Tighten the four retaining screws clockwise, in the order shown, to secure the heat sink.

Figure 41: Heat sink installation



5. Repeat for the additional heat sink.
6. Install the access panel (see Section 3.5.2).

3.13. Processor

3.13.1. Removing the Processor

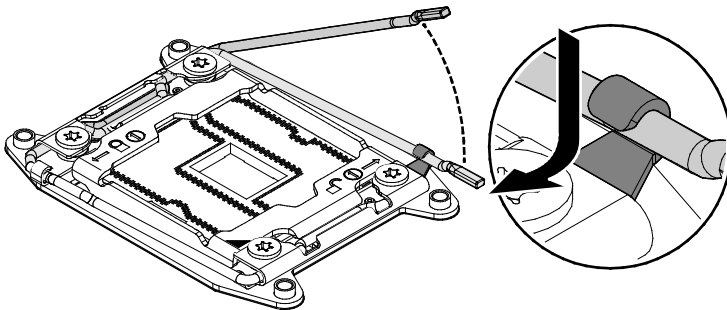


ESD protection must be worn during the procedure to avoid damaging the components.

To remove the processor:

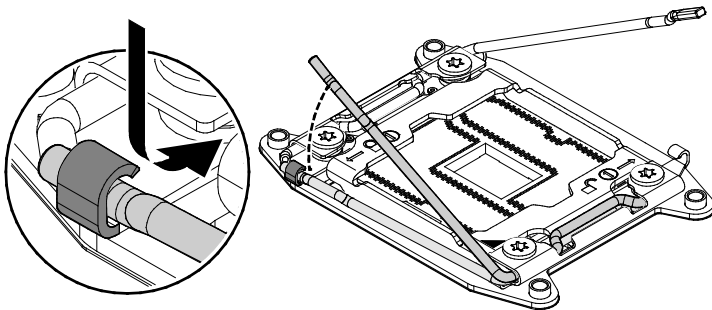
1. Power off the server, and then detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Remove the heat sink (see Section 3.12.1).
4. Press downward and outward on the right processor locking lever to release it.

Figure 42: Right processor locking lever release



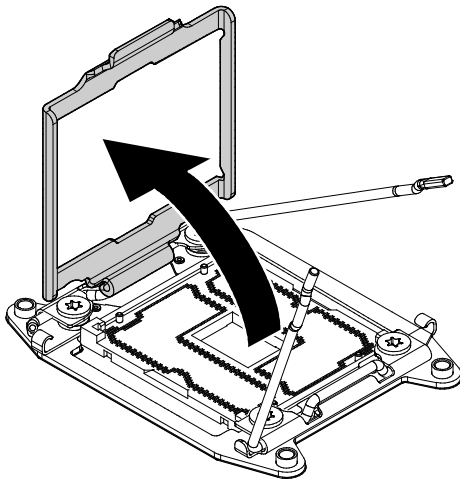
5. Press downward and outward on the left processor locking lever, pulling it fully open.

Figure 43: Left processor locking lever release



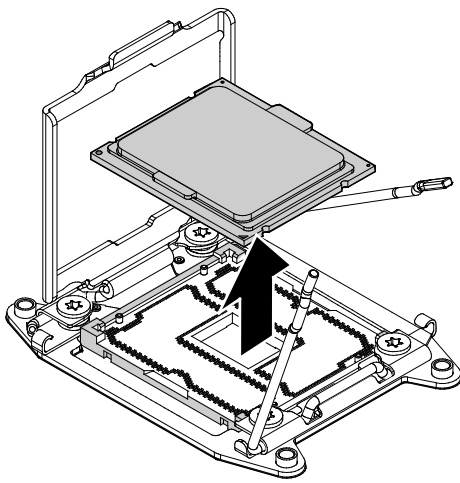
6. Press downward on the right processor locking lever to partially lift the processor access panel, and then lift the processor load plate to the fully open position.

Figure 44: Load plate opening



7. Lift the processor out of the socket.

Figure 45: Processor removal



8. Repeat the procedure for the additional processor.

3.13.2. Installing the Processor

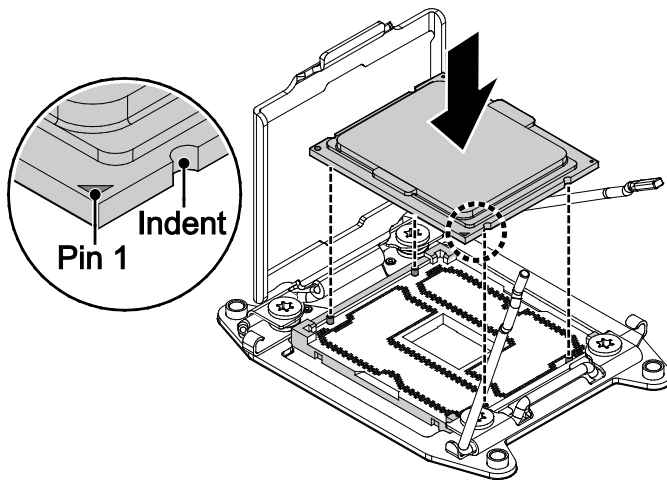


ESD protection must be worn during the procedure to avoid damaging the components.

To install the processor:

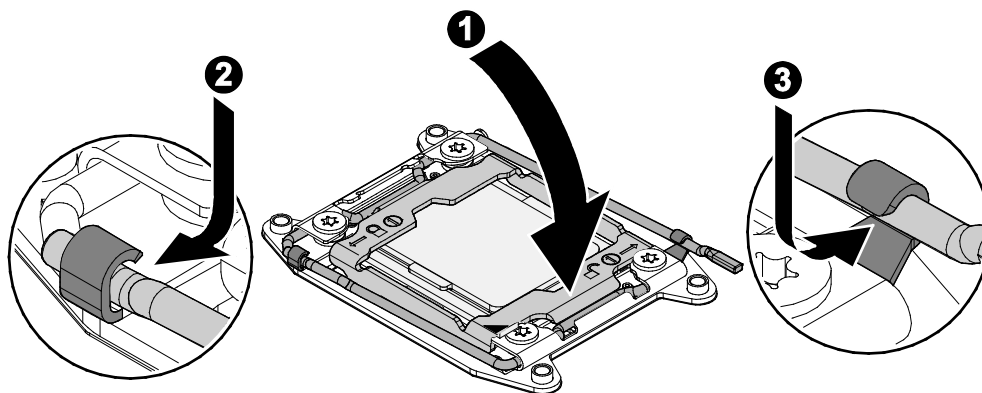
1. Align the gold triangle identifying pin 1 of the processor with the triangular cutout of the socket and the key-indent on the socket.
2. Insert the processor into the socket, being sure that the four keys on the socket fit into the corresponding keys on the processor.

Figure 46: Processor installation



3. Lower the processor load plate over the processor.
4. Push the left processor locking lever down (1), and then latch it into the locked position (2). The protective plastic cover pops out as the latch is engaged.
5. Push the right processor locking lever down and latch it into the locked position (3).

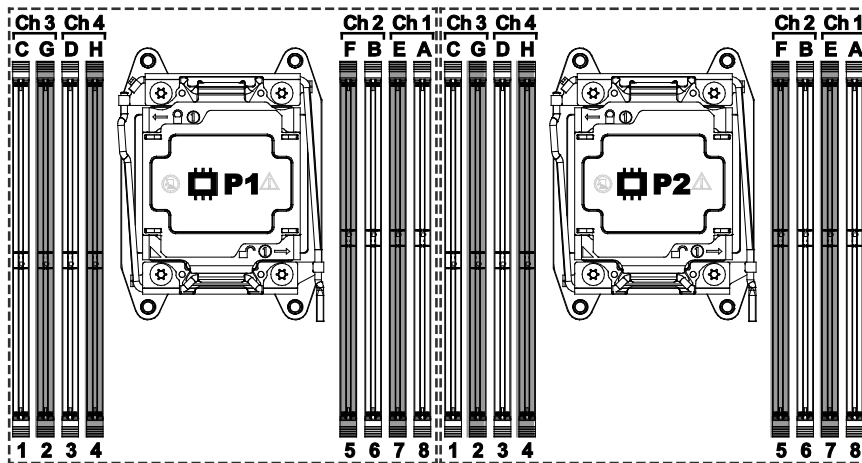
Figure 47: Processor locking



6. Repeat the procedure for the additional processor.
7. Install the heat sink (see Section 3.12.2).
8. Install the access panel (see Section 3.5.2).

3.14. Memory Modules

Figure 48: Memory modules



3.14.1. General DIMM Slot Population Guidelines

Observe the following guidelines for all AMP modes:

- ▶ Install DIMMs only if the corresponding processor is installed.
- ▶ When two processors are installed, balance the DIMMs across the two processors.
- ▶ White DIMM slots denote the first slot of a channel (Ch 1-A, Ch 2-B, Ch 3-C, Ch 4-D).
- ▶ Do not mix LRDIMMs, UDIMMs, RDIMMs, or HDIMMs.
- ▶ HDIMMs require 8 DIMMs per processor.
- ▶ When two processors are installed, install the DIMMs in sequential alphabetic order balanced between the two processors: P1-A, P2-A, P1-B, P2-B, P1-C, P2-C, and so on.

DIMM speeds are supported as indicated in the following table.

Table 15: Supported DIMM speeds

Populated slots (per channel)	Rank	Speeds supported (MT/s)
1	Single- or dual-rank	1866, 2133, 2400*
2	Single- or dual-rank	1866, 2133, 2400*
NOTE	* 2400 MHz supported by CPU v4 only.	

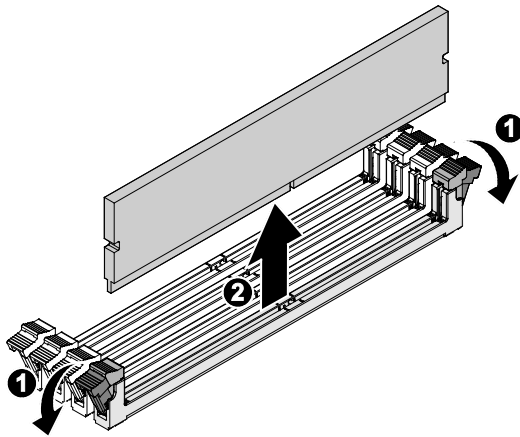
3.14.2. Removing a Memory Module

The system board includes 16 (four memory channels per processor) DIMM slots for the installation of DDR4 memory.

To remove the memory module:

1. Power off the server, and then detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Push the locking latches of the DIMM slot downward and outward to eject the memory module.
4. Remove the memory module.

Figure 49: Memory module removal



5. Repeat the process for the additional memory modules.

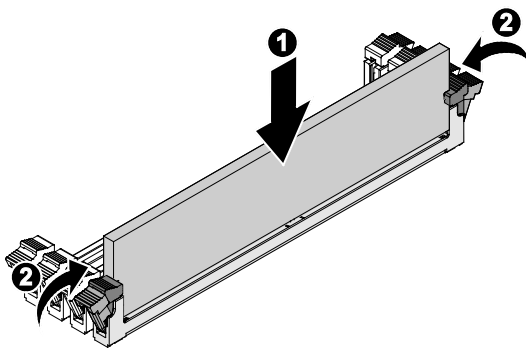
3.14.3. Installing a Memory Module

The system board has 16 DIMM slots for the installation of up to 16 DDR4 DIMMs.

To install the memory module:

1. Pull the locking latches of the DIMM slot outward.
2. Place the memory module into the socket so the notch and obstruction are aligned.

Figure 50: Memory module installation



3. Press the edge connector of the memory module into the slot. Press down firmly so that the locking latches of the DIMM slot are levered upward to secure the memory module.
4. Repeat for the additional memory modules.
5. Install the access panel (see Section 3.5.2).

3.15. System Board Module

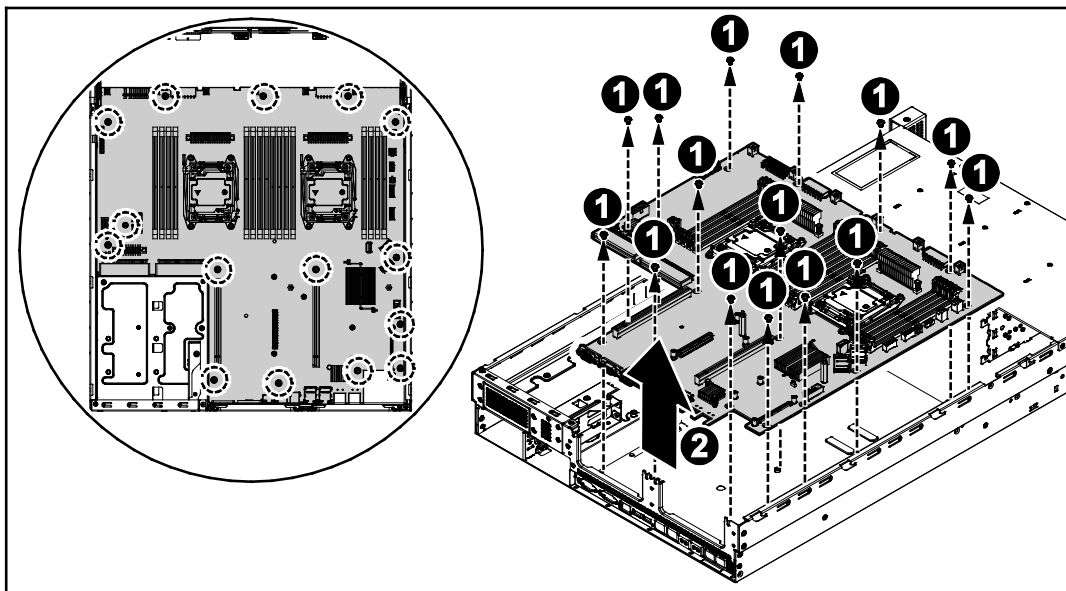
3.15.1. Removing the System Board Module

To remove the system board module:

1. Power off the server, and then detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Remove the system fan assembly (see Section 3.8.1).

4. Remove the system fan cage (see Section 3.9.1).
5. Remove the riser assembly (see Section 3.16.1).
6. Remove the OCP mezzanine card (see Section 3.17.1).
7. Remove the HBA mezzanine card (see Section 3.18.1).
8. Remove the memory modules (see Section 3.14.2).
9. Remove the heat sinks (see Section 3.12.1).
10. Remove the processors (see Section 3.13.1).
11. Disconnect all of the cables from the system board.
12. Remove the screws securing the system board to the chassis.
13. Release the I/O ports on the system board from the slots on the chassis.
14. Remove the system board.

Figure 51: System board removal

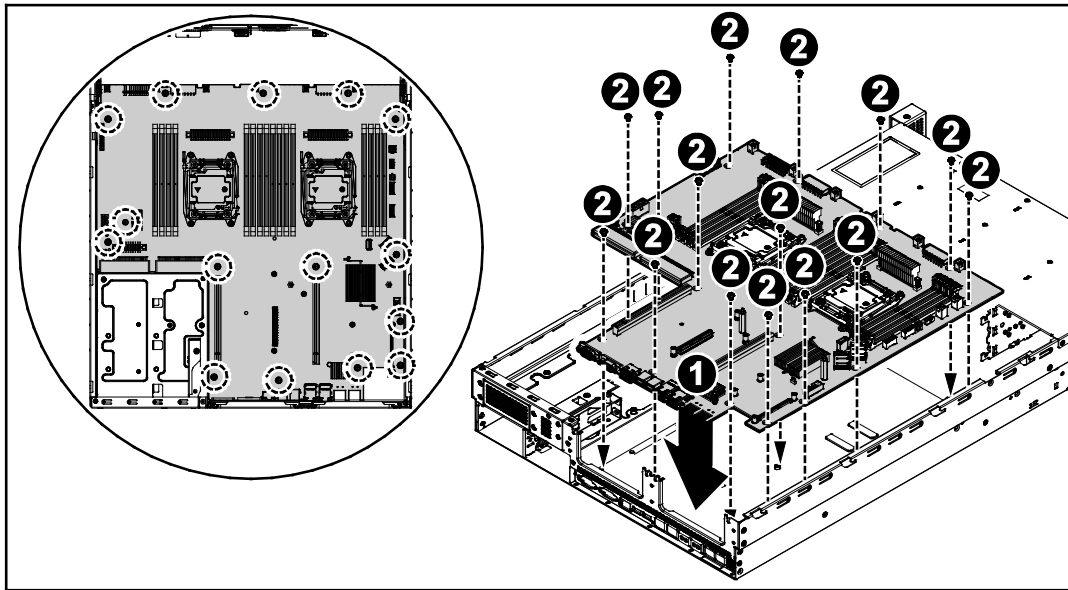


3.15.2. Installing the System Board Module

To install the system board assembly:

1. Align the I/O ports on the system board with the slots on the rear of the chassis.
2. Install the system board into the chassis.
3. Secure the system board to the chassis with the screws.

Figure 52: System board installation



4. Connect the cables.
5. Install the processors (see Section 3.13.2).
6. Install the heat sinks (see Section 3.12.2).
7. Install the memory modules (see Section 3.14.3).
8. Install the HBA mezzanine card (see Section 3.18.2).
9. Install the OCP mezzanine card (see Section 3.17.2).
10. Install the riser assembly (see Section 3.16.2).
11. Install the system fan cage (see Section 3.9.2).
12. Install the system fan assembly (see Section 3.8.2).
13. Install the access panel (see Section 3.5.2).

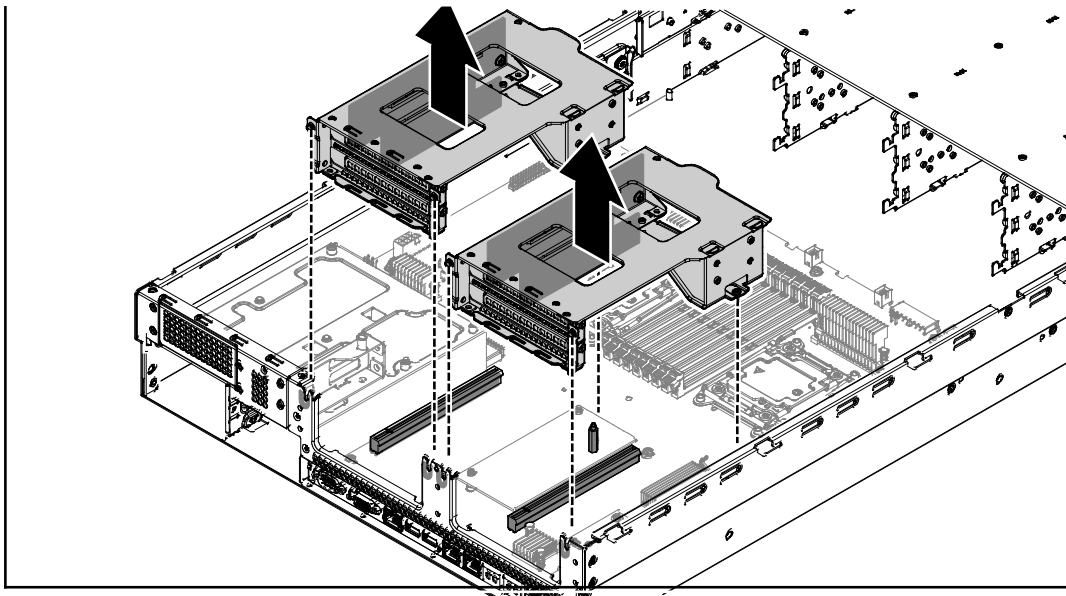
3.16. Riser Assembly

3.16.1. Removing the Riser Assembly

To remove the riser assembly:

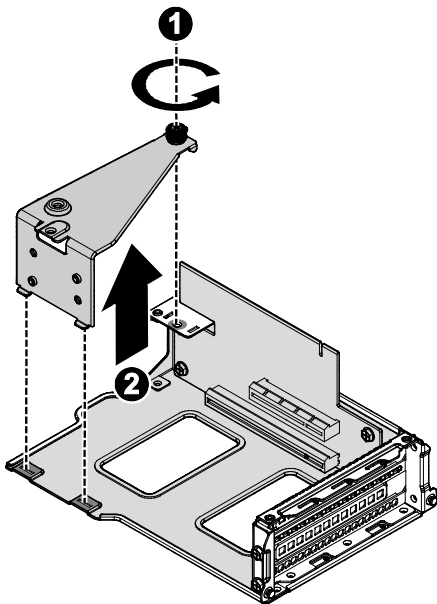
1. Power down the server, and then detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Grasp the riser assembly, and then gently lift the riser assembly up to remove the riser assembly from the chassis.

