Intel® Server D50DNP Family

Intel® Server Board D50DNP
Intel® D50DNP Module
Intel® Server System D50DNP

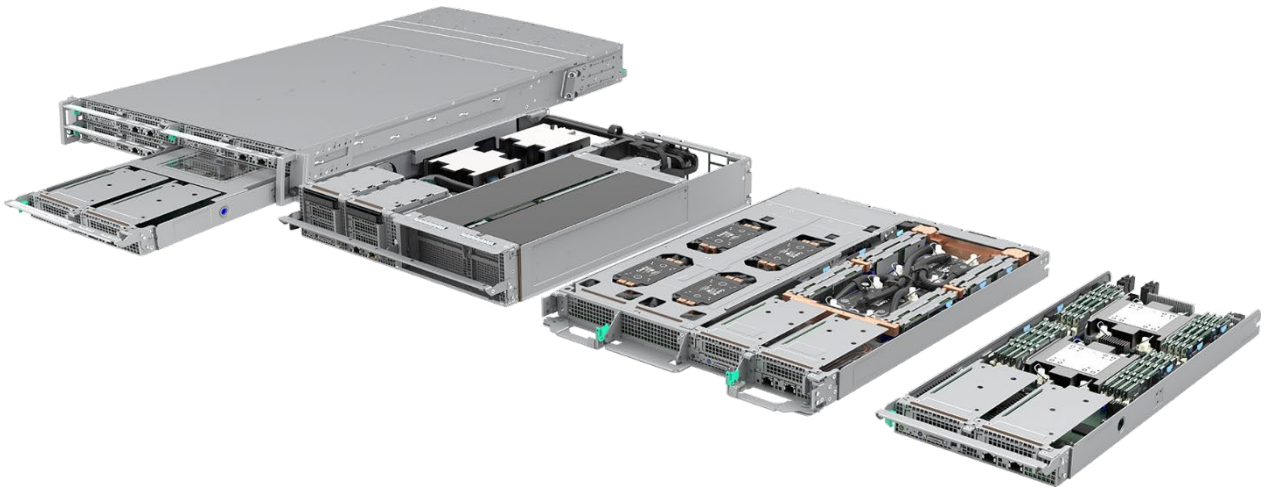
Integration and Service Guide

A guide providing instructions for the insertion and extraction of system components and available Intel accessories and spares.

Rev. 1.3

February 2024

D50DNP



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Document Revision History

Date	Revision	Changes
January 2023	1.0	Initial public release.
June 2023	1.1	• Added information about Intel® VROC support • Added SW license key management section 4.2 • Corrected trademarked names (PCIe*, NVMe* and MCIO*) to follow guideline • Removed content related to Intel® Optane™ persistent memory (PMem) 300 series • Added illustration for Intel® Xeon® Max CPU clip release mechanism • Added comment regarding system status LED behavior when power supply cold redundancy is disabled, and the power cord is unplugged (Page 205)
December 2023	1.2	• Modified section 4.2 to reflect changes in the software license registration process
February 2024	1.3	• Added 5th Gen Intel® Xeon® Scalable processor support information

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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 voids the UL listing and other regulatory approvals of the product. It 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 buttons on the front panel of each module do NOT turn off the server chassis AC power. To remove power from the server chassis, you must unplug the AC power cord from the electrical outlet. Make sure that the AC power cord is unplugged before you open the server chassis.

To service a module, it is not necessary to power down the entire system. Power off only the module requiring servicing before attempting to remove it from the server chassis.

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

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.

Electrostatic Discharge (ESD)

Electrostatic discharge can damage your computer or the components within it. ESD can occur without the user feeling a shock while working inside the system chassis or while improperly handling electronic devices like processors, memory or other storage devices, and add-in cards.

Intel recommends that the following steps be taken when performing any procedures described within this document or while performing service to any computer system.

- Where available, all system integration and/or service should be performed at a properly equipped ESD workstation.
- Wear ESD protective gear like a grounded antistatic wrist strap, sole founders, and/or conductive shoes.
- Wear an anti-static smock or gown to cover any clothing that may generate an electrostatic charge.
- Remove all jewelry.
- Disconnect all power cables and cords before opening the server chassis
- Power down the module and remove it from the server chassis, remove power feed from the server board before performing any integration or service
- Touch any unpainted metal surface of the chassis before performing any integration or service.

- Hold all circuit boards and other electronic components by their edges only.
- After removing electronic devices from the system or from their protective packaging, place them component side up on to a grounded anti-static surface or conductive foam pad. **Do not** place electronic devices on to the outside of any protective packaging.

Caution: Slide/rail mounted equipment is not to be used as a shelf or a work space.

Intel warranties that this product performs to its published specifications. However, all computer systems are inherently subject to unpredictable system behavior under various environmental and other conditions.

This product is not intended to be the sole source for any critical data and the user must maintain a verified backup. Failure to do so or to comply with other user notices in the product user guide and specification documents may result in loss of or access to data.

Weight of the System

- Remove all installed modules from the system before attempting to install the system into the rack.
- Due to the weight of a system, Intel recommends using a mechanical lift to install system into a rack. Or handling the system with two people supporting the system from the sides.
- If your system has rack handles installed, do not lift, or carry the system by the rack handles
- When lifting or moving a chassis, always grasp it by all four corners. Do not grasp the chassis by two points at opposing diagonal corners, doing so may damage the internal components.
- If you can only grasp the chassis at two different points, always grasp the chassis by the sides at the midpoint.

Liquid Cooling Safety Guidelines

- Make sure that there are no leaks and/or damaged parts before operating the liquid-cooling system.
- Do not energize the system or any installed modules if the liquid-cooling subsystem is compromised.
- Do not attempt to perform any service to the server chassis before removing power to the system. Turn off the modules before disconnecting the liquid-cooling quick disconnect tube connectors.
- To reduce the risk of damage to the cooling system, use care when installing or removing the liquid-cooled modules.
- Avoid excessive force when connecting and disconnecting quick disconnect couplings.
- Keep the liquid-cooling tubing clear of pinch points when installing or removing the server modules in/from the chassis.

Important Safety Certification Standards and Transition Support Information

The IEC 60950-1 2nd Edition safety standard (Information Technology Equipment) is going through a replacement phase due to the new IEC 62368-1 3rd Edition safety standard (Audio/Video, Information, and Communication Technology Equipment).

Intel server systems identified in this service guide are certified to:

- The new IEC 62368-1 3rd Edition standard for countries that have adopted this new standard.
- The outgoing IEC 60950-1 2nd Edition standard for countries that have not yet adopted the new standard.

During the global adoption/certification transition phase between the outgoing and new standards, safety requirement differences between the standards may temporarily dictate restricted usage of Intel server products as follows:

- In countries that have adopted the new IEC 62368-1 3rd Edition standard, no location restrictions apply beyond the standard intended application use requirements.
- In countries that have not yet adopted the new IEC 62368-1 3rd Edition standard, restricted access locations are required. Access in these locations is permitted only by technically trained and qualified personnel who are aware of potential safety hazards.

Note: This requirement applies only to Intel® Server System products released in 2019 or later. Legacy Intel® Server System products released in 2018 or earlier provide safeguards that require no additional access restrictions.

Explanation of temporary restricted access location measures:

The new IEC 62368-1 3rd Edition standard does not consider 240 VA an energy hazard. The outgoing IEC 60950-1 2nd Edition standard does consider 240 VA an energy hazard, therefore Intel server products released in 2019 or later certified to this standard require restricted access locations.

Legacy Intel server products (released in 2018 or earlier) were designed with additional safeguards to meet IEC 60950-1 2nd Edition standard 240 VA requirements, so no location restrictions apply beyond the standard intended application use requirements. After the IEC 60950-1 standard is phased out globally and Intel server products are certified to the new IEC 62368-1 standard, the temporarily restricted access locations will no longer be required.

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1. Introduction

The Intel® Server D50DNP Family includes products that are designed to support demanding high-performance computing (HPC) and artificial intelligence (AI) applications and workloads. Building blocks in the product family allow custom development of server systems using an Intel developed server board or density optimized Intel® D50DNP Module options. The product family also includes fully integrated 2U rack mount, multi-module systems. The product family supports the 4th & 5th Gen Intel® Xeon® Scalable family or Intel® Xeon® CPU Max Series processors. Previous generation Intel® Xeon® processor and Intel® Xeon® Scalable processor families are not supported.

For details on all system and module features, refer to the *Intel® Server D50DNP Family Technical Product Specification*. For related documents, see Table 1.

Notes:

- In this document, the **Intel® D50DNP Modules** term refers to all module types supported by the Intel® Server D50DNP Family: **compute module**, **management module**, **Intel® Data Center GPU Max Series accelerator module**, and **PCIe* accelerator module**.
- In this service guide, the 4th & 5th Gen Intel® Xeon® Scalable processor family or Intel® Xeon® CPU Max Series may be referred to simply as “processor”.

1.1 About This Document

This integration and service guide provides system integrators and service technicians with instructions for the installation and removal of system components. The document also describes available Intel accessories supported by this server system.

The document is organized into two parts. The first part (Chapters 2 through 5) is focused on the installation of system components and accessories into an L6 or L9 integrated server system.

Note: An L6 integrated system requires essential components to be installed in order to make it power-on ready. An L9 integrated system is power-on ready but may require additional options or accessories to be installed to enable specific system features.

The second part (Chapters 6, 7, and appendices A–F) is focused on system service. This section provides the service technician with valuable system information and procedures necessary to successfully identify and to replace a faulty system component.

1.1.1 System Integration

Chapter 2: L6 System Integration – Essential System Components. This chapter contains **i**nstallation procedures for the following system components: processors, memory, and power supply

Chapter 3: L9 System Integration. This chapter has the Installation procedures for system options and accessories

Chapter 4: System Software Update and Configuration. This is a short overview of the the system software stack installed on new Intel servers and where to get the latest revisions.

Chapter 5: System Packaging Assembly Instructions. This chapter contains the packing instructions for shipments of fully integrated systems

1.1.2 System Service

Chapter 6: System Features Overview. This chapter is an overview that identifies and locates the features associated with the Intel® Server D50DNP Family.

Chapter 7: FRU Replacement. Installation and replacement procedures for system field replaceable units (FRUs) are described here.

Appendix A: Getting Help. The **s**upport and contact information relevant for Intel server system is provided in this chapter.

Appendix B: General Memory Population Rules. This is the summary of general memory population rules for Intel® Server D50DNP Family.

Appendix C: System Status LED State Definitions. System status LED operating states and definition are described in this chapter.

Appendix D: Onboard Configuration and Service Jumpers. This chapter is dedicated to the descriptions of jumpers on the Intel® D50DNP Server Board D50DPN1SB.

Appendix E: POST Code Diagnostic LED. List of post progress codes and their description is in this chapter.

Appendix F: POST Error Codes. List of POST error codes that represent specific failures, warnings, or information can be found in this chapter.

Appendix G: Product Safety – Multi-language

1.2 Reference Documents and Support Collaterals

For additional information, see the product support collaterals specified in the following table.

Table 1. Intel® Server D50DNP Family Reference Documents and Support Collaterals

Topic	Document Title or Support Collateral	Document Classification
Technical information about this product family	*Intel® Server D50DNP Family Technical Product Specification.*	Public
System integration instructions and service guidance	*Intel® Server D50DNP Family Integration and Service Guide.*	Public
Server configuration guidance and compatibility	*Intel® Server D50DNP Family Configuration Guide.*	Public
BMC technical information of product family	*Integrated Baseboard Management Controller Firmware External Product Specification (EPS). Document ID: 682839*	Intel Confidential
Information about the Integrated BMC Web Console	*Integrated Baseboard Management Controller Web Console (Integrated BMC Web Console) User Guide.*	Public
BIOS technical information of product family	*4th Gen Intel® Xeon® Scalable Processor Family BIOS Firmware External Product Specification.*	Intel Confidential
BIOS setup utility information of product family	*Intel* Server Board D50DNP and M50FCP Family BIOS Setup Utility User Guide.*	Public
Base specifications for the IPMI architecture and interfaces	*Intelligent Platform Management Interface Specification Second Generation v2.0*	Public
Specifications for PCIe* interfaces	*PCIe Base Specification, Revision 3.0, Revision 4.0, Revision 5.0*	Public
TPM for PC Client specifications	*TPM PC Client Specifications, Revision 2.0*	Public
Specifications of 4th Gen Intel® Xeon® Scalable processor family	*Sapphire Rapids External Design Specification (EDS):* Document IDs: 630161, 612246, 612172, 633350, 611488	Intel Confidential
Specifications of 5th Gen Intel® Xeon® Scalable processor family	*Emerald Rapids External Design Specification(EDS):* Document IDs: 721175,723370	Intel Confidential
Processor design specifications and recommendations	*Eagle Stream Server and Fishhawk Falls Workstation Platforms Thermal Mechanical Specification (TMS)*: Document ID: 609847	Intel Confidential
BIOS and BMC Security Best Practices	*Intel® Server Systems Baseboard Management Controller (BMC) and BIOS Security Best Practices White Paper*	Public
Managing an Intel® Server Overview	*Managing an Intel® Server System 2020*	Public
Latest system software updates: BIOS and Firmware	*Intel® System Update Package (SUP) for Intel® Server D50DNP Family.*	Public
System update utility	*Intel® Server Firmware Update Utility and User Guide*	Public
To obtain full system information	*Intel® Server Information Retrieval Utility and User Guide*	Public
To configure, save, and restore various system options	*Intel® Server Configuration Utility and User Guide*	Public
Product Warranty Information	*Warranty Terms and Conditions*	Public
Intel® Data Center Manager (Intel® DCM) information	*Intel® Data Center Manager (Intel® DCM) Product Brief*	Public
	Intel® Data Center Manager (Intel® DCM) Console User Guide	Public

Note: Intel Confidential documents are made available under a nondisclosure agreement (NDA) with Intel and must be ordered through your local Intel representative.

2. L6 Integrated System Essential System Component Installation

The Intel® D50DNP Modules are offered with different levels of system integration. Modules that are not power-on ready are identified as L6 integrated modules. L6 modules require essential components (sold separately) to be installed. If your Intel® D50DNP Module did not come preinstalled with any of the following components, follow the procedures in this chapter:

- 2 processors – 4th & 5th Gen Intel® Xeon® Scalable processors or Intel® Xeon® CPU Max Series processors
- Memory
- Liquid-cooling Loop (liquid-cooled configurations only)
- Power supplies

If your Intel® D50DNP Module came preinstalled with all the components listed earlier, skip this chapter and go to Chapter 3 for installation procedures associated with all other system options and accessories.

To complete the L6 integration of the Intel® Server D50DNP to be power-on ready, a chassis from the Intel® Server Chassis FC2000 v2 family is required to contain the L6 integrated modules. The chassis for L6 systems is sold separately. The 2700 W (air cooled) or 3000 W (liquid cooled) power supply units are also sold separately.

Each module within a system is operating independently from the others. But the modules share common chassis resources like power and cooling. Table 2 describes the different ways that an Intel® Server System D50DNP can be configured.

For additional information regarding configuration options, see the *Intel® Server D50DNP Family Configuration Guide*.

Table 2. Intel® D50DNP Modules

Module Type	iPC	Height	Width	Cooling	Maximum Processor Thermal Design Power (TDP)	Modules per Chassis
Compute	D50DNP1MHCPAC	1U	Half width	Air cooled	250 W	Up to four
	D50DNP1MHEVAC				270 W	
	D50DNP1MHCPLC			Liquid cooled	385 W	
Management	D50DNP2MHSVAC	2U	Half width	Air cooled	350 W	Up to two
Intel® Data Center GPU Max Series Accelerator	D50DNP1MFALLC	1U	Full width	Liquid cooled	385 W	Up to two
PCIe* Accelerator	D50DNP2MFALAC	2U	Full width	Air cooled	350 W	One

Mixing different types of modules in the same chassis can be done as follows:

- Up to two 1U air-cooled compute modules with one 2U management module

Notes:

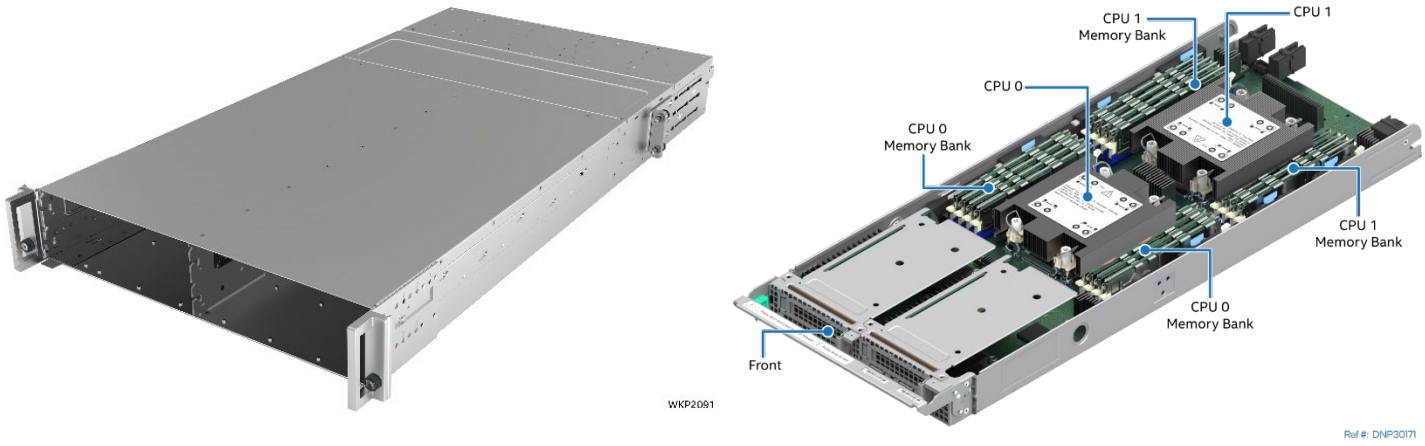
- Mixing liquid-cooled modules with air-cooled modules in a single system is not supported.
- Mixing 1U air-cooled compute module with regular processor heat sinks and 1U compute module with EVAC processor heat sinks in a single system is not supported.
- Support for CPU with 385W TDP in liquid-cooled configuration is under validation

Before You Begin

Before integration of any system components, review all the safety and ESD precautions in the Safety Warnings section at the beginning of this service guide.

System Reference

In the following procedures, all references to left, right, front, rear, top, and bottom assume that the reader is facing the front of the chassis and the front of a module as shown in the following figure (1U air-cooled compute module shown).



Server Chassis **1U Air-Cooled Compute Module**

Figure 1. System Directional Reference

Instruction Format

Each procedure described in this chapter follows an illustration first format. This format gives the reader the option to follow a quicker path to component integration by first seeing an illustration of the intended procedure. If necessary, the reader can then follow the step-by-step instructions that accompany each procedure.

2.1 Air Duct Removal / Installation

To maintain system thermals for air-cooled modules, the air duct must always be in place when the system is operational. Removal of the air duct is necessary when installing or replacing any system component.

Air duct construction and attachment method are similar for all half-width air-cooled modules D50DNP1MHCPAC, D50DNP1MHEVAC, and D50DNP2MHSVAC. The D50DNP2MFALAC module is slightly different and the changes in construction are reflected in the corresponding illustrations.

Note: Air ducts are not used with liquid-cooled modules.

Required Tools and Supplies:

- Anti-static wrist strap and conductive workbench pad (recommended)

2.1.1 Air Duct Removal (Half-width Modules)

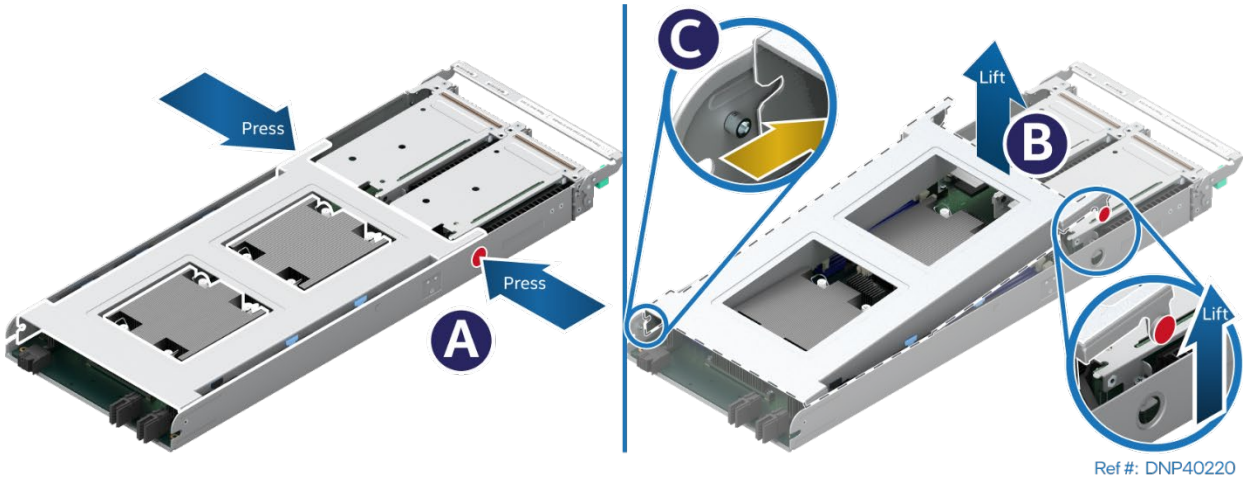


Figure 2. Removing the Air Duct (Half-width Modules)

1. Press the latches on both sides of the module inwards (see Letter A).
2. Carefully lift the front edge of the air duct (see Letter B).
3. Pull the air duct away from the module (see Letter C).

2.1.2 Air Duct Installation (Half-width Modules)

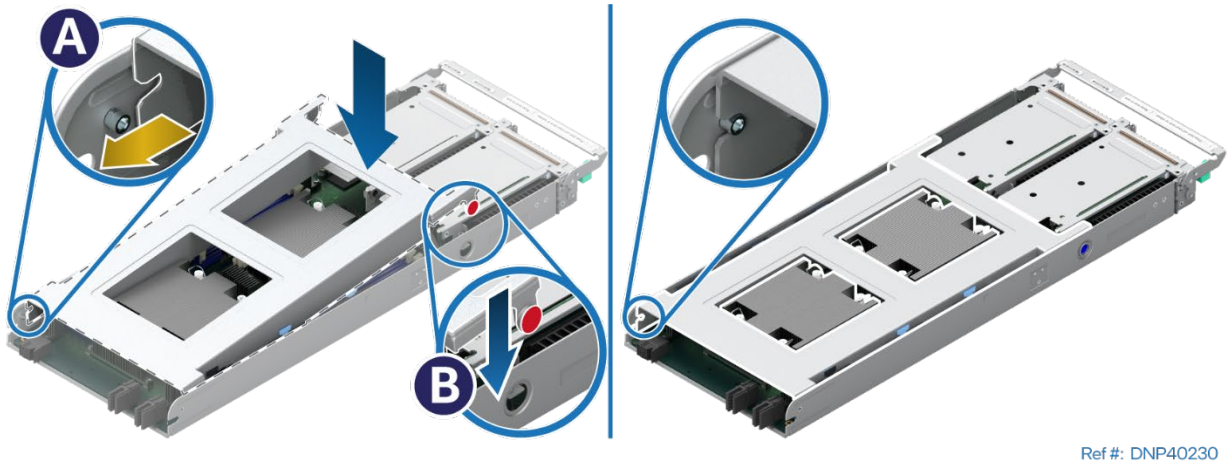


Figure 3. Installing the Air Duct (Half-width Modules)

1. Align and attach the hinge slots on the back end of the air duct with the hinge posts on both sides of the module (see Letter A).
2. Lower the air duct until both the left and right side latches snap into place (see Letter B).

2.1.3 Air Duct Removal (D50DNP2MFALAC Module)

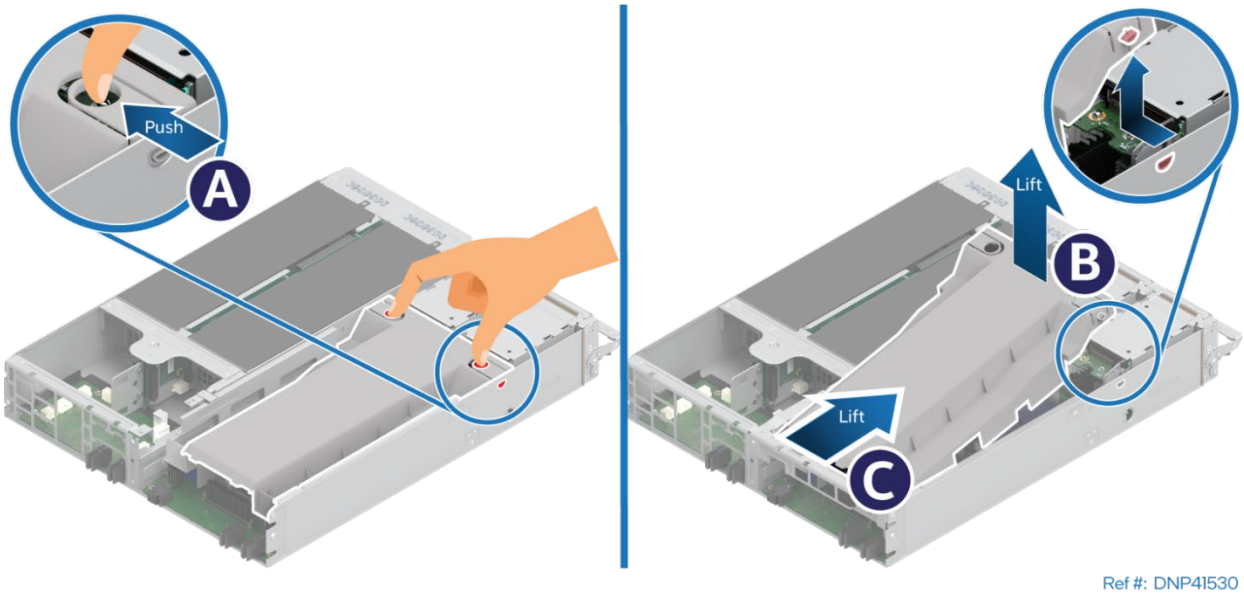


Figure 4. Removing the Air Duct (D50DNP2MFALAC Module)

1. Push the loops on both sides of the air duct inwards to release the latches (see Letter A).
2. Carefully lift the front edge of the air duct (see Letter B).
3. Pull the air duct away from the module in the direction shown (see Letter C).

2.1.4 Air Duct Installation (D50DNP2MFALAC Module)

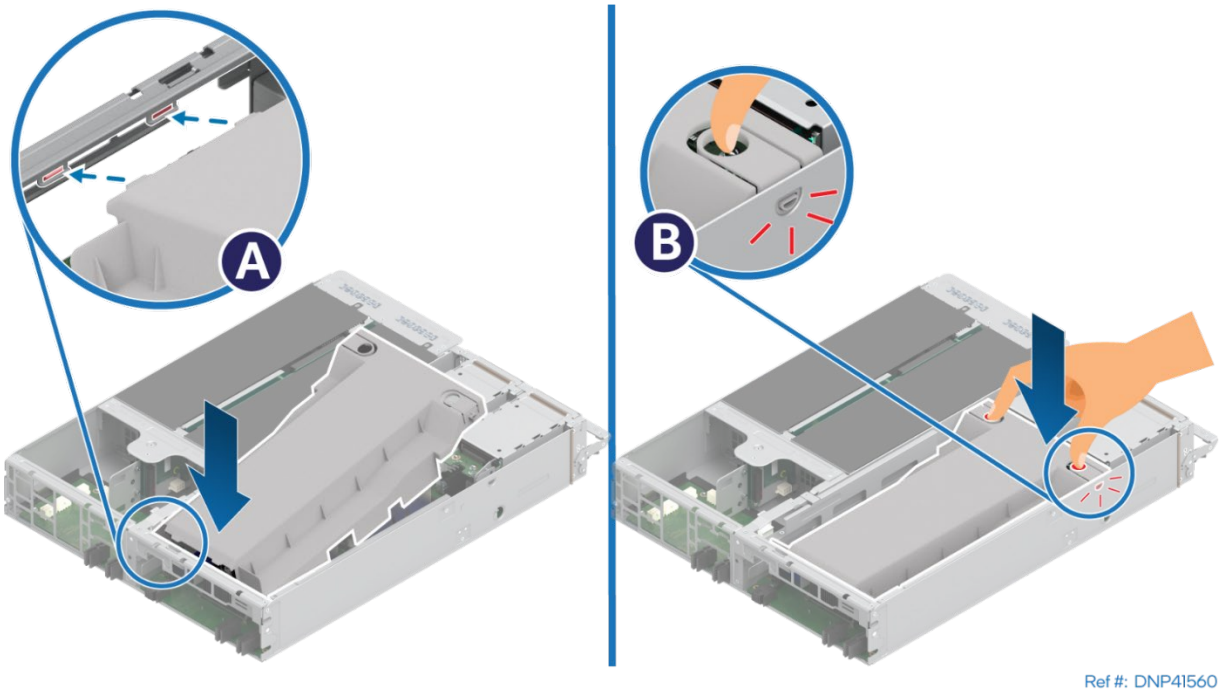


Figure 5. Installing the Air Duct (D50DNP2MFALAC Module)

1. Engage the tabs on the back end of the air duct with the slots at the rear edge of the module (see Letter A).
2. Lower the air duct until both the left and right side latches snap into place (see Letter B).

2.2 Processor Assembly and Installation

2.2.1 Heat Sinks

The Intel® D50DNP air-cooled modules support 1U height heat sinks and 2U height heat sinks as shown in the following figures. The compute module uses 1U height heat sinks. The management module and PCIe* accelerator module use 2U height heat sinks.

Note: Heat sinks are only supported on air-cooled modules.

There are two types of 2U heat sinks: front heat sink and back heat sink. There are three types of 1U heat sinks: front heat sink, back heat sink, and enhanced volume air cooling (EVAC) heat sink (front position only). The heat sinks are shown in the following figures. The front heat sink type is used for CPU 0 and the back heat sink type is used for CPU 1. The exploded views in the figures show the difference. The back heat sink types have more heat venting fins.

Note: Heat sinks are not interchangeable. The descriptions provided earlier must be followed.

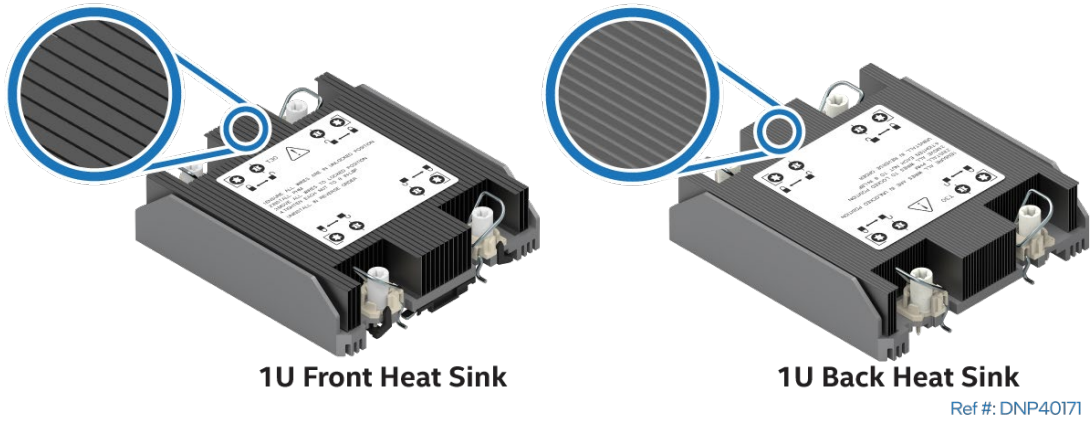


Figure 6. 1U Supported Standard Processor Heat Sinks

The EVAC heat sink is only used in the front for CPU 0. The compute module supporting the EVAC heat sink uses the standard back heat sink for CPU 1.

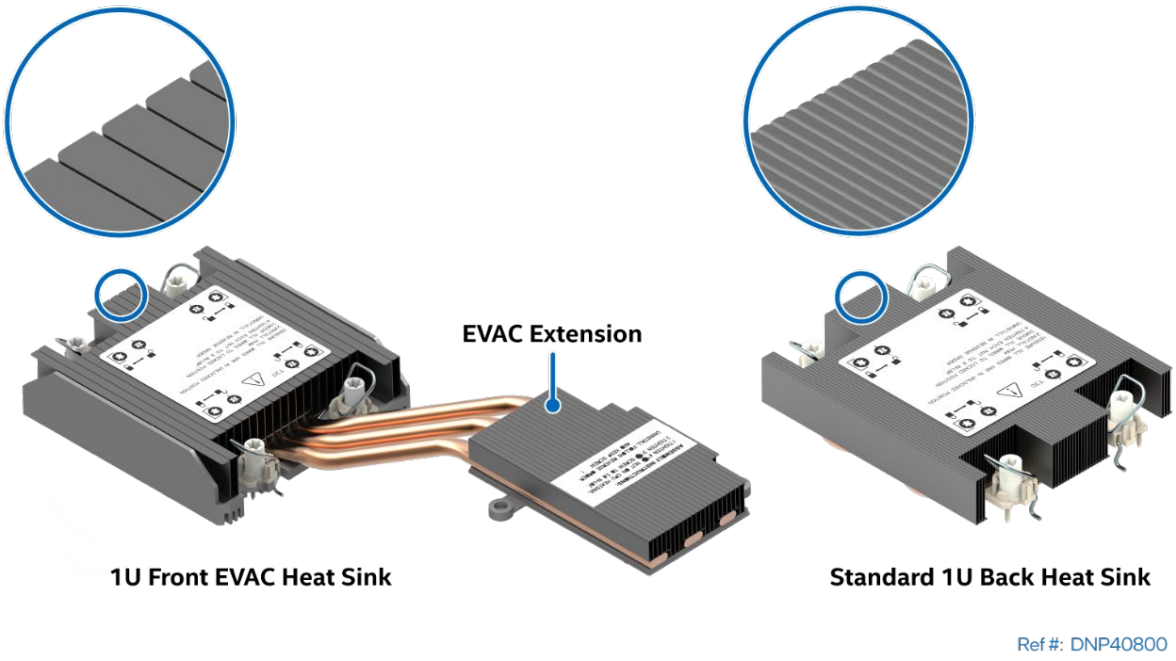


Figure 7. 1U Supported EVAC Processor Heat Sinks

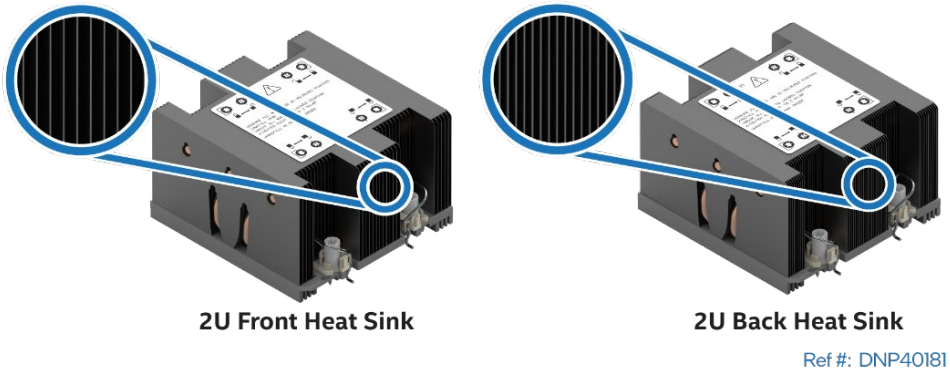


Figure 8. 2U Heat Sinks

The following figure displays a module with 1U front and back heat sinks installed. Only 1U standard front heat sink and 1U back heat sink are shown. However, the concept applies to modules using 1U EVAC front heat sink and 1U back heat sink or 2U front heat sink and 2U back heat sink.

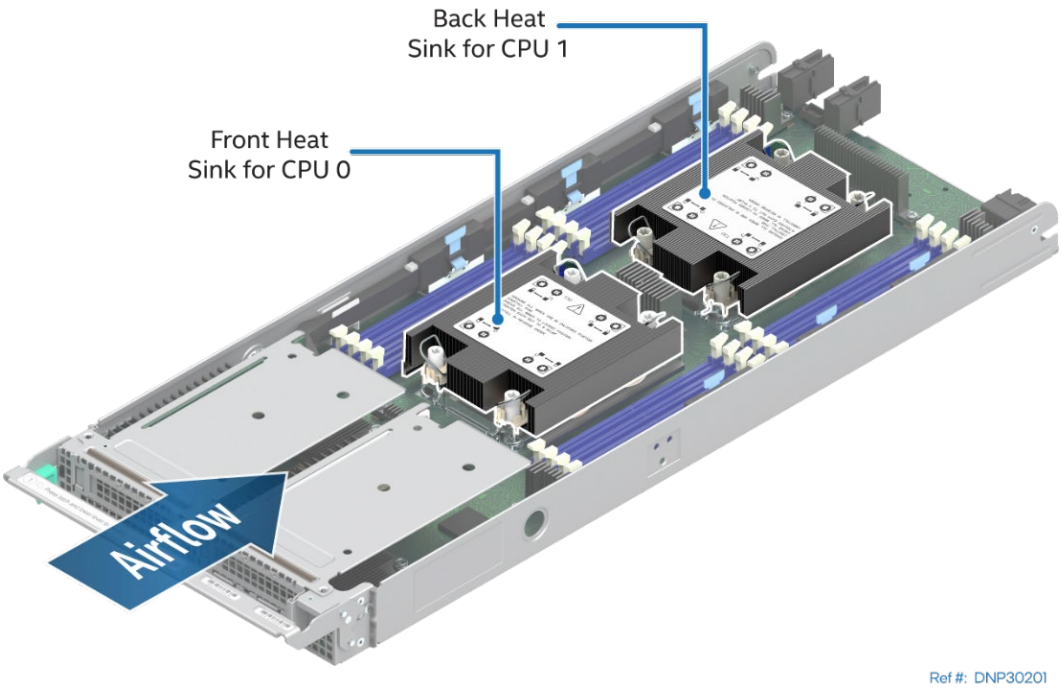


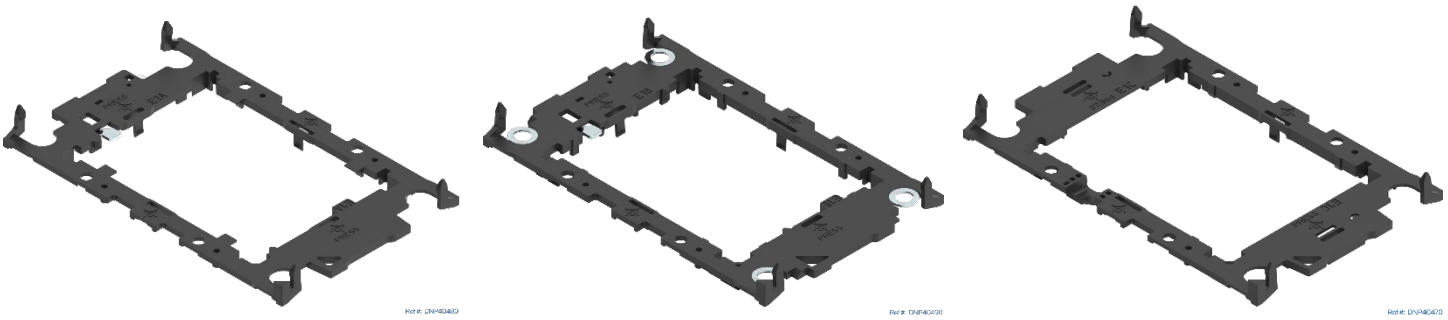
Figure 9. 1U Heat Sinks Installed in Module

2.2.2 Processor Carrier Clips

Two carrier clips are available for the 4th & 5th Gen Intel® Xeon® Scalable processor family and one for Intel® Xeon® CPU Max Series processors (see following figure). The choice of carrier clip depends on the processor type.

- 4th & 5th Gen Intel® Xeon® Scalable processor family XCC models use the E1A carrier clip.
- 4th & 5th Gen Intel® Xeon® Scalable processor family MCC models use the E1B carrier clip.
- Intel® Xeon® CPU Max Series processors family models use the E1C carrier clip.

The carrier clip designation (E1A, E1B, or E1C) is marked on each carrier clip. The designation for the needed carrier clip is also marked on each processor package. The heat sinks for the Intel® D50DNP Modules support all three carrier clips.



E1A Processor Carrier Clip E1B Processor Carrier Clip E1C Processor Carrier Clip

Figure 10. Supported Processor Carrier Clips

2.2.3 Assembly and Installation for Standard Air-Cooled Heat Sinks

Components Required

- 4th or 5th Gen Intel® Xeon® Scalable processors in shipping tray
- Processor carrier clips matching processor type
- 1U processor heat sinks (front and back) or 2U processor heat sinks (front and back)

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)
- Adjustable torque T30 Torx* screwdriver
- ESD gloves

Note: The installation figures in this section only display the 1U front heat sink and processor carrier clip E1A. However, the processor installation procedure is similar, regardless of the size of the heat sink and type of processor carrier clip.

A processor heat sink module (PHM) assembly and processor socket assembly (or “loading mechanism”) are necessary to install a processor onto the server board. Figure 11 identifies each component associated with the PHM and processor socket assemblies.

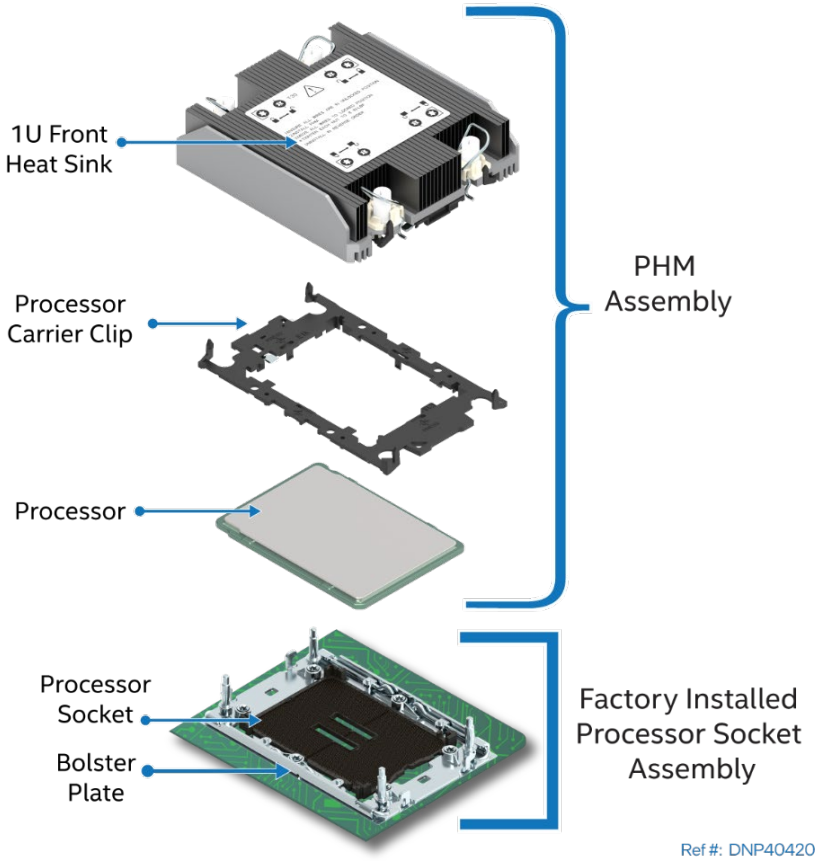


Figure 11. Processor Components and Processor Socket Reference Diagram with Standard Heat Sink

To properly assemble the PHM and to install it onto the server board, the procedures described in the following sections must be followed in the order specified. These instructions assume that all PHM components are new, and the Thermal Interface Material (TIM) is already applied to the bottom of the heat sink.

2.2.3.1 Processor Heat Sink Module (PHM) Assembly

Caution: Full ESD precautions should be followed to perform assembly of the PHM and installation of the PHM to the server board. Wear ESD gloves to prevent electrostatic damage and oxidation or foreign materials on processor package and land pads.

Each component within the PHM assembly includes a Pin 1 indicator. Pin 1 indicator alignment between all components is required throughout the assembly process.

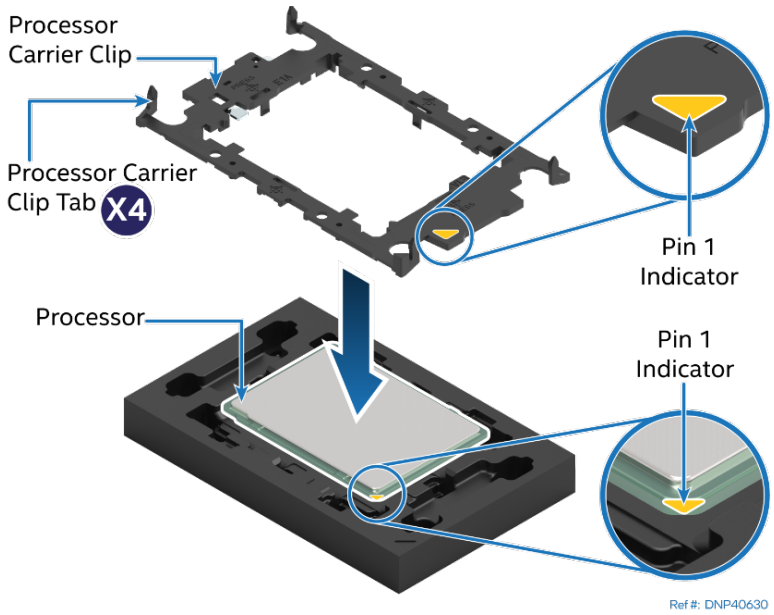


Figure 12. Installing the Processor Carrier Clip onto the Processor – Part 1

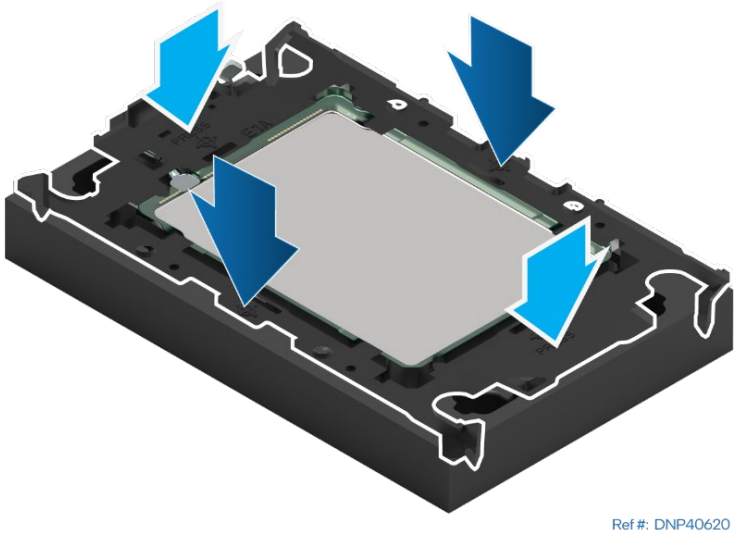


Figure 13. Installing the Processor Carrier Clip onto the Processor – Part 2

1. Align the Pin 1 indicator on the processor carrier clip with the Pin 1 indicator of the processor.
2. With the processor still in its tray, place the processor carrier clip over the processor.
3. Gently press down simultaneously on two opposite sides of the processor carrier clip until it clicks in place.
4. Repeat step 3 for the other two sides.

5. Locate the processor heat sink. To avoid damage, grasp it by its narrower sides as shown in the following figure.

Caution: Fin edges of the processor heat sink are very sharp. Intel recommends wearing thin ESD protective gloves when handling the PHM during the following procedures.

Caution: Processor heat sinks are easily damaged if handled improperly. See the following image for proper handling.

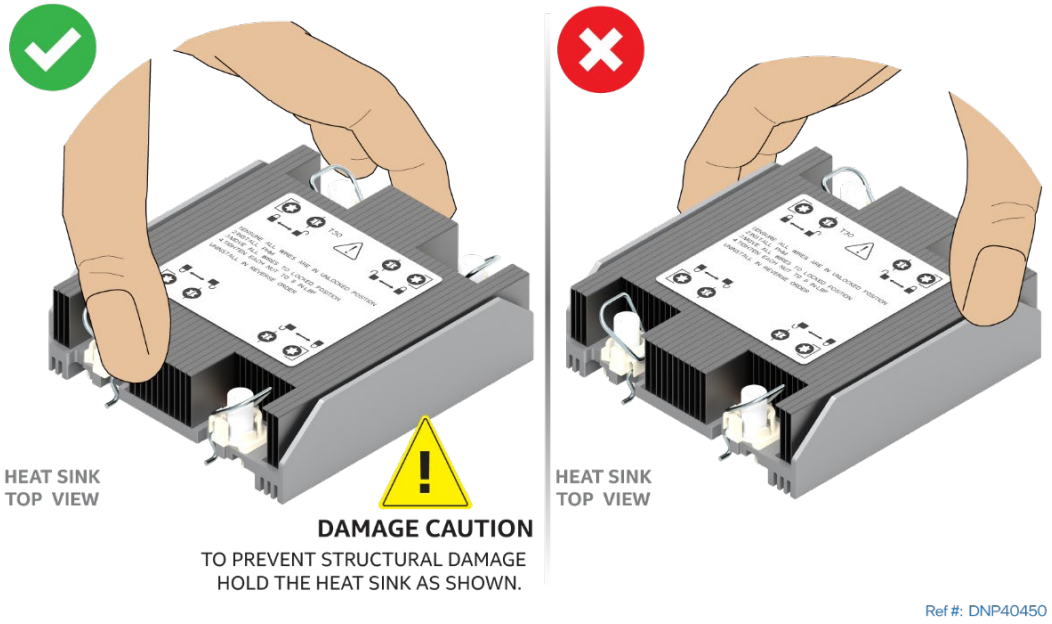


Figure 14. Heat Sink Handling

6. Place the heat sink bottom side up onto a flat surface.
7. Remove the plastic protective film from the Thermal Interface Material (TIM).

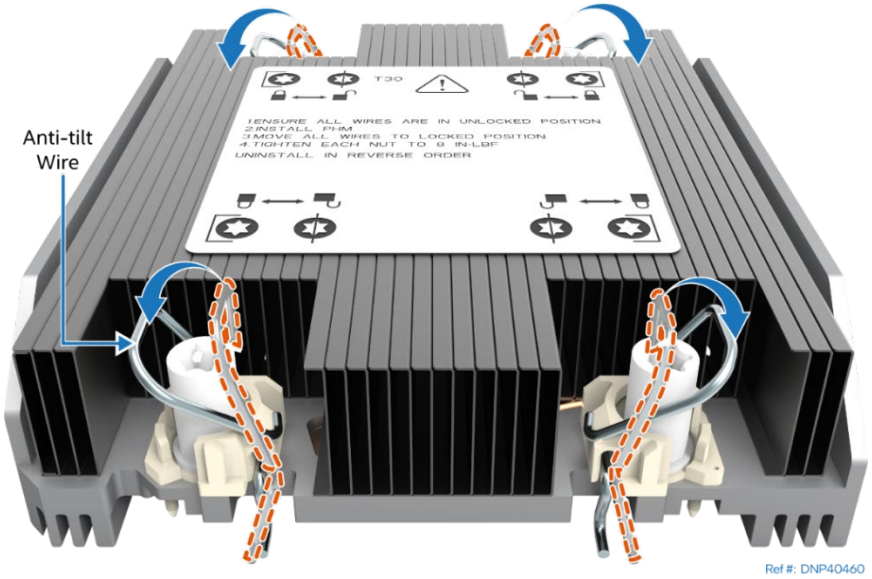


Figure 15. Processor Heat Sink Anti-tilt Wires in the Outward Position

8. Set the anti-tilt wire over each of the four heat sink fasteners to their outward position.

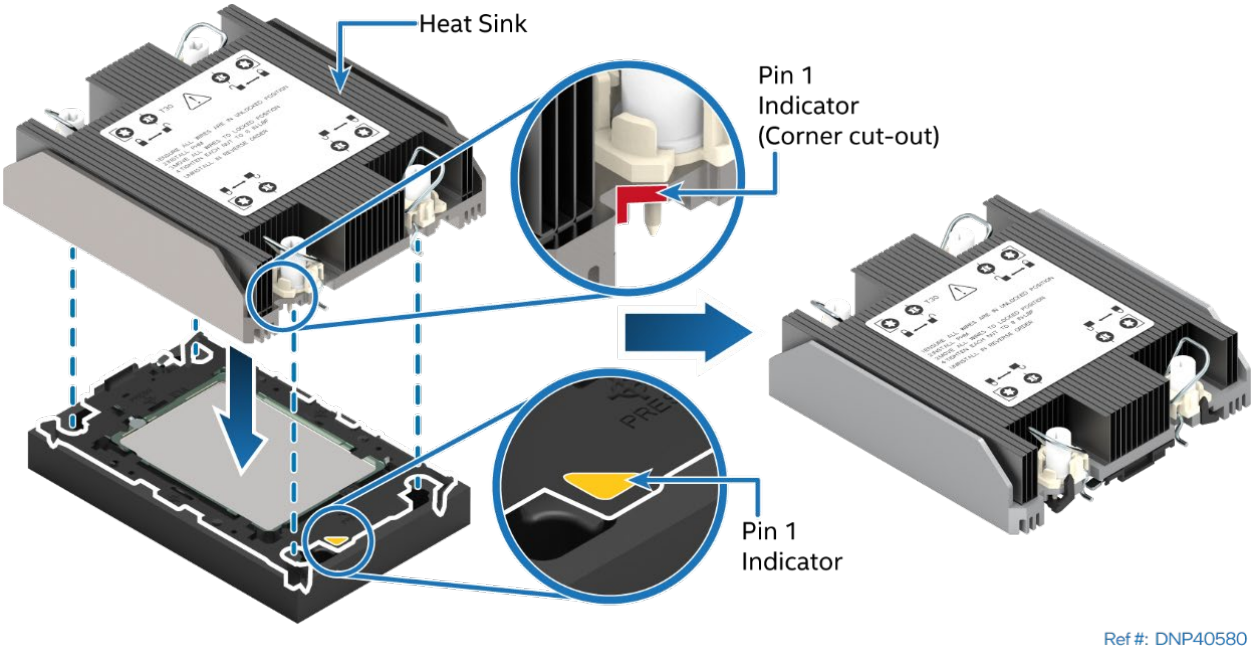


Figure 16. Aligning Pin 1 Indicator

9. Align the Pin 1 indicator of the processor carrier clip with one of the diagonally cut corners on the base of the heat sink. Or (if present) look for the Pin 1 indicator on the corner of the heat sink label.
10. Gently press down the heat sink onto the processor carrier clip until it clicks into place.
11. Ensure that all four heat sink corners are securely latched to the processor carrier clip tabs.

2.2.3.2 PHM Installation

If installed, remove the plastic cover from the processor socket.

Caution: Do not touch the socket pins. The pins inside the processor socket are extremely sensitive. A damaged processor socket may produce unpredictable system errors.

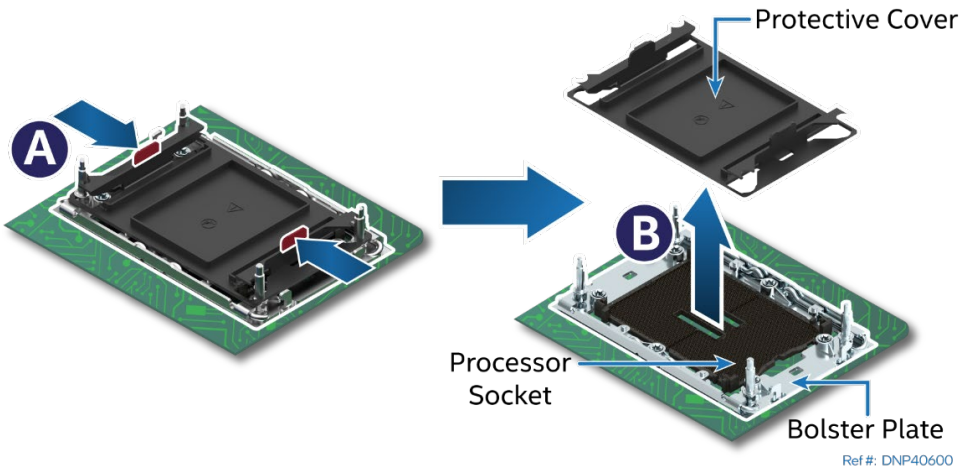


Figure 17. Socket Protective Cover Removal

1. Remove the socket protective cover by squeezing the finger grips (see Letter A) and pulling the cover up (see Letter B).
2. Ensure that the socket is free of damage or contamination before installing the PHM.

Caution: If debris is observed, blow it away gently with an air blower. Do not use tweezers or any other hard tools to remove the debris.

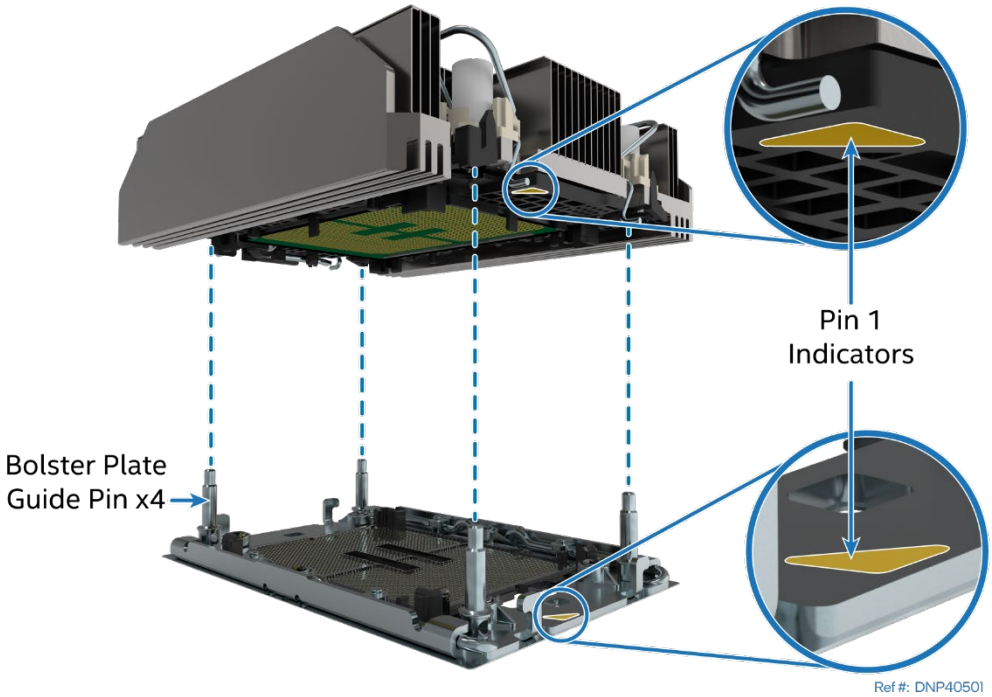


Figure 18. PHM Alignment with the Socket Assembly

Caution: Processor socket pins are delicate and bend easily. Use extreme care when placing the PHM onto the processor socket. Do not drop it.

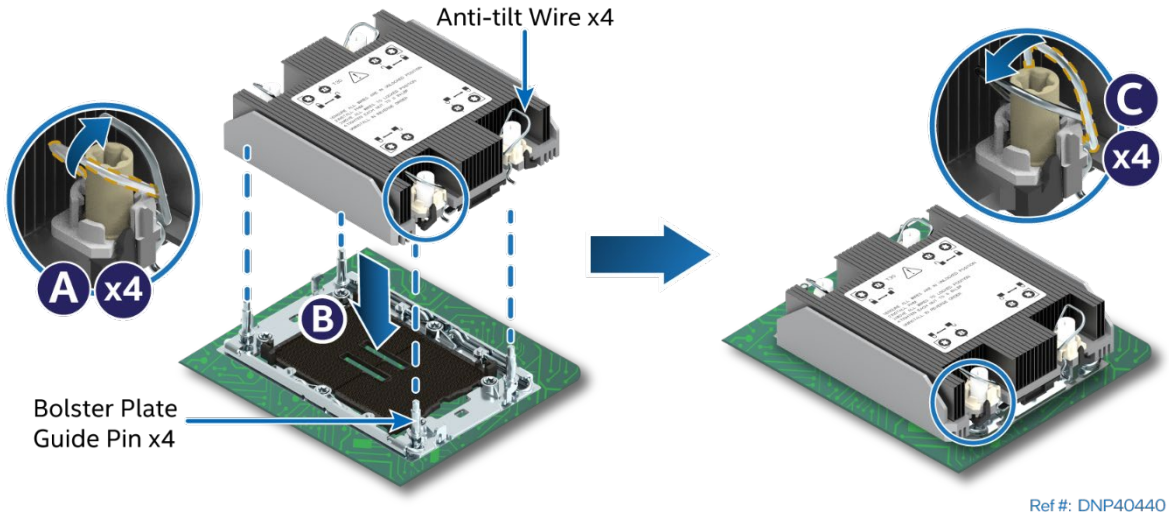


Figure 19. PHM Installation onto the Server Board

3. Set all four anti-tilt wires on the heat sink to the inward position (see Letter A).
4. Align the Pin 1 indicators of the processor carrier clip and processor with the Pin 1 indicator on the socket assembly bolster plate.
5. Carefully lower the PHM over the four bolster plate alignment pins (see Letter B).
6. Ensure that the PHM is sitting flat and even on the bolster plate.
7. Set all four anti-tilt wires on the heat sink to the outward position (see Letter C).

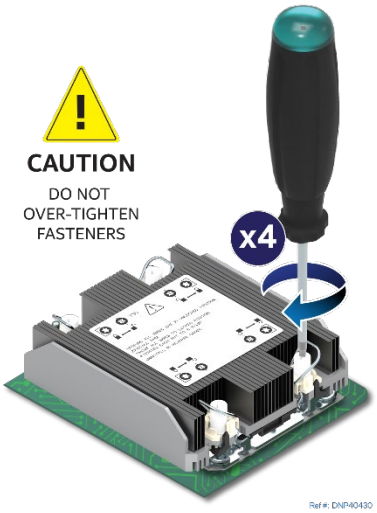


Figure 20. Tighten Heat Sink Fasteners

8. Using a T30 Torx* screwdriver, tighten the heat sink fasteners to 8 in-lb. No specific sequence is needed for tightening. General diagonal bolt tightening order can be used.

Note: Intel strongly recommends installing both processors. If only one processor is installed, do not install a processor heat sink on an empty socket.

2.2.4 Assembly and Installation for EVAC Heat Sinks

Components Required

- 4th or 5th Gen Intel® Xeon® Scalable processors or Intel® Xeon® CPU Max Series processors in shipping tray
- Processor carrier clips matching processor type
- 1U EVAC processor heat sink (front) and 1U standard processor heat sink (back)

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)
- Adjustable torque T30 Torx* screwdriver
- ESD Gloves
- Phillips* head screwdriver #1 and #2

Note: The following procedures show the installation for the 1U EVAC processor heat sink (front). To install the 1U standard processor heat sink (back), follow the procedures in Section 2.2.3.

A processor heat sink module (PHM) assembly and processor socket assembly (or “loading mechanism”) are necessary to install a processor onto the server board. Figure 21 identifies each component associated with the PHM and processor socket assemblies.

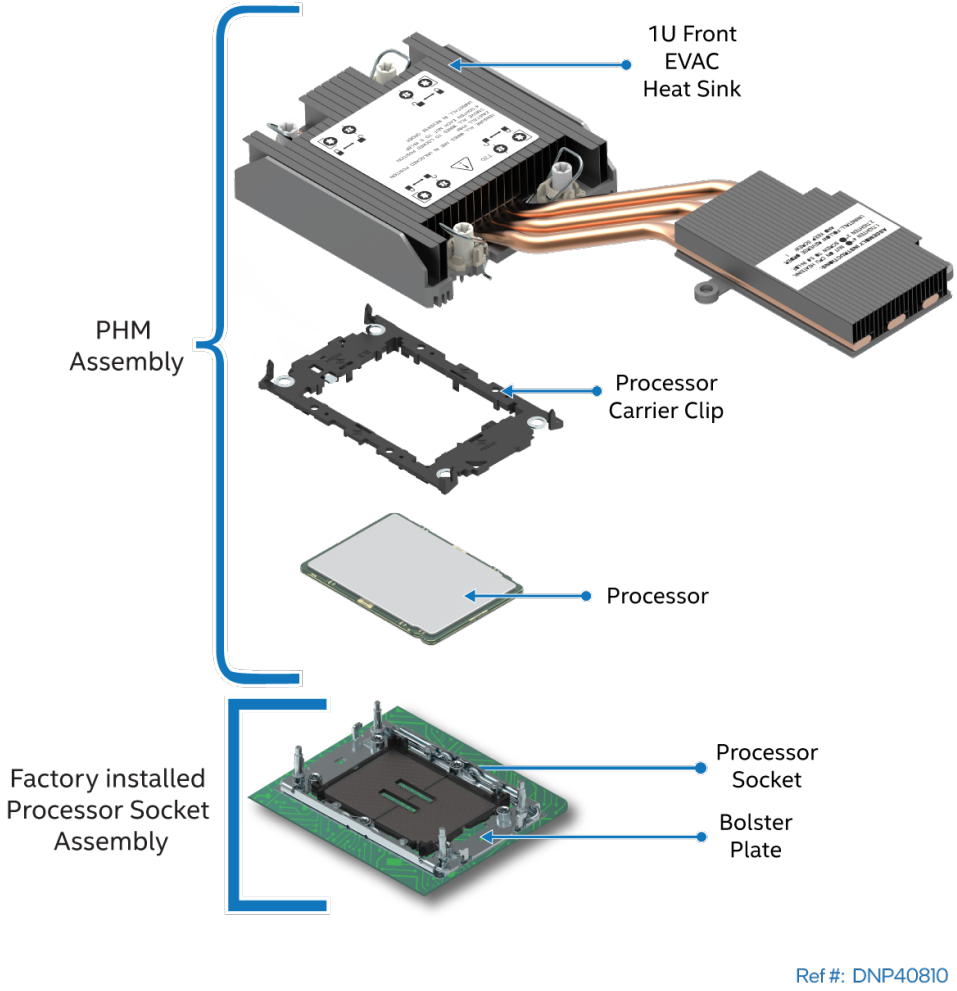


Figure 21. Processor Components and Processor Socket Reference Diagram with EVAC Heat Sink

To properly assemble the PHM and install it onto the server board, the procedures described in the following sections must be followed in the order specified. These instructions assume that all the PHM components are new, and the Thermal Interface Material (TIM) is already applied to the bottom of the heat sink.

2.2.4.1 Processor Heat Sink Module (PHM) Assembly

Caution: Full ESD precautions should be followed to perform assembly and installation of the PHM to the server board. Wear ESD gloves to prevent electrostatic damage and oxidation or foreign materials on processor package and land pads.

Each component within the PHM assembly includes a Pin 1 indicator. Pin 1 indicator alignment between all components is required throughout the assembly process.

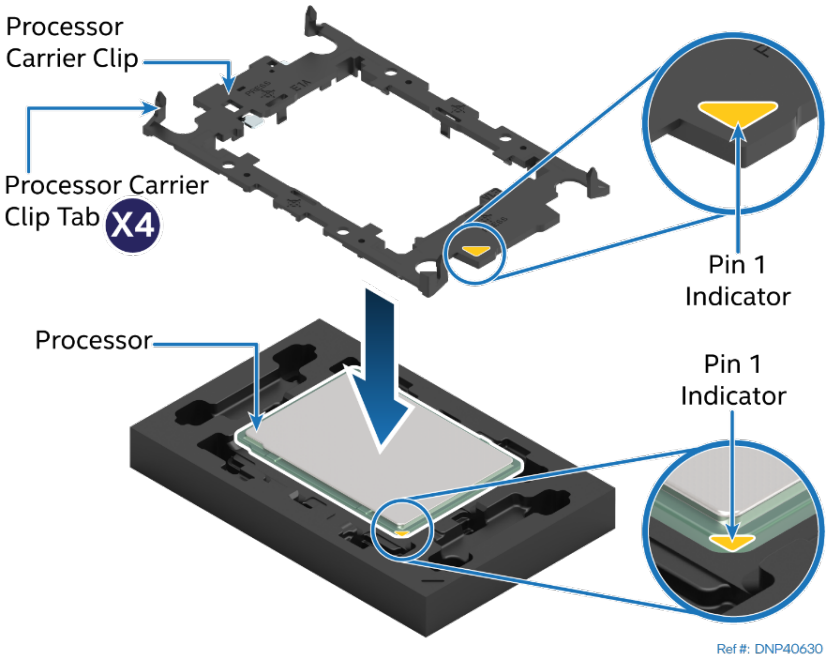


Figure 22. Installing the Processor Carrier Clip onto the Processor – Part 1

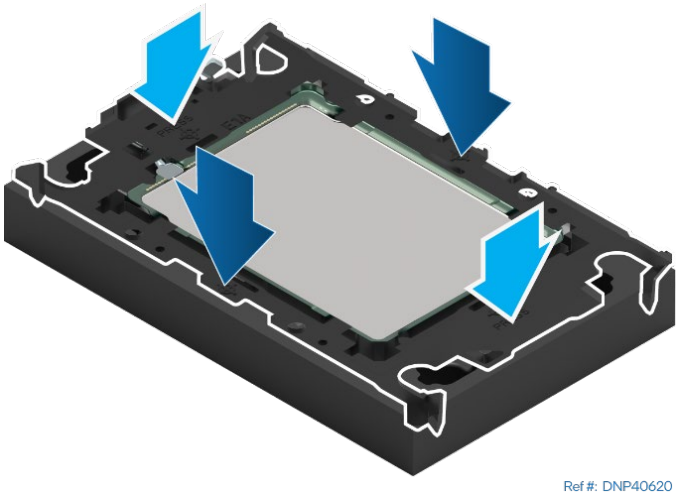


Figure 23. Installing the Processor Carrier Clip onto the Processor – Part 2

1. Align the Pin 1 indicator on the processor carrier clip with the Pin 1 indicator of the processor.
2. With the processor still in its tray, place the processor carrier clip over the processor.
3. Gently press down simultaneously on two opposite sides of the processor carrier clip until it clicks in place.
4. Repeat step 3 for the other two sides.

