

Intel[®] Server System R2000LH2/LT2 Family Service Guide

A Guide for Technically Qualified Assemblers of Intel[®] identified Subassemblies/Products

Order Number: G42282-004

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Important Safety Instructions

Read all caution and safety statements in this document before performing any of the instructions. See also *Intel® Server Boards and Server Chassis Safety Information* on the Intel® Server Deployment Toolkit 3.0 CD and/or at <http://www.intel.com/support/motherboards/server/sb/cs-010770.htm>.

Wichtige Sicherheitshinweise

Lesen Sie zunächst sämtliche Warnung und Sicherheitshinweise in diesem Dokument, bevor Sie eine der Anweisungen ausführen. Beachten Sie hierzu auch die *Sicherheitshinweise zu Intel® - Serverplatinen und Servergehäusen* auf der Intel® Server Deployment Toolkit 3.0 CD oder unter <http://www.intel.com/support/motherboards/server/sb/cs-010770.htm>.

Consignes de sécurité

Lisez attention toutes les consignes de sécurité et les mises en garde indiquées dans ce document avant de suivre toute instruction. Consultez *Intel® Server Boards and Server Chassis Safety Information* sur le Intel® Server Deployment Toolkit 3.0 CD ou bien rendez-vous sur le site <http://www.intel.com/support/motherboards/server/sb/cs-010770.htm>.

Instrucciones de seguridad importantes

Lea todas las declaraciones de seguridad y precaución de este documento antes de realizar cualquiera de las instrucciones. Vea *Intel® Server Boards and Server Chassis Safety Information* en el Intel® Server Deployment Toolkit 3.0 CD y/o en <http://www.intel.com/support/motherboards/server/sb/cs-010770.htm>.

重要安全指导

在执行任何指令之前，请阅读本文档中的所有注意事项及安全声明。和/或 <http://www.intel.com/support/motherboards/server/sb/cs-010770.htm> 上的 *Intel® Server Boards and Server Chassis Safety Information*（《Intel® 服务器主板与服务器机箱安全信息》）。

Warnings

Heed safety instructions: Before working with your server product, whether you are using this guide or any other resource as a reference, pay close attention to the safety instructions. You must adhere to the assembly instructions in this guide to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products/components will void the UL listing and other regulatory approvals of the product and will most likely result in noncompliance with product regulations in the region(s) in which the product is sold.

System power on/off: The power button DOES NOT turn off the system AC power. To remove power from the system, you must unplug the AC power cord from the wall outlet. Make sure the AC power cord is unplugged before you open the chassis, add, or remove any components.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground - any unpainted metal surface - on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine needle nosed pliers. If your jumpers do not have such a tab, take care when using needle nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool you use to remove a jumper, or you may bend or break the pins on the board.

Preface

About this Manual

This manual is written for system technicians who are responsible for troubleshooting, upgrading, and repairing this server system. It provides a brief overview of the features of the server board/chassis, a list of accessories or other components you may need, troubleshooting information, and instructions on how to add and replace components on the Intel® Server System R2000LH2/LT2 family products. For the latest revision of this manual, go to http://www.intel.com/p/en_US/support.

Table 1. Intel® Server System R2000LH2/LT2 family product list

Product Code	Description
Intel® Server System R2208LT2HKC4	With Intel® Server Board S4600LT2 and 8" x 2.5" hot swap hard drive bay
Intel® Server System R2304LT2HVC	With Intel® Server Board S4600LT2 and 4" x 3.5" hot swap hard drive bay
Intel® Server System R2304LH2HKC	With Intel® Server Board S4600LH2 and 4" x 3.5" hot swap hard drive bay
Intel® Server System R2208LH2HKC2	With Intel® Server Board S4600LH2 and 8" x 2.5" hot swap hard drive bay

Manual Organization

Chapter 1 provides a brief overview of the Intel® Server System R2000LH2/LT2 family. In this chapter, you will find a list of the server system features, and figures of the system and components to help you identify your system components and their locations.

Chapter 2 provides instructions on adding and replacing components. Use this chapter for step-by-step instructions and diagrams for installing or replacing components such as the fan, power supply, and front panel board, among other components.

Chapter 3 provides instructions on using the utilities that are shipped with the board or that may be required to update the system. This includes information for navigating through the BIOS Setup screens, performing a BIOS update, and resetting the password or BIOS defaults.

At the back of this document, you will find appendices on safety, “getting help”, and warranty information.

Additional Information and Software

For additional information about this family of products or any of their supported accessories, refer to the following resources available at http://www.intel.com/p/en_US/support/.

Table 2. Server System References

For this information or software	Use this Document or Software
For in-depth technical information about this product.	<i>Intel® Server System R2000LH2/LT2 Family Technical Product Specification</i> See the section on the web page titled, “Architecture/Specifications”.
For supported Intel® spares and accessories	<i>Intel® Server System R2000LH2/LT2 Family Quick Installation User’s Guide</i> See the section on the web page titled, “System Integration/User Guides/Compatibility”.
For supported Intel® spares and accessories	<i>Spares and Configuration Guide</i> See the section on the web page titled, “Documents & Guides”.
For server configuration guidance and compatibility	Intel® Server Configurator tool
For system power budget guidance	Power Budget Analysis Tool
For software to manage your Intel® Server System.	Intel® Server Management Software See the section on the web page titled, “Software/Code”.
For system firmware updates and onboard device drivers	Firmware and Drivers See the section on the web page titled, “Software/Code”.
Product Safety and Regulatory document	<i>Intel® Server Products - Product Safety and Regulatory Compliance Document</i> See the section on the web page titled, “Regulations/Certification/Compliance”.

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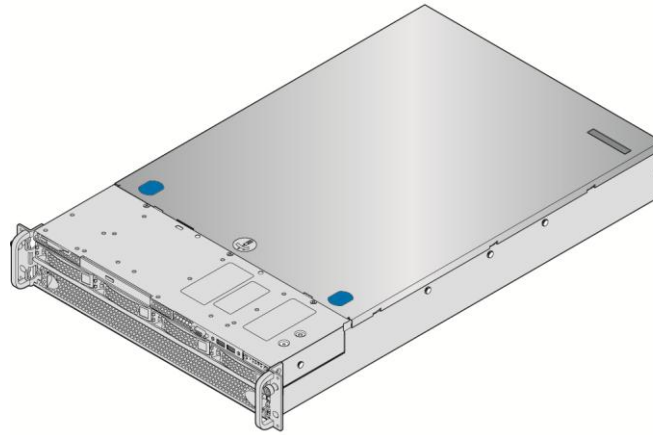
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1 Server System Features

This chapter briefly describes the main features of the Intel® Server System R2000LH2/LT2 family. This includes illustrations of the products, a list of the server system features, and diagrams showing the location of important components and connections on the server systems.



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Figure 1. Intel® Server System R2000LH2/LT2

Server System Feature Overview

Table 3 summarizes the features of the server systems.

Table 3. Intel® Server System R2000LH2/LT2 Feature Summary

Server System	Integrated Server Board
Intel® Server System R2000LH2 product family	Intel® Server Board S4600LH2
Intel® Server System R2000LT2 product family	Intel® Server Board S4600LT2

Feature	Description
Dimensions	<ul style="list-style-type: none"> ▪ 3.43 inches (87.3 mm) high ▪ 17.24 inches (438.0 mm) wide ▪ 28.0 inches (712.0 mm) deep
Processor Support	<ul style="list-style-type: none"> ▪ Support up to four Intel® Xeon® processors E5-4600 product family with a Thermal Design Power (TDP) of up to 130 W.
Memory	<ul style="list-style-type: none"> ▪ 48 DIMM slots – Three DIMMs/Channel – Four memory channels per processor ▪ Unbuffered DDR3 and registered DDR3 DIMMs ▪ Memory DDR3 data transfer rates of 800, 1066, 1333 MT/s and 1600 MT/s ▪ DDR3 standard I/O voltage of 1.5V and DDR3 Low Voltage of 1.35V
Chipset	Intel® C600-A chipset with support for optional Storage Option Select keys
External I/O connections	<ul style="list-style-type: none"> ▪ Video – Back Panel + Front Panel ▪ RJ-45 Serial- A Port ▪ S4600LH2 - 2 RJ-45 Network Interface Connectors supporting 10/100/1000Mb ▪ S4600LT2 - 2 RJ-45 Network Interface Connectors supporting 100/1000/10000Mb

Server System Features

Feature	Description
	<ul style="list-style-type: none"> ▪ USB 2.0 connectors - 4 on back panel + 2 on front panel
Internal I/O connectors/headers	<ul style="list-style-type: none"> ▪ One Type-A USB 2.0 connector ▪ One internal USB header ▪ One DH-10 Serial-B port connector
Optional I/O Module Support	<p>The following I/O modules utilize a single proprietary on-board connector. An installed I/O module can be supported in addition to standard on-board features and any add-in expansion cards.</p> <ul style="list-style-type: none"> ▪ Quad port 1 GbE based on Intel® Ethernet Controller I350 ▪ Dual port 10GBase-T Ethernet module based on Intel® Ethernet Controller I350 – AXX10GBTWLIOM ▪ Dual SFP+ port 10GbE module based on Intel® 82500 10 GbE controller – AXX10GBNIAIOM ▪ Single Port FDR speed InfiniBand* module with QSFP connector – AXX1FDRIBIOM
System Fans	<ul style="list-style-type: none"> ▪ Eleven managed system fans ▪ One power supply fan for each installed power supply module
Riser Cards	Support for two riser card slots. Each riser card slot has support for three PCIe x16 slots
Video	<ul style="list-style-type: none"> ▪ Integrated 2D Video Controller ▪ 16 MB DDR3 Memory
On-board storage controllers and options	<ul style="list-style-type: none"> ▪ One low-profile eUSB 2x5 pin connector to support low-profile eUSB solid state devices ▪ Two single port SATA connectors capable of supporting up to 6 GB/sec ▪ Two 4-port mini-SAS connectors capable of supporting up to 3 GB/sec SAS/SATA ▪ Intel® RAID C600 Upgrade Key support providing optional expanded SATA/SAS RAID capabilities
Security	Trusted Platform Module (Optional)
Server Management	<ul style="list-style-type: none"> ▪ Integrated Baseboard Management Controller, IPMI 2.0 compliant ▪ Support for Intel® Server Management Software (version TBD) ▪ Intel® Remote Management Module 4 support (optional) ▪ Intel® Remote Management Module 4 Lite support (optional)
Power Supply Options	<p>The system is shipped with two power supplies with support below options.</p> <ul style="list-style-type: none"> ▪ 1600W (1+1) Redundant Hot-swap Capable ▪ 1600W (1+0 or 2+0) Non-Redundant
Storage Bay Options	<ul style="list-style-type: none"> ▪ 4" x 3.5" SATA/SAS Hot Swap Hard Drive Bays + Optical Drive support ▪ 8" x 2.5" SATA/SAS Hot Swap Hard Drive Bays
Rack Mount Kit Options	<ul style="list-style-type: none"> ▪ Extended Value rack mount rail kit (AXXELVRAIL) ▪ Premium rack mount rail kit (AXXPRAIL), will be available at post launch

CAUTION: THE MAXIMUM RECOMMENDED SERVER WEIGHT FOR THE RACK RAILS CAN BE FOUND at <http://www.intel.com/support/motherboards/server/sb/CS-033655.htm>. EXCEEDING THE MAXIMUM RECOMMENDED WEIGHT OR MISALIGNMENT OF THE SERVER MAY RESULT IN FAILURE OF THE RACK RAILS HOLDING THE SERVER. Use of a mechanical assist to install and align server into the rack rails is recommended.

Wattage Limitation of the PCI Loading

Table 4 summarizes the wattage limitation of the PCI loading.

Table 4. Wattage Limitation of the PCIe Loading

VIN	Power Supply Configuration	Maximum PCI Loading
90 – 140VAC (AC low-Line)	1600W (1+1) Redundant Hot-swap Capable 1600W (1+0 or 2+0) Non-Redundant	260W
180 – 264VAC (AC high-line)	1600W (1+1) Redundant Hot-swap Capable 1600W (1+0 or 2+0) Non-Redundant	450W

Power Rating

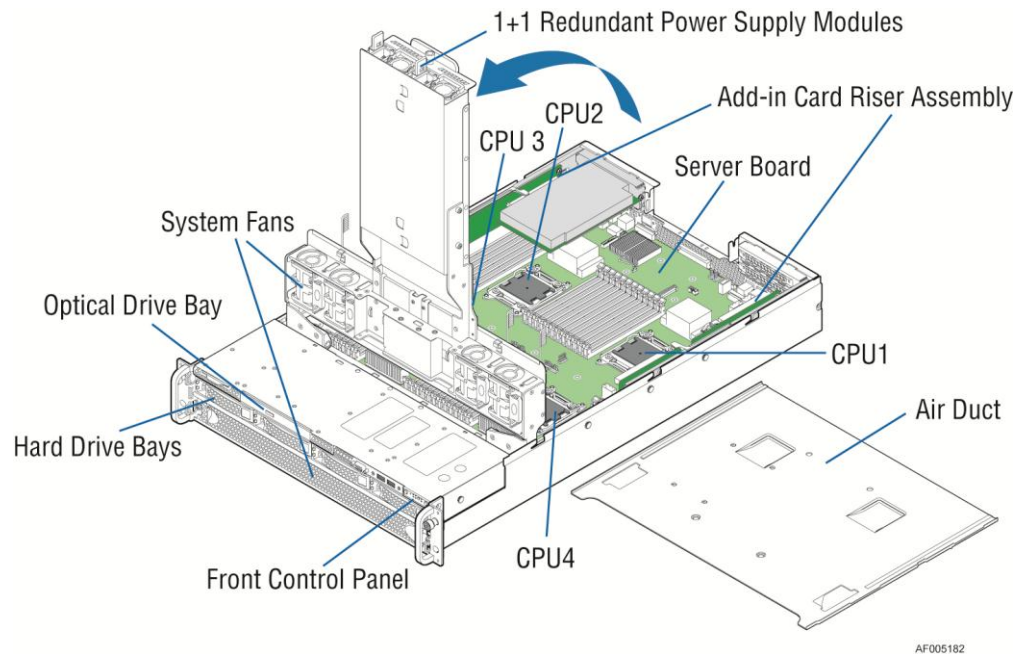
Table 5 summarizes the power rating of the power supply.

Table 5. Power Rating of the Power Supply

VIN	Total Available Power
100~127VAC (AC low-Line)	1120W
200~240VAC (AC high-line)	1600W

Server System Components

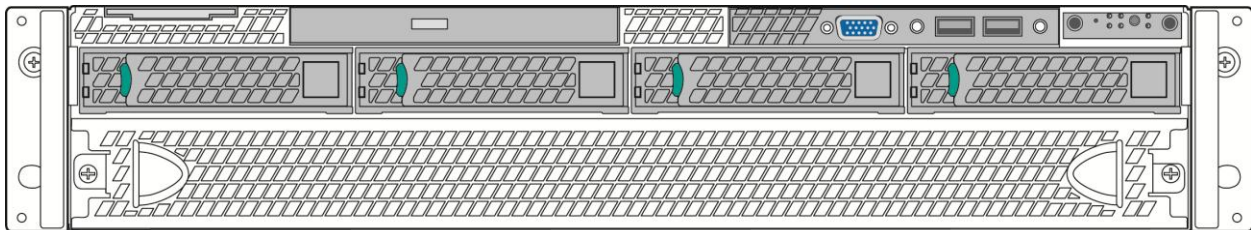
This section helps you identify the components of your server system. If you are near the system, you can also use the *Quick Reference Label* provided on the inside of the chassis cover to assist in identifying components.



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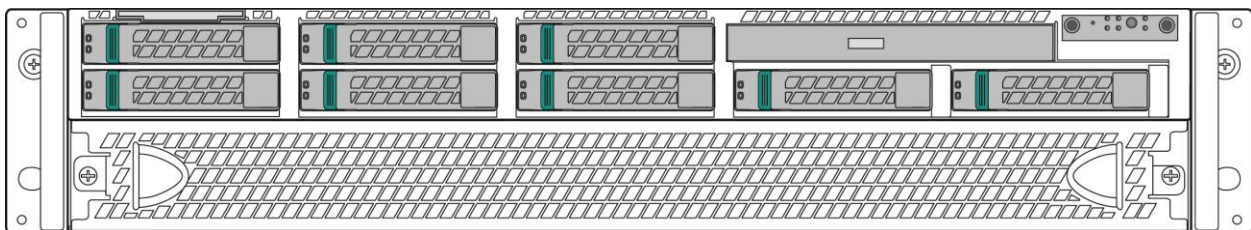
Figure 2. Intel® Server System R2000LH2/LT2 Components

Hot Swap Hard Drive Bay and Front Panel Options



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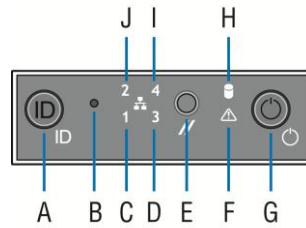
Figure 3. 3.5" Hot Swap Hard Drive Bay - 4 Drive Configuration



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Figure 4. 2.5" Hot Swap Hard Drive Bay - 8 Drive Configuration

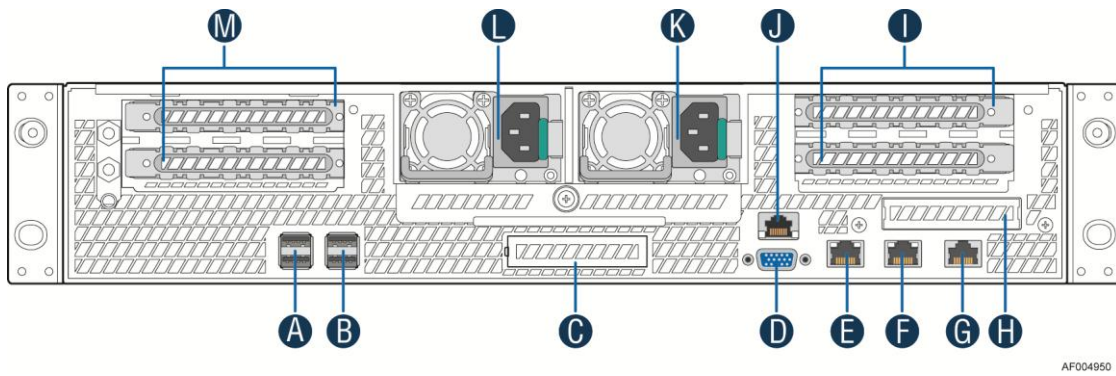
Front Panel



Label	Description	Label	Description
A	System ID Button w/Integrated LED	F	System Status LED
B	NMI Button (recessed, tool required for use)	G	Power Button w/Integrated LED
C	NIC-1 Activity LED	H	Hard Drive Activity LED
D	Not Used	I	Not Used
E	System Cold Reset Button	J	NIC-2 Activity LED

Figure 5. Front Panel Options

Back Panel

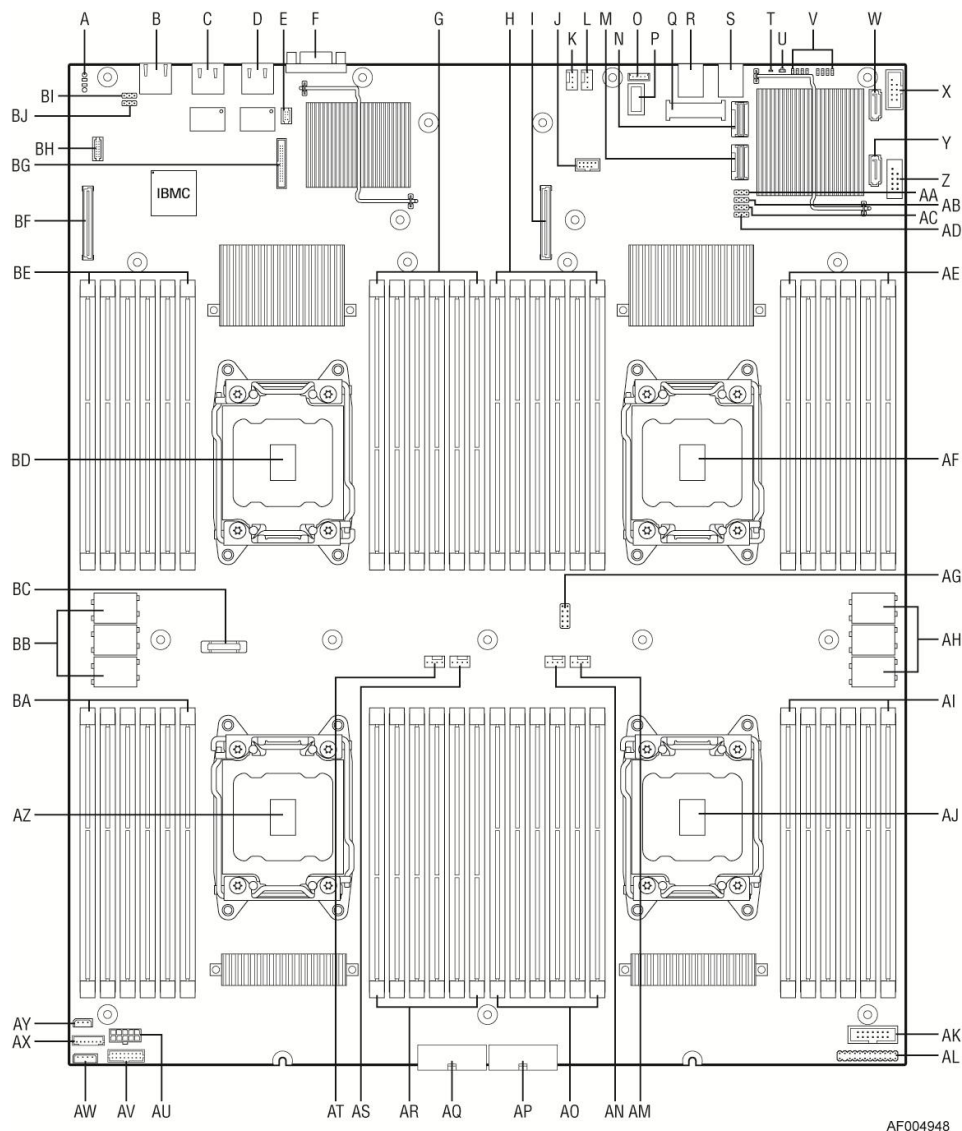


Label	Description	Label	Description
A	USB Ports	H	I/O Module Ports/Connectors (Optional)
B	USB Ports	I	Add-in adapter slots from Riser Card
C	I/O Module Ports/Connectors (Optional)	J	RMM4 NIC Port (Optional)
D	Video Connector	K	Power Supply Module #2
E	NIC - 1	L	Power Supply Module #1
F	NIC - 2	M	Add-in adapter slots from Riser Card
G	RJ45 Serial-A Port		

Figure 6. Back Panel Feature Identification

Server Board Components

This section helps you identify the components and connectors on the server board.