Figure 53: Riser assembly removal



4. Turn the riser assembly over to detach the cable routing.
5. Release the thumb screw securing the riser holder bracket to the riser body bracket.
6. Remove the riser holder bracket.

Figure 54: Riser holder bracket removal

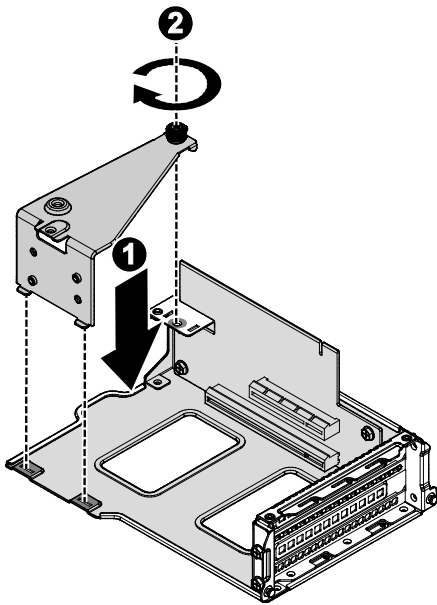


3.16.2. Installing the Riser Assembly

To install the riser assembly:

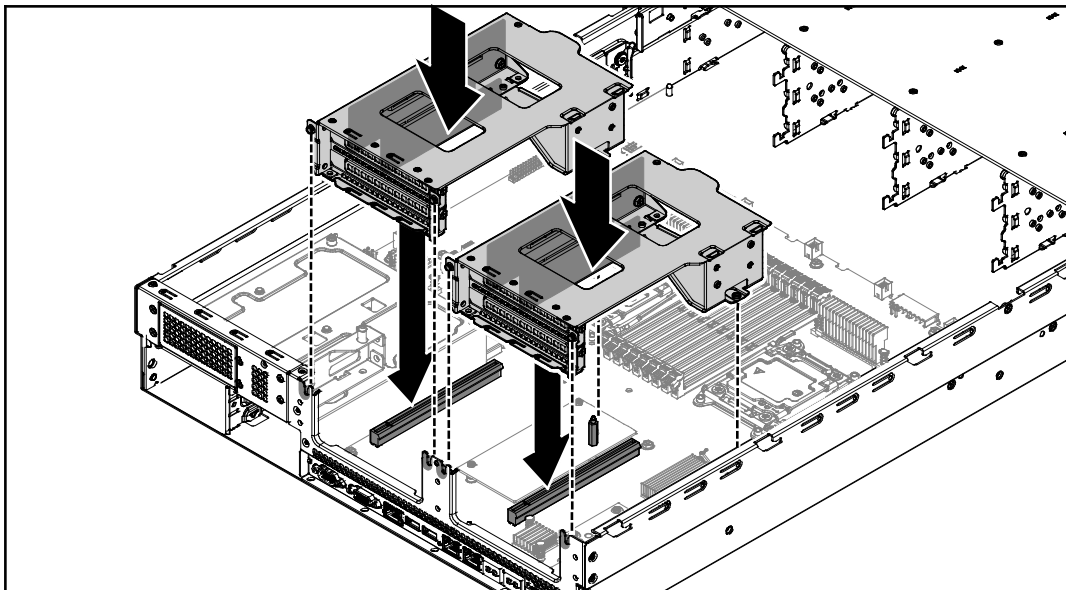
1. Align the thumb screw on the riser holder bracket with the screw hole on the riser body bracket.
2. Secure the riser holder bracket to the riser body bracket with thumb screw.

Figure 55: Riser holder bracket installation



3. Turn the riser assembly over to align with the PCIe slot on the system board.
4. Gently insert the riser assembly into the PCIe slot on the system board.

Figure 56: Riser assembly installation



5. Connect the cable routing to the riser assembly.
6. Install the access panel (see Section 3.5.2).

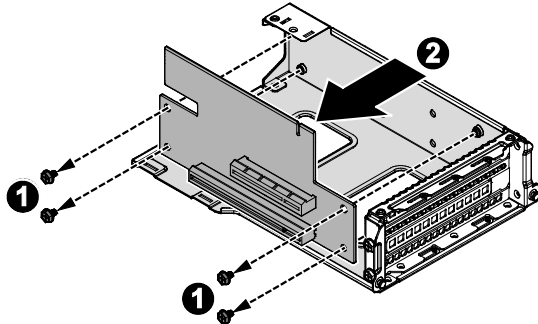
3.16.3. Removing the Riser Board

To remove the riser board:

1. Power down the server, and then detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).

3. Remove the riser assembly (see Section 3.16.1).
4. Remove the screws securing the riser board and the riser body bracket.
5. Remove the riser card.

Figure 57: Riser card removal

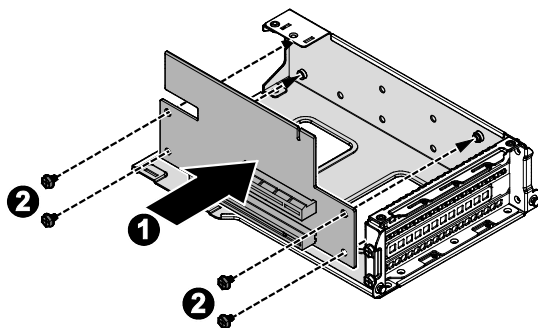


3.16.4. Installing the Riser Board

To install the riser board:

1. Align the screw holes on the riser board with the screw holes on the riser body bracket.
2. Secure the riser board to the riser bracket with screws.

Figure 58: Riser card installation



3. Install the riser assembly (see Section 3.16.2).
4. Install the access panel (see Section 3.5.2).

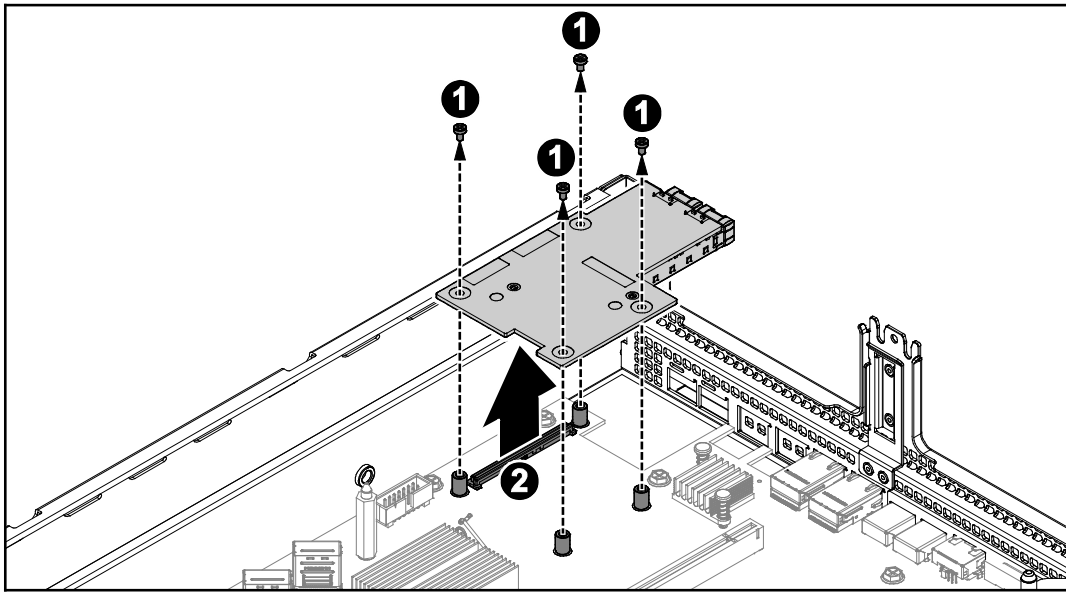
3.17. OCP Mezzanine Card

3.17.1. Removing the OCP Mezzanine Card

To remove the OCP mezzanine card:

1. Power off the server, and then detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Remove the riser assembly (see Section 3.16.1).
4. Remove the screws securing the OCP mezzanine card to the system board.
5. Remove the OCP mezzanine card.

Figure 59: OCP mezzanine card removal

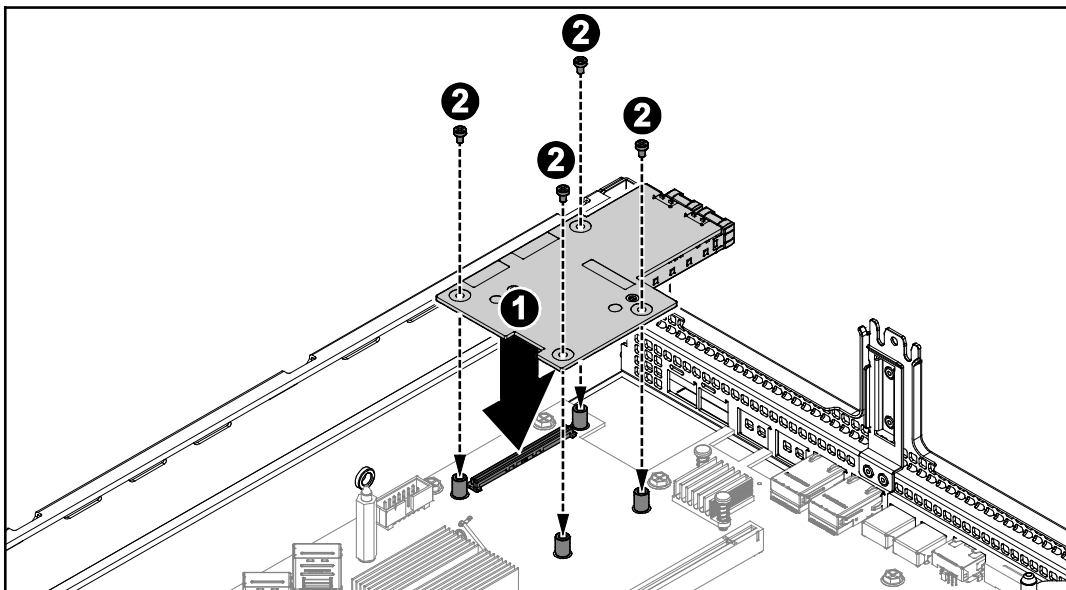


3.17.2. Installing the OCP Mezzanine Card

Follow these steps to install the OCP mezzanine card:

1. Align the connector on the OCP mezzanine card with the slot on the system board.
2. Gently install the OCP mezzanine card.
3. Secure the OCP mezzanine card to the chassis with screws.

Figure 60: OCP mezzanine card installation



4. Install the riser assembly (see Section 3.16.2).
5. Install the access panel (see Section 3.5.2).

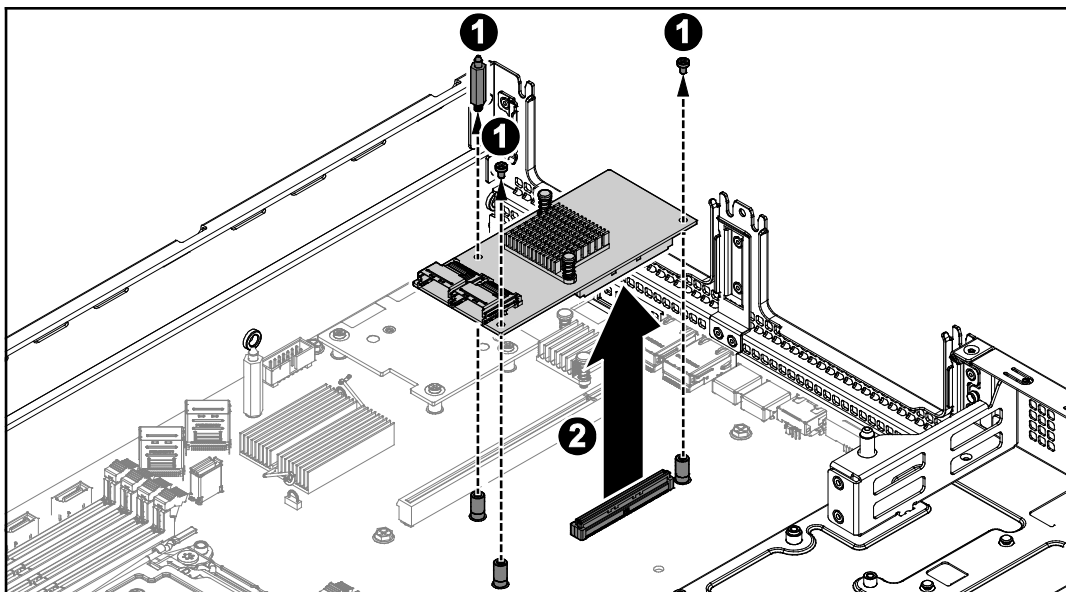
3.18. HBA Mezzanine Card

3.18.1. Removing the HBA Mezzanine Card

To remove the HBA mezzanine card:

1. Power down the server, and then detach all of the power cords from the power supplies.
2. Remove the access panel (see Section 3.5.1).
3. Remove the riser assembly (see Section 3.16.1).
4. Remove the screws securing the HBA mezzanine card to the system board.
5. Remove the HBA mezzanine card.

Figure 61: HBA mezzanine card removal

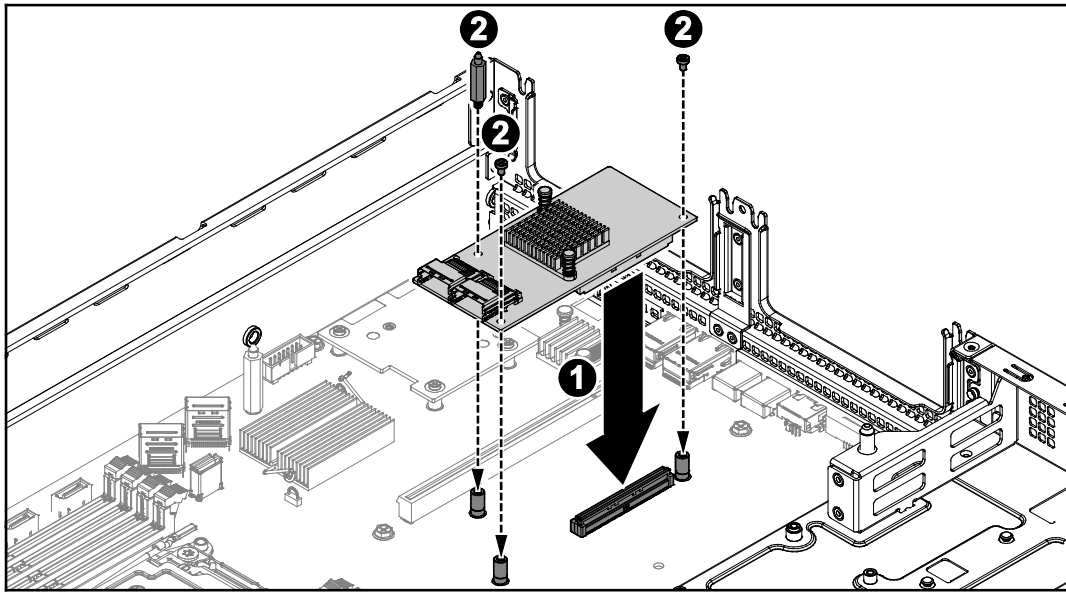


3.18.2. Installing the HBA Mezzanine Card

To install the HBA mezzanine card:

1. Align the connector on the HBA mezzanine card with the slot on the system board.
2. Gently install the HBA mezzanine card.
3. Secure the HBA mezzanine card to the chassis with screws.

Figure 62: HBA mezzanine card installation



4. Install the riser assembly (see Section 3.16.2).
5. Install the access panel (see Section 3.5.2).

3.19. Powering on and Selecting Boot Options

1. Connect the Ethernet cable.
2. Press **Power On/Standby**.
3. During the initial boot:
 - ▶ To modify the BIOS default settings, press **F2** or **DEL** when prompted from the start-up sequence to enter the BIOS setup utility. By default, the BIOS setup utility runs in the English language.
 - ▶ It is not necessary to modify the server configuration, press **F7** during system boot to select the boot device for system software installation.
 - ▶ To enter PXE boot, press **F12** during boot time when prompted from the start sequence.

3.20. Installing the Operating System

To operate properly, the server must have a supported OS.

To install an OS on the server, use one of the following methods:

- ▶ Local installation (USB key or USB optical disc)
- ▶ Remote deployment installation (PXE, virtual KVM)
- ▶ Follow up install OS step and reboot system

4/ Cabling

4.1. Internal System Cable Routing

The server internal cable routing is listed in the following figure and table:

Figure 63: Config 1 (without HBA mezzanine card)

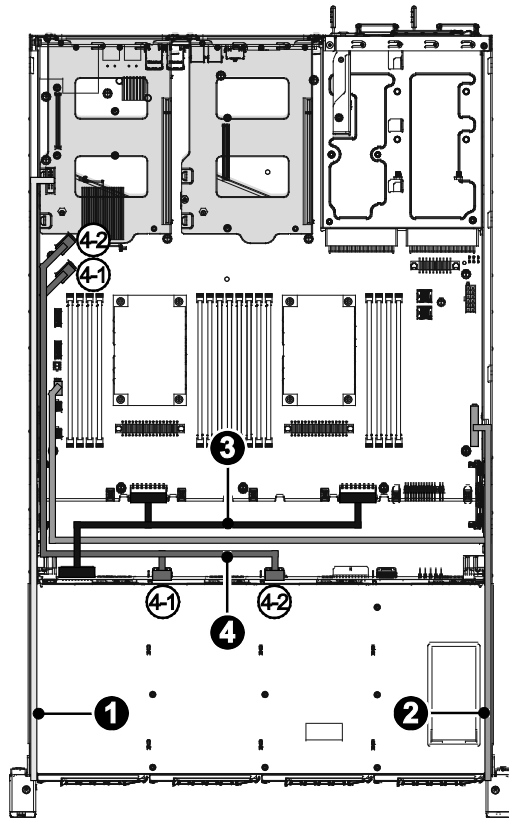


Table 16: Config 1 (without HBA mezzanine card)

Item	Description	Quantity
1	Front VGA cable	1 from system board
2	Front control & USB cable	1 from system board
3	HDD backplane power cable	1 from HDD backplane
4-1	MiniSAS cable 1, HDD backplane to system board	1 from HDD backplane
4-2	MiniSAS cable 2, HDD backplane to system board	1 from HDD backplane

Figure 64: Config 2 (with HBA mezzanine card)

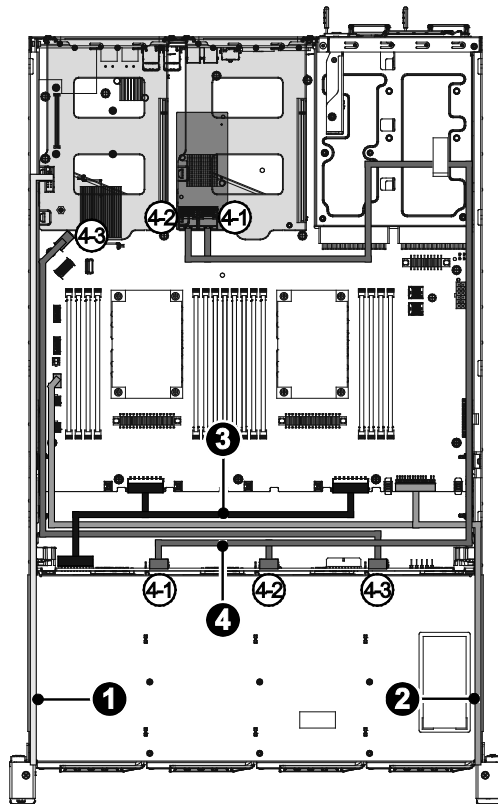


Table 17: Config 2 (with HBA mezzanine card)

Item	Description	Quantity
1	Front VGA cable	1 from system board
2	Front control & USB cable	1 from system board
3	HDD backplane power cable	1 from HDD backplane
4-1	MiniSAS cable 1, HDD backplane to HBA mezzanine card	1 from HDD backplane
4-2	MiniSAS cable 2, HDD backplane to HBA mezzanine card	1 from HDD backplane
4-3	MiniSAS cable 3, HDD backplane to system board	1 from HDD backplane

5/ Configuration

5.1. BMC

5.1.1. Web GUI Introduction

The web GUI is a friendly interface for the end users. A user can access the iBMC FW via a web browser, and then go through the server status and do many configurations to the iBMC FW.