5. Locate the processor heat sink. To avoid damage, grasp it by its narrower sides as shown in the following figure.

Caution: Fin edges of the processor heat sink are very sharp. Intel recommends wearing thin ESD protective gloves when handling the PHM during the following procedures.

Caution: Processor heat sinks are easily damaged if handled improperly. See the following image for proper handling.

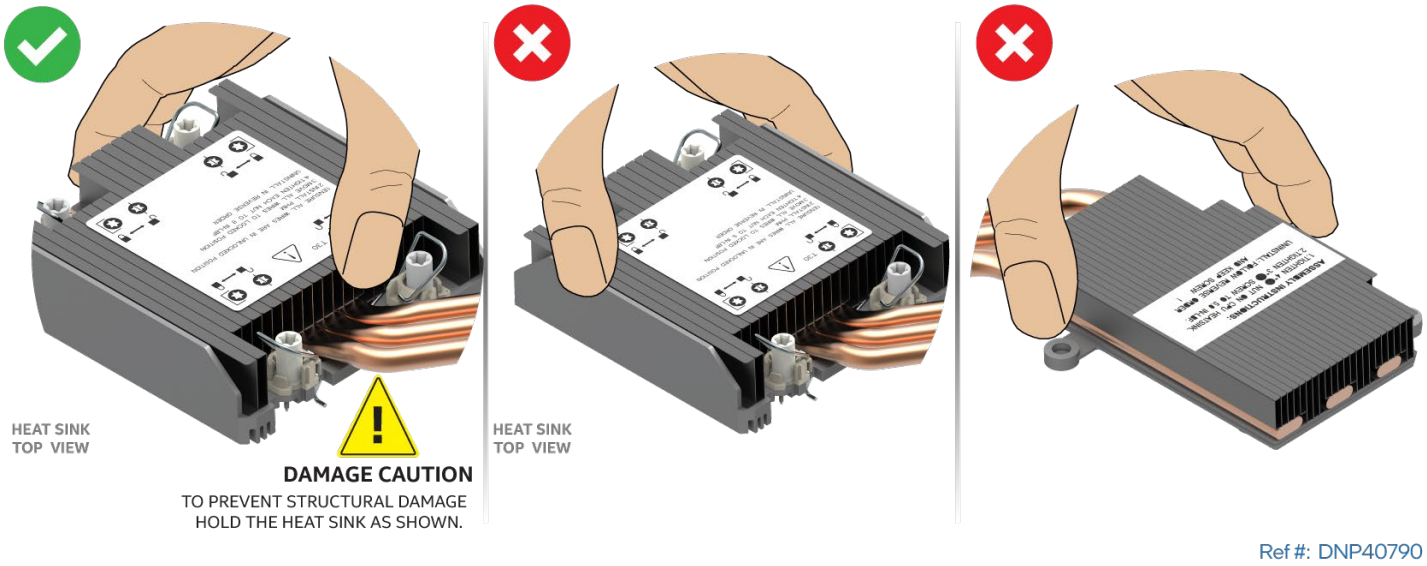


Figure 24. Handling Heat Sink

6. Place the heat sink bottom side up onto a flat surface.
7. Remove the plastic protective film from the Thermal Interface Material (TIM).

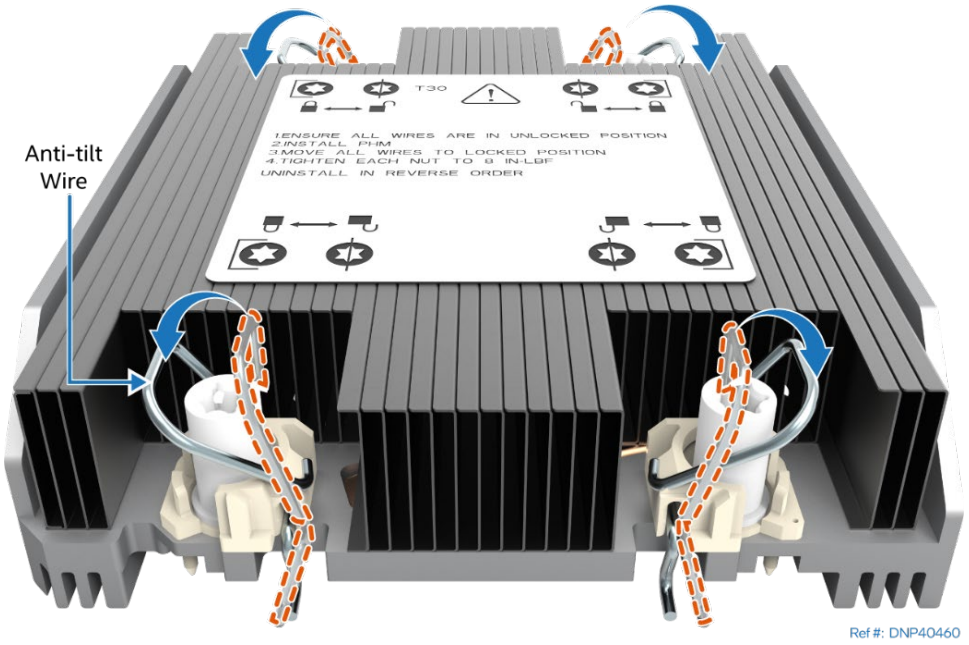


Figure 25. Processor Heat Sink Anti-tilt Wires in the Outward Position

8. Set the anti-tilt wire over each of the four heat sink fasteners to their outward position.

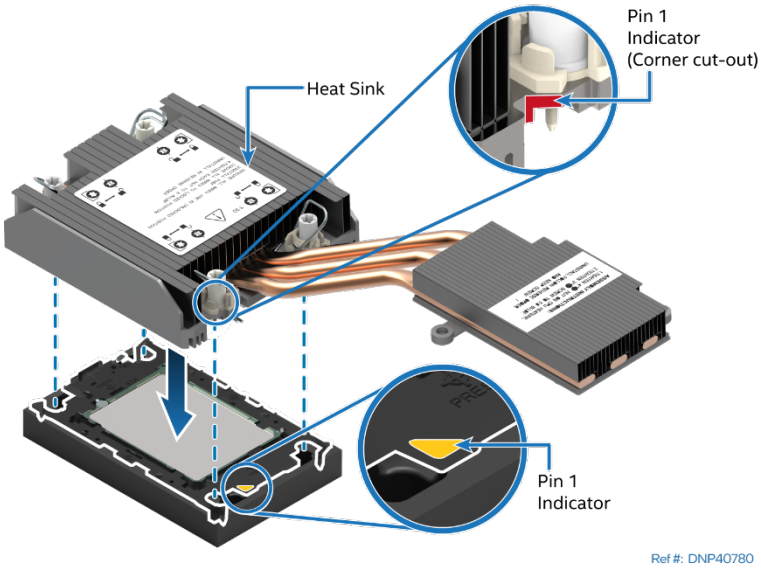


Figure 26. Pin 1 Indicator Alignment

9. Align the Pin 1 indicator of processor carrier clip with one of the diagonally cut corners on the base of the heat sink. Or (if present) look for the Pin #1 indicator on the corner of the heat sink label.
10. Gently press down the heat sink onto the processor carrier clip until it clicks into place.
11. Ensure that all four heat sink corners are securely latched to the processor carrier clip tabs.

2.2.4.2 EVAC PHM Installation

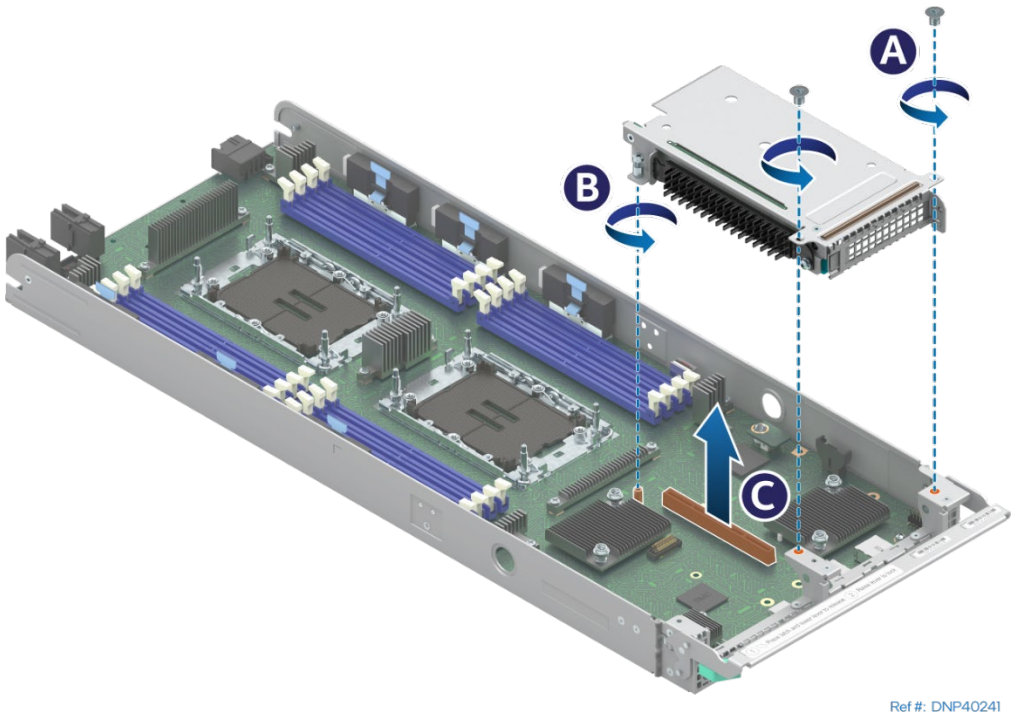


Figure 27. Removing a Riser Assembly

1. Using Phillips #1 screwdriver remove two screws that secure the right riser assembly to the front of the module (see Letter A).
2. Using Phillips screwdriver #2 loosen the captive screw at the back of the riser assembly. (see Letter B)
3. Carefully remove the riser assembly by lifting it up and away from the module (see Letter C).

Caution: Do not touch the socket pins. The pins inside the processor socket are extremely sensitive. A damaged processor socket may produce unpredictable system errors.

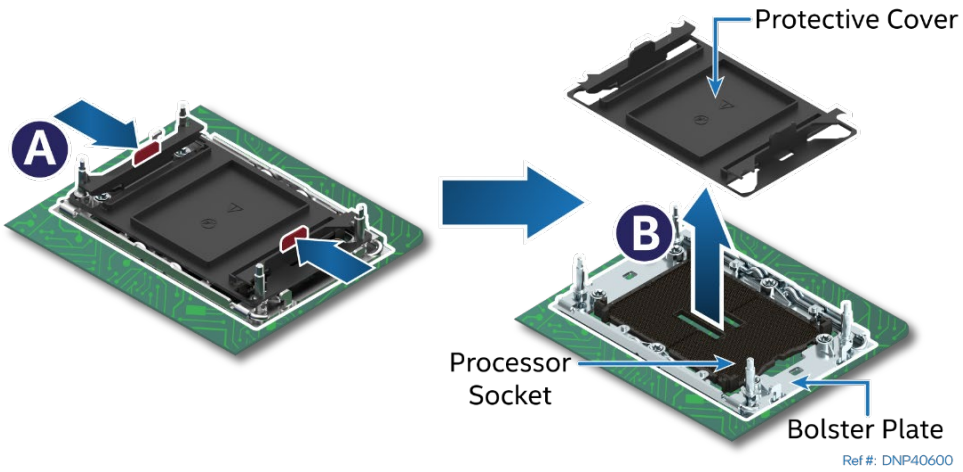


Figure 28. Socket Protective Cover Removal

4. Remove the socket protective cover by squeezing the finger grips (see Letter A) and pulling the cover up (see Letter B).
5. Ensure that the socket is free of damage or contamination before installing the PHM.

Caution: If debris is observed, blow it away gently with an air blower. Do not use tweezers or any other hard tools to remove the debris.

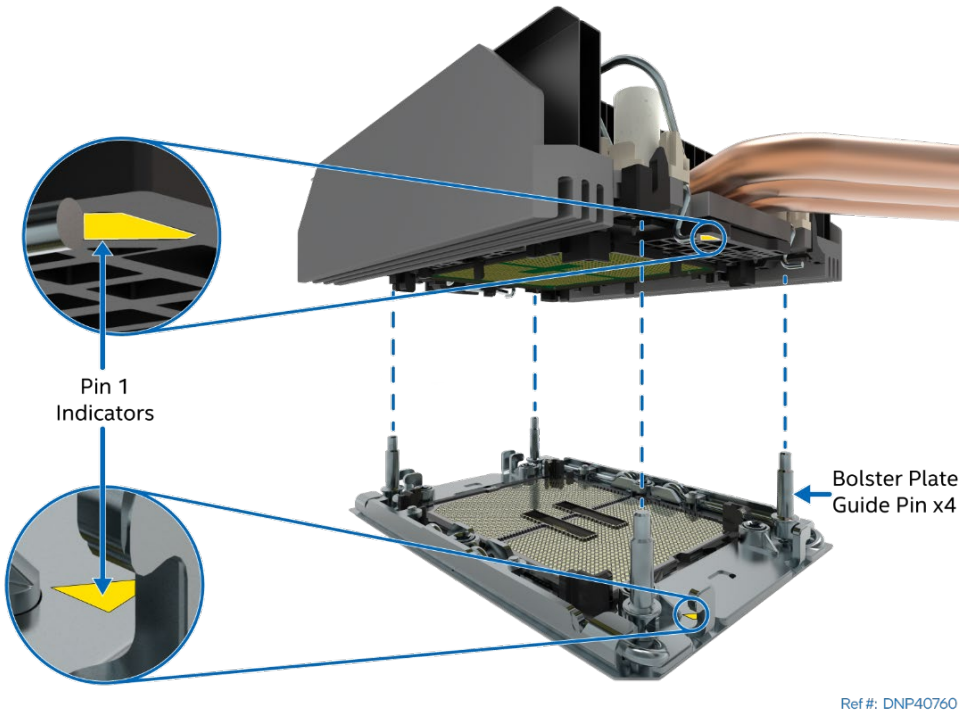


Figure 29. PHM Alignment with the Socket Assembly

Caution: Processor socket pins are delicate and bend easily. Use extreme care when placing the PHM on the processor socket. Do not drop it.

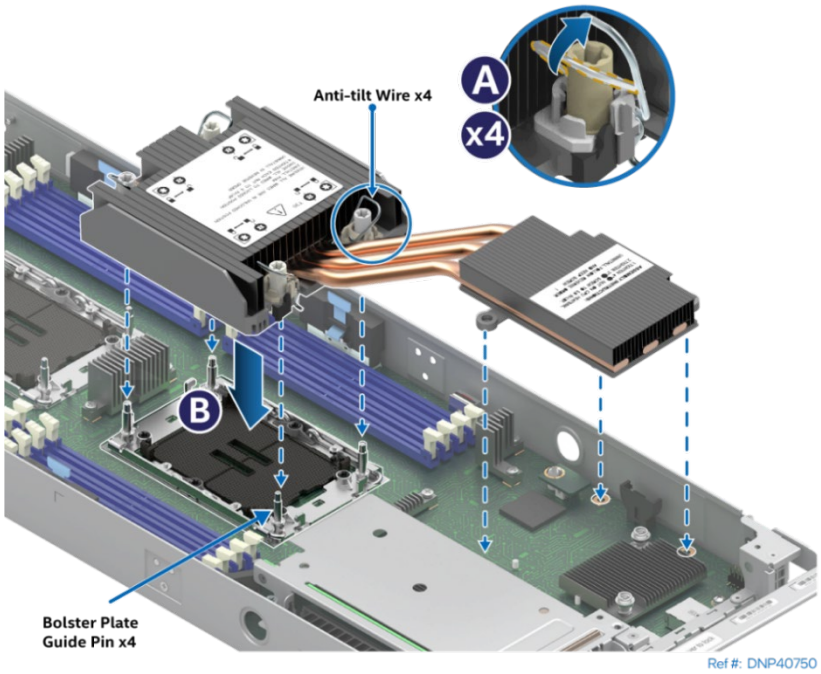


Figure 30. PHM Installation onto the Server Board

6. Set all four anti-tilt wires on the heat sink to the inward position (see Letter A).
7. Align the Pin 1 indicators of the processor carrier clip and processor with the Pin 1 indicator on the socket assembly bolster plate.
8. Carefully lower the PHM over the bolster plate's alignment pins (see Letter B).

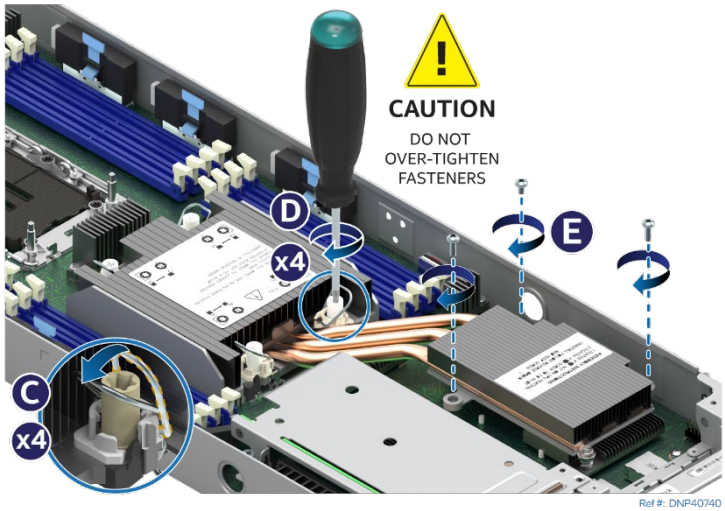


Figure 31. Tighten EVAC Heat Sink Extension

9. Ensure that the PHM is sitting flat and even on the bolster plate.
10. Set all four anti-tilt wires on the heat sink to the outward position (see Letter C).
9. Using a T30 Torx* screwdriver, tighten the heat sink fasteners to 8 in-lb (see Letter D). No specific sequence is needed for tightening. General diagonal bolt tightening order can be used.
11. Using a Phillips* screwdriver, tighten the three heat sink extension screws to 5 in-lb (see Letter E).

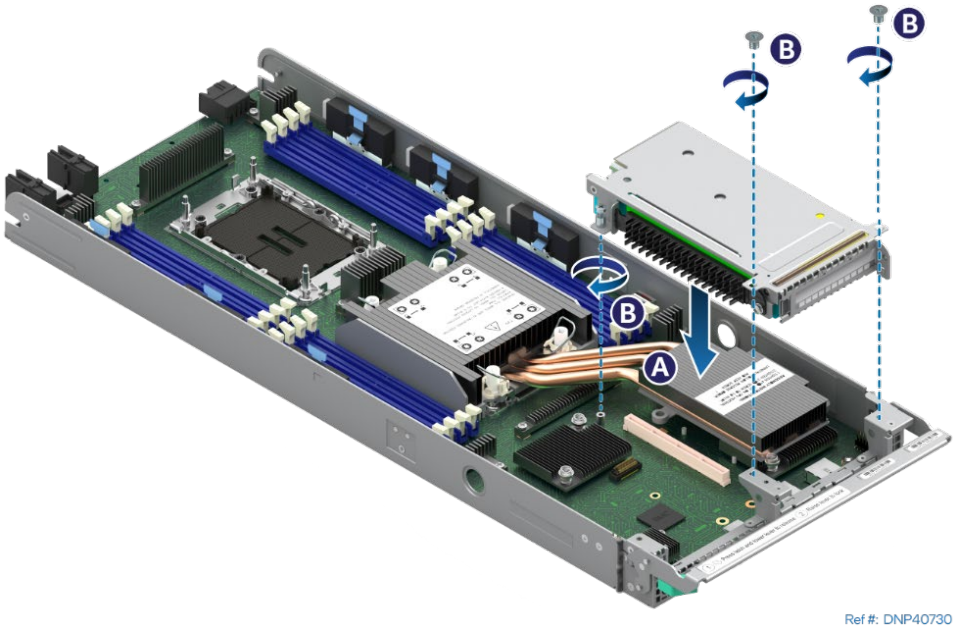


Figure 32.Installing a Riser Assembly

12. Align the riser card to the riser slot on the server board (see Letter A).
13. Carefully push down on the riser assembly until the riser card is securely seated into the riser slot.
14. Ensure that screw holes of the riser assembly are aligned with the mounting holes of the module.
15. Using Phillips screwdriver #2 tighten the captive screw at the back of the riser assembly to 5 in-lb. (see Letter B)
16. Using Phillips screwdriver #1 install two screws to secure the riser assembly to the front of the module. Tighten to 5 in-lb. (see Letter C).
17. Reinstall the air duct (see Section 2.1.2).

Note: Intel strongly recommends installing both processors. If only one processor is installed, do not install a processor heat sink on an empty socket.

2.2.5 Assembly and Installation for Liquid-Cooled Configurations

Components Required

- 4th or 5th Gen Intel® Xeon® Scalable processors or Intel® Xeon® CPU Max Series processors in shipping tray
- Processor carrier clips matching processor type

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)
- ESD gloves

For liquid-cooled system configurations, the processor is cooled through cold plates that are part of a liquid-cooling loop. The following steps only cover the processor and processor carrier clip installation to the socket assembly. The installation of the processor cold plates is explained in Section 2.3.

Caution: Full ESD precautions should be followed to perform assembly and installation of the PHM to the server board. Wear ESD gloves to prevent electrostatic damage and oxidation or foreign materials on processor package and land pads.

Each component within the PHM assembly includes a Pin 1 indicator. Pin 1 indicator alignment between all components is required throughout the assembly process.

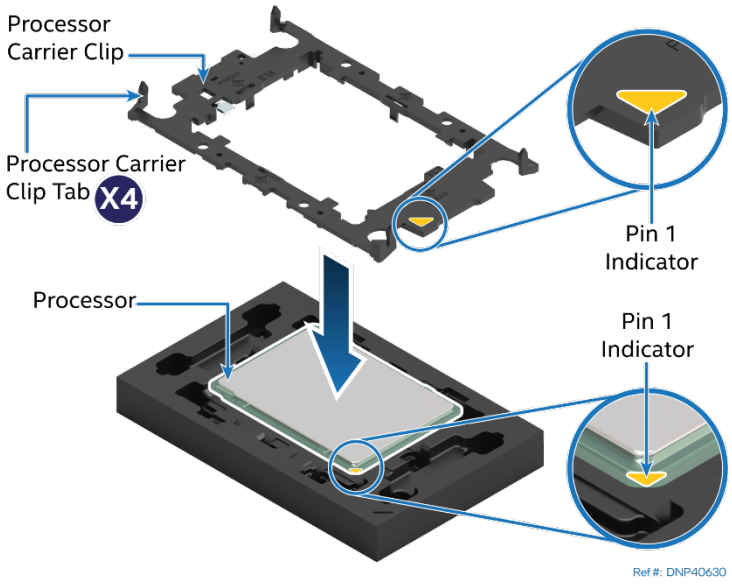


Figure 33. Installing the Processor Carrier Clip onto the Processor – Part 1

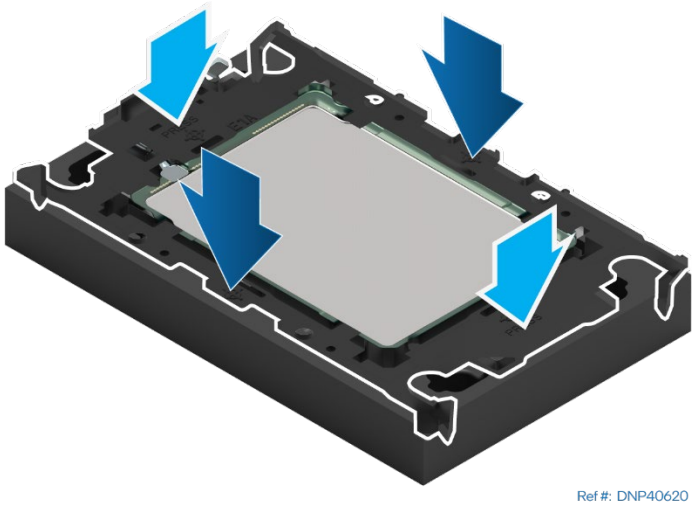


Figure 34. Installing the Processor Carrier Clip onto the Processor – Part 2

1. With the processor still in its tray, place the processor carrier clip over the processor.
2. Ensure that the Pin 1 indicator on the processor carrier clip is aligned with the Pin 1 indicator of the processor.
3. Gently press down simultaneously on two opposite sides of the processor carrier clip until it clicks in place.
4. Repeat step 3 for the other two sides.

Caution: Do not touch the socket pins. The pins inside the processor socket are extremely sensitive. A damaged processor socket may produce unpredictable system errors.

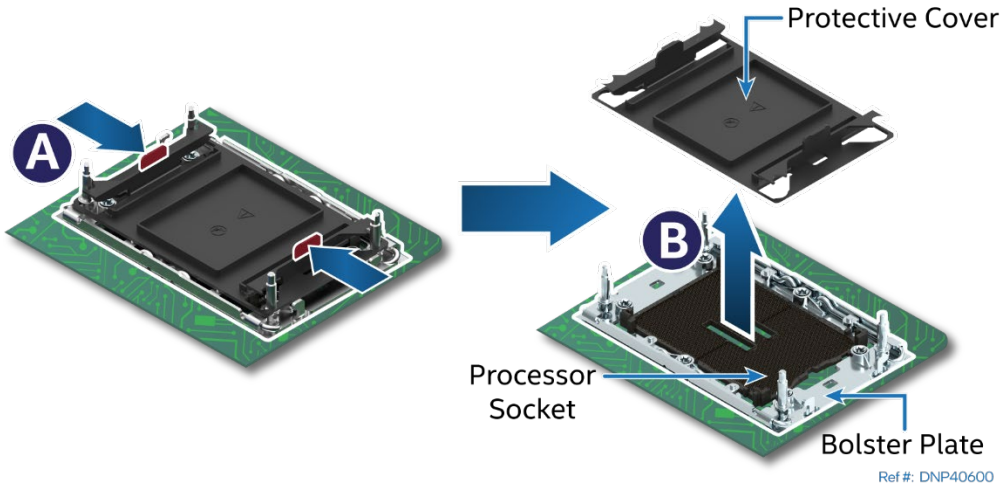


Figure 35. Socket Protective Cover Removal

5. Remove the socket protective cover by squeezing the finger grips (see Letter A) and pulling the cover up (see Letter B).
6. Ensure that the socket is free of damage or contamination before installing the PHM.

Caution: If debris is observed, blow it away gently with an air blower. Do not use tweezers or any other hard tools to remove the debris.

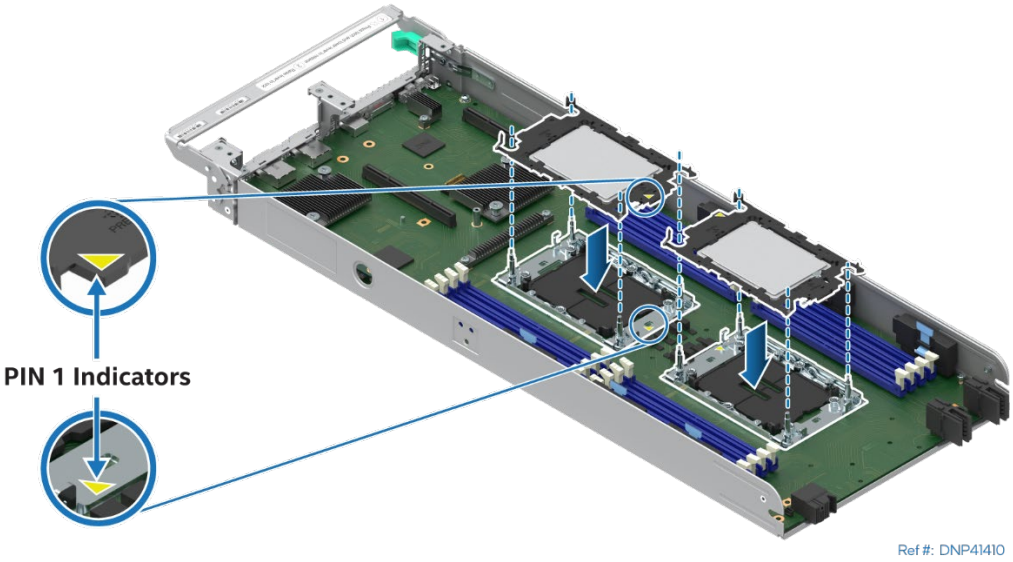


Figure 36. Align Processors and Processor Carrier Clips with Sockets

7. Align the Pin 1 indicators of the processor carrier clip and processor with the Pin 1 indicator on the bolster plate.
8. Lower the processors onto the socket assembly.

Caution: Processor socket pins are delicate and bend easily. Use extreme care when placing the processor and carrier clip onto the processor socket. Do not drop it.

2.3 Liquid-Cooling Loop Installation (D50DNP1MHCPLC Module)

The liquid-cooled systems are designed to connect to a non-Intel coolant distribution unit using Staubli* SCG 09 quick disconnect couplings. The internal cooling for this configuration is done using a liquid-cooling loop. To maintain system thermals for liquid-cooled modules, the liquid-cooling loop must always be in place when the system is operational.

The liquid-cooling loop kit for compute module (DNPLCLPCM) includes:

- Passive cold plate loop assembly
- Plastic carrying case
- Memory cooling kit

The installation of the liquid-cooling loop assumes that the processors and the processor clips are already installed in the sockets as explained in Section 2.2.5.

Note: Liquid-cooling loop installation requires that no DIMMs are installed in the memory slots.

Important Note: As part of the shipping process, there are screws occupying the screw holes on the server board as shown on the following figure. Remove those screws **before** starting the liquid-cooling loop installation procedures described in this section.

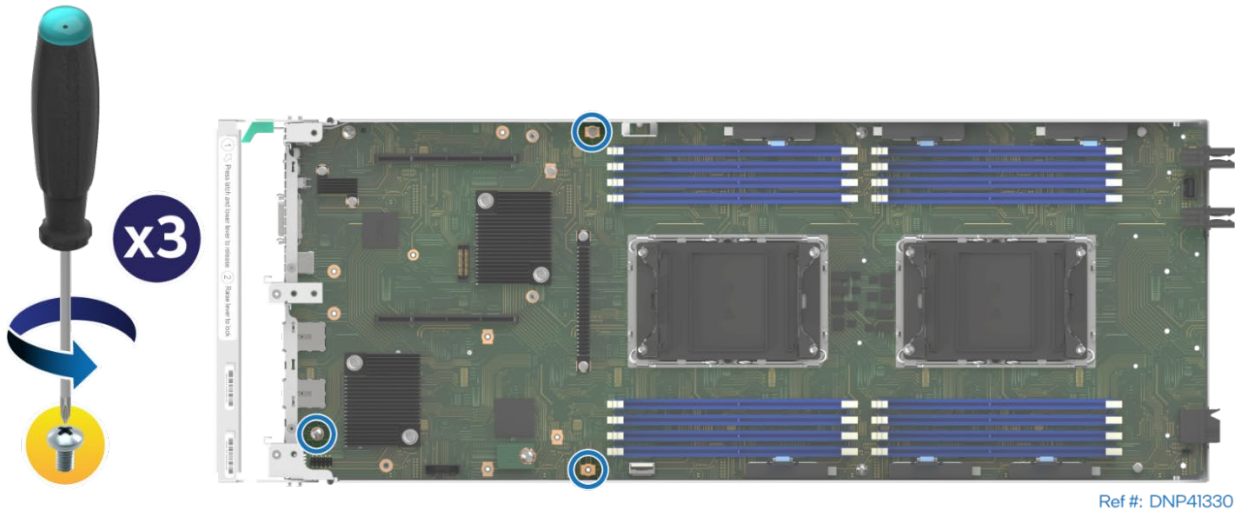


Figure 37. Screws to be removed before the installation

The cooling components for liquid-cooled systems are shown in the following figure.

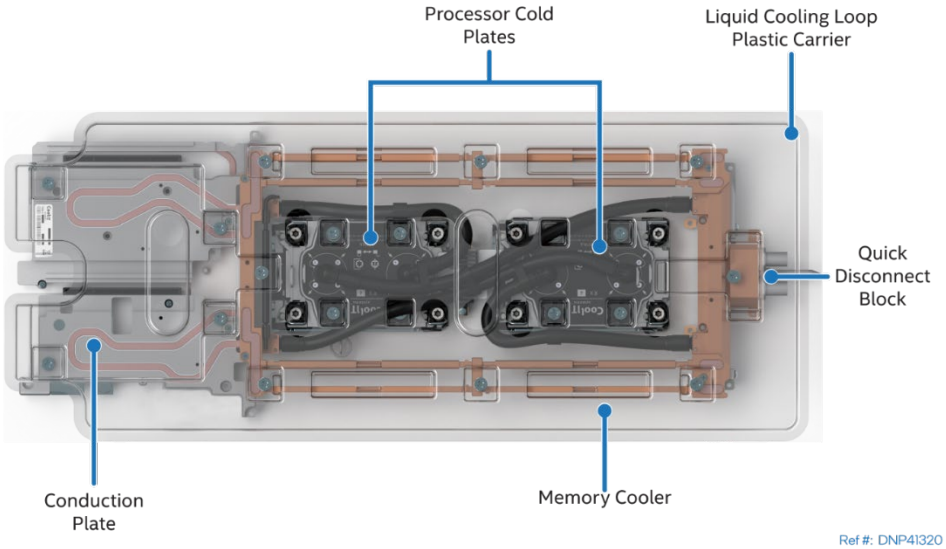


Figure 38. Liquid-Cooling Loop Components

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #2
- T30 Torx* screwdriver
- Liquid-cooling VR TIM application tools (TNPLCVRTLS)
- Liquid-cooling VR TIM application nozzles (TNPLCVRTNZ)
- Liquid-cooling VR TIM compound (TNPLCVRCMPD)

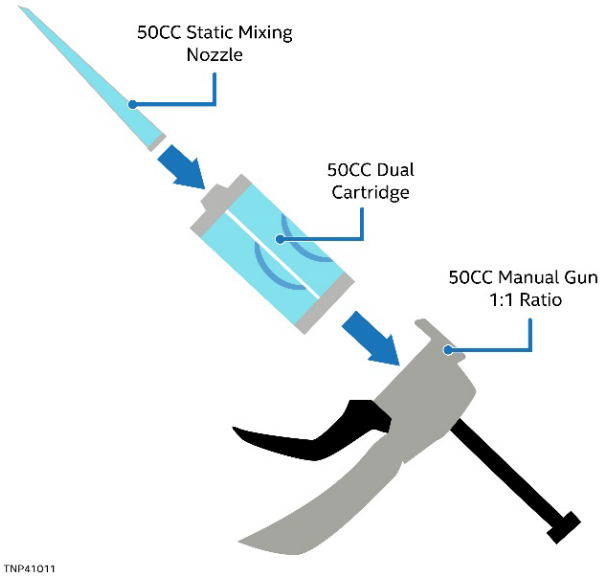


Figure 39. Assembling the Manual Applicator

1. Assemble the Bergquist SS95407* applicator, Bergquist GF3500S35* thermal gap filler cartridge, and Bergquist SS95437* nozzle as shown in the previous figure. Ensure that the thermal gap filler has not expired.

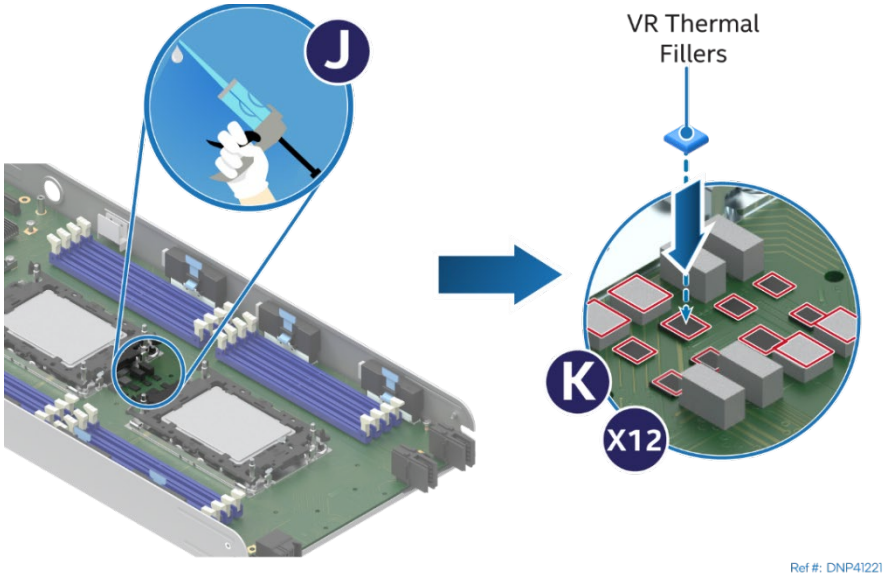


Figure 40. Applying Thermal Gap Filler

2. Using the assembled applicator (see Letter J), apply the thermal gap filler on top of the twelve center VR components (see Letter K).

Notes:

- For 4th & 5th Gen Intel® Xeon® Scalable XCC and for Intel® Xeon® CPU Max Series processor models, apply 248 cubic millimeters of thermal gap filler to cover the VR components with a minimum thickness of 1 mm.
- For 4th & 5th Gen Intel® Xeon® Scalable MCC processor models, apply 423 cubic millimeters of thermal gap filler to cover the VR components with a minimum thickness of 1.64 mm.

3. Carefully unpack the liquid-cooling loop.
4. Remove the protective covers from the PCIe* add-in card cold plate, the CPU 0 and CPU 1 cold plates.
5. Ensure that the thermal interface material (TIM) for each cold plate is in place and the plastic protective film is removed.

Important Note: The liquid-cooling loop comes with a plastic carrier attached from the factory. The carrier is used during the installation and removal of the liquid-cooling loop in the module. After the liquid-cooling loop is installed in the module, the plastic carrier needs to be removed from it. Keep the plastic carrier for the liquid-cooling loop removal, if needed in the future.

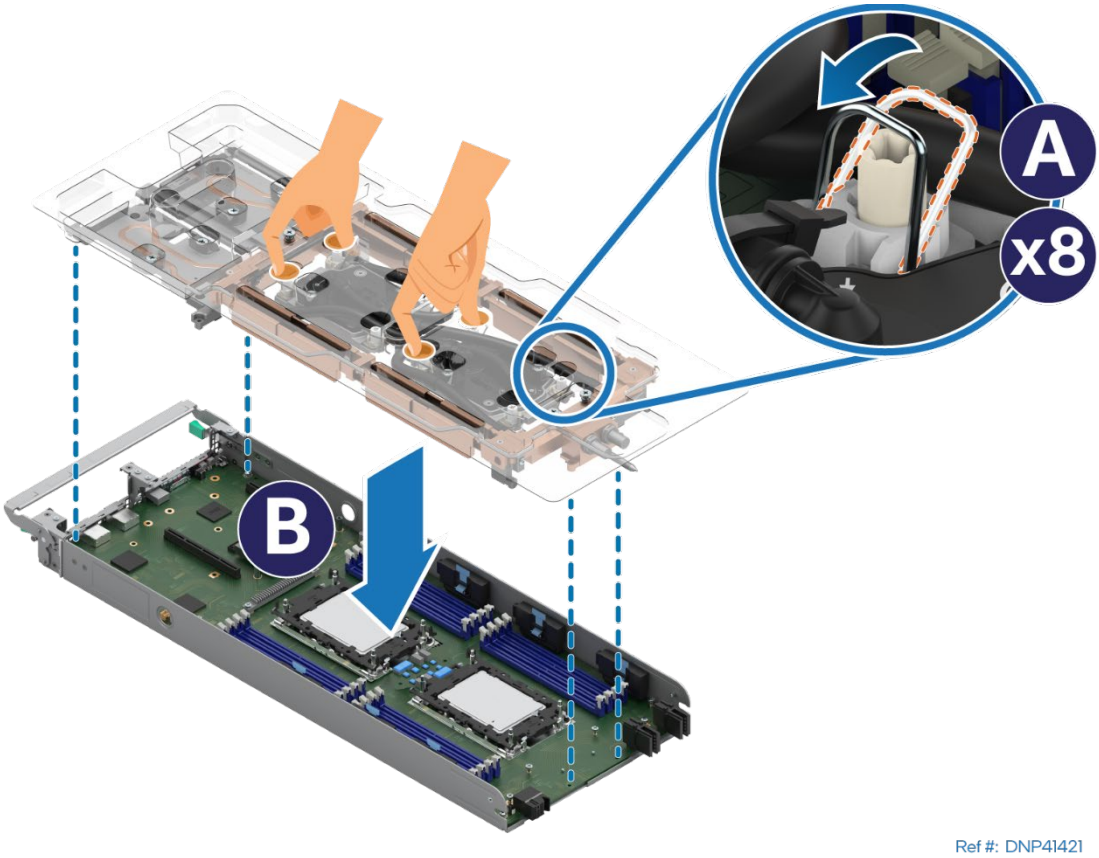


Figure 41. Installing Liquid-Cooling Loop

6. Set all eight anti-tilt wires in the liquid-cooling loop to the inward position (see Letter A).
7. With your fingers, hold the liquid-cooling loop and carefully place it into the module (see Letter B), ensuring that the processor cold plates are properly aligned with the bolster plate's alignment pins.

Important Note: Make sure that the screw holes for the cooling-loop on the board do not have screws in place.

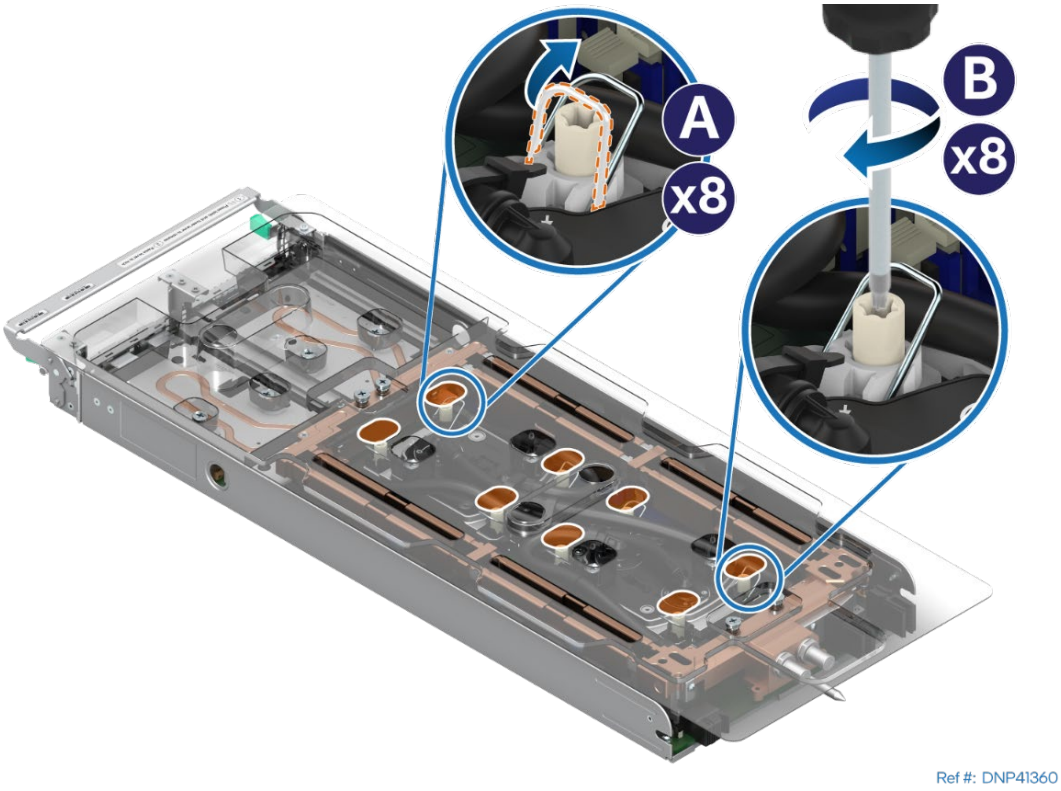


Figure 42. Securing the Processor Cold Plates

8. Set all eight anti-tilt wires in the liquid-cooling loop to the outward position (see Letter A).
9. Using a T30 Torx* screwdriver, tighten the cold plate fasteners to 8 in-lb (see Letter B). No specific sequence is needed. General diagonal bolt tightening order can be used.

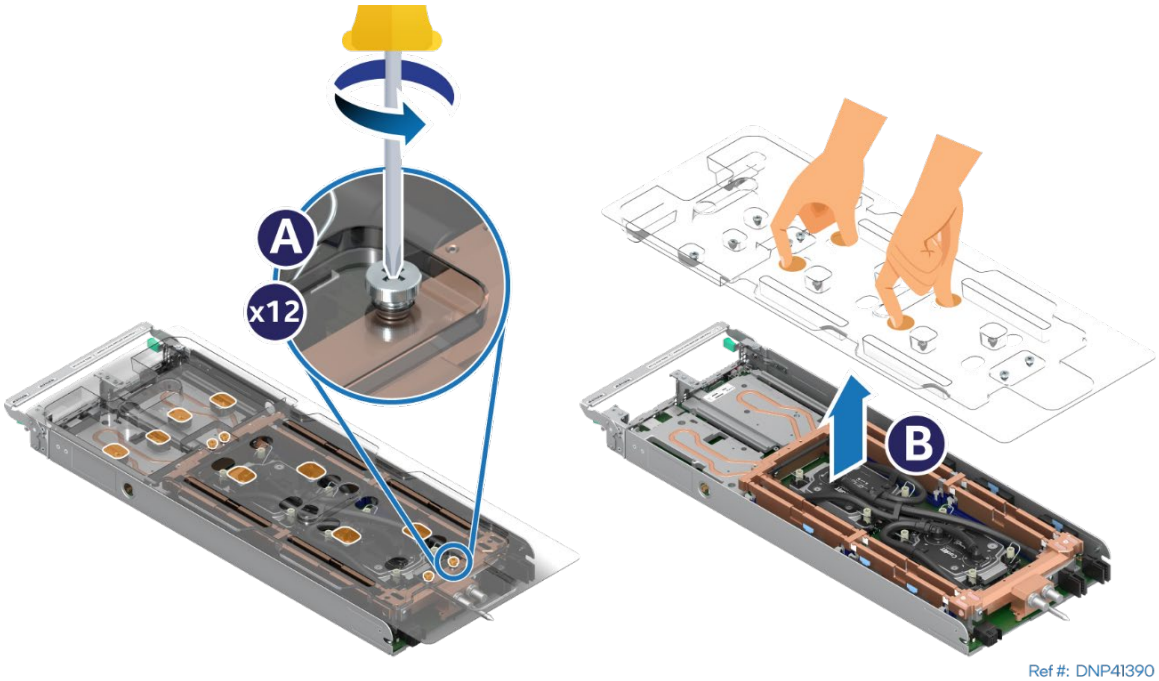
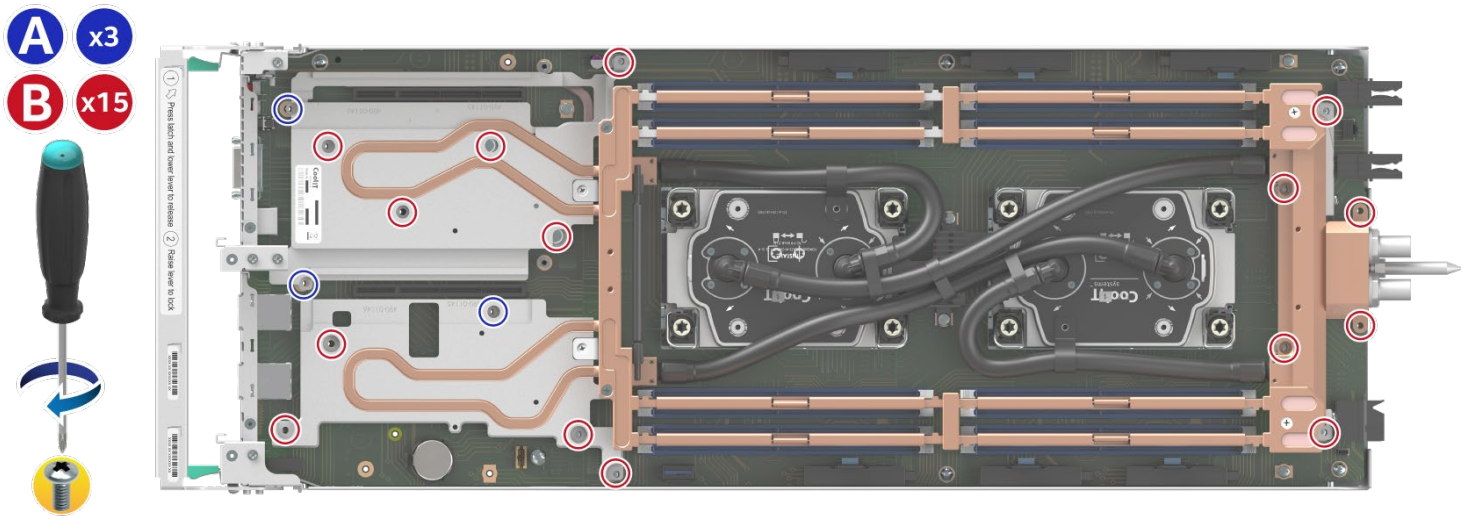


Figure 43. Removing Liquid-Cooling Loop Carrier

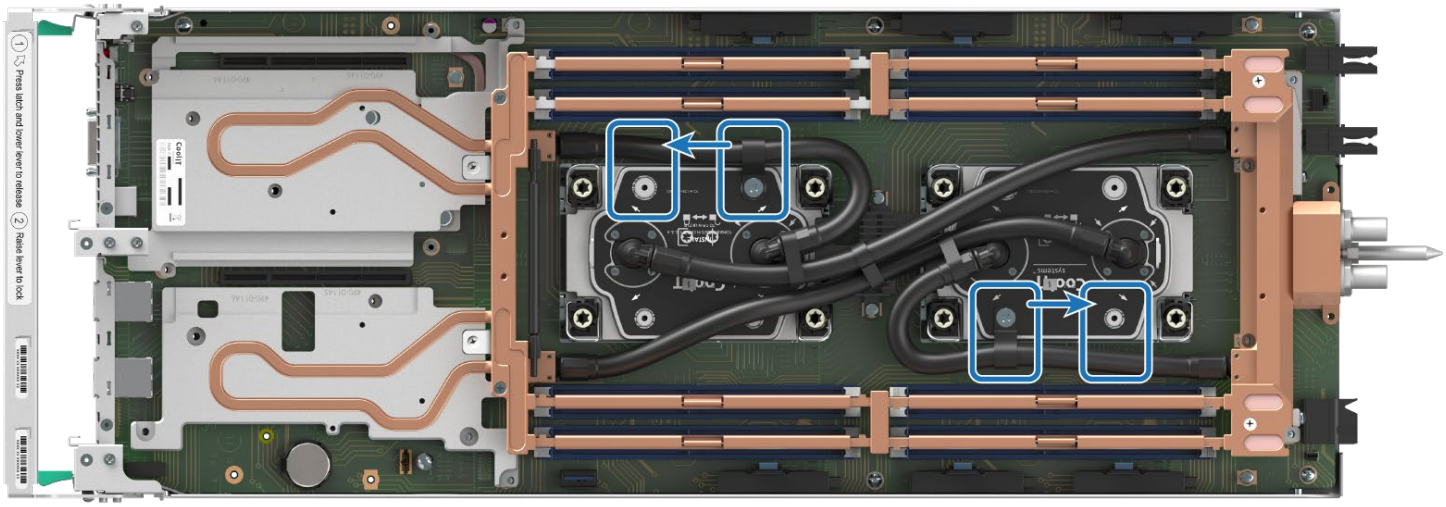
10. Unscrew all 12 captive screws on the plastic carrier (see Letter A) and carefully lift the carrier away from the module (see Letter B).



Ref #: DNP41350

Figure 44. Securing Liquid-Cooling Loop

11. Using three 8-mm long screws with washers (see Letter A), secure the liquid-cooling loop to the server board. Tighten to 5 in-lb.
12. Repeat the previous step using fifteen 12-mm long screws with washers (see Letter B). Tighten to 5 in-lb.



Ref #: DNP30700

Figure 45. Tube Ties Position Adjustment

13. If needed, adjust the position of the ties securing tubes to the cold plates to ensure they do not cover DIMM slots.

2.4 Memory Module Installation

The DIMM installation procedure for a liquid-cooled module and an air-cooled module is different. Refer to the appropriate subsection for your specific module configuration.

The Intel® Server Board D50DNP1SB supports DDR5 SDRAM RDIMMs, 3DS-RDIMMs, and 9x4 RDIMMs.

Supported DDR5 DIMMs are commonly referred to as “memory module” in the following instructions.

Note: The system requires that all memory slots be populated with either a memory module or a DIMM blank for air-cooled configurations. Preinstalled DIMM blanks should only be removed when replacing it with an actual memory module. When removing a memory module from the system, it must be replaced with an equivalent device or a DIMM blank. Liquid-cooled configurations require all DIMM slots to be populated with DDR5 DIMMs. See Appendix B for memory population rules.

2.4.1 Memory Installation for Air-Cooled Modules

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)

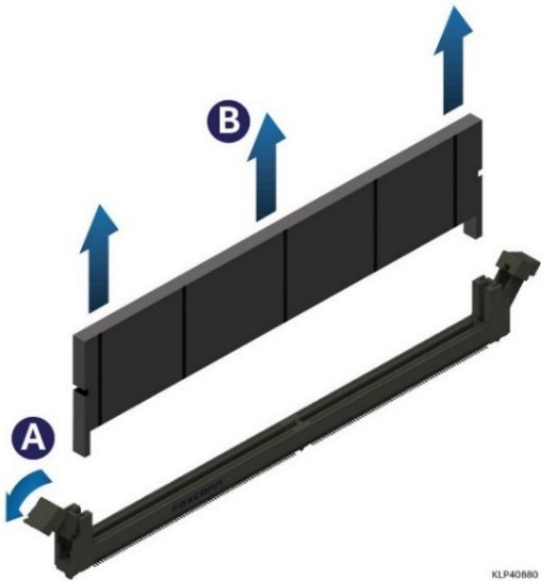


Figure 46. DIMM Blank Removal

1. Remove the DIMM blank from the desired memory slot
   - Open the ejection tabs at both ends of the selected memory slot (see Letter A).
   - Carefully remove the DIMM Blank from the system (see Letter B).

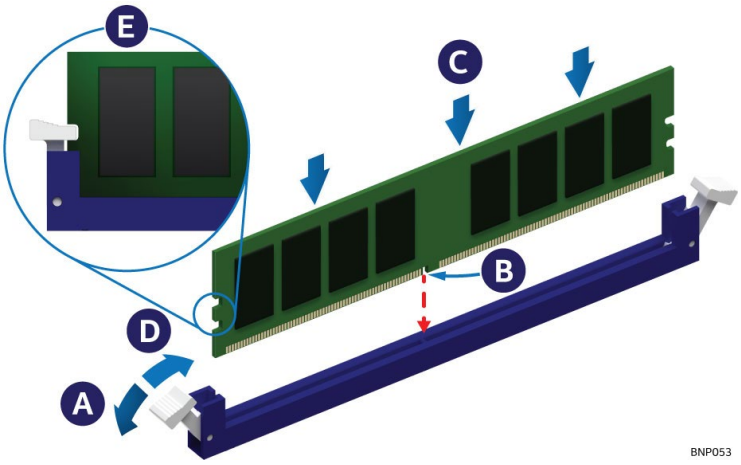


Figure 47. Memory Module Installation

2. Ensure that the ejection tabs at both ends of the memory slot are pushed outward to the open position (see Letter A).
3. Carefully remove the memory module from its packaging, taking care to handle it only by its outer edges.
4. Align the notch at the bottom edge of the memory module with the key in the memory slot (see Letter B).
5. Insert the memory module into the memory slot. Using even pressure along the top edge, push down on the memory module (see Letter C) until the ejection tabs of the memory slot snap into place (see Letter D).
6. Ensure that the ejection tabs are firmly in place (see Letter E).

2.4.2 Memory Installation for Liquid-Cooled Modules

Required Tools and Supplies:

- Anti-static wrist strap and conductive workbench pad (recommended)
- DIMM latch tool (attached to the cooling loop)
- Memory cooling kit (included in the liquid-cooling loop box)

The liquid-cooled modules only support DDR5 SDRAM DIMMs. Before installing the DDR5 SDRAM DIMMs, ensure that the liquid-cooling loop is already installed in the module (see Section 2.3).

The memory cooling kit is included in the box with the liquid-cooling loop box. It includes sixteen DIMM PMIC thermal pads, eight DIMM clips, and eight Mylar pads.

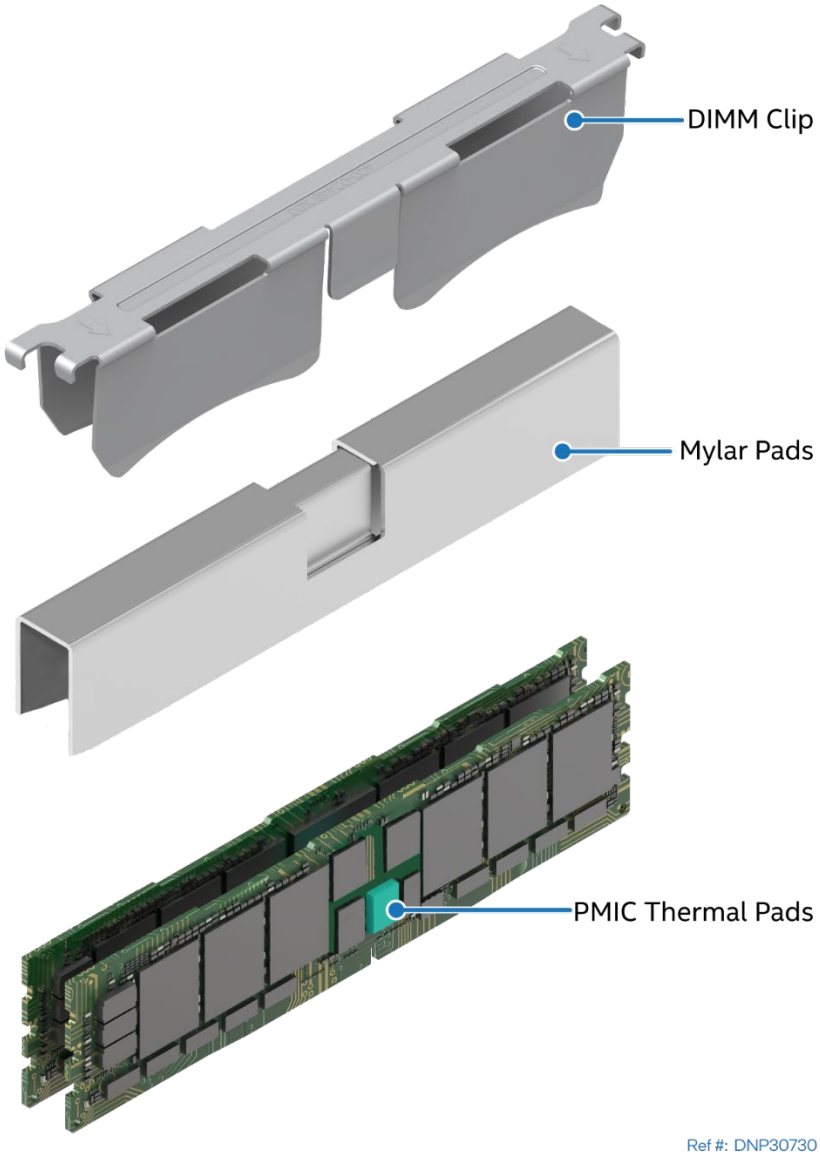


Figure 48. Memory Cooling Kit

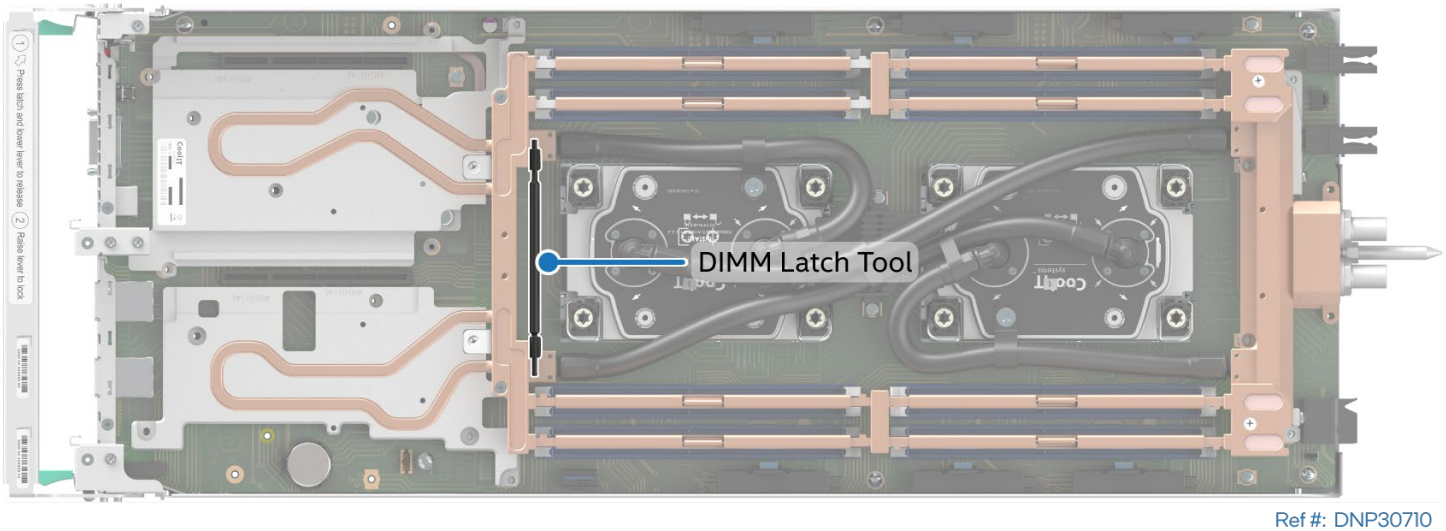


Figure 49. DIMM Latch Tool Location

1. Detach the DIMM latch tool from the cooling loop
2. Carefully remove the memory module from its packaging, taking care to handle it only by its outer edges.

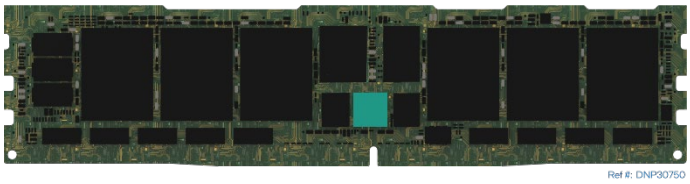


Figure 50. Attaching Thermal Pad to DIMM PMIC

3. Carefully detach one PMIC thermal pad from the paper and attach it to the DIMM power management integrated circuit (PMIC) as show on the previous picture.

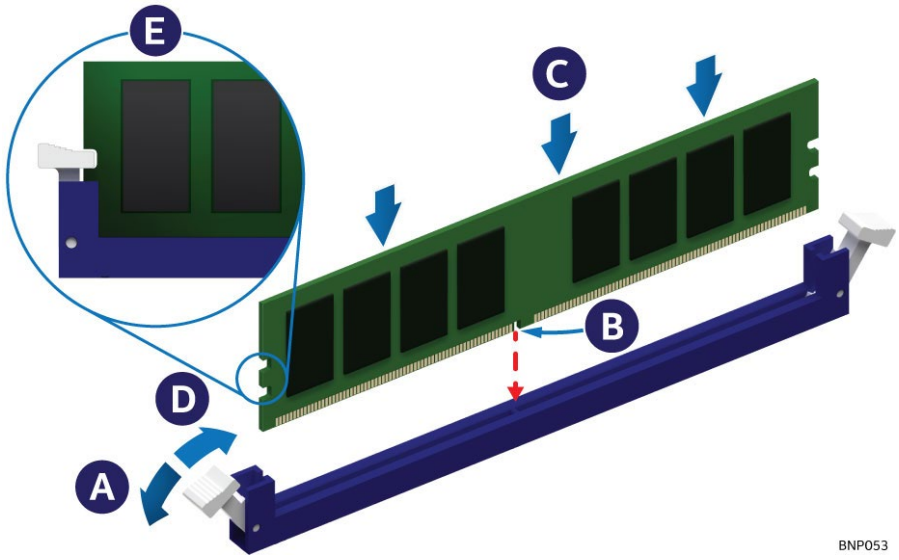


Figure 51. Installing DIMM for Liquid-Cooled Module

4. Using the DIMM latch tool push on the memory slot ejection tabs one-by-one to move them to the open position (see Letter A). Make sure that the TIM pads covering memory heat spreader line do not interfere with the memory slot.
5. Align the notch at the bottom edge of the memory module with the key in the memory slot (see Letter B).
6. Insert the memory module into the memory slot
7. Using even pressure along the top edge, push down on the memory module (see Letter C) until the ejection tabs of the memory slot snap into place (see Letter D).
8. Ensure that the ejection tabs are firmly in place (see Letter E).
9. Repeat steps 2 through 8 for all other DIMMs.
10. Attach the DIMM latch tool to the cooling loop

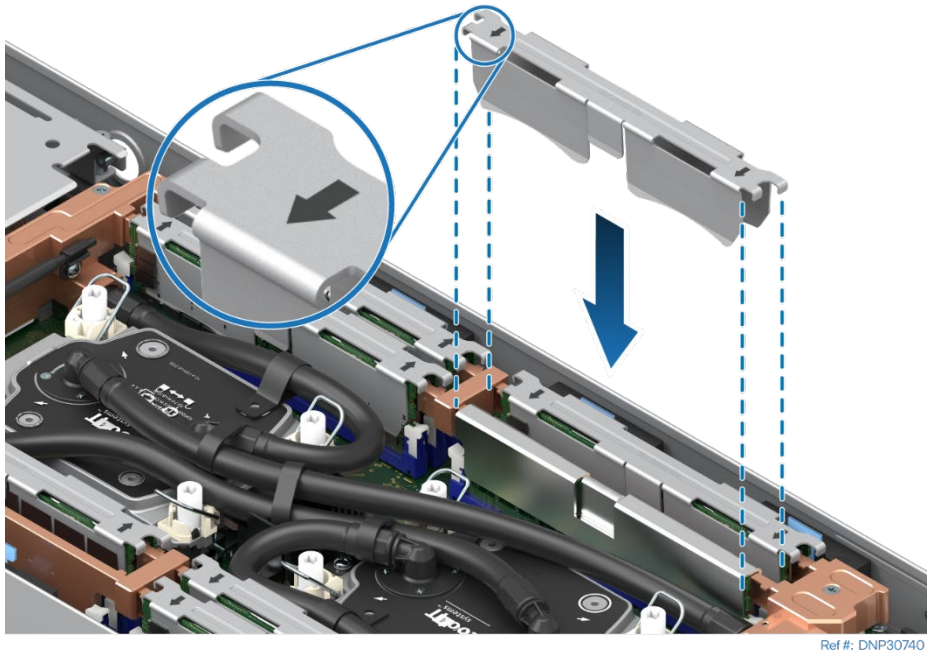


Figure 52. Mylar and DIMM clip installation

11. Wrap the Mylar pad around the memory heat spreader line and two adjacent DIMMs and Install the DIMM clip over the Mylar pad like on the previous picture. Make sure that the arrows on the clips look left for CPU 0 and look right for CPU 1.
12. Repeat for all remaining DIMM pairs.

2.5 Module Installation

For installation procedures associated with all other system options and accessories, refer to Chapter 3. If no other installations are required, the module must be installed in the chassis using the following steps.

Required Tools and Supplies

- Intel® D50DNP Module
- Anti-static wrist strap and conductive workbench pad (recommended)

1U module shown

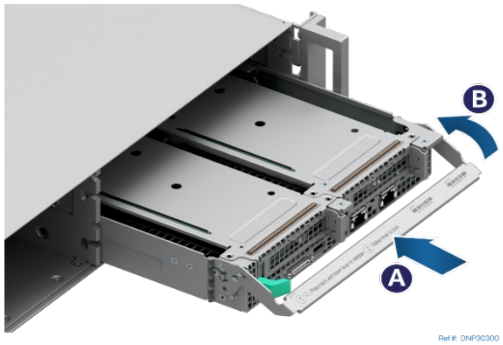


Figure 53. Installing a Module

1. Ensure that the lever in front of the module is lowered. If not, press the green latch inward and lower the lever (see Letter A).
2. Align the module to its corresponding bay and slide it into the chassis until the key pins in the lever are inside the chassis inner wall key holes.
3. Raise the lever to secure the module (see Letter B).

2.6 Power Supply Installation

Required Tools and Supplies

- Intel power supply modules
- Anti-static wrist strap and conductive workbench pad (recommended)

Note: The installation figure in this section only displays air-cooled chassis. However, the power supply installation is the same, regardless of chassis type.