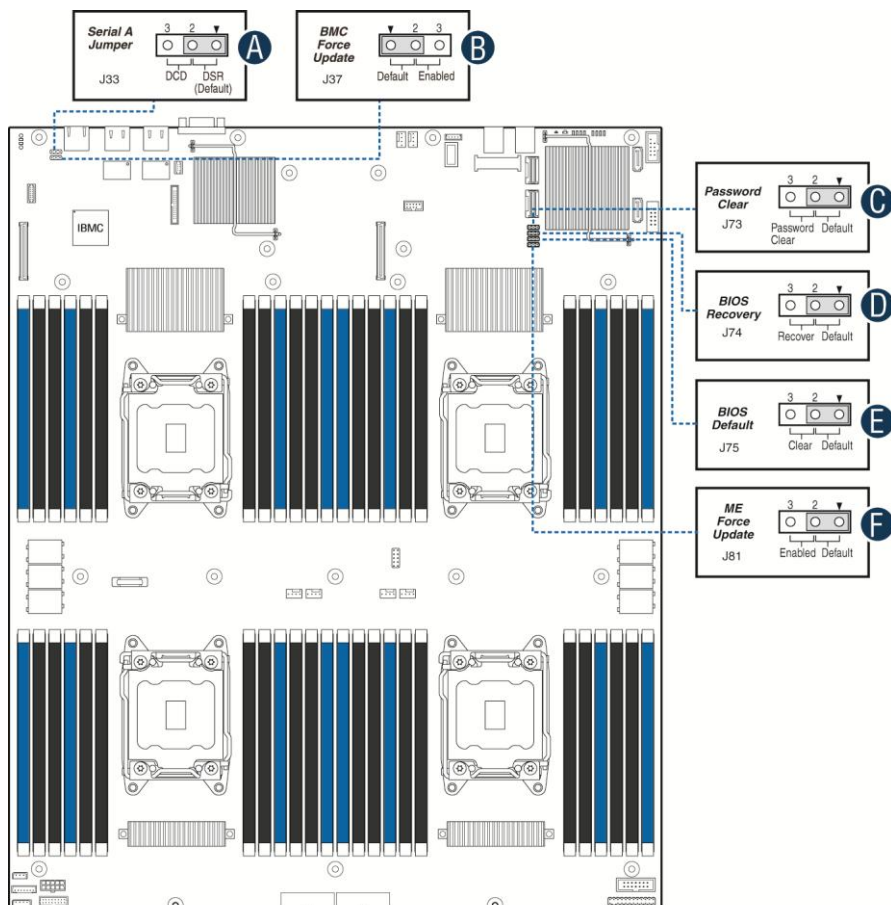
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	Description		Description
A	Manufacturing Mode jumper	AH	Riser Card slot #1
B	Serial 'A' Port (RJ45)	AI	CPU #4 DIMM slots – Memory Banks N and P
C	NIC 2	AJ	CPU #4 socket
D	NIC 1	AK	Front Panel Video connector
E	(Option) RMM4 Lite connector	AL	Front Panel header (SSI compatible)
F	Video connector	AM	CPU #1 Fan connector
G	CPU #2 DIMM slots – Memory Banks G and H	AN	CPU #4 Fan connector
H	CPU #1 DIMM slots – Memory Banks A and B	AO	CPU #4 DIMM slots – Memory Banks R and T
I	(Option) I/O Module connector	AP	Main Power Slot #2
J	(Option) eUSB Solid State Device (SSD) connector	AQ	Main Power Slot #1
K	Rear System Fan #2 connector	AR	CPU #3 DIMM slots – Memory Banks J and K

	Description		Description
L	Rear System Fan #1 connector	AS	CPU #3 Fan connector
M	4 Port SATA/SAS connector (Drives 4-7)	AT	CPU #2 Fan connector
N	4 Port SATA/SAS connector (Drives 0-3)	AU	Fan board power connector
O	(Option) Intel® RAID C600 Upgrade Key connector	AV	PDB signal connector
P	Type-A USB 2.0 connector	AW	4-pin IPMB connector
Q	(Option) mSATA port	AX	LCP connector
R	2 Stacked USB 2.0 ports	AY	3-pin Hot Swap Backplane SMBus* connector
S	2 Stacked USB 2.0 ports	AZ	CPU #3 socket
T	System ID LED	BA	CPU #3 DIMM slots – Memory Banks L and M
U	System Status LED	BB	Riser Card slot #2
V	POST Code Diagnostic LEDs	BC	Backup Battery
W	SATA only port #0	BD	CPU #2 socket
X	Internal Serial Port	BE	CPU #2 DIMM slots – Memory Banks E and F
Y	SATA only port #1	BF	(Option) I/O Module connector
Z	Internal USB port	BG	(Option) RMM4 NIC connector
AA	Password Clear jumper	BH	(Option) TPM connector
AB	BIOS Recover jumper	BI	Serial A jumper
AC	BIOS Default jumper	BJ	BMC force update
AD	ME Force Update jumper		
AE	CPU #1 DIMM slots – Memory Banks C and D		
AF	CPU #1 socket		
AG	CPLD programming header		

Figure 7. Server Board Connector and Component Locations

System Recovery Jumpers



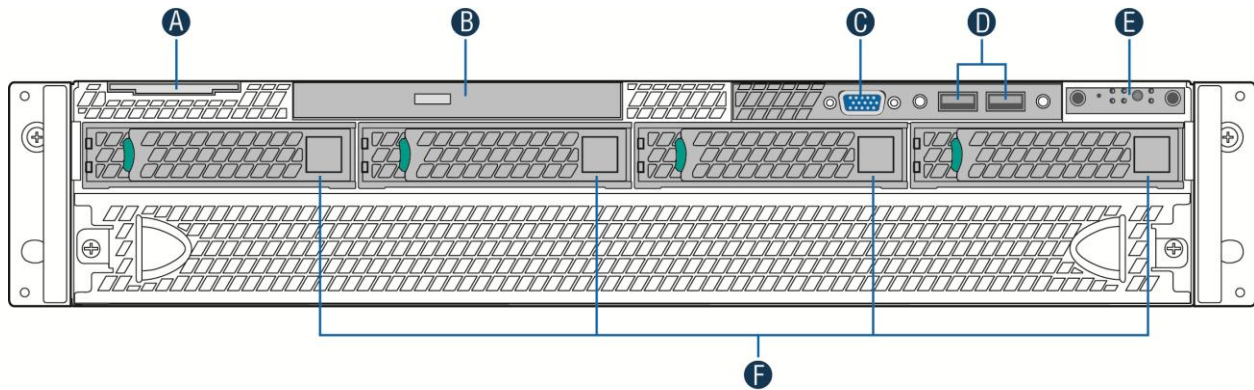
AF005249

	Jumper Name	Jumper Purpose
A	Serial A Jumper (J33)	If pins 2-3 are selected, the serial-A configuration is in Data Carrier Detect (DCD) mode. These pins should be selected on 1-2 for normal system operation.
B	BMC Force Update (J37)	If pins 2-3 are selected, the Integrated BMC Force Update Mode is enabled. These pins should be selected on 1-2 for normal system operation.
C	Password Clear (J73)	If pins 2-3 are selected, administrator and user passwords are cleared within five to ten seconds after the system is powered on. These pins should be selected on 1-2 for normal system operation.
D	BIOS Recover (J74)	If pins 2-3 are selected, the system can only boot from EFI-bootable recovery media with the recovery BIOS image. The main system BIOS will not boot. These pins should be selected on 1-2 for normal system operation.
E	BIOS Default (J75)	If pins 2-3 are selected, the BIOS settings are cleared on the next reset. These pins should be selected on 1-2 for normal system operation.
F	ME Force Update (J81)	If pins 2-3 are selected, the ME Force Update Mode is enabled. These pins should be selected on 1-2 for normal system operation.

Figure 8. Configuration Jumpers

Peripheral Devices

The Intel® Server System R2000LH2/LT2 provides locations and hardware for installing hard drives, CD-ROM drive, or DVD-ROM drive. The following figure shows the available options:



A	Asset Tag
B	Slimline Optical Drive Bay
C	Video Port
D	USB Ports
E	Front Control Panel
F	Hard Disk Drive Bays

Figure 9. Optional Peripherals (4x3.5-inch hard drive bays as shown)

Hard Disk Drive Carriers

The Intel® Server System R2000LH2/LT2 ships with either 3.5" or 2.5" hard disk drive carrier, and with different maximum number of hard disk drives; see the table below for details:

Table 6. Hard Disk Drive Options

Intel® Server System	Supported Hard Drive Type	Maximum Hard Drive Number
R2304LH2/LT2	3.5" or 2.5"	4
R2208LH2/LT2	2.5"	8

Note: SAS drives are only supported when proper Intel® RAID C600 Upgrade Key or Intel® Integrated RAID Module is installed.

For instructions on installing hard drives, see [Installing and Removing Hard Drive](#).

Note: Drives can consume up to 17 watts of power each. Drives must be specified to run at a maximum ambient temperature of 45°C.

Note: The Intel® Server System R2000LH2/LT2 does not support all SAS or Serial ATA (SATA) hard drives. For a web link to a list of supported hard drives, see [Additional Information and Software](#).

Slimline Optical Drive Carrier

The slimline optical drive carrier can be used with a single slimline optical drive. One slimline carrier is included with your server system; the optical drive must be purchased separately.

The drive in the optical drive carrier is NOT hot-swappable. The system power must be turned off to insert or remove the slimline optical drive carrier. For instructions on installing an optical drive, see [Installing and Removing a Slimline Optical Drive](#).

To use one of the drives provided by Intel[®], use the following order codes:

- Slimline DVD-ROM Drive: AXXSATADVDRM
- Slimline DVD-RW Drive: AXXSATADVDRWROM

Note: For a complete list of supported peripherals, go to http://serverconfigurator.intel.com/sct_app.aspx.

Bezel

The front bezel is available as optional accessory for the server system:

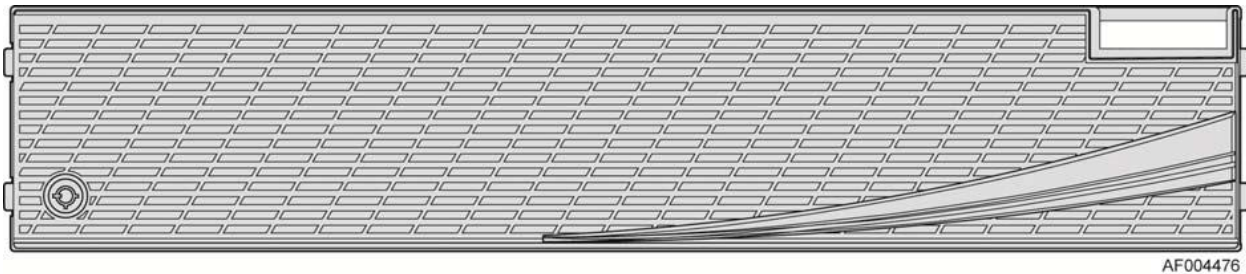


Figure 10. Front Bezel (Front View)

Hot-Swap SAS/SATA Backplane

The Hot-Swap SAS/SATA backplane serves as an interface between the mother board and the system drives. The following diagrams show the location for each connector found on the backplane.

4 x 3.5" Hard Drive Backplane

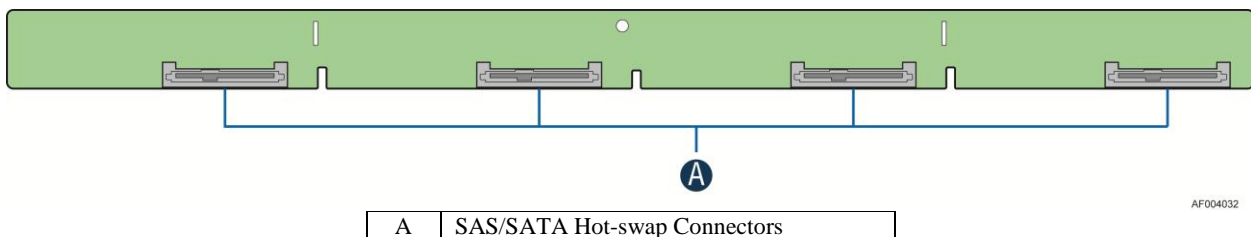
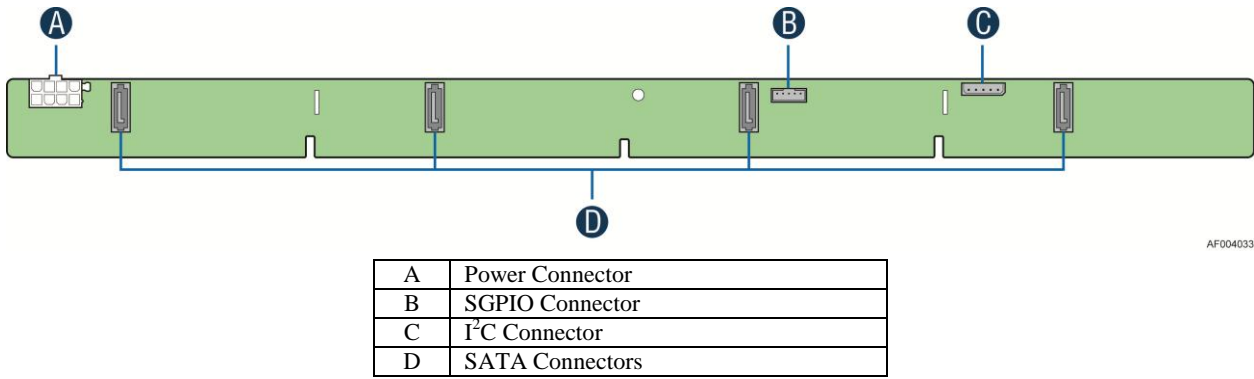


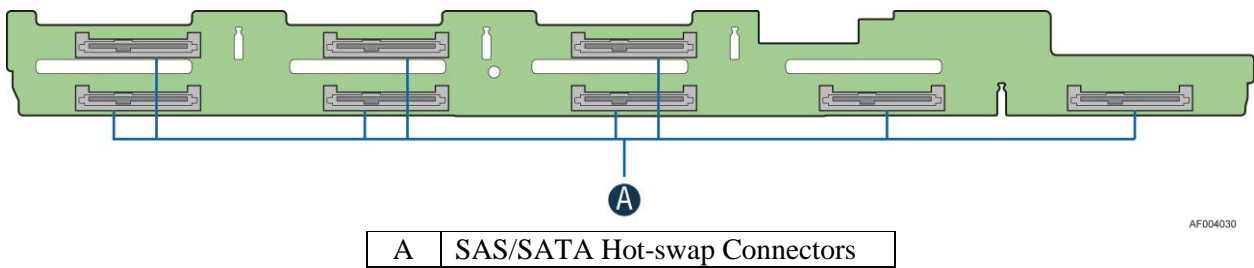
Figure 11. 4 x 3.5-inch Hard Drive Backplane Components (Front View)



AF004033

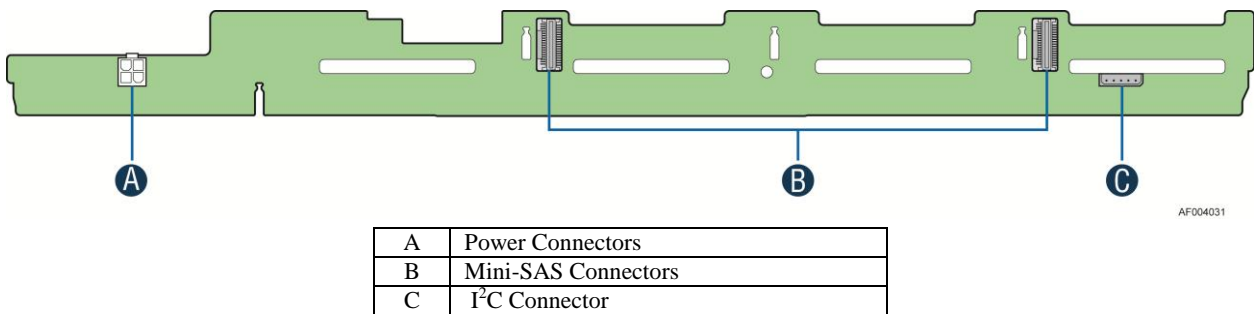
Figure 12. 4 x 3.5-inch Hard Drive Backplane Components (Rear View)

8 x 2.5" Hard Drive Backplane



AF004030

Figure 13. 8 x 2.5-inch Hard Drive Backplane Components (Front View)



AF004031

Figure 14. 8 x 2.5-inch Hard Drive Backplane Components (Rear View)

Advanced Management Options

Intel® Remote Management Module 4

The Intel® Remote Management Module 4 plugs into a dedicated connector on the server board and provides additional server management functionality to the server board.

This module provides a dedicated web server for viewing server information and remote control of the system. It also provides Remote KVM Redirection and USB Media Redirection allowing USB devices attached to the remote system to be used on the managed server.

For instructions on installing the Intel® Remote Management Module 4, see [Installing and Removing the Intel® Remote Management Module 4](#).

2 Hardware Installations and Upgrades

Before You Begin

Before working with your server product, pay close attention to the Safety Information at the beginning of this manual.

Note: Whenever you service the system, you must first power down the server and unplug all peripheral devices and the AC power cord.

Tools and Supplies Needed

- Phillips* (cross head) screwdriver (#1 bit and #2 bit)
- Needle nosed pliers
- Anti-static wrist strap and conductive foam pad (recommended)

System Reference

All references to left, right, front, top, and bottom assume the reader is facing the front of the chassis as it would be positioned for normal operation.

Note: The Intel® Server System R2304LH2 is shown for illustration purposes in this document.

Cable Routing

When you add or remove components from your server system, make sure your cables are routed correctly before reinstalling the server system cover. Use caution to make sure no cables or wires are pinched and that the airflow from the fans is not blocked. Use the figures below to determine the correct cable routing.

Note: Red lines are for power connection, dot lines are for optional device connection.

For system with 4 x 3.5" hot swap hard drive bay

Note:

1. To activate the port SCU1 (4-7) on the server board, a proper Intel® RAID C600 Upgrade Key must be installed. For instructions, see Intel® RAID C600 Upgrade Key Installation Guide.
2. A second SSD is supported when the optical drive is NOT in use.