The default user privilege is set to administrator (ADMIN). The web function access rights are determined by different privileges. For example, the administrator privilege can access all functions, but the user privilege cannot.

The web GUI provides many useful functions, such as:

- ▶ firmware update
- ▶ system power control
- ▶ system event log (SEL)
- ▶ current sensor reading
- ▶ configuration for: BMC network, user accounts, serial, PEF, alerts, SOL, information about BMC, and the system

5.1.2. IP Address

Static and DHCP are the two common IP sources of iBMC FW. The default setting is DHCP. The detailed IP address information is available from the BIOS setup menu.

5.1.3. User Name and Password

A user name and password are required to establish a web GUI session. The user should also have accessibility to the LAN channel. Use the system management software to set the user name, password, and grant access. The default setting is shown below:

- ▶ ID 2: User Name = admin Password = admin

NOTE: both user and password are in lower case.

5.1.4. Web Browsers

iBMC FW supports either Microsoft Internet Explorer (Windows platform) or Firefox (Linux platform).

The embedded web server provides full access. The web GUI is accessible via the HTTP protocol or via the encrypted HTTPS protocol.

5.1.5. Logging In

To log in to the web GUI, enter the iBMC FW IP address into a web browser. An example of using the HTTP protocol is <http://10.141.104.176>. An example of using the encrypted HTTPS protocol is <https://10.141.104.176>

5.1.6. Updating the Firmware

Many common problems can be resolved by updating the firmware. The BMC FW can be updated through a host-based utility or through the web GUI.

5.1.6.1. Restoring the Default Configuration

The BMC FW supports an OEM command to restore all of the configuration values to their defaults. Using the OEM command restores all IPMI configuration parameters and all Linux user configuration files (password, group, and so on). The OEM command is not available to the end user, but the web GUI provides a friendly interface to do this. This command does not restore the SEL records.

5.1.6.2. BMC FW Version

The “Get Device ID” command (NetFn Application, Command 1) reports the firmware revision. The “Get Device ID” command also reports the auxiliary firmware revision.

The firmware build ID can map from the firmware revision. Naming convention of build ID is J2BT xy . “ x ” is minor revision (BCD encoded), and “ y ” is auxiliary firmware revision. “ y ” is “ a ” if auxiliary firmware revision is 0, and “ y ” is “ b ” if auxiliary firmware revision is 1, and so on. For example, if the firmware revision is 0.12.0, the build ID is J2BT12A; if the firmware revision is 0.12.1, the build ID is J2BT12B. End-users can confirm whether restore default configuration when updating firmware through the utilities or through the web GUI.

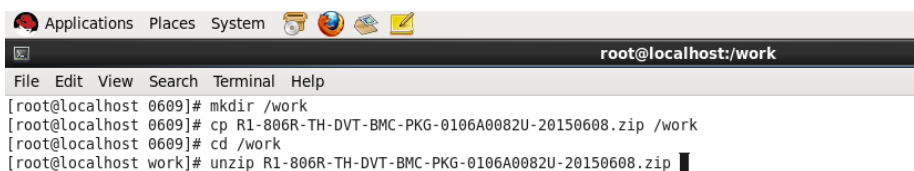
The default configuration should be restored when SDR is changed.

5.1.6.3. Updating BMC Using Linux

To update BMC using Linux:

1. Log into Linux.
2. Open the terminal.
3. Create new directory “/work”, command:
`mkdir /work`
4. Copy the BMC FW package to the /work directory using the command:
`cp file_name.zip /work`
5. Change the directory using the /work, command:
`cd /work`
6. Uncompress the BMC FW package using the command:
`unzip file_name.zip`

Figure 65: Uncompressing



```

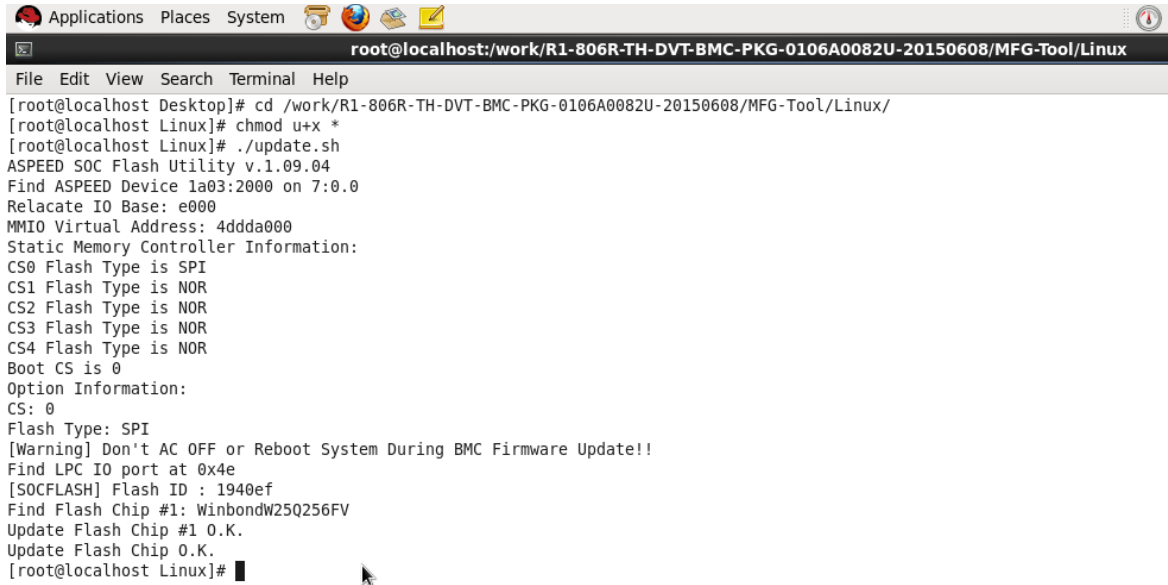
Applications Places System
root@localhost:/work
File Edit View Search Terminal Help
[root@localhost 0609]# mkdir /work
[root@localhost 0609]# cp R1-806R-TH-DVT-BMC-PKG-0106A0082U-20150608.zip /work
[root@localhost 0609]# cd /work
[root@localhost work]# unzip R1-806R-TH-DVT-BMC-PKG-0106A0082U-20150608.zip

```

7. Enter directory of uncompressed before, command:
`cd file_name/Linux/linux64bit/`
8. Add execute permission for all of the files in the file_name folder.
9. Execute /Update.sh to update BMC.

10. The following screen shot shows that BMC successfully updated.

Figure 66: BMC successfully updated

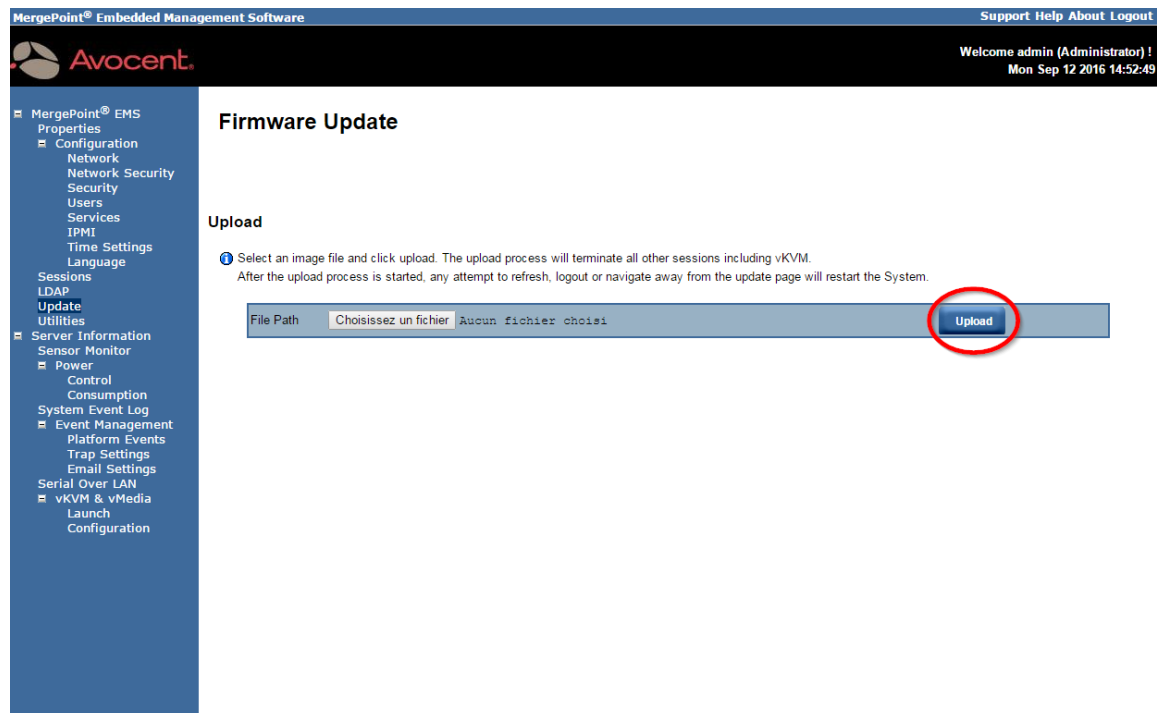


5.1.6.4. Updating BMC via a Web GUI

To update BMC using the web GUI:

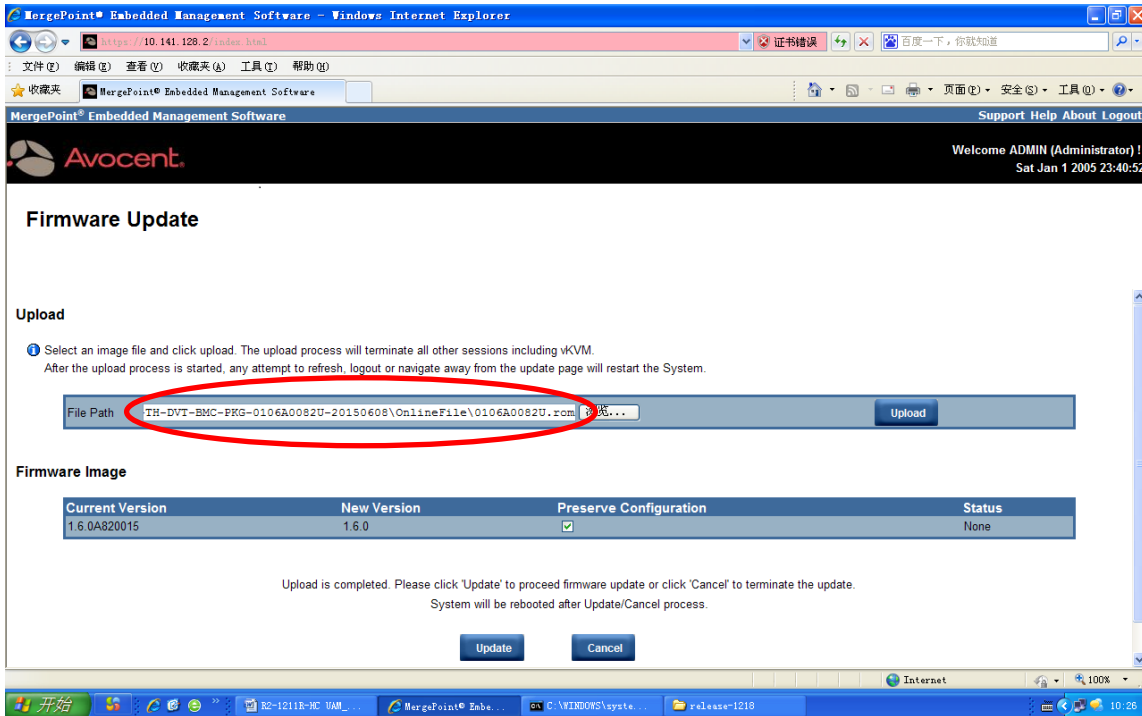
1. Log into the web GUI using a web browser.
2. Select **Update** from the left tree view, and then click **Browse**.

Figure 67: Web GUI



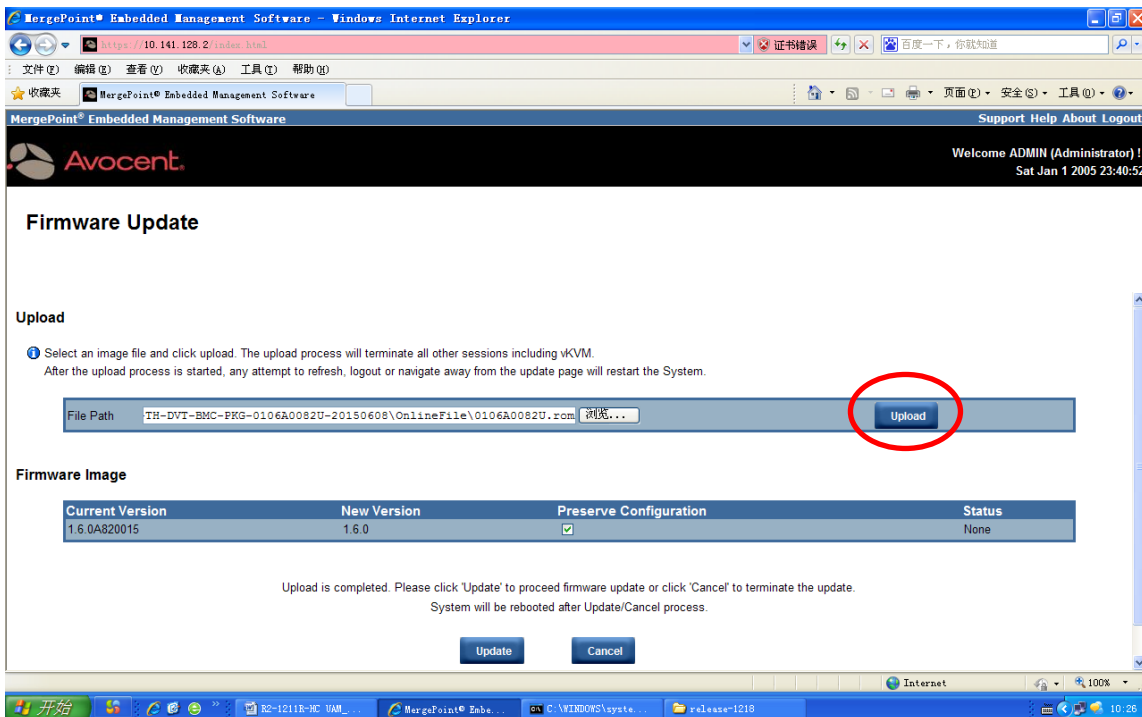
3. Select the BMC FW image file.

Figure 68: File selection



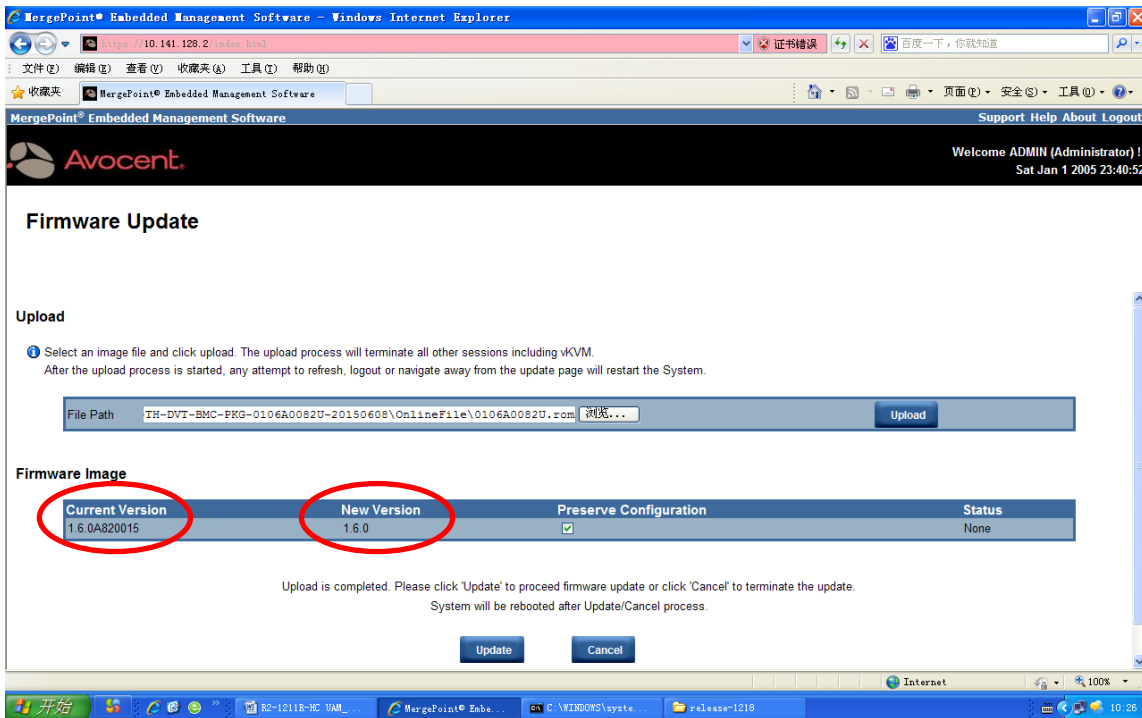
4. Click **Upload**. If the file is a valid file, all other sessions are terminated, and then the image upload begins. If the upload fails, a message displays with a notification to upload another file. .

Figure 69: File upload



- For a successful upload, the current firmware version and the version of the new file are displayed, as well as the Preserve Configuration checkbox, **Update** button and **Cancel** button. .