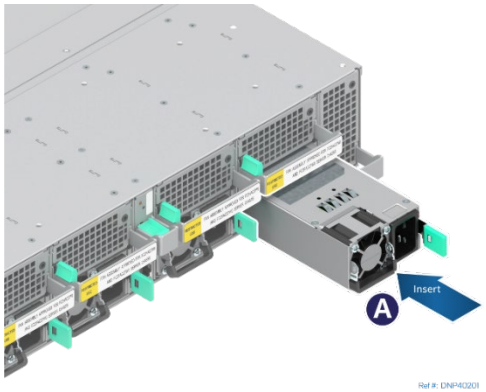


Figure 54. Installing the Power Supply

1. Insert the power supply module into the system fan assembly (see Letter A).
2. Push the power supply module into the system fan assembly until it locks into place.

3. System Options / Accessory Kit Installation

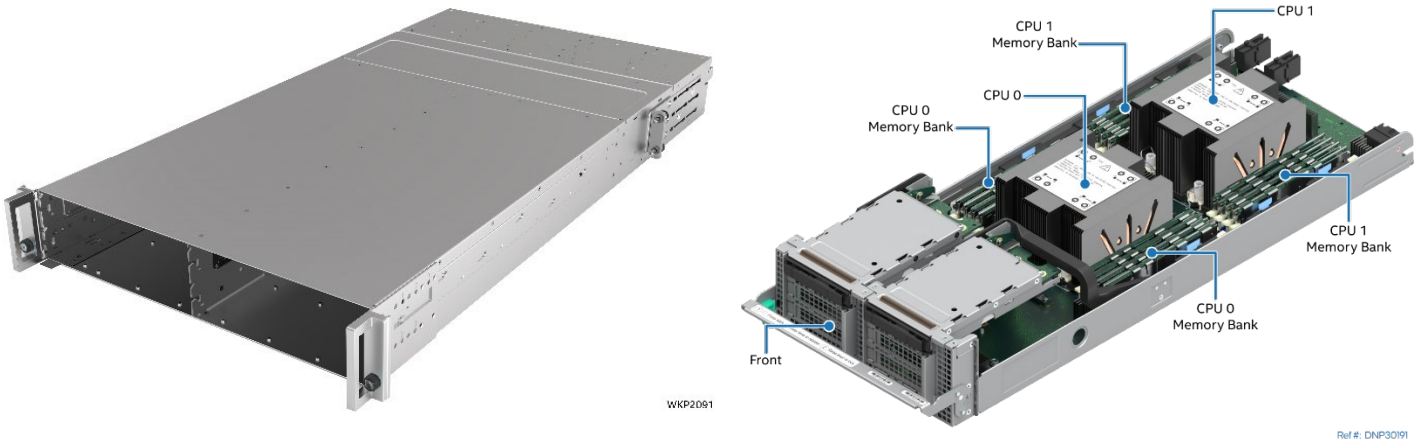
This chapter provides instructions for the integration of system options and other accessories. If your integrated Intel server did not come preinstalled with processors or memory, installation procedures for these components are in Chapter 2.

Before You Begin

Before integration of any system components, review all safety and ESD precautions in the Safety Warnings section at the beginning of this service guide.

System Reference

In the following procedures, all references to left, right, front, back, top, and bottom assume that the reader is facing the front of the chassis and the front of a module as shown in the following figure (2U air-cooled management module shown).



Server Chassis **2U Air-Cooled Management Module**

Figure 55. System Directional Reference

Instruction Format

Each procedure described in this chapter follows an illustration first format. This format gives the reader the option to follow a quicker path to component integration by first seeing an illustration of the intended procedure. If necessary, the reader can then follow the step-by-step instructions that accompany each procedure.

3.1 Installing the Chassis into a Rack

The chassis installation into a rack can be performed at any time throughout this chapter while the modules are being integrated with system options and accessories.

Before following the instructions in this section, remove all modules from the server chassis (see the details in Section 3.2.1). If the rail kit is already installed, proceed to Section 3.1.2.

3.1.1 Installing the Fixed Rail Kit

The Intel® Server D50DNP Family includes a fixed rail kit that serves as a shelf for the system installed into a rack. When a system is installed onto the fixed rails, it can be secured to both the rail and the rack via a pair of thumbscrews on the front of the server system.

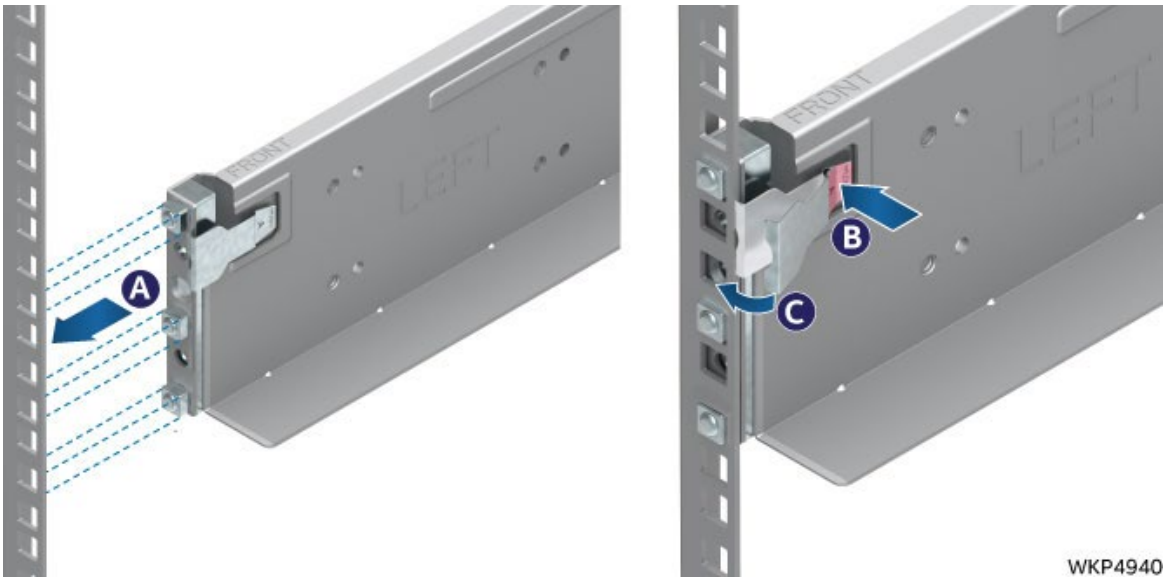


Figure 56. Securing the Front of the Rail

1. Remove the chassis rail kit from the packaging.
2. Locate the rail, either left or right, and align the rail guides with the slots in the front of the rack (see Letter A).
3. Insert the rail guides into their respective rack slots while pressing the clip (see Letter B).
4. Release the clip once the guides are fully inserted into the rack (see Letter C).

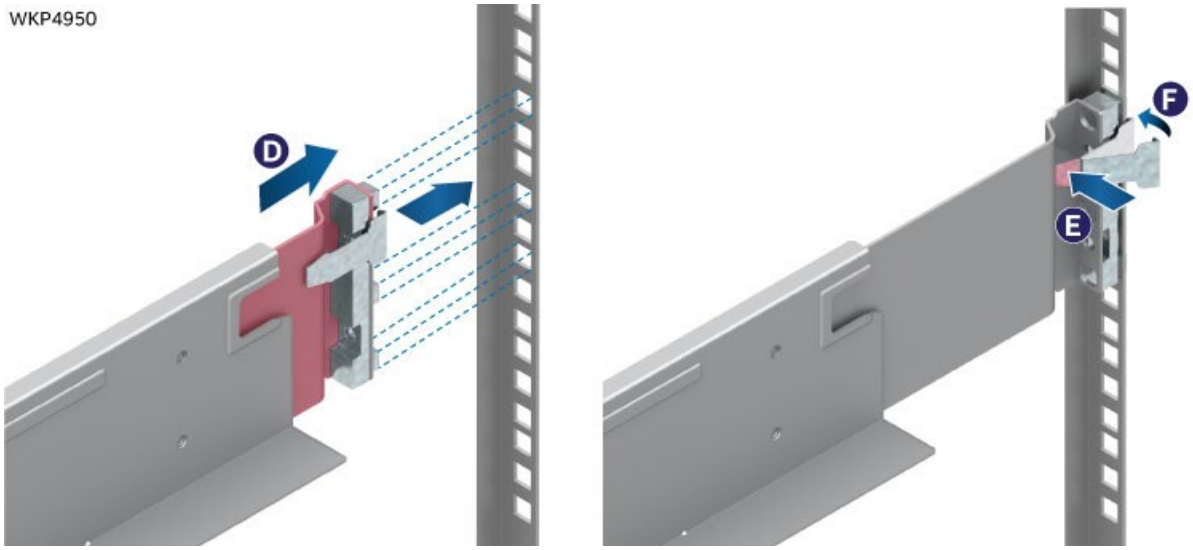


Figure 57. Securing the Back of the Rail

5. Extend and align the rear guides with their slots in the back of the rack (see Letter D).
6. Insert the rail guides into their respective rack slots while pressing the clip (see Letter E).
7. Release the clip once the guides are fully inserted into the rack (see Letter F).
8. Repeat this process with the opposite rail.

3.1.2 Installing the Chassis into a Rack

Important Safety Notes: Due to the heavy weight of a fully configured system, Intel recommends:

- Use a mechanical lift to aid with the installation of the system into the rack.
- Or remove all installed modules from the system and use at least two people to install the system into the rack.

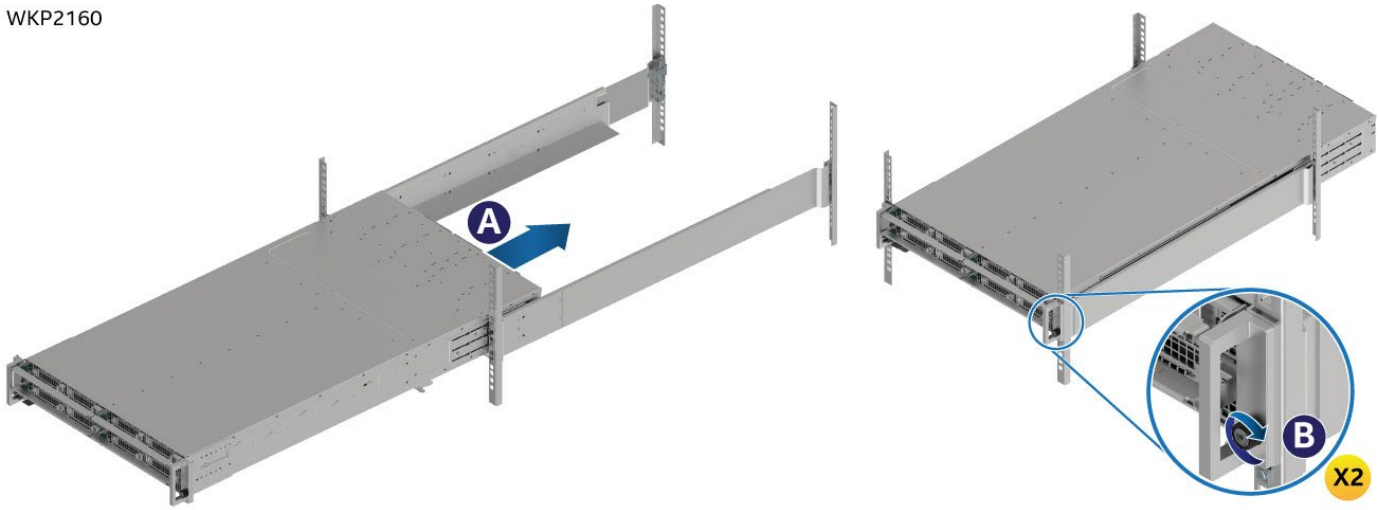


Figure 58. Installing the Chassis into the Rack

1. Insert the chassis onto the rails from the front of the rack and slide it towards the rear of the rack (see Letter A).
2. Tighten the thumbscrews on the chassis handles to secure the chassis to the rack (see Letter B).
3. If modules were removed, install them into the chassis (see Section 3.2.2).

3.2 Module Removal / Installation

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)

3.2.1 Module Removal

1. Power down the module using the power button on the front panel of the module.

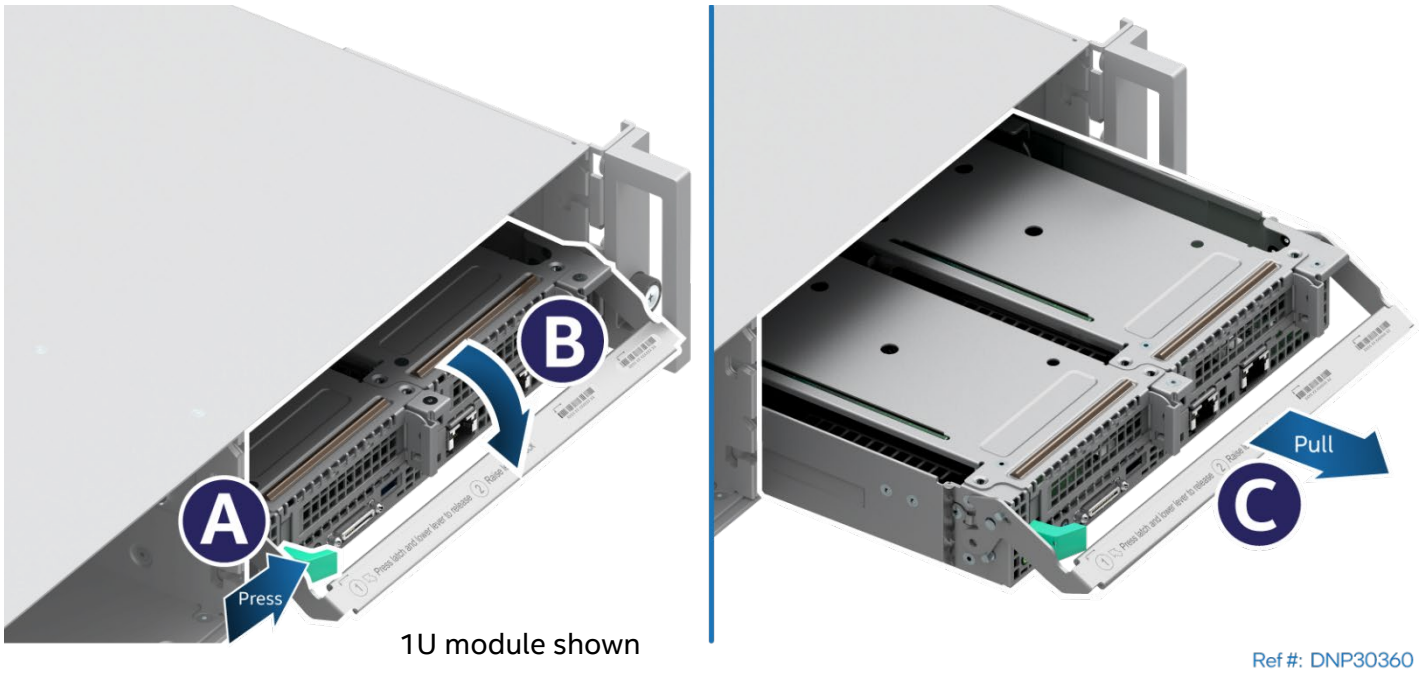


Figure 59. Removing a Module

2. Press the green latch inward (see Letter A) and lower the lever in front of the module (see Letter B).
3. Grasp the lever and pull out the module from the chassis (see Letter C).

Note: To keep the system operating within its thermal limits, module bays must be populated with either a module or module blank when any of the installed modules are operational.

3.2.2 Module Installation

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)

1U module shown

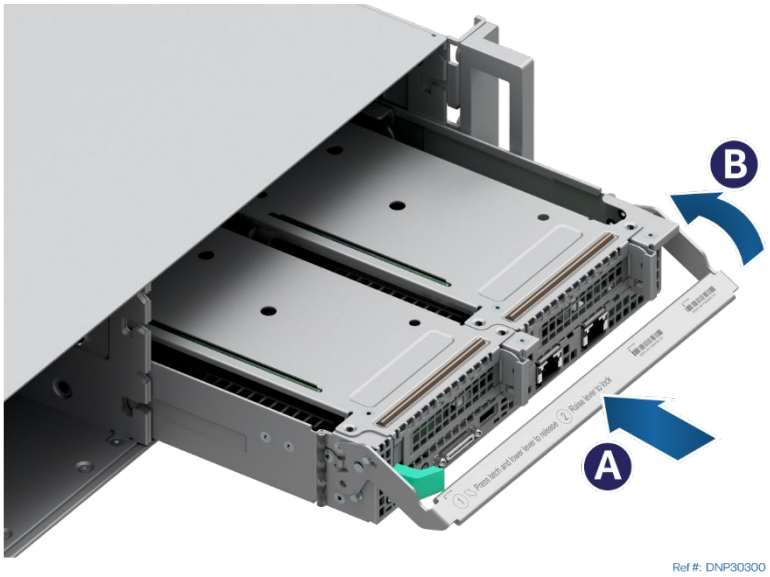


Figure 60. Installing a Module

1. Ensure that the lever in front of the module is lowered. If not, press the green latch inward and lower the lever (see Letter A).
2. Align the module to its corresponding bay and slide it into the chassis until the key pins in the lever are inside the chassis inner wall key holes.
3. Raise the lever to secure the module (see Letter B).

3.3 Air Duct Removal / Installation

To maintain system thermals, the air duct must always be in place when the module is operational. Removal of the air duct is necessary when installing or replacing any system component within the module.

Air duct construction and attachment method are similar for all half-width air-cooled modules D50DNP1MHCPAC, D50DNP1MHEVAC, and D50DNP2MHSVAC. The D50DNP2MFALAC module is slightly different and the changes in construction are reflected in the corresponding illustrations.

Note: Air ducts are not used with liquid-cooled modules.

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)

3.3.1 Air Duct Removal (Half-width Modules)

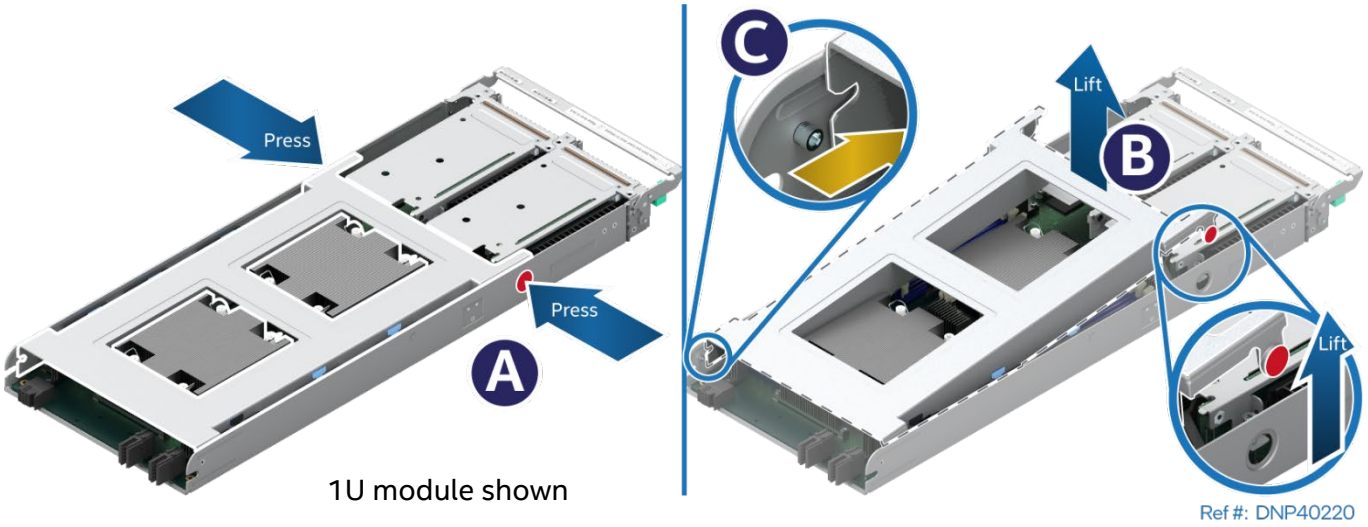


Figure 61. Removing the Air Duct (Half-width Modules)

1. Press the latches on both sides of the module inwards (see Letter A).
2. Carefully lift the front edge of the air duct (see Letter B).
3. Pull the air duct away from the module (see Letter C).

3.3.2 Air Duct Installation (Half-width Modules)

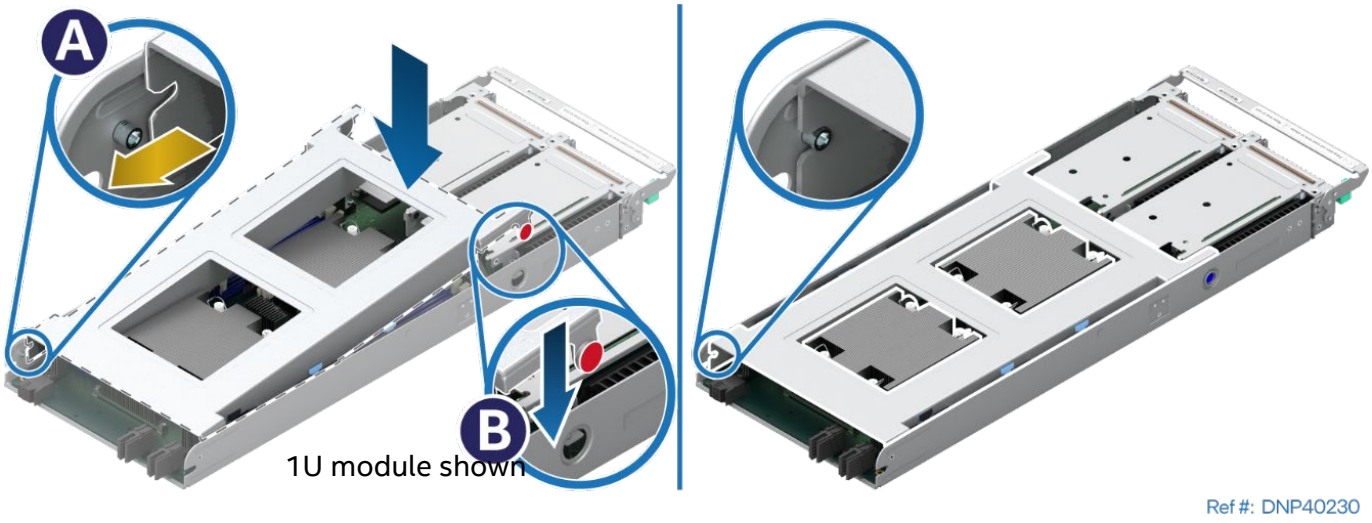


Figure 62. Installing the Air Duct (Half-width Modules)

1. Align and attach the hinge slots on the back end of the air duct with the hinge posts on both sides of the module (see Letter A).
2. Lower the air duct until both the left and right side latches snap into place (see Letter B).

3.3.3 Air Duct Removal (D50DNP2MFALAC Module)

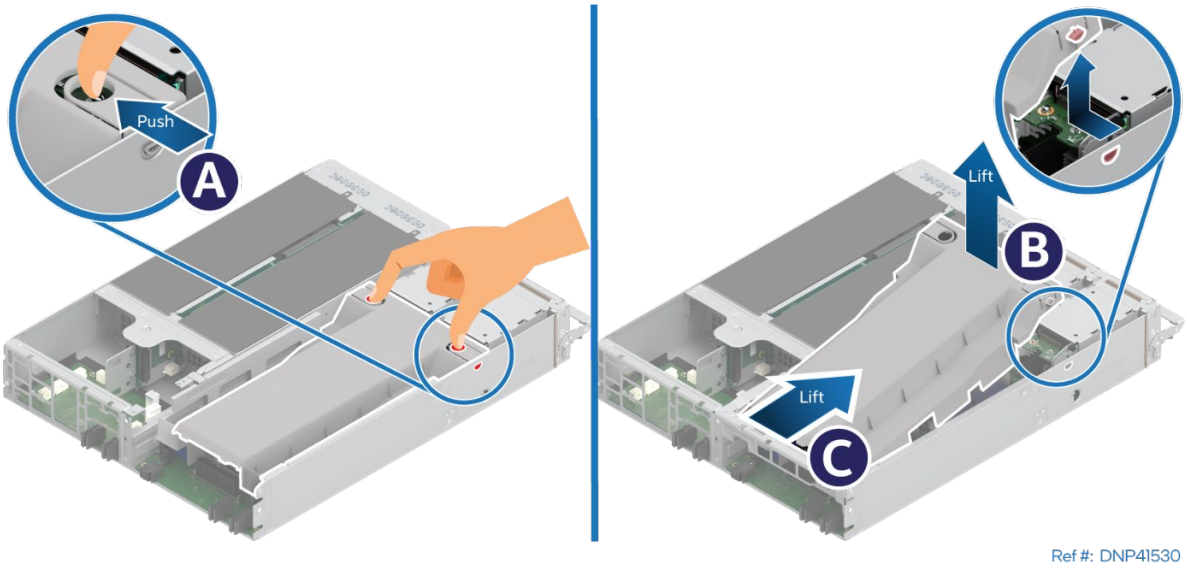


Figure 63. Removing the Air Duct (D50DNP2MFALAC Module)

1. Push the loops on both sides of the air duct inwards to release the latches (see Letter A).
2. Carefully lift the front edge of the air (see Letter B).
3. Pull the air duct away from the module (see Letter C).

3.3.4 Air Duct Installation (D50DNP2MFALAC Module)

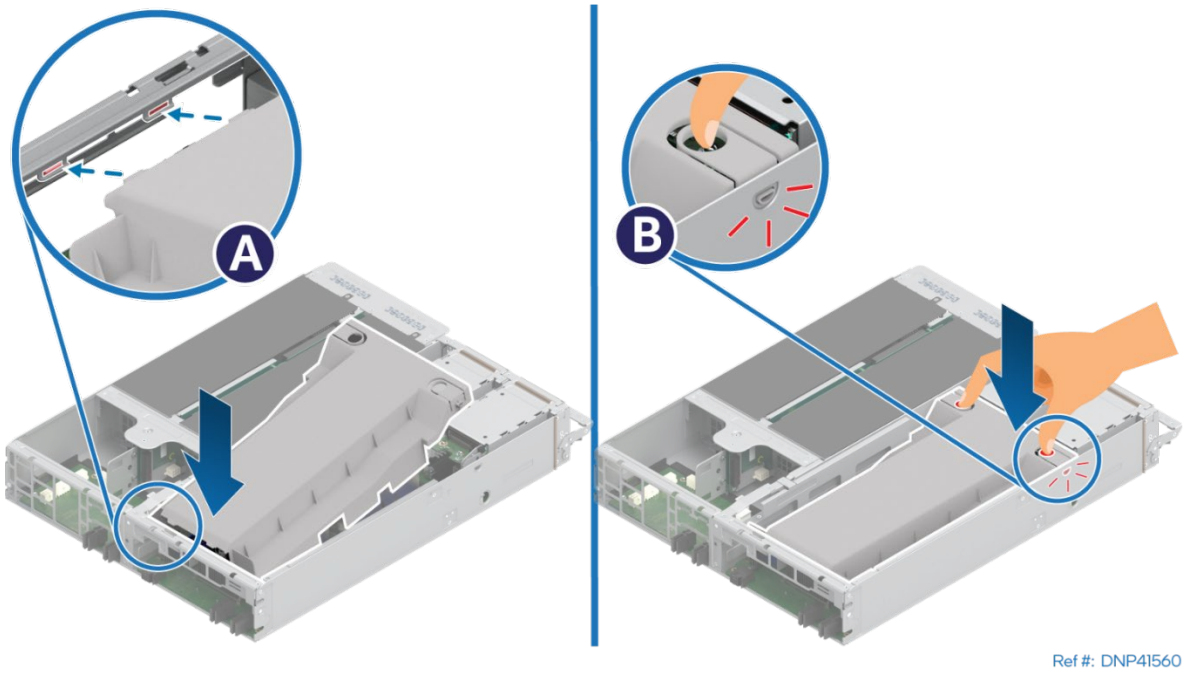


Figure 64. Installing the Air Duct (D50DNP2MFALAC Module)

1. Engage the tabs on the back end of the air duct with the slots at the rear edge of the module (see Letter A).
2. Lower the air duct until both the left and right side latches snap into place (see Letter B).

3.4 Low-Profile Add-In Card Installation

The Intel® Server D50DNP Family supports either up to two (in 1U modules) or up to four (in 2U modules) low-profile PCIe* add-in cards.

This section provides assembly and installation procedures for modules that require low-profile add-in card installation. The following procedures apply to both 1U and 2U modules in both air-cooled and liquid-cooled configurations.

Note: The PCIe accelerator module D50DNP2MFALAC has additional support for up to four full-height, full-length, double-width PCIe accelerator cards. Follow the installation procedures in Section 3.6 for these cards.

Available Riser Card Options

- 1U MCIO* (mini cool edge I/O) riser card (installed in 1U riser assembly) for 1U module
- 1U Standard riser card (installed in 1U riser assembly) for 1U module
- 2U riser card (installed in 2U riser assembly) for 2U module

The 1U standard riser card goes in riser slot 2 on the server board while the 1U MCIO riser card goes in riser slot 1. In addition, the MCIO connectors on the 1U MCIO riser card are cabled to the MCIO connector on the server board. The riser assemblies have a label that indicates which riser slot they can go into.

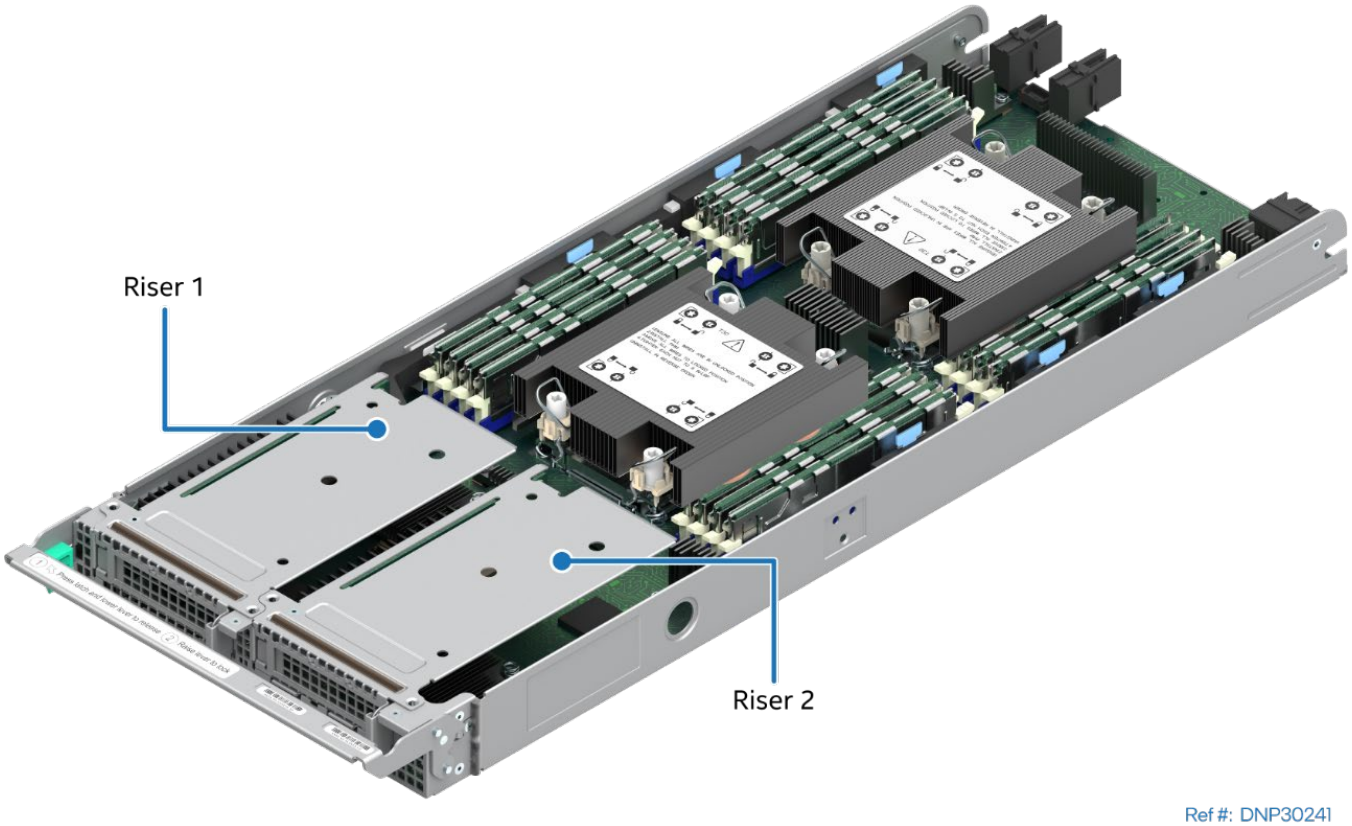


Figure 65. Riser 1 and Riser 2 in 1U Compute Module

Each of the two 1U riser cards supports a single x16 PCIe 5.0 add-in card slot (x16 electrical, x16 mechanical), compatible with low-profile PCIe add-in cards. Each 1U riser card also includes support for a single 80/110-mm PCIe or SATA M.2 SSD storage device.

Important Note: D50DNP1MHEVAC does not support a low-profile PCIe* 5.0 add-in card on riser slot 2 because the EVAC extension occupies this space. M.2 SSD is still supported on riser slot 2.

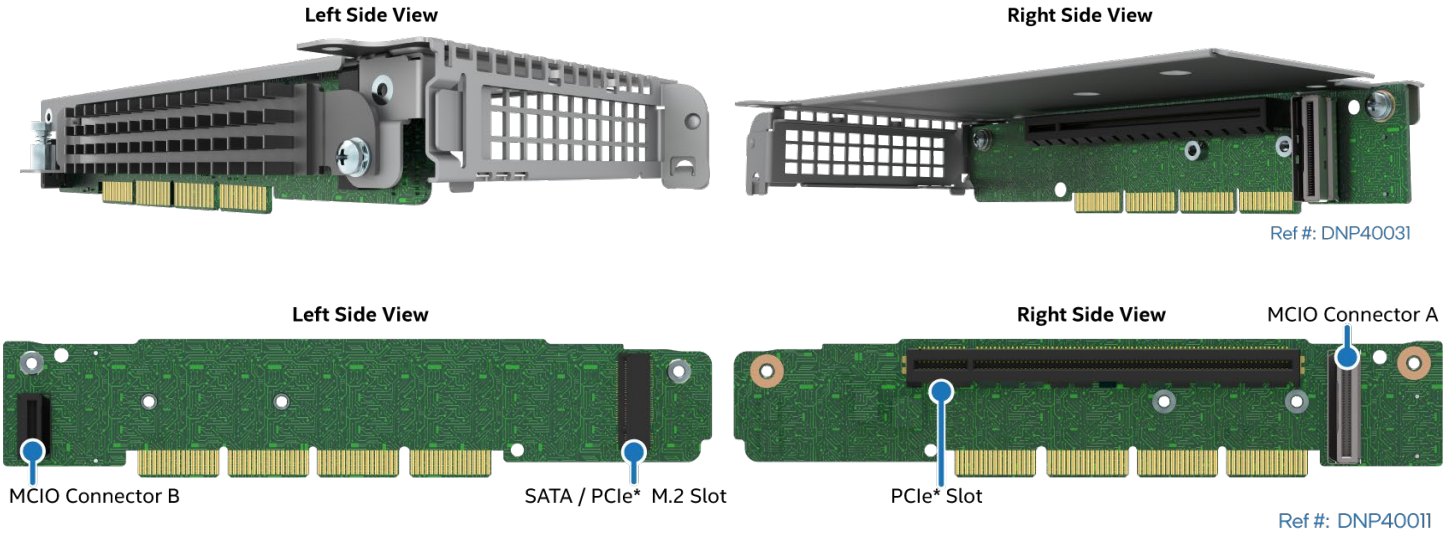


Figure 66. 1U MCIO* Riser

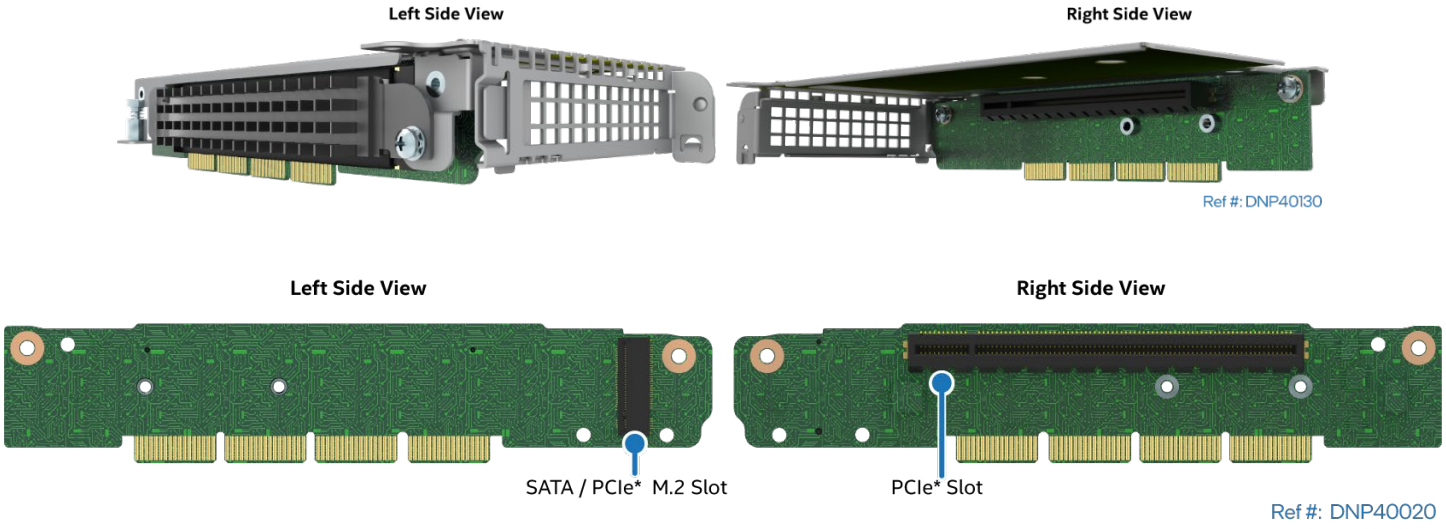


Figure 67. 1U Standard Riser

Unlike 1U riser cards where two types of cards are available, there is only one type of the 2U riser card. It can go interchangeably in riser slot 1 or riser slot 2 on the server board. The 2U riser card has a mini cool edge I/O (MCIO) connector that is cabled to the MCIO connector on the server board.

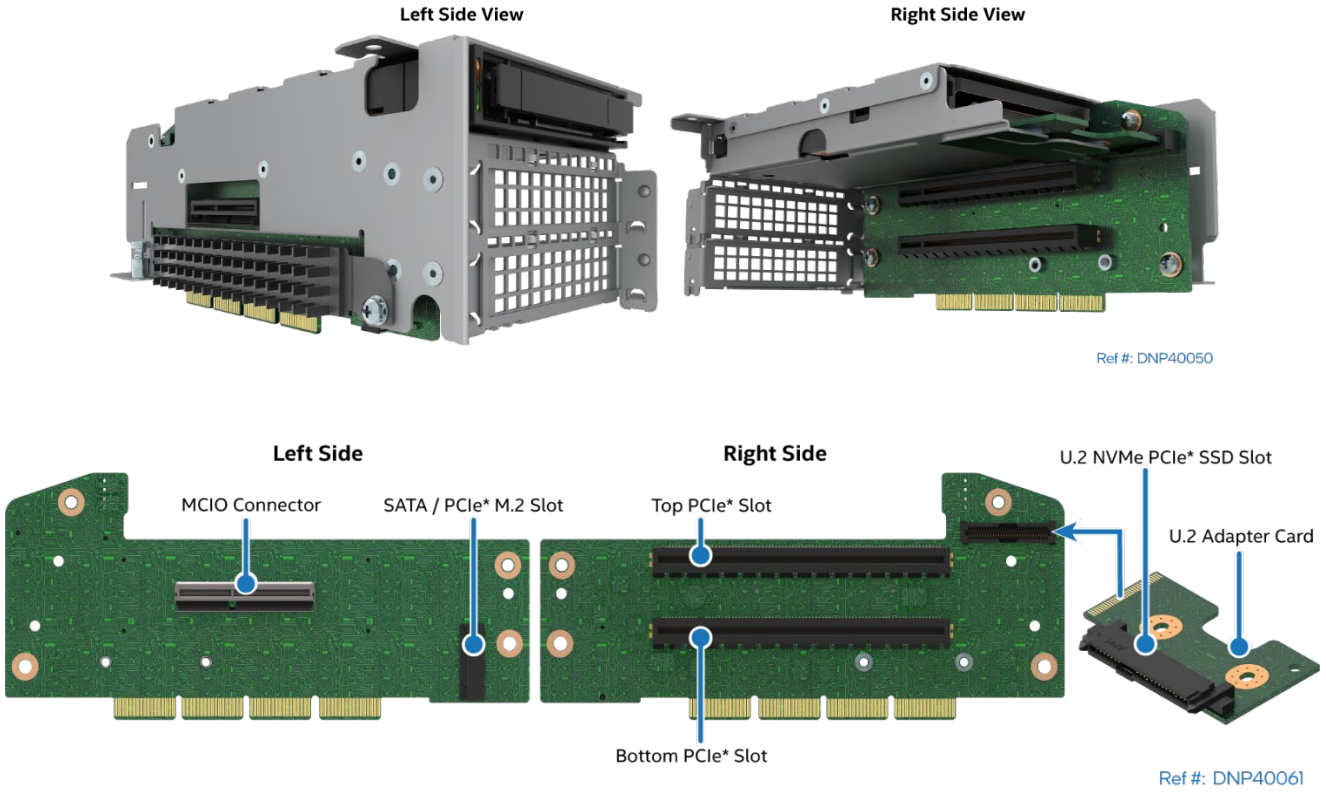


Figure 68. 2U Riser Assembly and Riser Card Features

Required Tools and Supplies

- PCIe* add-in card
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1 and #2

3.4.1 Standard Riser Assembly Removal

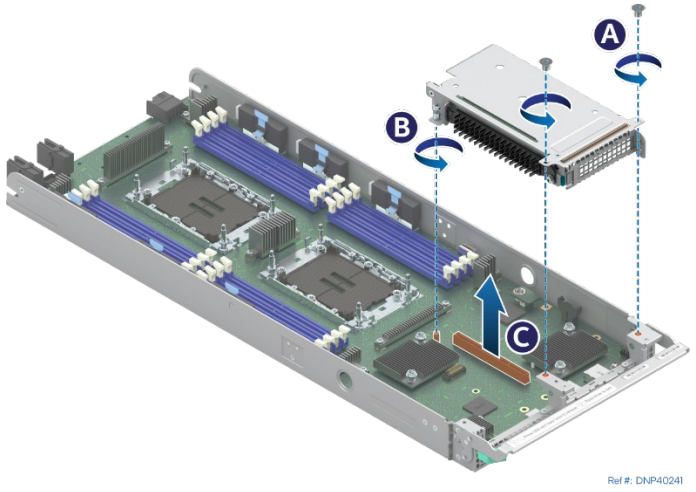


Figure 69. Removing a Riser Assembly with Standard Riser Card

1. Using Phillips screwdriver #1 remove two screws that secure the riser assembly to the front of the module (see Letter A).
2. Using Phillips screwdriver #2 loosen the captive screw at the back of the riser assembly. (see Letter B)
3. Carefully remove the riser assembly by lifting it up and away from the module (see Letter C).

3.4.2 MCIO* Riser Assembly Removal

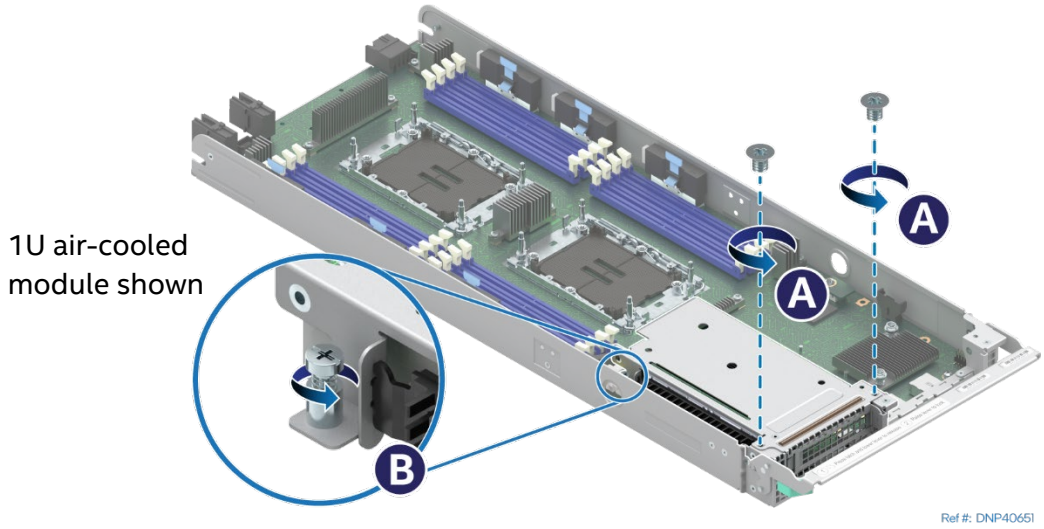


Figure 70. Removing the Screws for MCIO Riser Assembly

1. Using Phillips screwdriver #1 remove two screws that secure the riser assembly to the front of the module (see Letter A).
2. Using Phillips screwdriver #2 loosen the captive screw at the back of the riser assembly. (see Letter B)

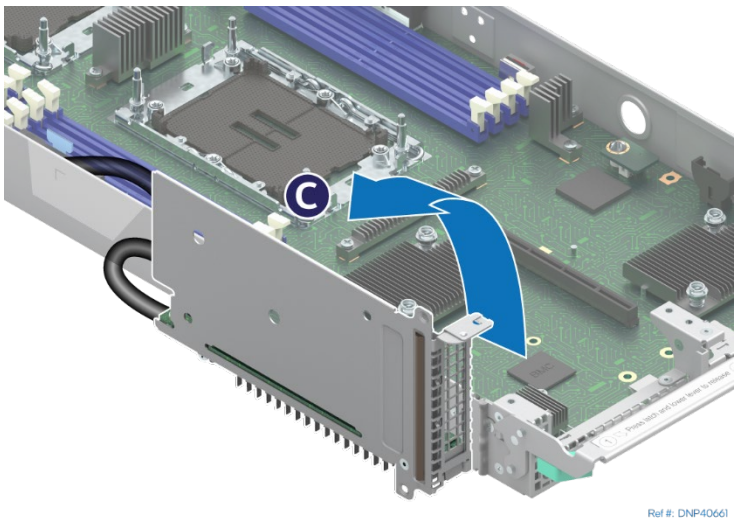


Figure 71. Tilting the MCIO Riser Assembly

3. Disconnect the riser board from the riser slot connector by lifting it up.
4. Tilt the riser assembly on its side (see Letter C) to make room to install the add-in card. Refer to the following section for add-in card installation.

3.4.3 PCIe* Add-In Card Installation

The following procedures are identical for both 1U and 2U riser card assemblies.

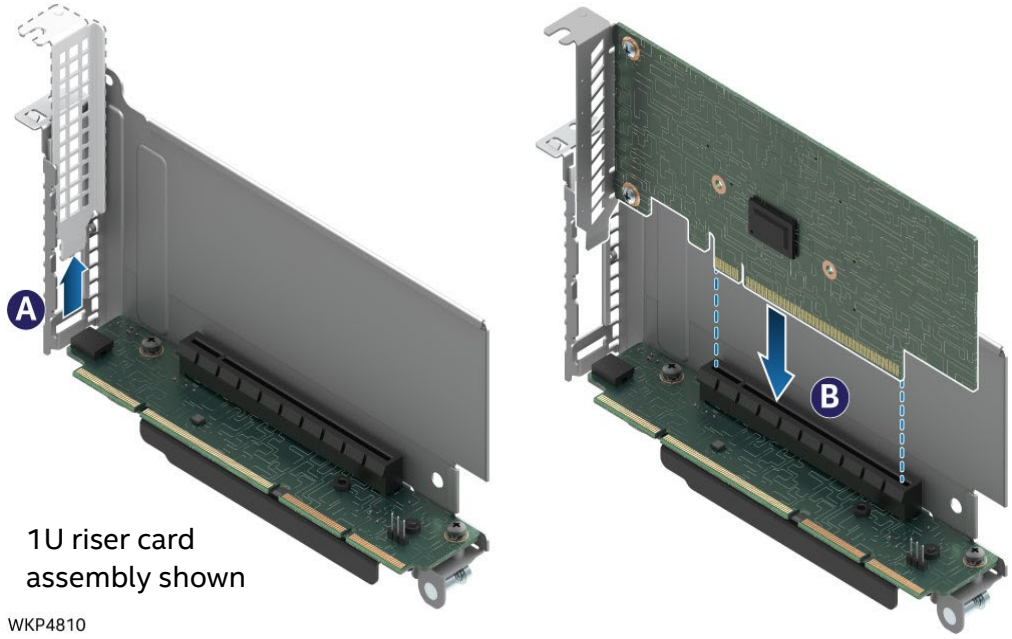


Figure 72. Installing an Add-In Card

- If present, carefully remove the metal filler plate from the metal frame of the riser assembly (see Letter A).
- Align the bracket of the add-in card to the opening of the riser assembly.
- Carefully push the add-in card into the PCIe slot (see Letter B). Ensure that the add-in card is fully seated.
- If necessary, repeat the installation steps for additional add-in cards.

3.4.4 Standard Riser Assembly Installation

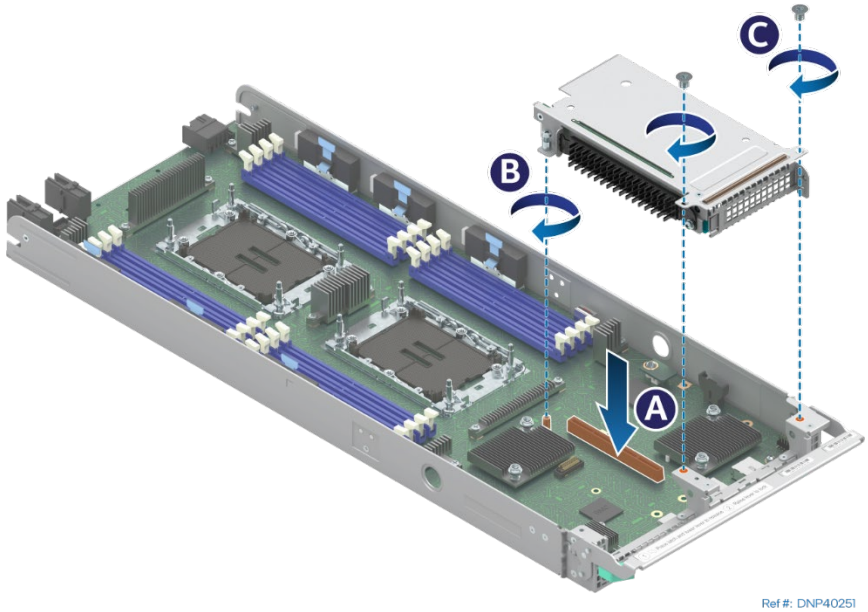
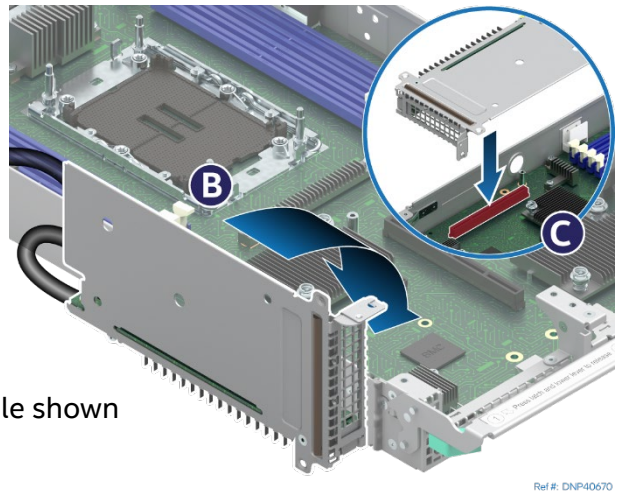


Figure 73. Installing a Standard Riser Assembly into the Chassis

1. Align the riser card to the riser slot on the server board (see Letter A).
2. Carefully push down on the riser assembly until the riser card is securely seated in the riser slot.
3. Ensure that the screw holes of the riser assembly are aligned with the mounting holes of the module.
4. Using Phillips screwdriver #2 tighten the captive screw at the back of the riser assembly to 5 in-lb. (see Letter B)
5. Using Phillips screwdriver #1 install two screws to secure the riser assembly to the front of the module. Tighten to 5 in-lb. (see Letter C).

3.4.5 MCIO* Riser Assembly Installation



1U air-cooled module shown

Figure 74. Installing the MCIO Riser Assembly

1. Align the riser card to the riser slot on the server board and tilt the riser assembly down (see Letter B).
2. Carefully push down on the riser assembly until the riser card is securely seated in the riser slot (see Letter C).

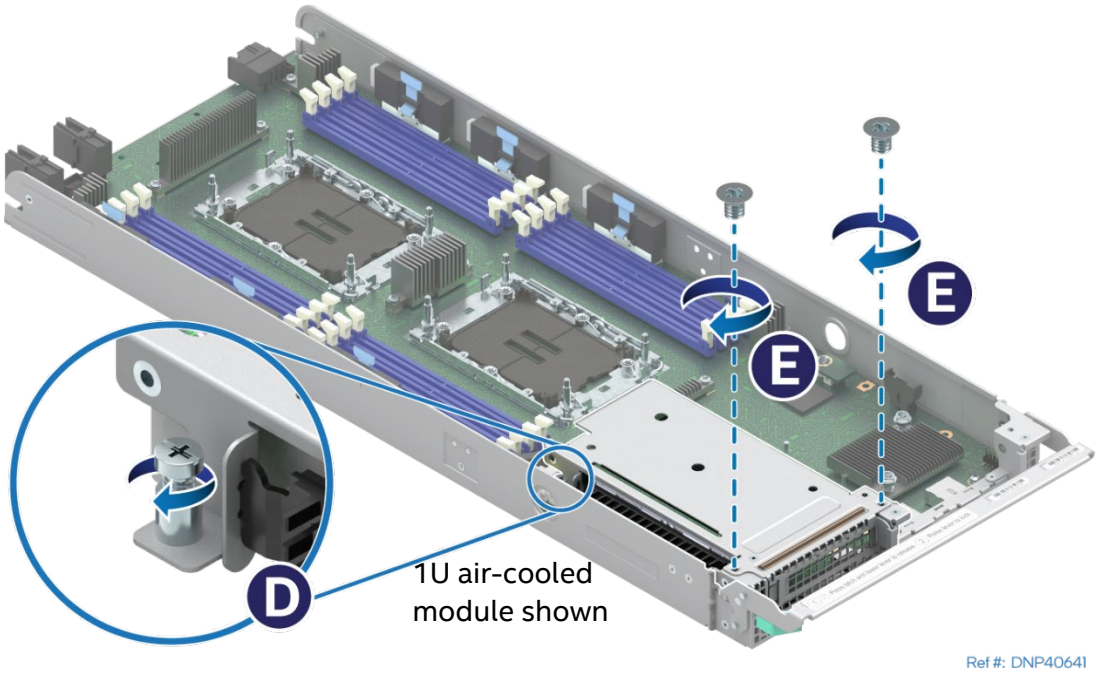


Figure 75. Securing the MCIO Riser Assembly

3. Ensure that the screw holes of the riser assembly are aligned with the mounting holes of the module.
4. Using Phillips screwdriver #2 tighten the captive screw at the back of the riser assembly to 5 in-lb. (see Letter D)
5. Using Phillips screwdriver #1 install two screws to secure the riser assembly to the front of the module. Tighten to 5 in-lb. (see Letter E).

3.4.6 Riser Assembly Installation into Liquid-Cooled Modules

The liquid-cooled modules D50DNP1MHCPLC and D50DNP1MFALLC use the same riser assemblies that are used for air-cooled modules. The procedures describing riser assmply installation into an air-cooled modules (Section 3.4.4 or Section 3.4.5) should be followed for liquid-cooled modules. But there is one important difference that customers must observe.

Three thin thermal interface material strips are attached to the conduction plates around each riser card slot. These strips conduct the heat from the M.2 SSD via the cold plate and riser bracket on the riser card. These strips are made from a sticky thermal interface material. They stick to both surfaces they contact: to the cooling loop conduction plate on one side and to the M.2 SSD cold plate and riser bracket on another side. These thin strips can be easily damaged and/or displaced when a riser assembly is removed. A user may not notice that a strip is displaced and is crossing the riser slot. When the riser assembly is being installed, the displaced thermal pad will be jammed into the riser slot. This will make the slot inoperable. The server board replacement will be required to restore the system.

Before installing a riser assembly into a liquid-cooled module, make sure that these strips are attached to the conduction plate in their designated places and do not cross the riser slot.

Important note: Three thin TIM strips are attached to the conduction plates around each riser card slot. Make sure that these strips are attached to the conduction plate in their designated places and do not cross the riser slot before installing the riser assembly.

3.5 Liquid-Cooled Add-In Card Installation (D50DNP1MHCPLC and D50DNP1MFALLC Modules)

1U liquid-cooled module can accommodate up to two low-profile liquid-cooled PCIe* add-in cards. These models are supported:

- NVIDIA* MCX653105A-HDAL
- NVIDIA* MCX653106A-HDAL
- NVIDIA* MCX75310AAS-HEAL
- NVIDIA* MCX75310AAS-NEAL

Required Tools and Supplies

- Liquid-cooled PCIe add-in card kit
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1

Note: The following steps to install PCIe add-in card should be performed along with the instructions for the add-in card.

1. Prepare the PCIe add-in card by attaching the thermal pad to the ASIC or heat spreader as instructed in the card documentation.
2. Remove the riser assembly following procedure described in Section 3.4.1 or Section 3.4.2. Pay attention not to damage or displace the thermal strips attached to the conduction plate.
3. Install PCIe add-in card following the procedure described in Section 3.4.3 (see letter B)
4. Install the riser assembly into the module following the procedure described in Section 3.4.6.
5. Secure the PCIe add-in card to the conduction plate with three screws supplied with the card. Tighten to 5 in-lb.

3.6 PCIe* Accelerator Module Add-In Card Installation (D50DNP2MFALAC Module)

The PCIe accelerator module includes a special riser assembly that can support up to four x16 full height, full length, double width PCIe add-in cards for acceleration solutions. The PCIe accelerator module riser assembly is on the right side of the module.

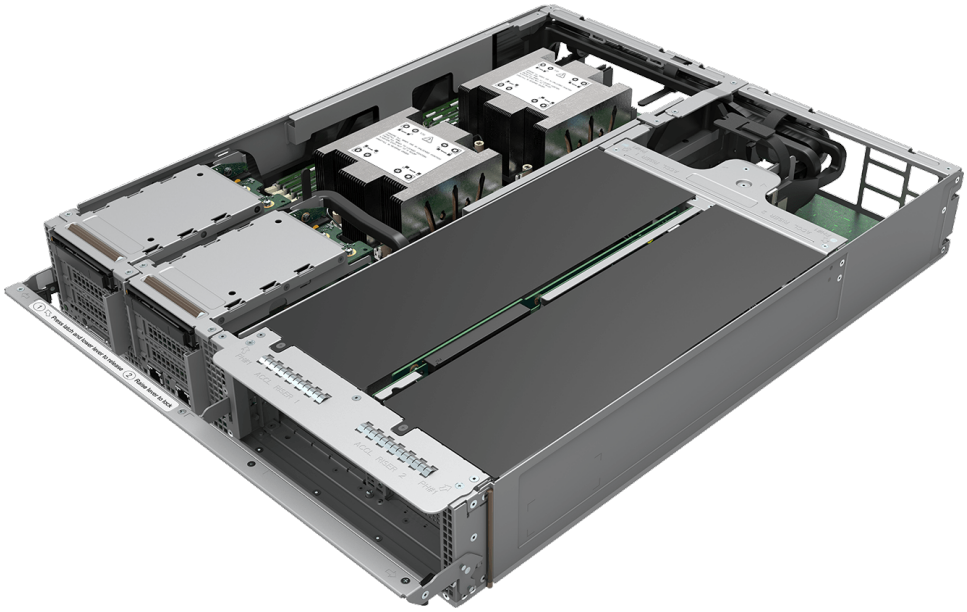


Figure 76. Air-Cooled PCIe* Accelerator Module

The PCIe accelerator module riser assembly houses two riser cards (shown in the following figures) where each riser card supports up to two PCIe accelerator add-in cards. Both riser cards come preinstalled in the PCIe accelerator module riser assembly. They are connected to the server board using MCIO* cables.

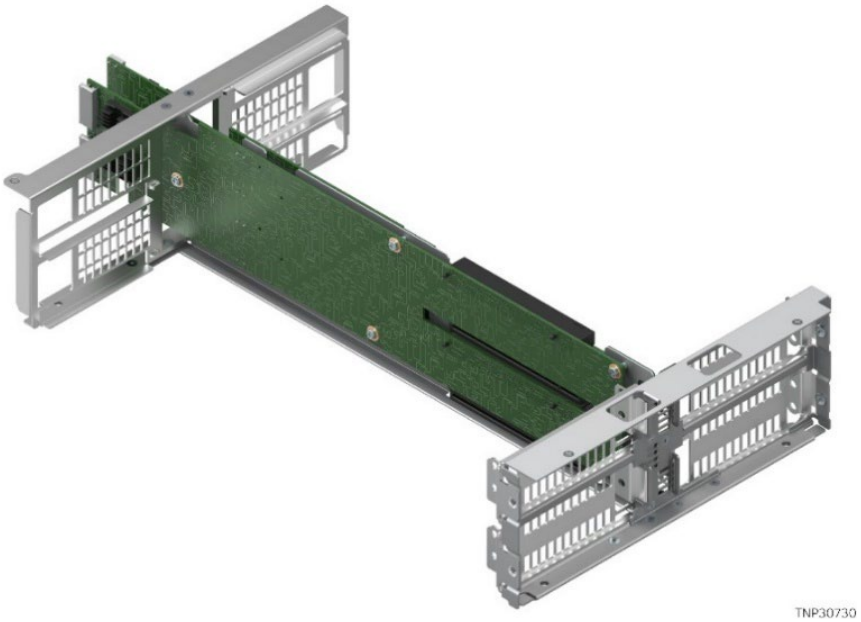


Figure 77. PCIe* Accelerator Module Riser Assembly

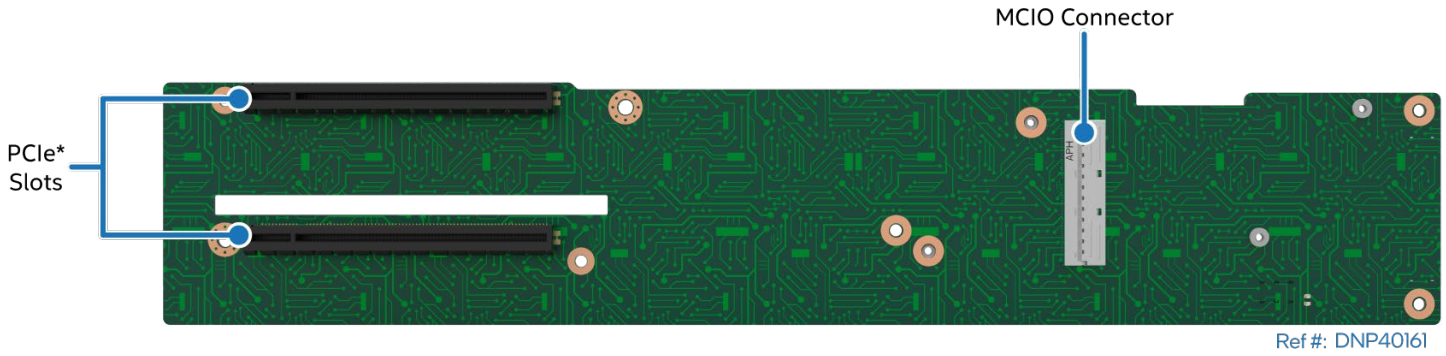


Figure 78. PCIe* Accelerator Module Riser Card 1 Front View

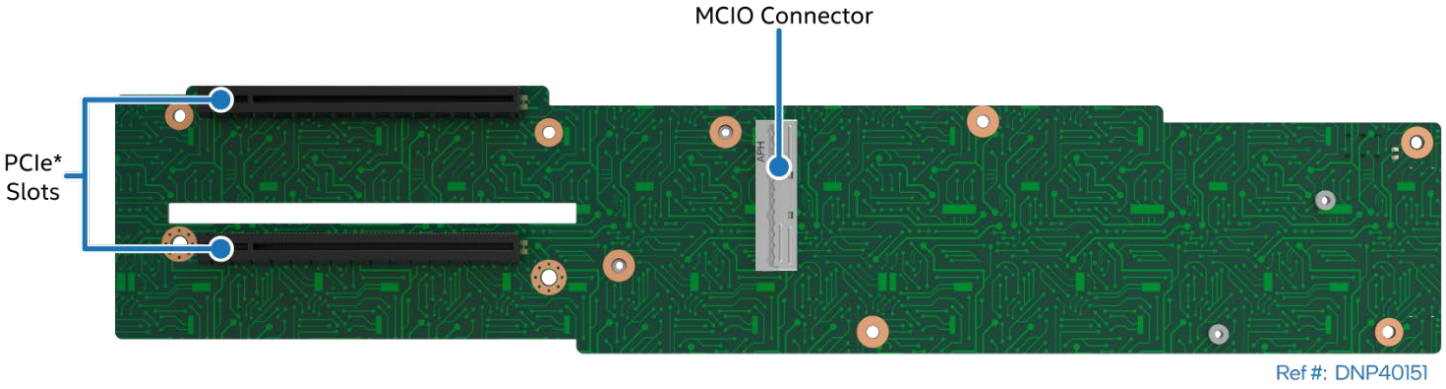


Figure 79. PCIe* Accelerator Module Riser Card 2 Front View

The PCIe* accelerator modules support the following types of accelerator add-in cards:

- Nvidia* Tesla* A100
- Programmable acceleration card with the Intel® Stratix® 10 SX FPGA
- Intel® Data Center GPU Max Series-based PCIe x16 accelerator add-in card
- Intel® Ethernet Network Adapter E810 Series

Each accelerator add-in card requires corresponding PCIe accelerator module card Kit matching the card type. Each kit includes the front bracket and optionally rear extension bracket and power cable. The card kit is an accessory option and must be ordered separately for each card.

Note: Mixed types of accelerator add-in cards in a single module are not supported.

Required Tools and Supplies

- PCIe accelerator add-in card
- PCIe accelerator module card Kit matching the card type
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1

Note: The following steps to replace the accelerator add-in card metal bracket should be performed along with the instructions in the add-in card documentation.

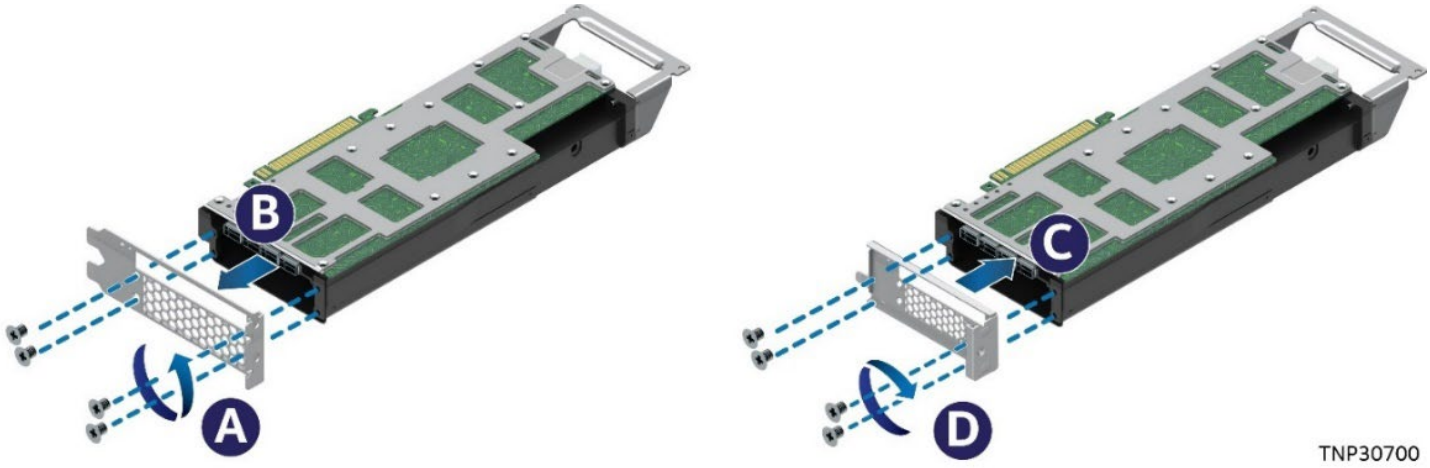


Figure 80. Replacing the Add-In Card Metal Bracket

1. Remove the screws that hold the original metal bracket on the accelerator add-in card (see Letter A).
2. Uninstall the original metal bracket (see Letter B) and replace it with the metal bracket in the accessory kit (see Letter C).
3. Fasten the screws to secure the metal bracket to the accelerator add-in card (see Letter D).
4. If the accessory kit comes with the rear extension bracket, install it on the accelerator add-in card.