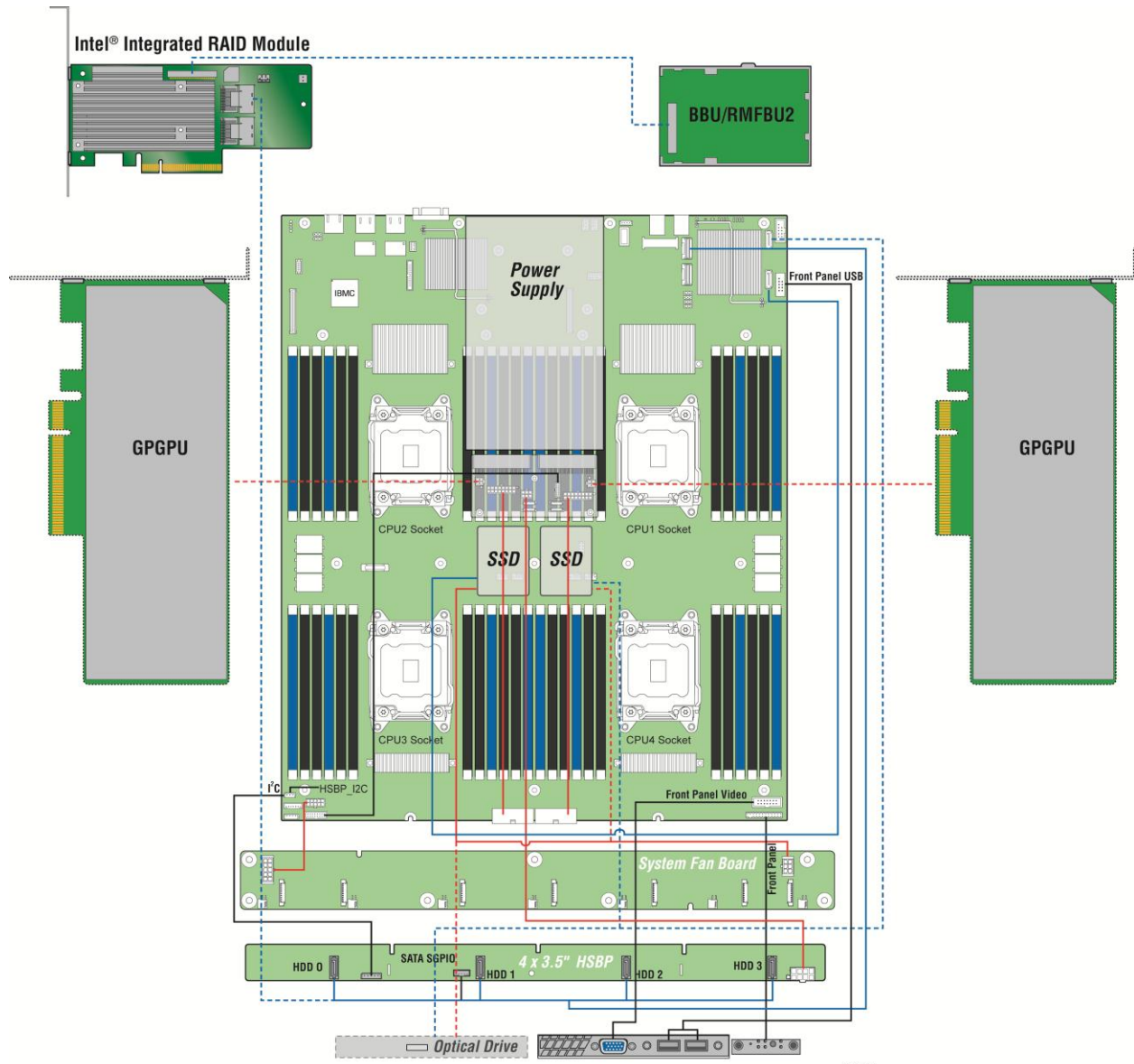


Figure 15. Cable Routing – 4 x 3.5" Hot Swap HDD

For system with 8 x 2.5" hot swap hard drive bay

Note:

1. To activate the port SCU1 (4-7) on the server board, a proper Intel® RAID C600 Upgrade Key must be installed. For instructions, see Intel® RAID C600 Upgrade Key Installation Guide.
2. A second SSD is supported when the optical drive is NOT in use.

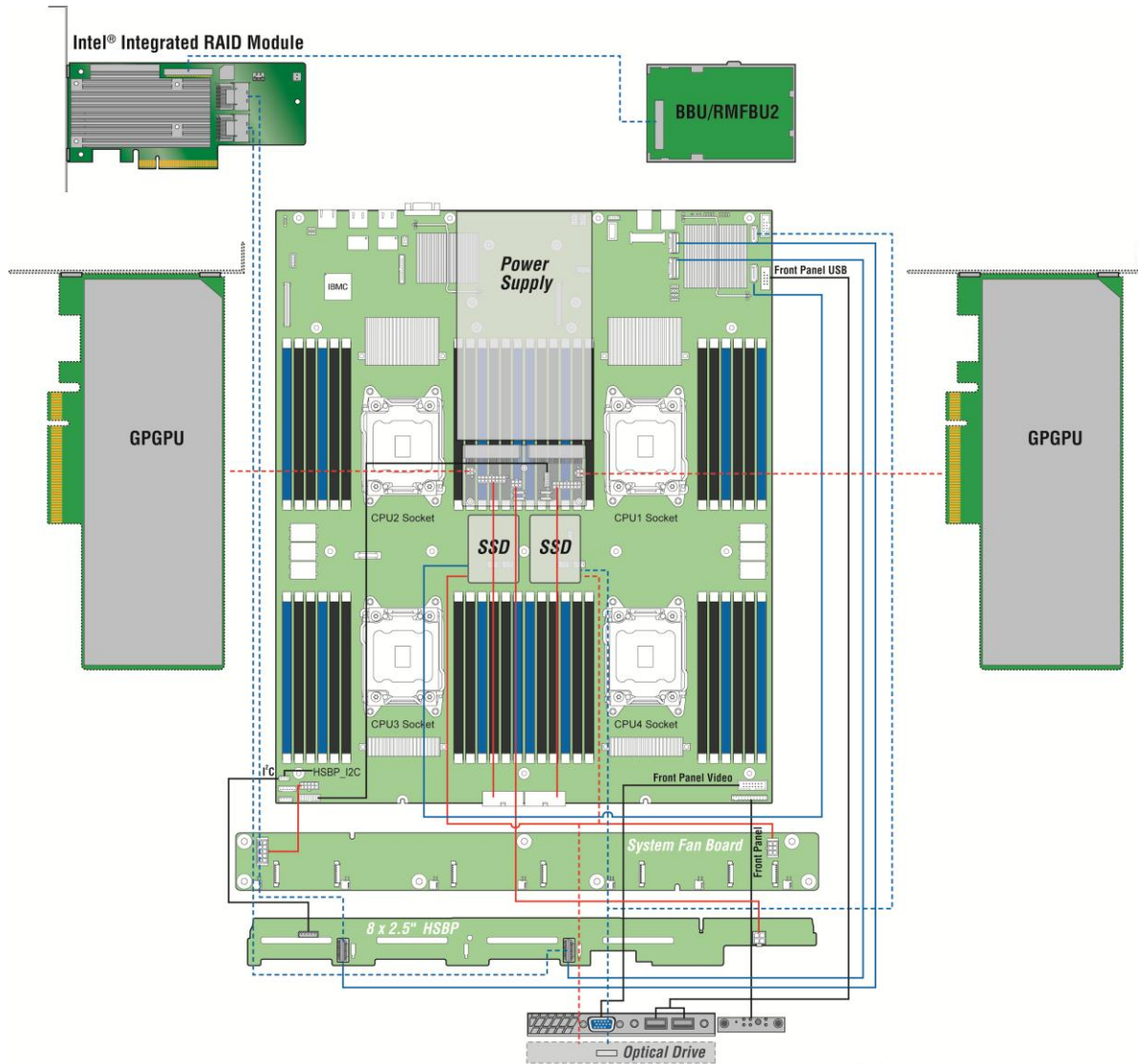
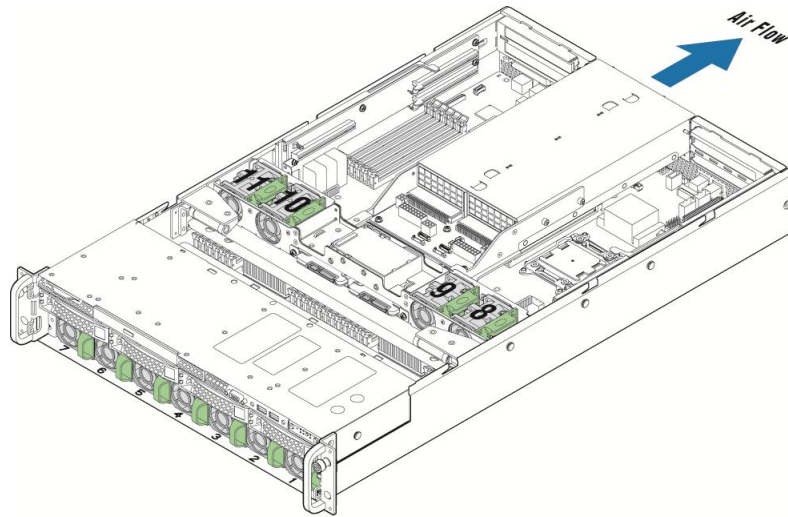


Figure 16. Cable Routing – 8 x 2.5" Hot Swap HDD

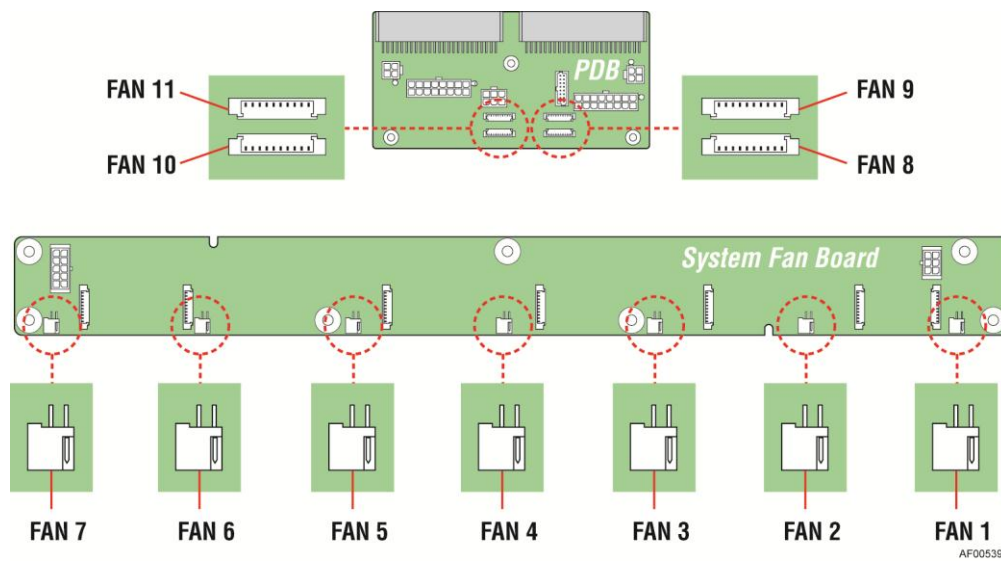
Fan Connections

Use the figures below to determine the proper fan connections.



AF005356

Figure 17. System Fan Order



AF005394

Figure 18. Connecting the Fan Power Cables to the Fan Board and PDB

Removing and Installing the Front Bezel (Optional)

Removing the Front Bezel

If your system includes a front bezel, follow these steps to remove the front bezel:

1. Unlock the bezel if it is locked.
2. Remove the left end of front bezel from rack handle (see letter **A**).
3. Rotate the front bezel anticlockwise to release the latches on the right end from the rack handle (see letter **B**).

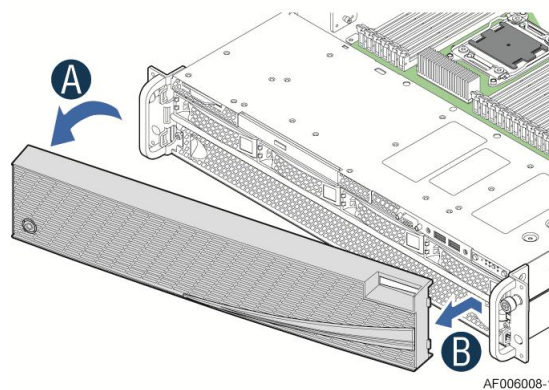


Figure 19. Removing the Front Bezel

Installing the Front Bezel

Note: Before installing the bezel, you must install the rack handles.

1. Lock the right end of the front bezel to the rack handle (see letter **A**).
2. Rotate the front bezel clockwise till the left end clicks into place (see letter **B**).
3. Lock the bezel if needed.

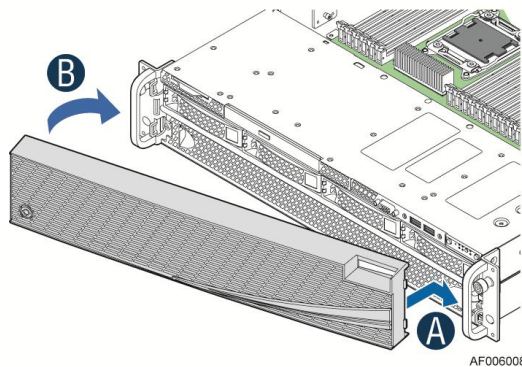


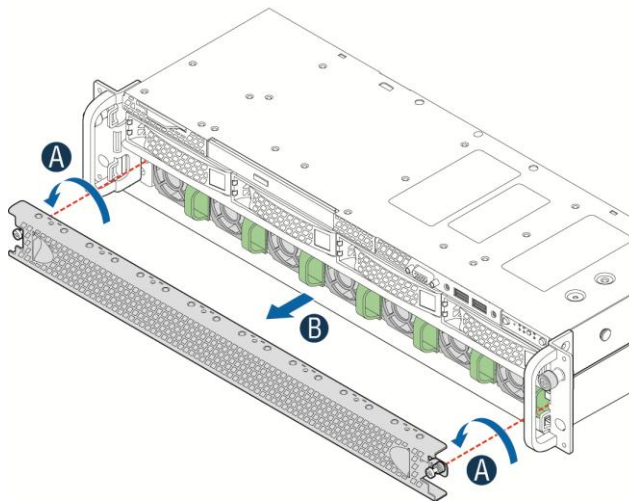
Figure 20. Installing the Front Bezel

Removing and Installing the Front Fan Bezel

Removing the Front Fan Bezel

Follow these steps to remove the front fan bezel:

1. Loosening the two screws on left and right end (see letter **A**).
2. Remove the front fan bezel from the chassis (see letter **B**)

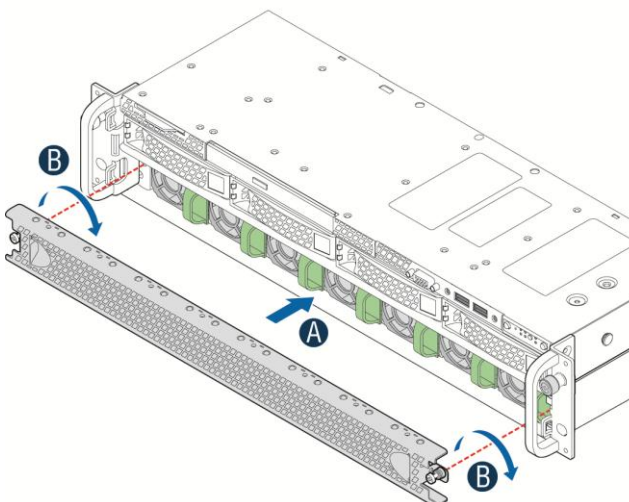


AF005385

Figure 21. Removing the Front Fan Bezel

Installing the Front Fan Bezel

1. Slide in the bezel (see letter **A**).
2. Secure the bezel to the chassis with the two screws on left and right end as shown (see letter **B**).



AF005384

Figure 22. Installing the Front Fan Bezel

Removing and Installing the Rack Handles

Removing the Rack Handles

Remove the two screws holding the rack handle in place, and remove the rack handle from the server system as shown.

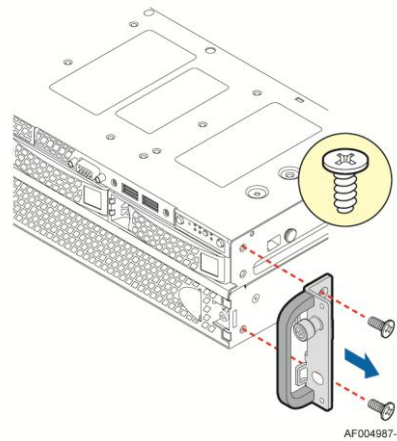


Figure 23. Removing the Rack Handle

Installing the Rack Handles

Align the rack handle with the two holes on the side of the server system and attach the rack handle to the server system with two screws as shown.

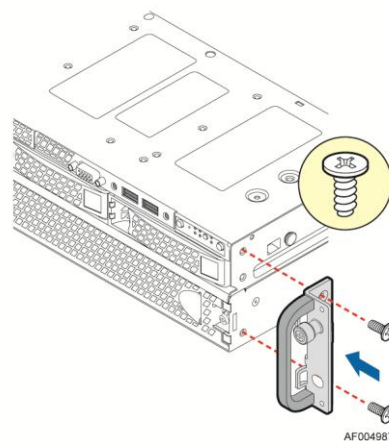


Figure 24. Installing the Rack Handle

Removing and Installing the Power Supply Module(s)

Removing the Power Supply Module(s)

1. Push the green latch in the direction shown while pulling out of the system by the handle.

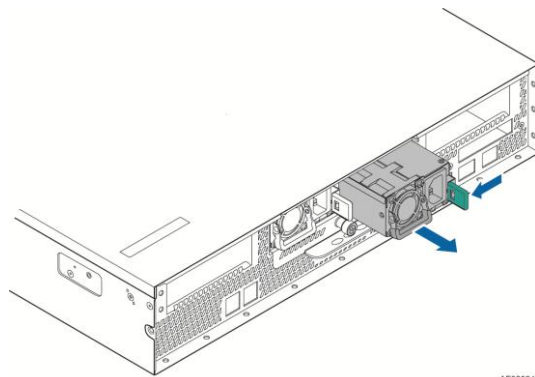


Figure 25. Removing the Power Supply Module

2. Repeat step 1 to remove the second power supply module.

Installing a Power Supply Module(s)

1. Insert the power supply module into the power supply cage and push all the way until it clicks into place.

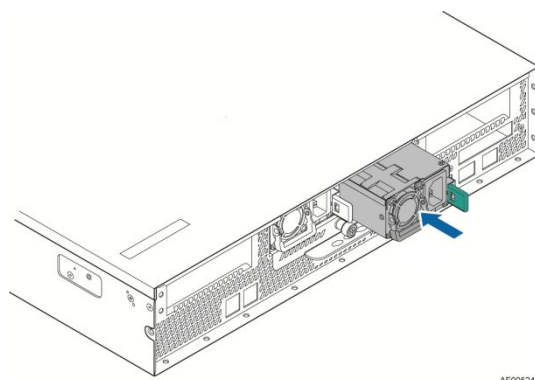


Figure 26. Installing the Power Supply Module

2. Repeat step 1 to install the second power supply module.

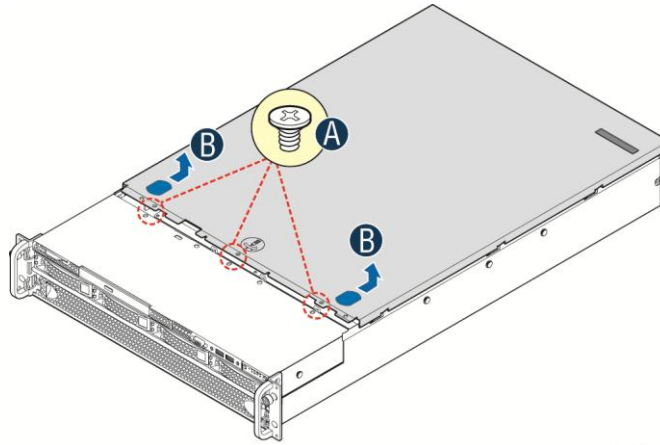
Removing and Installing the System Cover

Removing the System Cover

The server system must be operated with the system cover in place to ensure proper cooling. You will need to remove the top cover to add or replace components inside of the server. Before removing the top cover, power down the server and unplug all peripheral devices and the power cable(s).

Note: A non-skid surface or a stop behind the server system may be needed to prevent the server system from sliding on your work surface.

1. Observe the safety and ESD precautions at the beginning of this book.
2. Turn off all peripheral devices connected to the server. Turn off the server.
3. Disconnect the power cord.
4. Remove the screws (see letter **A**).
5. Depress the latches (see letter **B**).
6. Slide the cover back and lift upward.

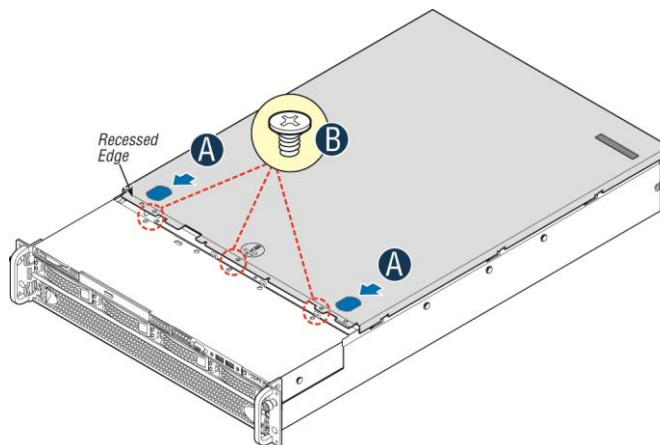


AF004963

Figure 27. Removing the System Cover

Installing the System Cover

1. Place system cover onto the chassis and slide forward to engage recessed edge at front of cover (see letter **A**).
2. Tighten the screw at front (see letter **B**).



AF004964

Figure 28. Installing the System Cover

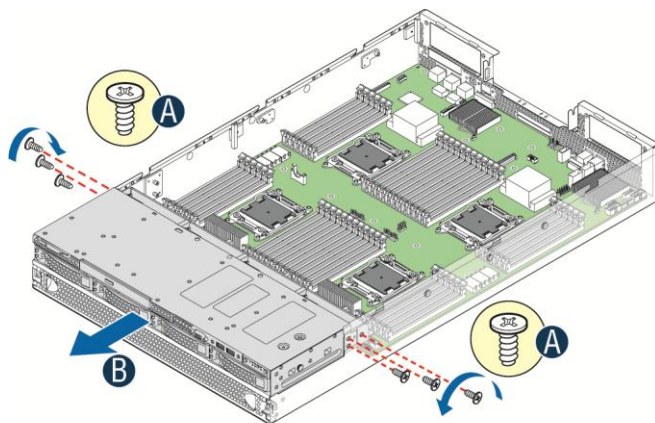
Removing and Installing the Front End Module

Before removing or installing the PCI riser assembly, please make sure following steps are performed:

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the rack handles. For instructions, see [Removing the Rack Handles](#).
3. Remove the system cover. For instructions, see [Removing the System Cover](#).

Removing the Front End Module

1. Disconnect any cables attached to the front end module.
2. Removing the six screws securing the front end module from the chassis (see letter **A**).
3. Slide the front end module in forward and remove it from the chassis (see letter **B**).