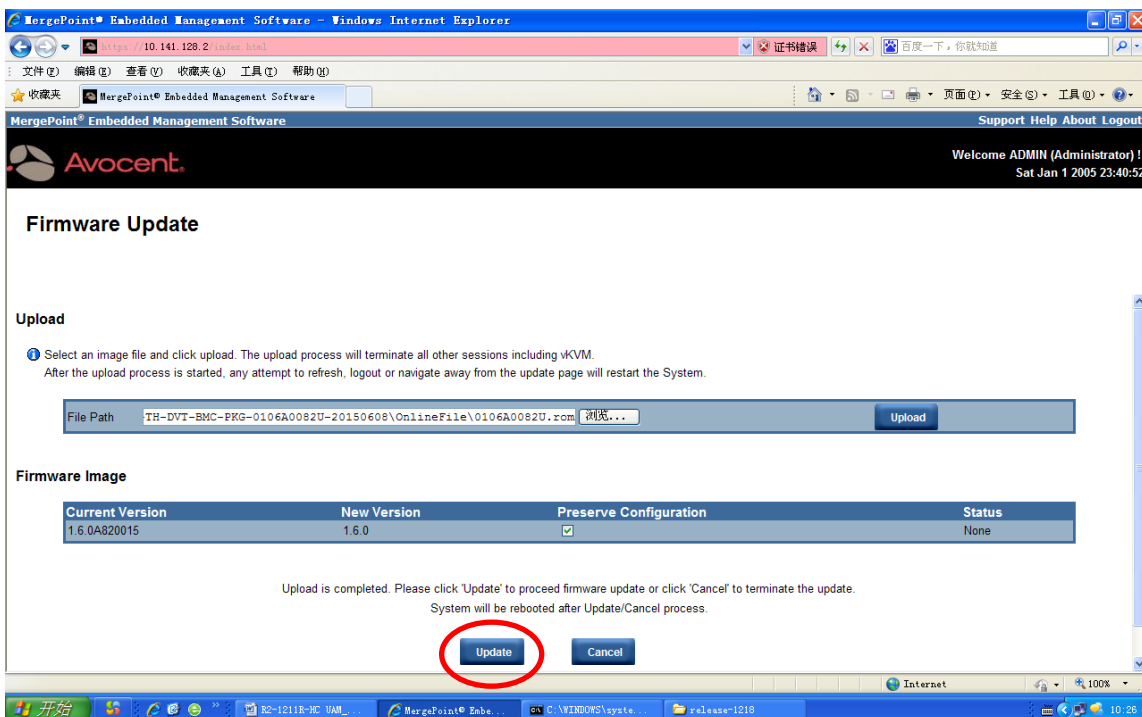
Figure 70: Successful upload



* Preserve Configuration: Clear to default FW settings or not.

- Click **Update** to begin the firmware update process and to view the status of the update.

Figure 71: Firmware update



7. When the update is completed, the embedded software automatically reboots.

Clicking **Cancel** terminates the process, and then the embedded software reboots.

5.2. BIOS Settings

There are eight menus in the BIOS setup utility, which appear in the following order: Main, Advanced, IntelRCSetup, Server Mgmt, GPNV Logs, Security, Boot, and Save & Exit. Use the arrow keys to navigate the menus or options that are listed on the menu. Configurable menu options or fields appear in color. For further instructions about how to navigate and change settings in the BIOS setup utility, see the on-screen instructions that are provided on the menu.

5.2.1. BIOS Setup Menus

The following table provides descriptions for the top-level BIOS setup menus.

Table 18: Top-level BIOS setup menus

BIOS Menu	Description
Main	General product information including BIOS/memory information, system language, and time/date
Advanced	Configuration information for the SMART settings, AST1250 super IO, network stack, CSM, USB, serial port console redirection, PCI subsystem settings, and trusted computing
IntelRCSetup	Configuration information for the processor, advanced power management, common RefCode, QPI, memory, IIO, PCH, miscellaneous, server ME, and runtime error logging
Server Mgmt	BMC self-test status, BMC firmware version, timer settings and timeout behaviours, system event log setting, BMC network settings and view system event Log
GPNV Logs	SMBIOS Event log Setting and View SMBIOS event logs.
Security	Set or change the user and supervisor passwords
Boot	Configure setup Prompt Timeout, bootup numlock state, quiet boot, boot mode select and the boot device priority
Save & Exit	Save changes and exit, discard changes and exit, save changes and reset, discard changes and reset; save options: save changes, discard changes; Restore Defaults; Boot Override and Launch Build-In EFI Shell

5.2.2. POST Error Message

There are three methods to treat the event/errors detected during POST:

- ▶ Log to SMBIOS
- ▶ Log to SEL
- ▶ Shown on-screen during POST

Table 19: SMBIOS event log

SMBIOS Event Log	Description
0x07	POST memory resize
0x08	POST errors
0x10	System limit exceeded
0x16	Log area reset
0x17	System boot

SMBIOS Event Log	Description
0xFF	End of log
0x80	IDE device failed
0x81	Flash device update operation failed
0x82	No more PCI resources available
0x83	No space for any more legacy OPR0M
0x84	Invalid password entered three times
0x85	Clear CMOS

Table 20: System event log (POST)

Sensor Name	Sensor Type	Sensor Number	E/R Type	Event Data1	Event Data2	Event Data3	Description
BIOS POST Sensor	0x0F	0x09	0x6F	0xC0	0x01	0xFF	System firmware error. No system memory is physically installed in the system.
	0x0F		0x6F	0xC0	0x02	0xFF	System firmware error. No usable system memory, all installed memory has experienced an unrecoverable failure.
	0x0F		0x6F	0xC0	0x0A	0xFF	System firmware error. No video device detected.
	0x07		0x6F	0x02	0xFF	0xFF	FRBI/BIST failure.
	0x10		0x6F	0x04	0xFF	0xFF	SEL full.

5.2.3. Entering the Pop-Up Boot Menu

To enter the pop-up boot menu, press **F7** during system boot when the Press <F7> to enter Popup Boot Menu message displays.

The pop-up boot menu screen displays as shown in the following figure.

Figure 72: Boot menu screen

Please select boot device:
<device list>
Enter Setup
↑ And ↓ to move selection ENTER to select boot device ESC to boot using defaults

5.2.4. Entering PXE Boot

To access PXE boot:

1. Set Network as the first boot device in BIOS setup menu.
2. Select Network device from the pop-up boot menu.

5.2.5. Entering the BIOS Setup Menu

The BIOS setup menu is accessible using the following methods:

- ▶ Connect a USB keyboard, mouse, and VGA monitor directly to the server.
- ▶ Use a console (or terminal emulator connected to a computer) through the serial port on the rear of the server.

To access the BIOS setup utility menus:

1. Press the power button on the front control panel to power up the server.
2. Press **F2** or **DEL** during system boot when the Press or <F2> to enter setup displays.
3. Use the left and right arrow keys to navigate the different menu options. When a menu option is selected, the top-level screen for that option appears.
4. Use the up and down arrow keys to scroll up and down to select an item on a top-level screen. When the up and down arrow keys are pressed, the only options that are highlighted are the options that can be modified.
 - ▶ If an item can be modified, user instructions for modifying the option appear in the right column of the screen.
 - ▶ If an item is a link to a sub-screen, a prompt to press **Enter** to access the sub-screen appears in the right column.
5. Modify the setup item and press **F4** to save the changes and exit the screen.
6. Follow the instructions on the **Save & Exit** menu screen to save or discard your changes and exit the BIOS setup utility.

5.2.6. BIOS Maintenance

This section provides information about upgrading the BIOS, clearing the BIOS password, clearing CMOS, BIOS recovery, and a BIOS jumper description.

5.2.6.1. Upgrading the BIOS Using DOS

The flash memory update utility loads a fresh copy of the BIOS into flash ROM. This utility only updates the BIOS region.

BIOS update utility: AFUDOS.EXE

Boot the system to DOS environment and execute the following command to update BIOS:

```
AFUDOS <BIOS ROM File Name>[Option 1][Option 2]
or
AFUDOS<Output BIOS ROM File Name><Commands>
```

▶ Commands

Use the mandatory field to select an operation mode.

- ▶ /O Save current ROM image to file
- ▶ /U Get and display ROM ID from BIOS ROM file
- ▶ /S Refer to Option: /S
- ▶ /D Verification test of given ROM File without flashing BIOS.

► Options

Use the optional field to supply more information for flashing the BIOS ROM. The following lists the supported optional parameters and format:

- /P Program main bios image
- /B Program Boot Block
- /N Program NVRAM
- /E Program Embedded Controller block if present
- /K Program all non-critical blocks
- /Kn Program n'th non-critical block only (0 >= n <= 7)
- /Q Quiet mode enable
- /REBOOT Reboot after update BIOS done
- /X Do not check ROM ID
- /S Display current system's BIOS ROM ID
- /R Preserve all SMBIOS structures during NVRAM programming.
- /Rn Preserve SMBIOS type N during Boot Block programming.
- /ECUF Update EC BIOS when newer version is detected.
- /Shutdown Shutdown after programming.

► Rules

- Any parameter enclosed by <> is a mandatory field.
- Any parameter enclosed by [] is an optional field.
- <Commands> cannot co-exist with any [Options].
- The main BIOS image is the default flashing area if no options are present.
- [/REBOOT], [/X], and [/S] automatically enables the [/P] function automatically.
- If [/B] is present alone, only the boot block area needs to be updated.
- If [/N] is present alone, only the NVRAM area needs to be updated.
- If [/E] is present alone, only the embedded controller block needs to be updated.

Table 21: Flash commands

Flash Command	Description
afudos XXXX.ROM /P	Program main BIOS image
afudos XXXX.ROM /P /B	Program main BIOS and BB (Boot Block)
afudos XXXX.ROM /P /B /N	Program main BIOS, BB and NVRAM
afudos XXXX.ROM /P /B /R	Program BB and main BIOS without SMBIOS

5.2.6.2. Clearing the BIOS Password

If the user and/or administrator password is lost or forgotten, clear both passwords by moving the password clear jumper into the clear position.

The BIOS determines if the password clear jumper is in the clear position during BIOS POST and clears any passwords if necessary. The password clear jumper must be restored to its original position for the new password to remain set.

5.2.6.3. Clearing the CMOS

The CMOS clear jumper uses RTCRST# to:

- ▶ Clear CMOS values
- ▶ Set the RTC power well configuration bits to default.

To compatible legacy BIOS for user who is used to use legacy BIOS, BIOS provide the function to restore the default settings of BIOS Setup when CMOS is cleared, even though UEFI BIOS store BIOS settings to NVRAM.

There are two methods to clear the CMOS:

- ▶ Clear the CMOS jumper.
- ▶ Remove the CMOS battery when the system is in **AC OFF** status.

NOTICE

Important: After clearing the CMOS, the BIOS setup default is restored, but the password that was set by the user is still reserved.

5.2.6.4. Recovering the BIOS

If the BIOS image is corrupt, a system BIOS update fails, or the system fails to complete POST, the BIOS must enter recovery mode. In recovery mode, an entire BIOS image can be refreshed to BIOS flash part.

To recover the BIOS:

1. Turn off the system power.
2. Open the chassis.
3. Move the BIOS recovery jumper from the normal positions 1-2 to the recovery positions 2-3.
4. Close the chassis.
5. Copy the latest BIOS image file (DC1F1XXX.ROM) to a USB drive, XXX is the revision number. A bootable USB is not required.
6. Insert the USB drive into the system.
7. Power up the system.
8. The system display setup <Recovery> screen displays automatically and flash update automatically runs.
9. Select Proceed with flash update. Flash update automatically runs.
10. Wait until <Program new data> completes, and then press **Enter** to shut down the system.

If the signature of FV_MAIN area is invalid, the BIOS automatically enters recovery mode; if this occurs, only perform steps 5 through 10.

After recovery completes, if the recovery jumper forces the BIOS recovery turn off the system, and then restore the jumper to its normal position.

5.2.6.5. BIOS jumpers

This section provides information about the BIOS. See the following table to locate the BIOS maintenance jumpers.

Table 22: BIOS jumpers

Jumper	Description	Jumper Adjustment
J15	CMOS CLEAR	1-2 (Default): Normal RTC reset 2-3: Clear RTC registers

Jumper	Description	Jumper Adjustment
J18	BIOS RECOVERY MODE	1-2 (Default): Normal operation 2-3: Force BIOS to enter recovery mode
J16	PASSWORD CLEAR	1-2 (Default): Normal operation 2-3: Password clear
J19	ME FIRMWARE UPDATE	1-2: Normal operation 2-3: ME firmware in force update mode
J4	ME Flash Override	1-2: Normal operation 2-3: ME Flash Override mode
JP1	INTRUDER HEADER	Close: Chassis cover is closed Open: Chassis cover is open

Figure 73: BIOS jumpers

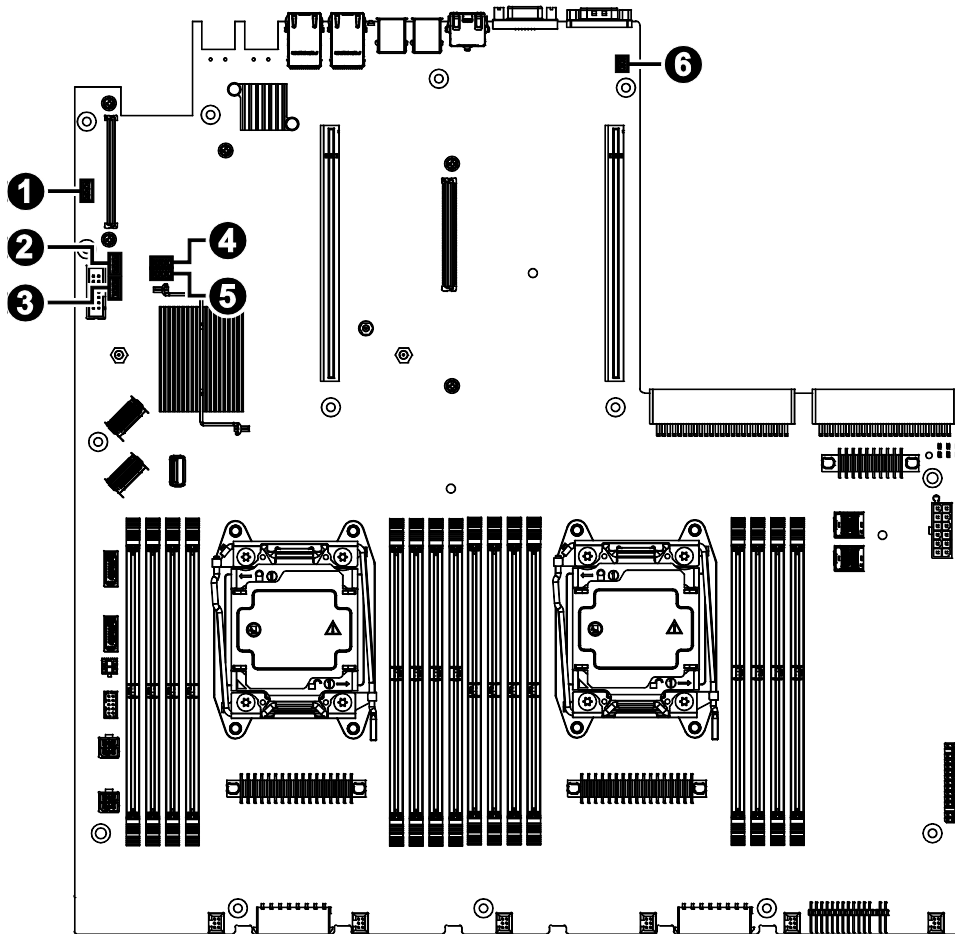


Table 23: BIOS jumper identification

Item	Description
1	ME flash override J4
2	BIOS recovery J18

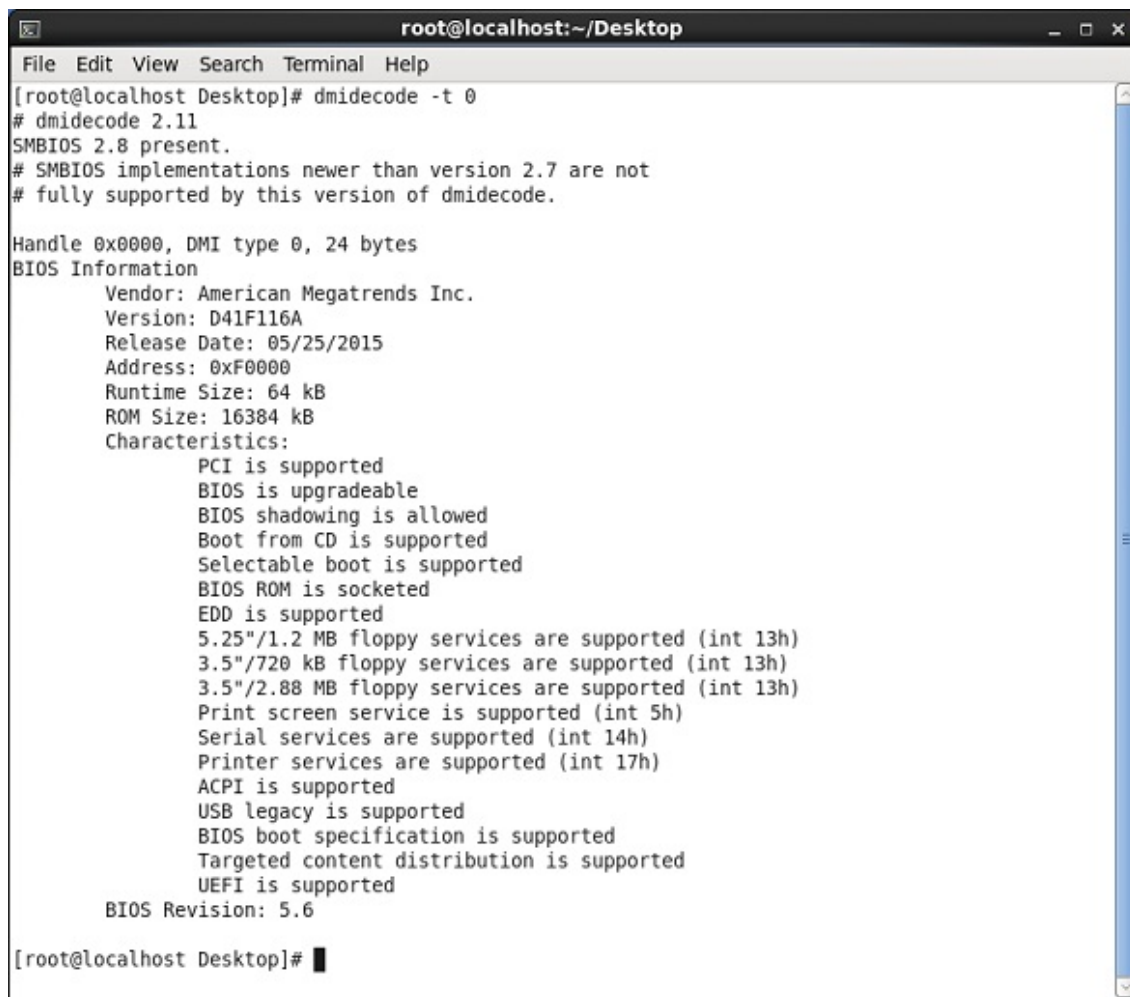
Item	Description
3	ME firmware update J19
4	Clear CMOS J15
5	Clear password J16
6	Intruder header JP1

5.3. Checking the FW Version

5.3.1. Checking the BIOS Version Using Linux

1. Log into Linux.
2. Open the terminal. Execute the `dmidecode -t 0` command to display the BIOS version, as shown in the following figure.