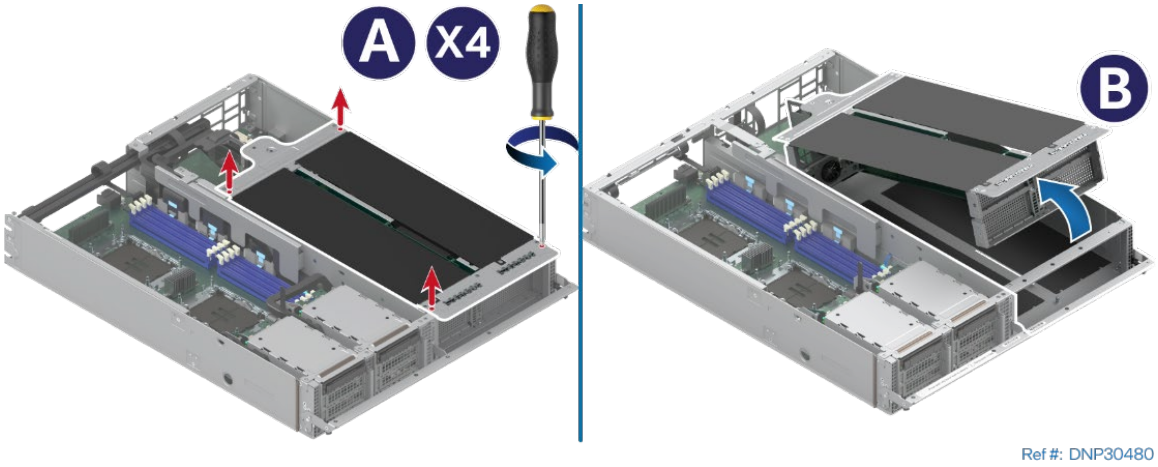


Figure 81. Removing the PCIe* Accelerator Module Riser Assembly

5. Loosen the four captive screws on the PCIe accelerator module riser assembly (see Letter A).
6. Carefully lift the PCIe accelerator module riser assembly up about two inches. Then, tilt the front side away from the module (see Letter B).

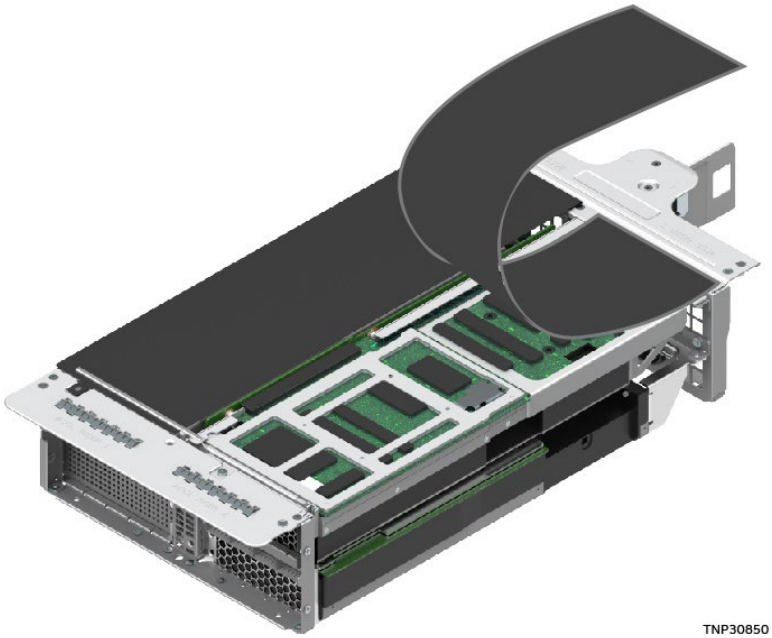


Figure 82. Lifting the Flap up on the Front Side of the Riser Assembly

7. Remove the screw holding the flap on the front side of the riser assembly and lift the flap up.

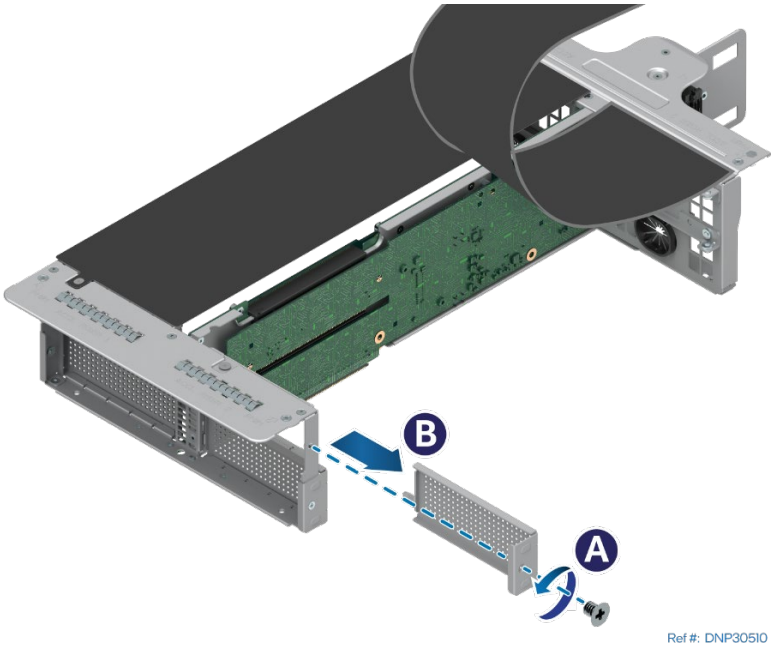


Figure 83. Removing the Original Metal Bracket

8. Remove the screw holding the original metal bracket (see Letter A) and remove the bracket from the front side of the riser assembly (see Letter B).
9. If the bracket kit includes a power cable, attach it to the accelerator add-in card

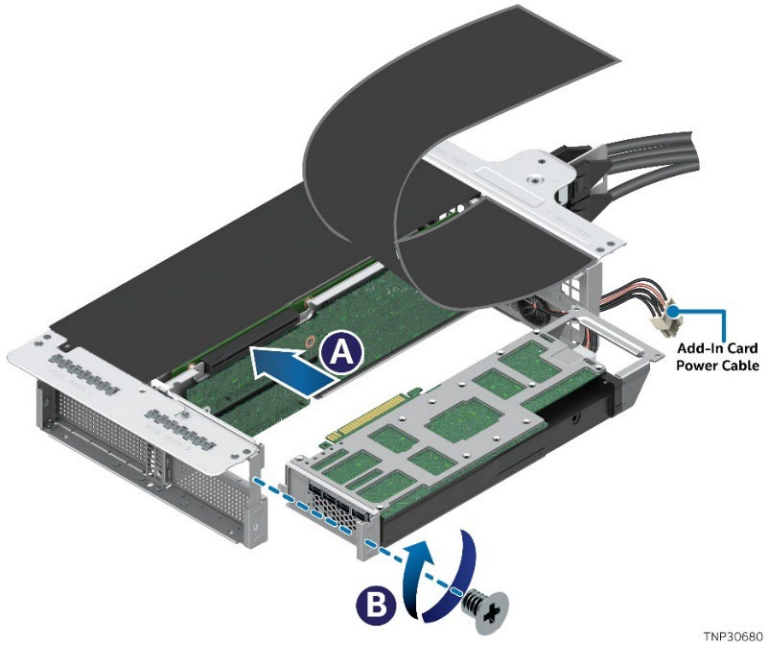


Figure 84. Installing the Accelerator Add-In Card in the Riser Assembly

10. Align the bracket of the accelerator add-in card with the opening of the riser assembly.
11. Route the add-in card power cable through the plastic shield opening in the rear of the riser assembly.
12. Carefully push the add-in card into the PCIe* slot (see Letter A). Ensure that the card is fully seated.
13. Fasten the screw on the metal bracket to secure the add-in card to the riser assembly (see Letter B).

Flap not shown in figure

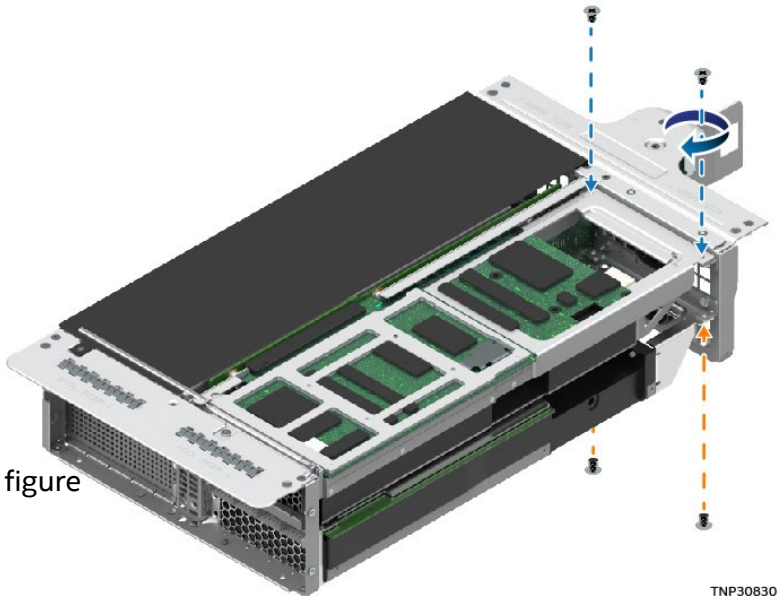


Figure 85. Securing the Accelerator Add-In Card in the Riser Assembly

14. Fasten the two screws on each corner of the back end to attach the accelerator add-in card to the riser assembly.

Note: The direction of the screws on the back end depends on whether the add-in card is in the top slot or bottom slot of the riser assembly.

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15. Repeat the step 1 through 14 to install other accelerator cards as needed.
16. Install the screw that holds the flap on the front side of the riser assembly.

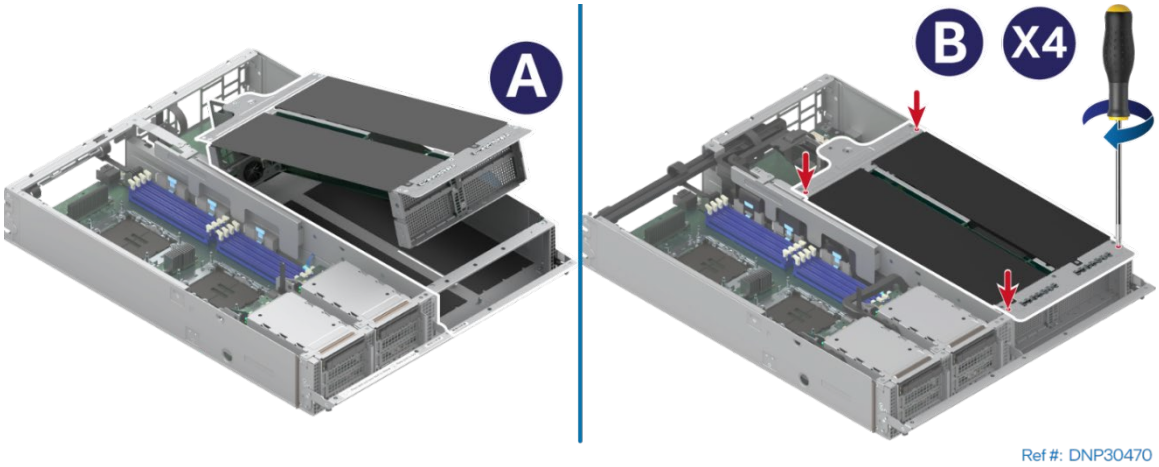


Figure 86. Installing the PCIe* Accelerator Module Riser Assembly

17. Install the PCIe accelerator module riser assembly by tilting the front side down to the module (see Letter A).
18. Fasten the captive screws to secure the PCIe accelerator module riser assembly to the module (see Letter B).

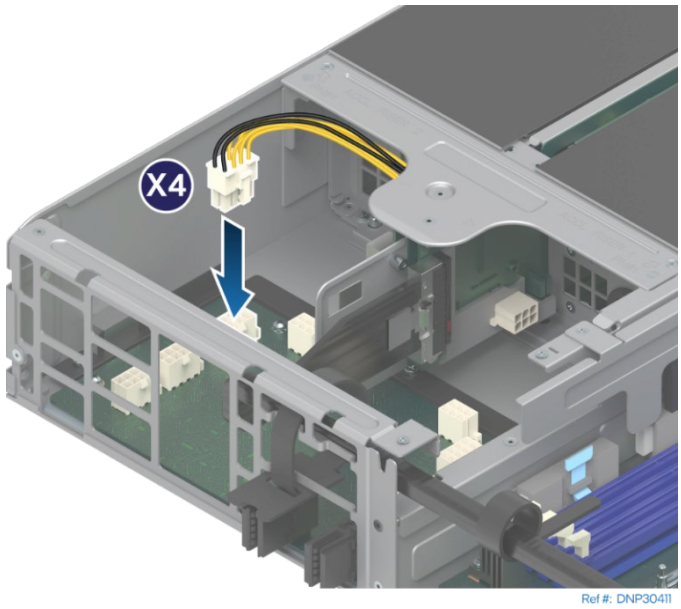


Figure 87. Connecting the Add-In Card Power Cable

19. Connect all accelerator power cables to the connectors on the power board.

3.7 2.5” U.2 Front Drive Installation

The D50DNP2MHSVAC and D50DNP2MFALAC modules support up to two hot-swap 2.5” form factor U.2 Solid State Drives (SSDs). Each drive is installed into a tool-less drive carrier. This section provides instructions for drive extraction from and installation into the chassis drive assembly.

Required Tools and Supplies

- Up to two 2.5” U.2 Solid State Drives (SSDs)
- Anti-static wrist strap and conductive workbench pad (recommended)

3.7.1 Drive Carrier Extraction

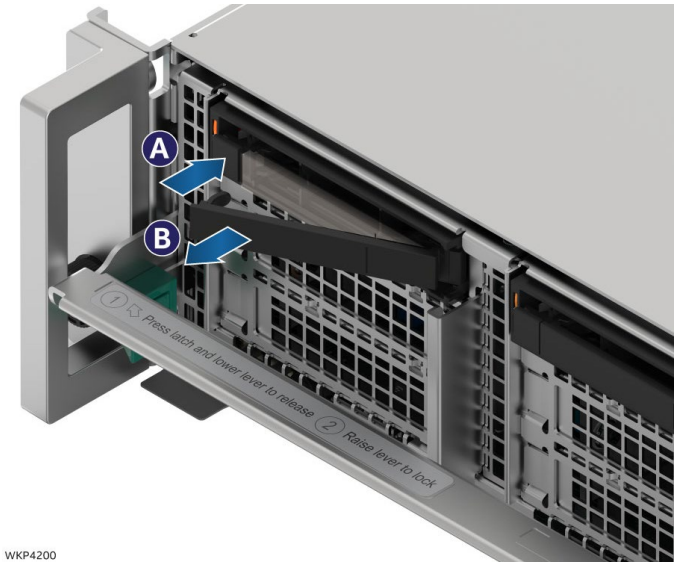


Figure 88. Drive Carrier Extraction from the Chassis

1. Press the button on the carrier face plate to release the lever (see Letter A).
2. Using the lever, pull the carrier from the drive bay (see Letter B).

3.7.2 Drive Carrier Assembly

Important: The Intel® Server System D50DNP is designed and tested to support 2.5” U.2 NVMe* SSDs only.

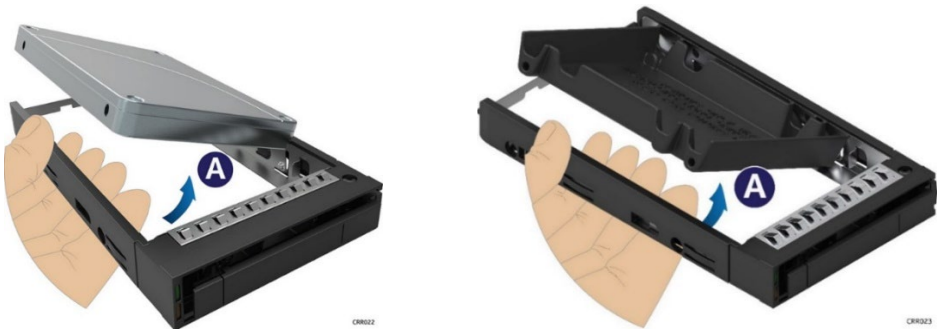


Figure 89. 2.5” Drive / Blank Removal

1. Remove the drive (or drive blank) from the carrier by gently rotating the top edge of a carrier rail outwards while simultaneously pushing the drive up from the bottom as shown in the picture.

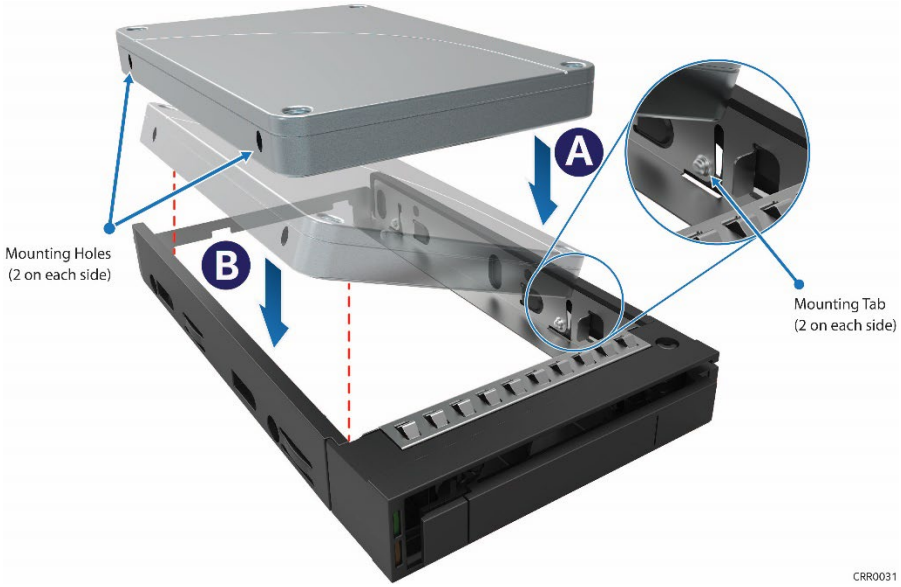


Figure 90. 2.5" Drive Installation into the Carrier

2. Carefully unpack the new drive, taking care not to touch any of the connector pins on the back side of the drive.
3. Direct the drive edge connector toward the back of the drive carrier.
4. Position the mounting holes on one side of the drive over the mounting tabs on the drive carrier side rail (see Letter A).
5. Lower the other side of the drive into the carrier (see Letter B) and press down on the drive until all mounting tabs are locked in holes.

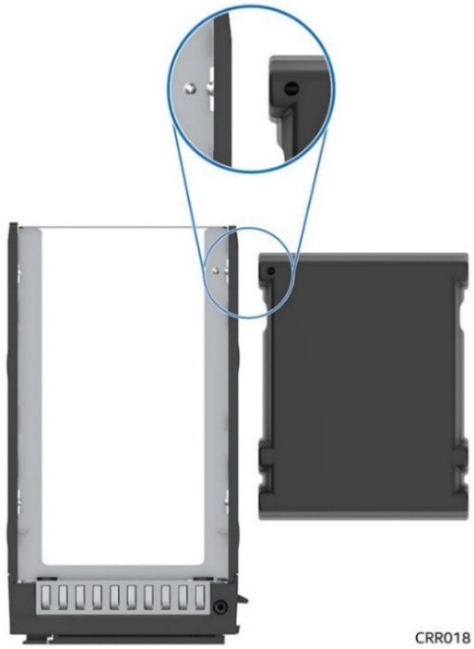


Figure 91. 2.5" Drive Carrier Alignment Features

Note: The 2.5" drive blank and drive carrier each have alignment features (see Figure 91) ensuring proper assembly. When reinstalling a drive blank into the drive carrier, ensure that the features are aligned before installation. Failure to properly install a drive blank may result in the carrier assembly not fitting properly into the drive bay.

3.7.3 Drive Carrier Installation

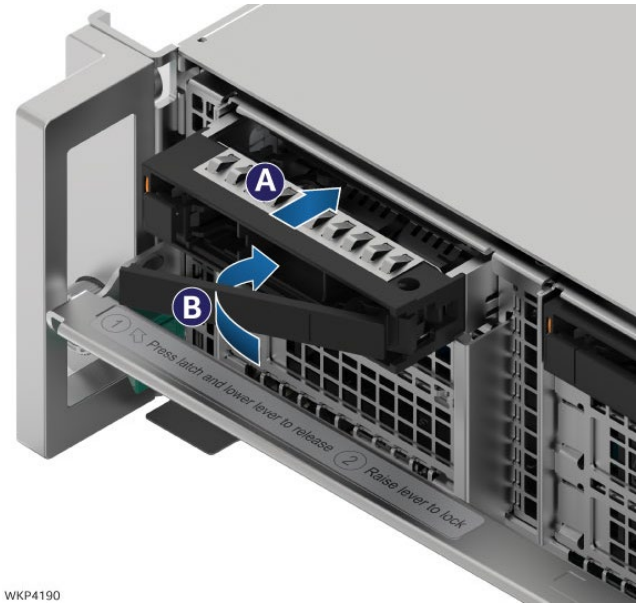


Figure 92. Drive Carrier Installation into the Chassis

1. Align the drive assembly with the open drive bay.
2. With the lever in the open position, insert the drive assembly into the drive bay (see Letter A) and push forward until the drive edge connector engages with the backplane connector.
3. Complete the drive installation by closing the drive assembly lever until it locks into place (see Letter B).

3.8 M.2 SSD Installation

Each M.2 SSD requires a heat sink or a cold plate to maintain proper working temperature. For air-cooled modules, the M.2 SSD heat sink is not installed at the factory. It is available as an accessory (DNPM2HS) and should be ordered separately for each M.2 SSD. Liquid-cooled systems come from factory fully assembled, including M.2 SSD cold plate. The M.2 SSD cold plate for liquid-cooled modules is also available as a spare kit (DNPM2LCHS).

Before following the procedures in this section, remove the selected module from the server chassis (see Section 3.2.1) and then remove the selected riser assembly from the module (see Section 3.4.1).

3.8.1 Thermal Pad Installation for Air-Cooled Configurations

This procedure applies to both 1U and 2U riser assemblies with illustrations showing differences where applicable.

Required Tools and Supplies

- PCIe* / SATA M.2 SSD
- M.2 heat sink kit for each M.2 SSD (DNPM2HS)
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1
- 3/16” hex nut driver

The M.2 SSD heat sink kit for air-cooled configurations includes two thermal pads: long and short. The long thermal pad is attached to the heat sink at the factory. The short one should be attached to the rear side of an SSD. Usually this is the side that has fewer components soldered on it.

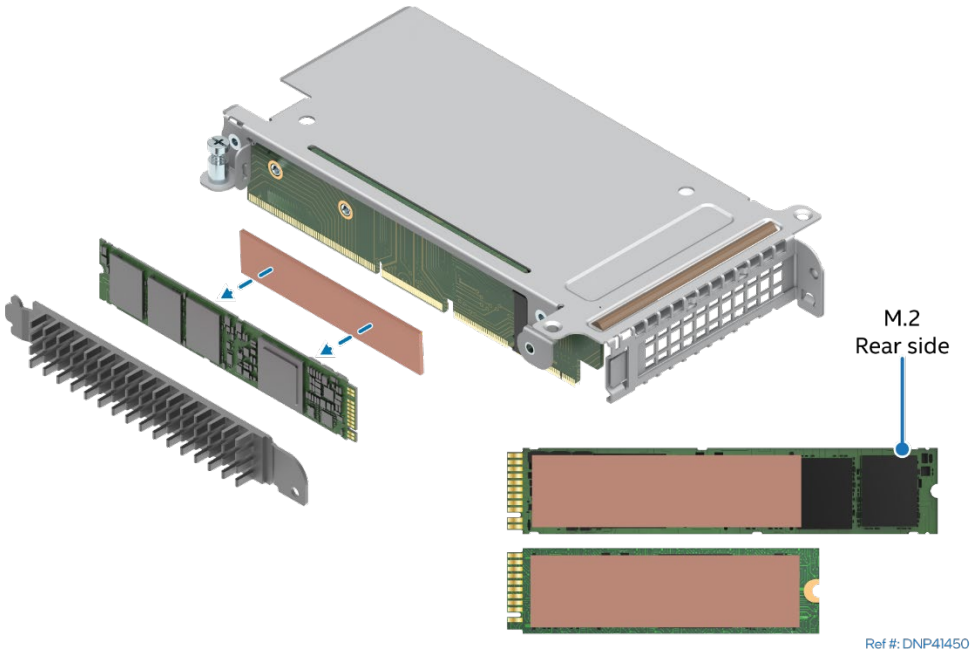


Figure 93. Attaching thermal pad to SSD

1. Peel off the protective film from one side of the short pad and attached it to the rear side of the SSD under the tallest SSD component. This is usually the SSD controller IC.
2. Peel off the protective film from another side of the short pad

3.8.2 M.2 SSD Installation for Air-Cooled Configurations

1. Remove two screws attaching the Mylar “Attention” label to the riser assembly. Note that the screw securing the label to the standoff has flat bottom head. This screw should be reused to secure the SSD.
2. If needed, adjust the position of the M.2 SSD mounting standoff to accommodate 110mm M.2 SSD. Using 3/16” hex nut driver, remove the standoff from the 80mm position and install it into the 110mm position. Tighten to 5 in-lb.

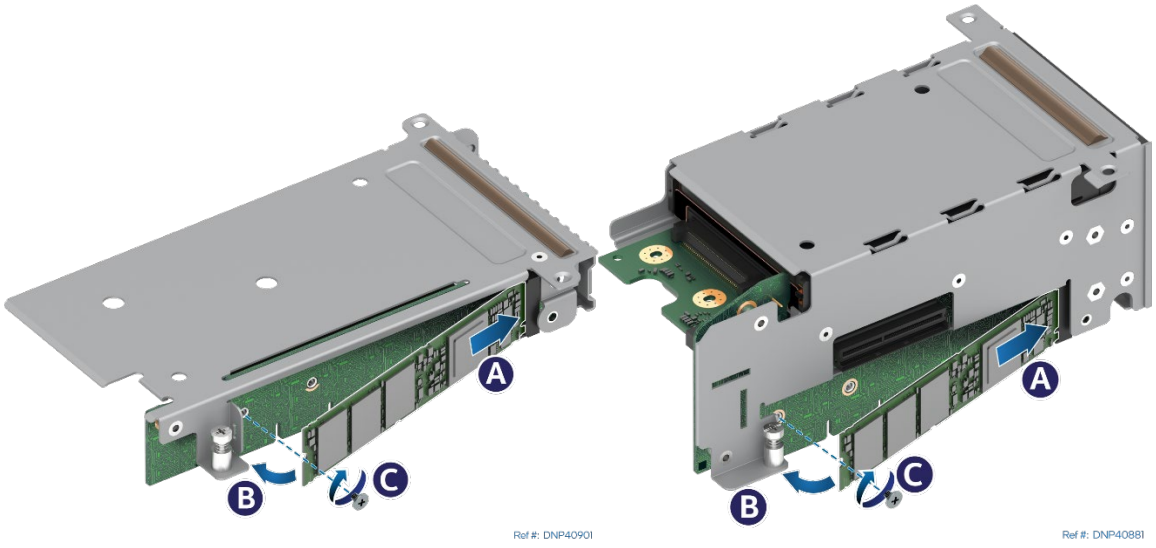


Figure 94. Installing M.2 SSD

3. Align the notch within the SSD edge connector with the key in the M.2 connector and insert the SSD into the connector (see Letter A).
4. Push the free edge of the SSD towards the riser assembly (see Letter B) and secure the SSD to the M.2 mounting standoff with the previously removed screw (see Letter C).

3.8.3 M.2 SSD Heat Sink Installation for Air-Cooled Configurations

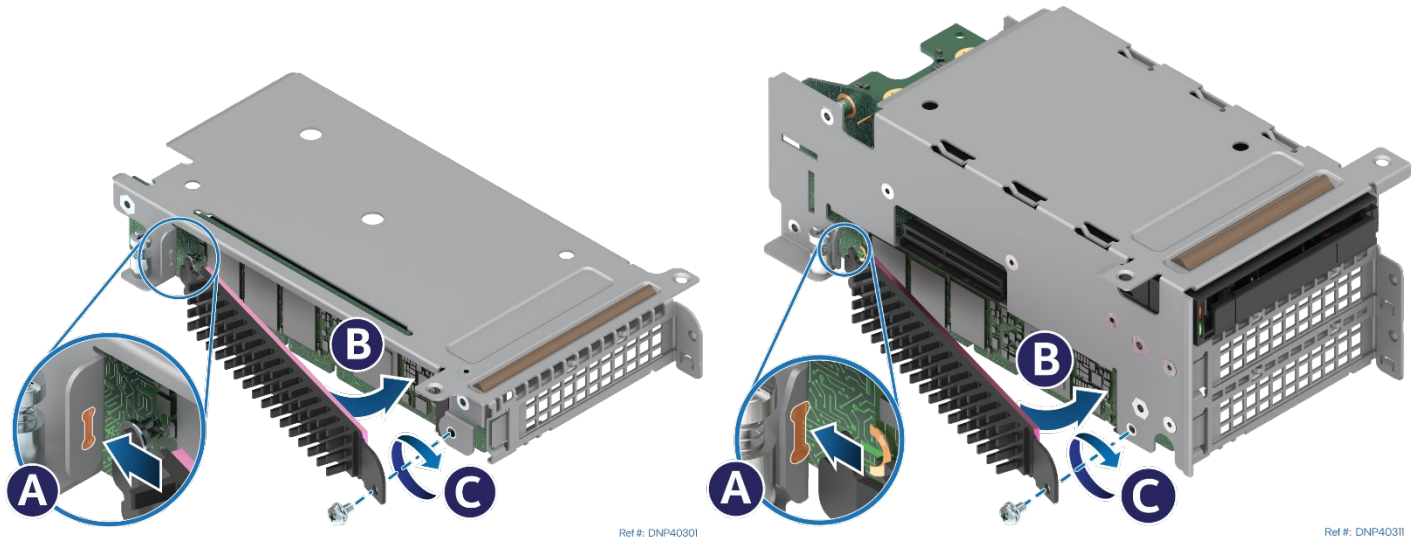


Figure 95. Installing M.2 Heat Sink

1. Peel off the protective film from the long thermal pad attached to the heat sink.
2. Insert the tab at the edge of the heat sink into the slot on the riser assembly (see Letter A) making sure the heat sink side covered with the thermal pad is facing the M.2 SSD.
3. Push the loose end of the heat sink towards the SSD (see Letter B).
4. Secure the heat sink to the riser assembly with the previously removed screw (see Letter C).

3.8.4 Riser Bracket Installation for Liquid-Cooled Configurations

Required Tools and Supplies

- PCIe* / SATA M.2 SSD
- M.2 cold plate kit for each M.2 SSD (DNPM2LCHS)
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1
- 3/16” hex nut driver

The M.2 SSD cold plate kit DNPM2LCHS includes:

- M.2 SSD cold plate
- Two thermal interface material pads (Laird Tflex HD7100*)
- Three M3 black pan-head screws (one is a spare)
- Two M3 screws for cold plate (one is a spare)
- Riser bracket
- Three spare thermal strips

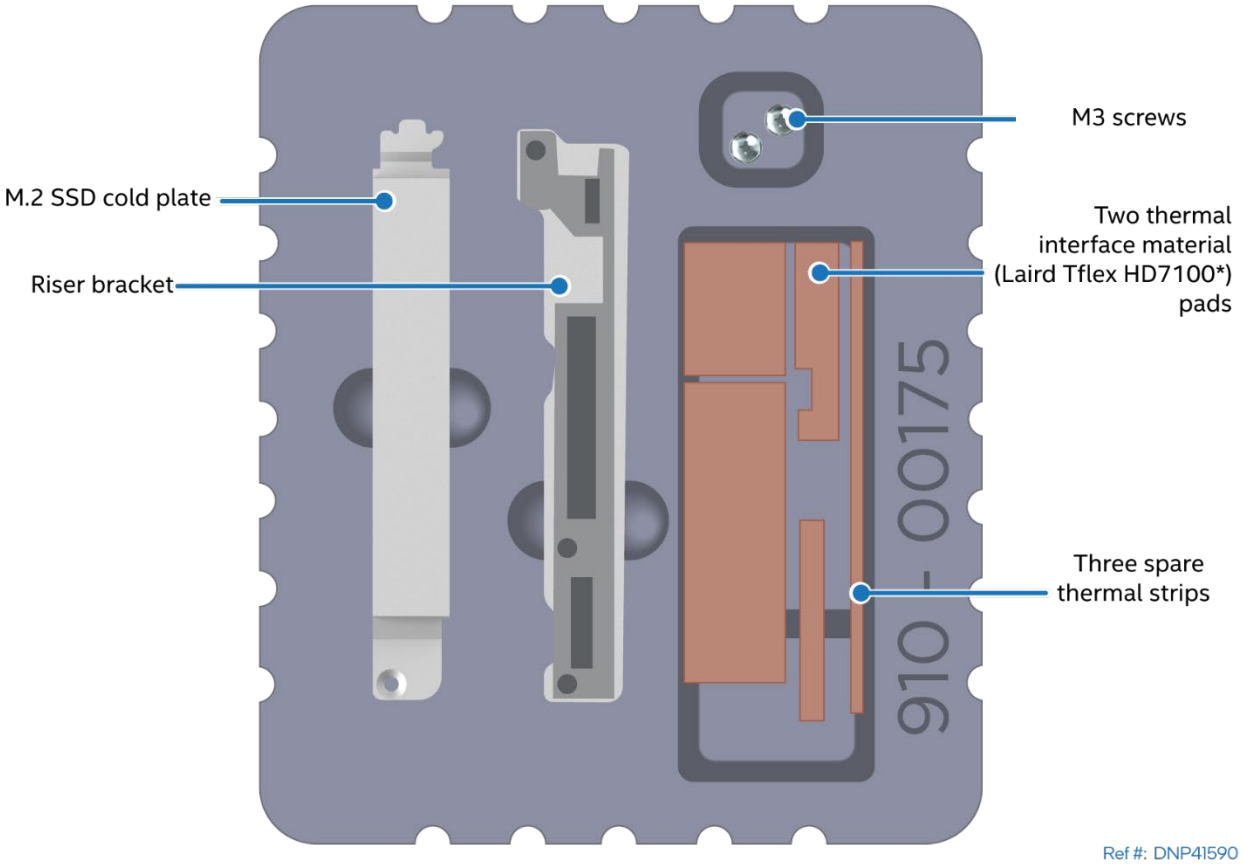


Figure 96. M.2 SSD cold plate kit

1. If needed, adjust the position of the M.2 SSD mounting standoff to accommodate 110mm M.2 SSD. Using 3/16" hex nut driver, remove the standoff from the 80mm position and install it into the 110mm position. Tighten to 5 in-lb.
2. Unpack the riser bracket and two M3 black pan-head screws from the D50DNP M.2 cold plate kit (DNPM2LCHS). The riser bracket has thermal pads attached at the factory.
3. Remove and discard the left screw securing the riser board to the riser assembly.
4. Using two black pan-head screws from the kit attach the riser bracket to the riser assembly from the PCIe connector side. Use vacant standoff. Tighten to 5 in-lb.

3.8.5 Thermal Pad Installation for Liquid-Cooled Configurations

The thermal interface material pads for M.2 SSDs come in two different sizes. For 80mm M.2 SSD, use only the long pad. For 110mm M.2 SSD both pads should be combined and installed together.

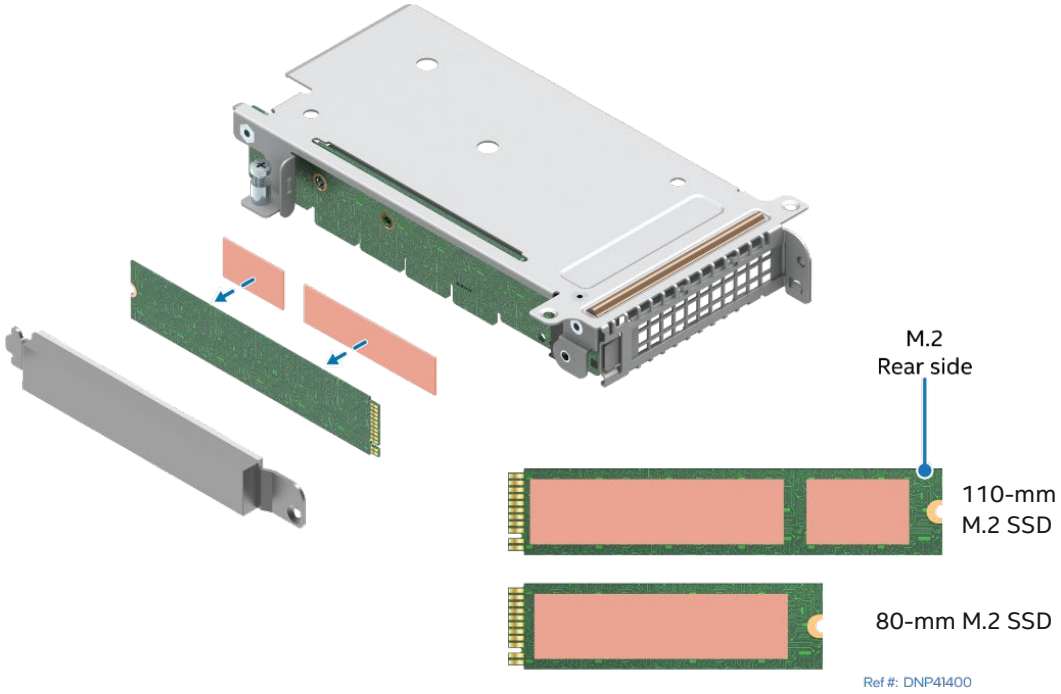


Figure 97. Installing the Thermal Interface Material Pads on M.2 SSD

1. Peel off the protective film from the thermal pad and attach it to the rear side of the M.2 SSD. Center the pad vertically and horizontally.

3.8.6 M.2 SSD Installation for Liquid-Cooled Configurations

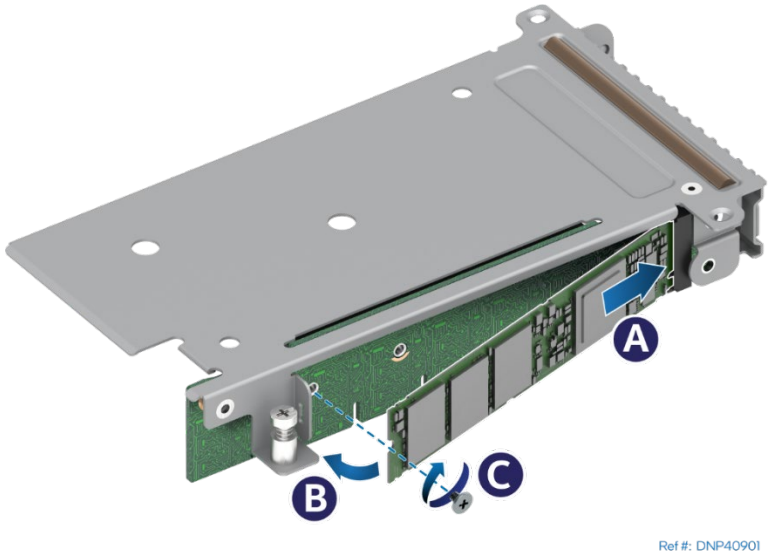


Figure 98. Installing the M.2 SSD

2. Remove the screw from the M.2 mounting standoff on the left side of the riser assembly.
3. Align the notch within the SSD edge connector with the key in the M.2 connector and insert the SSD into the connector (see Letter A).
4. Push the free edge of the SSD towards the riser assembly (see Letter B) and secure the SSD to the M.2 mounting standoff with the previously removed screw (see Letter C).

3.8.7 M.2 SSD Cold Plate Installation for Liquid-Cooled Configurations

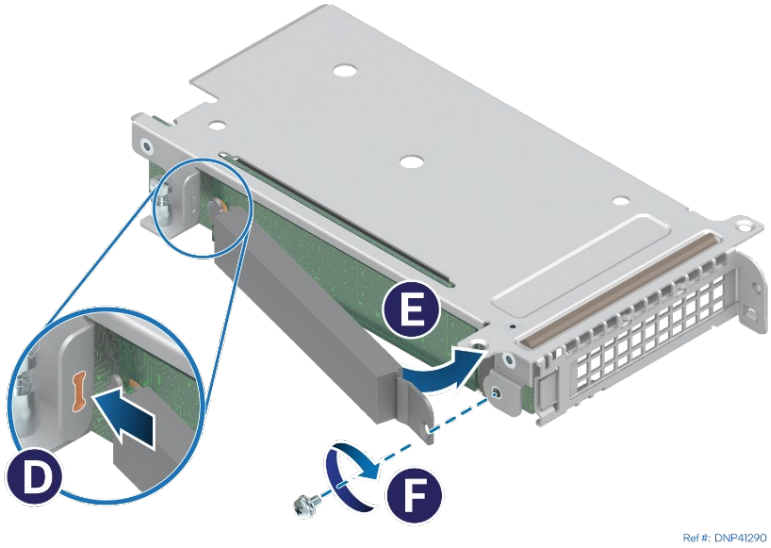


Figure 99. Installing the M.2 cold Plate

1. If present, peel off the protective film from the thermal interface material pad attached to the cold plate.
2. Insert the tab at the edge of the cold plate into the slot on the riser assembly (see Letter D).
3. Push the loose end of the cold plate towards the SSD (see Letter E) and secure the cold plate to the riser assembly with a screw from the kit (see Letter F).
4. Install the riser assembly following instructions in Section 3.4.6

3.9 Trusted Platform Module (TPM) Installation

This section provides instructions how to install a Trusted Platform Module (TPM) in the system. Refer to the *Intel® Server D50DNP Family Configuration Guide* for available options. The TPM kit comes with two different screws: Phillips* head screw and a tamper resistant head screw. The tamper resistant screw can be installed only once. Intel recommends securing the TPM with the tamper resistant screw.

Required Tools and Supplies

- Intel TPM accessory kit
- Anti-static wrist strap and conductive workbench pad (recommended)
- Medium flat-head screwdriver

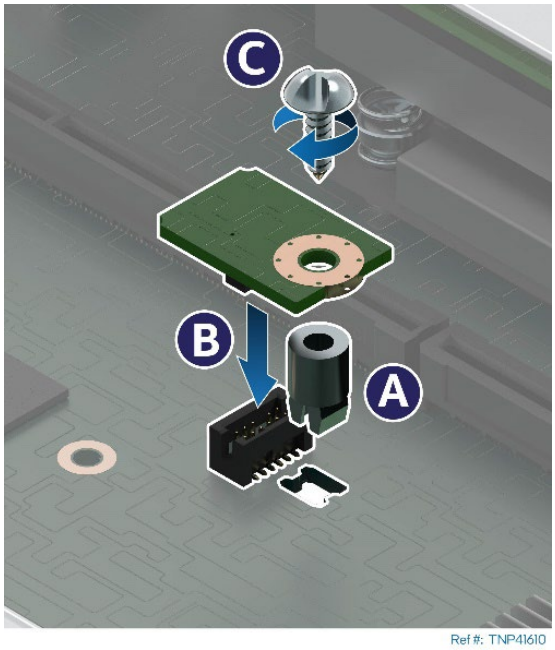


Figure 100. Installing the Trusted Platform Module (TPM)

1. Remove the module to be serviced from the server chassis (see Section 3.2.1) and place it on an anti-static work surface.
2. Remove the riser assembly #2 (see Section 3.4.1).
3. Locate the TPM module connector on the server board.
4. Insert the plastic stand-off from the TPM kit into the mounting hole on the server board (see Letter A).
5. Place the TPM module over the connector.
6. Press the module down onto the connector (see Letter B).
7. Secure the TPM module to the stand-off with the screw (see Letter C).

3.10 Ethernet Management Port Module (AXXFCEMP)

Your system may or may not come preconfigured with an Ethernet Management Port module. This section provides instructions for the installation and removal of this accessory option. The EMP module is hot-swap capable and can be installed or removed without powering down the system or any of its modules. This procedure applies to all Intel® Server D50DNP chassis types.

Required Tools and Supplies

- Ethernet Management Port Module
- Anti-static wrist strap and conductive workbench pad (recommended)

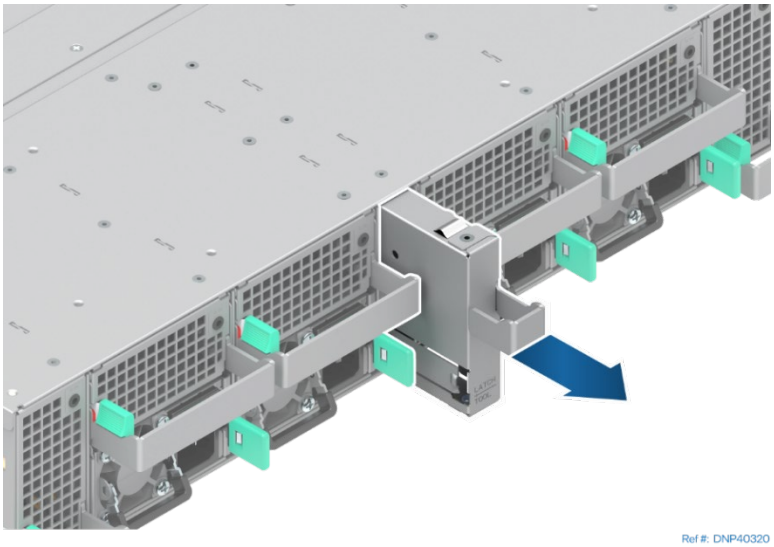


Figure 101. Removing the EMP Blank

1. If present, remove the EMP blank from the back of the server chassis by pulling it out from the chassis as shown in previous picture.

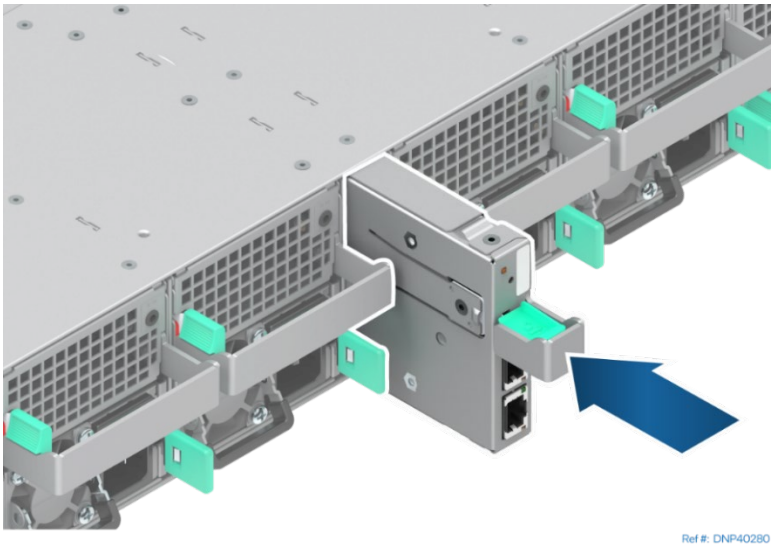


Figure 102. Installing the EMP Module/Blank

2. Install the EMP module by sliding it into the open EMP bay until it locks into place.

4. System Software Updates and Configuration

The Intel® D50DNP Modules include a software stack that contains CPLD, BIOS, BMC firmware, Intel® Management Engine (Intel® ME) firmware, and FRU data. A full software stack is installed during the system manufacturing process but may not be the latest available version. Intel highly recommends updating the full system software stack to the latest available version for optimal performance and system reliability. A System Update Package (SUP) containing the latest available system software stack can be downloaded from the Intel website: http://downloadcenter.intel.com.

Ensure that the embedded platform management subsystem is configured properly. Updated FRU data allows the platform management subsystem to monitor the specific system sensors used to determine appropriate system cooling, optimal performance, and accurate error reporting. FRU data is loaded by using the sysfwupdt utility that is included with the System Update Package (SUP).

4.1 Using the BIOS Setup Utility

This section describes how to access the BIOS Setup Utility. This utility can be used to view and configure system settings. These settings determine how the server operates.

4.1.1 Entering BIOS Setup Utility

To enter the BIOS Setup utility using a keyboard (or emulated keyboard), press the **<F2>** function key during boot time when the Intel Logo Screen or the POST Diagnostic Screen is displayed.

Note: At initial system power-on, a USB keyboard is not functional until the USB controller has been initialized during the power on self-test (POST) process. Only after that time, keystrokes from a USB keyboard are recognized, allowing for access the BIOS Setup Utility.

The following message is displayed on the diagnostic screen or above the logo screen:

Press [Enter] to directly boot.
Press [F2] to enter setup and select boot options.
Press [F6] to show boot menu options.
Press [F12] to boot from network.

After pressing the **<F2>** key, the system eventually loads the BIOS Setup Utility and displays the BIOS Setup top level menu screen.

Note: If system errors occur during the POST process, the regular system boot stops, and the system loads the BIOS Setup Utility. The Error Manager screen is displayed. The Error Manager screen lists and provides information about the specific boot errors detected.

4.1.2 No Access to the BIOS Setup Utility

If the BIOS Setup Utility is not accessible by pressing the **<F2>** key or other described access methods, it may be necessary to restore the BIOS default settings. For information relating to restoring BIOS defaults, see Appendix D.

4.1.3 Navigating the BIOS Setup Utility

The BIOS Setup Utility consists of several menu screens, each having either informational fields and/or configurable system setup options.

The bottom portion of each menu screen provides a list of commands that are used to navigate through the setup utility. These commands are always displayed.

If no administrator or user password is used, all available settings are configurable, and can be set by anyone with access to BIOS Setup.

System settings that are not configurable, because of security settings or configuration limits, are grayed out and are not accessible.

Table 3. BIOS Setup: Keyboard Commands

Key	Action	Description
<Enter>	Execute Command	The <Enter> key is used to: • Activate submenus when the selected feature is a submenu, or • Display a pick list if a selected option has a value field, or • 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, closes 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 BIOS returns to the parent menu. When the **<Esc>** key is pressed in any submenu, the BIOS returns to the parent menu.
↑	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.
<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 have the same effect.

<F9>	Setup Defaults	Pressing the **<F9>** key causes the following to display:
		`Load default configuration?`
		`Press 'Y' to confirm, 'N' / 'ESC' to ignore`
		If **<Y>** key is pressed, all BIOS fields are set to their default values. If **<N>** or **<Esc>** key is pressed, the user is returned to where they were before **<F9>** was pressed without affecting any existing field values.

<F10>	Save and Exit	Pressing the **<F10>** key causes the following message to display:
		`Save configuration changes and exit?`
		`Press 'Y' to confirm, 'N' / 'ESC' to ignore`
		If **<Y>** key is pressed, all changes are saved, and BIOS exits the Setup utility. If **<N>** or **<Esc>** key is pressed, the user is returned to where they were before **<F10>** was pressed without affecting any existing field values.

Refer to the BIOS Setup Utility User Guide for additional details on configuring BIOS options and parameters.

4.2 Software License Key Management

Some additional server features are activated by license keys. Examples are the BMC Advanced Server Management features and support of the Virtual RAID on CPU (VROC) RAID volumes.

4.2.1 Ordering Software License Key

There are two options available to order a software license key:

- **CTO/L9:** When ordering a fully integrated system from Intel using its on-line Configure-to-Order (CTO) tool, select the required license key (**`AdvSysMgmtKey`**, **`VROCStanKey`** or **`VROCPremKey`**) as an additional option. The Intel factory will then automatically upload the license key on to the system during the system integration process.
- **Add-on Accessory:** A software license key can be ordered separately from the system as an add-on accessory. This option requires that the license key be manually installed on the system. See the following sections for complete ordering and installation instructions.

4.2.2 Order and Register a License Key as an Add-on Accessory (Not via CTO)

1. Place an order for the required software license key with electronic delivery. Intel Product Codes:
   ADVSYSMGMTKEY for the Advanced System Management (ASM) Key
   VROCSTANKEY for the Intel® Virtual RAID on CPU Standard Software Key
   VROCPREMKEY for the Intel® Virtual RAID on CPU Premium Software Key
2. Receive an email with instructions to download the product key.
3. From the email, click the **Register** link (see Figure 103) to go the https://servertools.intel.com/registration web page

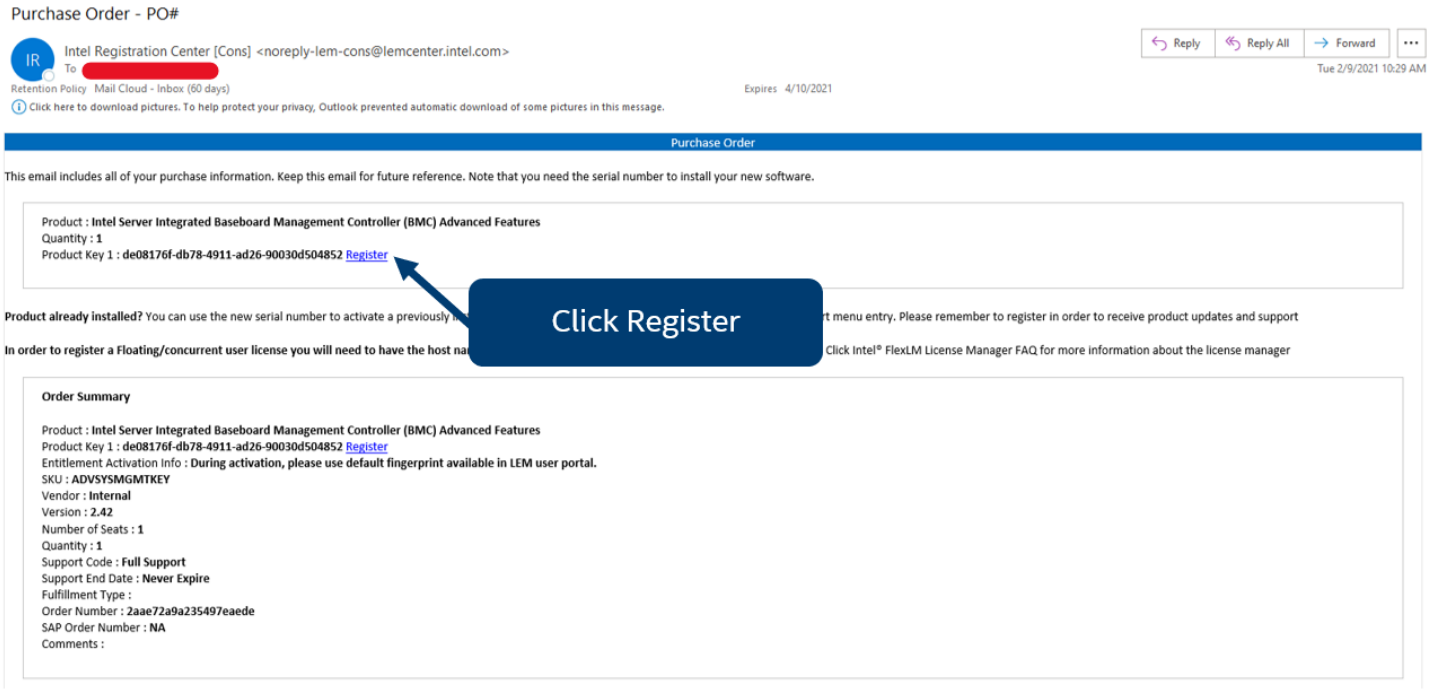


Figure 103. Example Email

4. Login using an existing Intel account or Create a new one. An email address is required

5. On the Registration Screen, Click the “Register” button to register the pre-entered license key number (see Figure 104)

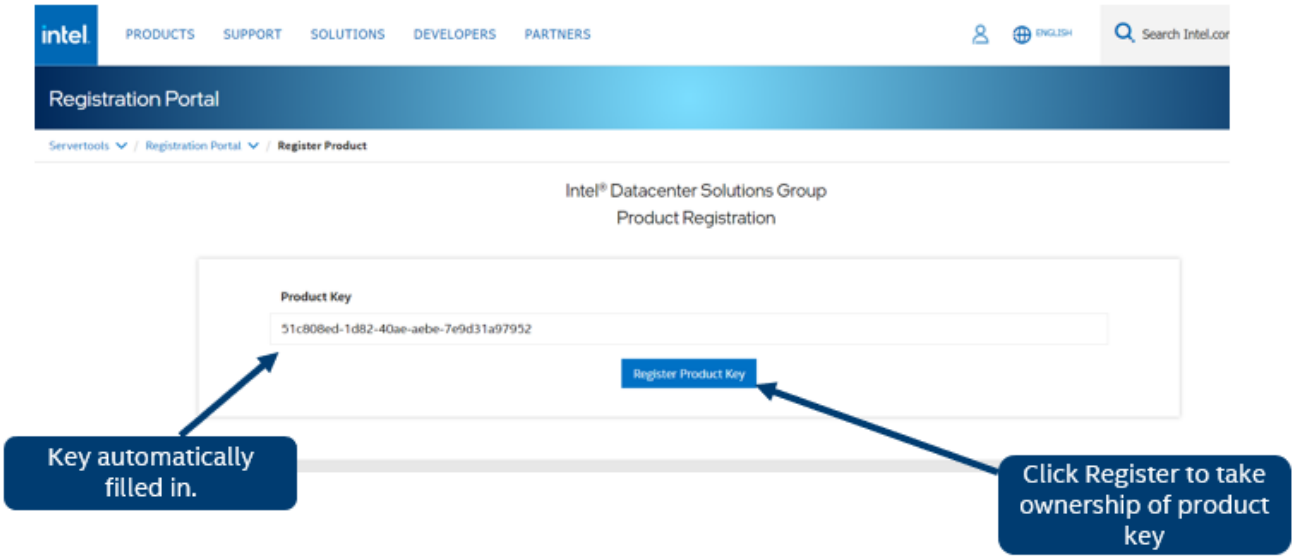


Figure 104. Register Key

6. Enter the number of Advanced System Management (ASM) licenses needed. It must be equal or less than the quantity available displayed in the right corner of the screen. Click on the “Generate License(s)” bottom to generate and download the single license file. (see Figure 105)

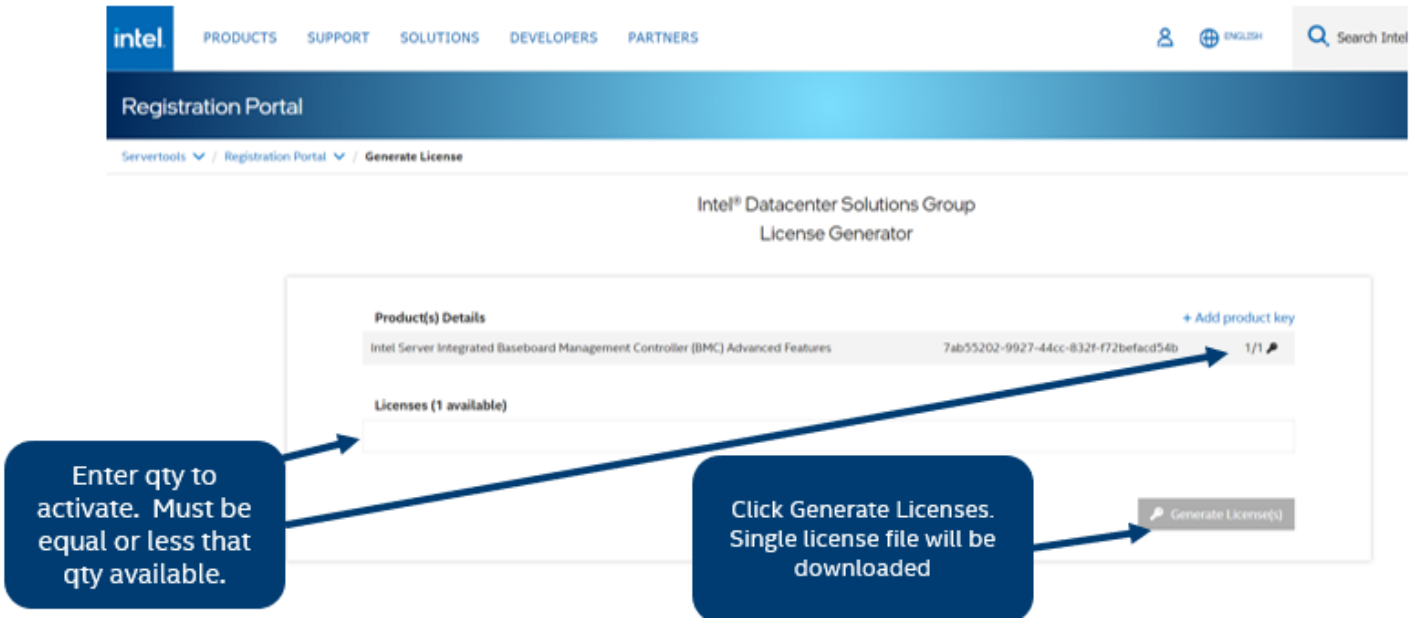


Figure 105. Generate License

Note: Only single license file per order is needed to activate multiple systems. If any key or email is lost, Intel can generate new product keys as needed.

7. To generate the license for either **VROCSTANKEY** or **VROCPREMKEY**:
   - Collect the board serial number. There are several ways to get the board serial number, e.g., barcode label attached to the board, BMC web console, Redfish/IPMI API's and utilities.

   - Multiple board serial numbers can be entered in the text box or by uploading a .JSON file with the list. Only a single license file will be downloaded. This single license file will work with all systems that match one of the serial numbers. (see Figure 106)

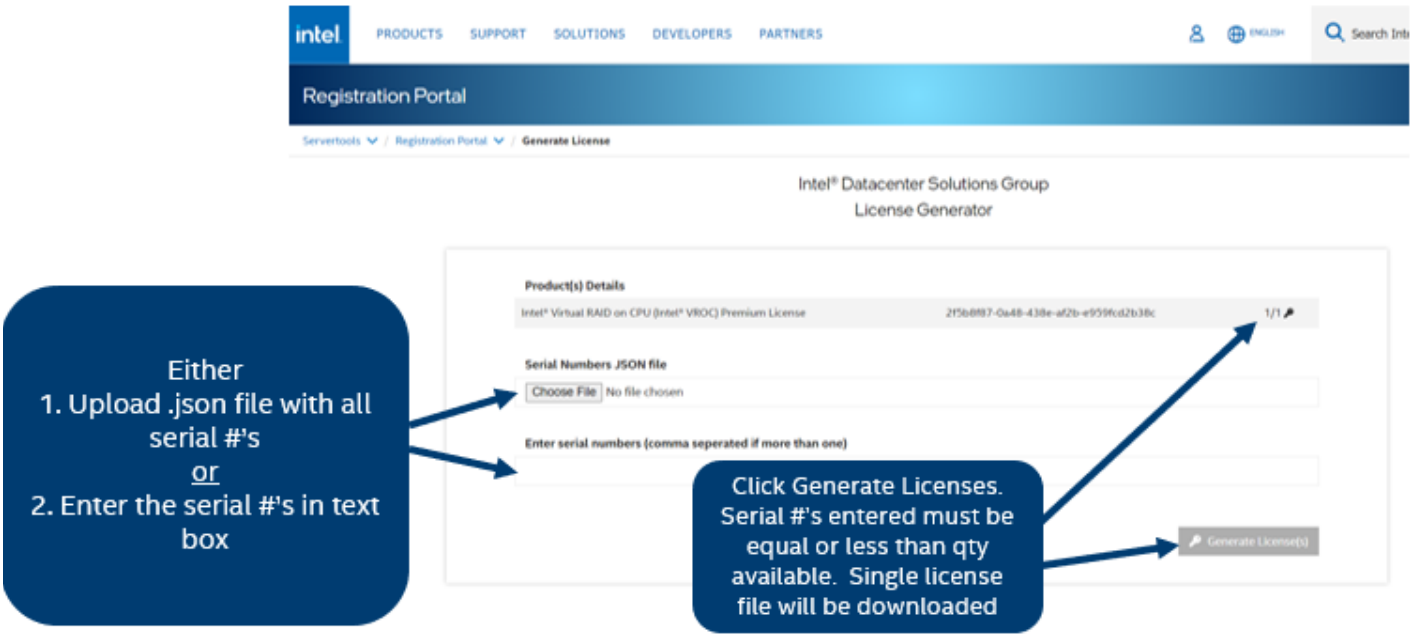


Figure 106. Generate License for Intel® Virtual RAID on CPU Standard/Premium Software Key

   - If using file to upload serial numbers (vs. text box), the following is the JSON format that should be in the file:

```
{ "serialNumbers":
["SERIAL1","SERIAL2","SERIAL3"]}
```

Click on "Generate License(s)" bottom to download the single license file. The quantity of the board serial numbers entered must be equal or less than the quantity available displayed on the right corner of the screen.

Note: Make sure to enter the board serial number NOT the product serial number.
Only one of the two methods either the JSON file or the text box is accepted.
The license file will work with all systems that match one of the board serial numbers. If any key or email is lost, Intel can generate new product keys as needed.

4.2.3 Software License Key Installation

Three options can be used to upload a software license onto a server:

- Integrated BMC Web Console
- Intel® Server Configuration Utility
- Redfish* Interface

4.2.3.1 Installation Using the Integrated BMC Web Console

The following procedure may be used to upload and confirm activation of a software license key. The example below illustrates the process of uploading the Advanced System Management (ASM) license using the Integrated BMC Web Console. Exactly the same process can be used to upload VROC software license key.

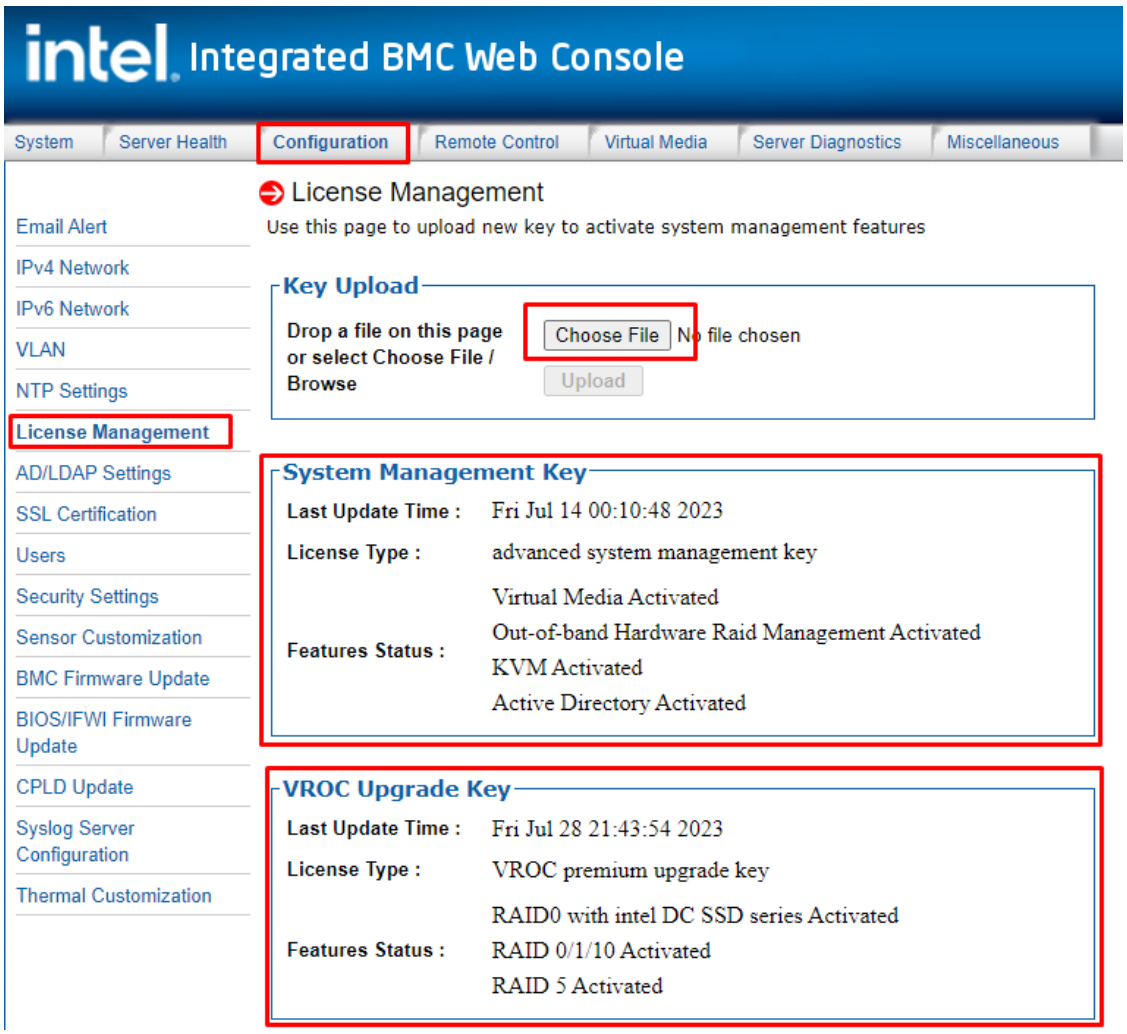


Figure 107. Integrated BMC Web Console License Management Page

1. Login to the Integrated BMC Web Console
2. Navigate to the **Configuration** > **License Management** page
3. Click the **Choose File** button to select the license key file
4. Select the **.v2c** license key file, then click the **Open** button
5. Click the **Upload** button to upload the ASM License Key or VROC Software License Key to the BMC
6. The **System Management Key/ VROC Upgrade Key** sections will show the license type and activated features

7. Navigate back to the **System** Tab. On the **System Information** page, view the **System Summary** information box to confirm the **Advanced Management Key** was successfully **Activated**.