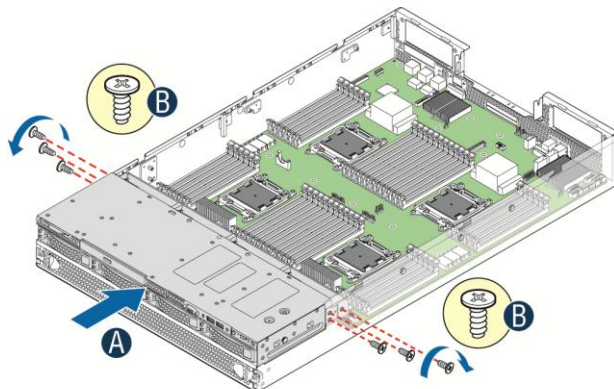


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Figure 29. Removing the Front End Module

Installing the Front End Module

1. Push the front end module into place (see letter **A**).
2. Secure the front end module with six screws (see letter **B**).



AF005843

Figure 30. Installing the Front End Module

3. Connect any required cables, please refer to [Cable Routing](#).

Removing and Installing the PCI Riser Assembly

Before removing or installing the PCI riser assembly, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).

Removing the PCI Riser Assembly

1. Disconnect any cables attached to any add-in cards, pull up the release lever (see letter **A**).
2. Grasp the riser assembly with both hands and pull up to remove from system (see letter **B**).

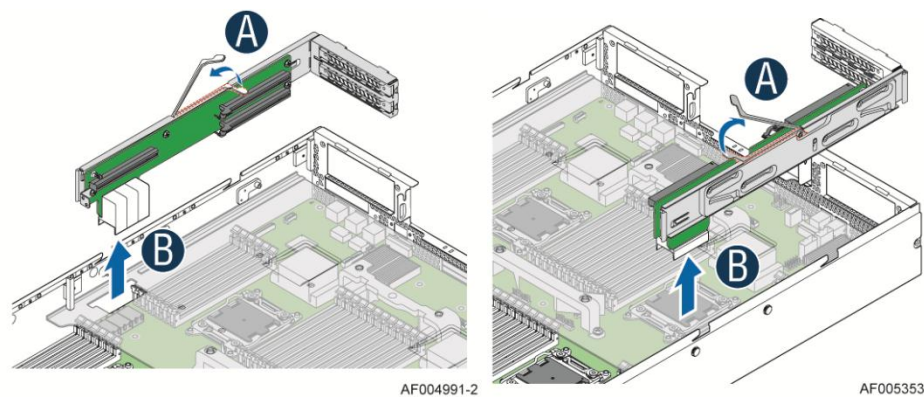


Figure 31. Removing the PCI Riser Assembly

Warning: Place the riser assembly upside down or sideways to avoid damage to the riser card connector.

Do one of the following:

- If you need to add or replace a PCI add-in card, see [Installing and Removing a PCI Add-in Card](#).
- If you removed the PCI riser assembly for another procedure, continue with that procedure.

Installing the PCI Riser Assembly

1. Position the riser card connector edge over the server board riser socket (see letter **A**).
2. Press down the release lever to install the riser assembly into the riser socket (see letter **B**).
3. Push on the board edge above the connector to ensure the connector is seated.

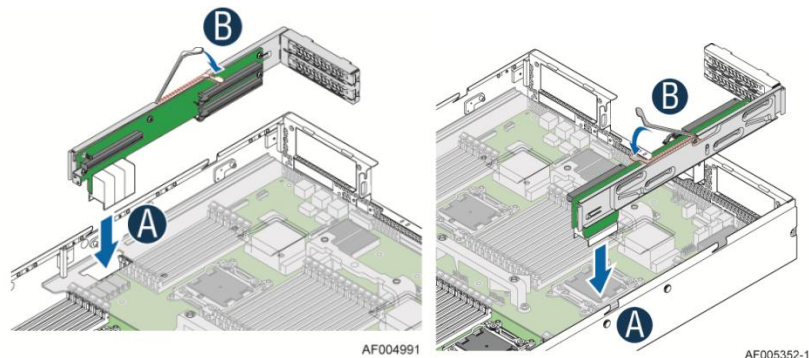


Figure 32. Installing the PCI Riser Assembly

4. Connect any cables to add-in cards that require them. See your add-in card documentation for information and add-in card requirements.

Installing and Removing a PCI Add-in Card

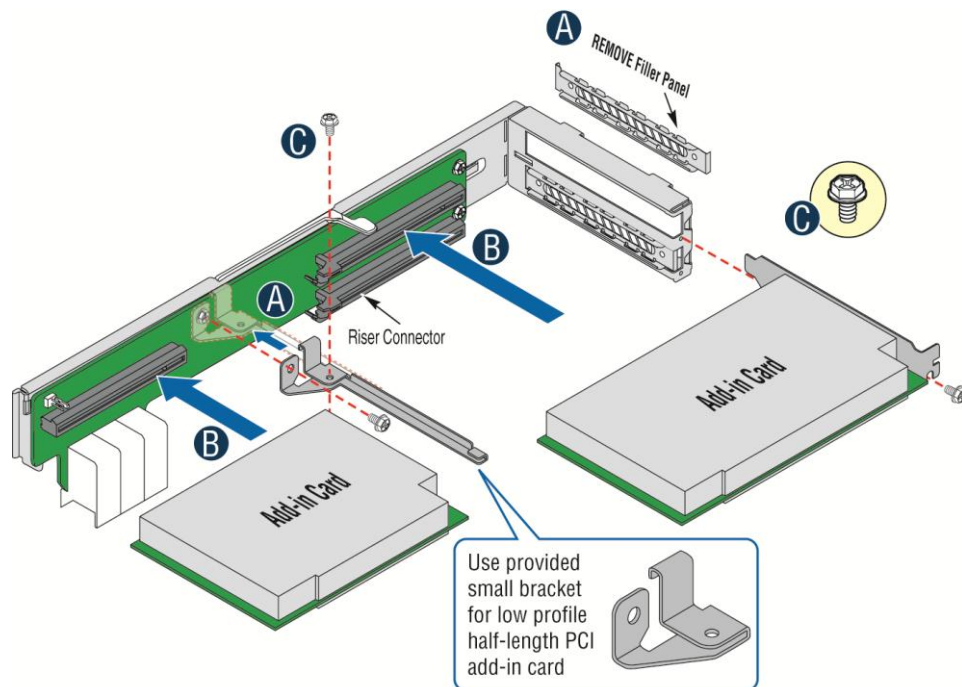
Before removing or installing a PCI add-in card, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).

Installing a PCI Add-in Card

Installing a Half-Length PCI Add-in Card

1. Remove the filler panel from the add-in card slot and install the provided proper bracket as shown (see letter **A**).
2. Insert add-in card until it sits in the riser connector (see letter **B**).
3. Secure add-in card with screw as shown (see letter **C**).



AF004990

Figure 33. Installing a Half-Length PCI Add-In Card

Installing a Full-length PCI Add-in Card

1. Remove the screw (See letter **A**), install and secure the provided proper bracket as shown (see letter **B**)
2. Remove the filler panel from the add-in card slot and remove the screw as shown (see letter **C**).
3. Insert add-in card until it sits in the riser connector (see letter **D**).
4. Secure the add-in card with screw as shown (see letter **E**).

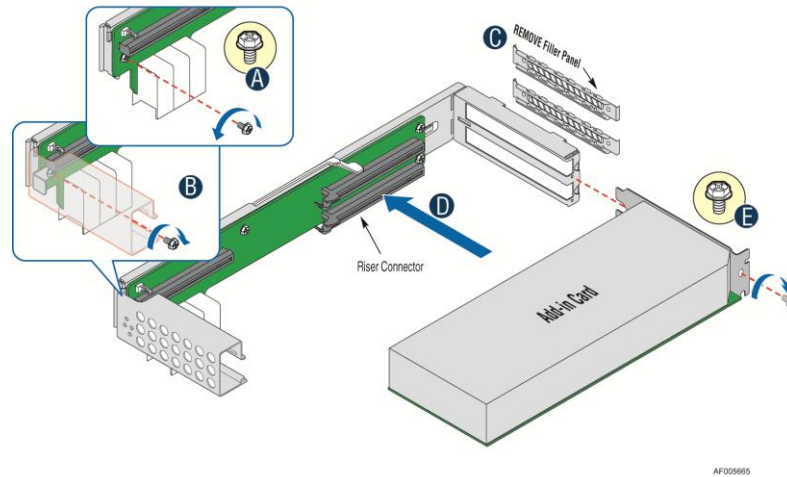


Figure 34. Installing a Full-Length PCI Add-In Card

Removing a PCI Add-in Card

Removing a Half-Length PCI Add-in Card

1. Remove the screw as shown (see letter **A**).
2. Remove the PCI add-in card from the riser card connector (see letter **B**).

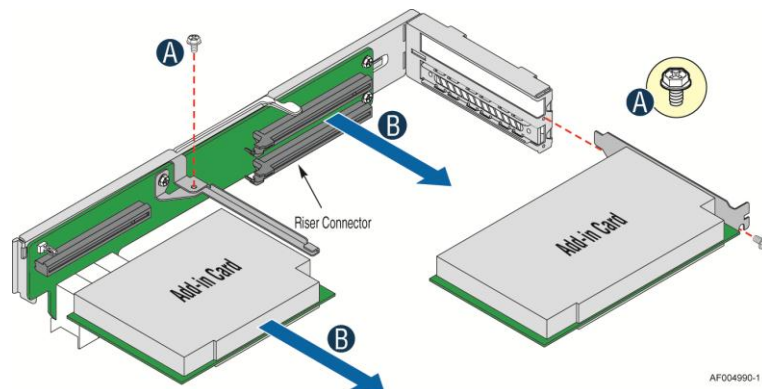


Figure 35. Removing a Half-Length PCI Add-In Card

Note: Make sure that all empty add-in card slots have filler panels installed.

Removing a Full-Length PCI Add-in Card

1. Remove the screw as shown (see letter **A**).
2. Remove the PCI add-in card from the riser card connector (see letter **B**).
3. Remove the screw and the bracket for full-length PCI add-in card as shown (see letter **C**).
4. Install the screw as shown (see letter **D**).

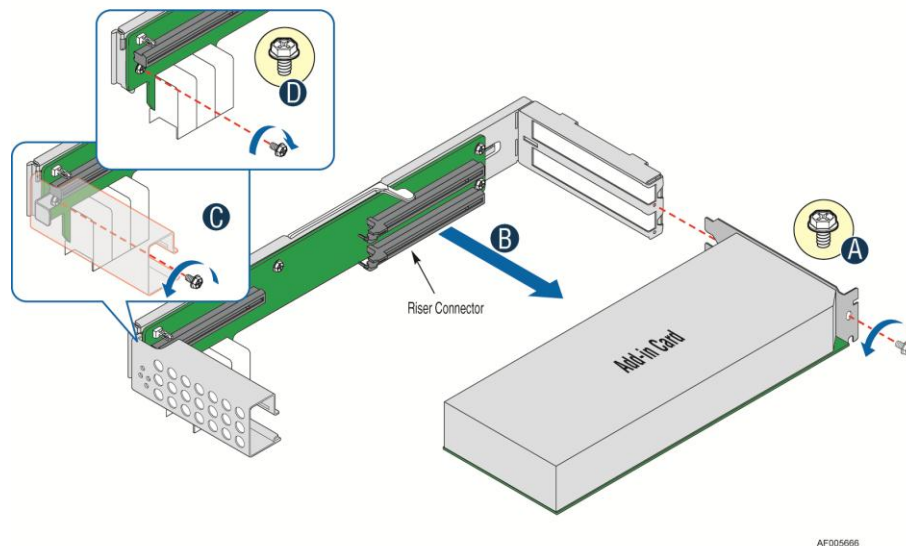


Figure 36. Removing a Full-Length PCI Add-In Card

Note: Make sure that all empty add-in card slots have filler panels installed.

Removing and Installing the Air Duct

Always operate your server system with the air duct in place. The air duct is required for proper airflow within the server system.

Before removing or installing the air duct, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
4. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).

Removing the Air Duct

1. Loosen the thumbscrew under the power supply cage at the rear of the system.
2. Lift up the tilt bay and fully open it to 110 degrees (see letter **A**).
3. Bend and slide out the air duct (see letter **B**).
4. Remove the air duct from the chassis (see letter **C**).

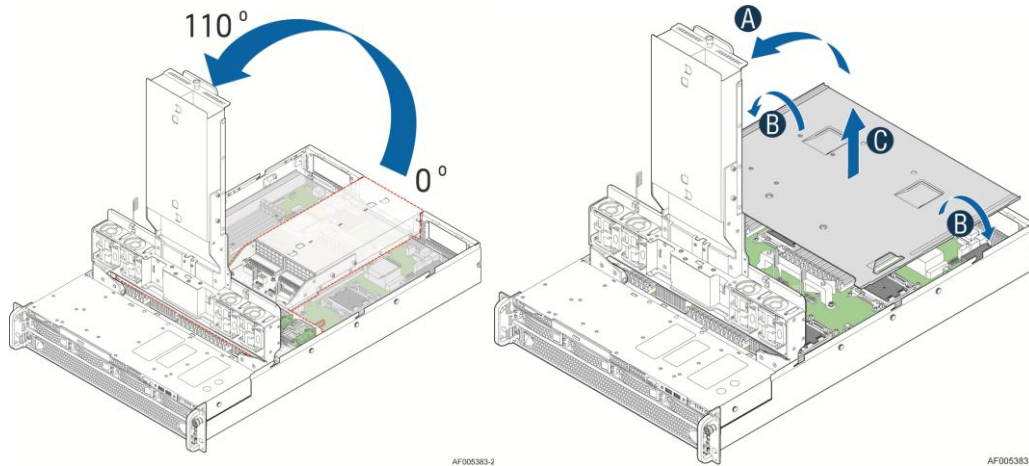


Figure 37. Removing the Air Duct

Installing the Air Duct

1. Bend and slide in the air duct (see letter **A**).
2. Install air duct into the chassis (see letter **B**).
3. Flip down the power supply (see letter **C**).

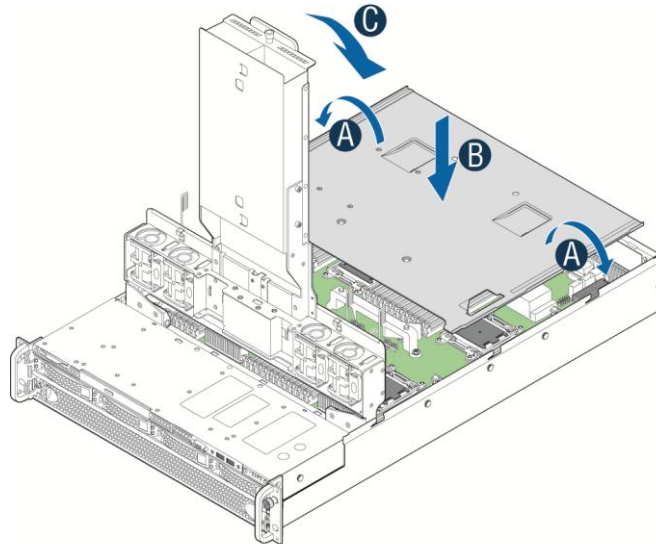


Figure 38. Installing the Air Duct

Removing and Installing the Processor Heatsink(s)

The heatsink has Thermal Interface Material (TIM) on the underside of it. Use caution so that you do not damage the thermal interface material. Use gloves to avoid sharp edges.

Before removing processor the heatsink(s), please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).
4. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
5. Remove the air duct. For instructions, see [Removing the Air Duct](#).

Removing Processor Heatsink(s)

The heatsink is attached to the server board/processor socket with captive fasteners. Using a #2 Phillips* screwdriver, loosen the four screws located on the heatsink corners in a diagonal manner using the following procedure:

1. Using a #2 Phillips* screwdriver, start with screw 1 and loosen it by giving it two rotations and stop (see letter **A**). (IMPORTANT: Do not fully loosen.)
2. Proceed to screw 2 and loosen it by giving it two rotations and stop (see letter **B**). Similarly, loosen screws 3 and 4. Repeat steps A and B by giving each screw two rotations each time until all screws are loosened.
3. Lift the heatsink straight up (see letter **C**).

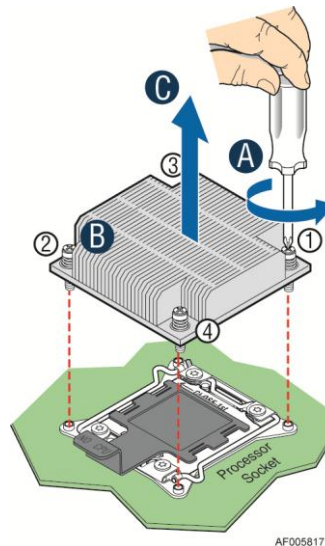


Figure 39. Removing Processor Heatsink

Installing Processor Heatsink(s)

1. Remove the protective film on the TIM if present (see letter **A**).
2. Align heatsink fins to the front and back of the chassis for correct airflow. Airflow goes from front-to-back of chassis (see letter **B**).

Each heatsink has four captive fasteners and should be tightened in a diagonal manner using the following procedure:

1. Using a #2 Phillips* screwdriver, start with screw 1 and engage screw threads by giving it two rotations and stop (see letter **C**). (Do not fully tighten.)
2. Proceed to screw 2 and engage screw threads by giving it two rotations and stop (see letter **D**). Similarly, engage screws 3 and 4.
3. Repeat steps C and D by giving each screw two rotations each time until each screw is lightly tightened up to a maximum of eight inch-lbs torque (see letter **E**).

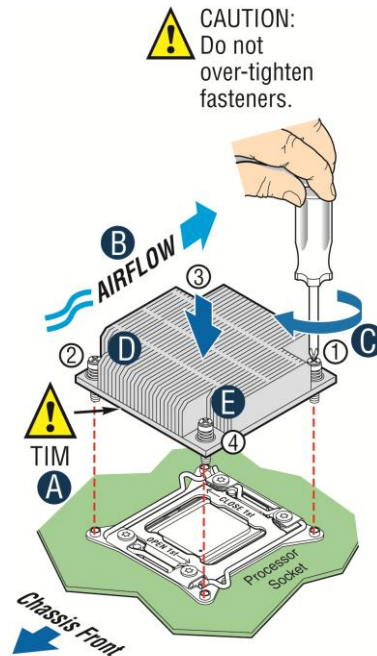


Figure 40. Installing Processor Heatsink

Installing or Replacing the Processor

Caution: Processor must be appropriate: You may damage the server board if you install a processor that is inappropriate for your server. For a web link to the list of compatible processor(s), see “Additional Information and Software” on page 4.

Caution: ESD and handling processors: Reduce the risk of electrostatic discharge (ESD) damage to the processor by doing the following:

- Touch the metal chassis before touching the processor or server board. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor.
- Avoid moving around unnecessarily.

Caution: Protective socket cover needs to be removed for proper cooling of the processor; failure to remove the cover could result in damage to the system.

Note: To avoid unexpected damage to the processor socket(s), Intel strongly recommends using Processor Insertion/ Removal Tool (IPN: G21819-003) to install or replace the processor(s).

Before removing or replacing the processor, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).

3. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).
4. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
5. Remove the air duct. For instructions, see [Removing the Air Duct](#).
6. Remove the processor heatsink(s). For instructions, see [Removing Processor Heatsink\(s\)](#).

Installing the Processor

1. Remove the cover as shown. Save the protective cover.

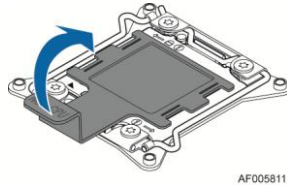


Figure 41. Installing Processor – Remove the Cover

2. Open the Socket Lever. Push down the lever handle on the **OPEN first** side and away from the socket to release it (see letter **A**). Repeat the steps to release the lever on the other side (see letter **B**).

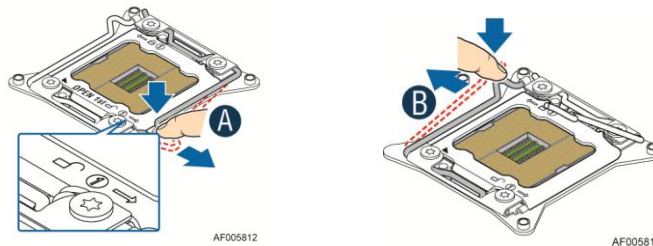


Figure 42. Installing Processor – Open the Socket Lever

3. Open the Load Plate. Press the locking lever slightly to raise the load plate (see letter **A**). Open the load plate all the way (see letter **B**).

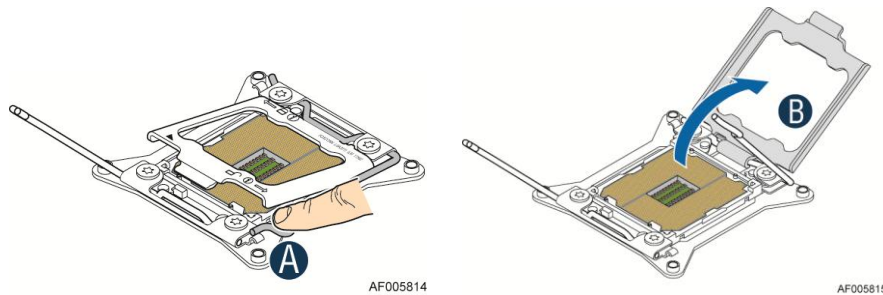


Figure 43. Installing Processor – Open the Load Plate

4. Install the Processor. Take the processor out of the box and remove the protective shipping cover (see letter **A**). Orient the processor with the socket so that the processor cutouts match the four orientation posts on the socket (see letter **B**). Note location of gold key at corner of processor (see letter **C**).