Figure 74: BIOS version using Linux



```

root@localhost:~/Desktop
File Edit View Search Terminal Help
[root@localhost Desktop]# dmidecode -t 0
# dmidecode 2.11
SMBIOS 2.8 present.
# SMBIOS implementations newer than version 2.7 are not
# fully supported by this version of dmidecode.

Handle 0x0000, DMI type 0, 24 bytes
BIOS Information
  Vendor: American Megatrends Inc.
  Version: D41F116A
  Release Date: 05/25/2015
  Address: 0xF0000
  Runtime Size: 64 kB
  ROM Size: 16384 kB
  Characteristics:
    PCI is supported
    BIOS is upgradeable
    BIOS shadowing is allowed
    Boot from CD is supported
    Selectable boot is supported
    BIOS ROM is socketed
    EDD is supported
    5.25"/1.2 MB floppy services are supported (int 13h)
    3.5"/720 kB floppy services are supported (int 13h)
    3.5"/2.88 MB floppy services are supported (int 13h)
    Print screen service is supported (int 5h)
    Serial services are supported (int 14h)
    Printer services are supported (int 17h)
    ACPI is supported
    USB legacy is supported
    BIOS boot specification is supported
    Targeted content distribution is supported
    UEFI is supported
  BIOS Revision: 5.6

[root@localhost Desktop]#

```

5.3.2. Checking the BIOS Version Using the BIOS Setup Utility

1. Log into the BIOS setup utility.
2. Use the arrow keys to select the **Main**, menu to display the BIOS version as shown in the following figure.

Figure 75: BIOS version using the BIOS setup utility



5.3.3. Checking the BMC Version Using Linux

1. Log into Linux.
2. Open the terminal. Execute the `ipmitool -I open mc info` command to display the BMC version as shown in the following figure.

Figure 76: BMC version using Linux

```

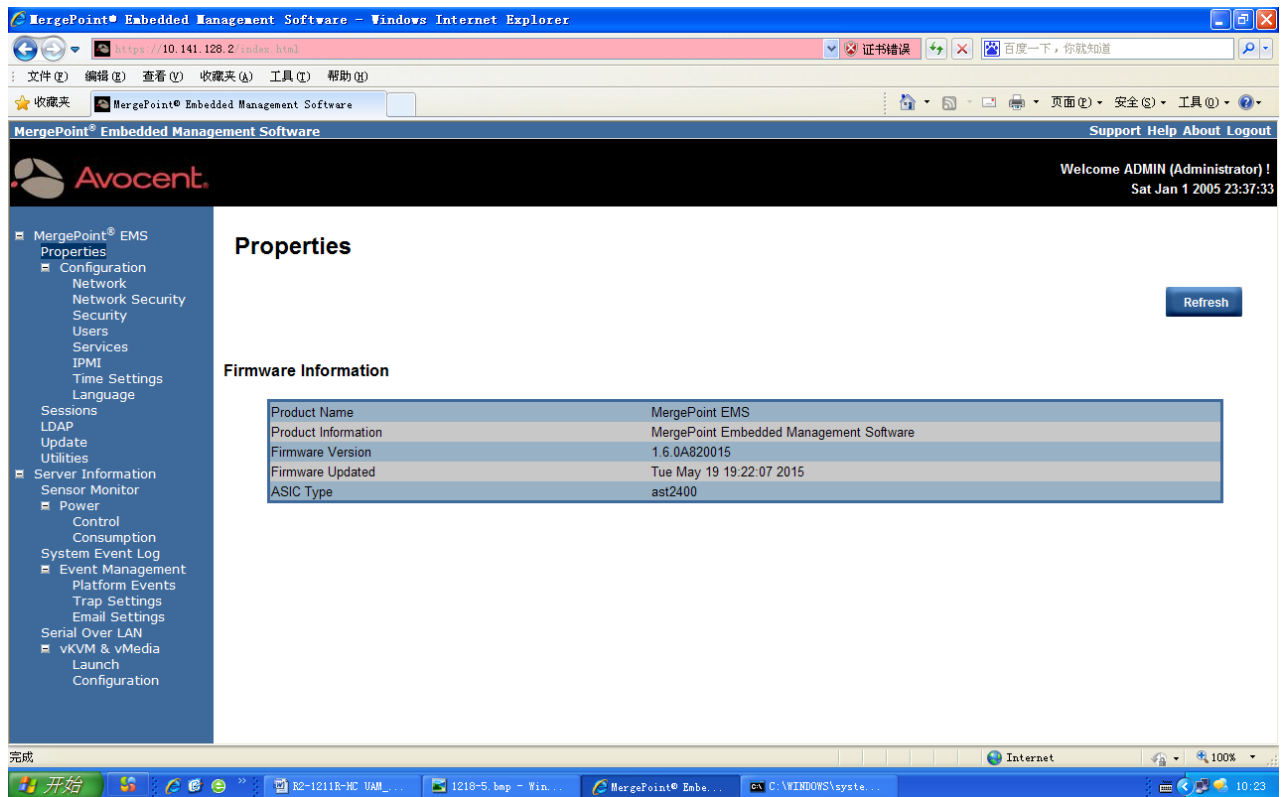
root@localhost:~
File Edit View Search Terminal Help
[root@localhost ~]# ipmitool -I open mc info
Device ID           : 32
Device Revision     : 1
Firmware Revision   : 1.5
IPMI Version        : 2.0
Manufacturer ID     : 0
Manufacturer Name   : Unknown
Product ID          : 0 (0x0000)
Product Name        : Unknown (0x0)
Device Available    : yes
Provides Device SDRs : no
Additional Device Support :
  Sensor Device
  SDR Repository Device
  SEL Device
  FRU Inventory Device
  IPMB Event Receiver
  Bridge
  Chassis Device
Aux Firmware Rev Info :
  0x0a
  0x82
  0x00
  0x15
[root@localhost ~]#

```

5.3.4. Checking the BMC Version Using the Web GUI

1. Log into the web GUI.
2. Click **Properties** to display the BMC version, as shown in the following figure.

Figure 77: BMC version using the Web GUI



5.4. Checking the Event Log

5.4.1. Checking the System Event Log Using Linux Remote Desktop

1. To check the system event log using Linux Log into Linux.
2. Open the terminal.
3. Execute the `ipmitool -I lanplus -H BMCIP -A admin -P admin sel list` command to check the system event log.

The system event log is shown in the following figure.

Figure 78: System event log using Linux remote desktop

```

Applications Places System
root@localhost:~/Desktop
File Edit View Search Terminal Help
[root@localhost Desktop]# service ipmi start
Starting ipmi drivers:
[root@localhost Desktop]# ipmitool -I lanplus -H 10.141.130.1 -U ADMIN -P ADMIN sel list
[ OK ]
1 | Pre-Init Time-stamp | Processor #0xc5 | Presence detected | Asserted
2 | Pre-Init Time-stamp | Memory #0x62 | Presence Detected | Asserted
3 | Pre-Init Time-stamp | System ACPI Power State #0xc1 | S0/G0: working | Asserted
4 | Pre-Init Time-stamp | Microcontroller/Coprocessor #0xc0 | Device Enabled
5 | Pre-Init Time-stamp | Power Supply #0x31 | Presence detected | Asserted
6 | Pre-Init Time-stamp | Power Unit #0x53 | Power off/down | Asserted
7 | Pre-Init Time-stamp | System ACPI Power State #0xc1 | S5/G2: soft-off | Asserted
8 | Pre-Init Time-stamp | Power Supply #0x66 | Power Supply AC lost | Asserted
9 | Pre-Init Time-stamp | Power Supply #0x31 | Power Supply AC lost | Asserted
a | Pre-Init Time-stamp | Power Supply #0x31 | AC out-of-range, but present | Asserted
b | Pre-Init Time-stamp | Power Supply #0x66 | Power Supply AC lost | Asserted
c | Pre-Init Time-stamp | Power Supply #0x66 | AC lost or out-of-range | Asserted
d | Pre-Init Time-stamp | Power Supply #0x66 | Power Supply AC lost | Asserted
e | Pre-Init Time-stamp | Power Supply #0x66 | AC lost or out-of-range | Asserted
f | Pre-Init Time-stamp | Power Supply #0x66 | Presence detected | Asserted
10 | Pre-Init Time-stamp | Power Supply #0x66 | Presence detected | Asserted
11 | Pre-Init Time-stamp | Power Supply #0x66 | Presence detected | Asserted
12 | Pre-Init Time-stamp | System Event | Timestamp Clock Sync | Asserted
13 | 01/01/2005 | 04:40:04 | System Event | Timestamp Clock Sync | Asserted
14 | 01/01/2005 | 04:40:08 | Processor #0xc5 | Presence detected | Asserted
15 | 01/01/2005 | 04:40:08 | Memory #0x62 | Presence Detected | Asserted
16 | 01/01/2005 | 04:40:12 | System ACPI Power State #0xc1 | S0/G0: working | Asserted
17 | 01/01/2005 | 04:40:12 | Microcontroller/Coprocessor #0xc0 | Device Enabled
18 | 01/01/2005 | 04:40:14 | Power Supply #0x31 | Presence detected | Asserted
19 | 01/01/2005 | 04:40:56 | System Event | Timestamp Clock Sync | Asserted
1a | 01/01/2005 | 04:40:56 | System Event | Timestamp Clock Sync | Asserted
1b | 01/01/2005 | 04:43:04 | System Event | Timestamp Clock Sync | Asserted
1c | 01/01/2005 | 04:43:05 | System Event | Timestamp Clock Sync | Asserted
1d | 01/01/2005 | 04:44:07 | System Event | Timestamp Clock Sync | Asserted
1e | 01/01/2005 | 04:44:08 | System Event | Timestamp Clock Sync | Asserted
1f | 01/01/2005 | 05:28:36 | Processor #0xc5 | Presence detected | Asserted
20 | 01/01/2005 | 05:28:36 | Memory #0x62 | Presence Detected | Asserted
21 | 01/01/2005 | 05:28:44 | System ACPI Power State #0xc1 | S0/G0: working | Asserted
22 | 01/01/2005 | 05:28:44 | Microcontroller/Coprocessor #0xc0 | Device Enabled
23 | 01/01/2005 | 05:28:45 | Power Supply #0x31 | Presence detected | Asserted
24 | 01/01/2005 | 05:43:11 | Power Supply #0x31 | Power Supply AC lost | Asserted
25 | 01/01/2005 | 05:43:11 | Power Supply #0x31 | AC out-of-range, but present | Asserted
26 | 01/01/2005 | 05:43:13 | Power Unit #0x53 | Power off/down | Asserted
27 | 01/01/2005 | 05:43:13 | System ACPI Power State #0xc1 | S5/G2: soft-off | Asserted
28 | 01/01/2005 | 05:28:16 | Power Supply #0x66 | Presence detected | Asserted
29 | 01/01/2005 | 05:28:17 | Power Supply #0x66 | Presence detected | Asserted
2a | 01/01/2005 | 05:28:21 | Power Supply #0x66 | Presence detected | Asserted
2b | 01/01/2005 | 05:28:22 | Power Supply #0x66 | Presence detected | Asserted
2c | 01/01/2005 | 05:28:22 | Power Supply #0x66 | Presence detected | Asserted
2d | 01/01/2005 | 05:28:28 | System Event | Timestamp Clock Sync | Asserted
2e | 01/01/2005 | 05:49:44 | System Event | Timestamp Clock Sync | Asserted
2f | 01/01/2005 | 05:49:48 | Processor #0xc5 | Presence detected | Asserted
30 | 01/01/2005 | 05:49:48 | Memory #0x62 | Presence Detected | Asserted
31 | 01/01/2005 | 05:49:51 | Power Unit #0x53 | AC lost | Asserted
32 | 01/01/2005 | 05:49:51 | System ACPI Power State #0xc1 | S0/G0: working | Asserted
33 | 01/01/2005 | 05:49:51 | Microcontroller/Coprocessor #0xc0 | Device Enabled

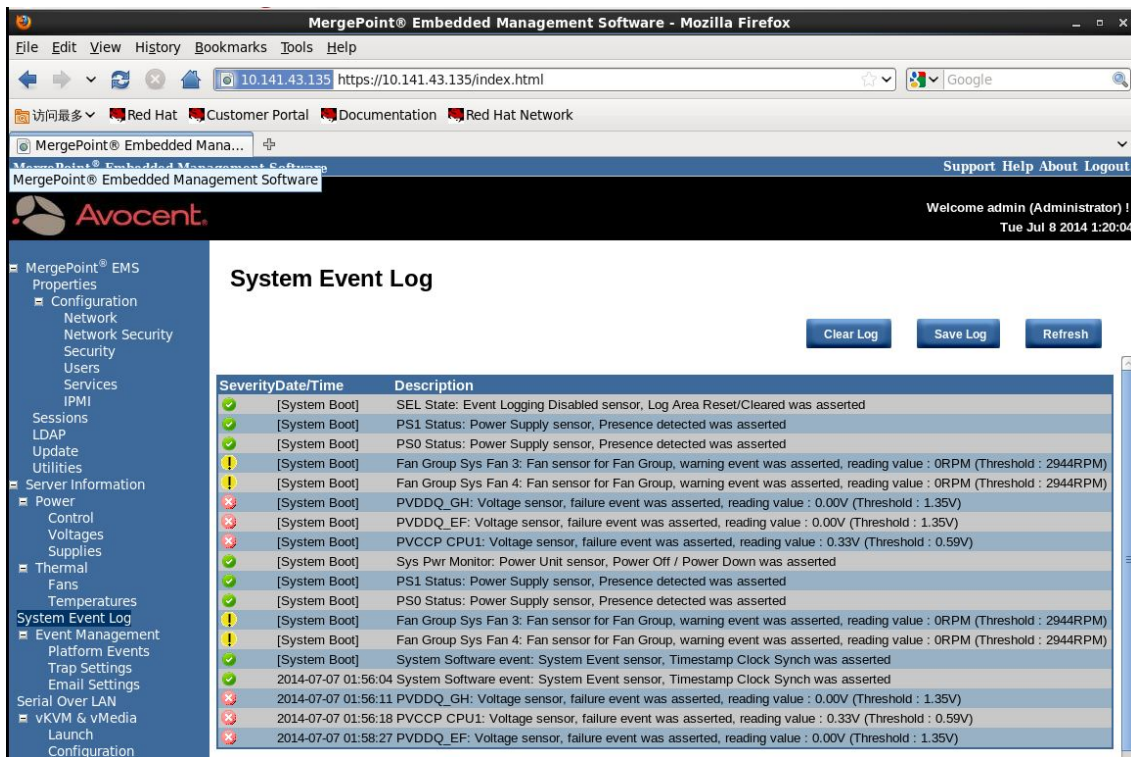
```

5.4.2. Checking the System Event Log Using the Web GUI

To check the system event log using the web user interface:

1. Log into the web GUI.
2. Click **System Event Log** to display the system event log, as shown in the following figure.

Figure 79: System event log using the web GUI



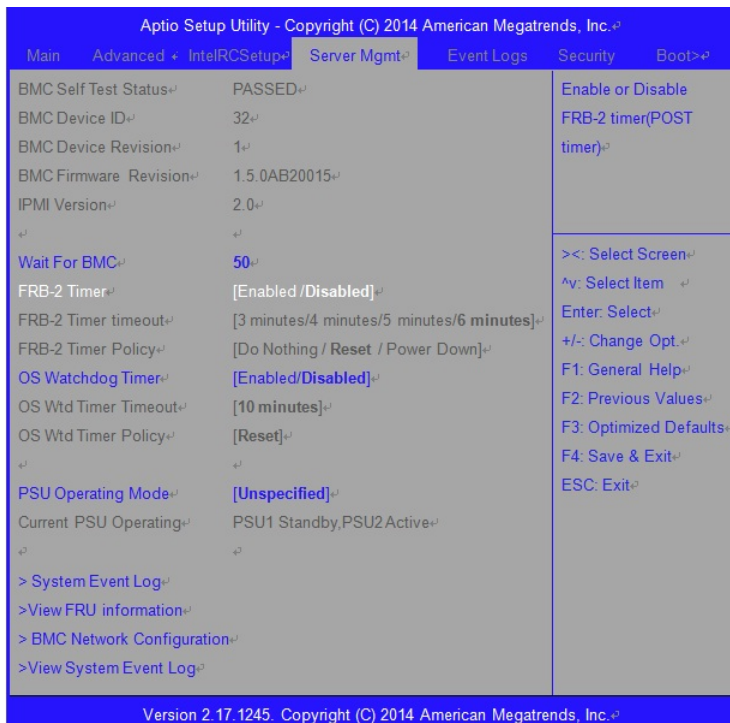
5.4.3. Checking the Event Log Using the BIOS Setup Utility

5.4.3.1. System Event Logs

To check the event log using the BIOS setup utility:

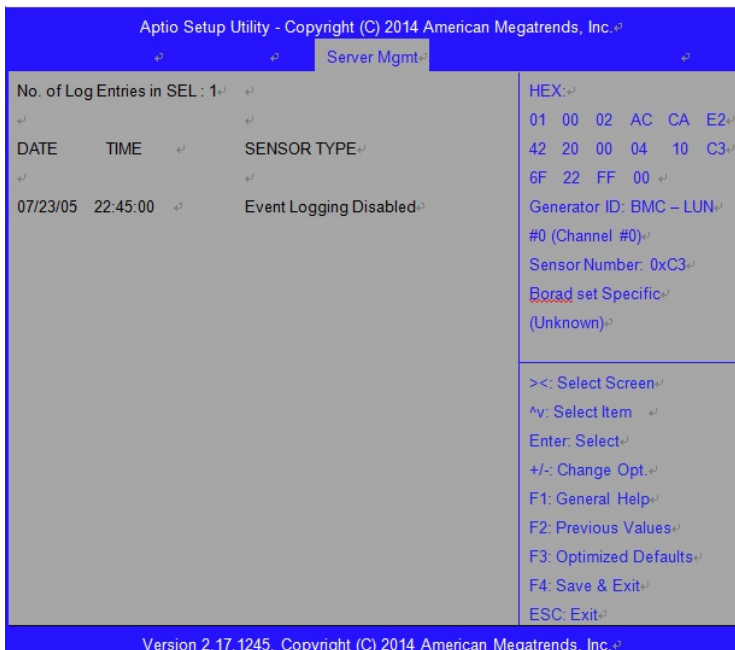
1. Enter the BIOS setup utility, and then select the **Server Mgmt** menu.