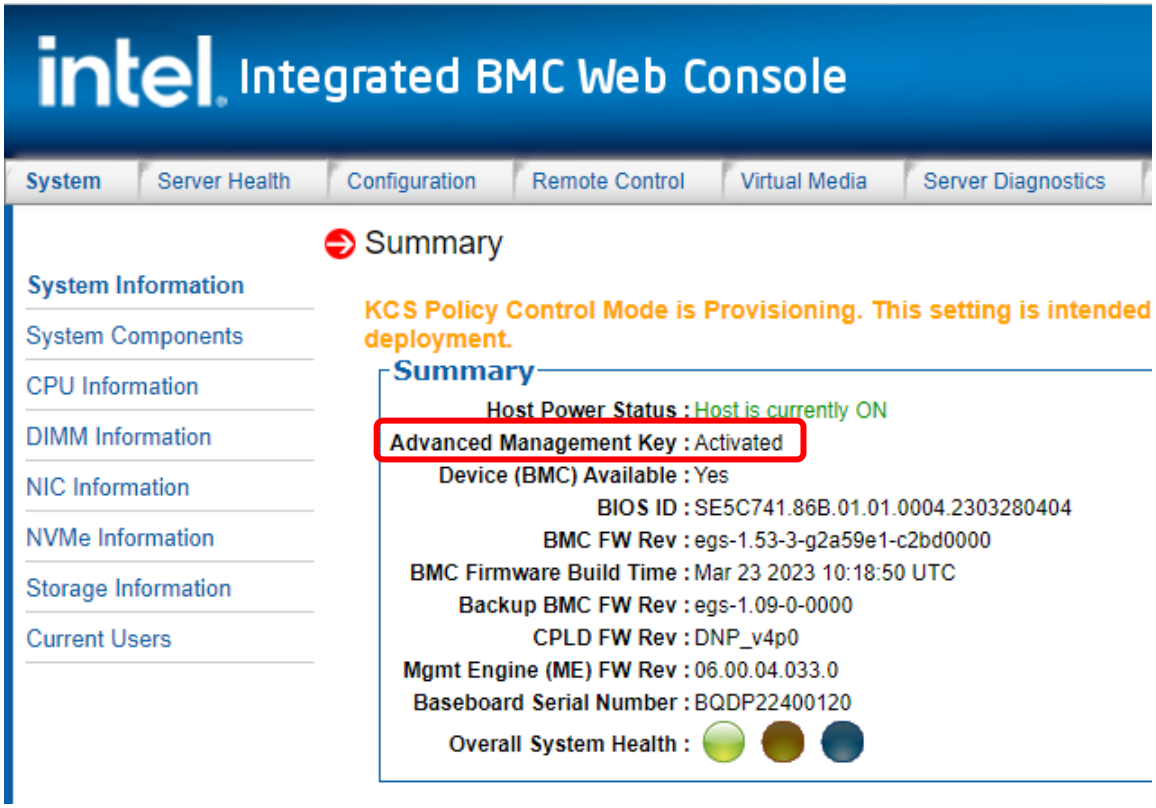


Figure 108. BMC Web Console System Information Page

4.2.3.2 Installation Using the Intel® Server Configuration Utility

The following procedure may be used to upload and confirm activation of the license keys using the syscfg command line utility.

To download the latest utility package, go to https://downloadcenter.intel.com/ and search for the "Intel Server Configuration Utility".

Prerequisites:

- Ensure the user has Administrator or Root privileges for the chosen operating system
- Ensure the KCS Policy Control Mode is set to "**Provisioning**"

Procedure:

1. Install the Intel® Server Configuration Utility on to the target server system. See the Intel® Server Configuration Utility User Guide for installation instructions.
2. Navigate to the sub-directory where the Server Configuration Utility was installed
3. From a command prompt run the following command

   syscfg /lic <key file name>

   where "file name" can be just the name of the license file if copied to the same directory as the syscfg command file, or the complete path of where the license key was copied can be entered along with the file name.

   Example below illustrates the process of uploading the VROC standard software license key. The same process can be used to upload the Advanced Server Management license key.

```
C:\SYSCFG 16.0.9>syscfg.exe /lic VROCSTANKEY.v2c

        Server Configuration Utility Version 16.0.9
        Copyright (c) 2023 Intel Corporation

Key Transfer...
Starting key upload:
Key Upload done

VROC license is uploaded successfully

C:\SYSCFG 16.0.9>
```

Figure 109. Upload VROC Standard License Key Using SYSCFG Utility

4. To confirm activation of the VROC license key, type the following command:
   syscfg /d lic

```
C:\SYSCFG 16.0.9>syscfg.exe /d lic

                        License Status
-------------------------------------------------------------------------------
Type                            |        Status         |       Time Stamp
-------------------------------------------------------------------------------
ASM key                         |       Activated       |       04/16/2023-11:37:04

VROC standard key               |       Activated       |       04/16/2023-11:41:27

VROC premium upgrade key        |       Not Activated   |
-------------------------------------------------------------------------------


C:\SYSCFG 16.0.9>
```

Figure 110. Confirm Activation of VROC Standard License Key Using SYSCFG Utility

4.2.3.3 Installation Using Redfish*

The following steps may be used to upload and confirm activation of a software license key using Redfish*.

Prerequisites:

- If not already present, install the “curl” and “grep” utilities onto the system from which the commands will be run.

Issue the following command to upload a software license key to the BMC

curl -k -u **username**:**password** https://BMC_IP/redfish/v1/UpdateService/SoftwareInventory/LicenseManagement/Actions/Oem/Intel.Oem.Upload -H "Content-Type: multipart/form-data" -F “updateFile=@filepath” -X POST

Notes:

- The command line above is a single command line, with no return character after “password ” and “ https…”
- username:password in the command line above should be replaced with the name of the user and their password

See the example below where:

- username = admin
- password = password

- BMC_IP = 192.168.0.102
- filepath = VROCPREMKEY.v2c

```
C:\SYSCFG 16.0.9>curl -k -u admin:password
https://192.168.0.102/redfish/v1/UpdateService/SoftwareInventory/LicenseManagement/Actions/Oem/Intel.Oem.Upload -H
"Content-Type: multipart/form-data"  -F "file=@VROCPREMKEY.v2c" -X POST
{
  "@odata.id": "/redfish/v1/TaskService/Tasks/2",
  "@odata.type": "#Task.v1_4_3.Task",
  "Id": "2",
  "TaskState": "Running",
  "TaskStatus": "OK"
}
C:\SYSCFG 16.0.9>
```

Figure 111. Redfish Command to Upload the VROC Premium Software License Key

Issue the following command to verify the activation status of the license keys.

curl -k -u **username**:**password** https://**BMC_IP**/redfish/v1/UpdateService/SoftwareInventory/LicenseManagement#Oem/LicenseInventory/Licenses -H "content-type: application/json" -X GET | grep -A1 LicenseStatus

```
C:\SYSCFG 16.0.9>curl -k -u admin:password
https://192.168.0.102/redfish/v1/UpdateService/SoftwareInventory/LicenseManagement#Oem/LicenseInventory/Licenses -H
"content-type: application/json" -X GET | grep -A1 LicenseStatus
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  3306  100  3306    0     0   6480      0 --:--:-- --:--:-- --:--:--  6507
          "LicenseStatus": "ACTIVATED",
          "LicenseType": "advanced system management key",
--
          "LicenseStatus": "ACTIVATED",
          "LicenseType": "VROC premium upgrade key",
```

Figure 112. Redfish Command to verify the VROC Premium Software License Key Activation

5. System Packaging Assembly Instructions

The original Intel packaging is designed to provide protection to a fully configured system and tested to meet ISTA (International Safe Transit Association) Test Procedure 3A (2018). The packaging is designed to be reuseable.

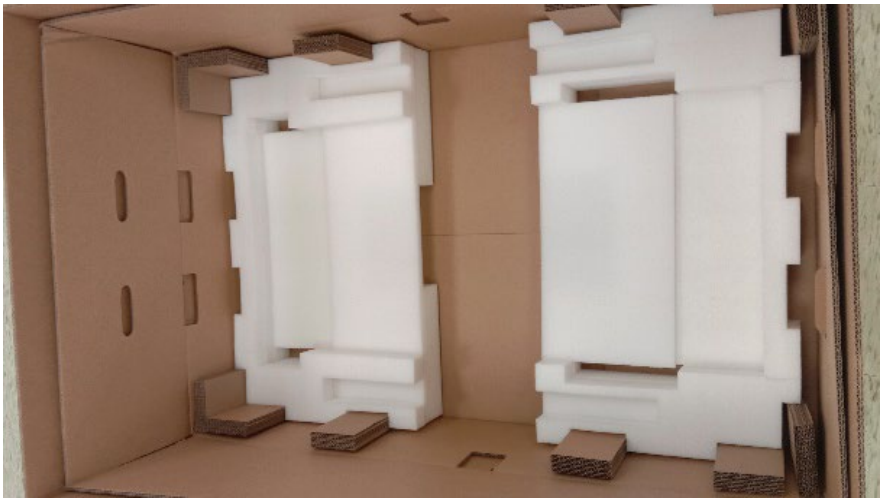
The original packaging includes two layers of boxes (an inner box and an outer shipping box) and inner packaging components. The boxes and packaging components are designed to function together as a protective packaging system.

When reused, all the original packaging materials must be used, including both boxes and each inner packaging component. In addition, all inner packaging components must be reinstalled in the proper location to ensure adequate protection of the system for subsequent shipment.

Note: The design of the inner packaging components does not prevent improper placement within the packaging assembly. Only one correct packaging assembly allows the package to meet the ISTA (International Safe Transit Association) Test Procedure 3A (2018) limits.

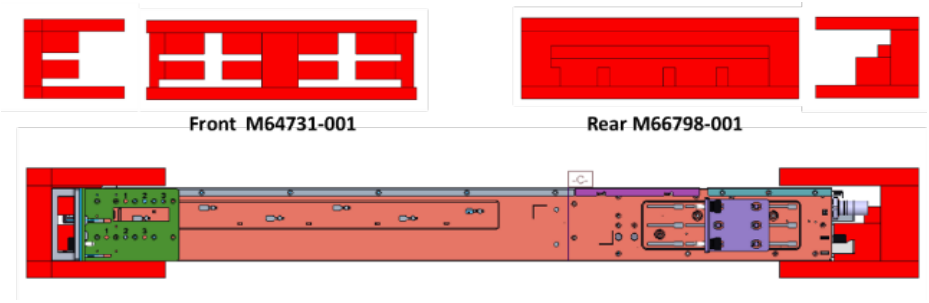
Failure to follow the specified packaging assembly instructions may result in damage to the system during shipment.

1. Put front cushion (M99013-001) on the left side and rear cushion (M99001-001) on the right side of the inner box. Place 12 paper inserts (M98998-001) into the cushion slots as shown.



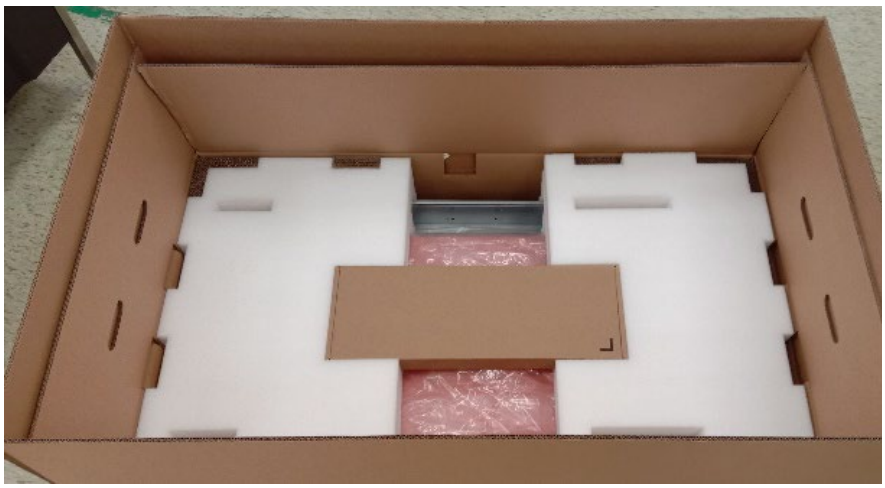
2. Wrap the red EPE foam sheet around the system.

3. Install the front foam element (M64731-001) in the front of the system (left piece in the following illustration) and the rear foam element (M66798-001) in the rear of the system (right piece in the following illustration).



4. Carefully place the system into the shipping bag and tape the bag shut.
5. Carefully lower the system into the inner shipping box as shown on the following picture.

6. Put the front foam element (M99013-001) on the left and the rear foam element (M99001-001) on the right as shown on the following picture. Then place the accessory kit box (H49469-001) in the cut-outs of the top elements.



7. Fold the flaps of the inner box closed, short flaps first, followed by long flaps.

Note: By design, the long flaps do not meet. Do not tape inner box flaps.

8. Fold the flaps of the outer box. Close the short flaps first, followed by the long flaps.

9. Tape the outer box using an H-pattern. Tape across the center first, followed by both ends.

6. System / Module Features Overview

This chapter provides service personnel a reference to identify and locate the features associated with the Intel® Server System D50DNP.

6.1 System Feature Identification

All systems in the Intel® Server D50DNP Family feature front-loading modules. The figures on the following pages provide a quick reference, identifying the key features of all supported system configurations.

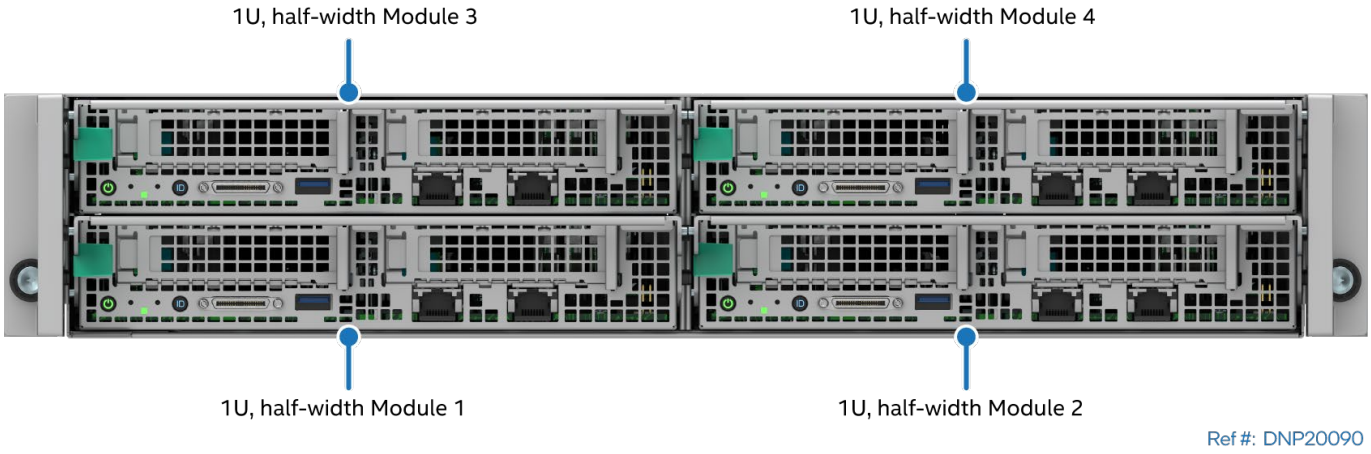


Figure 113. Module Identification for Four Half-Width Module System Configuration

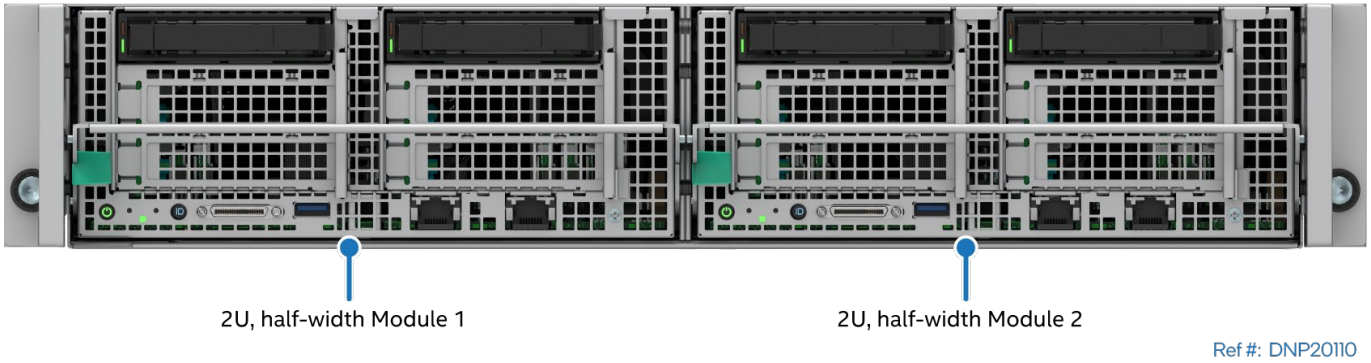


Figure 114. Module Identification for Two Half-Width Module System Configuration

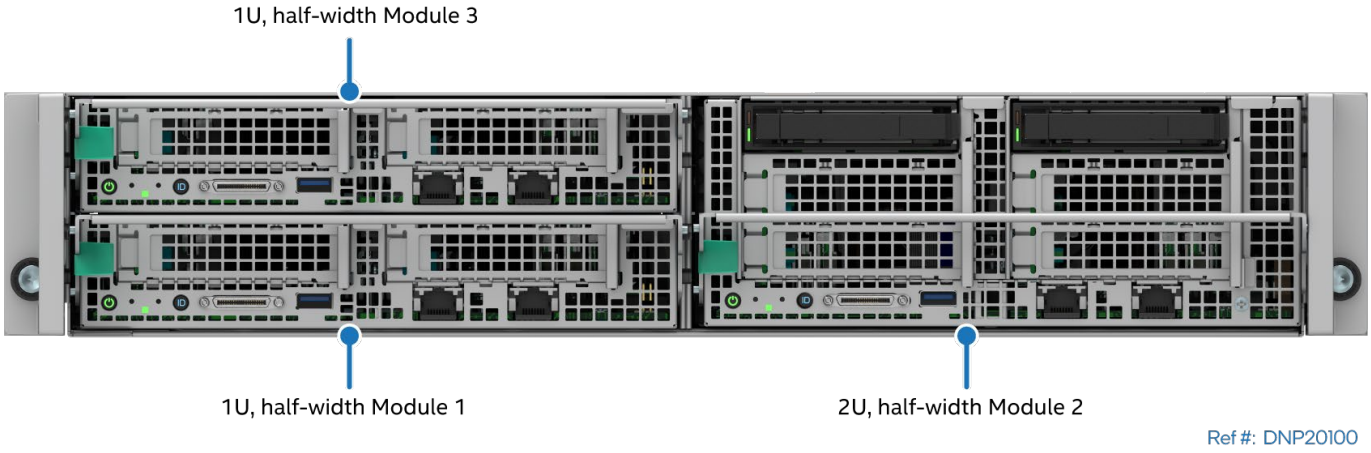
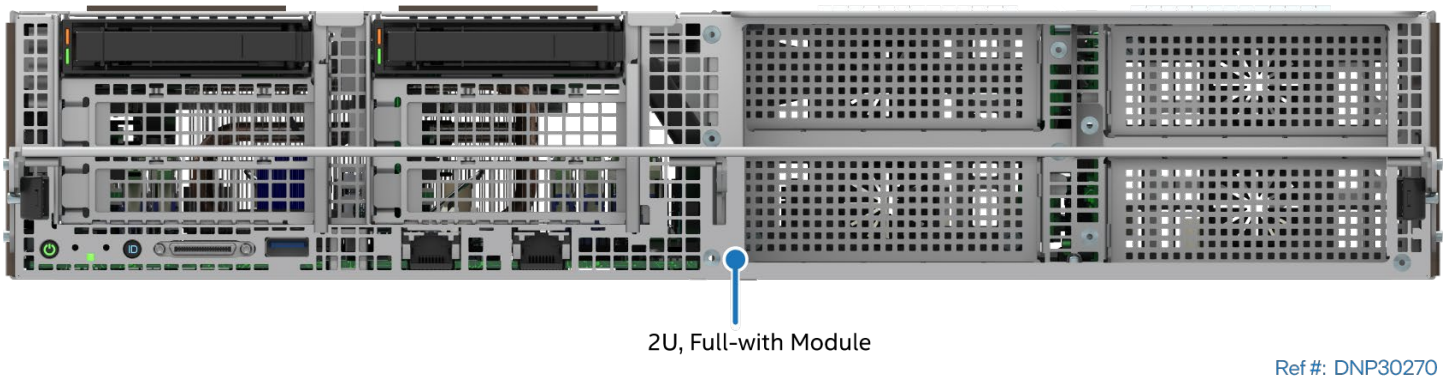
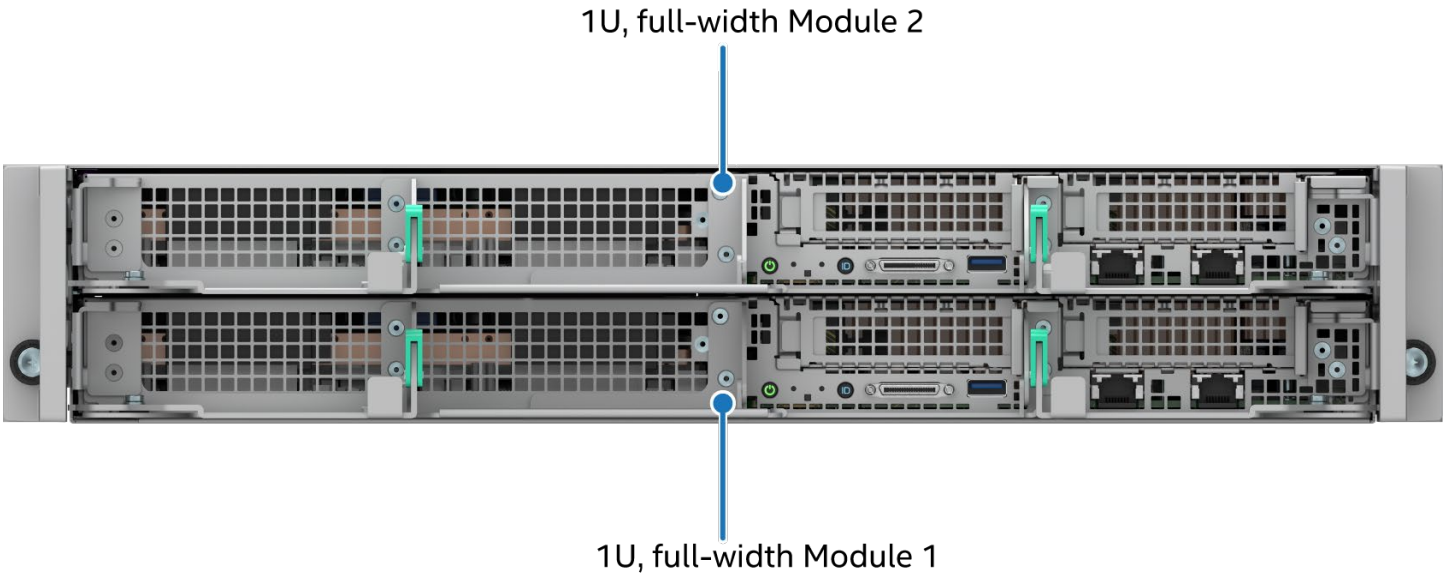


Figure 115. Module Identification for Three Half-Width module System Configuration



Ref #: DNP30270

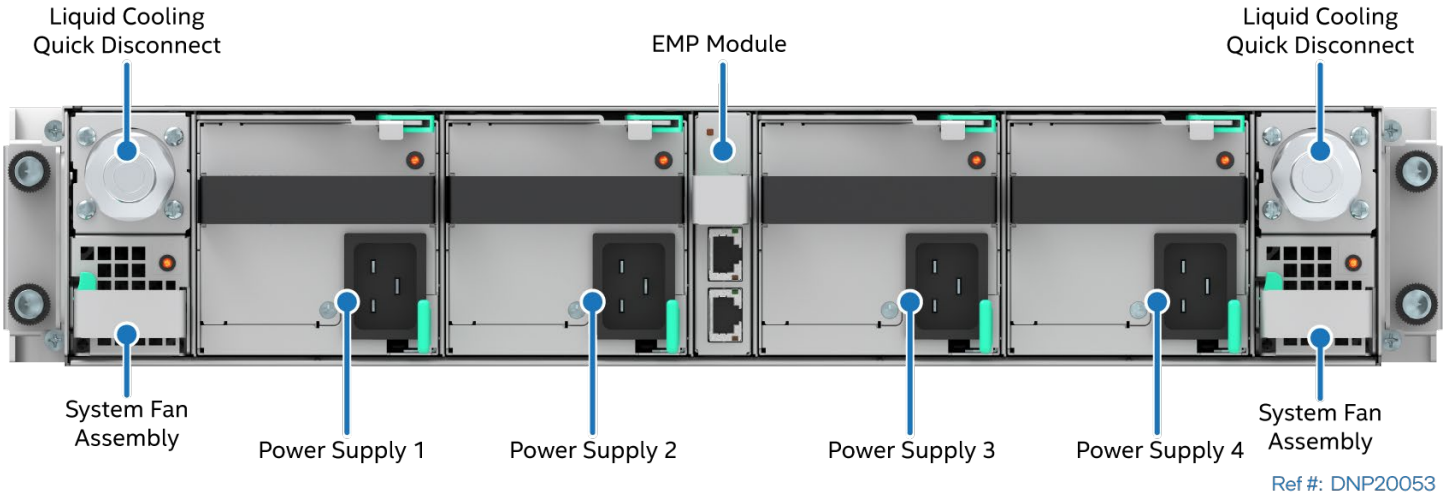
Figure 116. Module Identification for One Full-Width Module System Configuration



Ref #: DNP30571

Figure 117. Module Identification for Two Full-Width Module System Configuration

Systems are offered with either liquid-cooling or air-cooling options. The following figures identify key system features for both cooling options.



Ref #: DNP20053

Figure 118. Liquid-Cooled System Rear View

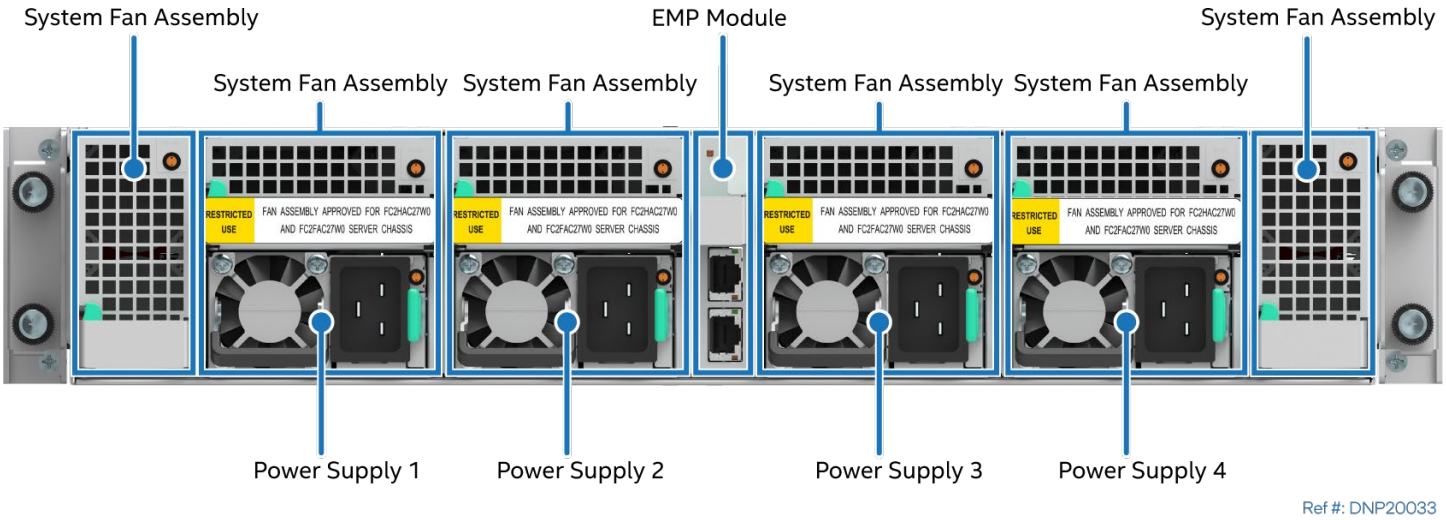


Figure 119. Air-Cooled System Rear View

6.2 Front Panel Feature Identification

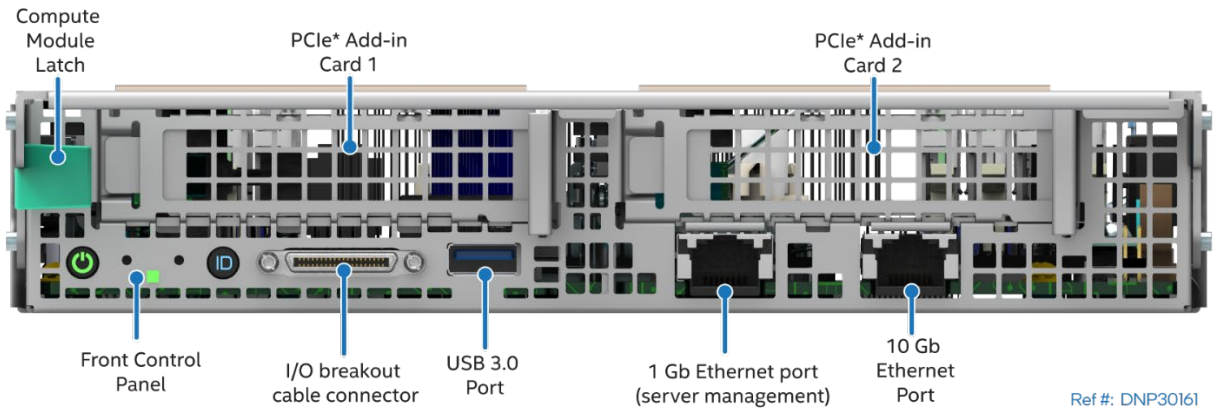


Figure 120. 1U Compute Module Front Panel Feature Identification

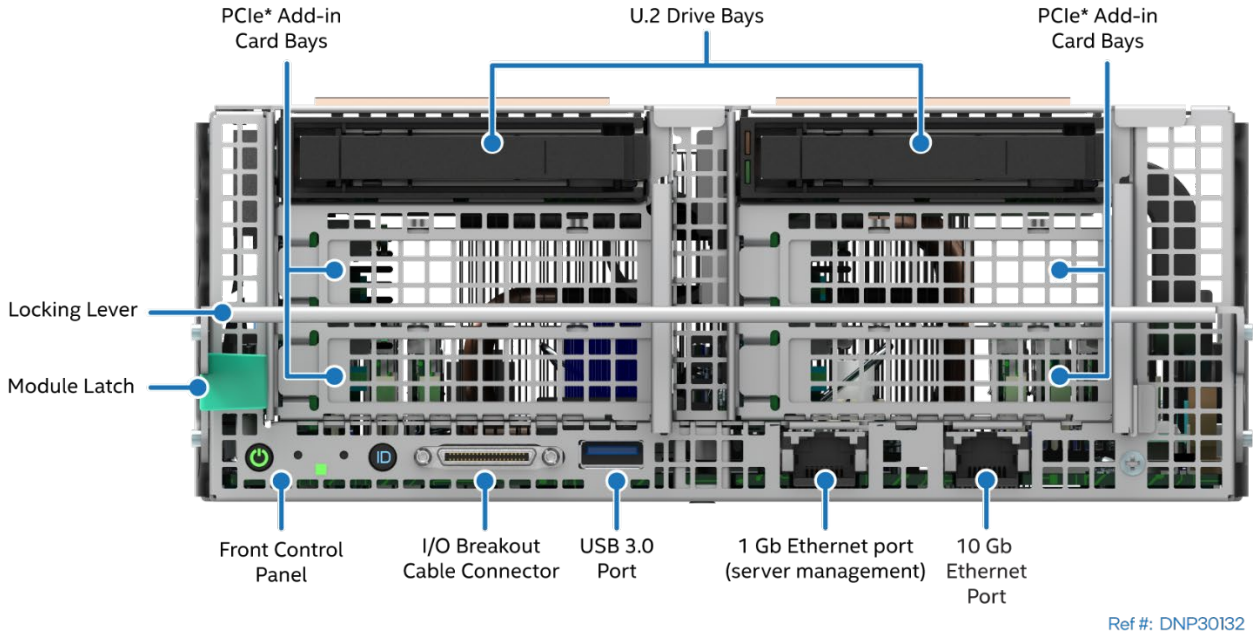


Figure 121. 2U Management Module Front Panel Feature Identification

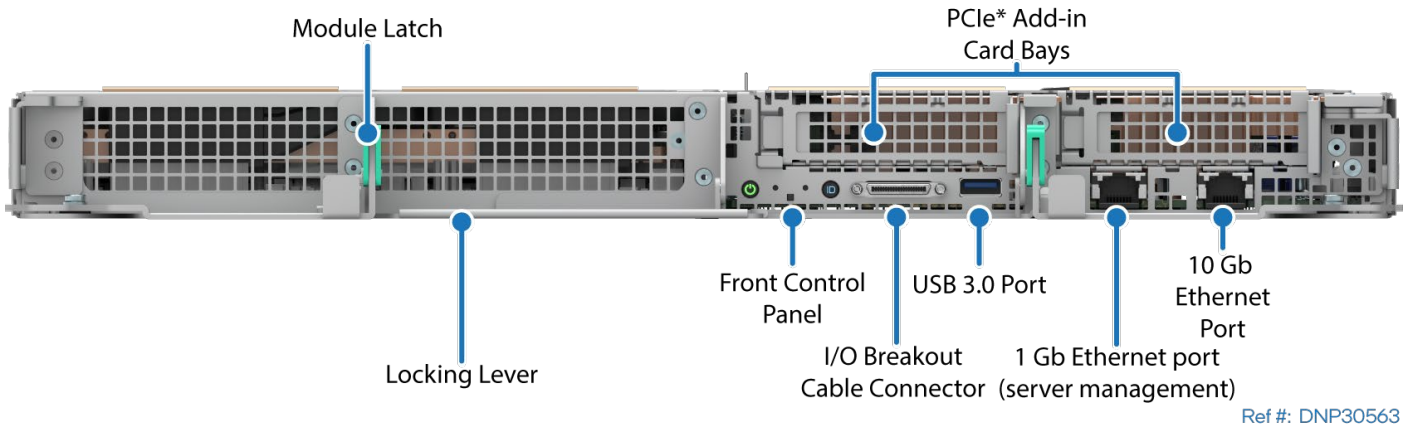


Figure 122. Intel® Data Center GPU Max Series Accelerator Module Feature Identification

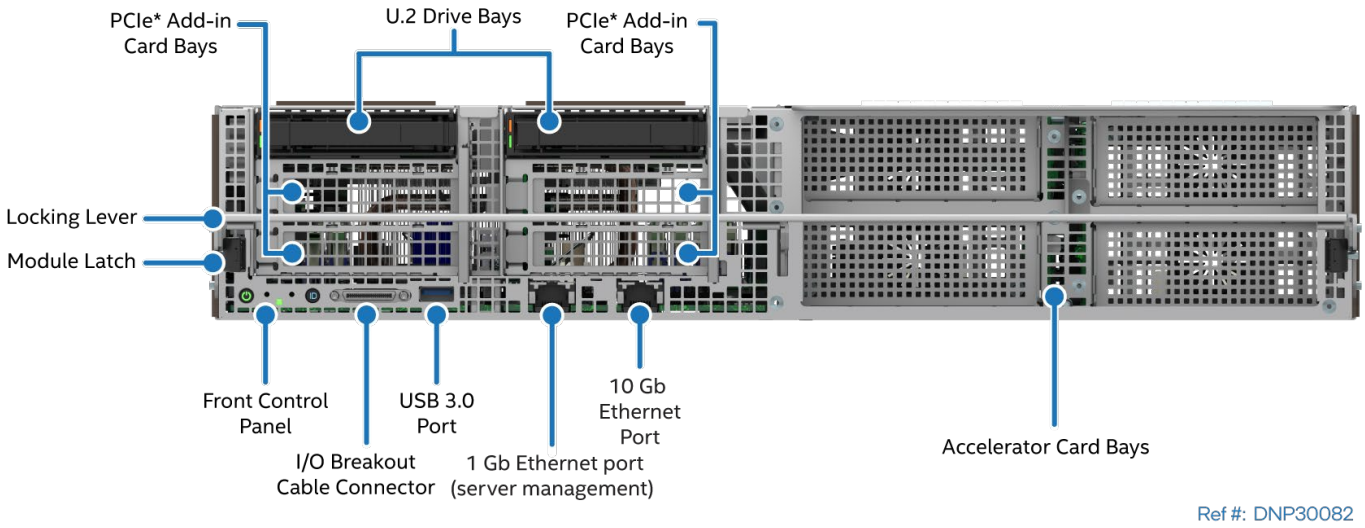


Figure 123. 2U PCIe* Accelerator Module Front Panel Feature Identification

6.3 Front Control Panel and I/O Breakout Cable Feature Identification

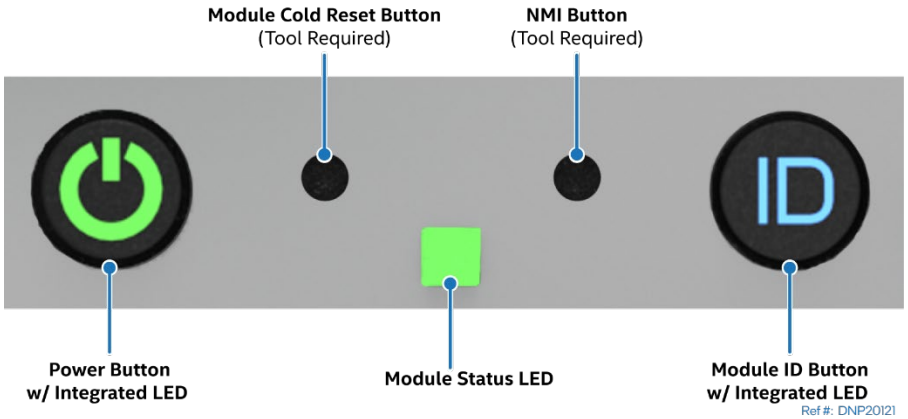


Figure 124. Front Control Panel Features

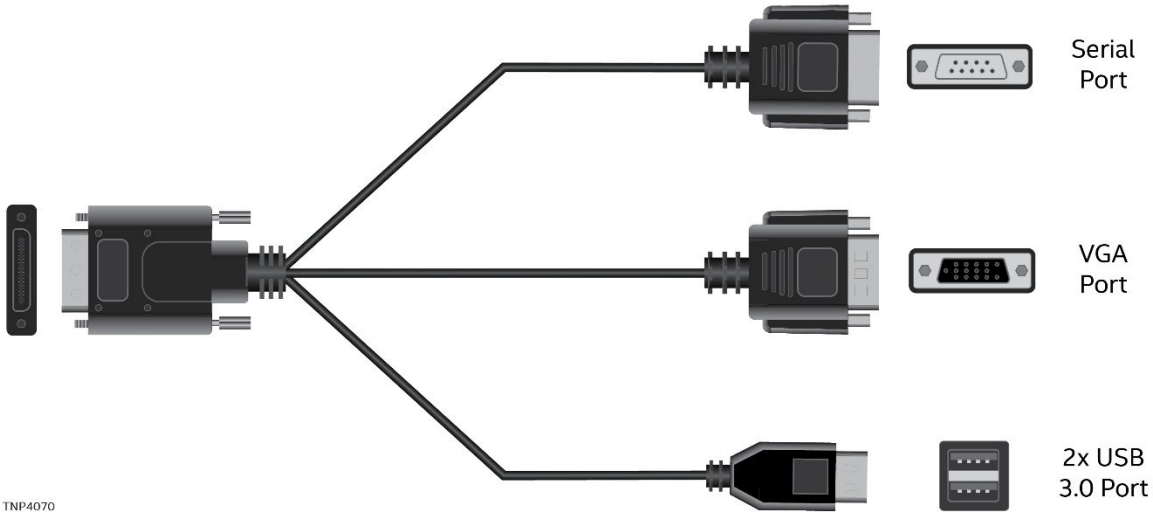


Figure 125. I/O Breakout Cable Connector Identification

6.4 System Component Identification

The following illustrations provide a quick reference to identify system components.

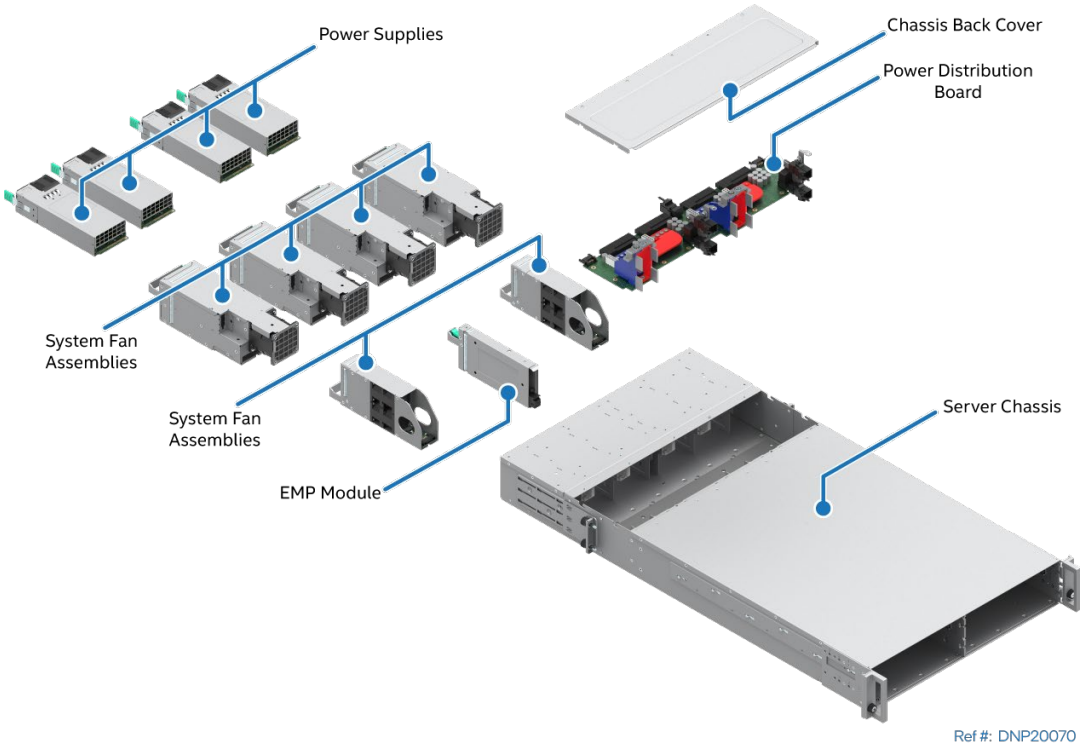


Figure 126. Air-Cooled Server Chassis Component Identification

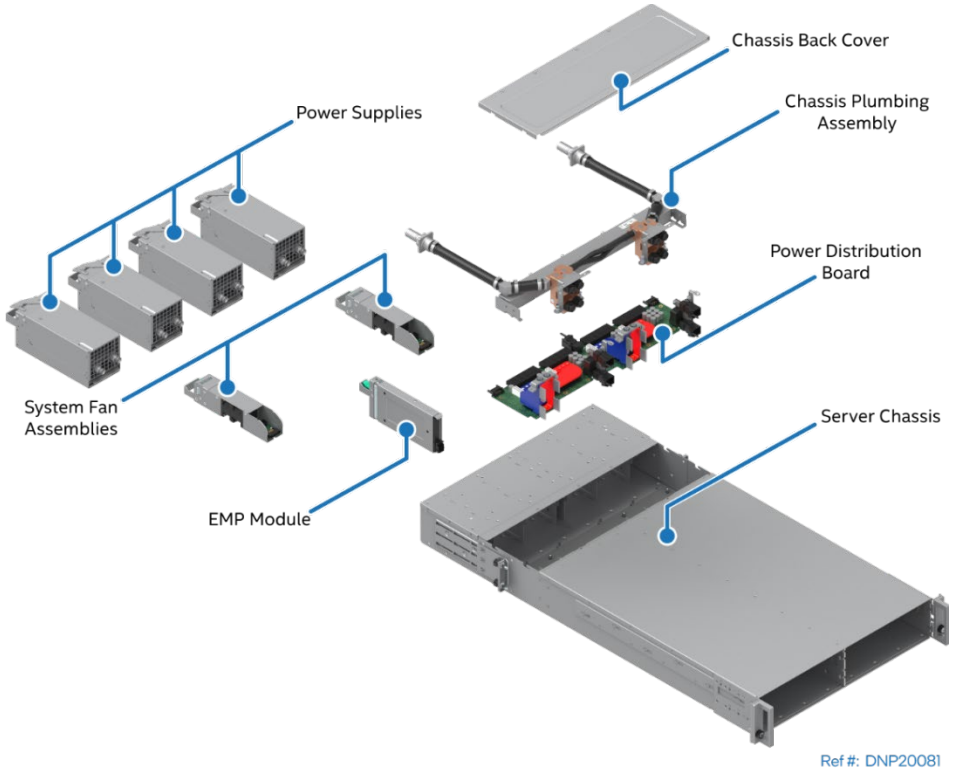


Figure 127. Liquid-Cooled Server Chassis Component Identification

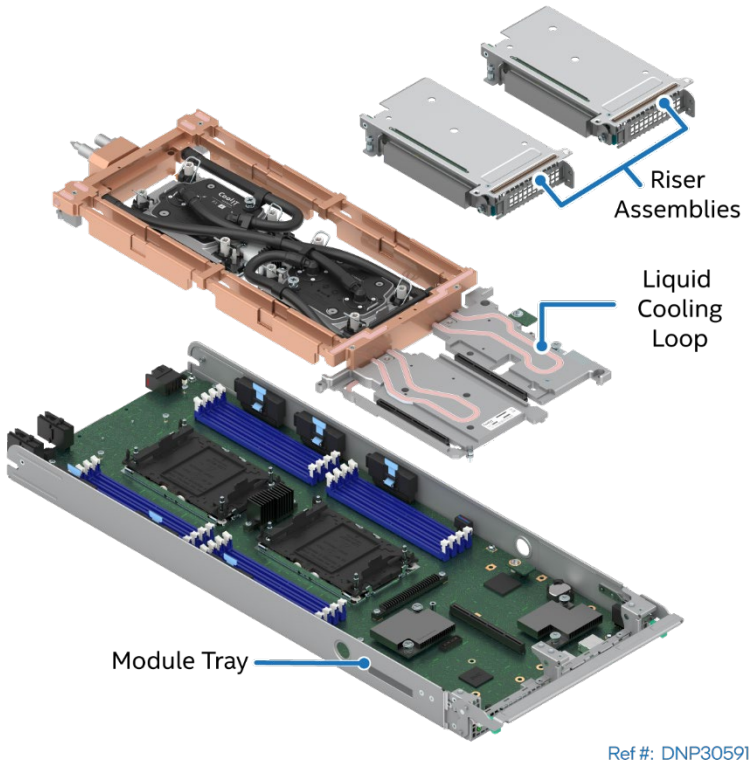


Figure 128. 1U Liquid-Cooled Compute Module Component Identification

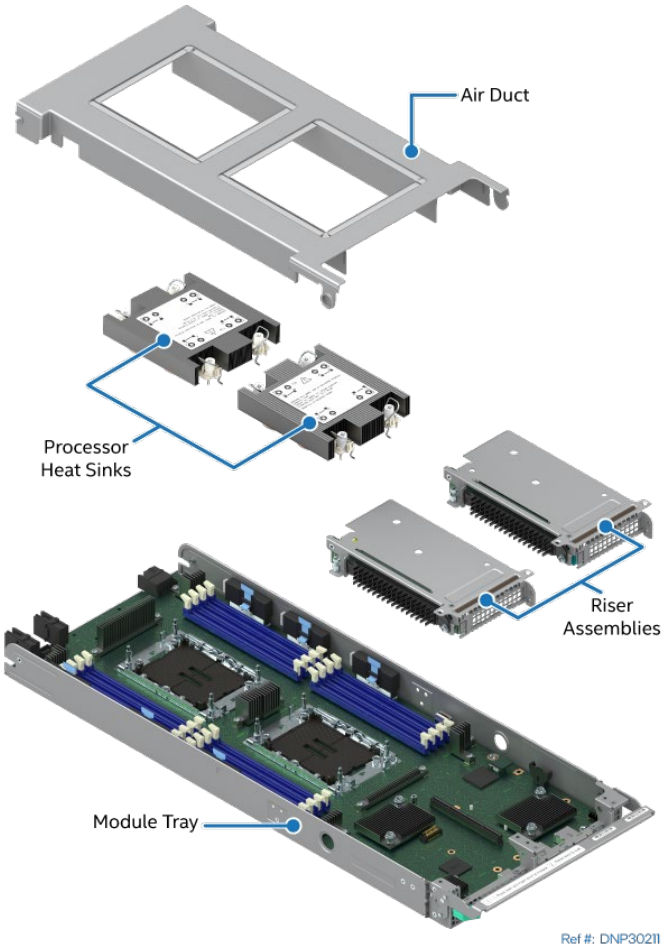


Figure 129. 1U Air-Cooled Compute Module Component Identification

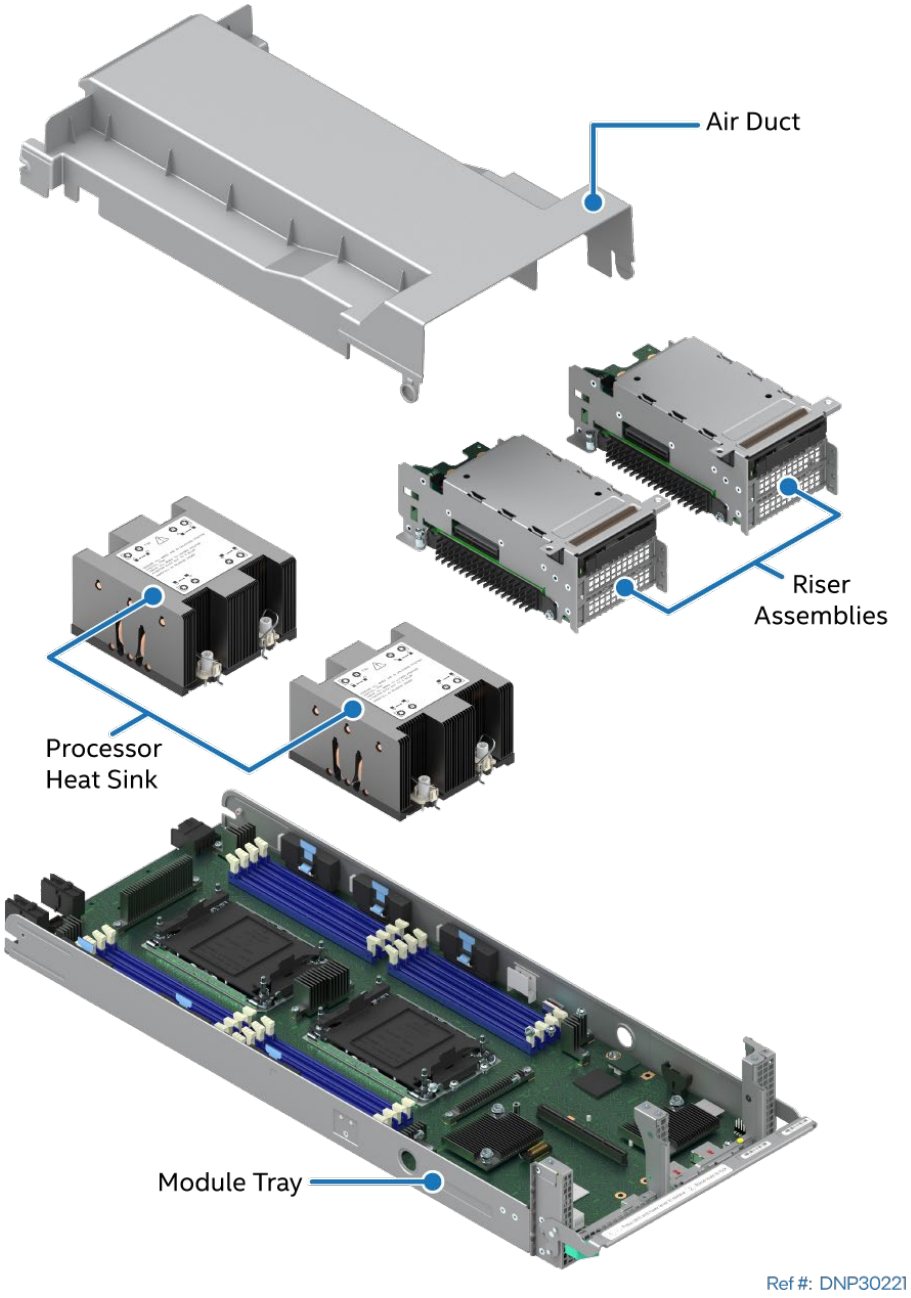


Figure 130. 2U Management Module Component Identification

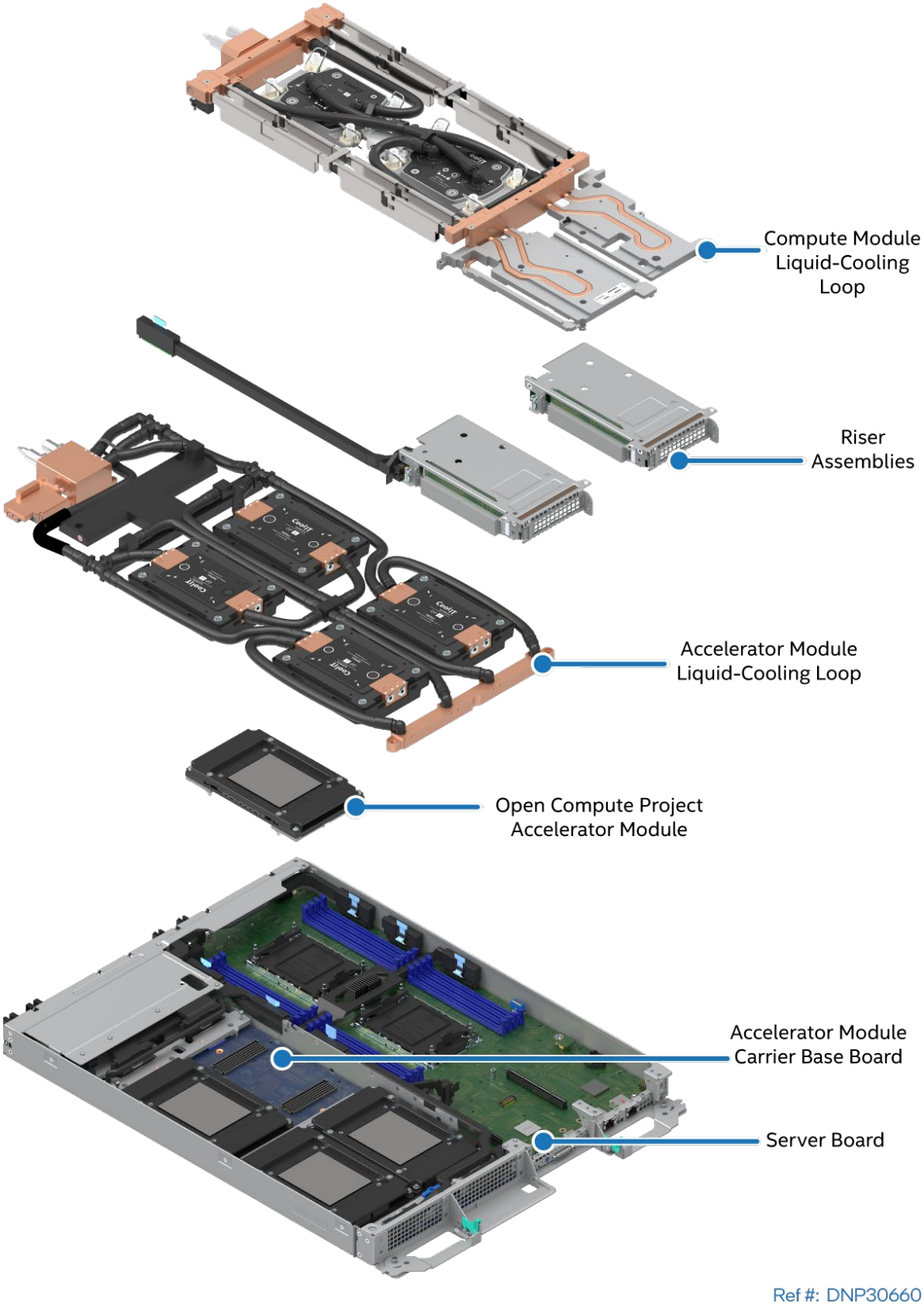


Figure 131. Intel® Data Center GPU Max Series Accelerator Module Component Identification

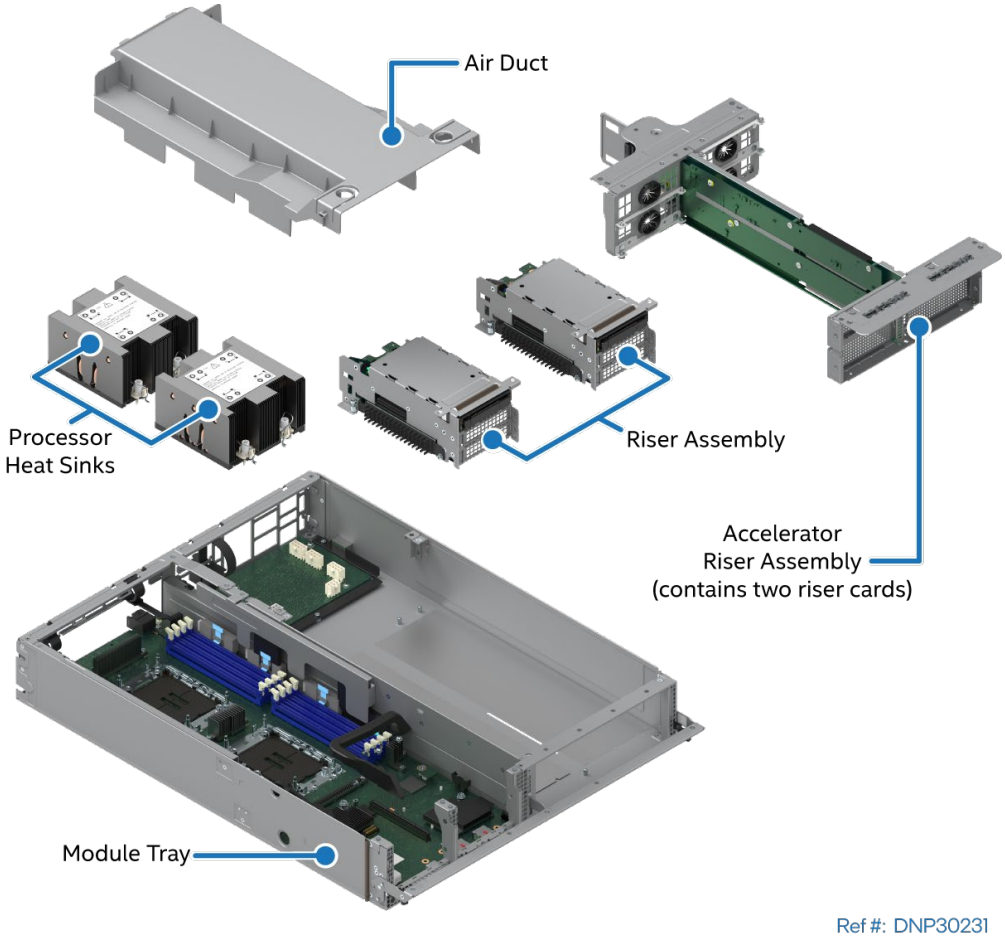


Figure 132. 2U PCIe* Accelerator Module Component Identification

6.5 Server Board Features

The following table provides Intel® Server Board D50DNP1SB specifications and the following figure identifies key features and component locations. Specific module characteristics are provided in the next section

Table 4. Intel® Server Board D50DNP1SB Feature Set

Feature	Description

Processor Support	• Dual Socket- E LGA4677
	• 4th & 5th Gen Intel® Xeon® Scalable processors family models:
	  ○ Intel® Xeon® Platinum 84xx/85xx processor
	  ○ Intel® Xeon® Gold 64xx/65xx processor
	  ○ Intel® Xeon® Gold 54xx/55xx processor
	• Intel® Xeon® CPU Max Series
	• Three Intel® UPI links at 16 GT/s for 4th Gen Intel® Xeon® Scalable processor and at 20 GT/s for 5th Gen Intel® Xeon® Scalable processor models
	Notes:
	• 4th & 5th Gen Intel® Xeon® Scalable Processor SKUs ending with "N" or "U" are not supported. All other processor SKUs are supported.
	• Previous generation Intel® Xeon® Processor and Intel® Xeon® Scalable Processor families are not supported.

Maximum Processor Thermal Design Power (TDP)	• 4th & 5th Gen Intel® Xeon® Scalable processors up to 350 W (server board only) • Intel® Xeon® CPU Max Series processors up to 350 W (server board only). **Note**: The maximum supported processor TDP at the system level may be lower than what the server board can support. Supported power, thermal, and configuration limits of the chosen server chassis need to be considered to determine if the system can support the maximum processor TDP limit of the server board. Refer to the server chassis/system documentation for additional guidance. **Note**: Support for CPU with 385W TDP in liquid-cooled configuration is under validation.

PCH Chipset	• Intel® C741 chipset
	• Features enabled on this server board:
	  ○ SATA III support
	  ○ USB 3.0 support
	  ○ PCIe* 3.0 support

Memory Support	• Up to 16 registered DDR5 SDRAM DIMMs (standard RDIMM, three-dimensional stacking RDIMM (3DS-RDIMM), and 9x4 RDIMM) • All DDR5 RDIMMs must support ECC • Up to 5600 MT/s data transfer rates (5600 MT/s is supported on 5th Gen Intel® Xeon® Scalable processor only) • Up to 2 TB DDR5 memory capacity for both processors (1 TB per processor), for all processor models • DDR5 standard voltage of 1.1 V • The memory speed supported depends on the installed processor. **Note:** DDR5 5600 128GB RDIMM is under validation.
Video Support	• Integrated 2D video controller • 16 MB of DDR4 Memory • One VGA DE-15 external connector through I/O breakout cable
Front Panel Support	

I/O Ports	• One USB 3.0 port
	• One I/O breakout cable, supporting the following:
	  ○ Two USB 3.0 port connectors (dual-stack)
	  ○ One VGA connector
	  ○ One serial port connector compliant with the Advanced Technology pinout specifications.
	
	Note: The I/O breakout cable is available as an accessory option (**AXXCONNTDBG**).

Networking	• One external 10GBASE-T Ethernet port (RJ45) • One external 1000BASE-T Ethernet port (RJ45) dedicated to server management

Feature	Description
LEDs	• Module status • Module ID
Buttons	• Power • Module ID • Module cold reset • Non-maskable interrupt (NMI)
Expansion Options	
Riser Slots	Two riser slots are available to connect PCIe add-in cards and storage devices. See module specific information for riser options.
Supported Onboard Connectors and Headers	
Mini Cool Edge I/O (MCIO*) PCIe* Interface Support	• Two MCIO connectors each with x16 PCIe 5.0 lanes are routed from CPU 0 • Four MCIO connectors each with x16 PCIe 5.0 lanes are routed from CPU 1
Security and Serviceability	
Security	Supported security technologies: • Intel® Platform Firmware Resilience (Intel® PFR) technology 3.0 • Intel® Total Memory Encryption – Multi-Key (Intel® TME-MK) Technology • Intel® Software Guard Extensions (Intel® SGX) Technology • Intel® Converged Boot Guard and Trusted Execution (Intel® CBnT) Technology • Trusted platform module 2.0 (China version) **AXXTPMCHNE8** (accessory option) • Trusted platform module 2.0 (rest of the world) **AXXTPMENC9** (accessory option) • Intel® Trust Domain Extensions (supported on 5th Gen Intel® Xeon® Scalable processor only)
Server Management	• Integrated Baseboard Management Controller (BMC) based on the ASPEED* AST2600 Advanced PCIe Graphics and Remote Management Processor • Compliant with the Intelligent Platform Management Interface (IPMI) 2.0 • Compliant with Redfish* • Supports OpenBMC • Supports Intel® Data Center Manager (Intel® DCM) • Supports Intel® Server Debug and Provisioning Tool (Intel® SDP Tool) • One external 1000BASE-T Ethernet port (RJ45) dedicated to server management • Intel® Light-Guided Diagnostics included with onboard LEDs
Onboard Configuration and Service Jumpers	• BIOS load defaults • BIOS password clear • Intel® Management Engine (Intel® ME) firmware force update • BIOS SVN downgrade • BMC SVN downgrade
BIOS	• Unified Extensible Firmware Interface (UEFI)-based BIOS (legacy boot is not supported)
Module Support	• D50DNP1MHCPAC • D50DNP1MHEVAC • D50DNP1MHCPLC • D50DNP2MHSVAC • D50DNP1MFALLC • D50DNP2MFALAC

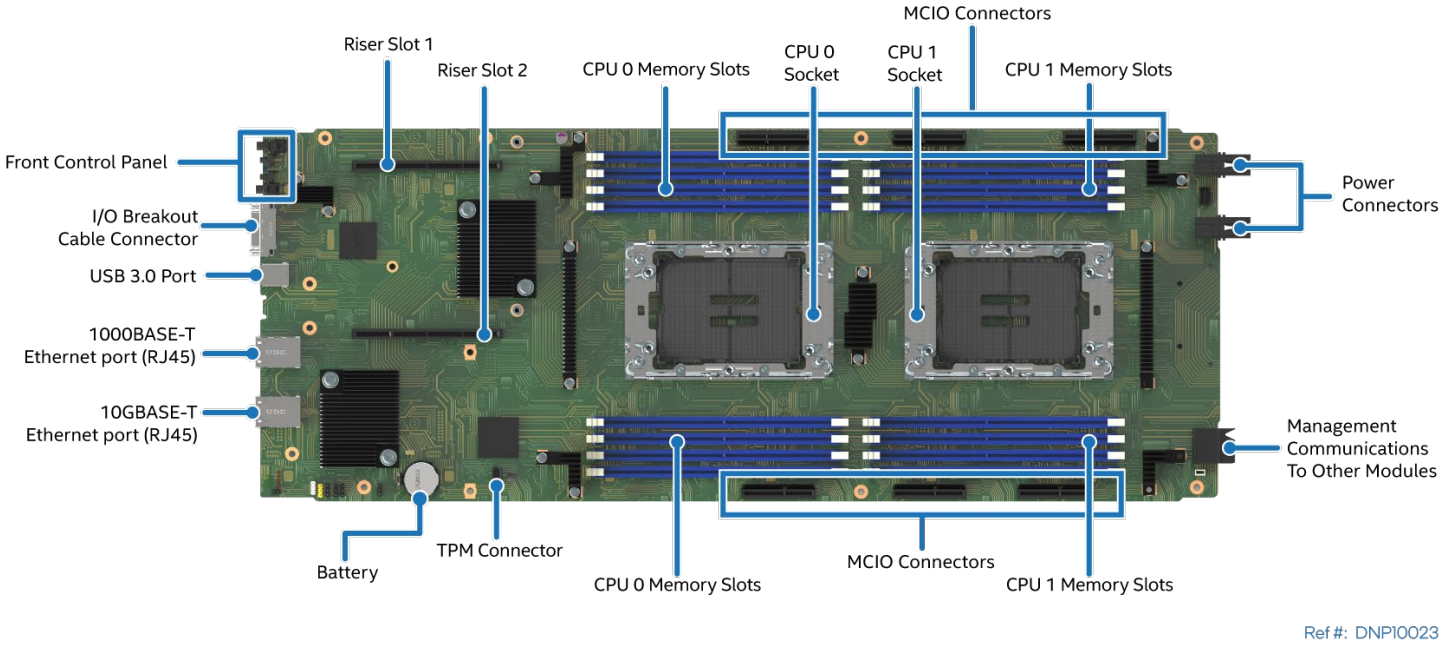


Figure 133. Intel® Server Board D50DNP1SB Feature Identification

The Intel® Server Board D50DNP1SB includes several jumper blocks to configure, protect, or recover specific features of the server board. Refer to Appendix D for details.

To help troubleshooting system hang conditions that occur during a system POST process, the server board includes a bank of eight diagnostic LEDs on the front edge of the board. These diagnostic LEDs are used during POST to represent POST progress codes or halt error codes.

During the system boot process, memory reference code (MRC) and system BIOS execute several memory initialization and platform configuration routines, each of which is assigned a hexadecimal POST progress code number. As each routine is started, the given POST progress code number is displayed on the diagnostic LEDs. If a system hangs during POST execution, the displayed POST progress code can be used to identify the last POST routine that was run before the error occurred. This helps to isolate the possible cause of the hang condition even when video is not available.

See Appendix E and Appendix F for a complete description of how these LEDs are read, and for a list of all supported POST codes.