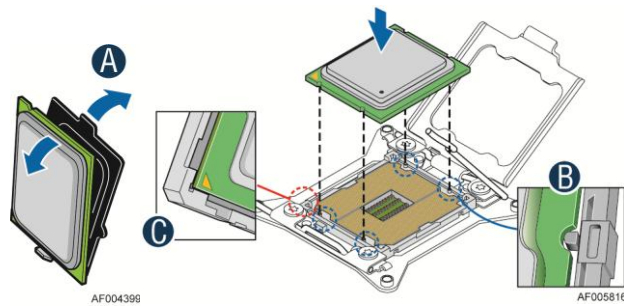


Figure 44. Installing Processor – Install the Processor

Note: The underside of the processor has components that may damage the socket pins if installed improperly. Processor must align correctly with the socket opening before installation. DO NOT DROP processor into socket!

5. Close the Load Plate. Carefully lower the load plate over the processor.

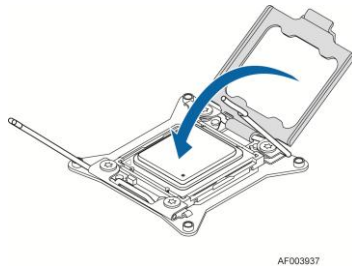


Figure 45. Installing Processor – Close the Load Plate

6. Latch the Locking Lever. Push down on the locking lever on the CLOSE 1st side (see letter A). Slide the tip of the lever under the notch in the load plate (see letter B). Make sure the load plate tab engages under the socket lever when fully closed. Repeat the steps to latch the locking lever on the other side (see letter C). Latch the levers in the order as shown.

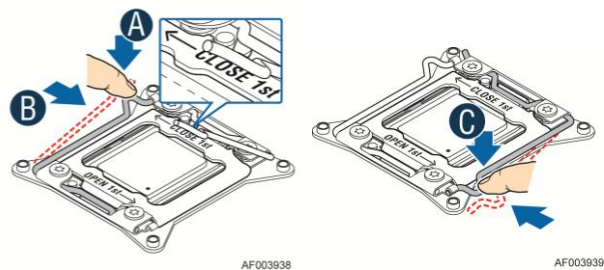


Figure 46. Installing Processor – Latch the Locking Lever

Installing and Removing the Memory

Before installing or removing the memory, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).
4. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
5. Remove the air duct. For instructions, see [Removing the Air Duct](#).

Installing Memory

1. Locate the DIMM sockets. Make sure the clips at either end of the DIMM socket(s) are pushed outward to the open position (see letter **A**).
2. Holding the DIMM by the edges, remove it from its anti-static package. Position the DIMM above the socket. Align the notch on the bottom edge of the DIMM with the key in the DIMM socket (see letter **B**).
3. Insert the bottom edge of the DIMM into the socket (see letter **C**). When the DIMM is inserted, push down on the top edge of the DIMM until the retaining clips snap into place (see letter **D**). Make sure the clips are firmly in place (see letter **E**).

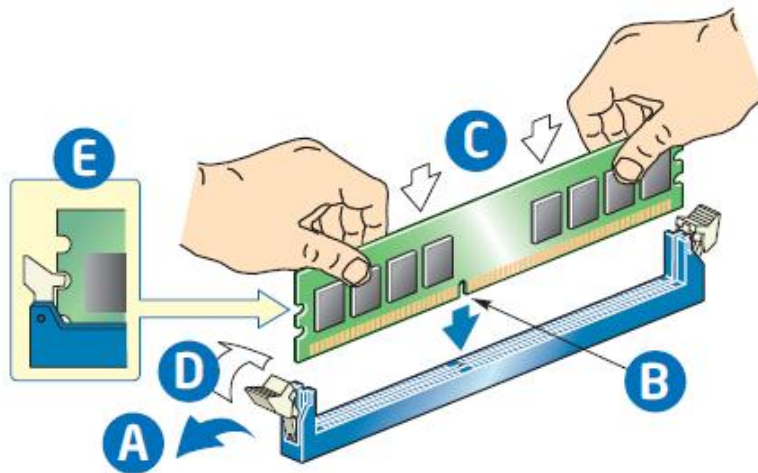


Figure 47. Installing Memory

Removing Memory

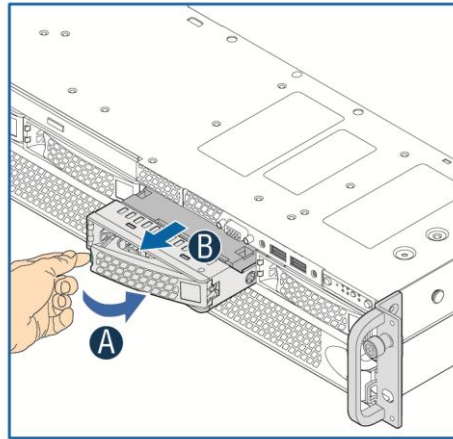
1. Locate the DIMM sockets. Gently spread the retaining clips at each end of the socket. The DIMM lifts from the socket.
2. Holding the DIMM by the edges, lift it from the socket, and store it in an anti-static package.

Installing and Removing Hard Drive

Caution: If you do not install all drives, empty drive bays must be occupied by carriers with plastic drive blank provided to maintain proper system cooling.

Installing a Hard Disk Drive into 3.5" Hot Swap Hard Drive Carrier

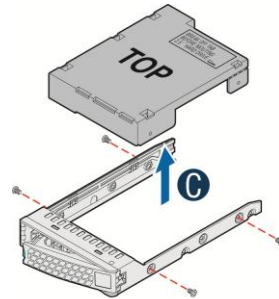
1. Remove the drive carrier by pressing the green button and opening the lever (see letter **A**). Slide the carrier out (see letter **B**).



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Figure 48. Installing Hard Disk Drive – Removing 3.5" HDD carrier

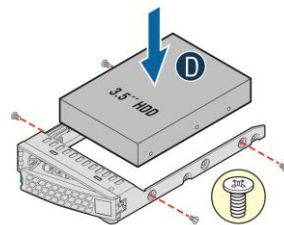
2. Remove the four screws securing the HDD interface bracket and remove the HDD interface bracket (see letter **C**).



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Figure 49. Installing Hard Disk Drive – Removing 3.5" HDD interface bracket

3. Install the hard disk drive using the same four screws as shown. Make sure the connector end of the drive matches the backplane connector (see letter **D**).



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Figure 50. Installing Hard Disk Drive – Installing 3.5" HDD

For installing 2.5" Hard Disk Drive as an option:

Break off the tab on the HDD interface bracket (see letter **d1**). Install the HDD interface bracket from top. Secure the bracket with three screws as shown (see letter **d2**). Slide the 2.5" HDD

into the bracket to align the screw holes with the right and left rail (see letter **d3**). Secure the hard disk drive using the four screws for 2.5" HDD (see letter **d4**).

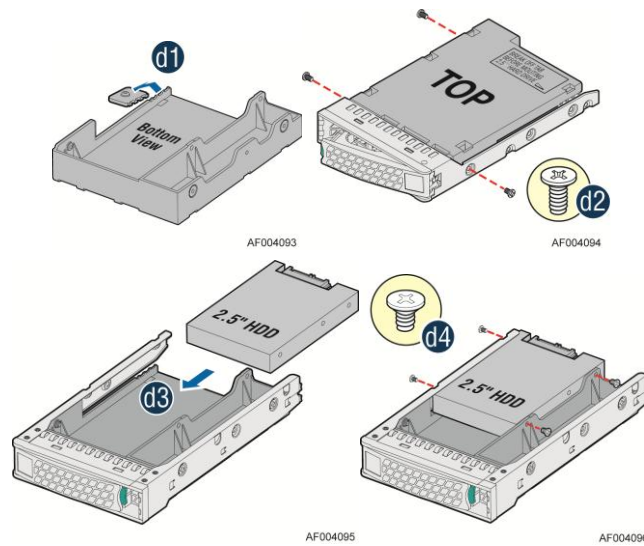


Figure 51. Installing Hard Disk Drive – Installing 2.5" HDD

4. With the lever open, insert the hard disk drive assembly into the chassis (see letter **E**). Push in the lever to lock it into place (see letter **F**).

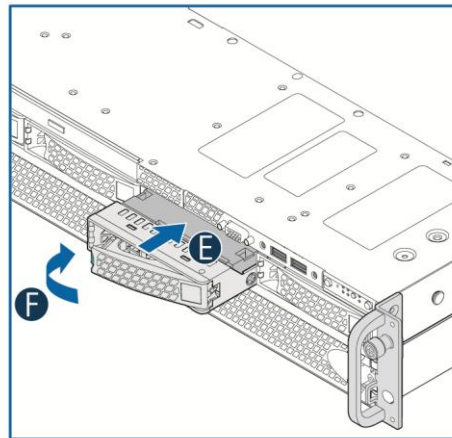


Figure 52. Installing Hard Disk Drive – Inserting 3.5" HDD Assembly

Installing a Hard Disk Drive into 2.5" Hot Swap Hard Drive Carrier

1. Remove the drive carrier by pressing the green latch to unlock (see letter **A**). Pull out the black lever and slide the carrier out (see letter **B**).

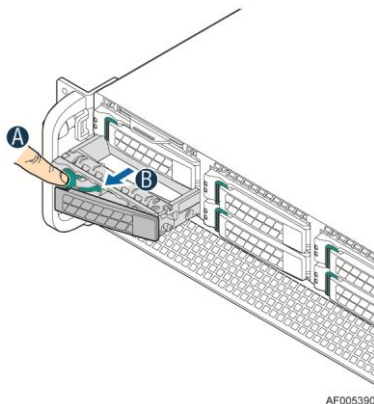


Figure 53. Installing Hard Disk Drive – Removing 2.5" HDD carrier

2. Remove the four screws securing the plastic drive blank from the 2.5" HDD carrier (see letter **C**). Disengage the plastic drive blank from the HDD carrier. Remove the plastic drive blank from the 2.5" HDD carrier (see letter **D**).

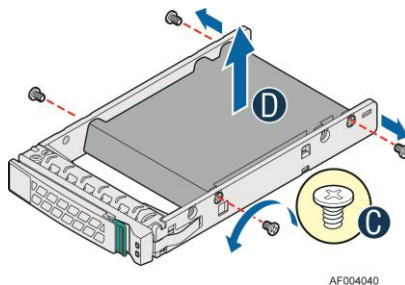


Figure 54. Installing Hard Disk Drive – Removing Plastic Drive Blank

3. Install the hard disk drive using the four screws as shown. Make Sure the connector end of the drive matches the backplane connector (see letter **E**).

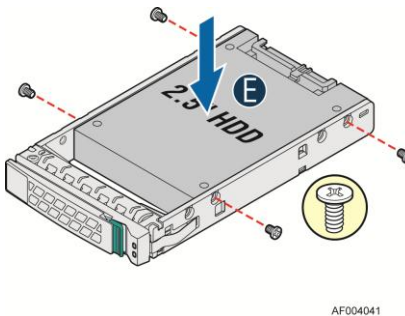


Figure 55. Installing Hard Disk Drive – Installing 2.5" HDD

4. With the lever open, insert the hard disk drive assembly into the chassis, then push in the lever to lock it into place (see letter **F**).

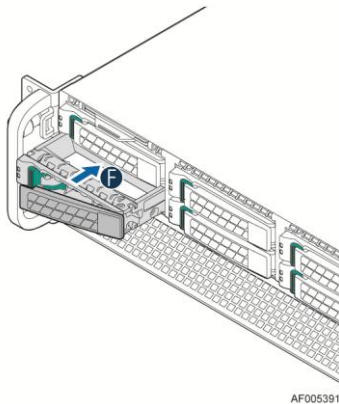


Figure 56. Installing Hard Disk Drive – Inserting 2.5" HDD assembly

Installing and Removing a Slimline Optical Drive

Cautions: The slimline optical drive is **NOT** hot-swappable. Before removing or replacing the drive, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the AC power cord from the system or wall outlet.

To maintain proper system cooling, a filler panel must be installed if you do not install a device at this location.

Before installing or removing the slimline optical drive, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).

Installing a Slimline Optical Drive

1. Install the plastic guide onto the back of the drive and attach with two screws as shown (see letter **A**).

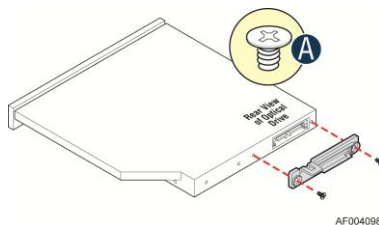


Figure 57. Installing the Plastic Guide to the Optical Drive

2. Insert the optical drive into chassis opening and push all the way until it stops (see letter **B**). Connect the cables as shown (see letter **C**).

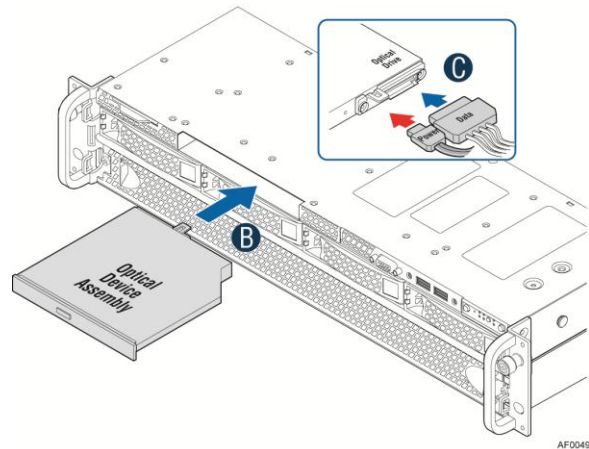


Figure 58. Installing an Optical Drive

Removing a Slimline Optical Drive

1. Remove the cables (see letter **A**). Slide the optical drive out (see letter **B** and **C**).

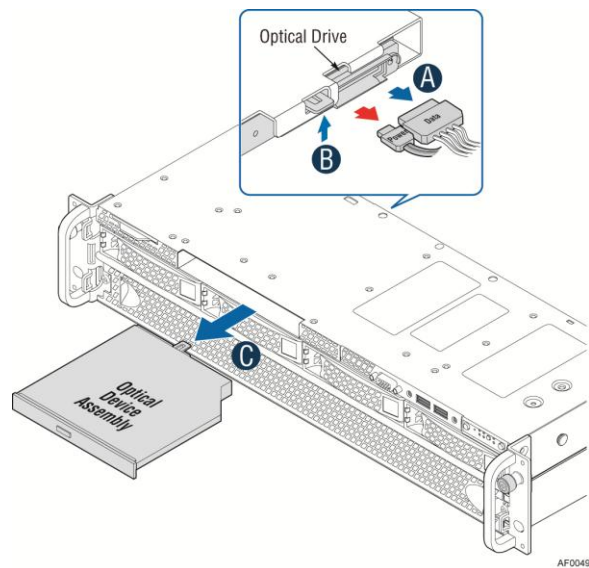


Figure 59. Removing the Slimline Optical Drive

2. If no device will be installed in this location, install a filler panel in this location.

Installing and Removing the Intel® I/O Expansion Module

Before installing or removing the Intel® I/O expansion module, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).

3. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).
4. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
5. Remove the air duct. For instructions, see [Removing the Air Duct](#).

Before Installing Intel® I/O Expansion Module at the Left Edge of the Board (Optional)

1. Install the module to the provided bracket (see letter **A**).
2. Secure the module to the bracket with the three screws (see letter **B**).
3. Install the provided connector converter (see letter **C**).

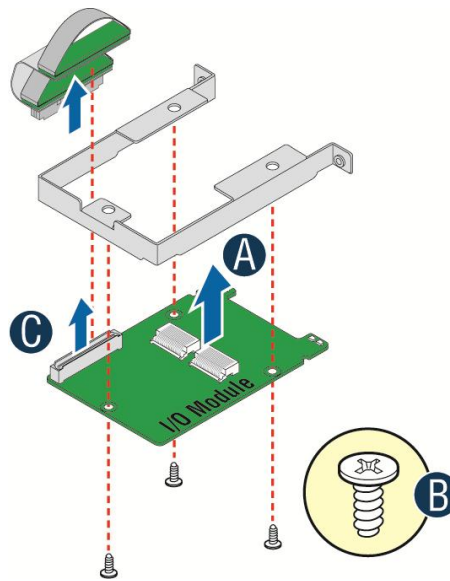
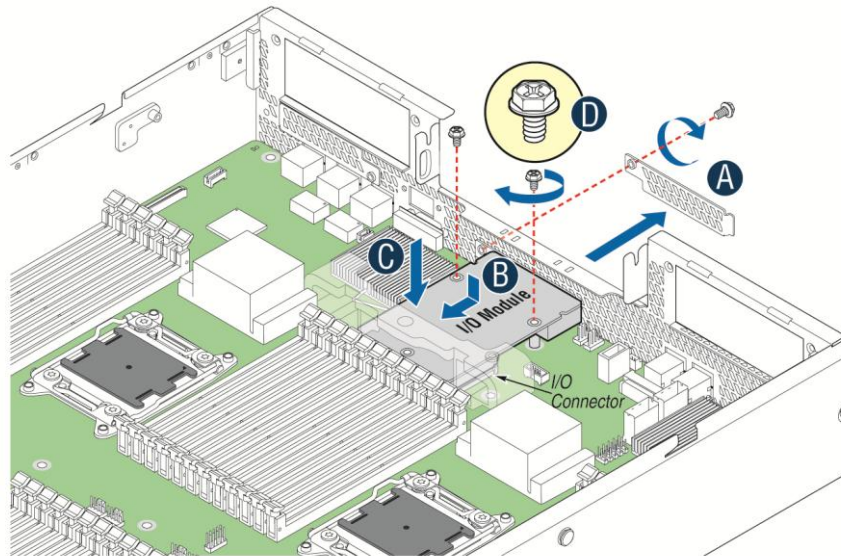


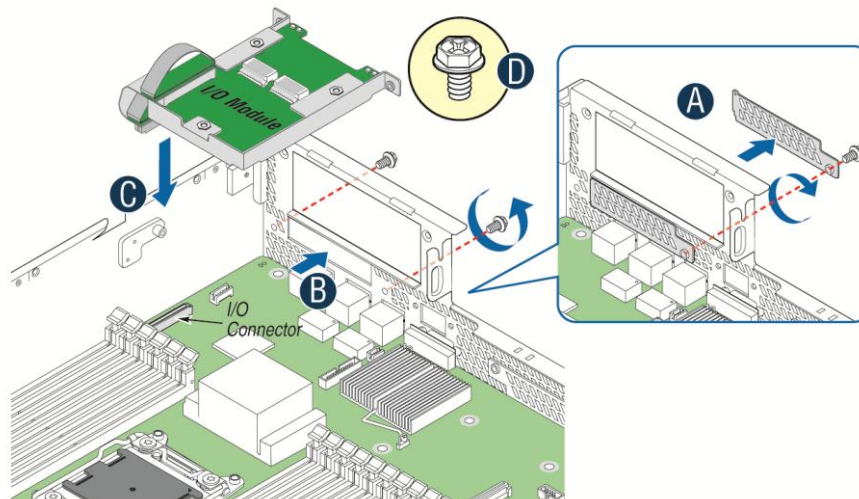
Figure 60. Installing Intel® I/O Expansion Module

Installing Intel® I/O Expansion Module

1. Remove the screw securing the filler panel from the chassis and remove the filler panel (see letter **A**).
2. Position the module over the server board, fit the front of the module into the back panel slot (see letter **B**).
3. Attach the module to the server board connector (see letter **C**).
4. Secure the module with the two screws as shown (see letter **D**).



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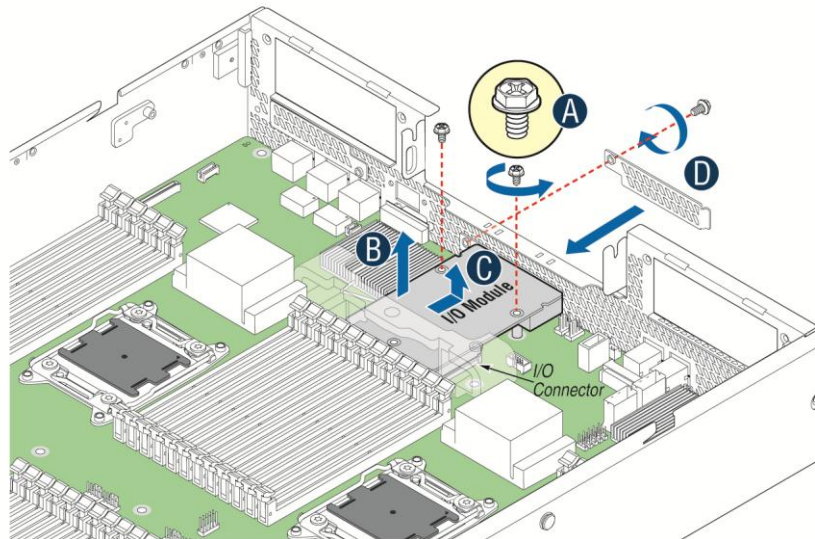


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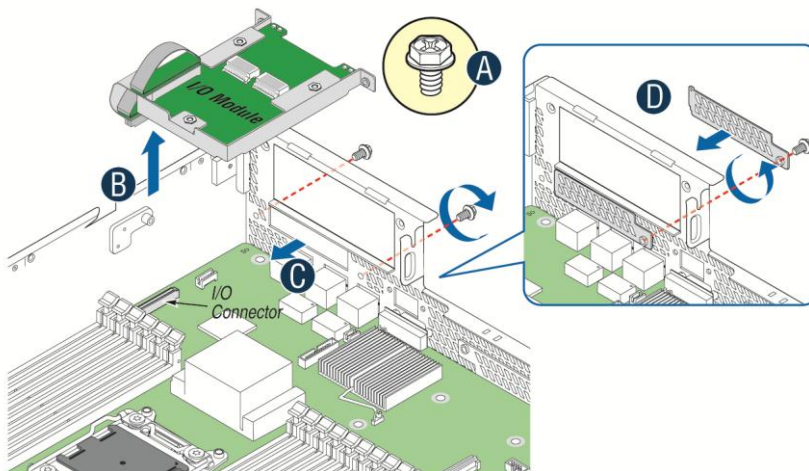
Figure 61. Installing Intel® I/O Expansion Module

Removing Intel® I/O Expansion Module

1. Remove the two screws as shown (see letter **A**).
2. Remove the module out of the server system (see letter **B** and **C**).
3. Install the I/O expansion module filler panel into the system back panel and secure it to the chassis with the screw (see letter **D**).