Figure 80: Server Mgmt menu



2. Use the arrow keys to select **System Event Log**, and then press **Enter**. The “System Event Log” displays.

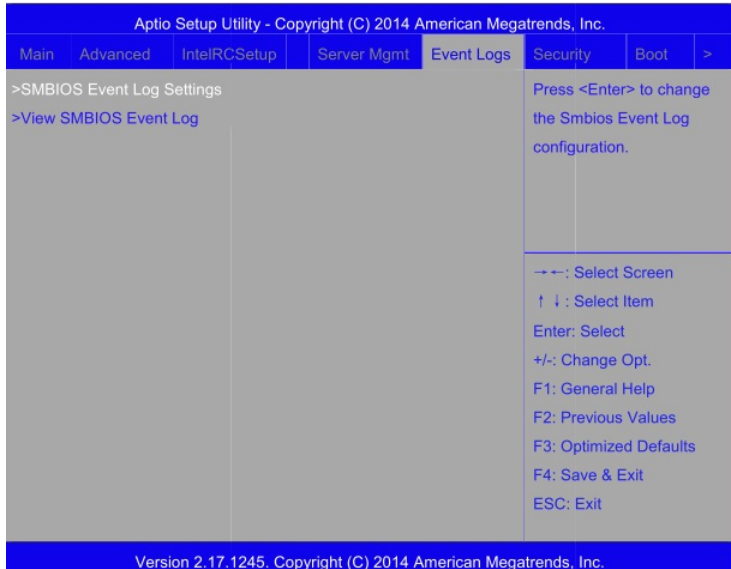
Figure 81: System event log using the BIOS setup utility



5.4.3.2. SMBIOS

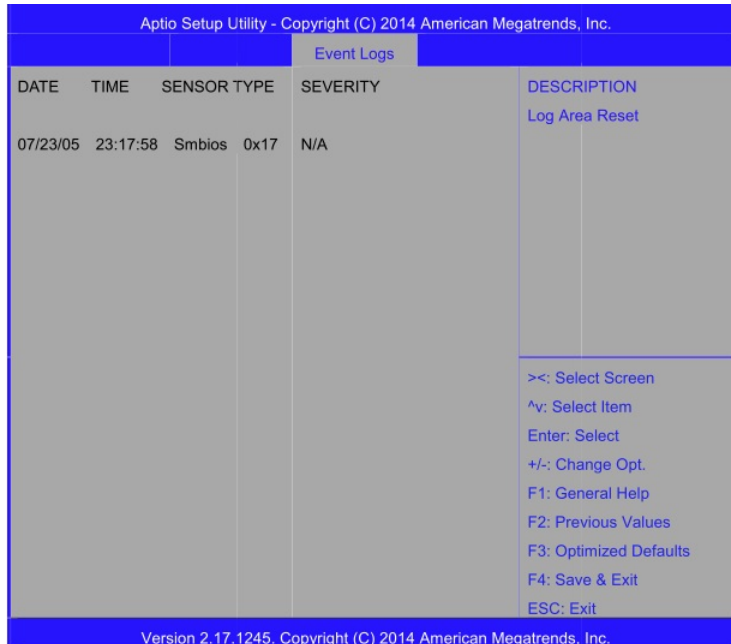
1. Enter the BIOS setup, and then select the **Event Logs** menu.

Figure 82: Event logs menu



2. Use the arrow keys to select **View SMBIOS Event Log**, and then press **Enter**. The “SMBIOS Event Log” displays.

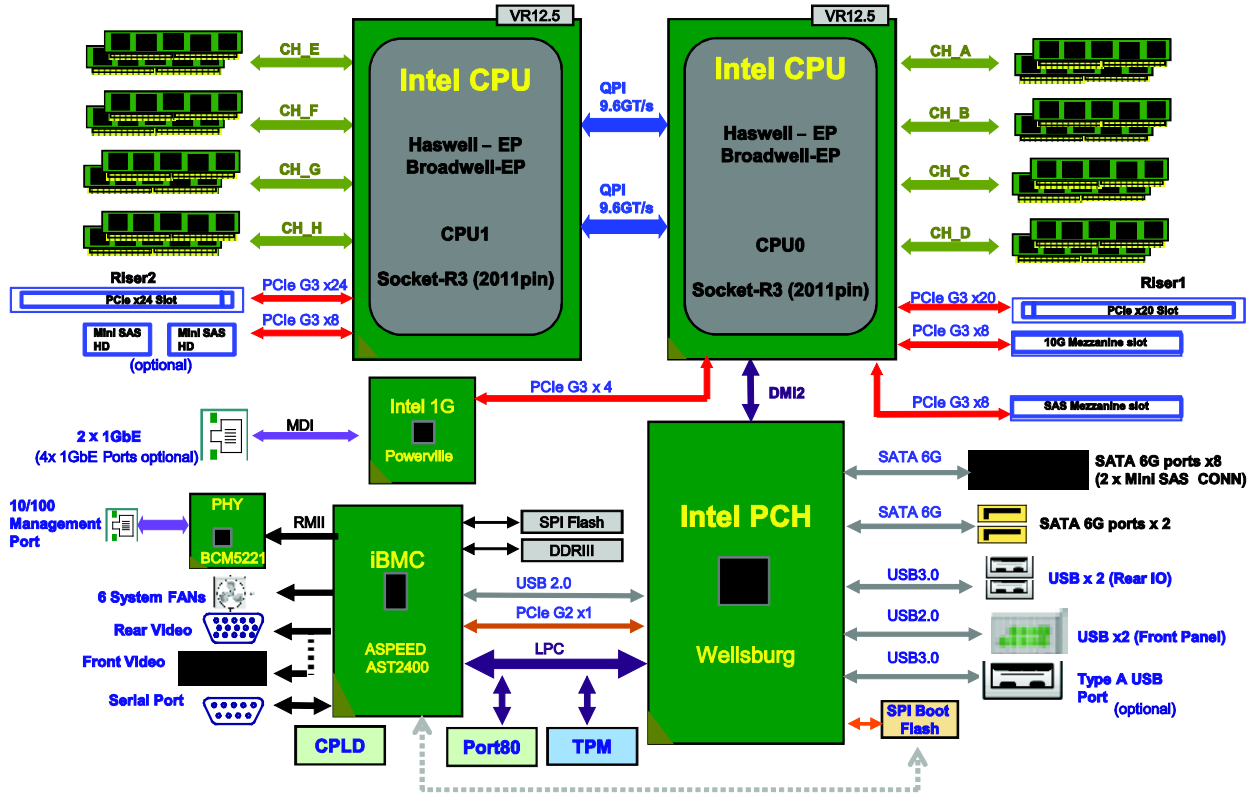
Figure 83: SMBIOS Event Log



6/ Diagrams

6.1. System Board Diagram

Figure 84: System board diagram



7/ Troubleshooting

7.1. Troubleshooting Preparation

7.1.1. Pre-Diagnostic

NOTICE

To avoid potential problems, ALWAYS read the warnings and cautionary information in the server documentation before removing, replacing, reseating or modifying system components.

Important: Refer to the server documentation for information on procedures, hardware options, software tools and operating systems supported by the server.

Follow the following pre-diagnostic steps before system troubleshooting process:

1. Review the important safety information.
2. Collect symptom information.
3. Prepare the server for troubleshooting.
4. Use the troubleshooting flowchart to begin the troubleshooting process.

7.1.2. Symptom Collection

Before troubleshooting a server problem, collect the following information:

- ▶ Does the server power on?
- ▶ Does the server complete POST?
 - If not, then what do the health LEDs indicate? Is video display available? If the server completes POST and video is available, are there any POST error messages?
 - Record the text of the POST error message as displayed.
- ▶ Does the server successfully boot an operating system or hypervisor? If not, does the server display any of the following symptoms?
 - ▶ An uncorrectable machine check exception
 - ▶ Stop error or blue screen (Windows)
 - ▶ Purple diagnostic screen (Linux)
 - ▶ Linux kernel panic
 - ▶ A system “hang”
 - ▶ A system “freeze”
- ▶ If the problem occurs after an OS is installed:
 - ▶ Does the problem occur when a new application is loading or a patch is applying?
 - ▶ What symptoms did the server display when the server malfunctioned? (for example, did it reboot, were there LED codes, health logs, messages on the screen, and so forth)
- ▶ Are any indications present that show that the malfunction was reported as a memory error, PCI error, or so forth? The processor now contains the memory controller and PCI Express controller, so faults in other areas may be attributed to a processor malfunction.

When did the problem occur?

Record exactly when the problem happens (include the date and time). If it happens more than once, keep a list of all symptoms for each occurrence.

- ▶ What events preceded the failure?
After which steps does the problem occur?
- ▶ What has been changed since the time the server was working?
- ▶ Did you recently add or remove hardware or software?
- ▶ How long has the server exhibited problem symptoms?
- ▶ If the problem occurs randomly, what is the duration or frequency?
- ▶ Observe the server LEDs and their statuses. See the LED Indicators for more information.

7.1.3. Prepare the Server for Diagnosis

1. Be sure that the server is in the proper operating environment with adequate power, air conditioning, and humidity control. For required environmental conditions, see the server documentation.
2. Record any error messages displayed by the system.
3. Remove all external peripherals such as the network cables, monitor, keyboard, and mouse.
4. Collect all tools and utilities necessary to troubleshoot the problem, such as a Torx screwdriver, loopback adapters, ESD wrist strap, and software utilities.
5. Determine if the server will troubleshoot offline or online.
6. To diagnose the server offline, power down the server and peripheral devices. If possible, always perform an orderly shutdown:
 - a. Exit any applications.
 - b. Exit the operating system.
 - c. Power down the server.
7. Disconnect any peripheral devices not required for testing (any devices not necessary to power up the server).

7.1.4. Performing Processor Procedures in the Troubleshooting Process

Before performing any troubleshooting steps that involve processors, review the following guidelines:

- ▶ Be sure that only authorized personnel perform the troubleshooting steps that involve installation, removal, or replacement of a processor.
- ▶ Always locate the documentation for your installed processor model before performing any steps that require installing, removing, or replacing a processor. If you cannot locate the hard copy of the instructions, locate the server user and maintenance guide on the following website: www.kontron.com.
- ▶ Never touch the contacts in the processor socket. THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED. If the contacts inside the processor socket are damaged, you must replace the system board.
- ▶ Some processor models require the use of a processor installation tool, and specific steps are documented to ensure that they do not damage the processor or processor socket on the system board. For server models that have pins inside the processor socket, remember that THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED. If the socket is damaged, you must replace the system board.
- ▶ Always complete all other troubleshooting procedures before removing or replacing a processor.

7.1.5. Breaking the Server down to the Minimum Hardware Configuration

During the troubleshooting process, it might be necessary to break down the server to the minimum hardware configuration. A minimum configuration consists of only the components needed to boot the server and successfully pass POST.

When requested to break the server down to the minimum configuration, uninstall the following components, if installed:

- ▶ All additional DIMMs
Leave only the minimum required to boot the server—either one DIMM or a pair of DIMMs.
- ▶ All additional cooling fans, if applicable
- ▶ All additional power supplies, if applicable (leave one installed)
- ▶ All hard drives
- ▶ All optional mezzanine cards
- ▶ All expansion boards

Before removing the components, be sure to determine the minimum configuration for each component and follow all guidelines in the server user and maintenance guide.

Always use the recommended minimum configuration above before removing any processors. If you are unable to isolate the issue with the configuration above, you will then remove all but one of the processors.

NOTICE

Before removing or replacing any processors, be sure to follow the guidelines provided in removing and installing processors steps.

Failure to follow the recommended guidelines can cause damage to the system board, requiring replacement of the system board.

8/ Diagnostic Flowcharts

8.1. Troubleshooting Flowcharts

To effectively troubleshoot a problem, Kontron recommends that you start with the first flowchart in this section, “Start diagnosis flowchart (see Section 8.1.1)” and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in “General Diagnosis Flowchart (see Section 8.1.3)”.

The General diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

The available flowcharts include:

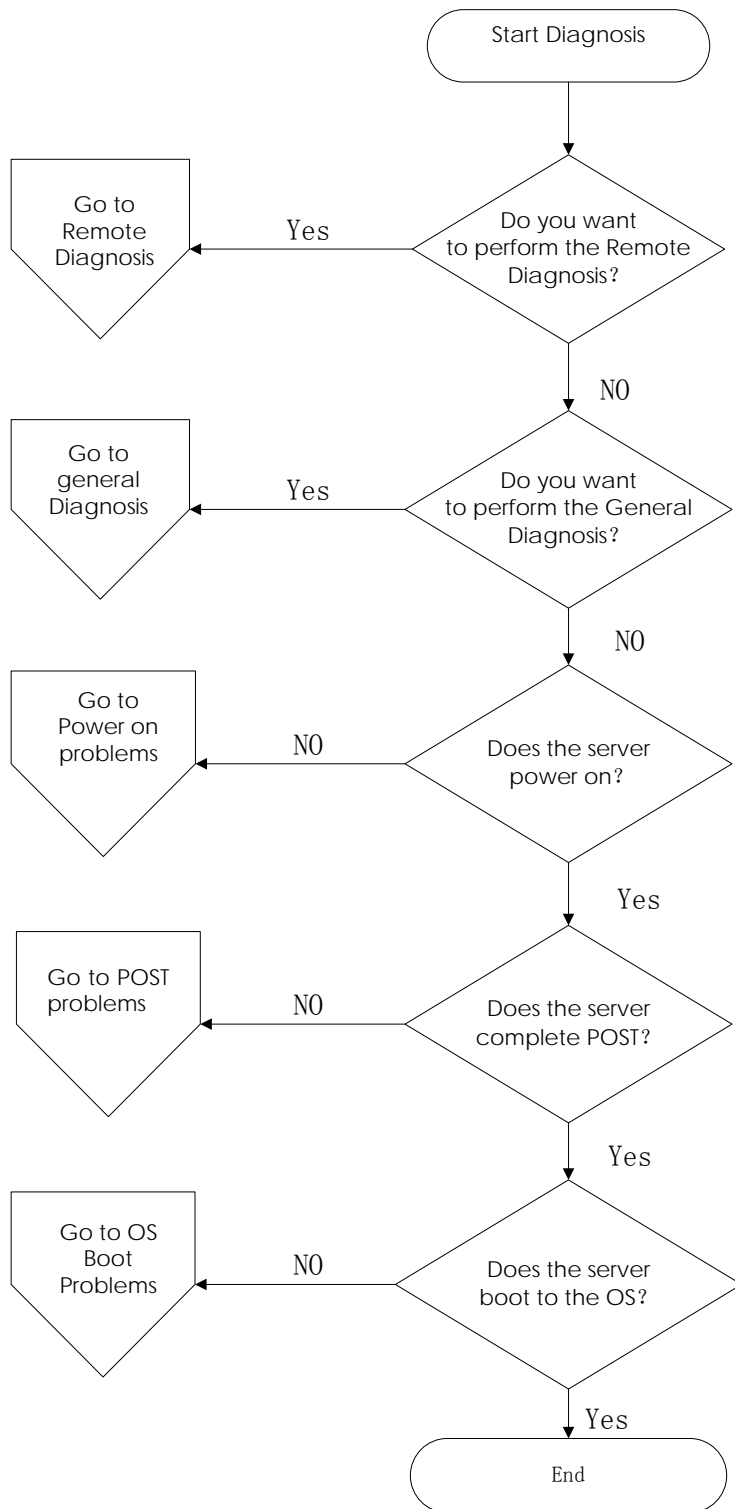
- ▶ Start Diagnosis Flowchart
- ▶ Remote Diagnosis Flowchart
- ▶ General Diagnosis Flowchart
- ▶ Power-On Problems Flowchart
- ▶ POST Problems Flowchart
- ▶ Operating System Boot Problems Flowchart

Some information provided in the flowcharts can be further explained in other sections of this document.

8.1.1. Start Diagnosis Flowchart

Use the following flowchart to start the diagnostic process.

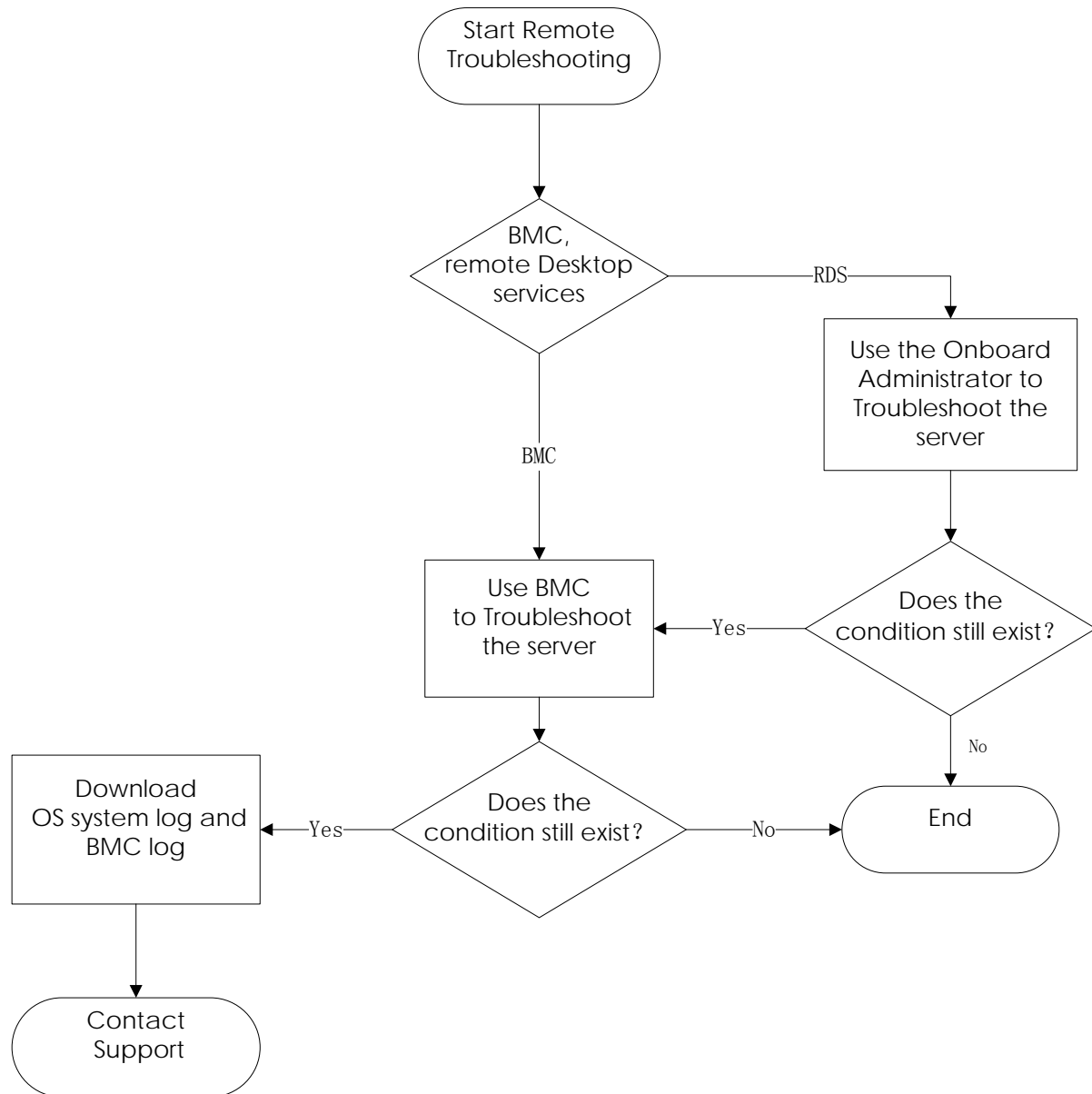
Figure 85: Start diagnosis flowchart



8.1.2. Remote Diagnosis Flowchart

The Remote diagnosis flowchart provides a generic approach to troubleshoot a server from a remote location.