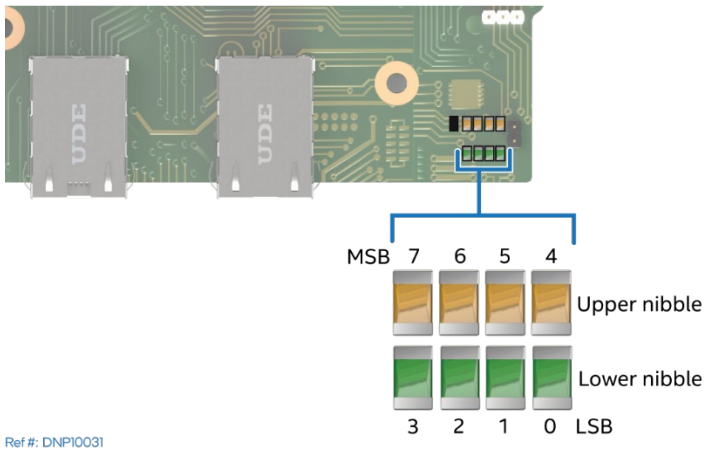


Figure 134. Onboard LED Location

6.6 Module and Chassis Specific Features

Intel® Server Board D50DNP1SB defines many characteristics of the modules. The following tables show module-specific characteristics only. Refer to the board specification table in the previous section for common family features.

Table 5. 1U Compute Module Specific Features

Feature	Description
Maximum Processor Thermal Design Power (TDP)	• Up to 350 W (D50DNP1MHCPLC) • Up to 270 W (D50DNP1MHEVAC) • Up to 250 W (D50DNP1MHCPAC) **Note**: CPU with 385W TDP in liquid-cooled configuration is under validation
Memory Support	• Up to 16 DDR5 SDRAM DIMMs in air-cooled modules • 16 DDR5 SDRAM RDIMMs in liquid-cooled modules
Expansion Options	
Riser Slots	**Riser Slot 1 supports 1U single PCIe* slot riser card assembly (DNP1UMRISER)** • with single PCIe 5.0 x16 slot supporting one low profile PCIe add-in card. • PCIe 5.0 lanes routed from CPU 1 through an MCIO* cable. **Riser Slot 2 supports 1U single PCIe slot riser card assembly (DNP1URISER)** • with single PCIe 5.0 x16 slot supporting one low profile PCIe add-in card. • PCIe 5.0 lanes routed from CPU 0. • D50DNP1MHEVAC does not support a low-profile PCIe add-in card in Riser Slot 2 because the EVAC extension occupies this space. M.2 SSD is still supported in Riser Slot 2. • Each 1U riser can accommodate one SATA or PCIe 3.0 NVMe* 80/110mm M.2 SSD drive. SATA and PCIe lanes are routed from the Intel® C741 chipset • The PCIe slots in 1U riser cards provide up to 25 W of power. • PCIe lanes routed from processor/chipset support Intel® VMD and Intel® VROC 8.0 (NVMe-based RAID). VROC support requires installation of the Intel® VROC license key (accessory option, iPC **VROCSTANKEY**).

Table 6. 2U Management Module Specific Features

Feature	Description
Maximum Processor Thermal Design Power (TDP)	• Up to 350 W
Memory Support	• Up to 16 DDR5 SDRAM RDIMMs
Expansion Options	
Riser Slots	**Riser Slot 1 supports 2U dual PCIe* slot riser card assembly (DNP2UMRISER)** • with two PCIe 5.0 x16 slots, each supporting one low profile PCIe add-in card. • PCIe lanes for the bottom slot are routed from CPU 0. • PCIe lanes for the top slot are routed from the CPU 1 through an MCIO* cable. • PCIe lanes for the U.2 SSD are routed from the CPU 1. **Riser Slot 2 supports 2U dual PCIe slot riser card assembly (DNP2UMRISER)** • with two PCIe 5.0 x16 slots, each supporting one low profile PCIe add-in card. • PCIe lanes for the bottom slot are routed from CPU 0. • PCIe lanes for the top slot are routed from the CPU 1 through an MCIO cable. • PCIe lanes for the U.2 SSD are routed from the CPU 0. • Both 1U and 2U risers can accommodate one SATA or PCIe 3.0 NVMe* 80/110mm M.2 SSD drive. SATA and PCIe lanes are routed from the Intel® C741 chipset • The PCIe slots in 2U riser cards provide up to 25 W of power. • PCIe lanes routed from processor/chipset support Intel® VMD and Intel® VROC 8.0 (NVMe-based RAID). VROC support requires installation of the Intel® VROC license key (accessory option, iPC **VROCSTANKEY**).

Table 7. Intel® Data Center GPU Max Series Accelerator Specific Features

Feature	Description
Maximum Processor Thermal Design Power (TDP)	• Up to 350 W **Note**: CPU with 385W TDP in liquid-cooled configuration is under validation
GPU Support	• Four Intel® Data Center GPU Max Series GPUs in OAM form factor and a maximum TDP of 600W each. All four GPUs must always be present.
Memory Support	• 16 DDR5 RDIMMs
Riser Slots	**Riser Slot 1 supports 1U single PCIe slot riser card assembly (DNP1UMRISER)** • with single PCIe 5.0 x16 slot supporting one low profile PCIe add-in card. • PCIe 5.0 lanes routed from CPU 1 through an MCIO cable. **Riser Slot 2 supports 1U single PCIe slot riser card assembly (DNP1URISER)** • with single PCIe 5.0 x16 slot supporting one low profile PCIe add-in card. • PCIe 5.0 lanes routed from CPU 0. • Each 1U riser can accommodate one SATA or PCIe 3.0 NVMe* 80/110mm M.2 SSD drive. SATA and PCIe lanes are routed from the Intel® C741 chipset • The PCIe slots in 1U riser cards provide up to 25 W of power. • PCIe lanes routed from processor/chipset support Intel® VMD and Intel® VROC 8.0 (NVMe-based RAID). VROC support requires installation of the Intel® VROC license key (accessory option, iPC **VROCSTANKEY**).

Table 8. PCIe* Accelerator Module Specific Features

Feature	Description
Maximum Processor Thermal Design Power (TDP)	• Up to 350 W
Memory Support	• Up to 16 DDR5 SDRAM DIMMs
Expansion Options	
Riser Slots	**Riser Slot 1 supports 2U dual PCIe slot riser card assembly (DNP2UMRISER)** • with two PCIe 5.0 x16 slots, each supporting one low profile PCIe add-in card. • PCIe lanes for the bottom slot are routed from CPU 0. • PCIe lanes for the top slot are routed from the CPU 1 through an MCIO* cable. • PCIe lanes for the U.2 SSD are routed from the CPU 1. **Riser Slot 2 supports 2U dual PCIe slot riser card assembly (DNP2UMRISER)** • with two PCIe 5.0 x16 slots, each supporting one low profile PCIe add-in card. • PCIe lanes for the bottom slot are routed from CPU 0. • PCIe lanes for the top slot are routed from the CPU 1 through an MCIO cable. • PCIe lanes for the U.2 SSD are routed from the CPU 0. • Both risers can accommodate one SATA or PCIe 3.0 NVMe* 80/110mm M.2 SSD drive. SATA and PCIe lanes are routed from the Intel® C741 chipset • The PCIe slots in 2U riser cards provide up to 25 W of power. • PCIe lanes routed from processor/chipset support Intel® VMD and Intel® VROC 8.0 (NVMe-based RAID). VROC support requires installation of the Intel® VROC license key (accessory option, iPC **VROCSTANKEY**).
Accelerator Riser Slots	**Riser Slot 1 supports 2U full-length, dual PCIe slot riser card assembly (DNPACCLRISER1)** • with two full-height, full-length, double-width PCIe 5.0 (x16 mechanical, x16 electrical) slots routed from CPU 0 through MCIO cable **Riser Slot 2 supports 2U full-length, dual PCIe slot riser card assembly (DNPACCLRISER2)** • with two full-height, full-length, double-width PCIe 5.0 (x16 mechanical, x16 electrical) slots routed from CPU 1 through MCIO cable

Table 9. Intel® Server Chassis / Intel® Server System D50DNP Feature Set

Feature	Description			
	Chassis FC2HLC30W0	**Chassis FC2FLC30W0**	**Chassis FC2HAC27W0**	**Chassis FC2FAC27W0**
Chassis Definition	FC2000 half-width configuration, liquid cooled	FC2000 full-width configuration, liquid cooled	FC2000 half-width configuration, air cooled	FC2000 full-width configuration, air cooled
Chassis Type	2U, rack-mount, multi-module			2U rack-mount, single module
Chassis Dimensions	865 x 442 x 86.8 mm			
Packaging Dimensions	1192 x 758 x 317 mm (L x W x H)			
Supported Intel® D50DNP Modules	Up to four 1U half-width compute modules (liquid cooled)	Up to two 1U Intel® Data Center GPU Max Series Accelerator full-width modules (liquid cooled)	• Up to four 1U half-width modules (air cooled) • One 2U half-width module and two 1U half-width modules (air cooled) • Up to two 2U half-width modules (air cooled)	• One PCIe accelerator module 2U full-width (air cooled)

Cooling	**Liquid-cooled configurations:**
	• Liquid-cooling loop (per module)
	• Liquid-cooling plumbing connections on the back of the chassis
	• Two 40 x 40 x 40 mm fans
			Air-cooled configurations:
			• Eight dual-rotor hot-swap system fans with support for fan redundancy
			  ○ Four 60 x 60 x 56 mm fans
			  ○ **Important Note:** Only install 60-mm system fans that are designed for the Intel® Server Chassis D50DNP (**FCXX60MMACFAN**). Do not install 60-mm system fans from previous product generations.
			  ○ Four 40 x 40 x 40 mm fans
			• One 40-mm fan per installed power supply unit (PSU)	

Power	Supports four 3000 W AC liquid-cooled power supplies with power redundancy (dependent on system configuration). A minimum of two power supplies are required for any configuration. PSUs are sold separately.		Supports four 2700 W AC air-cooled power supplies with power redundancy (dependent on system configuration). A minimum of two power supplies are required for any configuration. PSUs are sold separately.	
Rack Mount Kit (FCXXRAILKIT)	• Tool-less installation • Fixed position **Note:** Rack mount kit is included with the chassis.			
Serviceability	Modular chassis features for simplified serviceability: • Fully independent Intel® D50DNP Modules • Hot-swap power supplies • Hot-swap system fans • Hot-swap U.2 solid state drive (SSD) storage (2U Intel® D50DNP Modules)			
Operating Temperature	10–35°C ambient temperature			
Server Management	Optional Ethernet Management Port (EMP) that allows to aggregate management ports on each module and daisy-chain chassis to minimize number of cables.			

7. FRU Replacement

This chapter provides instructions for replacement of system components considered to be field replaceable units (FRU). The Intel® Server System D50DNP features a modular design. This design allows replacement of modules, system fans, power supply (in redundant power supply configuration only), and Ethernet Management Port module (EMP module) without having to power off the entire system.

System components that do require the full system be powered off and AC power cords disconnected from the system include the following:

Air-cooled configurations:

- Power distribution board

Liquid-cooled configurations:

- Power distribution board
- Chassis plumbing assembly

When service is necessary for any of the individual modules within the server system, it is necessary to power off the selected module before removing it from the server chassis.

Before You Begin

Before integration of any system components, review all the safety and ESD precautions in the Safety Warnings section at the beginning of this service guide.

System Reference

In the following procedures, all references to left, right, front, back, top, and bottom assume that the reader is facing the front of the chassis and the front of a module.

Instruction Format

Each procedure described in this chapter follows an illustration first format. This format gives the reader the option to follow a quicker path to component replacement by first seeing an illustration of the intended procedure. If necessary, the reader can then follow the step-by-step instructions that accompany each procedure.

7.1 Module Removal / Installation

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)

7.1.1 Module Removal

1. Power down the module using the power button on the front panel of the module to be removed.

1U module shown

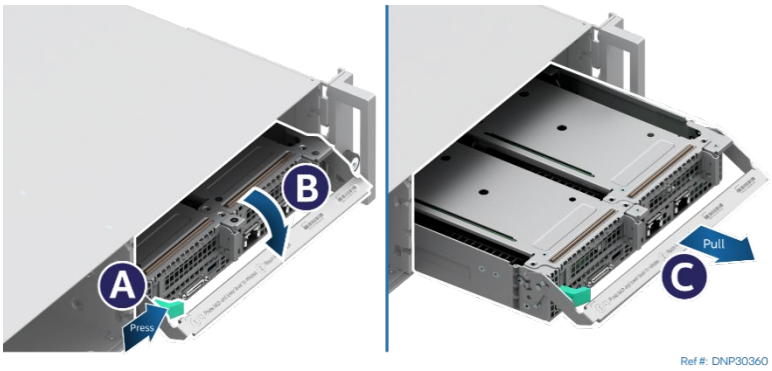


Figure 135. Removing a Module

2. Press the green latch inward (see Letter A) and lower the lever in front of the module (see Letter B).
3. Pull out the module from the chassis (see Letter C).

Note: To keep the system operating within its thermal limits, module bays must be populated with either a module or module blank when any of the installed modules are operational.

7.1.2 Module Installation

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)

1U module shown

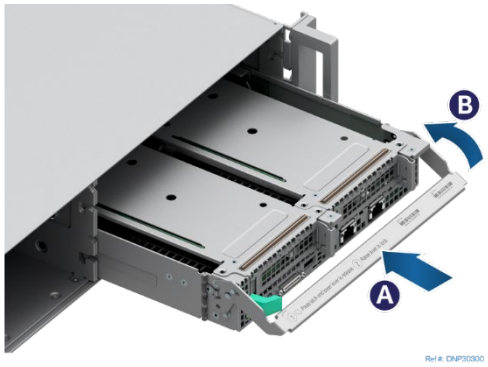


Figure 136. Installing a Module

1. Ensure that the lever in front of the module is lowered. If not, press the green latch inward and lower the lever (see Letter A).
2. Align the module to its corresponding bay and slide it into the chassis until the key pins in the lever are inside the chassis inner wall key holes.
3. Raise the lever to secure the module (see Letter B).

7.2 Air Duct Removal / Installation

To maintain system thermals, the air duct must always be in place when the system is operational. Removal of the air duct is necessary when installing or replacing any system component within the module.

Air duct construction and attachment method are similar for all half-width air-cooled modules D50DNP1MHCPAC, D50DNP1MHEVAC, and D50DNP2MHSVAC. The D50DNP2MFALAC module is slightly different and the changes in construction are reflected in the corresponding illustrations.

Note: Air ducts are not used with liquid-cooled modules.

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)

7.2.1 Air Duct Removal (Half Width Modules)

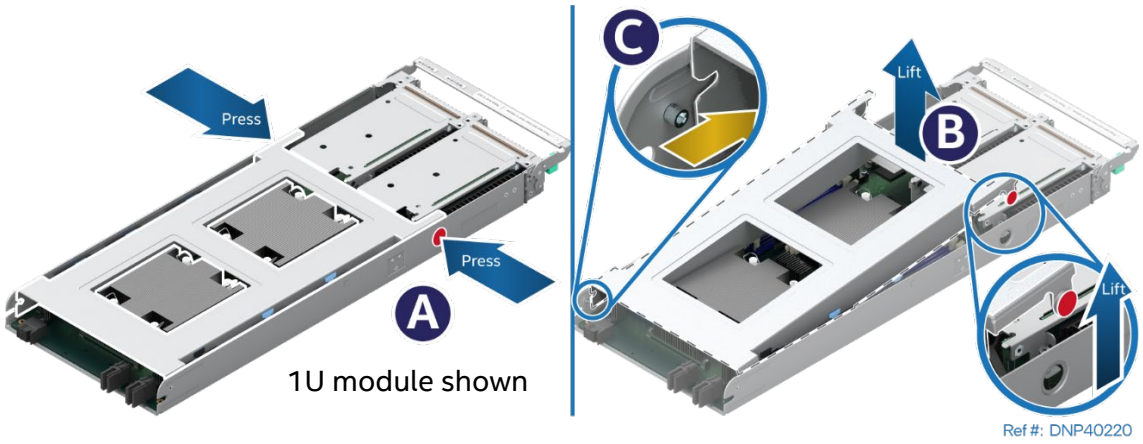


Figure 137. Removing the Air Duct

1. Press the latches on both sides of the module inwards (see Letter A).
2. Carefully lift the front edge of the air duct (see Letter B).
3. Pull the air duct away from the module (see Letter C).

7.2.2 Air Duct Installation (Half Width Modules)

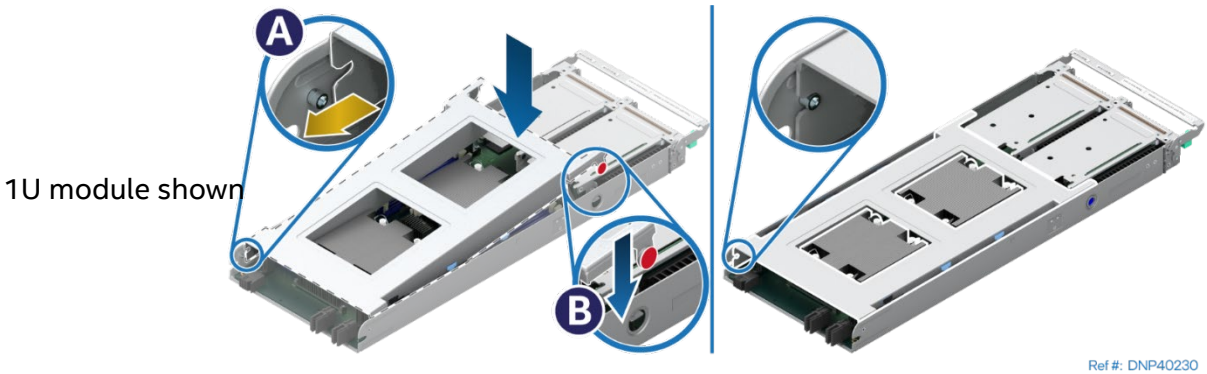


Figure 138. Installing the Air Duct

1. Align and attach the hinge slots on the back end of the air duct with the hinge posts on both sides of the module (see Letter A).
2. Lower the air duct until both latches snap into place (see Letter B).

7.2.3 Air Duct Removal (D50DNP2MFALAC Module)

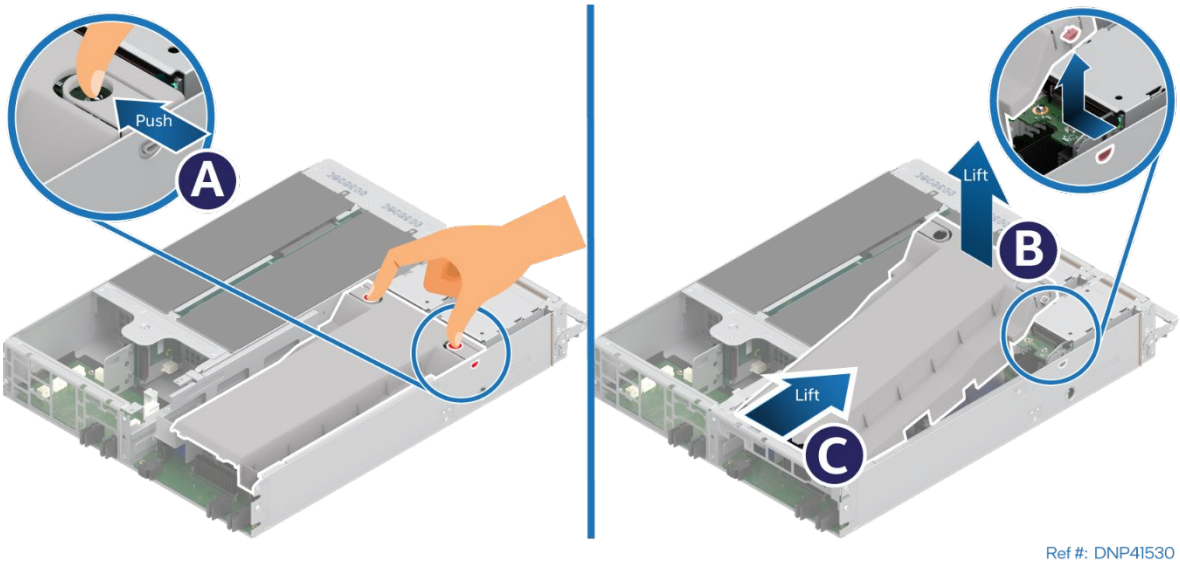


Figure 139. Removing the Air Duct (D50DNP2MFALAC Module)

1. Push the loops on both sides of the air duct inwards to release the latches (see Letter A).
2. Carefully lift the front edge of the air duct (see Letter B).
3. Pull the air duct away from the module (see Letter C).

7.2.4 Air Duct Installation (D50DNP2MFALAC Module)

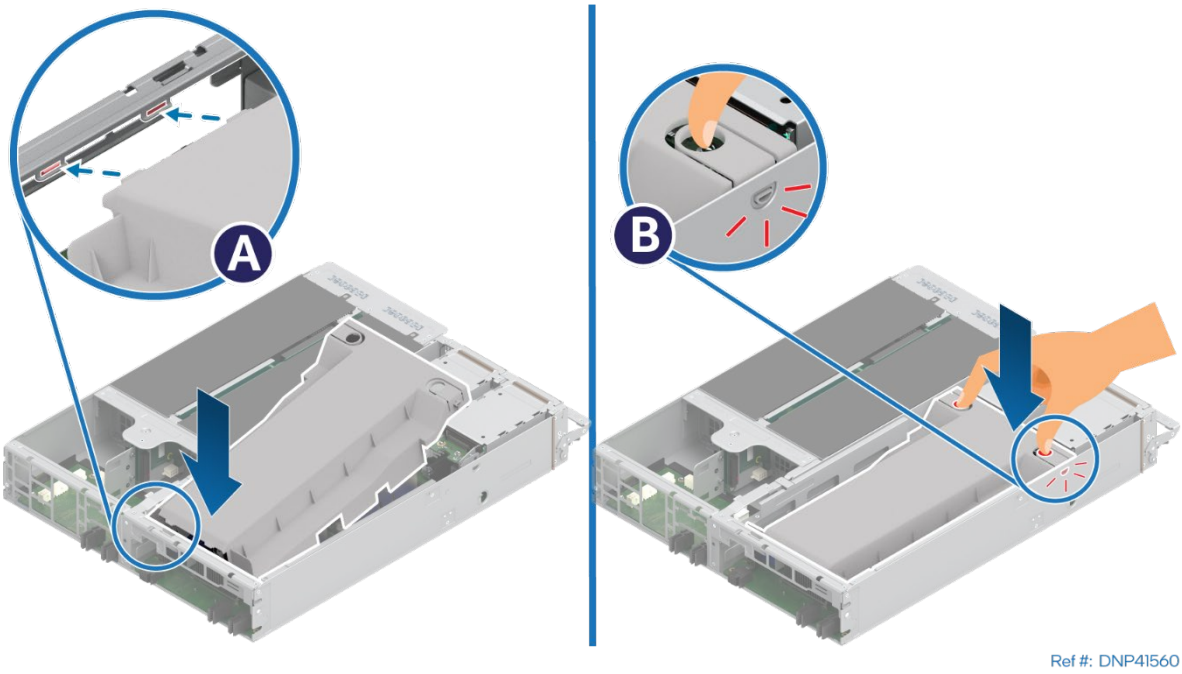


Figure 140. Installing the Air Duct (D50DNP2MFALAC Module)

1. Engage the tabs on the back end of the air duct with the slots at the rear edge of the module (see Letter A).
2. Lower the air duct until both latches snap into place (see Letter B).

7.3 Processor Replacement

7.3.1 Processor Replacement for Standard Air-Cooled Heat Sinks

Components Required for Each Processor

- New 4th or 5th Gen Intel® Xeon® Scalable processor in the shipping tray
- Matching processor carrier clip
- Existing processor heat sink with new thermal interface material (TIM)

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)
- ESD Gloves (recommended)
- Adjustable torque T30 Torx* screwdriver

Note: The installation figures in this section only display the 1U front heat sink and processor carrier clip E1A. However, the processor installation procedure is the same, regardless of the size of the heat sink and type of processor carrier clip.

Caution: Fin edges of the processor heat sink are very sharp. Intel recommends wearing thin ESD protective gloves when handling the PHM during the following procedures.

Caution: Processor heat sinks are easily damaged if handled improperly. See the following figure for proper handling.

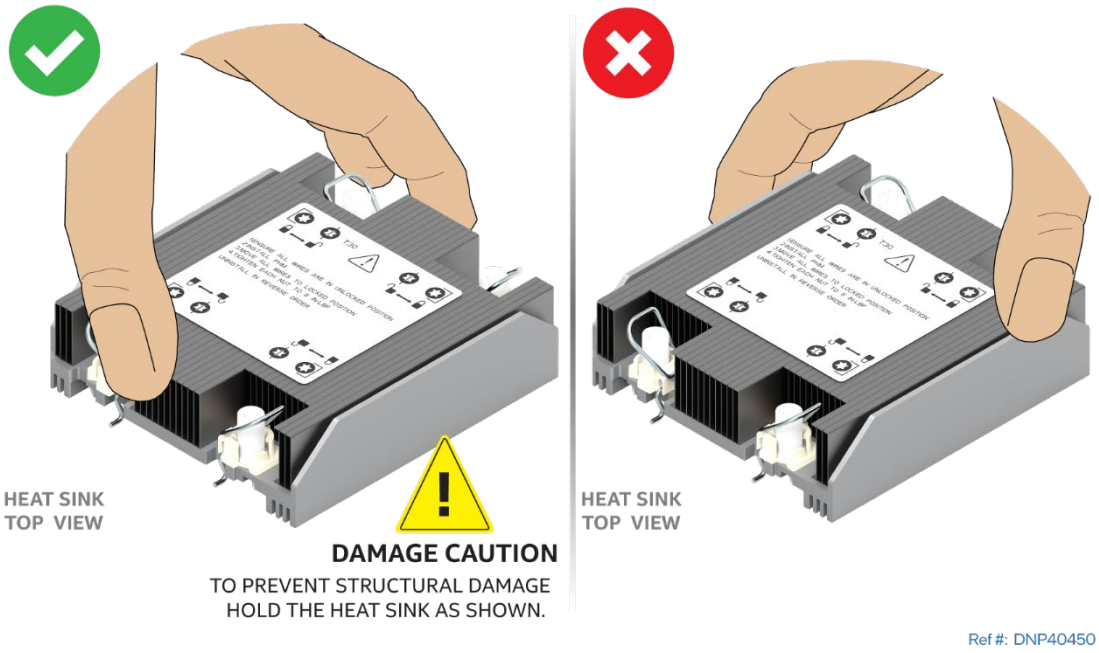


Figure 141. Processor Heat Sink Handling

7.3.1.1 Processor Heat Sink Module (PHM) Removal

1. Identify and locate the processor to be removed.

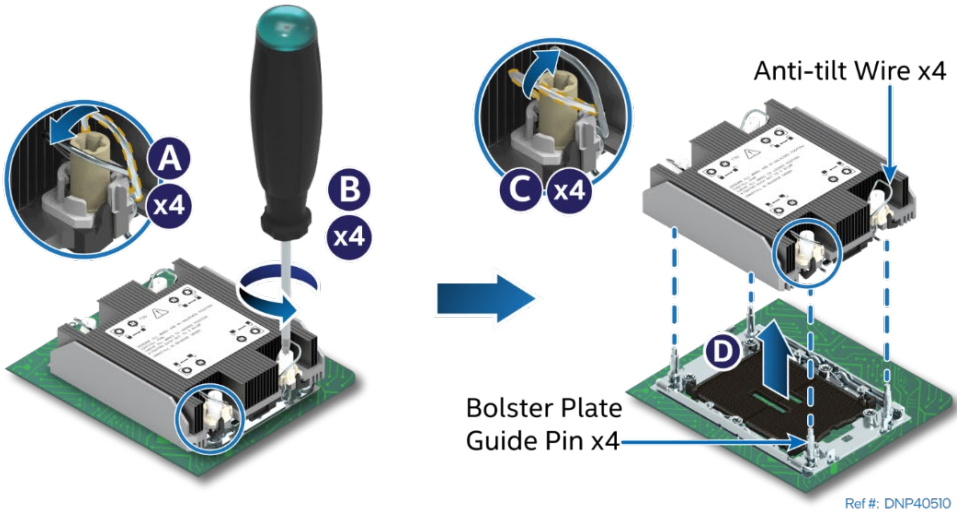


Figure 142. PHM Assembly Removal from Processor Socket

2. Set all four anti-tilt wires on the heat sink to the outward position (see Letter A).
3. Using T30 Torx* screwdriver, fully loosen all four heat sink fasteners in any order (see Letter B). General bolt loosening order, such as diagonal sequence, can be used.
4. Set all four anti-tilt wires on the heat sink to the inward position (see Letter C).
5. Carefully grasp the PHM and lift it straight up and off the server board (see Letter D).
6. With the processor facing up, set the PHM on a flat surface.
7. Visually inspect that the processor socket is free of damage or contamination.

Caution: If debris is observed, blow it away gently with an air blower. Do not use tweezers or any other hard tools to remove the debris

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8. If not replacing the processor, install the original plastic socket cover over the processor socket.

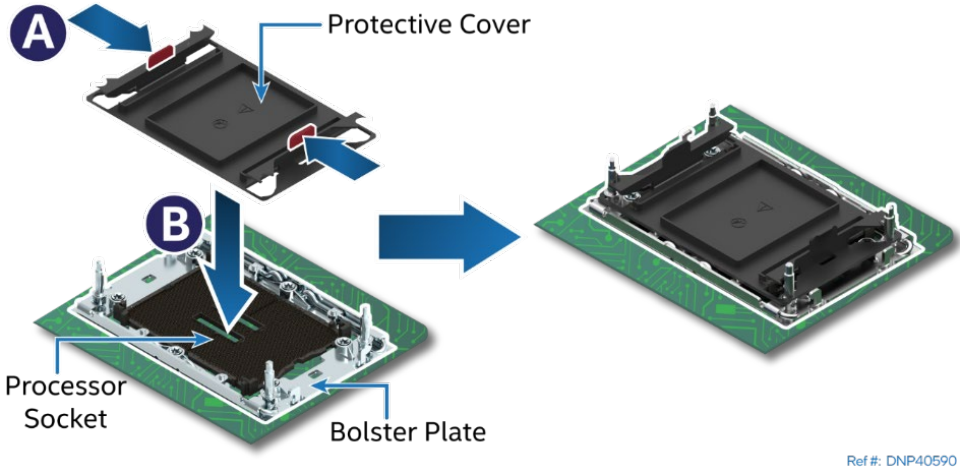


Figure 143. Reinstall the Socket Cover

- Squeeze the finger grips at each end of the cover (see Letter A).
- Carefully lower the cover over the four alignment pins of the bolster plate and onto the processor socket (see Letter B).
- Release finger grips to lock the cover in place.
- Ensure that the socket cover is locked in place.

Caution: Do not press down on the center of the socket cover.

7.3.1.2 PHM Disassembly

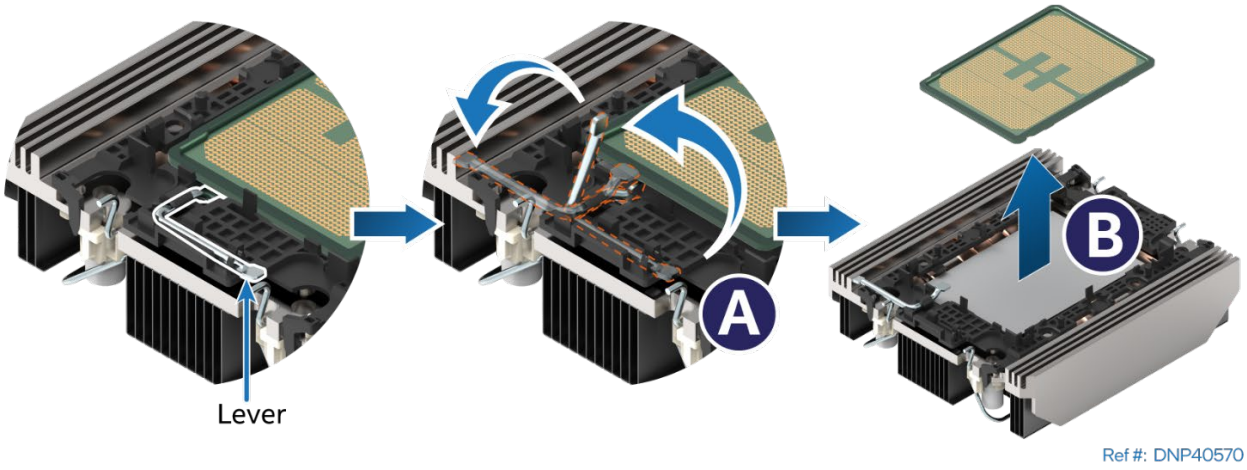


Figure 144. Processor Removal from PHM Assembly

1. While holding down the PHM, rotate the lever (see Letter A) from right to left until the processor lifts free from the processor carrier clip.
2. Holding down the processor carrier clip, carefully lift the processor out of the processor carrier clip (see Letter B).

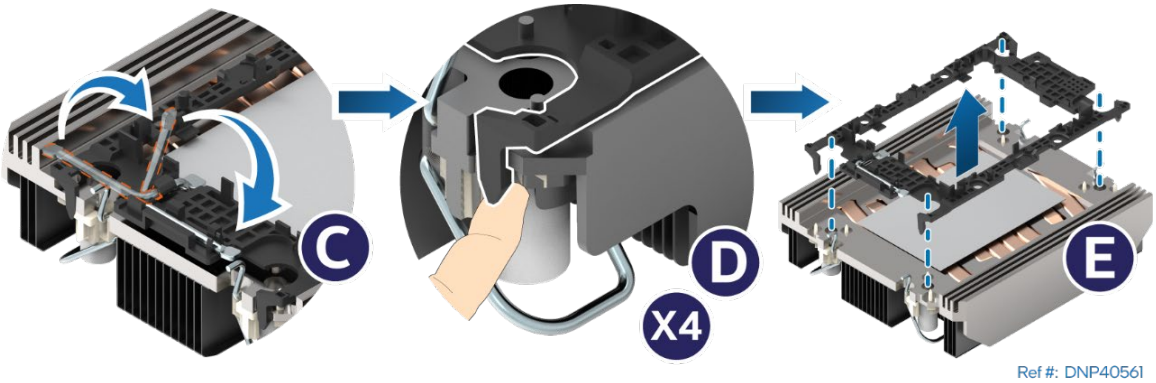


Figure 145. Processor Carrier Clip Removal from PHM Assembly

3. Return the lever to the original position (see Letter C).
4. Detach the processor carrier clip from the heat sink.
   - Unlatch the hook on each corner of the processor carrier clip (see Letter D).
   - Lift the clip from the heat sink (see Letter E).

The processor carrier clip for a Intel® Xeon® CPU Max series processor has slightly different mechanism to separate the processor from the heat sink. Instead of the lever, the clip has a cam mechanism on the long side on the clip. To separate an Intel® Xeon® CPU Max series processor from the heat sink and the processor carrier clip, rotate the cam with a flat head screwdriver in any direction not nore than 60 degrees. After the processor is removed from the carrier clip, return the cam into its original position with the screwdriver slot in the vertical position.

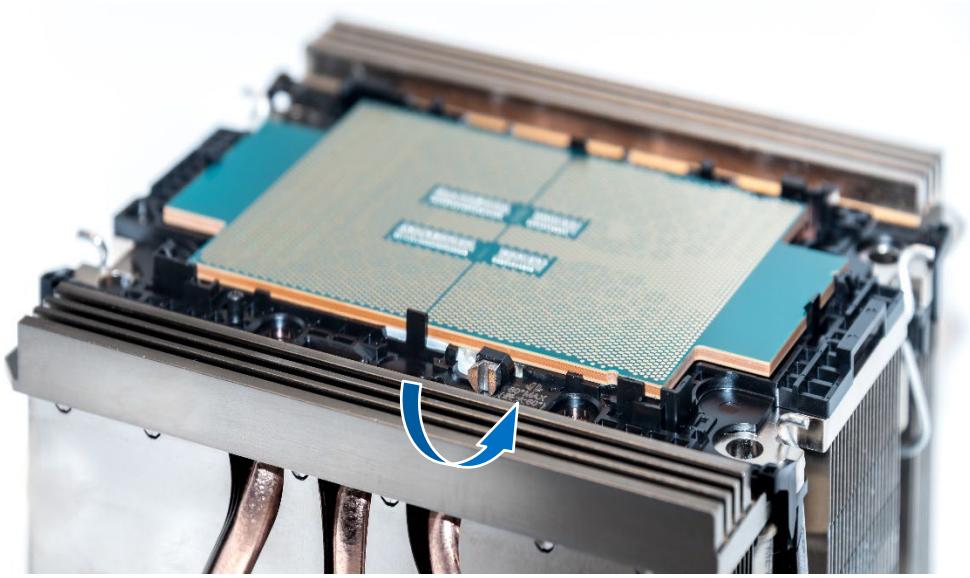


Figure 146. Intel® Xeon® CPU Max series processor removal

7.3.1.3 PHM Reassembly

To properly reassemble the PHM and install it onto the server board, the procedures described in the following sections must be followed in the order specified. These instructions assume that the processor heat sink (new or reuse of existing) has the necessary thermal interface material (TIM) Honeywell PTM7000* already applied to the clean bottom of the heat sink.

Caution: Full ESD precautions should be followed to perform assembly and installation of the PHM to the server board. Wear ESD gloves to prevent electrostatic damage and oxidation or foreign materials on processor package and land pads.

Each component within the PHM assembly includes a Pin 1 indicator. Pin 1 indicator alignment between all components is required throughout the assembly process.

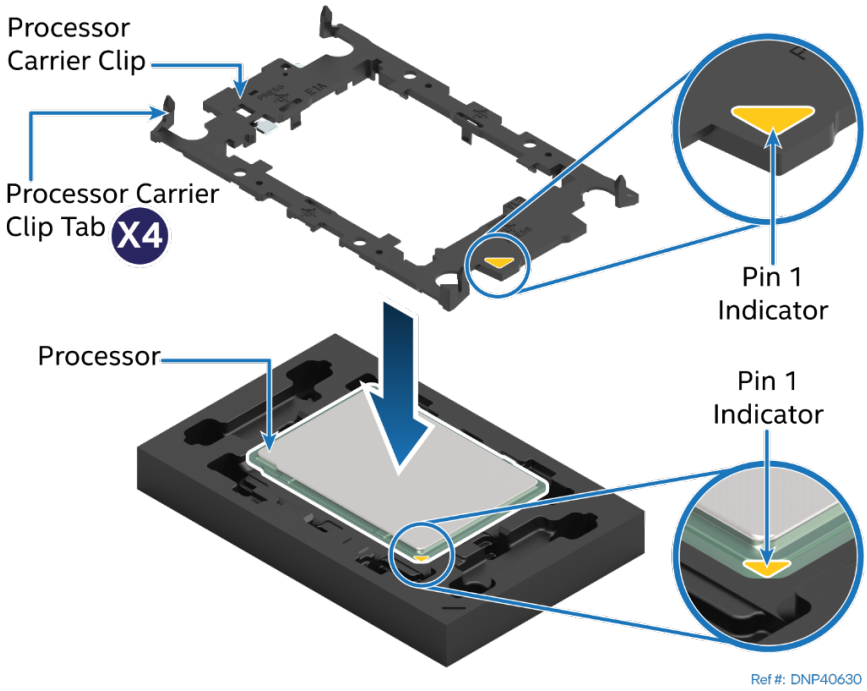


Figure 147. Installing Processor Carrier Clip onto Processor – Part 1

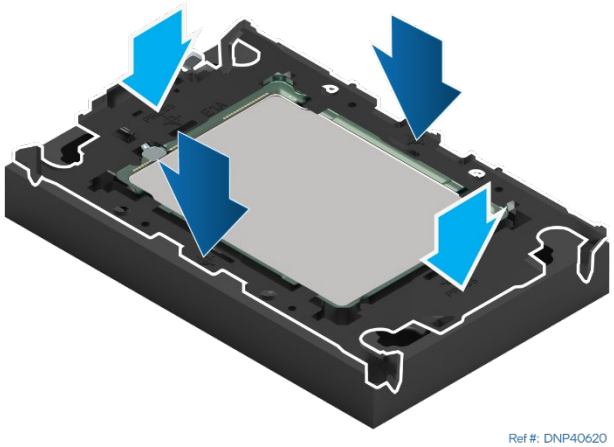


Figure 148. Installing Processor Carrier Clip onto Processor – Part 2

1. Align the Pin 1 indicator on the processor carrier clip with the Pin 1 indicator of the processor.
2. With the processor still in its shipping tray, place the processor carrier clip over the processor.

3. Gently press down simultaneously on two opposite sides of the processor carrier clip until it clicks in place.
4. Repeat step 3 for the other two sides.
5. Locate the processor heat sink. To avoid damage, grasp it by its narrower sides as shown.

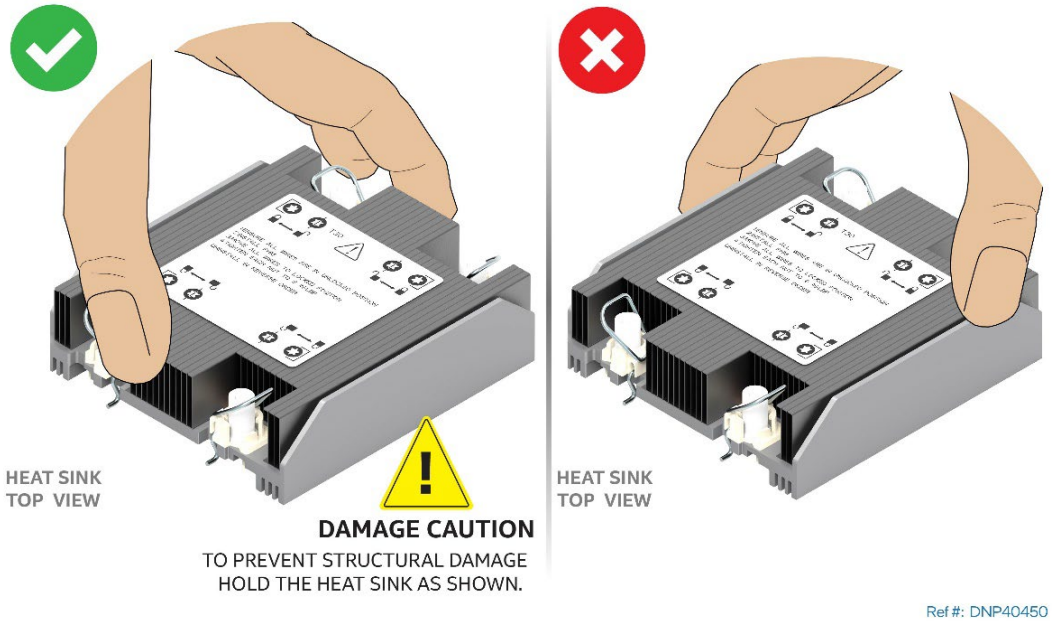


Figure 149. Processor Heat Sink Handling

6. Place the heat sink bottom side up onto a flat surface.

   If reusing an existing heat sink

   - Properly clean off existing thermal interface material from the bottom of the heat sink.
   - Apply new TIM (Honeywell PTM7000*).

   If using a new heat sink, remove the plastic protective film from the Thermal Interface Material (TIM).

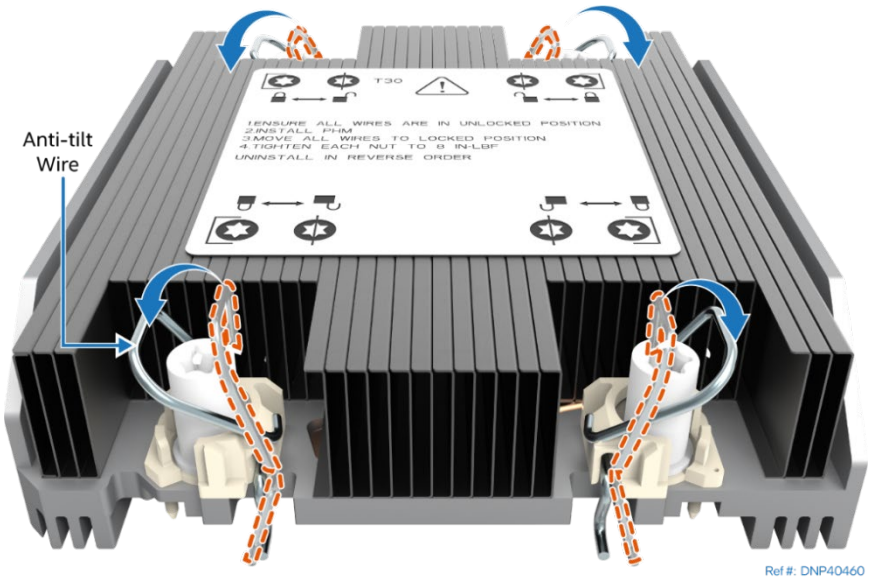


Figure 150. Processor Heat Sink Anti-tilt Wires in the Outward Position

7. Set the anti-tilt wire over each of the four heat sink fasteners to their outward position.

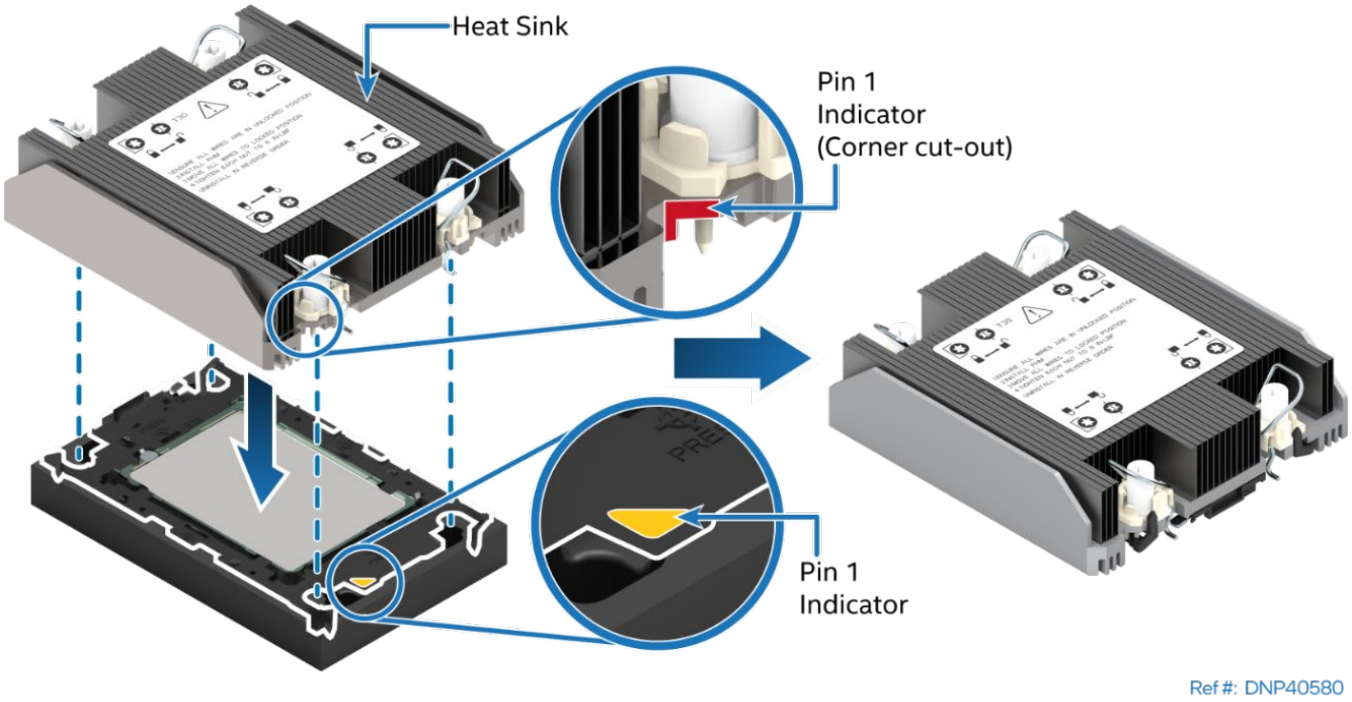


Figure 151. Pin 1 Indicator of Processor Carrier Clip

8. Align the Pin 1 indicator of processor carrier clip with one of the diagonally cut corners on the base of the heat sink. Or (if present) look for the Pin 1 indicator on the corner of the heat sink label.
9. Gently press down the heat sink onto the processor carrier clip until it clicks into place.
10. Ensure that all four heat sink corners are securely latched to the processor carrier clip tabs.

7.3.1.4 PHM Installation

1. If installed, remove the plastic cover from the processor socket.

Caution: Do not touch the socket pins. The pins inside the processor socket are extremely sensitive. A damaged processor socket may produce unpredictable system errors.

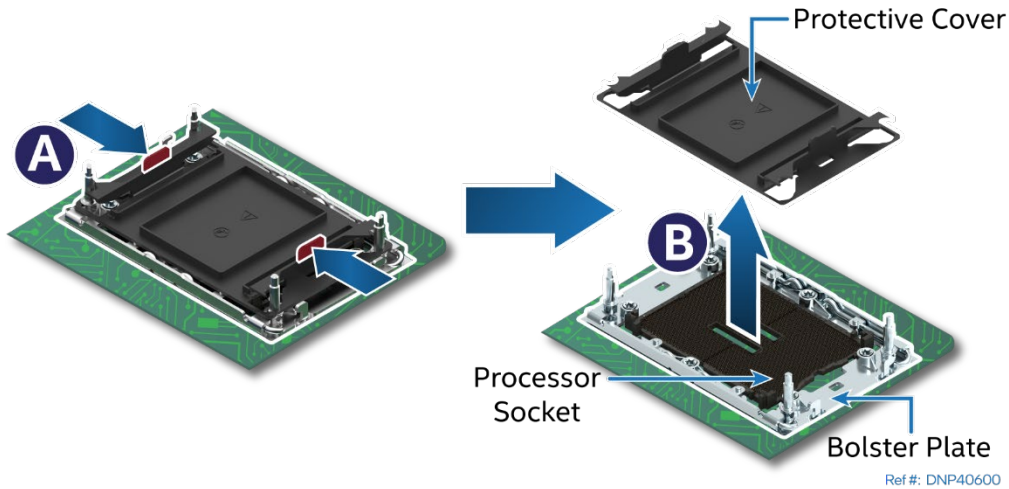


Figure 152. Socket Protective Cover Removal

2. Remove the protective cover by squeezing the finger grips (see Letter A) and pulling the cover up (see Letter B).
3. Ensure that the socket is free of damage or contamination before installing the PHM.

Caution: If debris is observed, blow it away gently with an air blower. Do not use tweezers or any other hard tools to remove the debris.

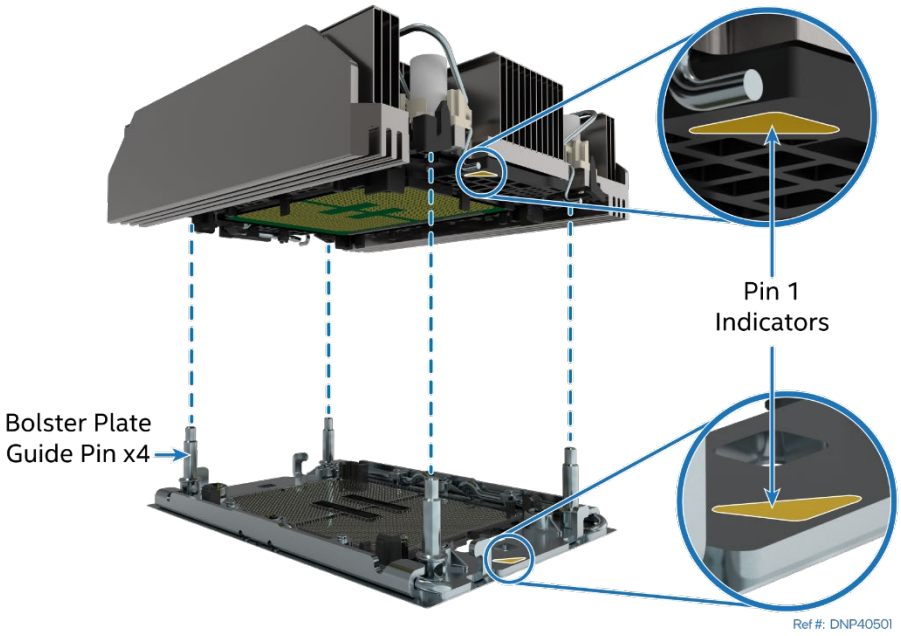


Figure 153. PHM Alignment with Socket Assembly

Caution: Processor socket pins are delicate and bend easily. Use extreme care when placing the PHM onto the processor socket. Do not drop it.

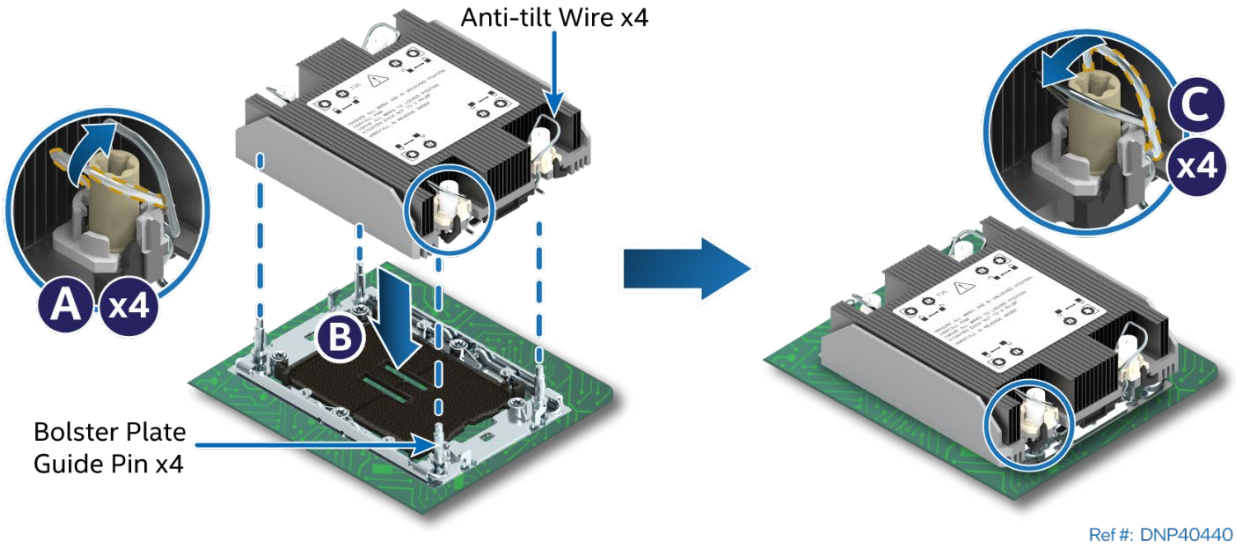


Figure 154. PHM Installation onto Server Board

4. Set all four anti-tilt wires on the heat sink to the inward position (see Letter A).
5. Align the Pin 1 indicators of the processor carrier clip and processor with the Pin 1 indicator on the socket assembly bolster plate.

6. Carefully lower the PHM over the four bolster plate alignment pins (see Letter B).
7. Ensure that the PHM is sitting flat and even on the bolster plate.
8. Set all four anti-tilt wires on the heat sink to the outward position (see Letter C).

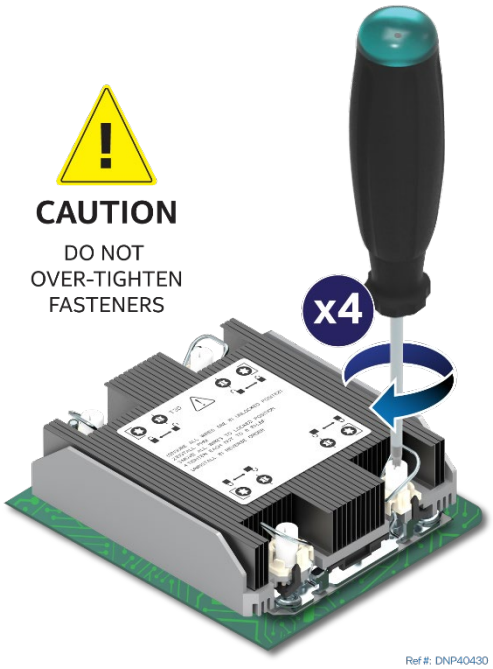


Figure 155. Tighten Heat Sink Fasteners

9. Using an adjustable torque T30 Torx* screwdriver, tighten the heat sink fasteners to 8 in-lb. No specific sequence is needed for tightening. General diagonal bolt tightening order can be used.

Note: Intel strongly recommends installing both processors. If only one processor is installed, do not install a processor heat sink on an empty socket.

7.3.2 Processor Replacement for EVAC Heat Sink

Components Required for Each Processor

- New 4th or 5th Gen Intel® Xeon® Scalable processor in the shipping tray
- Matching processor carrier clip
- Existing 1U EVAC processor heat sink with new thermal interface material (TIM) applied

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)
- ESD Gloves (recommended)
- Adjustable torque T30 Torx* screwdriver
- Phillips* head screwdriver #2

Note: The procedures in this section show the replacement for the 1U EVAC processor heat sink (front). To replace the 1U standard processor heat sink (back), follow the procedures in Section 7.3.1.

Caution: Fin edges of the processor heat sink are very sharp. Intel recommends wearing thin ESD protective gloves when handling the PHM during the following procedures.

Caution: Processor heat sinks are easily damaged if handled improperly. See the following image for proper handling.

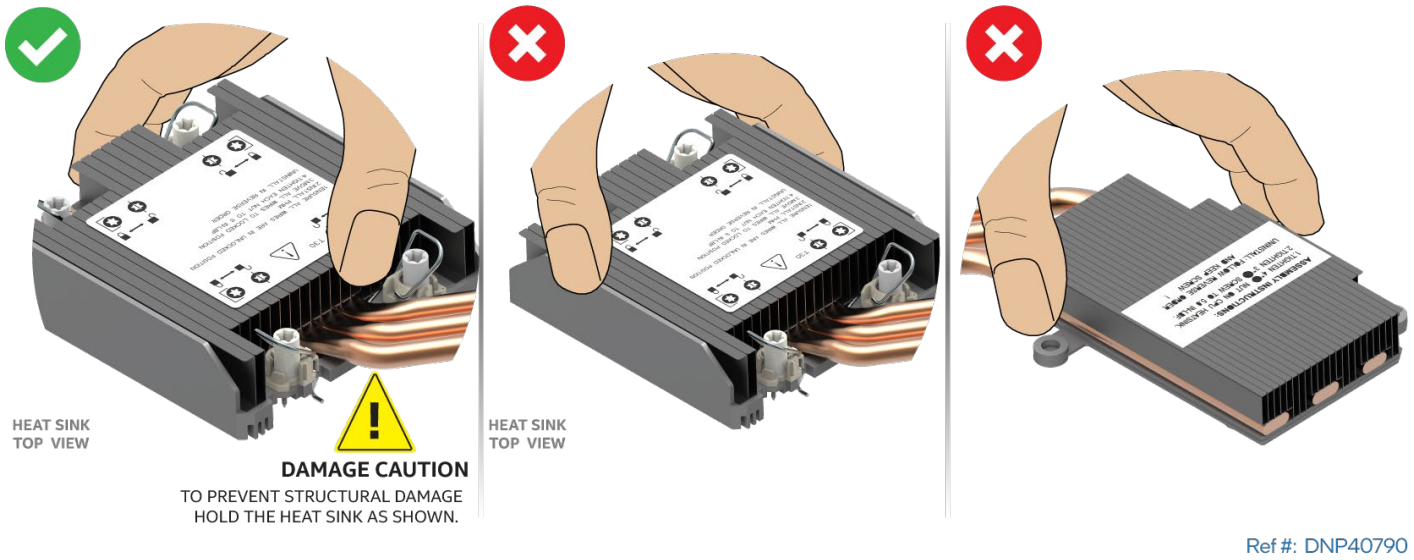


Figure 156. Processor EVAC Heat Sink Handling

7.3.2.1 Processor Heat Sink Module (PHM) Removal

1. Remove the riser assembly on the right side of the module.

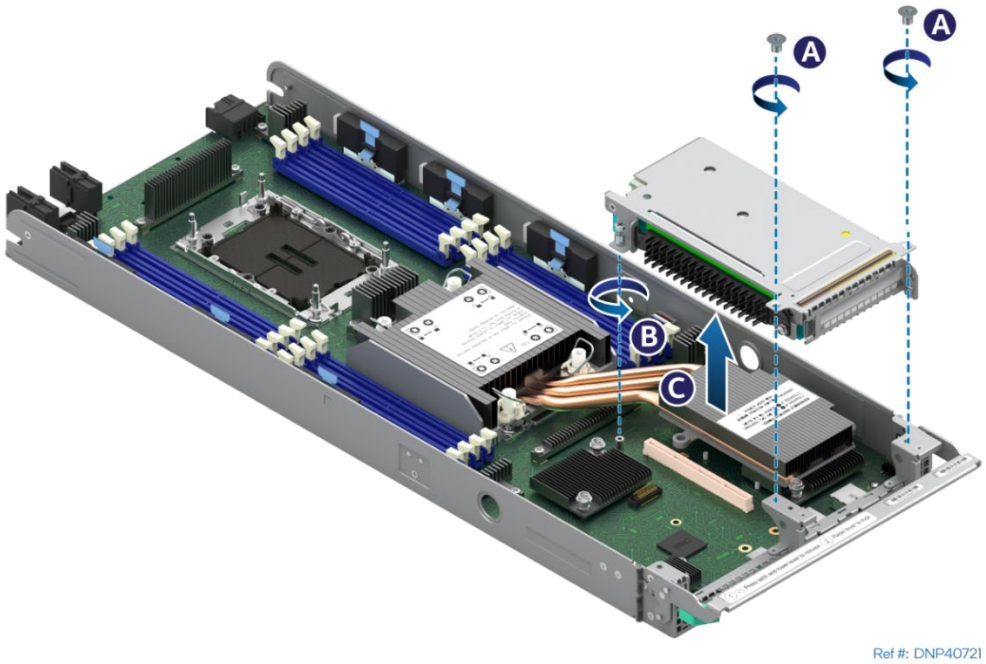


Figure 157. Removing a Riser Assembly

- Using Phillips screwdriver #1 remove two screws that secure the riser assembly to the front of the module (see Letter A).
- Using Phillips screwdriver #2 loosen the captive screw at the back of the riser assembly. (see Letter B)

- Carefully remove the riser assembly by lifting it up and away from the module (see Letter C).

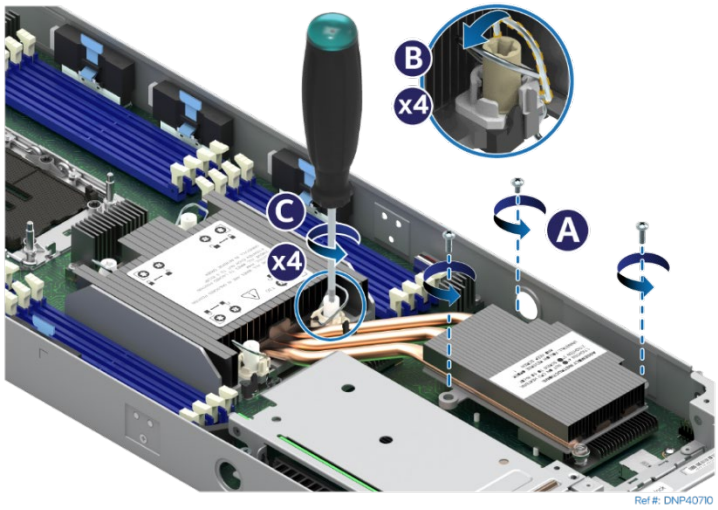


Figure 158. Loosen EVAC Heat Sink Fasteners

2. Using a Phillips* screwdriver, fully loosen the heat sink extension screws (see Letter A).
3. Set all four anti-tilt wires on the heat sink to the outward position (see Letter B)
4. Using T30 Torx* screwdriver, fully loosen all four heat sink fasteners on the PHM in any order (see Letter C). General bolt loosening order, such as diagonal sequence, can be used.

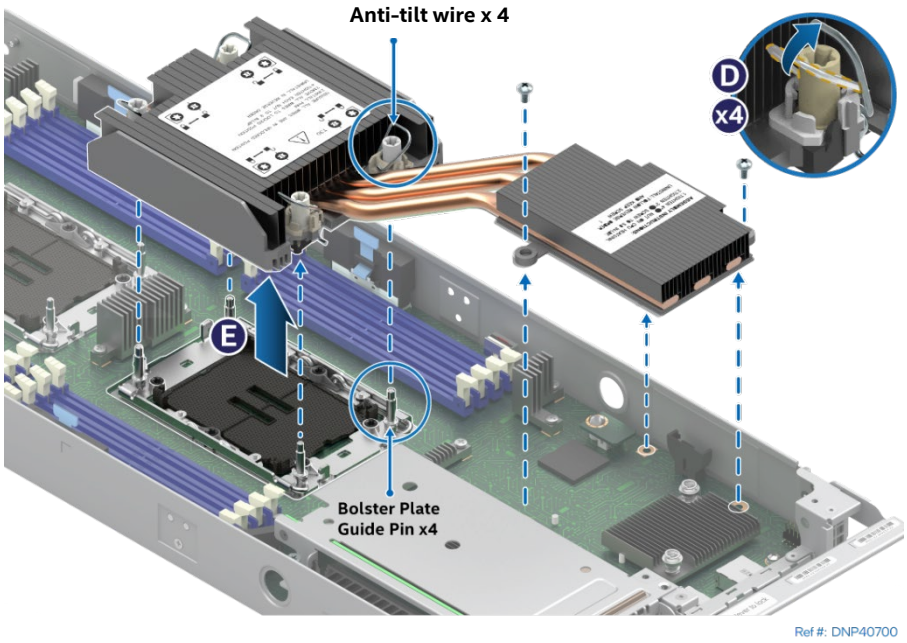


Figure 159. PHM Assembly Removal from Processor Socket

5. Set all four anti-tilt wires on the heat sink to the inward position (see Letter D).
6. Carefully grasp the PHM and lift it straight up and off the server board (see Letter E).
7. With the processor facing up, set the PHM on a flat surface.
8. Visually inspect that the processor socket is free of damage or contamination.

Caution: If debris is observed, blow it away gently with an air blower. Do not use tweezers or any other hard tools to remove the debris.

9. If not replacing the processor, install the original plastic socket cover over the processor socket.

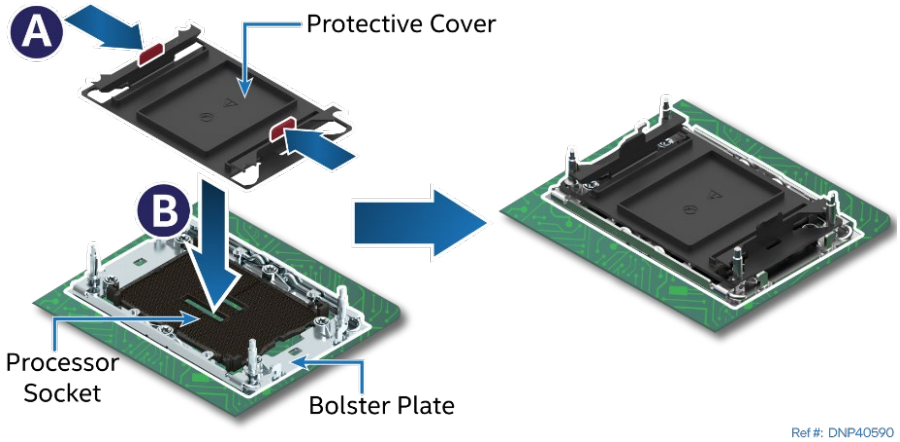


Figure 160. Reinstall the Socket Cover

- Squeeze the finger grips at each end of the cover (see Letter A).
- Carefully lower the cover over the four alignment pins of the bolster plate and onto the processor socket (see Letter B).
- Release finger grips to lock the cover in place.

Caution: Do not press down on the center of the socket cover.

7.3.2.2 PHM Disassembly

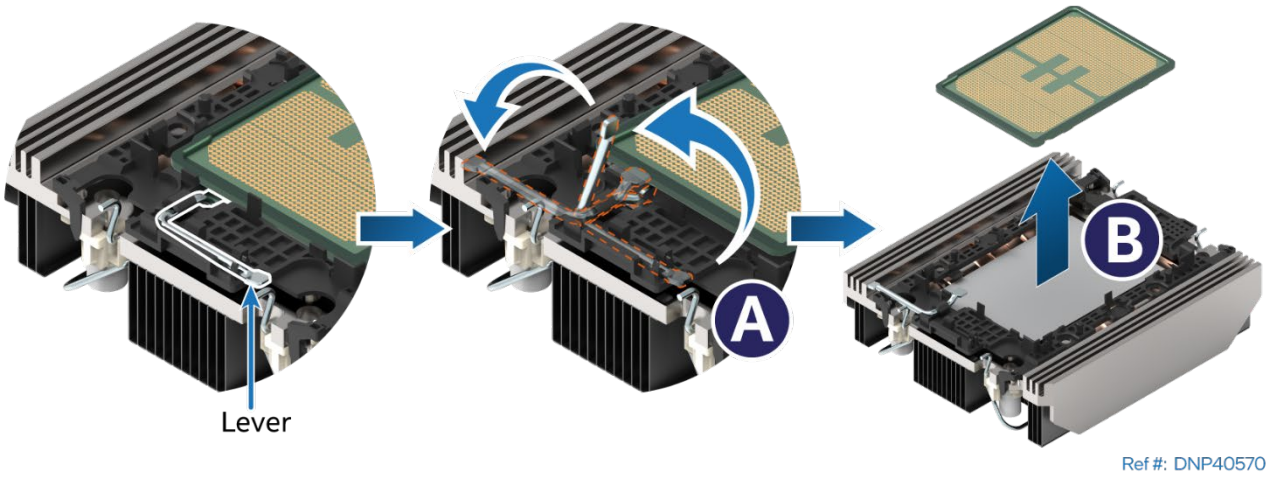


Figure 161. Processor Removal from PHM Assembly

1. While holding down the PHM, rotate the lever (see Letter A) from right to left until the processor lifts free from the processor carrier clip.
2. Holding down the processor carrier clip, carefully lift the processor out of the processor carrier clip (see Letter B).