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Figure 62. Removing Intel® I/O Expansion Module

Installing and Removing the Intel® Remote Management Module 4

Before installing or removing the Intel® Remote Management Module 4, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).
4. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
5. Remove the air duct. For instructions, see [Removing the Air Duct](#).

Installing the Intel® RMM4 Lite

Locate the RMM4 Lite connector next to onboard NIC port, carefully pick up the Intel® RMM4 Lite module, and match the alignment pin of the module and the connector on server board. Press to install.

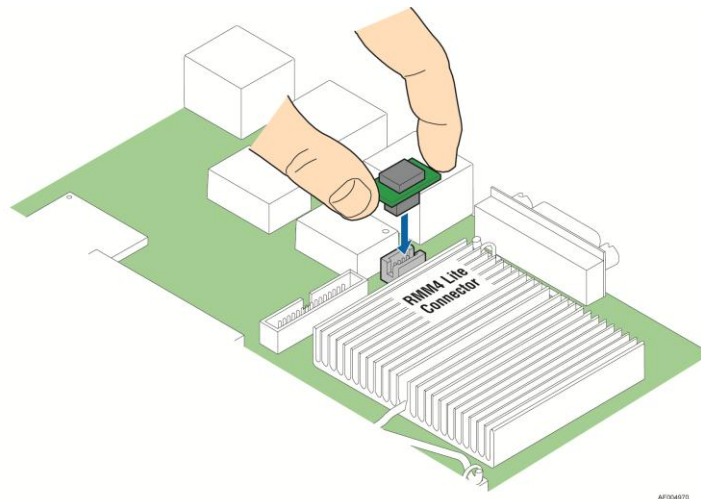


Figure 63. Installing the Intel® RMM4 Lite

Install the Intel® RMM4 NIC

1. Connect the cable to the server board (see letter **A**).
2. Secure the module with the two screws as shown (see letter **B**).
3. Connect the cable to the module (see letter **C**).

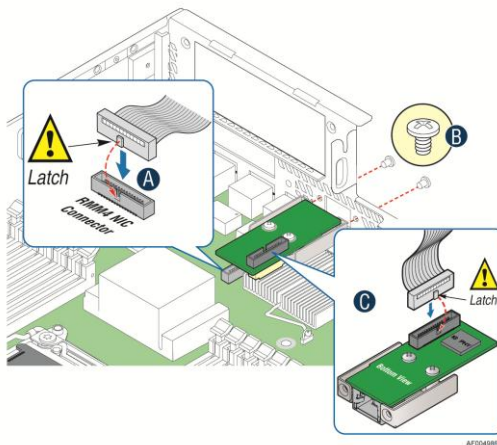


Figure 64. Installing the Intel® RMM4 NIC

Removing the Intel® RMM4 Lite

Pull up the RMM4 Lite module to remove it from the mother board.

Removing the Intel® RMM4 NIC

1. Remove the cable to the module (see letter **A**).
2. Remove the two screws as shown and remove the module out of the server system (see letter **B**).
3. Remove the cable to the server board (see letter **C**).

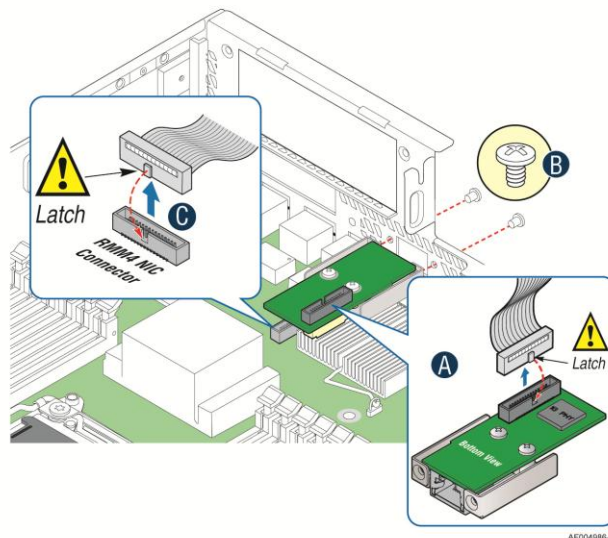


Figure 65. Removing the Intel® RMM4 NIC

Installing and Removing an Internal Solid State Drive

Before installing or removing the Solid State Drive, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the rack handles. For instructions, see [Removing the Rack Handles](#).
4. Slide the front end module in forward a bit. For instructions, see [Removing the Front End Module](#).

Installing a Solid State Drive

1. Remove the two screws to release the Solid State Drive carrier (see letter **A**)
2. Place the Solid State Drive in the carrier (see letter **B**).
3. Secure the Solid State Drive with the four screws (see letter **C**).
4. Slide the Solid State Drive carrier into the chassis (see letter **D**).
5. Secure the Solid State Drive carrier with the two screws (see letter **E**).
6. Connect cables (see letter **F**).

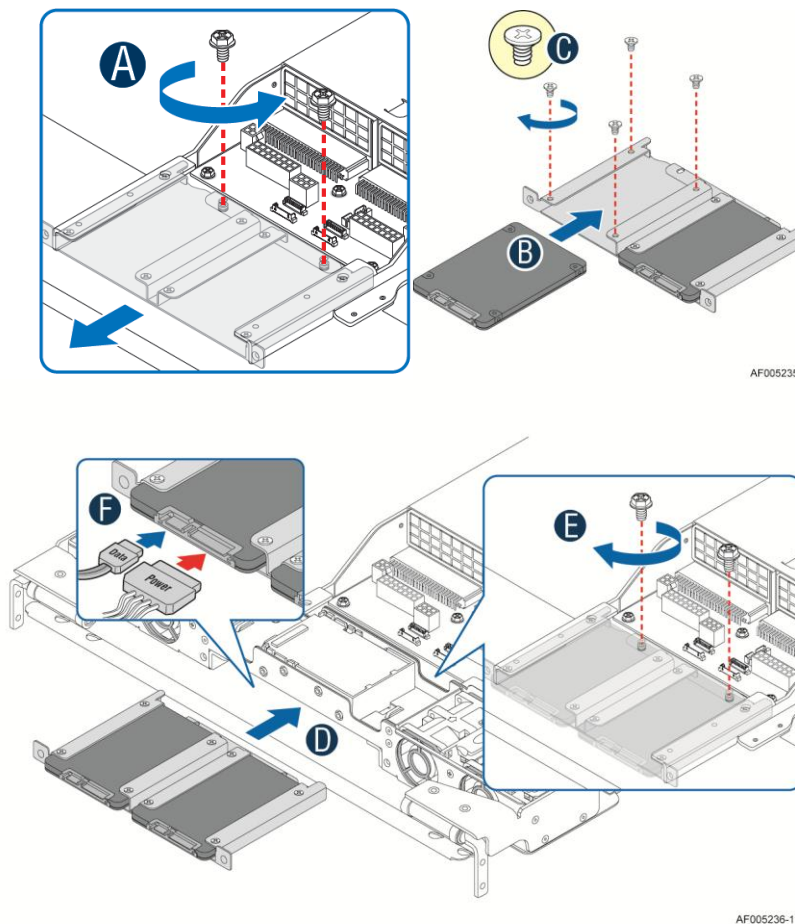


Figure 66. Installing a SSD

Removing a Solid State Drive

1. Disconnect cables (see letter **A**).
2. Remove the two screws to release the Solid State Drive carrier (see letter **B**).
3. Pull the Solid State Drive up to remove from the air duct (see letter **C**).
4. Remove the four screws to release the Solid State Drive (see letter **D**).
5. Pull the Solid State Drive up to remove from the carrier (see letter **E**).
6. Secure the Solid State Drive carrier to chassis with the two screws.

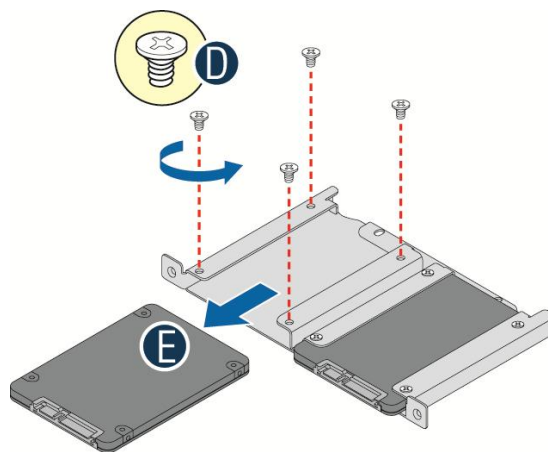
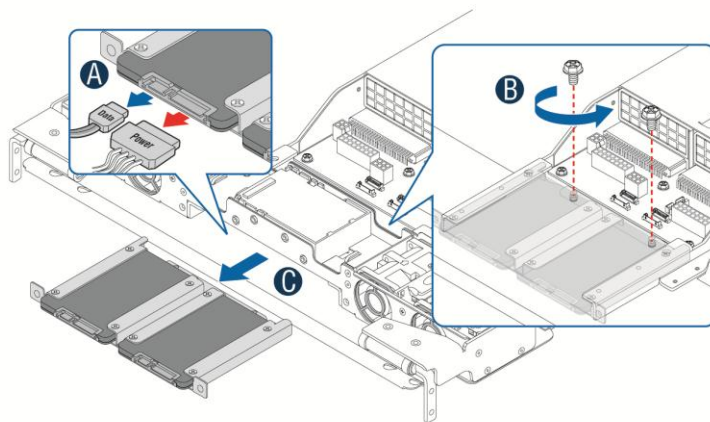


Figure 67. Removing a SSD

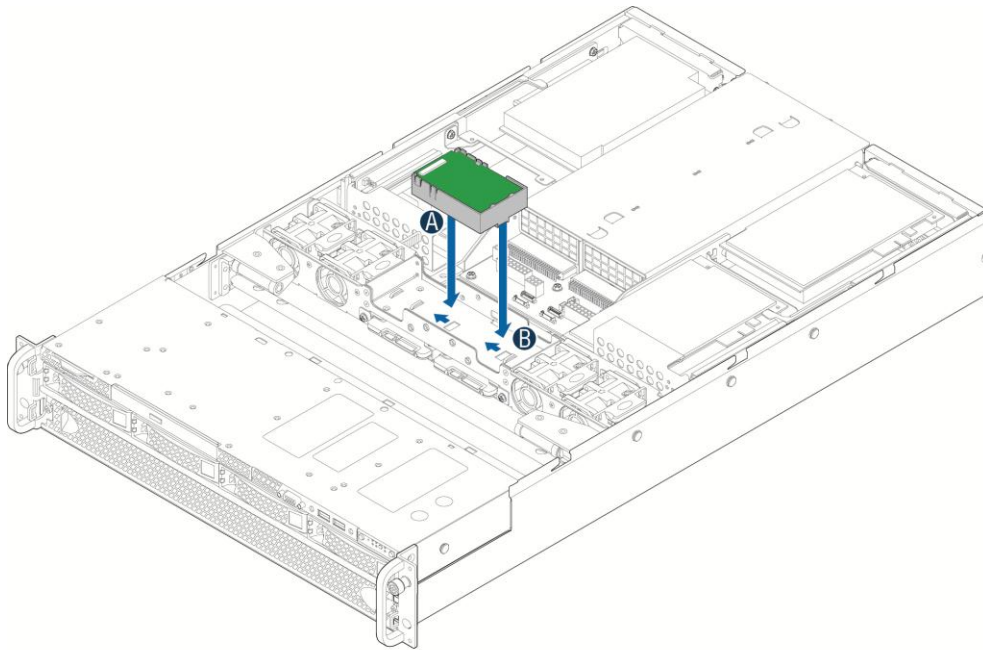
Installing and Removing the Intel® RAID Smart Battery

Before installing or removing the Intel® RAID Smart Battery, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).

Installing the Intel® RAID Smart Battery

1. Connect the cable between the BBU and the RAID card. For details, see *Intel® RAID Smart Battery User's Guide*.
2. Position the battery against chassis (see letter **A**).
3. Align the tabs on the plastic battery holder with the mounting holes in the chassis and slide in the plastic battery holder until the tabs engage with the mounting holes (see letter **B**).



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Figure 68. Installing the Intel® RAID Smart Battery

Removing the Intel® RAID Smart Battery

1. Slide out the plastic battery holder (see letter **A**).
2. Lift the battery up to remove it from the server chassis (see letter **B**).

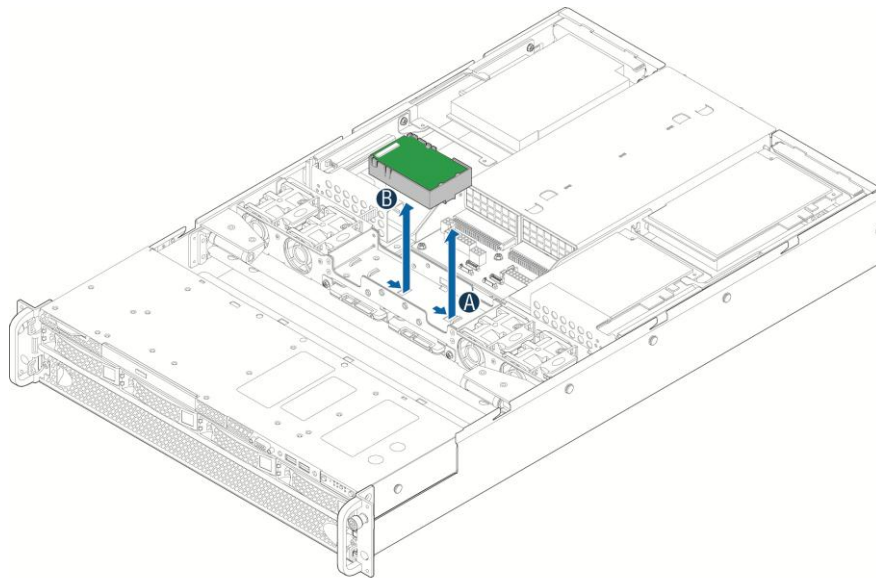


Figure 69. Removing the Intel® RAID Smart Battery

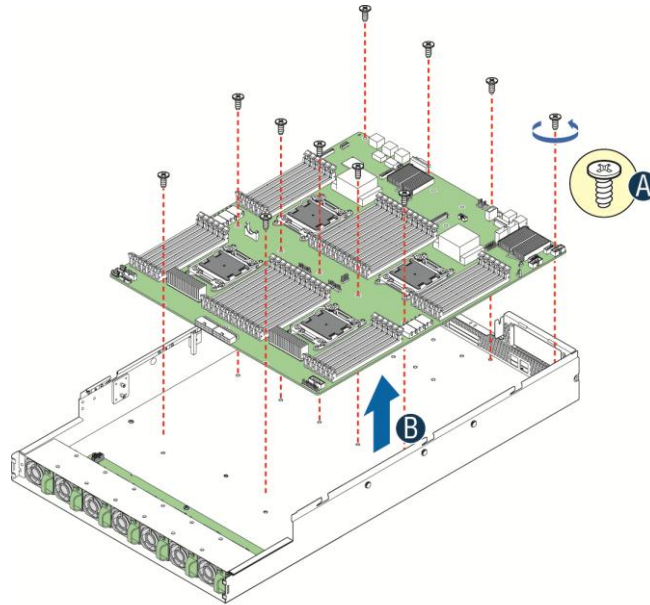
Installing and Removing the Server Board

Before installing or removing the server board, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).
4. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
5. Remove the air duct. For instructions, see [Removing the Air Duct](#).
6. Remove the processor heatsink(s). For instructions, see [Removing Processor Heatsink\(s\)](#).
7. Remove the processor(s). For instructions, see [Installing or Replacing the Processor](#).
8. Remove the memory. For instructions, see [Removing Memory](#).
9. Remove all the Intel® I/O expansion module(s). For instructions, see [Removing Intel® I/O Expansion Module](#).
10. Remove Intel® Remote Management Module 4. For instructions, see [Installing and Removing the Intel® Remote Management Module 4](#).

Removing the Server Board

1. Disconnect all cables from the server board.
2. Remove the thirteen screws from the server board (see letter **A**).
3. Lift the server board from the server system (see letter **B**).

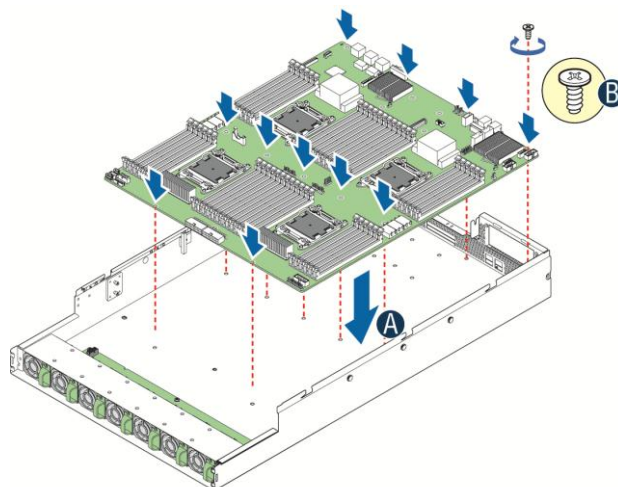


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Figure 70. Removing the Server Board

Installing the Server Board

1. Place the server board into the server system (see letter **A**).
2. Secure the server board with thirteen screws (see letter **B**).



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Figure 71. Installing the Server Board

3. Connect all power cables to the server board.

Replacing the Backup Battery

The lithium battery on the server board powers the RTC for up to 10 years in the absence of power. When the battery starts to weaken, it loses voltage, and the server settings stored in CMOS RAM in the RTC (for example, the date and time) may be wrong. Contact your customer service representative or dealer for a list of approved devices.

Warning: *Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.*

Advarsel: Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

Advarsel: Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

Varning: Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

Varoitus: Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).
4. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
5. Remove the air duct. For instructions, see [Removing the Air Duct](#).
6. Locate the battery on the server board.
7. Gently press the metal clip as shown to release the battery (see letter **A**).
8. Remove the battery from the plastic socket (see letter **B**).

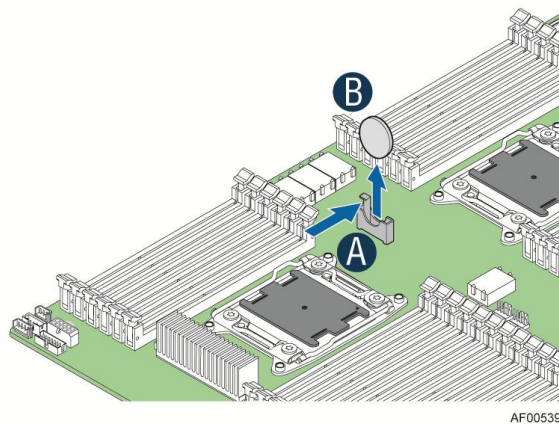


Figure 72. Replacing the Backup Battery

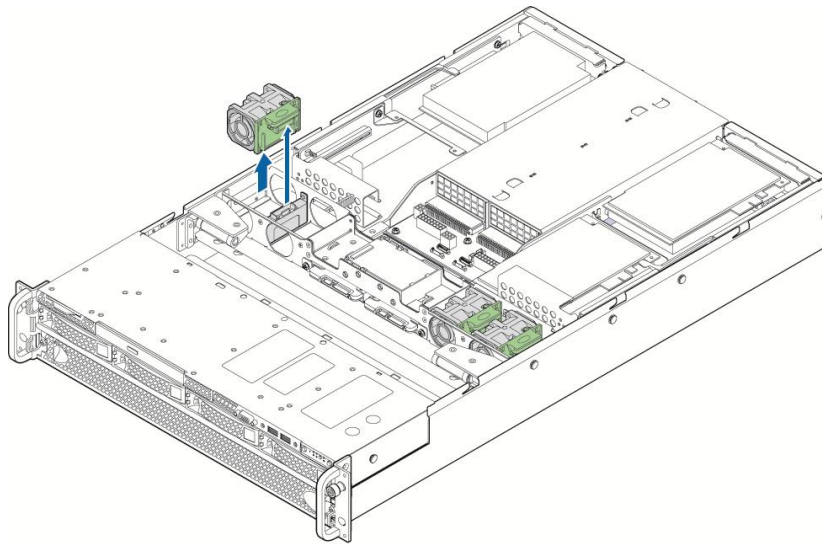
9. Dispose of the battery according to local ordinance.

10. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it in the battery socket.

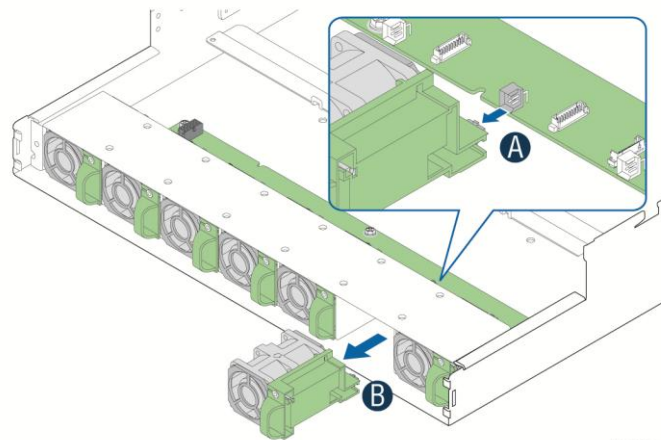
Note: You will need to run the BIOS Setup to restore the configuration settings to the RTC.