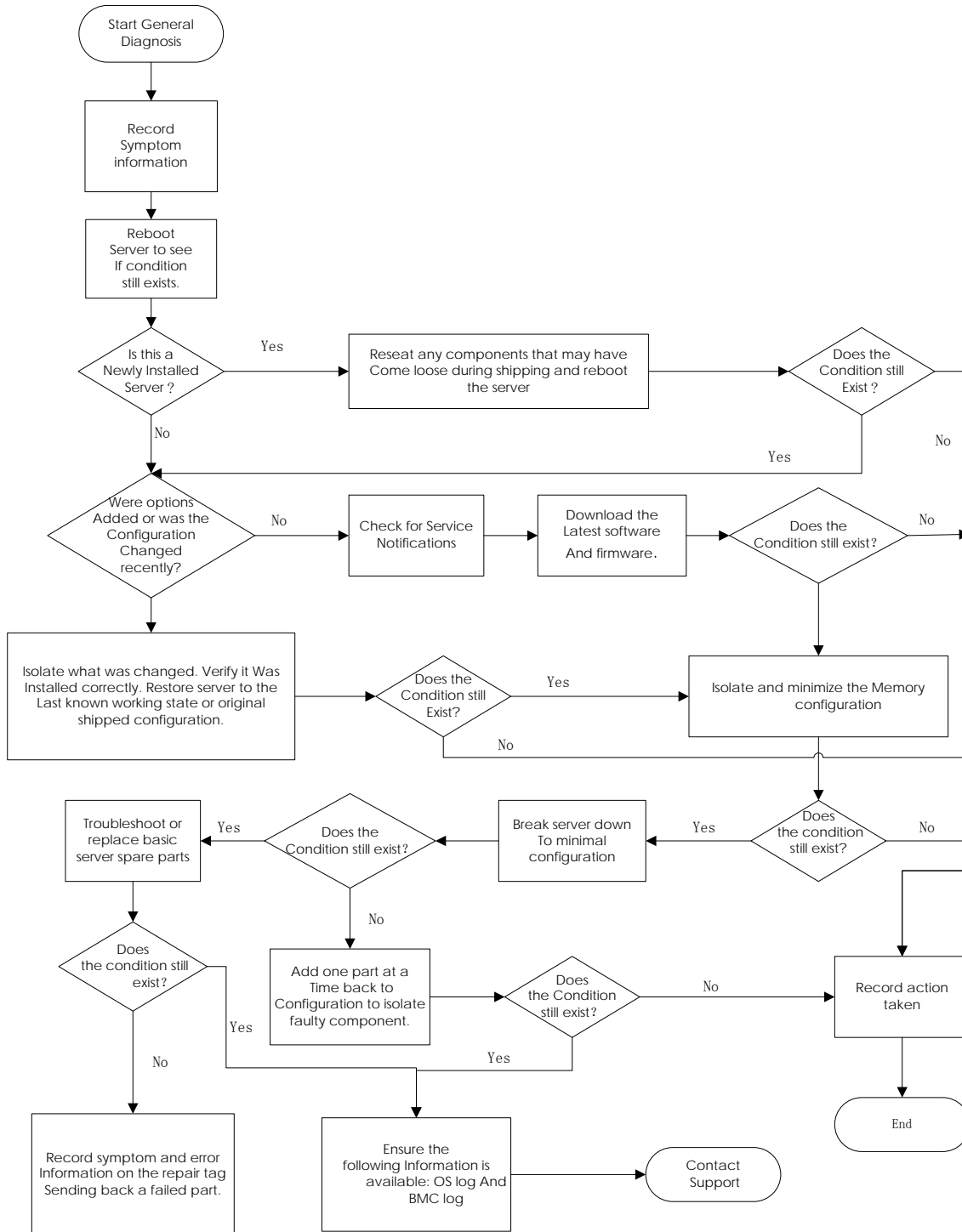
Figure 86: Remote diagnosis flowchart



8.1.3. General Diagnosis Flowchart

The General diagnosis flowchart provides a generic approach to troubleshooting. If you are unsure of the problem, or if the other flowcharts do not fix the problem, use the following flowchart.

Figure 87: General diagnosis flowchart



8.1.4. Power-On Problems Flowchart

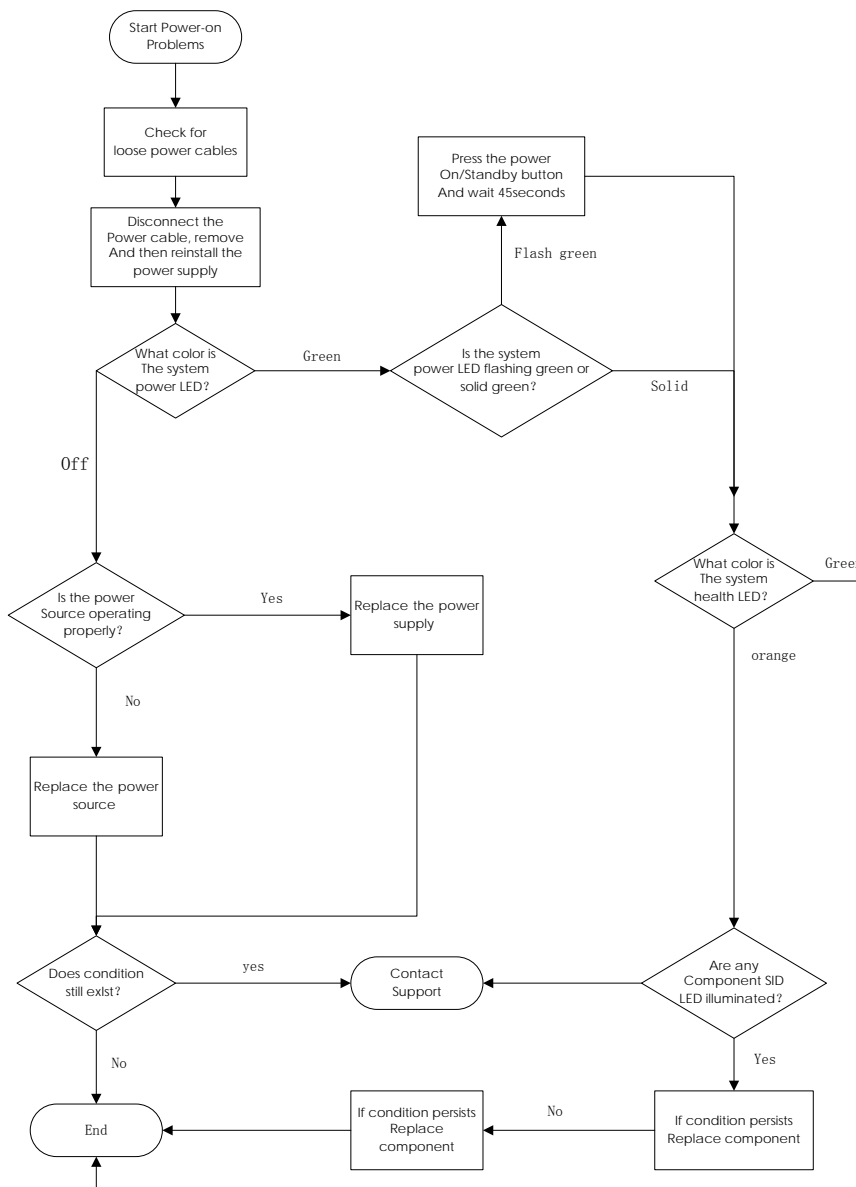
Symptoms:

- ▶ The server does not power on.
- ▶ The system power LED is off or flashing.
- ▶ The health LED is solid orange.

Possible causes:

- ▶ Improperly seated faulty power supply
- ▶ Loose or faulty power cord
- ▶ Power source problem
- ▶ Improperly seated component or interlock problem

Figure 88: Power-on problems flowchart

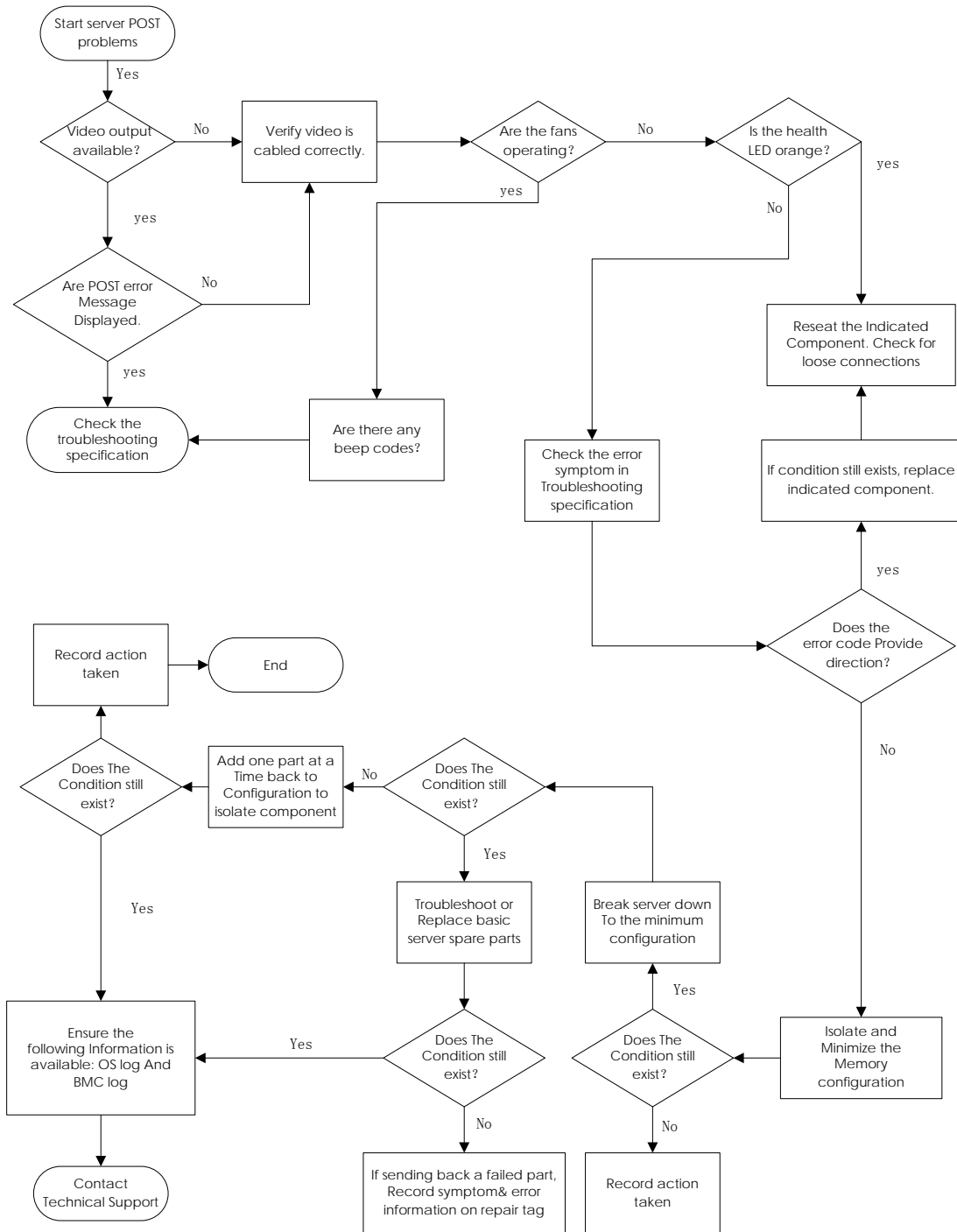


8.1.5. POST Problems Flowchart

Symptoms:

- ▶ Server does not complete POST
- ▶ Server completes POST with errors

Figure 89: POST problems flowchart

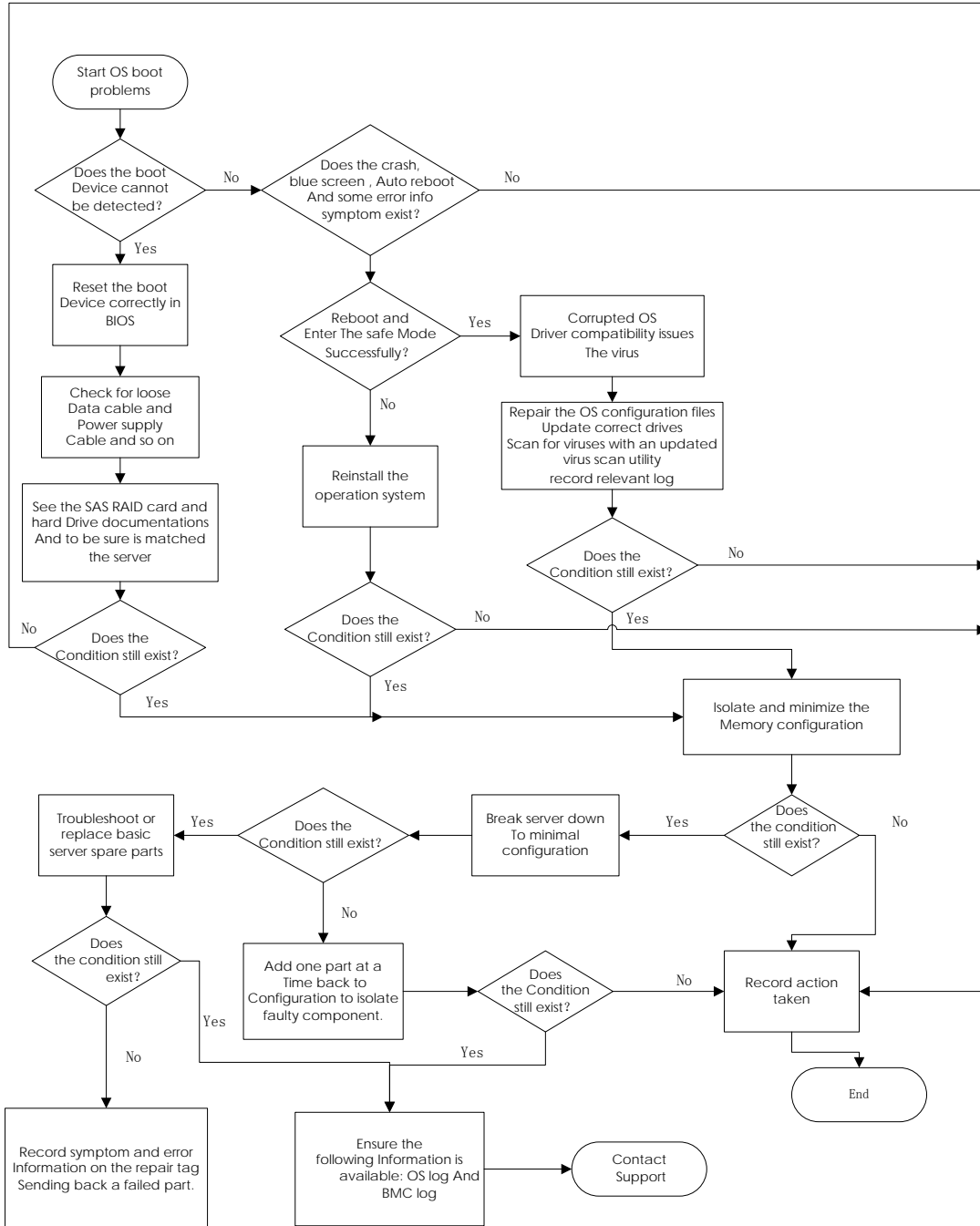


8.1.6. Operating System Boot Problems Flowchart

Possible Causes:

- ▶ Corrupted OS
- ▶ Hard drive subsystem problem
- ▶ Incorrect boot order setting in the BIOS
- ▶ Hardware problem

Figure 90: Operating system boot problems flowchart



8.2. Troubleshooting General Problems

8.2.1. Resolving Common Problems

8.2.1.1. Common Problem Guideline

1. System cannot power on

- ▶ Be sure that all power and I/O cords are securely connected
- ▶ Verify that the system board is powered up
- ▶ Configure the server with the minimum components (one CPU, the least amount of memory, and connect only the display monitor and keyboard). Connect directly to the system board jumper to determine if the server now starts normally
- ▶ Check the power. Remove all of the power cables. Connect the green cable and the black cable on the PSU power to check the result
- ▶ If problems continue to occur, remove and reinstall each device, checking the connectors and sockets for bent pins or other damage

2. System frequently reboots

There are generally three factors that might cause the system to reboot:

- ▶ Breakdown of power
Supply power to the server from an available power source.
- ▶ Problems with memory
Check the event log or memory configuration from the BIOS to determine if there is a problem with the memory which requires replacing the memory. Check the display to determine if the memory error was detected during POST. If the event log shows that a memory error caused the memory problem, re-seat all of the memory by removing and re-installing all of the memory modules. If reseating the memory modules does not resolve the memory/reboot problem, replace the memory.
- ▶ Problems with the software
Update the software or re-install the system.

3. System stopped issue

Track the reasons the system stopped from the software and hardware, respectively.

- ▶ Software tracking: Check the system event log to identify and locate the problem.
- ▶ Hardware tracking: The power supply is not sufficient; HDD/SSD has some problem (scan the surface of them to check). Add-on cards might also cause the system to halt (for example, SCSI/RAID cards or other PCI facilities).

Pay attention to any possible reasons any of the hardware components might have caused the system to stop, even if the problem has been resolved. Observe the server to confirm that the system stop issue has whether it has been thoroughly resolved.

4. Failure to recognize the HDD during system installation

- ▶ Determine if the HDDs were installed in the HDD carriers
- ▶ Determine if the SAS/SATA cables are correctly connected
- ▶ Check the HDD LED indicators to determine if the drives are receiving power
- ▶ Determine if the storage controller driver is properly installed or the driver is not compatible with the HDD.
- ▶ Determine if the driver is compatible with the HDD

8.2.1.2. Handling and Installing the CPU

NOTICE

Failure to properly handle the CPU can cause damage to CPU components and the system board connector. It can also cause the system to collapse.

When handling a CPU, observe the following guidelines:

- ▶ Before installing the CPU, determine if the CPU has bent pins
- ▶ Be careful not to touch the CPU pins
- ▶ When installing the CPU, remember to place the side with triangle point onto the triangle on the board
- ▶ Correctly installing the CPU is not enough. You must also consider the heat radiation; if the CPU temperature is too high, it might affect the system performance. The heat sink is used for the CPU heat radiation. When you install heat sink, observe the following guidelines:

When you install the heat sink:

- ▶ Align the heat sink so the sticker label faces the memory module
- ▶ Secure the heat sink with the screw

8.2.1.3. DIMM Handling and Installation Guidelines

NOTICE

Failure to properly handle DIMMs can cause damage to DIMM components and the system board connector.

DIMM population order and configuration is critical in maximizing performance for the system.

When handling a DIMM, observe the following guidelines:

- ▶ Avoid electrostatic discharge.
- ▶ Always hold DIMMs by the side edges only.
- ▶ Avoid touching the connectors on the bottom of the DIMM.
- ▶ Never wrap your fingers around a DIMM.
- ▶ Avoid touching the components on the sides of the DIMM.
- ▶ Never bend or flex the DIMM.

When installing a DIMM, observe the following guidelines:

- ▶ Before seating the DIMM, open the DIMM slot and align the DIMM with the slot. Some servers require the use of a DIMM tool to open the slots.
- ▶ To align and seat the DIMM, use two fingers to hold the DIMM along the side edges.
- ▶ To seat the DIMM, use two fingers to apply gentle pressure along the top of the DIMM.

8.2.1.4. SAS/SATA and SSD Drive Guidelines

When adding drives to the server, observe the following general guidelines:

- ▶ Drives must be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.
- ▶ Drives in the same logical volume must be of the same type.

8.3. Hardware Problem Troubleshooting

8.3.1. Power Problems

8.3.1.1. Power Source Problems

1. Press the Power On/Standby button to be sure it is on. If the server has a Power On/Standby button that returns to its original position after being pressed, be sure you press the switch firmly.
2. Plug another device into the grounded power outlet to be sure the outlet works. Also, be sure the power source meets applicable standards.
3. Replace the power cord with a known functional power cord to be sure it is not faulty.
4. Replace the power strip with a known functional power strip to be sure it is not faulty.
5. Have a qualified electrician check the line voltage to be sure it meets the required specifications.
6. If Enclosure Dynamic Power Capping or Enclosure Power Limit is enabled on supported servers, be sure there is sufficient power allocation to support the server.
7. Be sure no loose connections exist.

8.3.1.2. Power Supply Problems

1. Be sure no loose connections exist.
2. If the power supplies have LEDs, be sure they indicate that each power supply is working properly. If the LEDs indicate a problem with a power supply, then check the power source. If the power source is working properly, then replace the power supply.