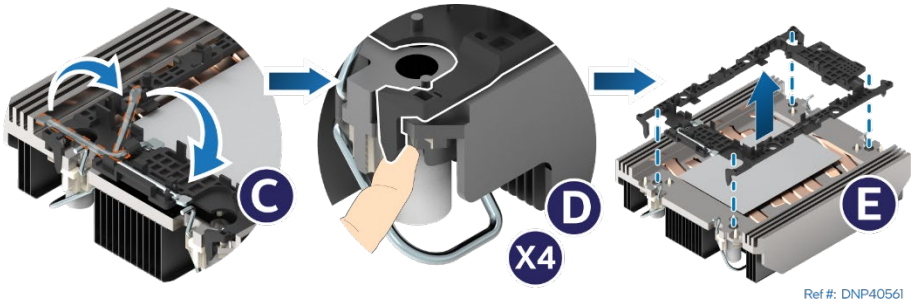


Figure 162. Processor Carrier Clip Removal from PHM Assembly

3. Return the lever to the original position (see Letter C).
4. Detach the processor carrier clip from the heat sink:
   a. Unlatch the hook on each corner of the processor carrier clip (see Letter D).
   b. Lift the clip from the heat sink (see Letter E).

7.3.2.3 PHM Reassembly

To properly reassemble the PHM and install it onto the server board, the procedures described in the following sections must be followed in the order specified. These instructions assume that the processor heat sink (new or reuse of existing) has the necessary thermal interface material (TIM) Honeywell PTM7000* already applied to the clean bottom of the heat sink.

Caution: Full ESD precautions should be followed to perform assembly and installation of the PHM to the server board. Wear ESD gloves to prevent electrostatic damage and oxidation or foreign materials on processor package and land pads.

Each component within the PHM assembly includes a Pin 1 indicator. Pin 1 indicator alignment between all components is required throughout the assembly process.

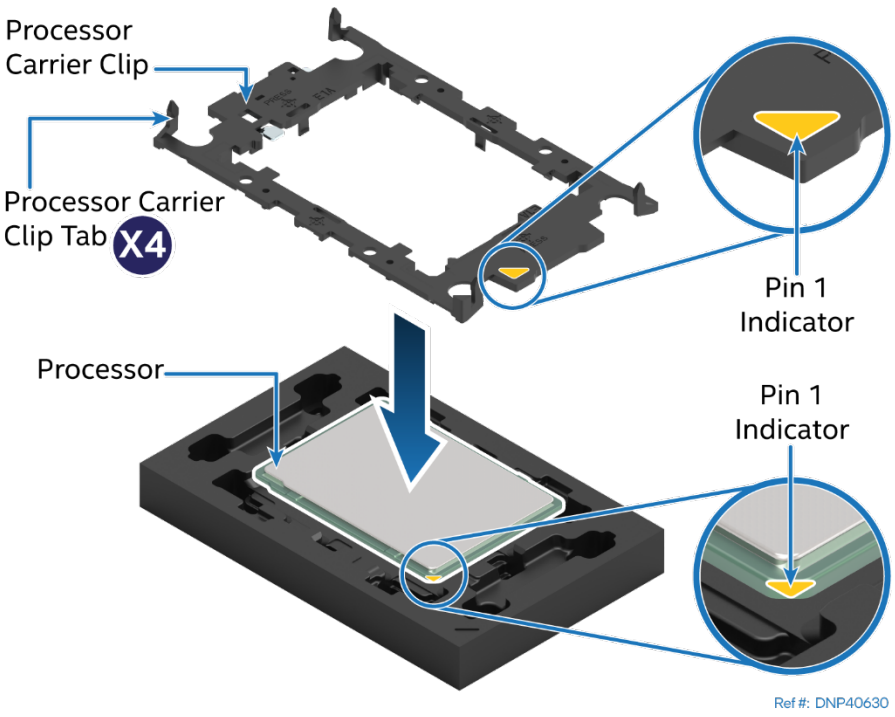


Figure 163. Installing Processor Carrier Clip onto Processor – Part 1

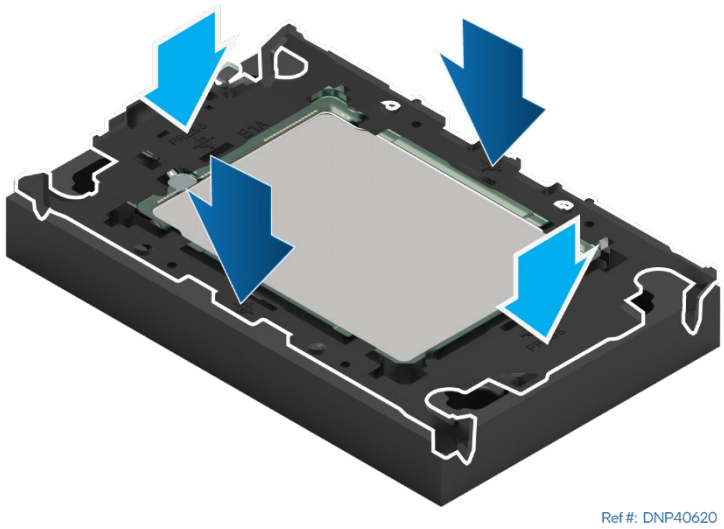


Figure 164. Installing Processor Carrier Clip onto Processor – Part 2

1. Align the Pin 1 indicator on the processor carrier clip with the Pin 1 indicator of the processor.
2. With the processor still in its tray, place the processor carrier clip over the processor.
3. Gently press down simultaneously on two opposite sides of the processor carrier clip until it clicks in place.
4. Repeat step 3 for the other two sides.
5. Locate the processor heat sink. To avoid damage, grasp it by its narrower sides as shown.

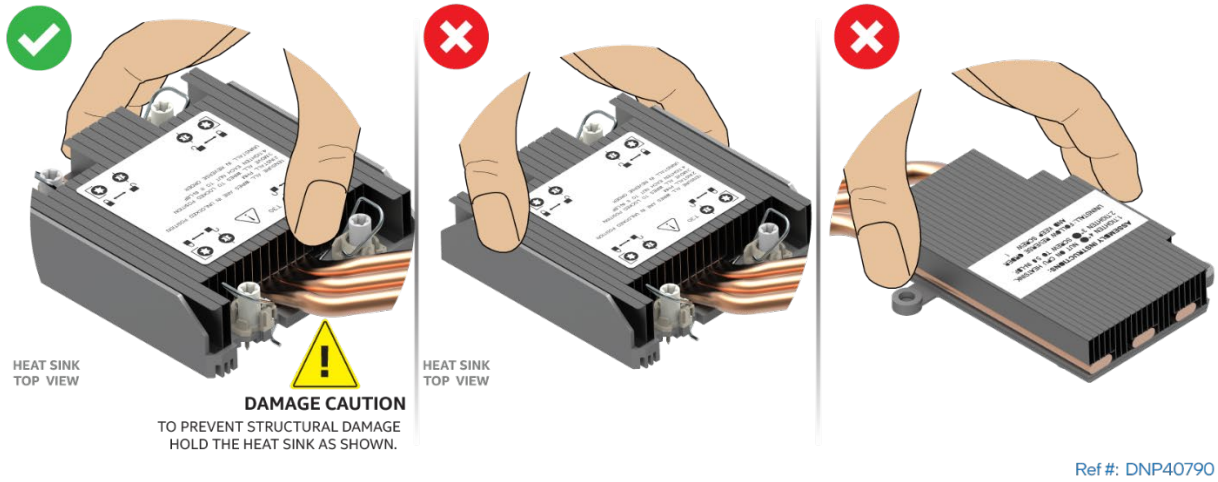


Figure 165. Processor Heat Sink Handling

6. Place the heat sink bottom side up onto a flat surface.

   If reusing an existing heat sink:

   - Properly clean off existing thermal interface material (TIM) from the bottom of the heat sink
   - Apply new TIM (Honeywell PTM7000*)

   If using a new heat sink, remove the plastic protective film from the Thermal Interface Material (TIM).

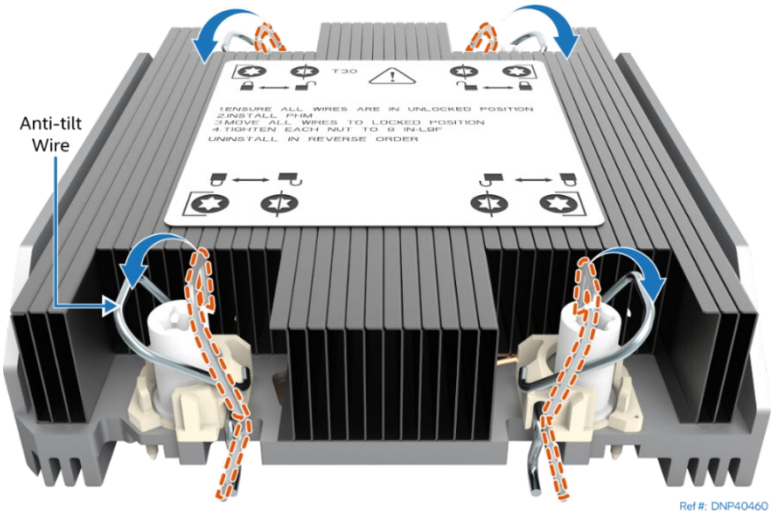


Figure 166. Processor Heat Sink Anti-tilt Wires in the Outward Position

7. Set the anti-tilt wires to their outward position.

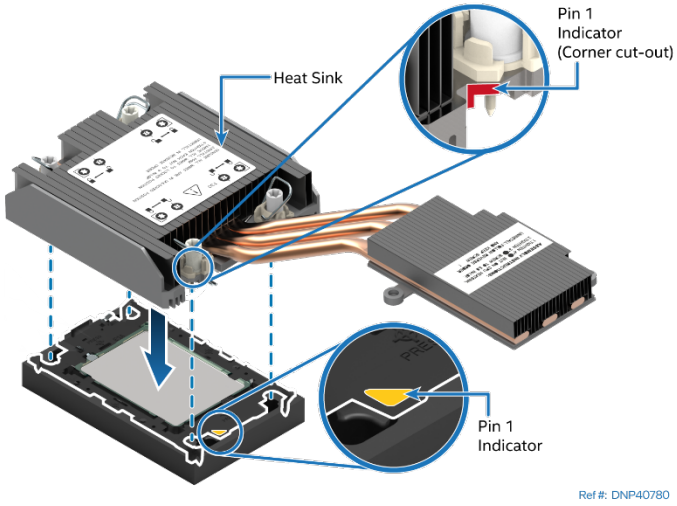


Figure 167. Pin 1 Indicator of Processor Carrier Clip

8. Align the Pin 1 indicator of the processor carrier clip with one of the diagonally cut corners on the base of the heat sink. Or (if present) look for the Pin 1 indicator on the corner of the heat sink label.
9. Gently press down the heat sink onto the processor carrier clip until it clicks into place.
10. Ensure that all four heat sink corners are securely latched to the processor carrier clip tabs.

7.3.2.4 PHM Installation

1. If installed, remove the plastic cover from the processor socket.

Caution: Do not touch the socket pins. The pins inside the processor socket are extremely sensitive. A damaged processor socket may produce unpredictable system errors.

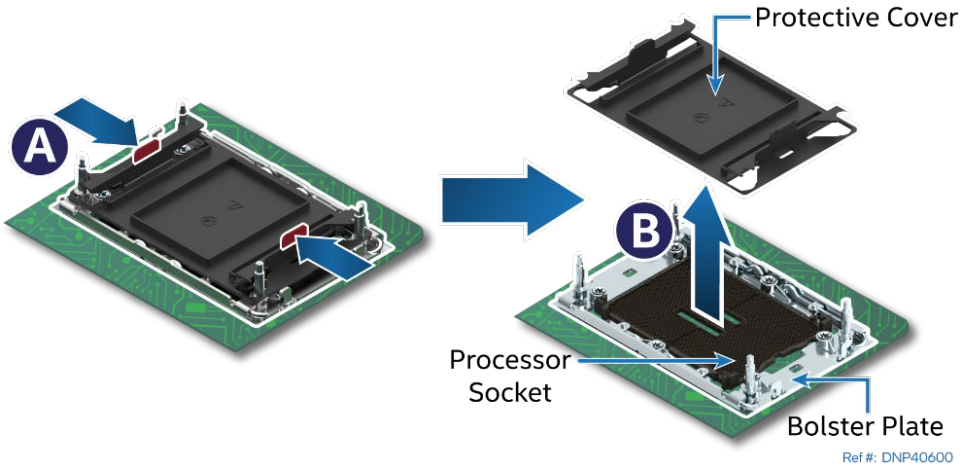


Figure 168. Socket Protective Cover Removal

2. Remove the protective cover by squeezing the finger grips (see Letter A) and pulling the cover up (see Letter B).
3. Ensure that the socket is free of damage or contamination before installing the PHM.

Caution: If debris is observed, blow it away gently with an air blower. Do not use tweezers or any other hard tools to remove the debris.

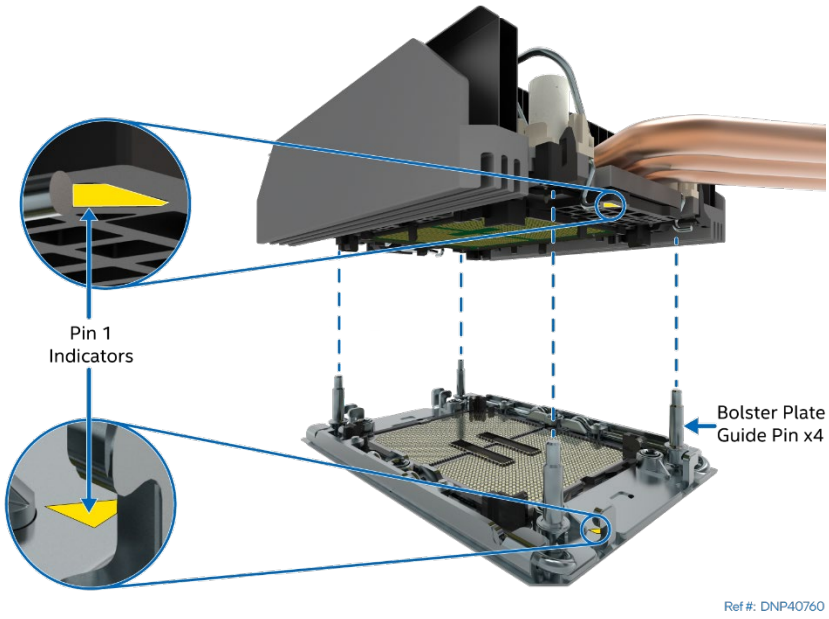


Figure 169. PHM Alignment with Socket Assembly

Caution: Processor socket pins are delicate and bend easily. Use extreme care when placing the PHM onto the processor socket. Do not drop it.

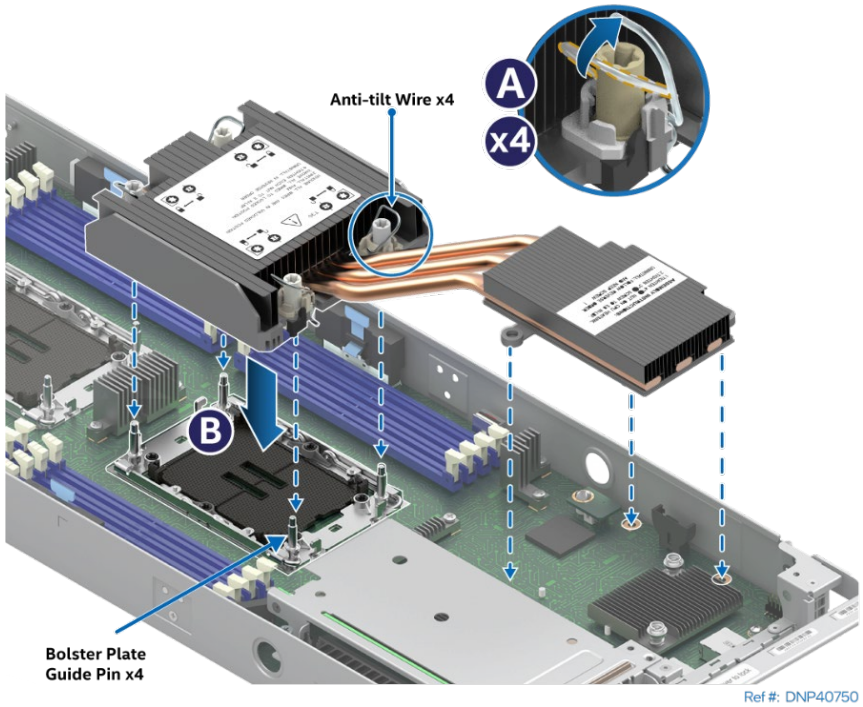


Figure 170. PHM Installation onto Server Board

4. Set all four anti-tilt wires on the heat sink to the inward position (see Letter A).
5. Align the Pin 1 indicators of the processor carrier clip and processor with the Pin 1 indicator on the socket assembly bolster plate.
6. Carefully lower the PHM over the four bolster plate alignment pins (see Letter B).

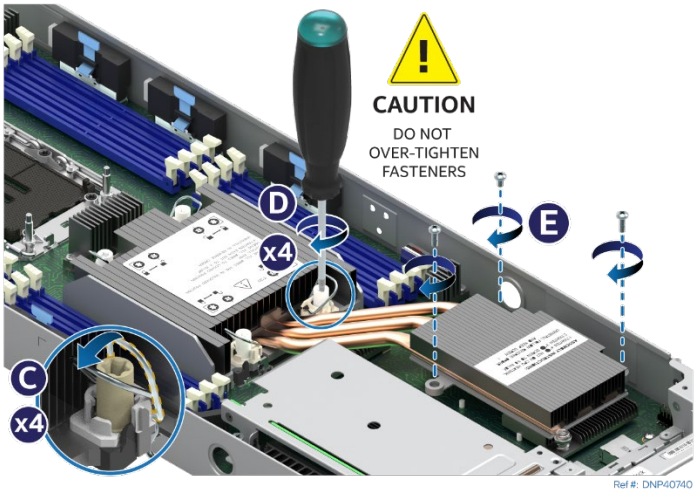


Figure 171. Tighten EVAC Heat Sink Extension

7. Ensure that the PHM is sitting flat and even on the bolster plate.
8. Set all four anti-tilt wires on the heat sink to the outward position (see Letter C).
9. Using a T30 Torx* screwdriver, tighten the heat sink fasteners to 8 in-lb (see Letter D). No specific sequence is needed for tightening. General diagonal bolt tightening order can be used.
10. Using a Phillips* screwdriver, tighten the three heat sink extension screws to 5 in-lb (see Letter E).

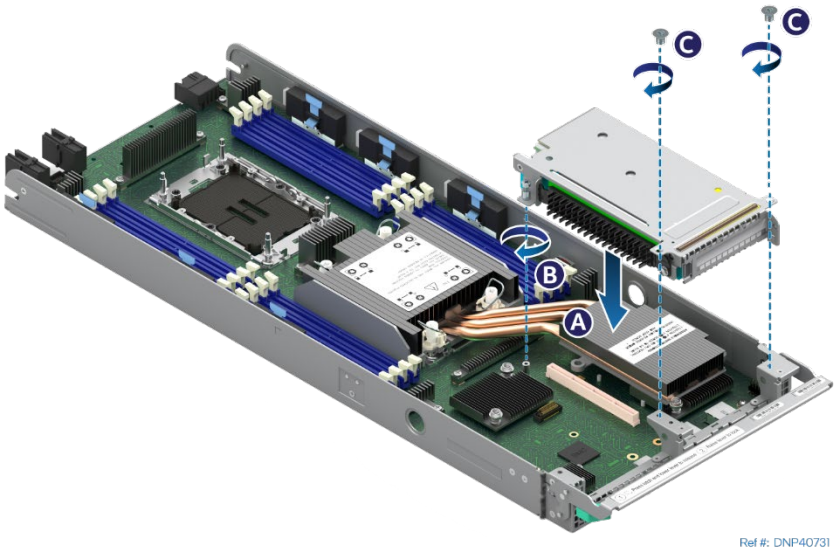


Figure 172.Installing a Riser Assembly

11. Align the riser card to the riser slot on the server board (see Letter A).
12. Carefully push down on the riser assembly until the riser card is securely seated in the riser slot.
13. Ensure that the screw holes of the riser assembly are aligned with the mounting holes of the module.
14. Using Phillips screwdriver #2 tighten the captive screw at the back of the riser assembly to 5 in-lb. (see Letter B)
15. Using Phillips screwdriver #1 install two screws to secure the riser assembly to the front of the module. Tighten to 5 in-lb. (see Letter C).
16. Reinstall the air duct and module (see Section 7.2.2 and Section 7.1.2).

Note: Intel strongly recommends installing both processors. If only one processor is installed, do not install a processor heat sink on an empty socket.

7.3.3 Processor Replacement for Liquid-Cooled Configurations

Components Required for Each Processor

- 4th or 5th Gen Intel® Xeon® Scalable processor in the shipping tray
- Matching processor carrier clip
- Existing processor cold plate
- New thermal interface material (TIM) Dow Corning TC-5622*

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)
- ESD gloves (recommended)
- Adjustable torque T30 Torx* screwdriver
- D50TNP liquid-cooling VR TIM application tools (TNPLCVRTLS)
- D50TNP liquid-cooling VR TIM application nozzles (TNPLCVRTNZ)
- D50TNP liquid-cooling VR TIM compound (TNPLCVRCMPD)

Caution: Full ESD precautions should be followed to perform assembly and installation of the PHM to the server board. Wear ESD gloves to prevent electrostatic damage and oxidation or foreign materials on processor package and land pads.

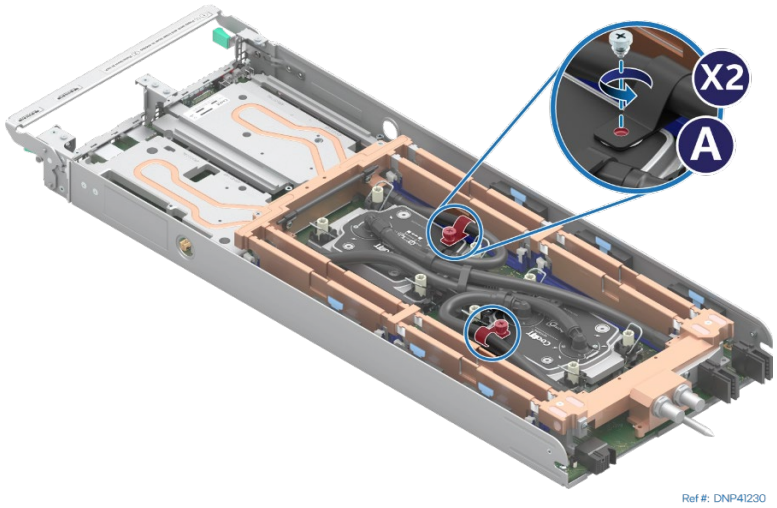


Figure 173. Removing Screws on Top of Processor Cold Plate

1. Remove the screws and the clips that hold the outer hoses on top of the processor cold plate (see Letter A).

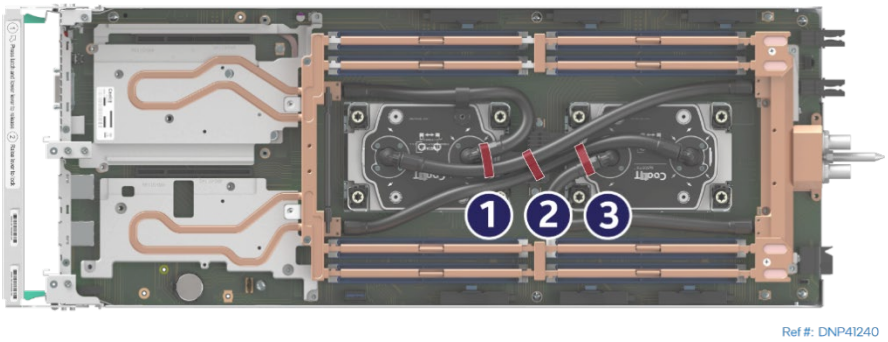


Figure 174. Removing the Velcro* Tape in the Middle of the Cold Plates

2. Remove the three Velcro tape pieces between the processor cold plates.

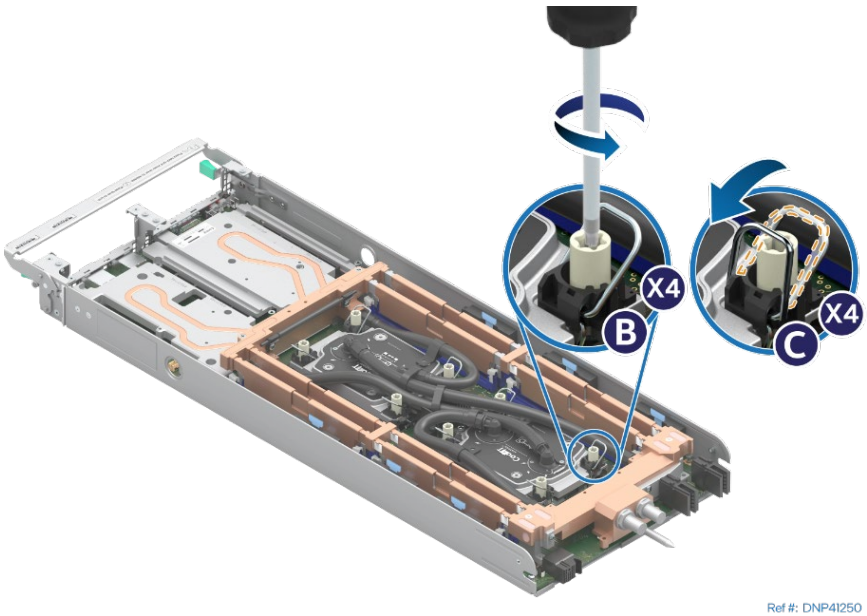


Figure 175. Loosening Processor Cold Plate Fasteners

3. Fully loosen all four fasteners on the processor cold plate in any order (see Letter B). General bolt loosening order, such as diagonal sequence, can be used.
4. Set all four anti-tilt wires on the cold plate to the inward position (see Letter C).

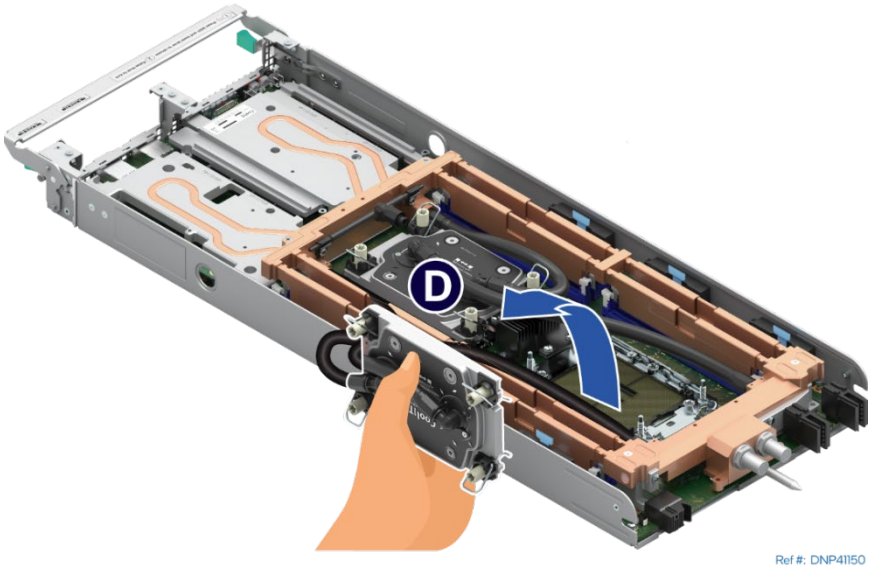


Figure 176. Removing Processor Cold Plate

5. While holding the processor cold plate, lift it slightly and carefully rotate it off the server board (see Letter D). Do not touch the processor pins.
6. After removing the cold plate, visually inspect that the socket is free of damage or contamination.

Caution: If debris is observed, blow it away gently with an air blower. Do not use tweezers or any other hard tools to remove the debris.

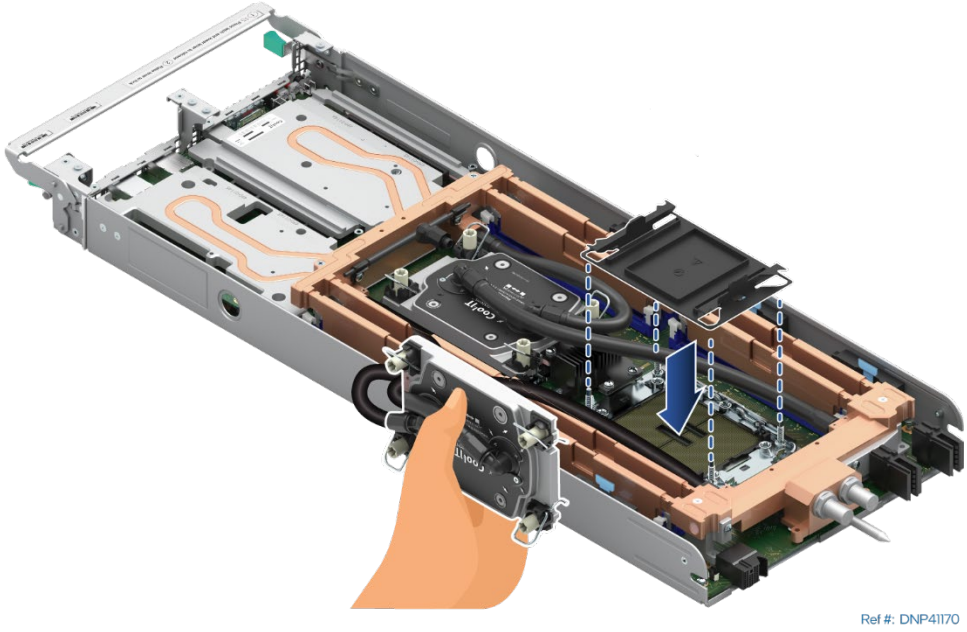


Figure 177. Reinstall the Socket Cover

7. Reinstall the socket cover to protect the socket pins before proceeding to the next step.

- Squeeze the finger grips at each end of the cover and carefully lower the cover onto the socket. Then, release the finger grips.
- Ensure that the socket cover is locked in place.

Note: Do not press down on the center of the socket cover.

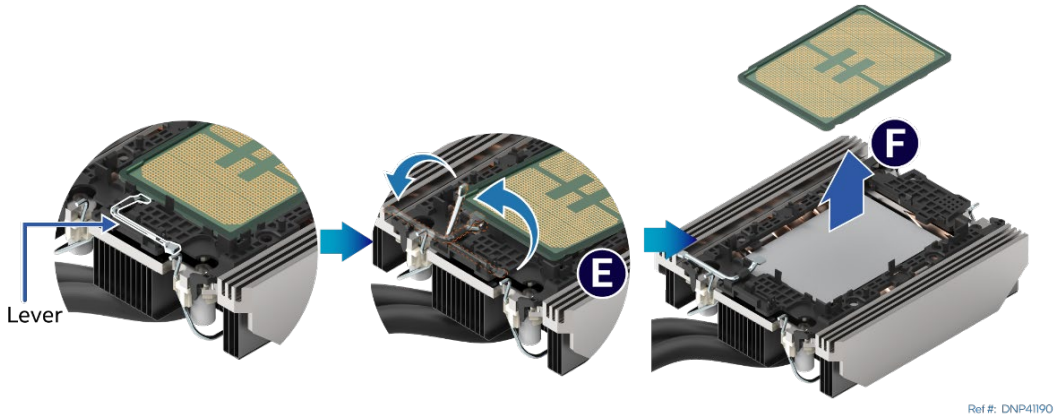


Figure 178. Processor Removal from Processor Carrier Clip and Processor Cold Plate

8. While holding down the processor cold plate without stretching the hose, rotate the lever (see Letter E) from right to left until the processor lifts from the processor carrier clip.
9. Holding down the processor carrier clip, carefully lift the processor out of the processor carrier clip (see Letter F).

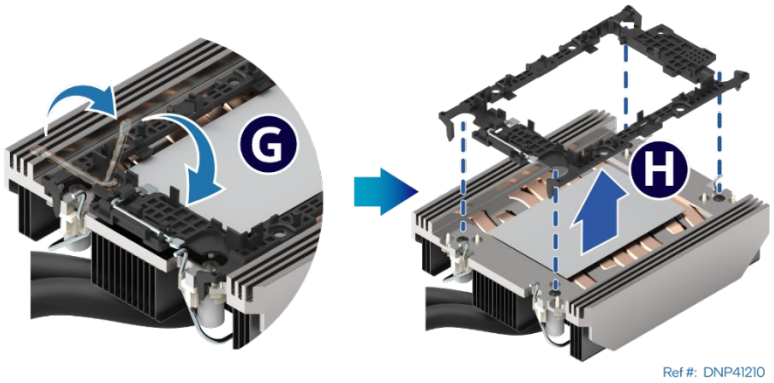


Figure 179. Processor Carrier Clip Removal from Processor Cold Plate

10. Return the lever to the original position (see Letter G).
11. Unlatch the hook on each corner of the processor carrier clip and lift it from the processor cold plate (see Letter H).

To properly reassemble the new processor and processor carrier clip and install them onto the server board, the following procedures must be followed in the order specified. These instructions assume that the processor cold plate has the necessary thermal interface material (TIM) Dow Corning TC-5622* already applied to the clean bottom of the cold plate.

Caution: Full ESD precautions should be followed to perform assembly and installation of the PHM to the server board. Wear ESD gloves to prevent electrostatic damage and oxidation or foreign materials on processor package and land pads.

The new processor, processor carrier clip, and processor socket all have a Pin 1 indicator. Pin 1 indicator alignment between all these components is required throughout the assembly process.

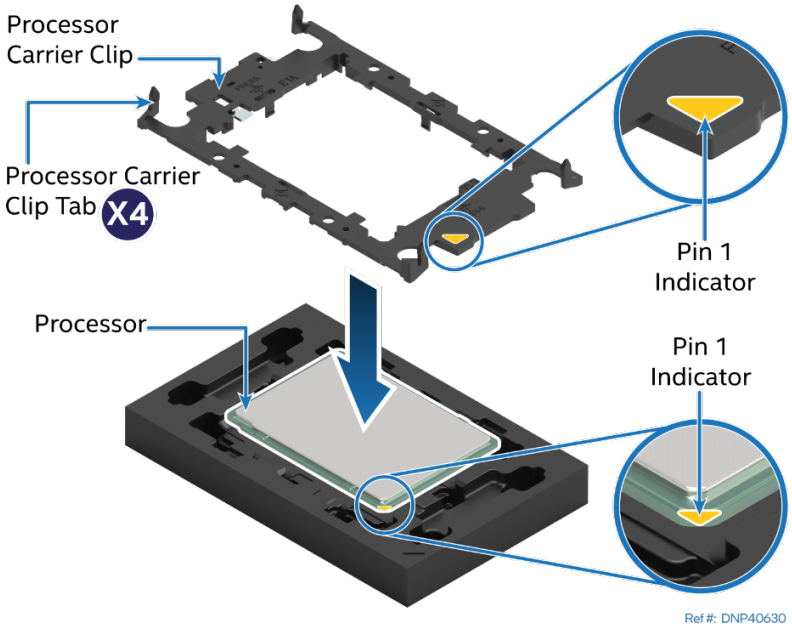


Figure 180. Installing Processor Carrier clip onto Processor – Part 1

12. Align the Pin 1 indicator on the processor carrier clip with the Pin 1 indicator of the processor.
13. With the processor still in its tray, place the processor carrier clip over the processor.

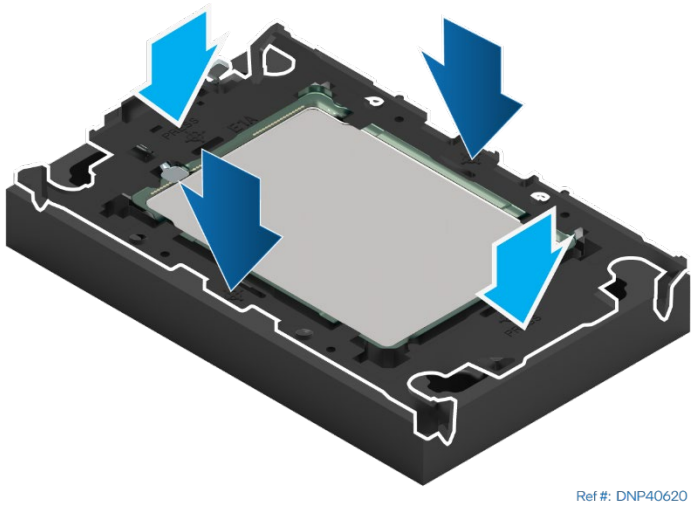


Figure 181. Installing Processor Carrier Clip onto Processor – Part 2

14. Gently press down simultaneously on two opposite sides of the processor carrier clip until it clicks in place.
15. Repeat step 14 for the other two sides.

Caution: Do not touch the socket pins. The pins inside the processor socket are extremely sensitive. A damaged processor socket may produce unpredictable system errors.

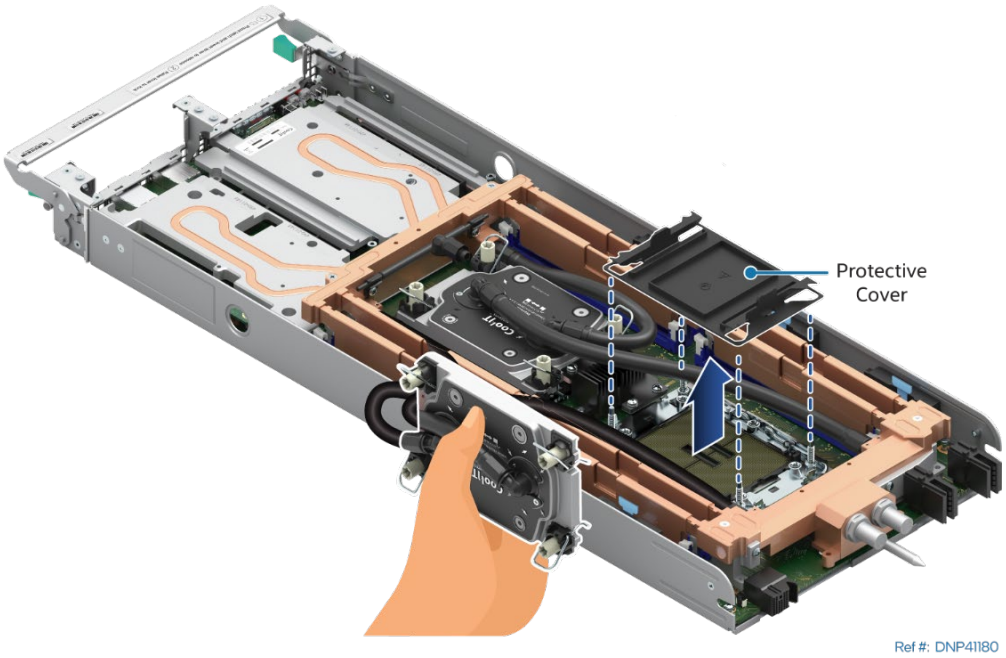


Figure 182. Socket Protective Cover Removal

16. Remove the socket protective cover by squeezing the finger grips and pulling the cover up.
17. Ensure that the socket is free of damage or contamination before installing the PHM.

Caution: If debris is observed, blow it away gently with an air blower. Do not remove it with a hard tool, such as with tweezers.

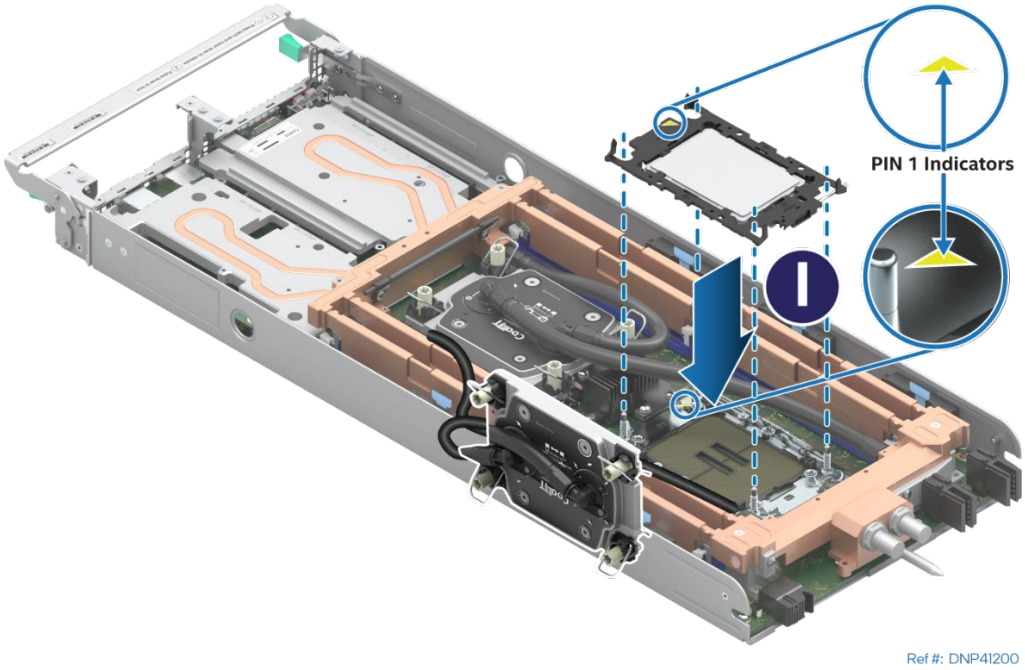


Figure 183. Processor Installation onto Server Board

Caution: Processor socket pins are delicate and bend easily. Use extreme care when placing the processor onto the processor socket. Do not drop it.

18. Align the Pin 1 indicators of the processor carrier clip and processor with the Pin 1 indicator on the bolster plate. Place the processor carrier clip and processor on the socket (see Letter I).

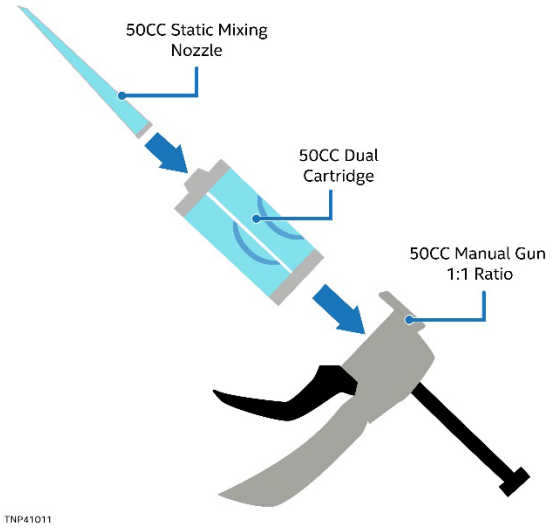


Figure 184. Assembling the Manual Applicator

19. Assemble the Bergquist SS95407 applicator, Bergquist GF3500S35 thermal gap filler cartridge, and Bergquist SS95437 nozzle as shown in the figure.

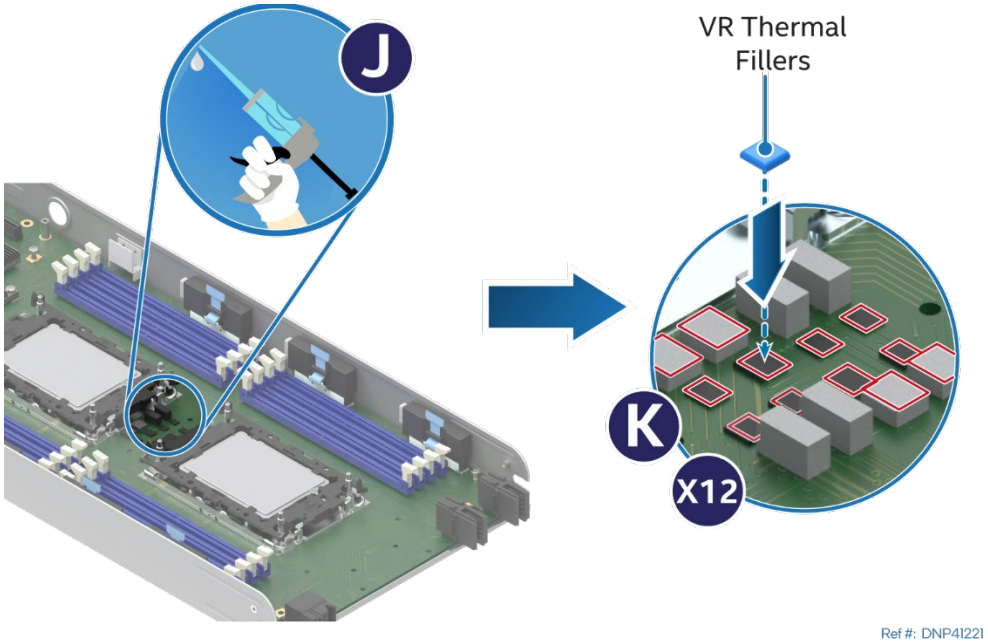


Figure 185. Applying Center VR Thermal Gap Filler

20. Using the assembled applicator (see Letter J), apply the thermal gap filler on top of the center processor voltage regulator (VR) components (see Letter K). Apply the filler only on the VR associated with the processor currently being replaced.

Notes:

- For 4th & 5th Gen Intel® Xeon® Scalable processors Family XCC models and Intel® Xeon® CPU Max Series processor models, apply 248 cubic millimeters of thermal gap filler to cover the VR components with a minimum thickness of 1 mm.

- For 4th & 5th Gen Intel® Xeon® Scalable processors Family MCC models, apply 423 cubic millimeters of thermal gap filler to cover the VR components with a minimum thickness of 1.64 mm.

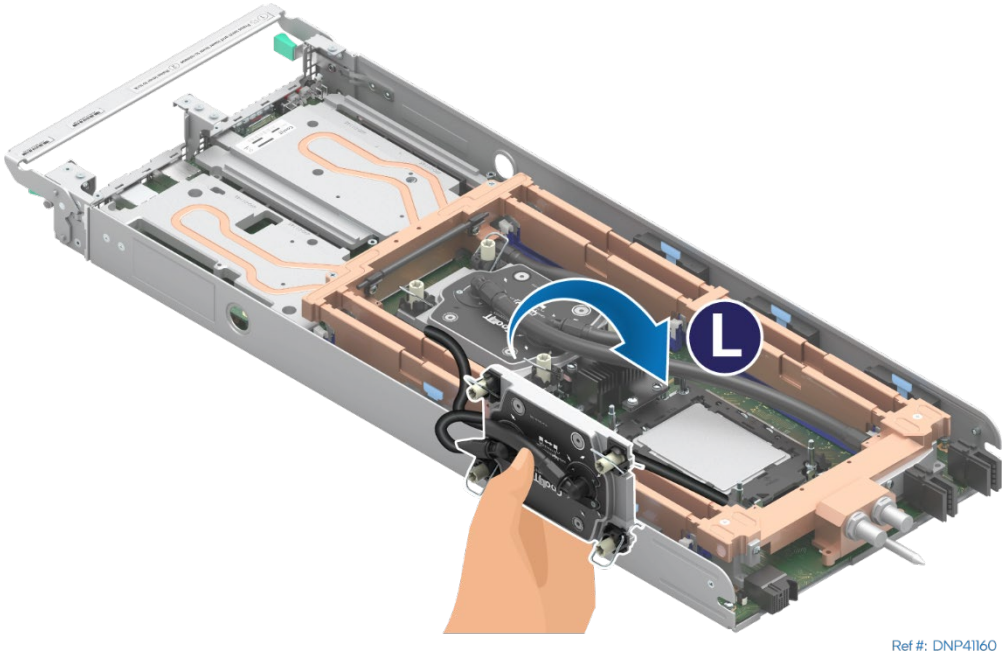


Figure 186. Reinstalling Processor Cold Plate

21. Carefully reinstall the processor cold plate back onto the bolster plate's alignment pins (see Letter L).

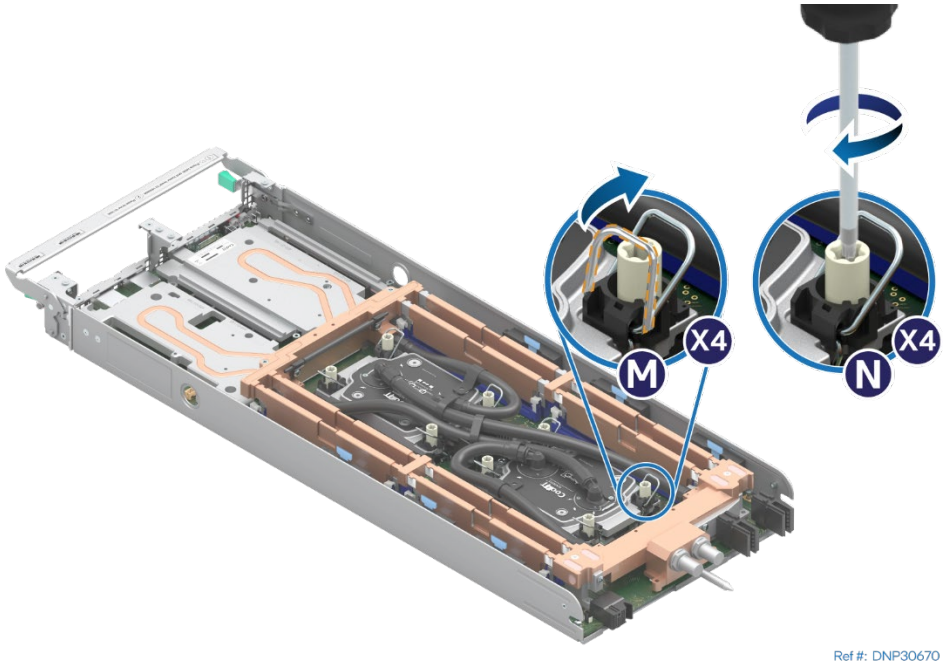


Figure 187. Securing Processor Cold Plate

22. Set all four anti-tilt wires on the cold plates to the outward position (see Letter M).
23. Using a T30 Torx* screwdriver, tighten the cold plate fasteners to 8 in-lb (see Letter N). No specific sequence is needed for tightening. General diagonal bolt tightening order can be used.

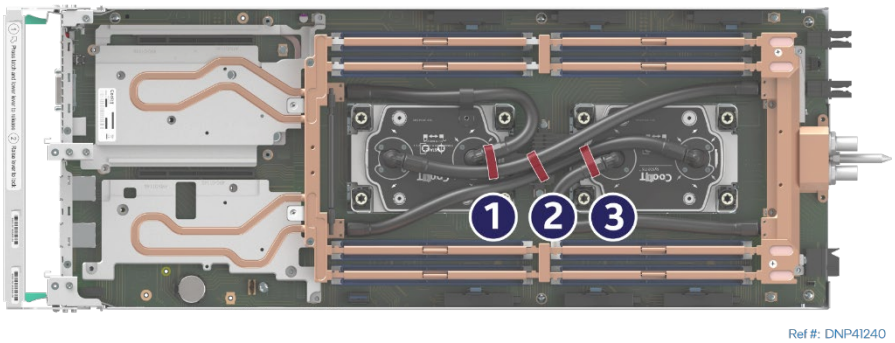


Figure 188. Installing the Velcro* Tape in the Middle of the Cold Plates

24. Install three Velcro tape pieces between the processor cold plates and wrap them around the hoses on top of the processor cold plates.

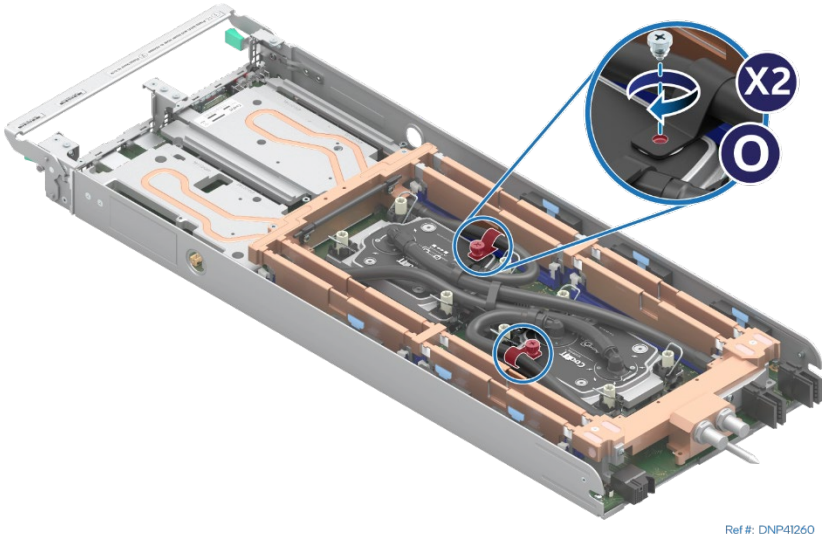


Figure 189. Installing the Screws on Top of Processor Cold Plate

25. Install the screws and the clips that hold the outer hoses on the top of the processor cold plate (see Letter O).

7.4 Memory Module Replacement

7.4.1 Memory Replacement for Air-Cooled Modules

The Intel® Server Board D50DNP1SB supports DDR5 SDRAM RDIMMs, 3DS-RDIMMs, and 9x4 DIMMs.

Liquid-cooled configurations require all DIMM slots to be populated with DDR5 DIMMs. See Appendix B for general memory population rules.

Note: The system requires that all memory slots be populated with either a memory module or a DIMM blank for air-cooled configurations. Preinstalled DIMM blanks should only be removed when replacing it with an actual memory module. When removing a memory module from the system, it must be replaced with an equivalent device or a DIMM blank. Liquid-cooled configurations require all DIMM slots to be populated with DDR5 DIMMs.

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)
- Replacement equivalent memory module

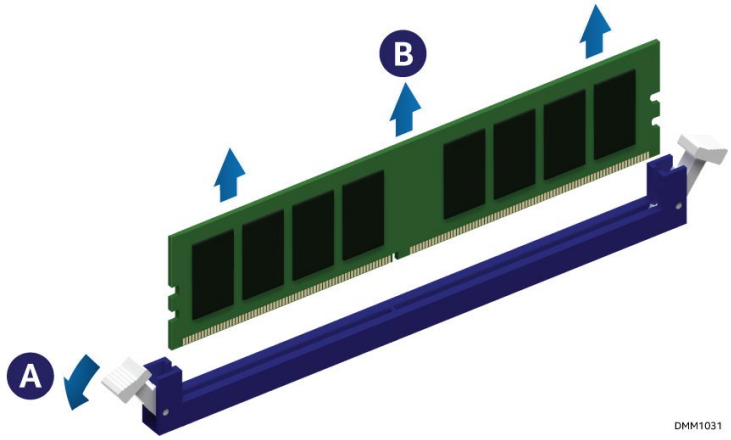


Figure 190. Removing the Memory Module from an Air-Cooled System

1. Identify and locate the memory module to be replaced.
2. Open the ejection tabs at both ends of the selected memory slot (see Letter A). The memory module slightly lifts from the slot.
3. Holding the memory module by its edges, lift it away from the slot (see Letter B).

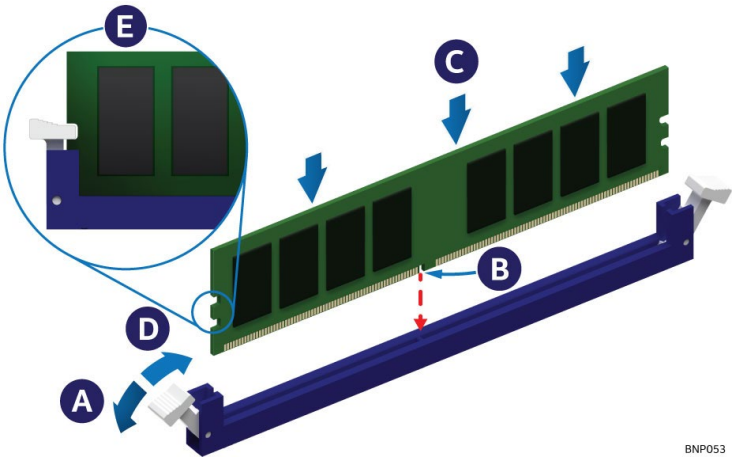


Figure 191. Installing the Memory Module in an Air-Cooled System

4. Ensure that the ejection tabs at both ends of the memory slot are in the open position (see Letter A).
5. Carefully unpack the replacement memory module, taking care to only handle the device by its outer edges.
6. Align the notch at the bottom edge of the memory module with the key in the memory slot (see Letter B).
7. Using even pressure along the top edge, push down on the memory module (see Letter C) until the ejection tabs of the memory slot snap into place (see Letter D).
8. Ensure that the ejection tabs are firmly in place (see Letter E).

7.4.2 Memory Replacement for Liquid-Cooled Modules

Required Tools and Supplies:

- Anti-static wrist strap and conductive workbench pad (recommended)
- DIMM latch tool (attached to the cooling loop)
- Memory cooling kit (included in the liquid-cooling loop box) or DIMM PMIC spare kit (DNPLCDMTM)

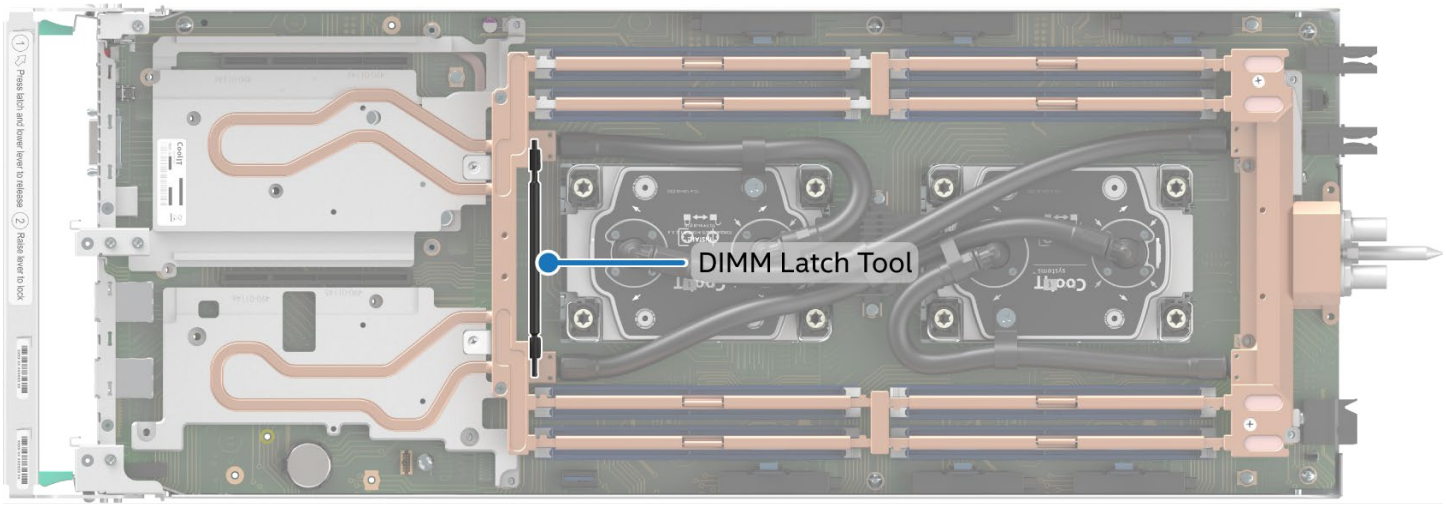


Figure 192. DIMM Latch Tool Location

1. Detach the DIMM latch tool from the cooling loop
2. Identify and locate the memory module to be replaced.

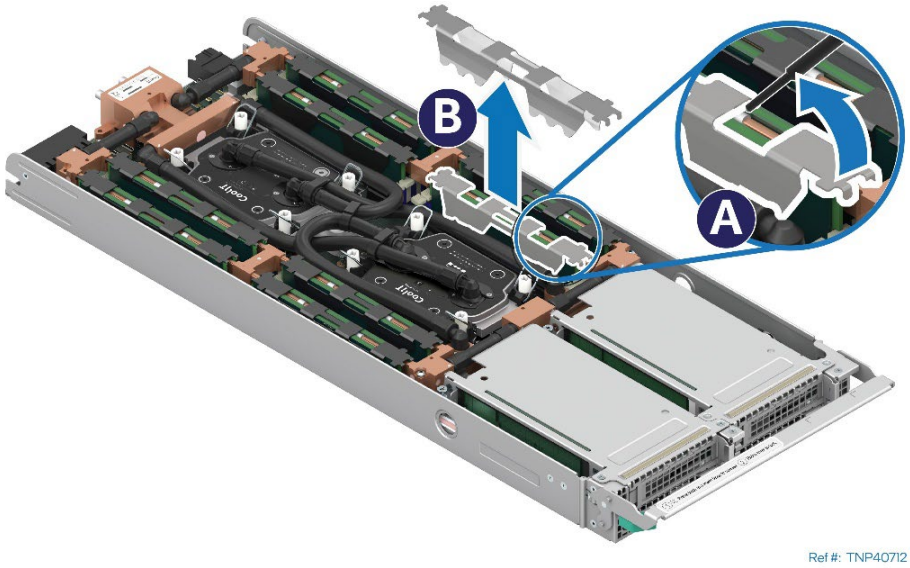


Figure 193. Removing the DIMM Clips

3. Position one end of the DIMM latch tool between the DIMM clip and the memory heat spreader line (see Letter A).
4. Using the DIMM latch tool as a lever, lift the DIMM clip from the DIMMs (see Letter B).
5. Remove the Mylar pad wrapped around two adjacent DIMMs.

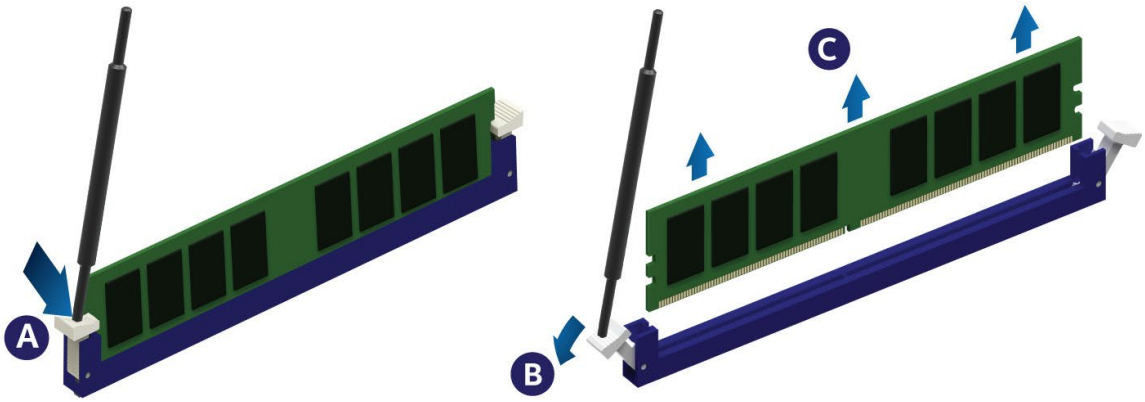


Figure 194. Removing the Memory Module from a Liquid-Cooled System

6. Using the DIMM latch tool, open the ejection tabs at both ends of the memory slot (see Letters A and B). The memory module will slightly lift from the slot.
7. Hold the memory module by its edges and lift it away from the slot (see Letter C).
8. Inspect the DIMM slot. If debris is observed, blow it away gently with an air blower. Do not remove it manually, such as with tweezers.
9. Ensure that the thermal interface material from the memory heat spreaders line does not interfere with the DIMM slot.
10. Carefully remove the replacement memory module from its packaging, taking care to handle it only by its outer edges.

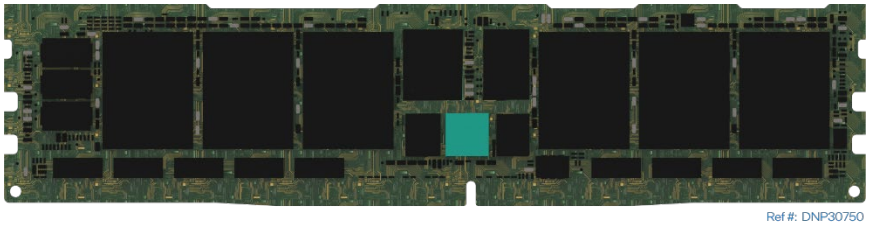


Figure 195. Attaching Thermal Pad to DIMM PMIC

11. Carefully detach one PMIC thermal pad from the paper and attach it to the replacement DIMM power management integrated circuit (PMIC) as shown on the picture.

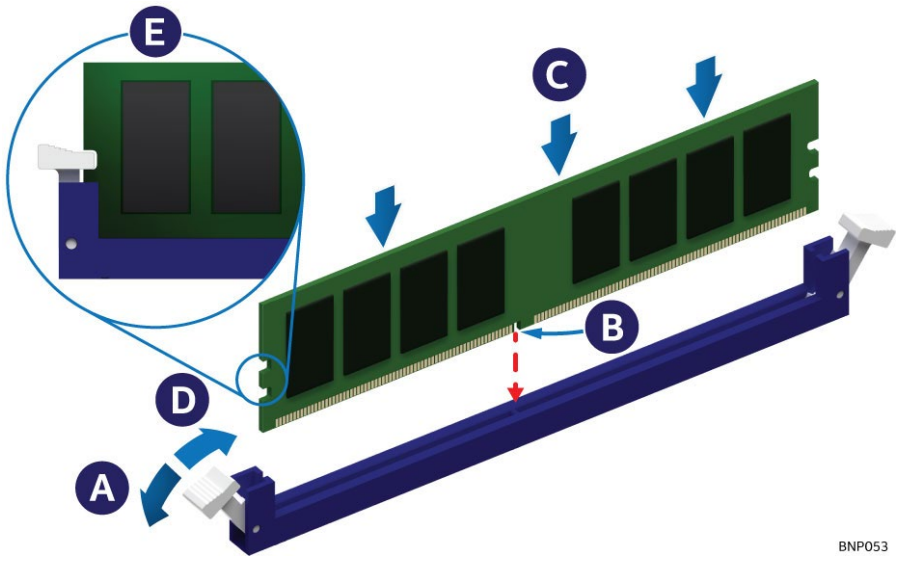


Figure 196. Installing DIMM for Liquid-Cooled Module

12. Ensure that the ejection tabs at both ends of the memory slot are in the open position (see Letter A). Use the memory replacement tool if the memory ejection tabs are in the closed position.
13. Align the notch at the bottom edge of the memory module with the key in the memory slot (see Letter B).
14. Insert the memory module into the memory slot. Using even pressure along the top edge, push down on the memory module (see Letter C) until the ejection tabs of the memory slot snap into place (see Letter D).
15. Ensure that the ejection tabs are firmly in place (see Letter E).
16. Attach the DIMM latch tool to the cooling loop

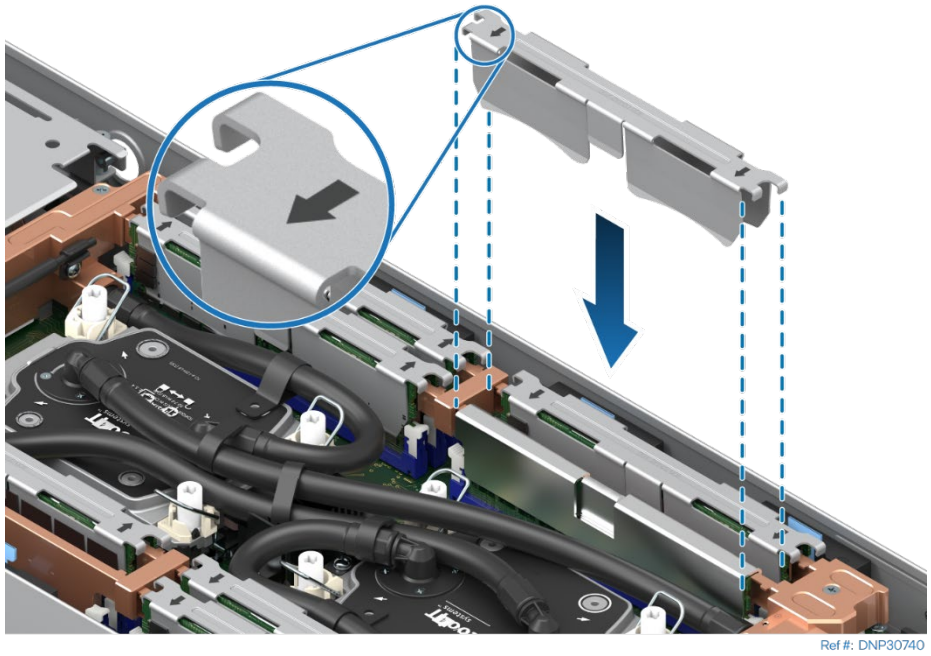


Figure 197. Mylar and DIMM clip installation

17. Wrap the Mylar pad around the memory heat spreader line and two adjacent DIMMs and Install the DIMM clip over the Mylar pad like on the picture. Make sure the arrows on the clips look left for CPU 0 and look right for CPU 1.

7.5 Riser Card and PCIe* Add-In Card Replacement

The Intel® Server D50DNP Family supports either up to two (1U modules) or up to four (2U modules) low-profile PCIe add-in cards.