Replacing a Redundant Fan Module

1. Remove the system cover if needed. For instructions, see [Removing the System Cover](#).
2. Pull system fan straight up to remove it from the fan holder.
3. Replace the system fan by guiding it into the slot and firmly pressing down to ensure that it is properly seated.



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Figure 73. Replacing a system fan

Replacing the Backplane

Before removing or installing the backplane, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove all hot-swap drive carriers, regardless of whether or not a drive is installed in the carrier.

Removing the Backplane

1. Disconnect all cables from the backplane.
2. Remove the screw (see letter **A**).
3. Pull up the backplane (see letter **B**).
4. Remove the backplane from the server chassis (see letter **C**).

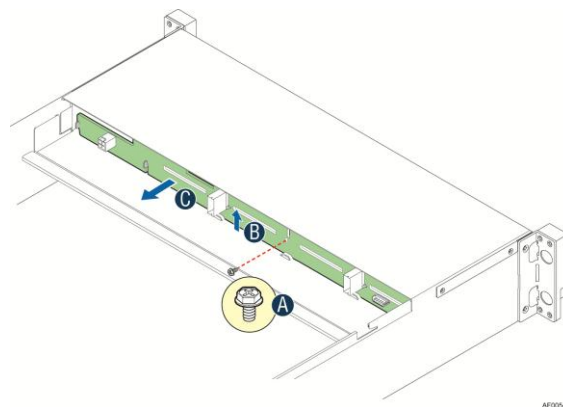


Figure 74. Removing the backplane

Installing the Backplane

1. Hold the backplane only by the edges. Do not push or pull on any components on the backplane. Position the backplane in place at the front of the server system (see letter **A**).
2. Slide the backplane into the server system guides (see letter **B**).
3. Secure the backplane with the screw as shown (see letter **C**).

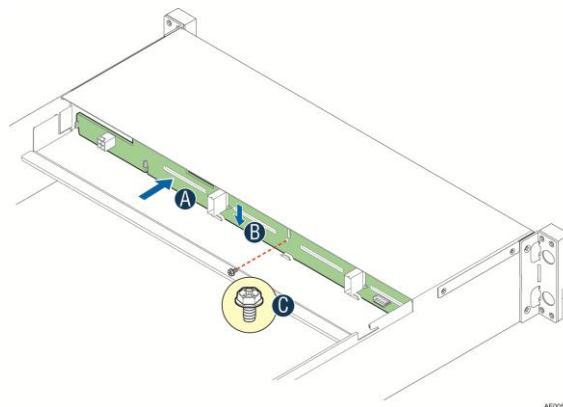


Figure 75. Installing the backplane

4. Connect cables to backplane, please refer to [Cable Routing](#).

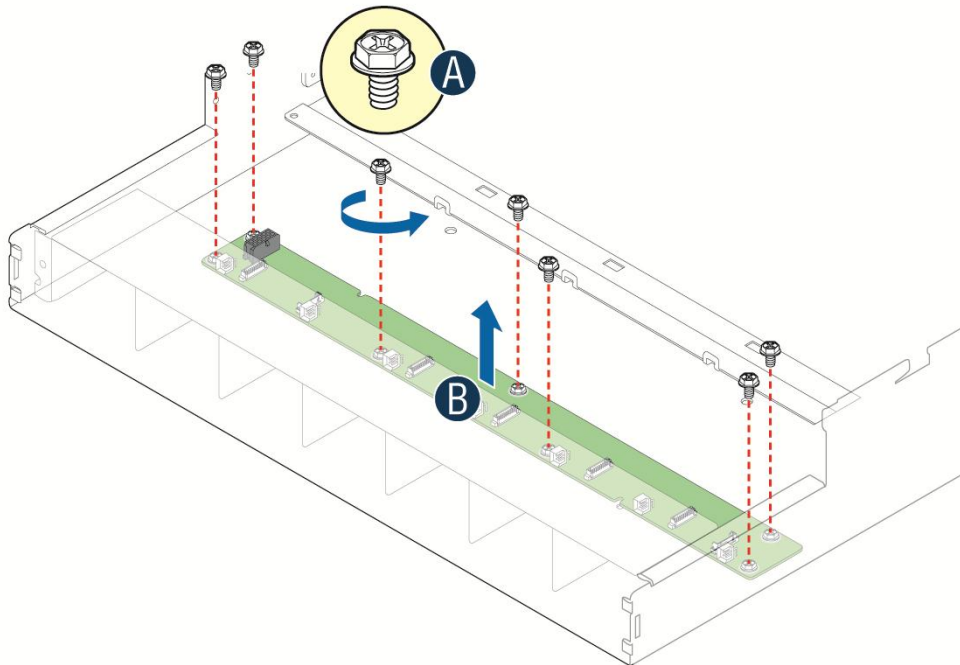
Replacing the Lower Fan Board

Before removing or installing the lower fan board, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove system the fan modules connected to the lower fan board. For instructions, see [Replacing a Redundant Fan Module](#).
4. Remove the rack handles. For instructions, see [Removing the Rack Handles](#).
5. Remove the front end module. For instructions, see [Removing the Front End Module](#).

Removing the Lower Fan Board

1. Disconnect all cables from the lower fan board.
2. Remove the screws (see letter **A**).
3. Remove the lower fan board from the server chassis (see letter **B**).

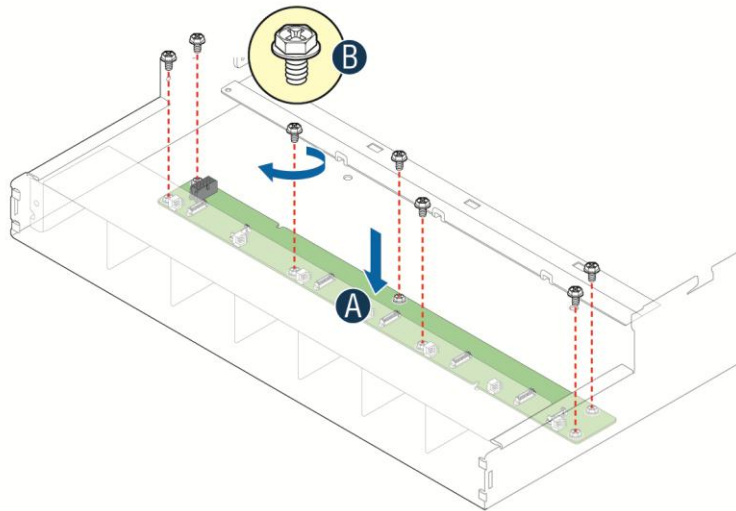


AF005845

Figure 76. Removing the Lower Fan Board

Installing the Lower Fan Board

1. Hold the lower fan board only by the edges. Do not push or pull on any components on the lower fan board. Position the lower fan board in place at the front of the server system (see letter **A**).
2. Secure the lower fan board with the screws as shown (see letter **B**).



AF005846

Figure 77. Installing the Lower Fan Board

3. Connect cables to the lower fan board; please refer to [Cable Routing](#).

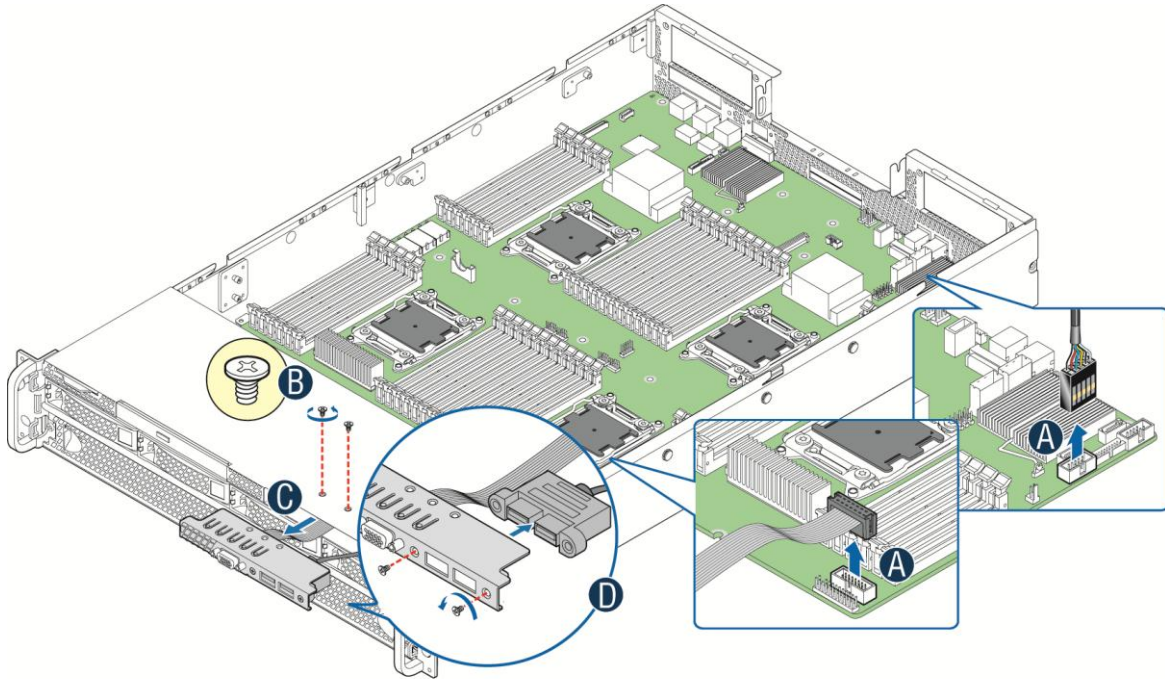
Replacing the Front Video and USB Module

Before removing or installing the front video and USB module, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).
4. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
5. Remove the air duct. For instructions, see [Removing the Air Duct](#).

Removing the Front Video and USB Module

1. Disconnect video and USB cables from server board (see letter **A**).
2. Remove the two screws as shown (see letter **B**).
3. Slide the module out (see letter **C**).
4. Remove the two screws as shown, slide the front USB header out (see letter **D**).

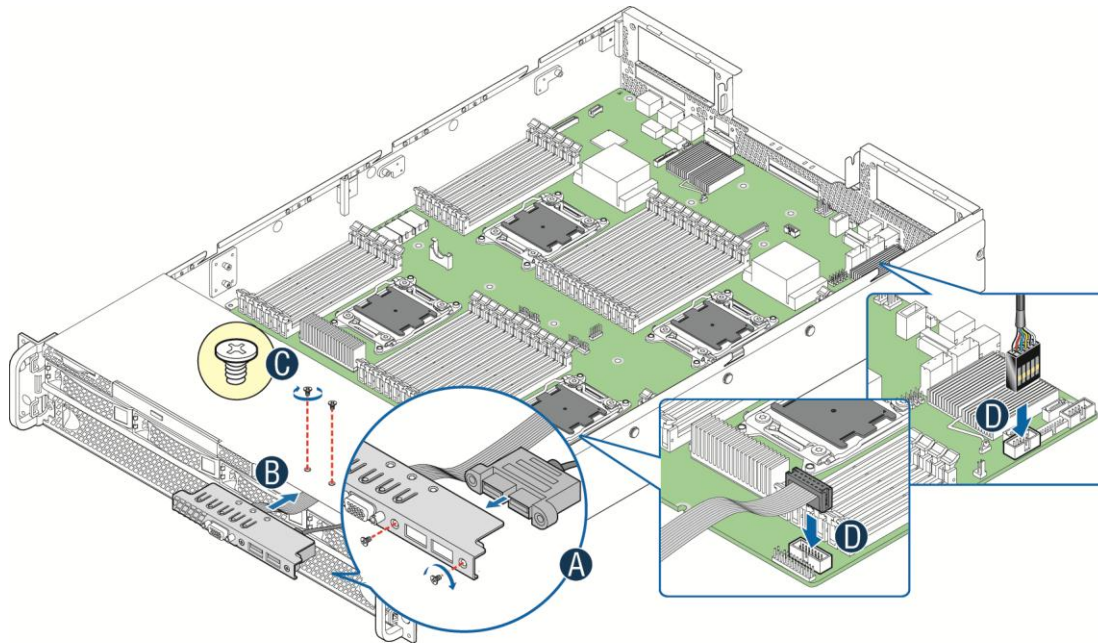


AF005836

Figure 78. Removing the front video and USB Module

Installing the Front Video and USB Module

1. Secure the front USB header to the module with two screws as shown (see letter **A**).
2. Insert the front video and USB module into chassis (see letter **B**).
3. Secure the front video and USB module to chassis with two screws (see letter **C**).
4. Install the video and USB cables to the server board as shown (see letter **D**).



AF005837

Figure 79. Installing the front video and USB Module

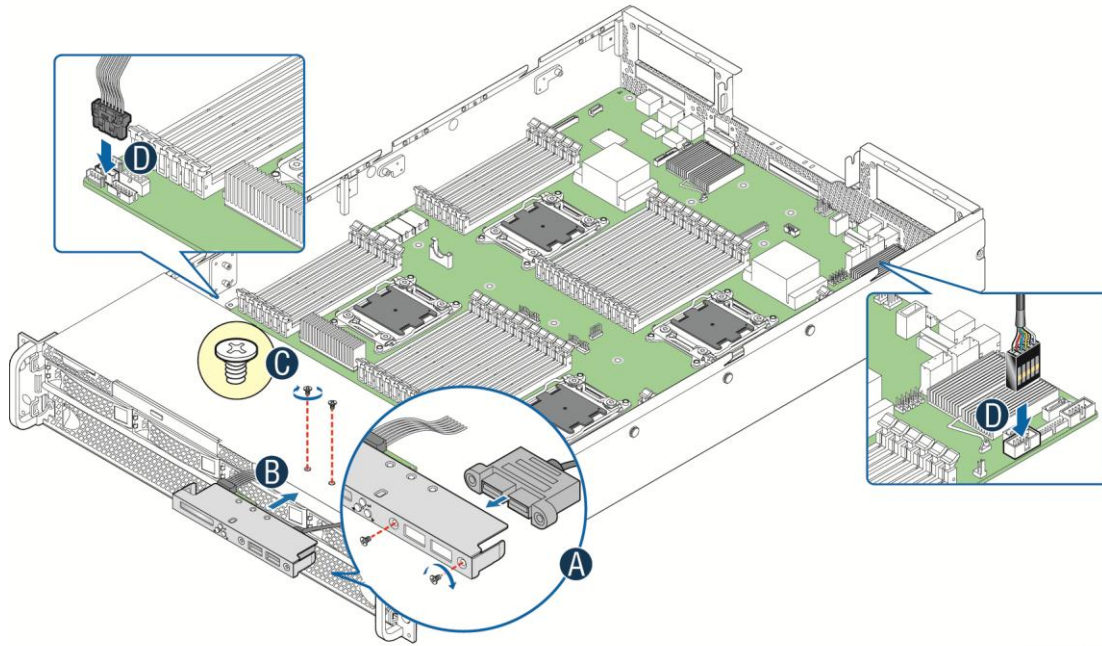
Installing and Removing the LCP Module

Before installing or removing the LCP module, please make sure following steps are performed.

1. Ensure the AC power cord(s) are disconnected from the system.
2. Remove the system cover. For instructions, see [Removing the System Cover](#).
3. Remove the power supply modules. For instructions, see [Removing the Power Supply Module\(s\)](#).
4. Remove the PCI riser assemblies. For instructions, see [Removing the PCI Riser Assembly](#).
5. Remove the air duct. For instructions, see [Removing the Air Duct](#).

Installing the LCP Module

1. Remove the front video and USB module. For instructions, see [Removing the Front Video and USB Module](#).
2. Secure the front USB header to the module with two screws as shown (see letter **A**).
3. Insert the LCP module into chassis (see letter **B**).
4. Secure the LCP module to chassis with two screws (see letter **C**).
5. Install the LCP and USB cables to the server board as shown (see letter **D**).

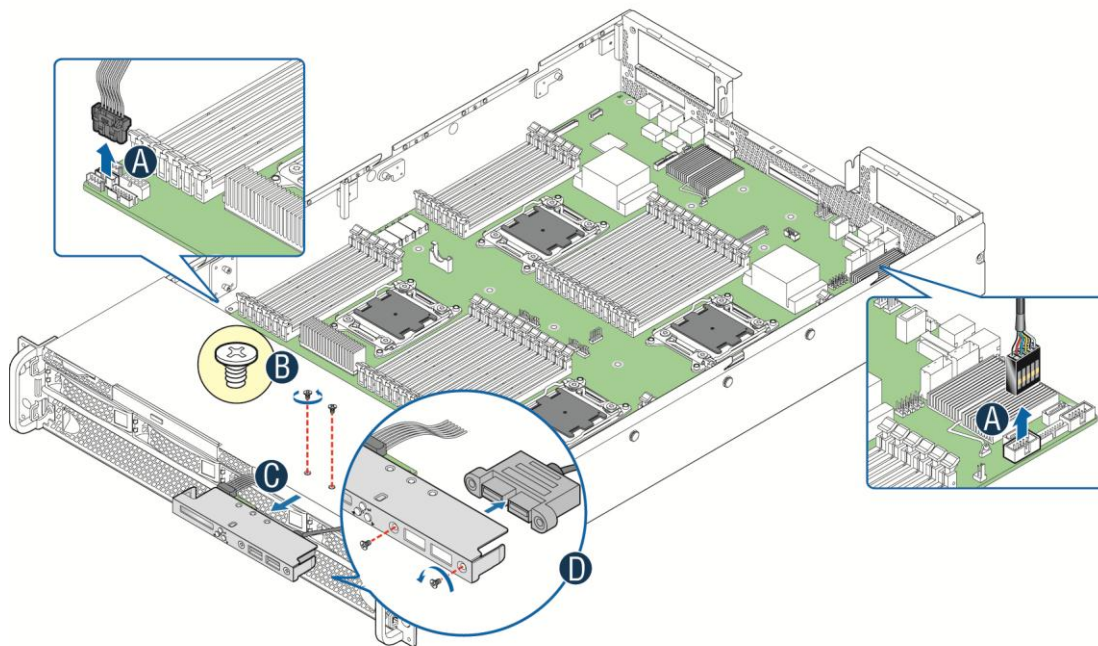


AF005839

Figure 80. Installing the LCP Module

Removing the LCP Module

1. Disconnect LCP and USB cables from server board (see letter **A**).
2. Remove the two screws as shown (see letter **B**).
3. Slide the module out (see letter **C**).
4. Remove the two screws as shown, slide the front USB header out (see letter **D**).
5. Install the front video and USB module. For instructions, see [Installing the Front Video and USB Module](#).



AF005838

Figure 81. Removing the LCP Module

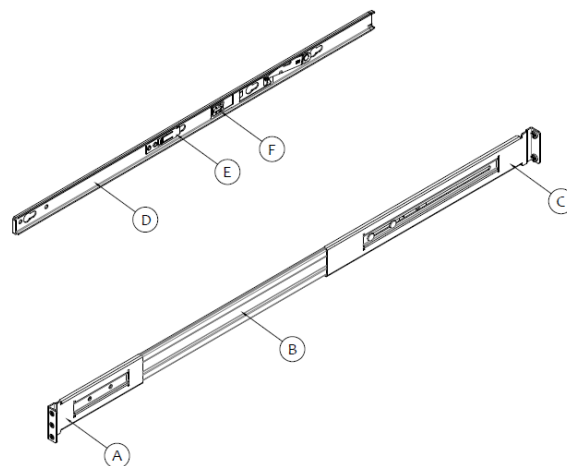
Install the Bezel (Optional)

Install the System into Rack (Optional)

Caution: The maximum recommended server weight for the rack rails can be found at <http://www.intel.com/support/motherboards/server/sb/CS-033655.htm>. Exceeding the maximum recommended weight or misalignment of the server may result in failure of the rack rails holding the server. Use of a mechanical assist to install and align server into the rack rails is recommended.

Note: The Extended Value rack mount rail kit (AXXELVRAIL) supports the system weight of ~65lbs fully loaded. However, the rail travel limitation does not allow removal of the top cover during normal operation, impacting hot swapping of the system fans. The Premium rack mount rail kit (AXXPRAIL) will be available at post launch to eliminate the hot swap fan limitation.

This section helps you to install the system into a rack with AXXELVRAIL.



Label	Description	Label	Description
A	Front Bracket	D	Inner Member
B	Outer Member	E	Safety Locking Pin
C	Rear Bracket	F	Release Button

Figure 82. Slides Component

Installing the Chassis into Rack

1. Pull release button to remove inner member from slides.
2. Align brackets to desired vertical position on rack and insert fasteners.
3. Move ball retainer to the front of slides.