If the 6.7Hz green LED is flashing it could mean any of the following:

- ▶ AC power unavailable
- ▶ Power supply failed

8.3.2. General Hardware Problems

8.3.2.1. Problems with New Hardware

1. Be sure the hardware being installed is compatible with the server.
2. Be sure the new hardware is installed properly. To be sure that all requirements are met, see the device, server, and OS documentation. Common problems include:
 - ▶ Connection of the data cable, but not the power cable, of a new device
 - ▶ Loose connections exist
3. Be sure no memory, I/O or interrupt conflicts exist.
4. Be sure all cables are connected to the correct locations.
5. Be sure other components were not accidentally unseated during the installation of the new hardware component.
6. Be sure all necessary software updates, such as device drivers, ROM updates, and patches, are installed and current, and is the latest version.
7. Be sure all boards are properly installed in the server.
8. Boot to the BIOS to determine if the utility is configured.
9. Replace another different known functional device to plug into the location to be sure that the server is not faulty.

10. Replace another same model device.

8.3.2.2. Unknown Problem

1. Check the server LEDs to see if any statuses indicate the source of the problem.
2. Power down and disconnect power to the server. Remove all power sources to the server.
3. Be sure no loose connections exist.
4. Add the debug card before reconnecting power.
5. Reconnect power, and then power on the system.
6. See the number shown on the debug card. If there is an error on the debug card indicating that the server will stop, see the BIOS specifications (standard status codes) to determine where the process stopped. For example, if the number on the debug card points to memory, re-seat the memory. If reseating the memory does not resolve problem, consider using a different memory module to verify it is a memory problem.

8.3.2.3. Third-party Device Problems

1. See the device documentation to be sure the device is properly installed.
2. If the device is the only device on a bus, be sure the bus works by installing a different device on the bus.
3. Be sure the latest device drivers are installed.
4. Uninstall the device. If the server functions without the removed device, the problem might exist with the device rather than the server. Either the server does not support the device, or a conflict exists with another device.
5. Remove other device. If the server functions properly, a conflict exists with another device. If the device still does not function properly, see the server and operating system documentation to be sure that the server and operating system support the device.

8.3.3. Internal System Problems

8.3.3.1. CD-ROM and DVD Drive Problems

1. System does not boot from the drive
 - ▶ Be sure no loose connections exist.
 - ▶ Be sure the media from which you are attempting to boot is not damaged and is a bootable CD.
 - ▶ Be sure legacy support for a USB CD-ROM driver is enabled in the BIOS and be sure that the drive boot option in the BIOS is set up so that the server boots from the CD-ROM drive first.
 - ▶ If the data read from the driver is inconsistent, or if the drive cannot read the data, be sure that the inserted CD or DVD format is valid for the drive. For example, be sure not to insert a DVD into a drive that only supports CDs.
2. Drive is not detected
 - ▶ Be sure no loose connections exist.
 - ▶ See the drive documentation to be sure cables are connected as required.
 - ▶ Be sure the cables are working properly. Replace with known functional cables to test whether the original cables were faulty.
 - ▶ Be sure the USB port functions normally with a USB CD-ROM drive.
 - ▶ Be sure legacy support for a USB is set enabled in the BIOS.

8.3.3.2. Drive Problems (Hard Drives and Solid State Drives)

1. Drives are not recognized

- ▶ See the hard drive and server documentation to be sure the hard drive is compatible with the server.
- ▶ See the SAS RAID card documentation to be sure the RAID card is compatible with the server.
- ▶ Be sure no power problems exist.
- ▶ Be sure no loose connections exist.
- ▶ Be sure the driver or backplane is connected properly.
- ▶ Be sure legacy support for SAS is set up correctly.
- ▶ Connect only one hard drive directly from the SATA port to determine if the server is causing the problem.
- ▶ Boot to the BIOS RU tool to determine if the SAS controller can be detected.
- ▶ Connect only one hard drive directly from the SAS port using a SAS-SATA cable to determine if the problem is with the SAS cable.
- ▶ Replace the current SAS cable with another correctly functioning SAS cable to determine if the problem is with the SAS cable.
- ▶ Be sure the RAID card controller is correct and supports the hard drive.
- ▶ Replace the current SAS RAID card with a correctly functioning SAS RAID card.
- ▶ Be sure the SAS backplane board driver is the latest driver
- ▶ Replace the current backplane board with a correctly functioning backplane board

2. Data is inaccessible

Action:

- ▶ Be sure the files are not corrupt. Run the repair utility for the operating system.
- ▶ Be sure no viruses exist on the server. Run a current version of a virus scan utility.
- ▶ Be sure the TPM is enabled in BIOS.
- ▶ Be sure the firewall setting is correct.
- ▶ When migrating encrypted data to a new server, be sure to follow the recovery procedures.

8.3.3.3. USB Drive Key Problems

System does not boot from the drive:

- ▶ Be sure that USB is enabled in the BIOS
- ▶ Be sure the drive boot order in the BIOS is set so that the server boots from the USB drive key
- ▶ Reseat the USB drive key

8.3.3.4. Fan Problems

Fan speed too fast:

- ▶ Be sure the fans are properly seated and working:
 - a. Determine if the fan cables are corresponded to the slots.
 - b. Determine if the fan cables are correctly plugged into the slot pins.
- ▶ Be sure no ventilation problems exist.
- ▶ Be sure the BMC firmware is the latest.

- ▶ Reseat the fan cables and restart the server.

8.3.3.5. Memory Problems

1. Server fails to recognize existing memory:

- ▶ Be sure the server supports the memory modules.
- ▶ Be sure the memory modules are correctly installed in a supported configuration.
- ▶ Be sure the memory modules are properly seated.
- ▶ Reseat the memory.
- ▶ Use a known working memory module to test each slot to determine there is a problem with the slot.
- ▶ Test each bank of DIMMs by removing all other DIMMs. Then, isolate the failed DIMM by switching each DIMM in a bank with a known working DIMM.

2. Server fails to recognize new memory:

- ▶ Be sure the server supports the new memory modules.
- ▶ Be sure the new memory is the correct type for the server and is installed correctly.
- ▶ Be sure no conflicts are occurring with existing memory.
- ▶ Use a known working memory module to test each slot to determine if there is a problem with the slot.
- ▶ Reseat the new memory.

3. Invalid memory configuration:

- ▶ DIMMs are installed when no corresponding processor is detected.
Description: A processor must be installed to use memory.
Action: Populate the processor socket or remove the DIMM.
- ▶ DIMM size parameters not supported:
Possible cause: The installed memory module is an unsupported size.
Action: Install a memory module of a supported size.
- ▶ Incomplete bank detected in bank X
Possible cause: The bank is missing one or more DIMMs.
Action: Fully populate the memory bank.
- ▶ Mismatched DIMMs within DIMM Bank
Possible cause: The installed DIMMs in the same bank are of different sizes.
Action: Install correctly matched DIMMs.
- ▶ Unsupported DIMM in Socket X
Possible cause: Unregistered DIMMs or insufficient DIMM timings.
Action: Install registered ECC DIMMs.

4. Memory configuration warning

The DIMM in socket X does not have a primary width of 4 and only supports standard ECC. Advanced ECC does not function when mixing DIMMs with primary widths of x4 and x8.

Possible cause: The installed DIMMs have a primary width of x8.

Action: Install DIMMs that have a primary width of x4 if advanced ECC memory support is required.

5. DIMM initialization error

Receive enable error. Cannot train memory.

Possible cause: The system receives a receive enable error during memory training.

Action: Contact Kontron's support.

6. DIMM configuration error

- ▶ Quad Rank DIMMs must be installed in the first socket of any memory channel in which they are populated.
System stopped

Possible cause: Quad rank DIMMs are installed after SR or DR DIMMs.

Action: Be sure that quad rank DIMMs are installed in the first socket of any memory channel.

- ▶ UDIMMs and RDIMMs are installed in the system. The system cannot have both types of DIMMs installed.
System stopped

Possible cause: A DIMM configuration error exists with mismatched DIMMs.

Action: Be sure all DIMMs are of the same type.

7. Invalid Lockstep memory configuration

Possible cause: The memory is not installed properly to support Lockstep mode.

Action: Install or reinstall DIMMs to support mirrored mode.

8. Mirror memory configuration

- ▶ Memory sizes on boards X and Y do not match

Possible cause: The overall size of two boards that are participating in a mirrored configuration does not match.

Action: Install or reinstall the DIMMs to support mirrored mode.

9. Non-numeric messages or beeps only

- ▶ Advanced memory protection mode: Advanced ECC

Possible cause: Advanced ECC support is enabled.

Action: None.

- ▶ Advanced memory protection mode: Advanced ECC with hot-add support

Possible cause: Advanced ECC with hot-add support is enabled.

Action: None

8.3.3.6. Processor Problems

- ▶ Be sure that the server supports each processor and that each processor is correctly installed.
- ▶ Only supported processors should be installed. Specific steps are required for the installation of processors.
- ▶ Be sure that the socket pins on each processor are intact
- ▶ Replace the processor with another processor that is known to be properly functioning.

8.3.3.7. Network Connection Problems

1. Network not working

- ▶ Be sure that no loose connections exist between the LAN port and the system board.
- ▶ Be sure no loose connections exist between the LAN port and the LAN cable.
- ▶ Determine if the software is causing the problem
- ▶ Replace the LAN cable with a LAN cable that is known to be functioning properly

- ▶ Use the latest LAN card driver when installing the OS, and be sure the server and the OS support the controller.
- ▶ Be sure a valid IP address is assigned to the controller and that the configuration settings are correct.
- ▶ Restart the server to determine if the network starts working.

2. Network stops working

- ▶ Be sure no loose connections exist.
- ▶ Be sure the correct network driver is installed for the controller and that the driver file is not corrupt. Reinstall the driver.
- ▶ Test the network cable to verify that it is functioning properly by replacing it with a cable that is known to be properly functioning.
- ▶ Be sure the network controller is not damaged.
- ▶ Reinstall the network driver.
- ▶ Restart the server to determine if the network starts working

3. Network stops working when an adding an external board

Action:

- ▶ Be sure no loose connections exist.
- ▶ Be sure the server and OS support the external board.
- ▶ Be sure the new external board does not change the server configuration
- ▶ Be sure the correct driver is installed for the network controller.
- ▶ Reinstall the network driver.
- ▶ Restart the server to determine if the network starts working.

8.3.4. External Device Problems

8.3.4.1. Mouse and Keyboard Problems

- ▶ Be sure no loose connections exist.
- ▶ Be sure the keyboard or and mouse is connected to the correct ports.
- ▶ Be sure the keyboard or mouse is clean.
- ▶ Be sure legacy support for USB is enabled in the BIOS.
- ▶ Replace the device with a known working equivalent device (another similar mouse or keyboard).
- ▶ Restart the system and determine if the input device functions correctly after the server restarts.

8.3.4.2. Cable Problems

Unwarranted driver failures while using an older mini SAS cable. If using an older cable that is near the life expectancy, replace the Mini SAS cable.

8.4. Software Problem Troubleshooting

The best sources of information for software problems are the operating system and application software documentation, which might also point to fault detection tools that report errors and preserve the system configuration. Other useful resources include the drivers matched with the operating system.

Use either utility to gather critical system hardware and software information and to help with the problem diagnosis.

8.4.1. Operating System Problems and Resolutions

8.4.1.1. Operating System Problems

1. Acting system locks up
 - ▶ Scan for viruses with an updated virus scan utility.
 - ▶ Review the system event log.
 - ▶ Review the BIOS log.
 - ▶ Gather the BMC SEL information for review, if needed.
2. Errors are displayed in the error log

Follow the information provided in the error log, and then see the operating system documentation.
3. Problems occur after the installation of a service pack

Follow the instructions for updating the operating system.

8.4.1.2. Operating System Updates

Use care when applying operating system updates (Service Packs, drivers, and patches). Before updating the operating system, read the release notes for each update. If you do not require specific fixes from the update, Kontron recommends that you do **not** apply the updates.

If you decide to apply an operating system update:

1. Perform a full system backup.
2. Apply the operating system update, using the instructions provided.
3. Install the current drivers.

If you apply the update and have problems, please contact with FXN FAE.

8.4.1.3. Restoring to a Backed-Up Version

If you recently upgraded the operating system or software and cannot resolve the problem, you can try restoring a previously saved version of the system. Before restoring the backup, make a backup of the current system. If restoring the previous system does not correct the problem, you can restore the current set to be sure you do not lose additional functionality.

See the documentation provided with the backup software.

8.4.1.4. When to Reconfigure or Reload Software

If all other options have not resolved the problem, consider reconfiguring the system. Before this step, do the following:

1. Weigh the projected downtime of a software reload against the time spent troubleshooting intermittent problems. It might be advantageous to start over by removing and reinstalling the problem software.
2. Be sure the server has adequate resources (processor speed, hard drive space, and memory) for the software.
3. Be sure the server ROM is current and the configuration is correct.
4. Be sure you have printed records of all troubleshooting information you have collected to this point.
5. Be sure you have two good backups before you start. Test the backups by using a backup utility.
6. Check the operating system and application software resources to be sure you have the latest information.
7. If the last-known functioning configuration does not work, try to recover the system with operating system recovery software. For more information, see the operating system documentation.

8.4.2. Application Software Problems

8.4.2.1. Software Locks Up

1. Check the application log and operating system log for entries indicating why the software failed.
2. Check for incompatibility with other software on the server.
3. Check the support website of the software vendor for known problems.
4. Review log files for changes made to the server which might have caused the problem.
5. Scan the server for viruses with an updated virus scan utility.

8.4.2.2. Utility Run Failures

1. Check the run environment and execute it in the supported OS and platforms.
2. Track the detailed test items with the utility's optional parameters and format step-by-step.
3. Check the known issues and fix bugs with the utility's release file, such as the "readme" file.

8.4.2.3. Errors That Occur After a Software Setting Is Changed

Check the system logs to determine what changes have been made, and then change settings to the original configuration.

8.4.2.4. Errors Occur After the System Software Is Changed

Change settings to the original configuration. If more than one setting is changed, change the settings one at a time to isolate the cause of the problem.

8.4.2.5. Errors Occur After an Application Is Installed

1. Check the application log and operating system log for entries which may indicate why the software failed.
2. Check system settings to determine if they are the cause of the error. You might need to obtain the settings from the server setup utility and manually set the software switches. See the application documentation, the vendor website, or both.
3. Check for overwritten files. See the application documentation to find out which files are added by the application.
4. Reinstall the application.
5. Be sure you have the most current drivers.

8.4.3. ROM Problems

8.4.3.1. Remote ROM Flash Problems

1. Command-line syntax error

If the correct command-line syntax is not used, an error message describing the incorrect syntax is displayed and the program exits. Correct the syntax, and then restart the process.

2. Access denied on target computer

If you specify a networked target computer for which you do not have administrative privileges, an error message is displayed describing the problem, and then the program exits. Obtain administrative privileges for the target computer, and then restart the process. Be sure the remote registry service is running on a Windows®-based system.

3. Invalid or incorrect command-line parameters

If incorrect parameters are passed into command-line options, an error message describing the invalid or incorrect parameter is displayed and the program exits (Example: Invalid source path for system configuration). Correct the invalid parameter, and then restart the process.

4. Network connection fails on remote communication

Because network connectivity cannot be guaranteed, it is possible for the administrative client to become disconnected from the target server during the ROM flash preparation. If any remote connectivity procedure fails during the ROM flash online preparation, the ROM flash does not occur for the target system. An error message describing the broken connection displays and the program exits. Attempt to ascertain and correct the cause of connection failure, and then restart the process.

5. Failure occurs during ROM flash

The flash cannot be interrupted during this process, or the ROM image is corrupted and the server does not start. The most likely reason for failure is a loss of power to the system during the flash process.

6. Updating firmware

To update the firmware (BIOS FW, BMC FW, HBA card FW, HDD FW, and so on):

- ▶ Check the firmware version on the device.
- ▶ Determine the latest firmware version available.
- ▶ Download and update the firmware to the current version supported for the hardware configuration.
- ▶ Verify the firmware update by checking the firmware version.

8.4.3.2. Boot Problems

Possible cause:

1. The BIOS ROM flash fails.
2. The system ROM is corrupt.
3. A logical drive is not configured by the LSI RAID controller.
4. The controller boot order is not set properly.
5. Hardware issues.

Correction Action:

If the system ROM is corrupted, the system automatically switches to the redundant ROM in most cases. If the system does not automatically switch to the redundant ROM, perform the following steps:

1. Power down the server.
2. Remove the server from the rack, if necessary.
3. Remove the access panel.
4. Change the clear CMOS jumper into the clear position 2-3, then restore it to original position 1-2.
5. Install the access panel.
6. Install the server into the rack.
7. Power up the server.
8. If both the current and backup versions of the ROM are corrupt, return the system board for a service replacement.

9/ Battery Replacement

If the server no longer automatically displays the correct date and time, you might need to replace the battery that provides power to the real-time clock.

⚠ WARNING

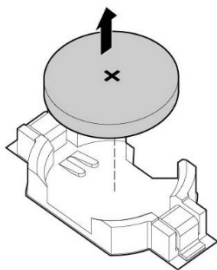
The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

- ▶ Do not attempt to recharge the battery.
- ▶ Do not expose the battery to temperatures higher than 60°C (140°F).
- ▶ Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- ▶ Replace only with the spare designated for this product.

To remove the component:

1. Power down the server.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Do one of the following:
 - ▶ Extend the server from the rack
 - ▶ Remove the server from the rack Remove the access panel.
4. If installed, remove the secondary PCIe riser cage.
5. Locate the battery.
6. Remove the battery.

Figure 91: Battery removal



To replace the component, reverse the removal procedure.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

10/ Firmware Update Tools

This chapter describes the firmware the system firmware types, support OS, utility for firmware update and supported server mode.

Table 24: Firmware update tools

Firmware Type	Supported OS	Server Mode	Firmware Tool
System BIOS	DOS	Offline	AFUDOS.exe
BMC	DOS	Offline	BMCFWUD.EXE
	Linux (32/64-bit)	Online	bmcfwul
	Windows (32/64-bit)	Online	Bmcfwuw.exe
	Web GUI	Online	Web browser

11/Firmware and Drivers Support

11.1. Firmware List

11.1.1. System Board Programming Data

- ▶ BIOS
- ▶ BMC
- ▶ CPLD
- ▶ LAN EEPROM (I350)

11.1.2. HDD Backplane

- ▶ CPLD FW

11.1.3. HBA/RAID Card

- ▶ LSI2308 HBA Card FW (optional)

11.1.4. 10G OCP Mezzanine Card

- ▶ 82599 10G OCP Flash
- ▶ 82599 10G OCP EEPROM

11.1.5. Fan Speed Control

- ▶ Fan Speed control

11.2. Device Drivers

- ▶ LAN (Powerville i350)
- ▶ LAN (Intel 82599)
- ▶ VGA (AST2400/1400)
- ▶ HBA card (PMC8076, optional)
- ▶ HBA card (LSI2308, optional)



About Kontron

Kontron, a global leader in embedded computing technology and trusted advisor in IoT, works closely with its customers, allowing them to focus on their core competencies by offering a complete and integrated portfolio of hardware, software and services designed to help them make the most of their applications.

With a significant percentage of employees in research and development, Kontron creates many of the standards that drive the world's embedded computing platforms; bringing to life numerous technologies and applications that touch millions of lives. The result is an accelerated time-to-market, reduced total-cost-of-ownership, product longevity and the best possible overall application with leading-edge, highest reliability embedded technology

Kontron is a listed company. Its shares are traded in the Prime Standard segment of the Frankfurt Stock Exchange and on other exchanges under the symbol "KBC". For more information, please visit: <http://www.kontron.com/>



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