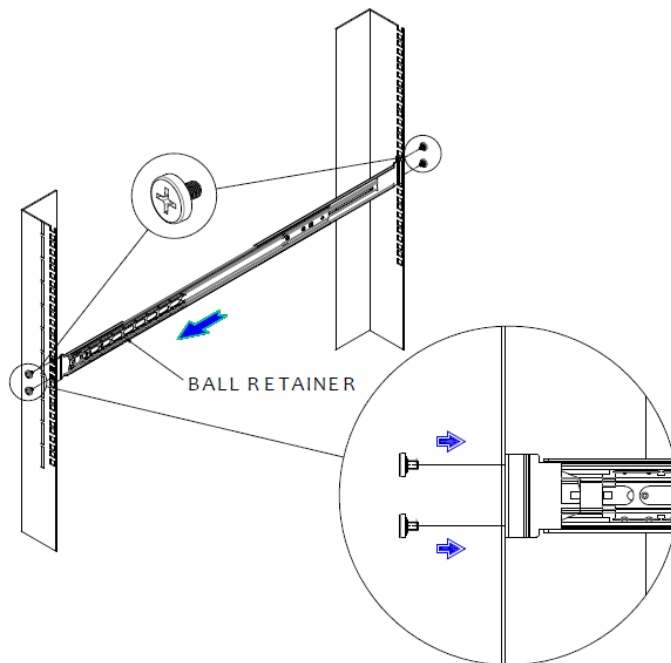


Figure 83. Install Slides to Rack

4. Align inner member key holes to standoffs on chassis, move inner member as shown below.

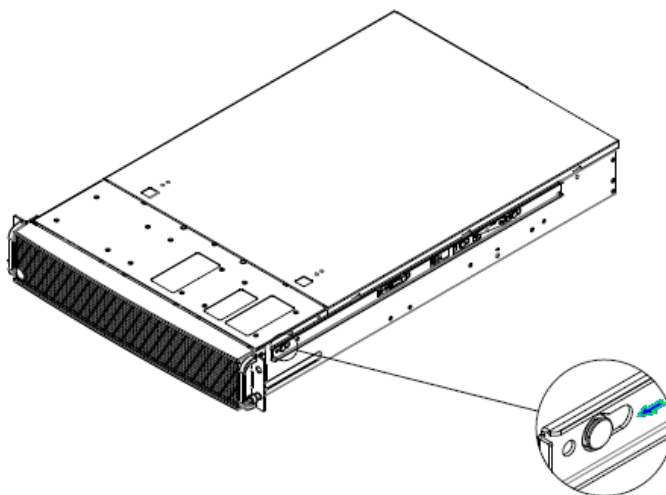


Figure 84. Install Inner Member to Chassis

5. Pull the release button in the inner member to release the lock and allow the chassis to close.

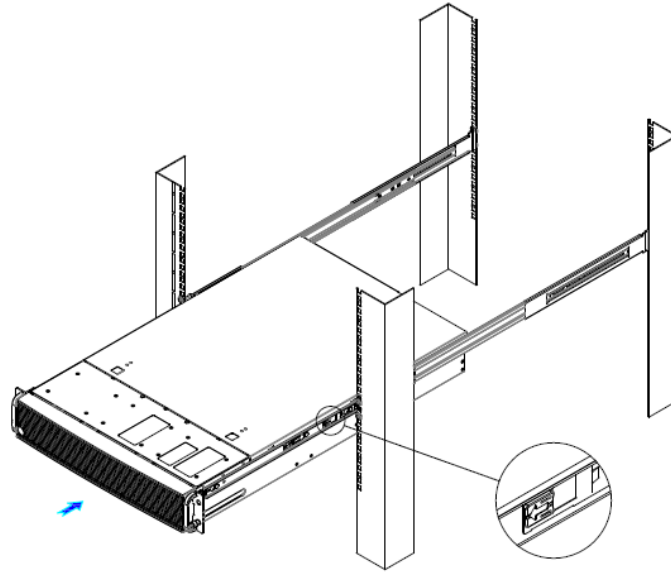


Figure 85. Install Chassis to Fixed Slides

Removing the Chassis from Rack

1. Fully extend the slides until it is in the locked position, pull the release button to release lock and disconnect inner member from slides.

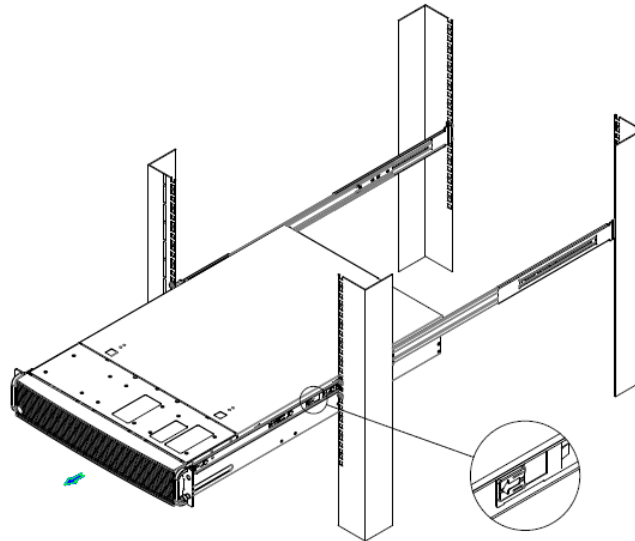


Figure 86. Extend Slides

2. Press safety locking pin to release inner member from chassis.

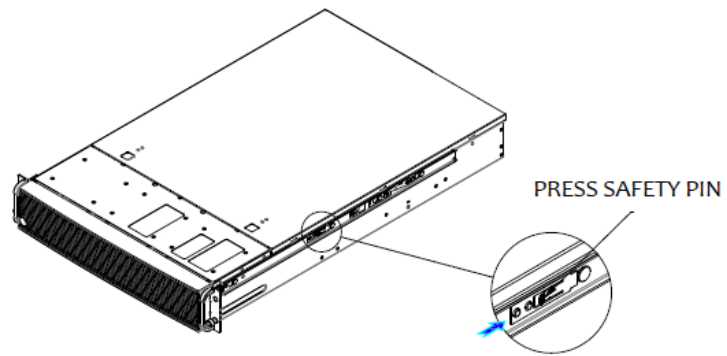


Figure 87. Remove Inner Member from Chassis

3 Server Utilities

Using the BIOS Setup Utility

This section describes the BIOS Setup Utility options, which is used to change server configuration defaults. You can run BIOS Setup with or without an operating system being present.

Starting Setup

To enter the BIOS Setup using a keyboard (or emulated keyboard); press the <F2> function key during boot time when the OEM or Intel® logo is displayed. The following message is displayed on the diagnostics screen and under the Quiet Boot logo screen:

Press <F2> to enter setup

When the Setup Utility is entered, the Main screen is displayed. However, serious errors cause the system to display the Error Manager screen instead of the Main screen.

Setup Navigation Keyboard Commands

The bottom right portion of the Setup screen provides a list of commands that are used to navigate through the Setup utility. These commands are displayed at all times.

Each Setup menu page contains a number of features. Each feature is associated with a value field, except those used for informative purposes. Each value field contains configurable parameters. Depending on the security option chosen and in effect by the password, a menu feature's value may or may not be changed. If a value cannot be changed, its field is made inaccessible and appears grayed out.

Table 7. BIOS Setup: Keyboard Command Bar

Key	Option	Description
<Enter>	Execute Command	The <Enter> key is used to activate submenus when the selected feature is a submenu, or to display a pick list if a selected option has a value field, or to select a subfield for multi-valued features like time and date. If a pick list is displayed, the <Enter> key selects the currently highlighted item, undoes the pick list, and returns the focus to the parent menu.
<Esc>	Exit	The <Esc> key provides a mechanism for backing out of any field. When the <Esc> key is pressed while editing any field or selecting features of a menu, the parent menu is re-entered. When the <Esc> key is pressed in any submenu, the parent menu is re-entered. When the <Esc> key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded. If "No" is selected and the <Enter> key is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <Esc> was pressed, without affecting any existing settings. If "Yes" is selected and the <Enter> key is pressed, the setup is exited and the BIOS returns to the main System Options Menu screen.
↑	Select Item	The up arrow is used to select the previous value in a pick list, or the previous option in a menu item's option list. The selected item must then be activated by pressing the <Enter> key.
↓	Select Item	The down arrow is used to select the next value in a menu item's option list, or a value field's pick list. The selected item must then be activated by pressing the <Enter> key.
← →	Select Menu	The left and right arrow keys are used to move between the major menu pages. The keys have no effect if a sub-menu or pick list is displayed.

Key	Option	Description
<Tab>	Select Field	The <Tab> key is used to move between fields. For example, <Tab> can be used to move from hours to minutes in the time item in the main menu.
-	Change Value	The minus key on the keypad is used to change the value of the current item to the previous value. This key scrolls through the values in the associated pick list without displaying the full list.
+	Change Value	The plus key on the keypad is used to change the value of the current menu item to the next value. This key scrolls through the values in the associated pick list without displaying the full list. On 106-key Japanese keyboards, the plus key has a different scan code than the plus key on the other keyboards, but will have the same effect.
<F9>	Setup Defaults	<p>Pressing the <F9> key causes the following to display:</p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Load Optimized Defaults?</p> <p>Yes No</p> </div> <p>If “Yes” is highlighted and <Enter> is pressed, all Setup fields are set to their default values. If “No” is highlighted and <Enter> is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <F9> was pressed without affecting any existing field values.</p>
<F10>	Save and Exit	<p>Pressing the <F10> key causes the following message to display:</p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Save configuration and reset?</p> <p>Yes No</p> </div> <p>If “Yes” is highlighted and <Enter> is pressed, all changes are saved and the Setup is exited. If “No” is highlighted and <Enter> is pressed, or the <Esc> key is pressed, the user is returned to where they were before <F10> was pressed without affecting any existing values.</p>

Setup Screen Menu Selection Bar

The Setup Screen Menu selection bar is located at the top of the BIOS Setup Utility screen. It displays tabs showing the major screen selections available to the user. By using the left and right arrow keys, the user can select the listed screens. Some screen selections are out of the visible menu space, and become available by scrolling to the left or right of the current selections displayed.

BIOS Setup Utility Screens

The following sections describe the screens available in the BIOS Setup utility for the configuration of the server platform.

For each of these screens, there is an image of the screen with a list of Field Descriptions which describe the contents of each item on the screen. Each item on the screen is hyperlinked to the relevant Field Description. Each Field Description is hyperlinked back to the screen image.

These lists follow the following guidelines:

- The text heading for each Field Description is the actual text as displayed on the BIOS Setup screen. This screen text is a hyperlink to its corresponding Field Description.
- The text shown in the Option Values and Help Text entries in each Field Description are the actual text and values are displayed on the BIOS Setup screens.

- In the Option Values entries, the text for default values is shown with an underline. These values do not appear underline on the BIOS Setup screen. The underlined text in this document is to serve as a reference to which value is the default value.
- The Help Text entry is the actual text which appears on the screen to accompany the item when the item is the one in focus (active on the screen).
- The Comments entry provides additional information where it may be helpful. This information does not appear on the BIOS Setup screens.
- Information enclosed in angular brackets (< >) in the screen shots identifies text that can vary, depending on the option(s) installed. For example, <Amount of memory installed> is replaced by the actual value for “Total Memory”.
- Information enclosed in square brackets ([]) in the tables identifies areas where the user must type in text instead of selecting from a provided option.
- Whenever information is changed (except Date and Time), the systems requires a save and reboot to take place in order for the changes to take effect. Alternatively, pressing <ESC> discards the changes and resumes POST to continue to boot the system according to the boot order set from the last boot.

Map of Screens and Functionality

There are a number of screens in the entire Setup collection. They are organized into major categories. Each category has a hierarchy beginning with a top-level screen from which lower-level screens may be selected. Each top-level screen appears as a tab, arranged across the top of the Setup screen image of all top-level screens.

There are more categories than will fit across the top of the screen, so at any given time there will be some categories which will not appear until the user has scrolled across the tabs which are present.

The categories and the screens included in each category are listed below, with links to each of the screens named.

Table 8. Screen Map

Categories (Top Tabs)	2 nd Level Screens	3 rd Level Screens
Main Screen (Tab)		
Advanced Screen (Tab)		
↖	Processor Configuration	
↖	Memory Configuration	
	↳[Except S1200BT]	Memory RAS and Performance Configuration
↖	Mass Storage Controller Configuration	
↖	PCI Configuration	
↖	Serial Port Configuration	
↖	USB Configuration	
↳[With BMC Only]	System Acoustic and Performance Configuration	
↳[Non-BMC Only]	Hardware Monitor	
	↳[Non-BMC Only]	Realtime Temperature and Voltage Status
Security Screen (Tab)		

Server Utilities

Categories (Top Tabs)	2 nd Level Screens	3 rd Level Screens
Server Management Screen (Tab)		
↳	Console Redirection	
↳	System Information	
↳ [With BMC Only]	BMC LAN Configuration	
Boot Options Screen (Tab)		
↳	CDROM Order	
↳	Hard Disk Order	
↳	Floppy Order	
↳	Network Device Order	
↳	BEV Device Order	
↳	Add EFI Boot Option	
↳	Delete EFI Boot Option	
Boot Manager Screen (Tab)		
Error Manager Screen (Tab)		
↳ [Non-BMC Only]	View Event Log Screen	
Exit Screen (Tab)		

Appendix A: Regulatory and Compliance Information

Please refer to the *Server Products Regulatory and Safety document* for the product regulatory compliance reference. The document can be downloaded from <http://www.intel.com/support/motherboards/server/>.

Appendix B: Safety Information

Please refer to the *Server Products Regulatory and Safety document* for the Safety Information. The document can be downloaded from <http://www.intel.com/support/motherboards/server/>.

Appendix C: Installation/Assembly Safety Instructions

Please refer to the *Server Products Regulatory and Safety document* for the Installation/Assembly Safety Instructions. The document can be downloaded from <http://www.intel.com/support/motherboards/server/>.

Appendix D: Getting Help

If you encounter an issue with your server platform, please follow these steps to obtain support on your product.

- 1 Get connected to our support web page for 24x7 support when you need it to get the latest and most complete technical support information on all Intel® Enterprise Server and Storage Platforms. Information available at the support site includes:
 - Latest BIOS, firmware, drivers, and utilities
 - Product documentation, *Installation*, and *Quick Start Guides*
 - Full product specifications, technical advisories, and errata
 - Compatibility documentation for memory, hardware add-in cards, chassis support matrix, and operating systems
 - Server and chassis accessory parts list for ordering upgrades or spare parts
 - A searchable knowledgebase to search for product information throughout the support site
- 2 Send an email to Intel®'s technical support center using the following online form if you still cannot obtain a solution to your issue.
- 3 Lastly, you can contact an Intel® support representative using one of the following support phone numbers. Charges may apply. Intel® customer support suggests filling out the issue report form to better service the issue.

Intel® now offers Channel Program members around-the-clock 24x7 technical phone support on Intel® server boards, server chassis, server RAID controller cards, and Intel® Server Management.

Note: You must login in to the reseller site to obtain the 24x7 number.

Warranty Information

To obtain warranty information, visit the following Intel® website:

<http://www.intel.com/support/motherboards/server/sb/cs-010807.htm>

Appendix E: Intel® Server Issue Report Form

Issue Report Form (Rev 3.6)

Note: Filling out this form completely is required for any escalation.

Customer Contact Information:

Customer Support Case#:

Intel® Server Board or System:

(Example: S2400BB, R2000BB)

Server Chassis:

(Example P4000M. If third-party chassis used, indicate make and model.)

Base Board Information: (Some information maybe found by accessing BIOS & going through the Server Management menu > System Information)

Baseboard PBA/TA/AA # (Example: 123456-789):

- can be found on the white sticker label on the baseboard.

System BIOS Version:

Intel® Remote Management Module Firmware Version (if applicable):

BMC Version:

FRU/SDR Version:

Has the latest BIOS been tried? (Yes/No):

Has the latest BMC been tried? (Yes/No):

Has the latest RMM Firmware been tried? (Yes/No):

Has the latest FRU/SDR been tried? (Yes/No):

Processor information:

	Type	Speed	sSpec	Thermal Solution
Processor 1				
Processor 2				

Appendix E: Intel® Server Issue Report Form

Thermal solution (heatsink) examples:
(1U, Passive w/air ducting, and so on)

Memory:

Manufacturer	Part Number	DRAM Part Number	On Intel tested list?

Add-in adapters (Example: NICs, Management Adapters, Serial Expansion Cards, PCI-Express* Adapters, RAID Controllers, SCSI Controllers, and so on):

Type	Slot	Manufacturer	Model	Firmware

Other third party hardware (Example: Example: KVM, Chassis, and so on):

Description/Use	Manufacturer	Model	Firmware

Storage Devices (Example: SCSI, SATA, SAS, USB, Tape, and so on):

Manufacturer	Model	Type	Size	Firmware	In Hot Swap Bay?

Manufacturer	Model	Type	Size	Firmware	In Hot Swap Bay?

Operating System Information (Example: RedHat* Enterprise Linux, Microsoft Windows Server 2003* Service pack 1, OEM CD):

Manufacturer:

Version:

Language version (English, Arabic, and Chinese (Simplified)):

Service Pack Level or Kernel Revision:

Distribution (OEM/Retail):

Intel® RAID Controller: (Example SRCU42E)

RAID controller part number (PBA number):

RAID controller firmware version:

Has the latest RAID firmware been tried? (Yes/No):

RAID driver version:

Has the latest RAID driver been tried? (Yes/No):

RAID volumes configuration (disks & RAID level):

RAID volume use (Boot device/Data Volume):

Is BBU (Battery Backup Unit) installed? (Yes/No):

BBU part number:

Detailed description of issue:

Troubleshooting tried:

Steps to replicate the issue:

Issue impact statements:

Do you have any potential Intel system, or component purchases that this issue is holding up? If yes, please provide a brief description below.

Do you have systems already purchased that are not being delivered to your customers because of this issue? If yes, please provide a brief description below.

Have you returned systems or components to your place of purchase because of this issue? If yes, please provide a brief description below.

*All other brands and names are property of their respective owners.

Appendix F: Warranty

Limited Warranty for Intel® Chassis Subassembly Products

Intel® warrants that the Products (defined herein as the Intel® chassis subassembly and all of its various components and software delivered with or as part of the Products) to be delivered hereunder, if properly used and installed, will be free from defects in material and workmanship and will substantially conform to Intel®'s publicly available specifications for a period of three (3) years after the date the Product was purchased from an Intel® authorized distributor. Software of any kind delivered with or as part of products is expressly provided "as is" unless specifically provided for otherwise in any software license accompanying the software.

If any Product furnished by Intel® which is the subject of this Limited Warranty fails during the warranty period for reasons covered by this Limited Warranty, Intel®, at its option, will:

- REPAIR the Product by means of hardware and/or software; OR
- REPLACE the Product with another Product; OR
- REFUND the then-current value of the Product if Intel® is unable to repair or replace the Product.

If such Product is defective, transportation charges for the return of Product to buyer within the USA will be paid by Intel®. For all other locations, the warranty excludes all costs of shipping, customs clearance, and other related charges. Intel® will have reasonable time to make repairs or to replace Product or to refund the then-current value of the Product.

In no event will Intel® be liable for any other costs associated with the replacement or repair of Product, including labor, installation or other costs incurred by buyer and in particular, any costs relating to the removal or replacement of any product soldered or otherwise permanently affixed to any printed circuit board.

This Limited Warranty, and any implied warranties that may exist under state law, apply only to the original purchaser of the Product.

Extent of Limited Warranty

Intel® does not warrant that Products to be delivered hereunder, whether delivered standalone or integrated with other Products, including without limitation semiconductor components, will be free from design defects or errors known as "errata". Current characterized errata are available upon request.

This Limited Warranty does not cover damages due to external causes, including accident, problems with electrical power, usage not in accordance with product instructions, misuse, neglect, alteration, repair, improper installation, or improper testing.

Warranty Limitations and Exclusions

These warranties replace all other warranties, expressed or implied including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Intel® makes no expressed warranties beyond those stated here. Intel® disclaims all other warranties, expressed or implied including, without limitation, implied warranties of merchantability and fitness for a

Appendix F: Warranty

particular purpose. Some jurisdictions do not allow the exclusion of implied warranties, so this limitation may not apply.

All expressed and implied warranties are limited in duration to the limited warranty period. No warranties apply after that period. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you.

Limitations of Liability

Intel®'s responsibility under this, or any other warranty, implied or expressed, is limited to repair, replacement, or refund, as set forth above. These remedies are the sole and exclusive remedies for any breach of warranty. Intel® is not responsible for direct, special, incidental, or consequential damages resulting from any breach of warranty under another legal theory including, but not limited to, lost profits, downtime, goodwill, damage to or replacement of equipment and property, and any costs of recovering, reprogramming, or reproducing any program or data stored in or used with a system containing this product. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This limited warranty gives you specific legal rights, and you may also have other rights that vary from jurisdiction to jurisdiction.

Any and all disputes arising under or related to this Limited Warranty shall be adjudicated in the following forums and governed by the following laws: for the United States of America, Canada, North America, and South America, the forum shall be Santa Clara, California, USA, and the applicable law shall be that of the State of California, USA; for the Asia Pacific region, the forum shall be Singapore and the applicable law shall be that of Singapore; for Europe and the rest of the world, the forum shall be London and the applicable law shall be that of the United Kingdom. In the event of any conflict between the English language version and any other translated version(s) of this Limited Warranty, the English language version shall control.

How to Obtain Warranty Service

To obtain warranty service for this Product, you may contact Intel® or your authorized distributor.

- North America and Latin America: To obtain warranty repair for the product, please go to the following website to obtain instructions:
<http://www.intel.com/support/motherboards/warrantysupport.htm>
- In Europe and in Asia: Contact your original authorized distributor for warranty service.

Any replacement Product is warranted under this written warranty and is subject to the same limitations and exclusions for the remainder of the original warranty period.

Telephone Support

If you cannot find the information you need on Intel®'s website (<http://www.intel.com>), call your local distributor or an Intel® Customer Support representative.

See Appendix D: Getting Help for telephone numbers.

Returning a Defective Product

Before returning any product, call your authorized dealer/distribution authority.