This section provides assembly and installation procedures for modules that require low-profile add-in card installation. The following procedures apply to both 1U and 2U modules in both air-cooled and liquid-cooled configurations.

Note: The PCIe accelerator module has additional support for up to four full-height, full-length, and double-width PCIe cards. Follow the replacement procedures in Section 7.9 for those cards.

Required Tools and Supplies

- Intel riser card spare kit
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1 and #2

Available Riser Card Options

- 1U MCIO* riser card (installed in 1U riser assembly) for 1U module
- 1U Standard riser card (installed in 1U riser assembly) for 1U module
- 2U riser card (installed in 2U riser assembly) for 2U module

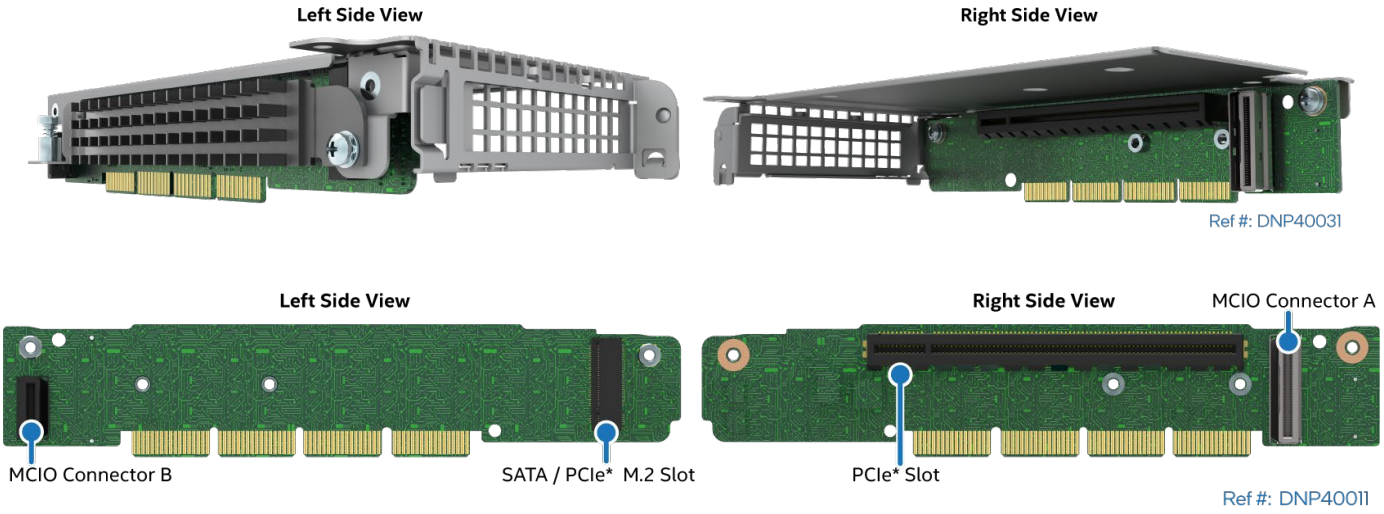
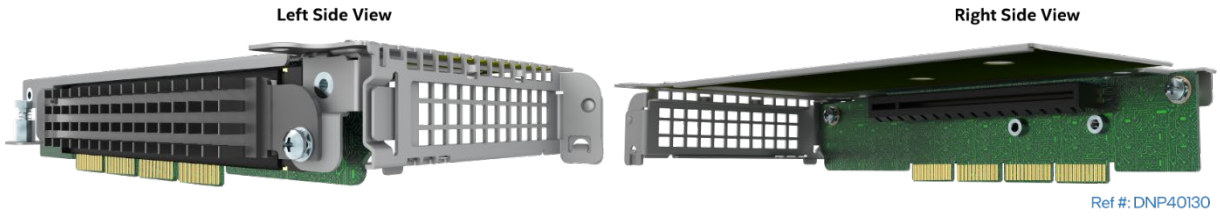


Figure 198. 1U MCIO Riser Card



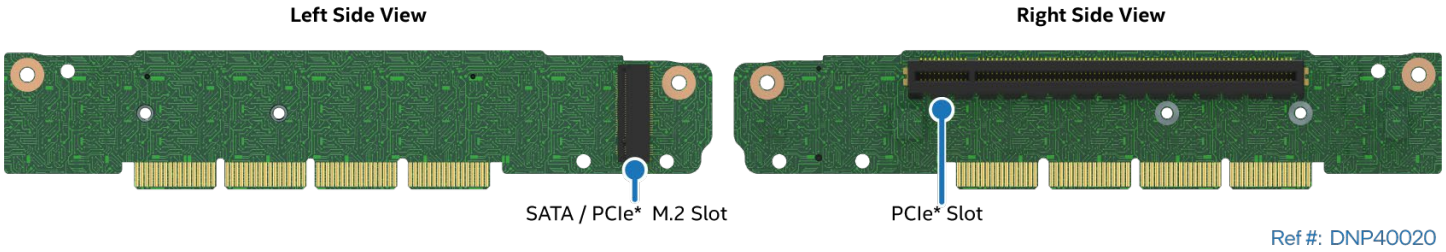


Figure 199. 1U Standard Riser Card

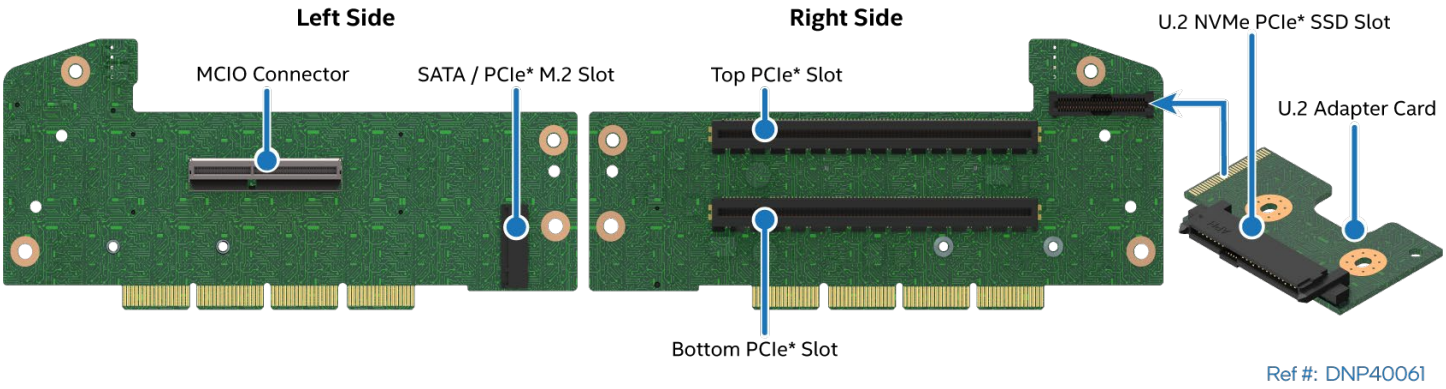


Figure 200. 2U Riser Assembly and Riser Card Features

7.5.1 Standard Riser Assembly Removal

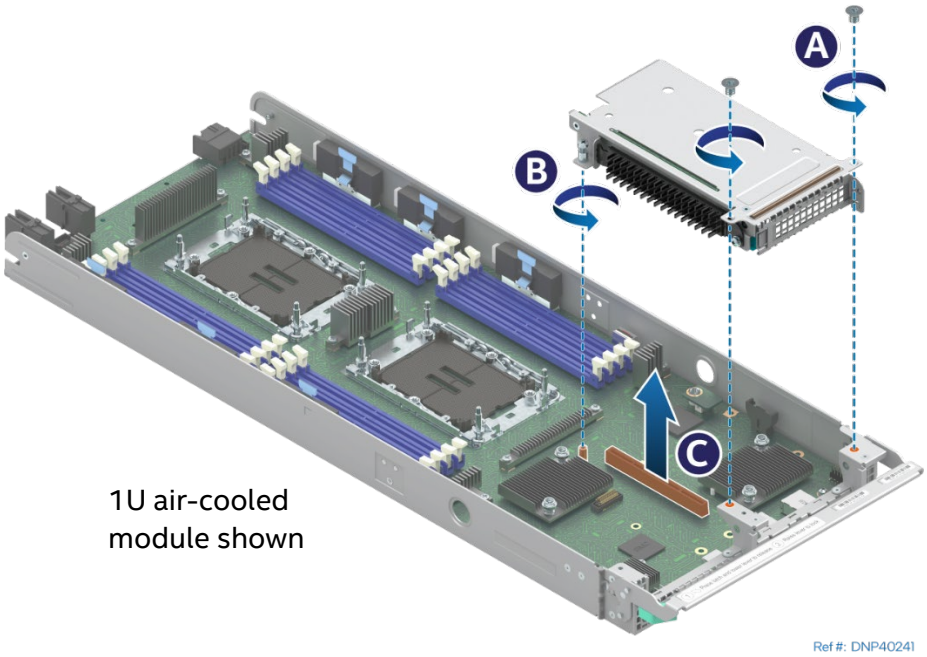


Figure 201. Removing Riser Assembly

1. Using Phillips screwdriver #1 remove two screws that secure the riser assembly to the front of the module (see Letter A).
2. Using Phillips screwdriver #2 loosen the captive screw at the back of the riser assembly. (see Letter B)
3. Carefully remove the riser assembly by lifting it up and away from the module (see Letter C).

7.5.2 MCIO* Riser Assembly Removal

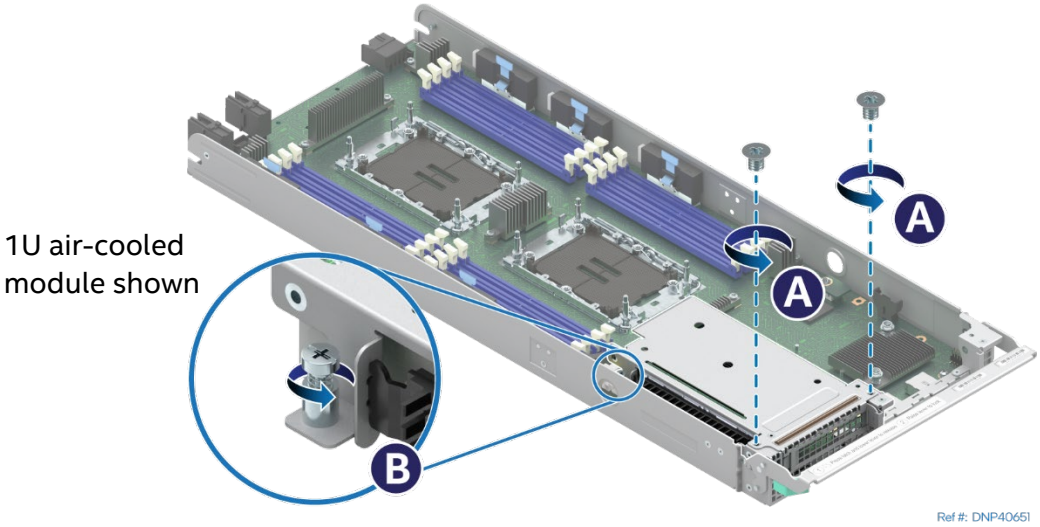


Figure 202. Removing Screws for MCIO Riser Assembly

1. Using Phillips screwdriver #1 remove two screws that secure the riser assembly to the front of the module (see Letter A).
2. Using Phillips screwdriver #2 loosen the captive screw at the back of the riser assembly. (see Letter B)

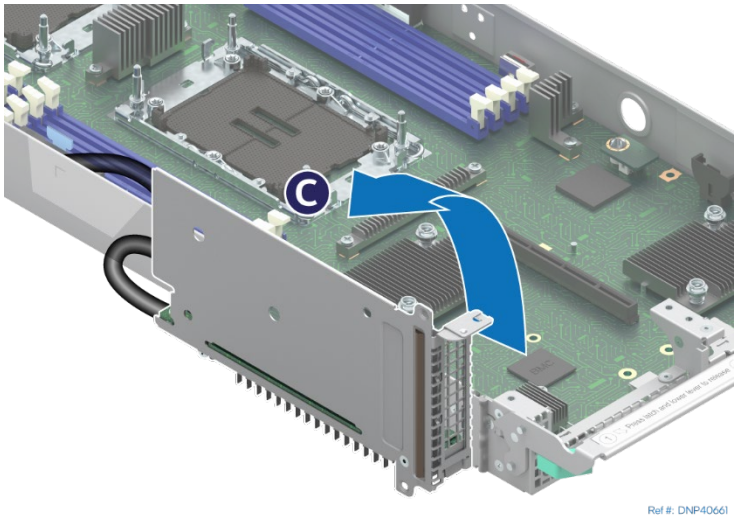


Figure 203. Tilting MCIO* Riser Assembly

3. Disconnect the riser board from the riser slot connector by lifting it up.
4. Tilt the riser assembly on its side (see Letter C) to make room to install the add-in card.

7.5.3 PCIe* Add-In Card Replacement

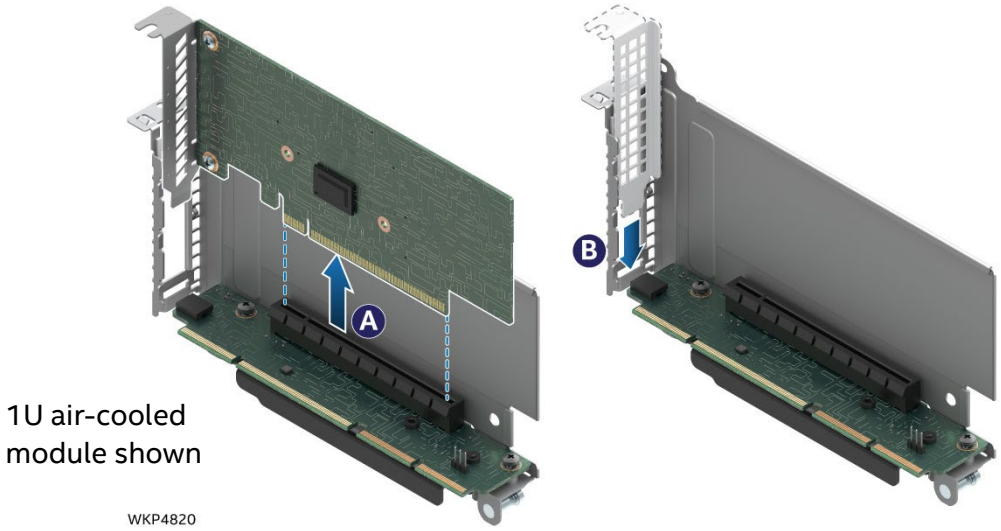


Figure 204. Add-In Card Removal

1. Carefully remove the add-in card from the PCIe slot (see Letter A).
2. If not installing a new add-in card, carefully install the original metal filler plate over the opening on the metal frame of the riser assembly (see Letter B).

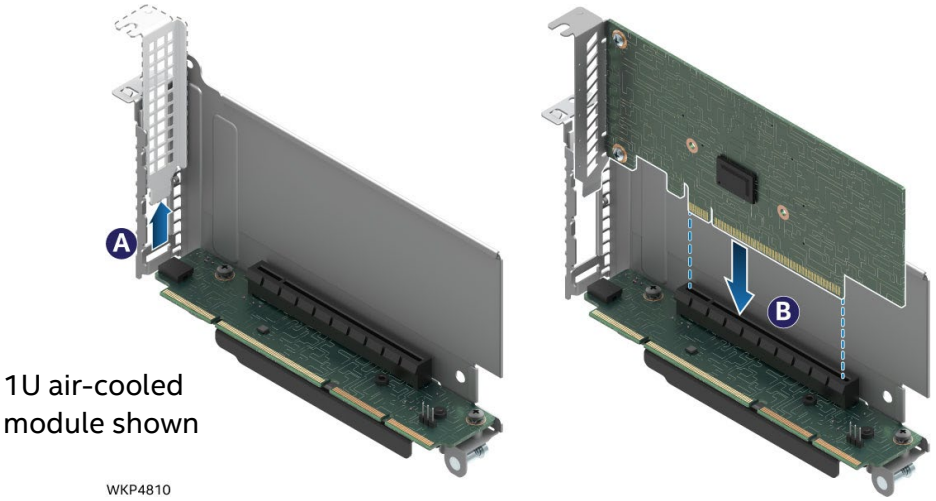


Figure 205. Add-In Card Installation

3. If installed, carefully remove the original rear metal filler plate from the metal frame of the riser assembly (see Letter A).
4. Align the rear bracket of the add-in card to the rear opening of the riser assembly.
5. Carefully insert the add-in card down into the PCIe* slot (see Letter B).
6. Ensure that the add-in card is fully seated.
7. If necessary, repeat the installation steps for additional riser card.
8. Reinstall the riser card assembly into the module (see Section 7.5.4).

7.5.4 Standard Riser Assembly Installation

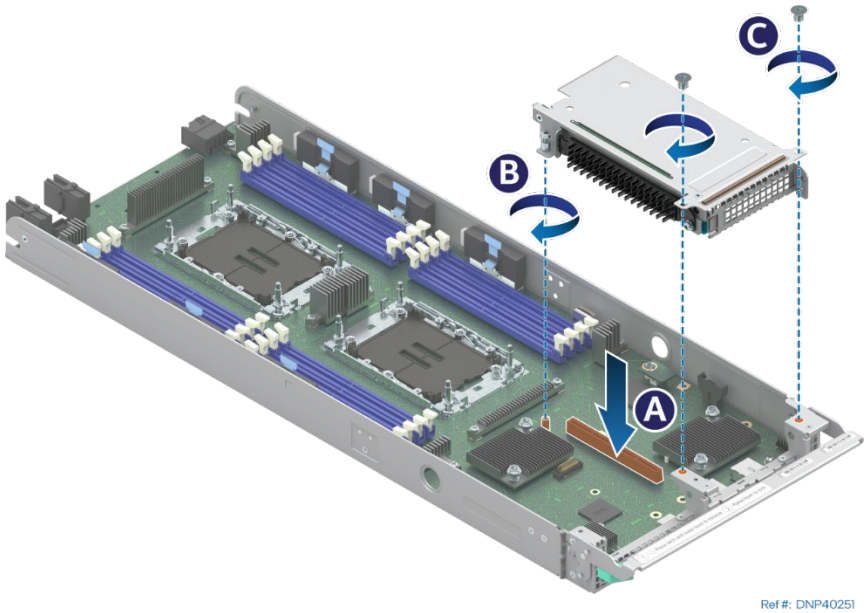
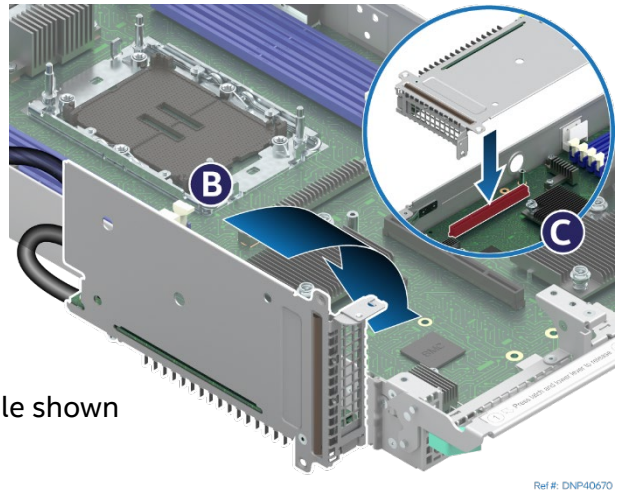


Figure 206. Installing Standard Riser Assembly into Chassis

1. Align the riser card with the riser slot on the server board (see Letter A).
2. Carefully push down on the riser assembly until the riser card is securely seated in the riser slot.
3. Ensure that the screw holes of the riser assembly are aligned with the mounting holes of the module.
4. Using Phillips screwdriver #2 tighten the captive screw at the back of the riser assembly to 5 in-lb. (see Letter B)
5. Using Phillips screwdriver #1 install two screws to secure the riser assembly to the front of the module. Tighten to 5 in-lb. (see Letter C).

7.5.5 MCIO* Riser Assembly Installation



1U air-cooled module shown

Figure 207. Installing the MCIO Riser Assembly

1. Tilt the riser assembly down and align the riser card with the riser slot on the server board (see Letter B).
2. Carefully push down on the riser assembly until the riser card is securely seated in the riser slot (see Letter C).

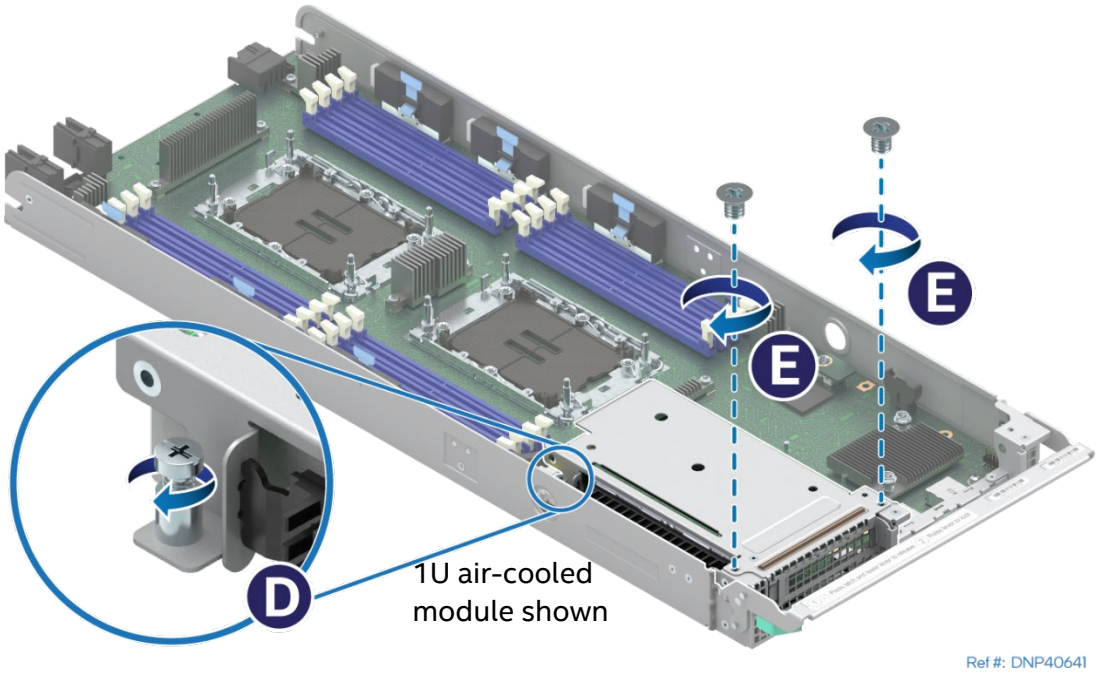


Figure 208. Securing the MCIO Riser Assembly

3. Ensure that the screw holes of the riser assembly are aligned with the mounting holes of the module.
4. Using Phillips screwdriver #2 tighten the captive screw at the back of the riser assembly to 5 in-lb. (see Letter D)
5. Using Phillips screwdriver #1 install two screws to secure the riser assembly to the front of the module. Tighten to 5 in-lb. (see Letter E).

7.5.6 Riser Assembly Installation into Liquid-Cooled Modules

The liquid-cooled modules D50DNP1MHCPLC and D50DNP1MFALLC use the same riser assemblies that are used for air-cooled modules. The procedures describing riser assmply installation into air-cooled modules (Section 7.5.4 or Section 7.5.5) should be followed for liquid-cooled modules. But there is one important difference that customers must observe.

There are three thin thermal pad strips attached to the conduction plates around each riser card slot. These strips conduct the heat from the M.2 SSD via the cold plate and riser bracket on the riser card. These strips are made from a sticky thermal interface material and they stick to both surfaces they contact: to the cooling loop conduction plate on one side and to the M.2 SSD cold plate and riser bracket on another side. These thin strips can be easily damaged and/or displaced when a riser assembly is removed. If they displaced crossing the riser slot and a user does not notice that when installing the riser assembly, the thermal pad will be jammed into the riser slot making it inoperable. The server board replacement will be required to restore the system.

Before installing a riser assembly into a liquid-cooled module, make sure these thermal pads are attached to the conduction plate in their designated places and do not cross the riser slot.

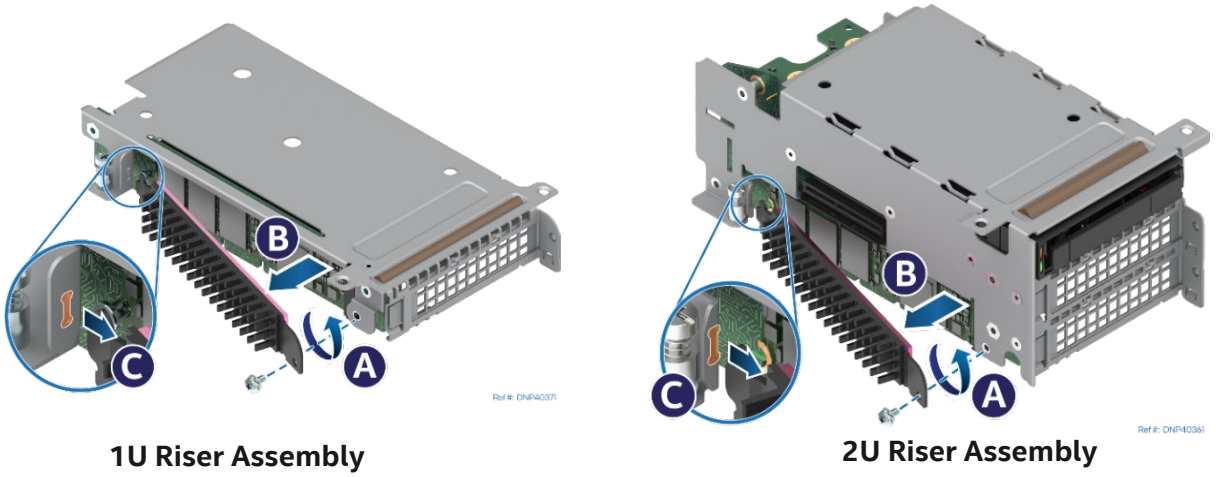
7.6 M.2 SSD Replacement

7.6.1 M.2 SSD and Heat Sink Replacement for Air-Cooled Configurations

Required Tools and Supplies

- Replacement PCIe* / SATA M.2 SSD
- M.2 heat sink kit (DNPM2HS) for each replacement M.2 SSD (recommended)
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1

This procedure applies to M.2 storage replacement for both 1U and 2U riser assemblies with illustrations showing differences where applicable. Remove the riser assembly that the M.2 SSD is attached to (see Section 7.5).

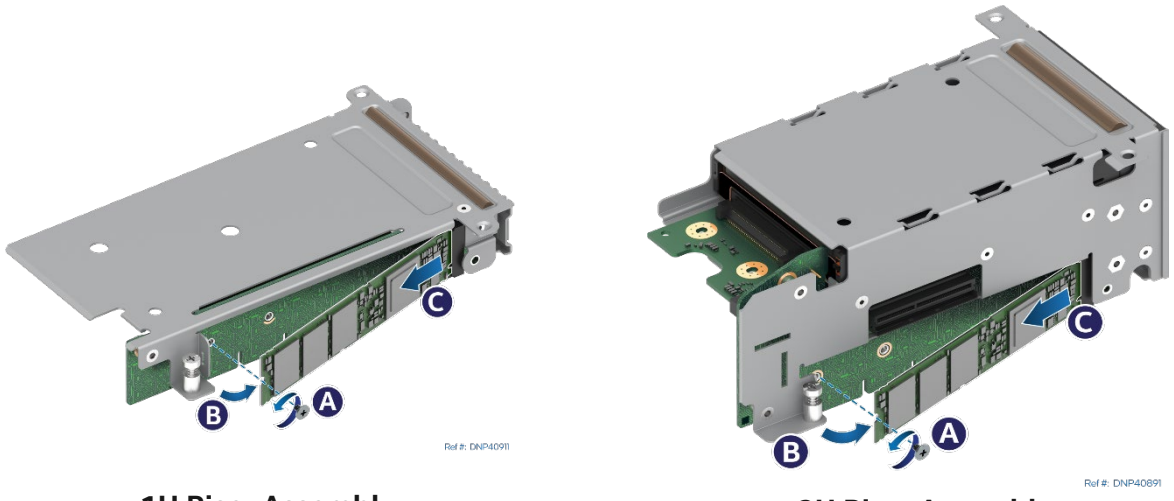


1U Riser Assembly

2U Riser Assembly

Figure 209. Removing Air-Cooled M.2 Heat Sink

1. Locate the heat sink on the left side of the riser assembly and remove the screw (see Letter A).
2. Slowly pull the free end of the heat sink outwards to detach the TIM from the SSD (see Letter B).
3. Slide the heat sink out in the direction shown (see Letter C).



1U Riser Assembly

2U Riser Assembly

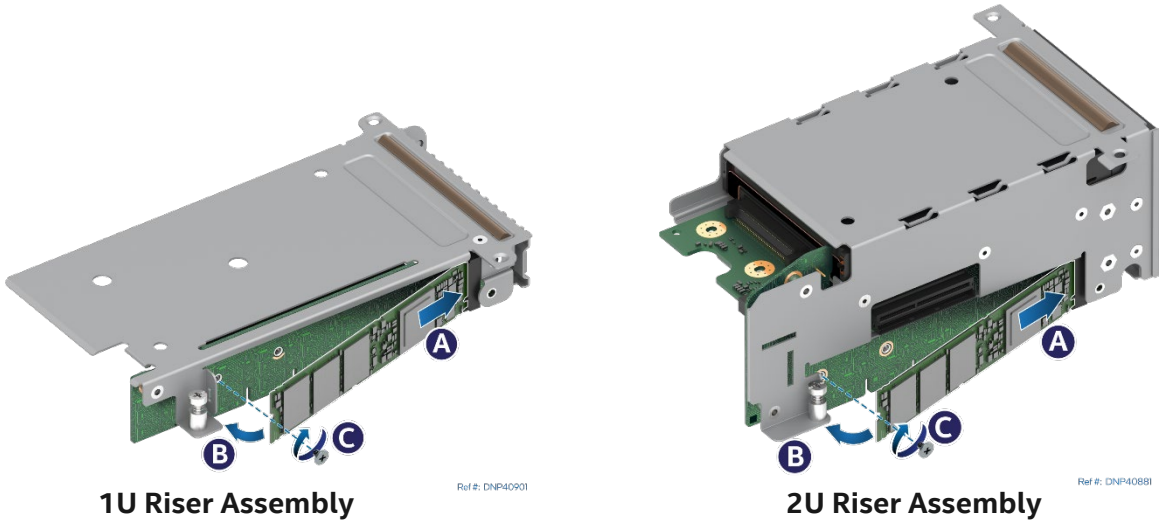
Figure 210. Removing Air-Cooled M.2 SSD

4. Remove the screw securing M.2 SSD to the mounting standoff on the left side of the riser assembly (see Letter A).
5. Carefully rotate outward the free end of the M.2 SSD (see Letter B).

6. Grasp the M.2 SSD by its edges and remove it from the connector in the direction shown (see Letter C).
7. Carefully peel off the thermal pad from the rear side of the SSD and assess if it can be reused with the new SSD.

If no SSD is being installed, follow step 8 and step 9. If the SSD is being replaced, skip step 8 and step 9:

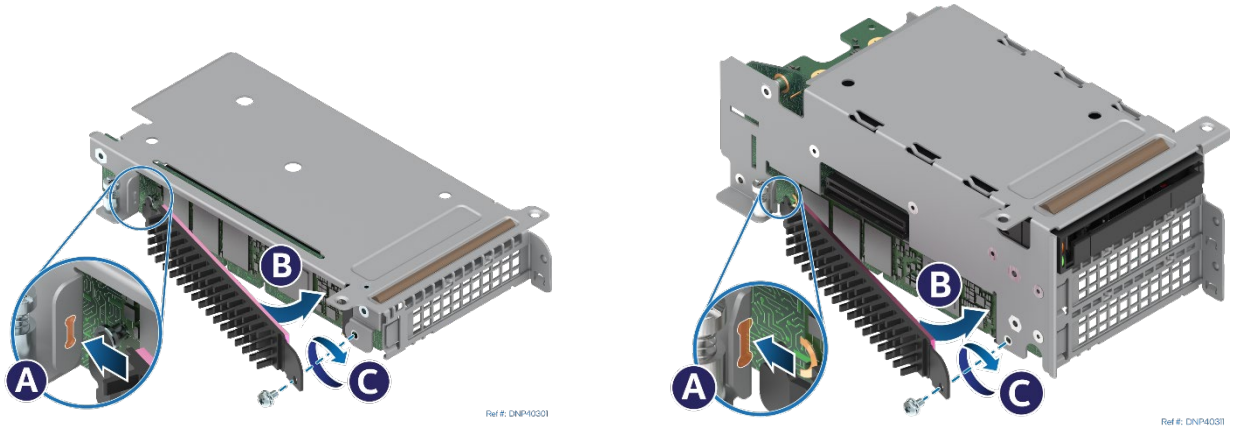
8. Return the previously removed screw to the M.2 mounting standoff.
9. Reinstall the M.2 SSD heat sink onto the riser assembly.



1U Riser Assembly **2U Riser Assembly**

Figure 211. Installing Air-Cooled M.2 SSD

10. Remove the screw (if present) from the M.2 mounting standoff on the left side of the riser assembly.
11. Attach a new or used thermal pad to the rear side of the SSD under the tallest SSD component. This is usually the SSD controller IC.
12. Align the notch within the SSD edge connector with the key in the M.2 connector and insert the SSD into the connector (see Letter A).
13. Push the free end of the SSD towards the riser assembly (see Letter B).
14. Secure the M.2 SSD to the mounting standoff with the previously removed screw (see Letter C).



1U Riser Assembly **2U Riser Assembly**

Figure 212. Installing Air-Cooled M.2 Heat Sink

15. If installing a new heat sink, peel off the protective film from the thermal interface material.
16. Insert the tab at the edge of the heat sink into the slot on the riser assembly (see Letter A) making sure the heat sink side covered with the thermal pad is facing the M.2 SSD.
17. Push the loose end of the heat sink towards the SSD (see Letter B).
18. Secure the heat sink to the riser assembly with a screw (see Letter C).

7.6.2 M.2 SSD and Cold Plate Replacement for Liquid-Cooled Configurations

Required Tools and Supplies

- Replacement PCIe* / SATA M.2 SSD
- M.2 cold plate kit (DNPM2LCHS) for each replacement M.2 SSD (recommended)
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1

Liquid-cooled configurations use the M.2 SSD cold plate to absorb the heat generated by the SSD. A thermal pad made from a thermal interface material Laird Tflex HD7100* should be installed on the rear side of the M.2 SSD.

Before following steps in this section, remove the riser assembly that the M.2 SSD is attached to (see Section 7.5).

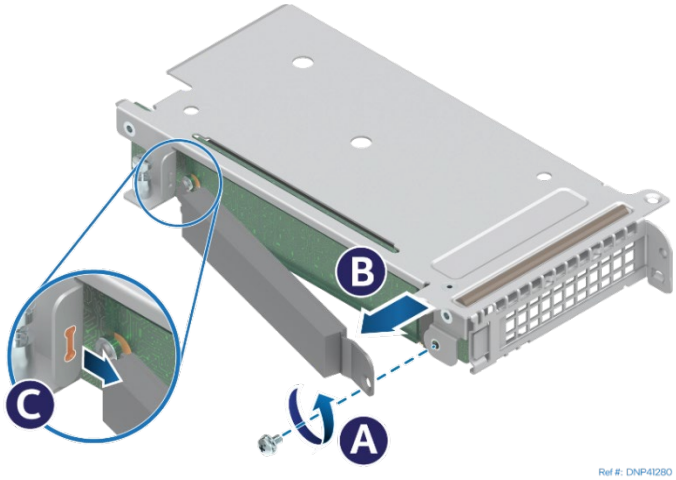


Figure 213. Removing M.2 Cold Plate

1. Locate the cold plate on the left side of the riser assembly and remove the screw (see Letter A).
2. Slowly pull the free end of the cold plate outward to detach the TIM from the SSD (see Letter B).
3. To remove the cold plate, slide it in the direction shown (see Letter C).

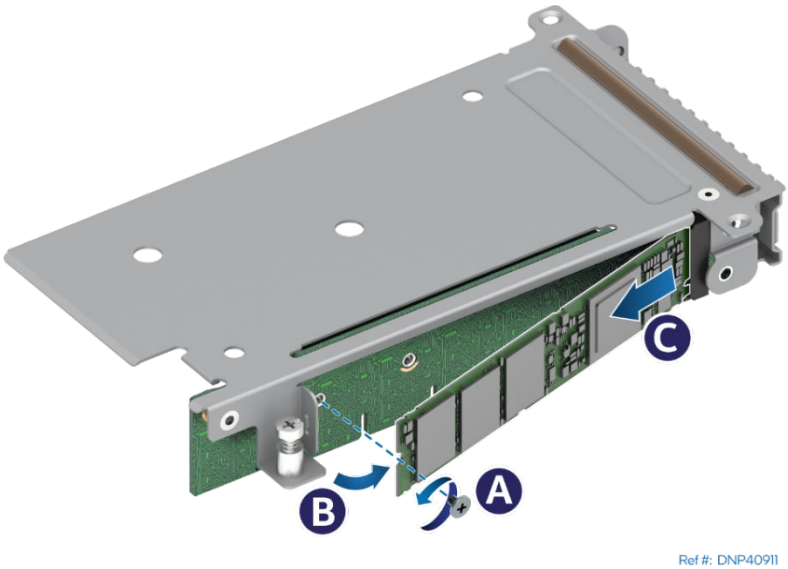


Figure 214. Removing Liquid-Cooled M.2 SSD

4. Remove the screw securing M.2 SSD to the mounting standoff on the left side of the riser assembly (see Letter A).
5. Carefully rotate outward the free end of the M.2 SSD away from the riser assembly (see Letter B).
6. Grasp the M.2 SSD by its edges and remove it from the connector in the direction shown (see Letter C). Carefully peel off the thermal pad from the rear side of the SSD and assess if it can be reused with the new SSD.

If no SSD is being installed, follow step 7 and step 8. If the SSD is being replaced, skip step 7 and step 8.

7. Return the previously removed screw to the M.2 mounting standoff.
8. Reinstall the M.2 cold plate onto the riser assembly.

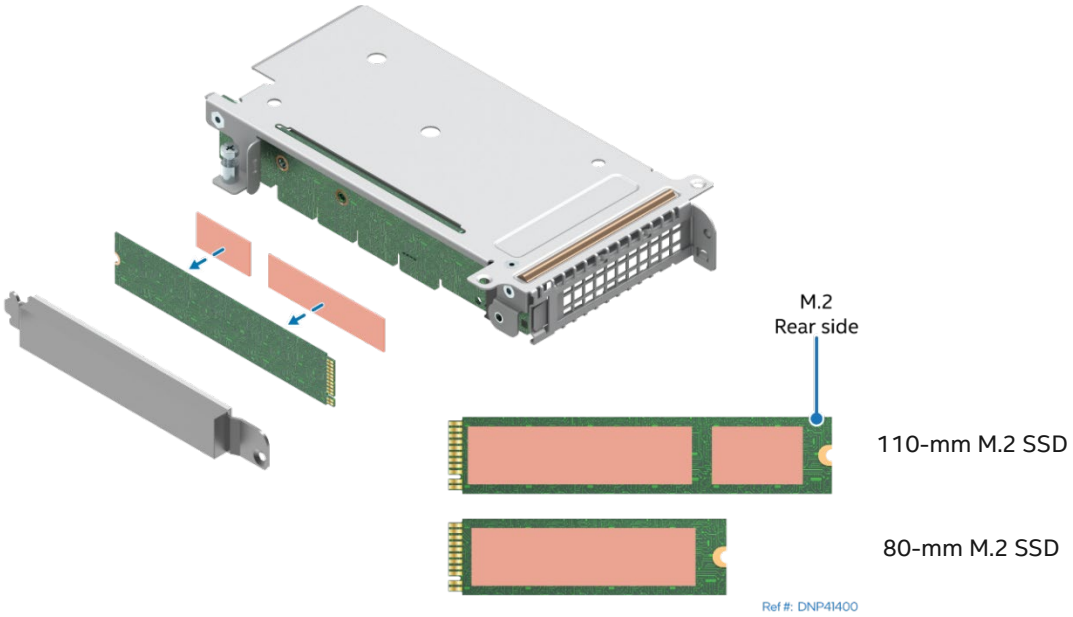


Figure 215. Installing Thermal Interface Material (TIM) on M.2 SSD

9. Attached a new or used thermal pad to the rear side of the SSD. Center the pad vertically and horizontally.

Note: The thermal interface material pads come in two different sizes. For 80-mm M.2 SSD use only the long pad. For 110-mm M.2 SSD, combine the long and the short pads together.

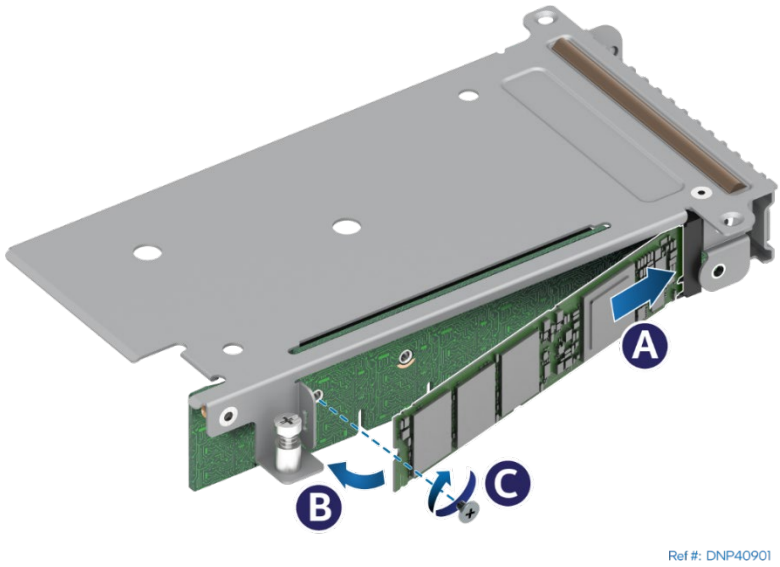


Figure 216. Installing M.2 SSD

10. Align the notch within the SSD edge connector with the key in the M.2 connector and insert the SSD into the connector (see Letter A).
11. Push the free end of the SSD towards the riser assembly (see Letter B).
12. Secure the M.2 SSD to the mounting standoff with the previously removed screw (see Letter C).

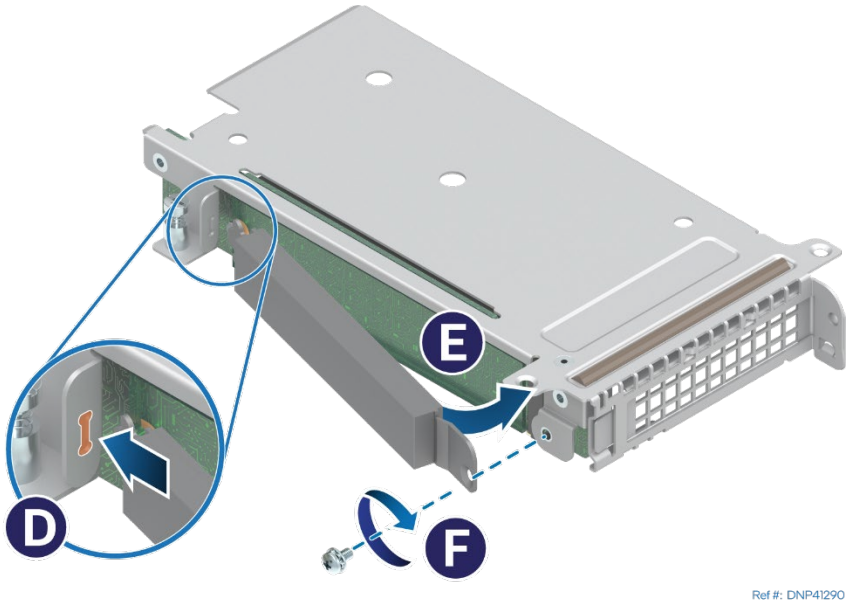


Figure 217. Installing M.2 Cold Plate

13. If installing a new cold plate, peel off the protective film from the thermal interface material.
14. Insert the tab at the edge of the cold plate into the slot on the riser assembly (see Letter D) making sure the heat sink side covered with the thermal pad is facing the M.2 SSD.
15. Push the loose end of the cold plate towards the SSD (see Letter E).
16. Secure the cold plate to the riser assembly with a screw (see Letter F).

7.7 Liquid-Cooling Loop Replacement (D50DNP1MHCPLC Module)

Note: Remove all the DIMMs from the memory slots before replacing the liquid-cooling loop (see Section 7.4.2).

The components of the liquid-cooled loop are shown in the following figure.

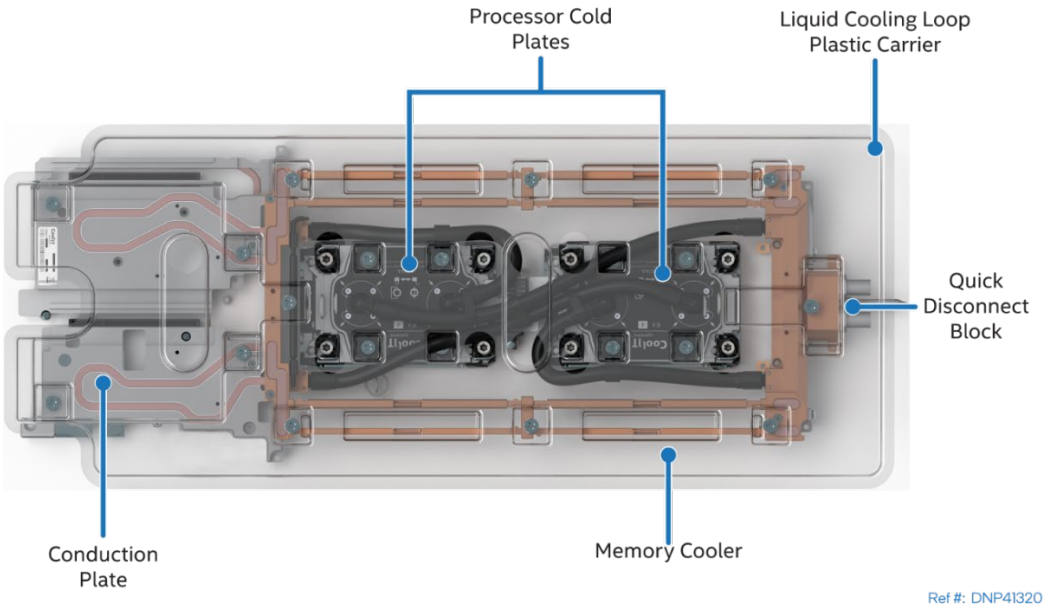


Figure 218. Liquid-Cooling Loop Components

Required Tools and Supplies

- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #2
- Torx T30* screwdriver
- D50TNP liquid-cooling VR TIM application tools (TNPLCVRTLS)
- D50TNP liquid-cooling VR TIM application nozzles (TNPLCVRTNZ)
- D50TNP liquid-cooling VR TIM compound (TNPLCVRCMPD)

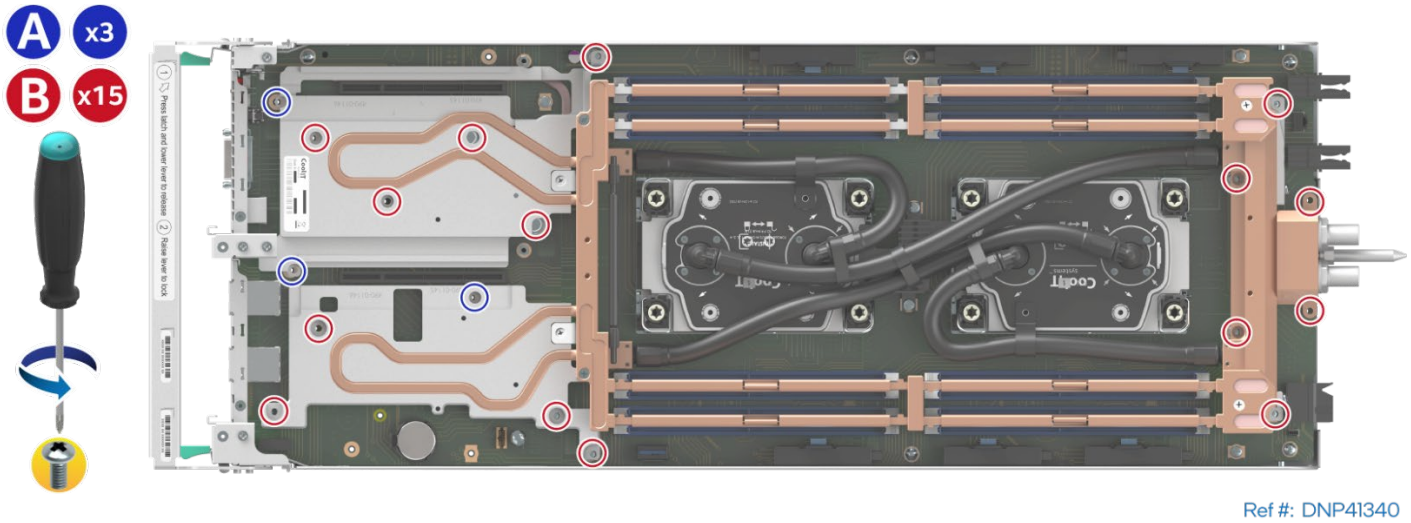


Figure 219. Removing Screws on Liquid-Cooling Loop

1. Remove all screws used to secure the liquid-cooling loop to the server board (see Letter A and Letter B).

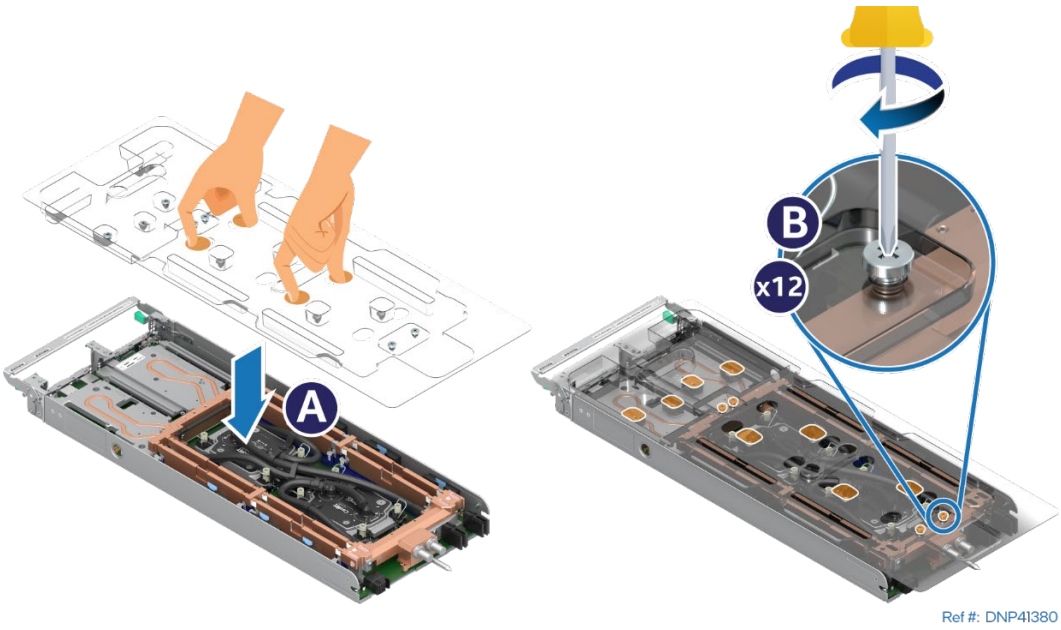


Figure 220. Installing the Liquid-Cooling Loop Carrier

Note: The liquid-cooling loop comes from the factory with a plastic carrier attached. The carrier is used during the installation and removal of the liquid-cooling loop in the module.

2. Place the plastic carrier onto the cooling loop aligning the captive screws on the plastic carrier with the screw holes on the liquid-cooling loop (see Letter A).
3. Fasten all the screws (see Letter B).

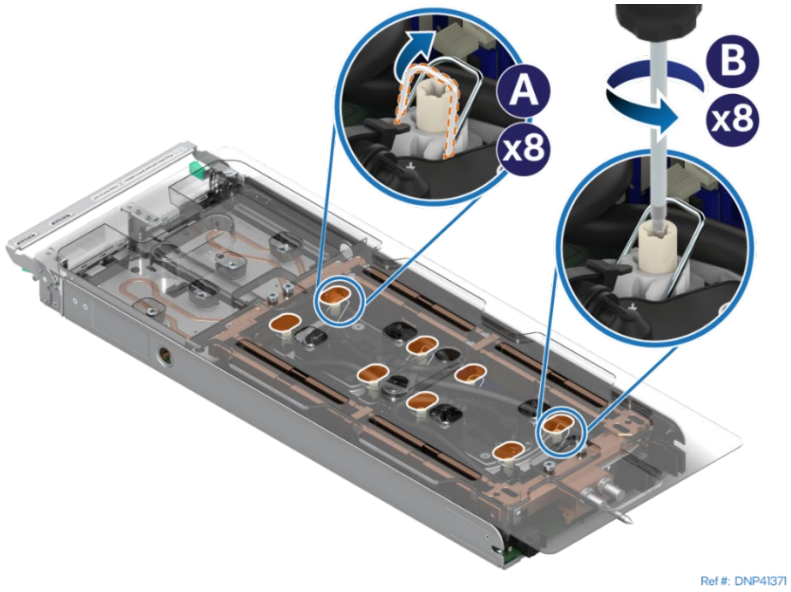


Figure 221. Loosening Processor Cold Plates

4. Ensure that all the anti-tilt wires on the cold plates are in the outward position (see Letter A).
5. Fully loosen all four fasteners on each cold plate in any order (see Letter B). General bolt loosening order, such as diagonal sequence, can be used.

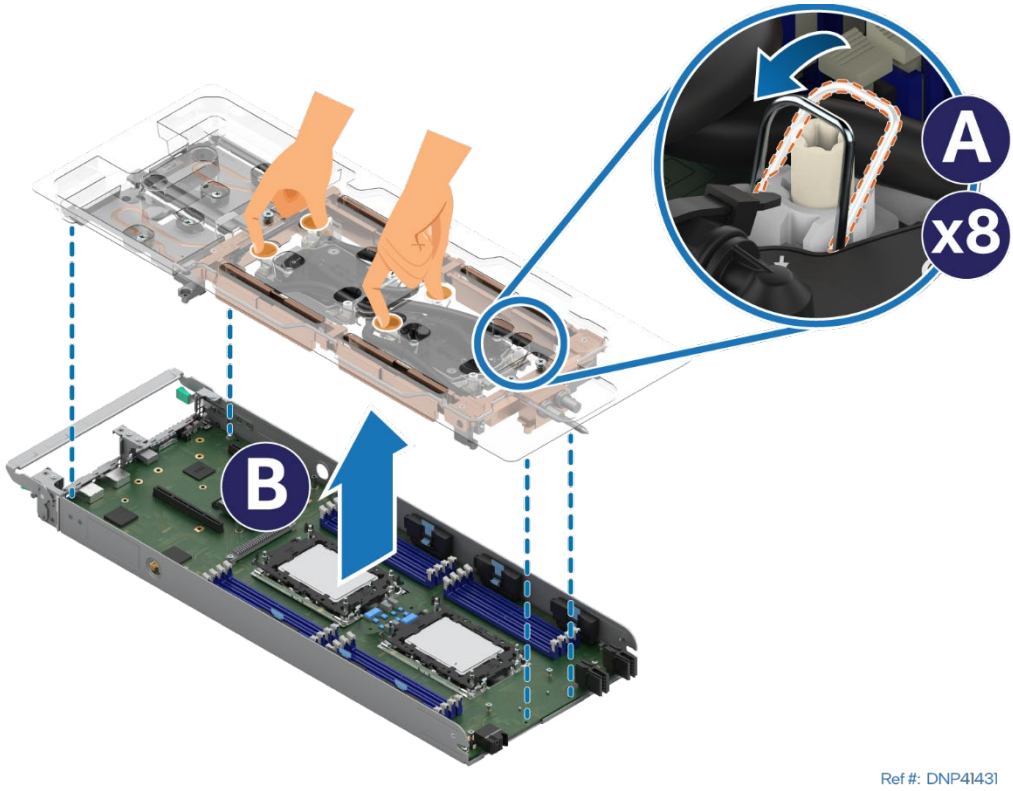


Figure 222. Removing Liquid-Cooling Loop

6. Set all the anti-tilt wires on the cold plates to the inward position (see Letter A).
7. With your fingers, hold the plastic carrier (with the liquid-cooling loop attached to it) and carefully lift it up and away from the module (see Letter B).
8. With the processor facing up, set the liquid-cooling loop carrier with the liquid-cooling loop attached to it down onto a flat surface.

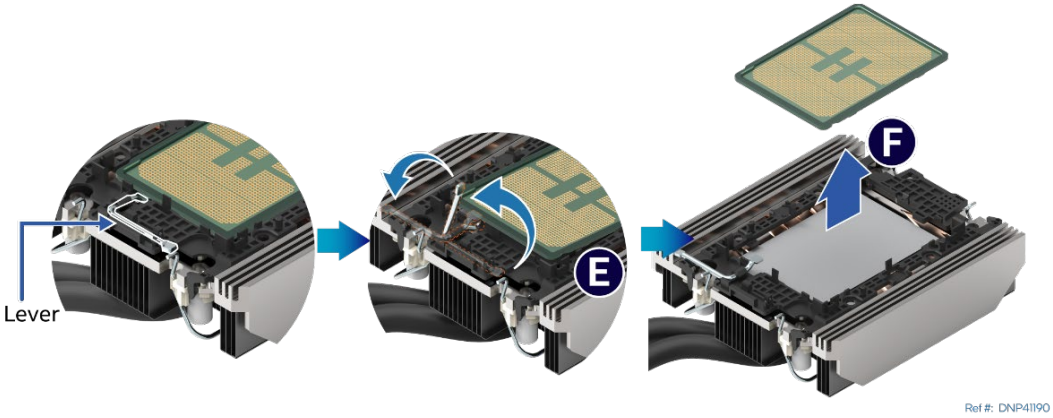


Figure 223. Processor Removal from Processor Carrier Clip and Processor Cold Plate

9. Rotate the lever (see Letter E) from right to left until the processor lifts from the processor carrier clip.
10. Holding down the processor carrier clip, carefully lift the processor out of the processor carrier clip (see Letter F). Put the processors onto the shipping tray.

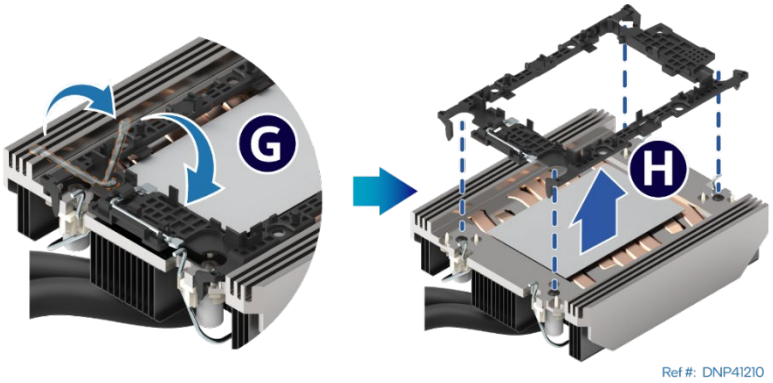


Figure 224. Processor Carrier Clip Removal from Processor Cold Plate

11. Return the lever to the original position (see Letter G).
12. Unlatch the hook on each corner of the processor carrier clip and lift it from the processor cold plate (see Letter H).
13. Carefully clean the processor heat spreader, processor carrier clip and the cold plate from the remaining TIM.
14. Ensure that each socket is free of damage or contamination before reinstalling the processor and processor carrier clip.

Caution: If debris is observed, blow it away gently with an air blower. Do not remove it manually, such as with tweezers.

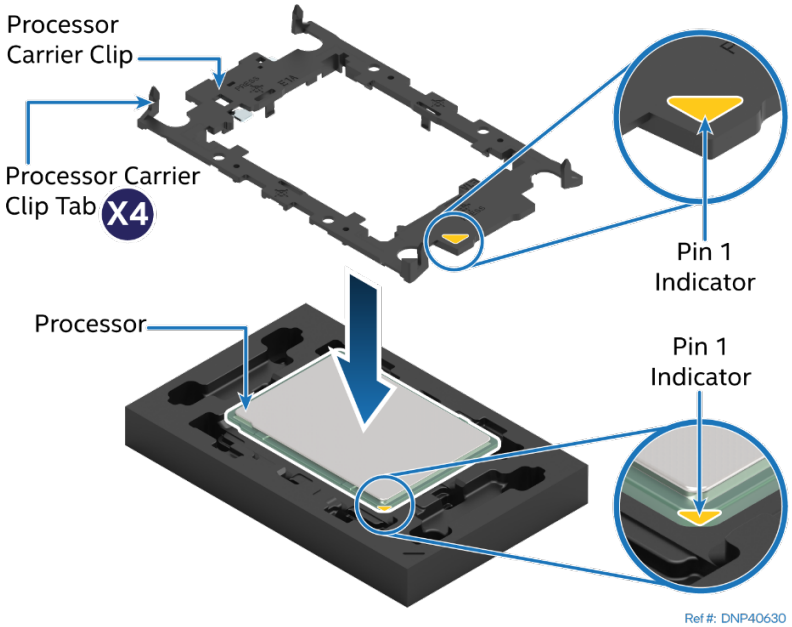


Figure 225. Installing Processor Carrier clip onto Processor – Part 1

15. Align the Pin 1 indicator on the processor carrier clip with the Pin 1 indicator of the processor.
16. With the processor still in its tray, place the processor carrier clip over the processor.

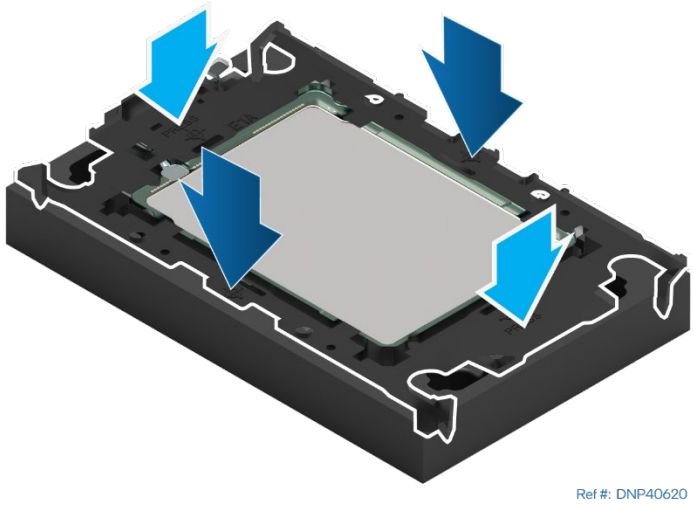


Figure 226. Installing Processor Carrier Clip onto Processor – Part 2

17. Gently press down simultaneously on two opposite sides of the processor carrier clip until it clicks in place.
18. Repeat step 17 for the other two sides.

Caution: Do not touch the socket pins. The pins inside the processor socket are extremely sensitive. A damaged processor socket may produce unpredictable system errors.

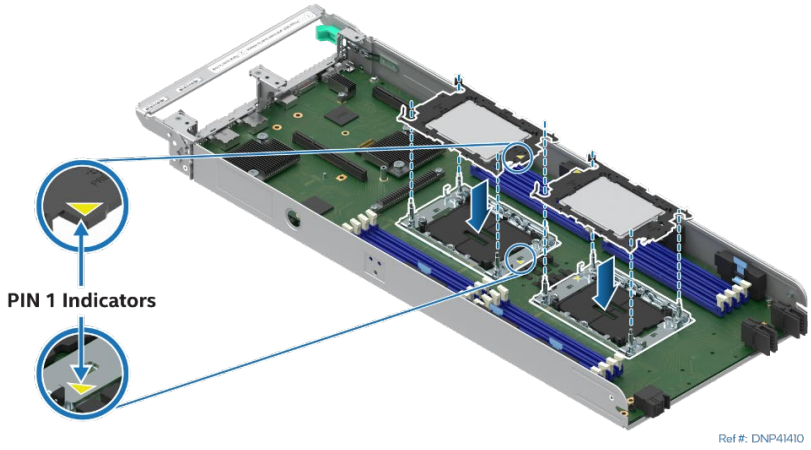


Figure 227. Align Processors and Processor Carrier Clips with Sockets

19. Align the Pin 1 indicators of the processor carrier clip and processor with the Pin 1 indicator on the bolster plate. Lower the processor with carrier clip onto the bolster plate.

Caution: Processor socket pins are delicate and bend easily. Use extreme care when placing the processor and carrier clip onto the processor socket. Do not drop it.

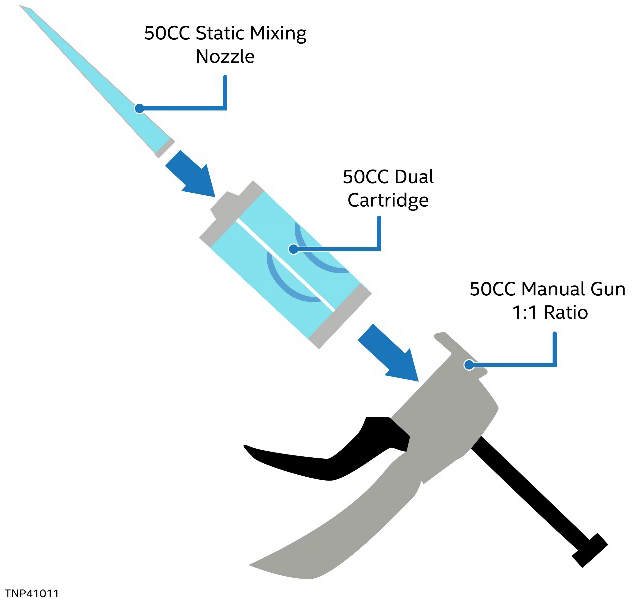


Figure 228. Assembling the Manual Applicator

20. Assemble the Bergquist SS95407 applicator, Bergquist GF3500S35 thermal gap filler cartridge, and Bergquist SS95437 nozzle as shown in the previous figure.

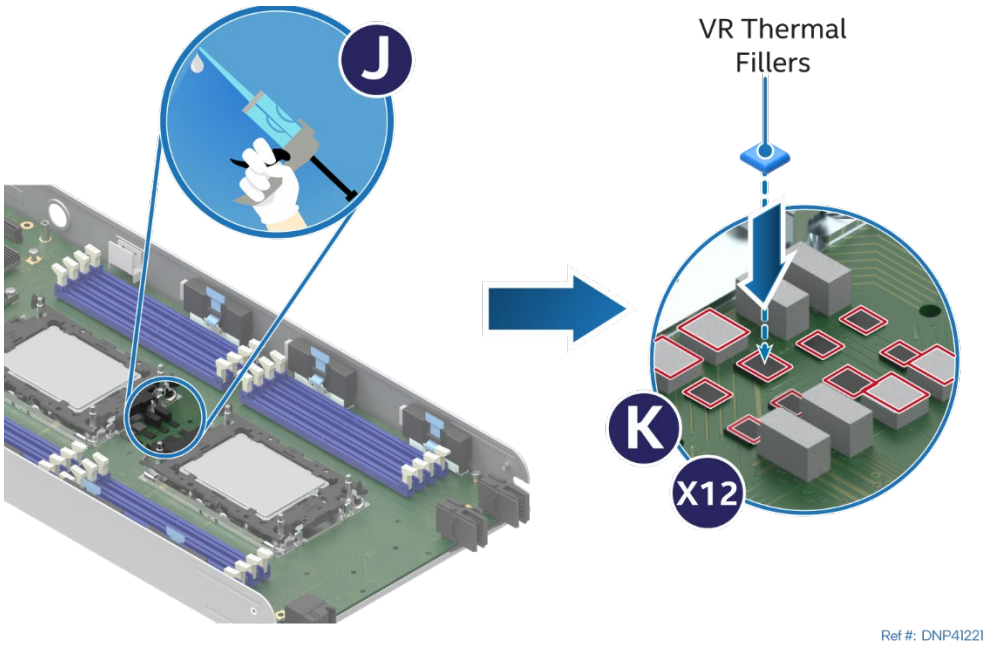


Figure 229. Applying Center VR Thermal Gap Filler

21. Using the assembled applicator (see Letter J), apply the thermal gap filler on top of the twelve center CPU VR components (see Letter K).

Notes:

- For 4th & 5th Gen Intel® Xeon® Scalable XCC and for Intel® Xeon® CPU Max Series processor models, apply 248 cubic millimeters of thermal gap filler to fully cover the VR components with a minimum thickness of 1 mm.
- For 4th & 5th Gen Intel® Xeon® Scalable MCC processor models, apply 423 cubic millimeters of thermal gap filler to fully cover the VR components with a minimum thickness of 1.64 mm.

22. Carefully unpack a new liquid-cooling loop.
23. Remove the protective covers from the PCIe* add-in card cold plate and from the CPU cold plates.
24. Ensure that the thermal interface material (TIM) for each cold plate is in place and the plastic protective film is removed.

Important Note: The liquid-cooling loop comes from the factory with a plastic carrier attached. The carrier is designed to be used during the installation and removal of the liquid-cooling loop in the module. After the liquid-cooling loop is installed in the module, the plastic carrier needs to be removed from it. Keep the plastic carrier for the liquid-cooling loop removal, if needed in the future.

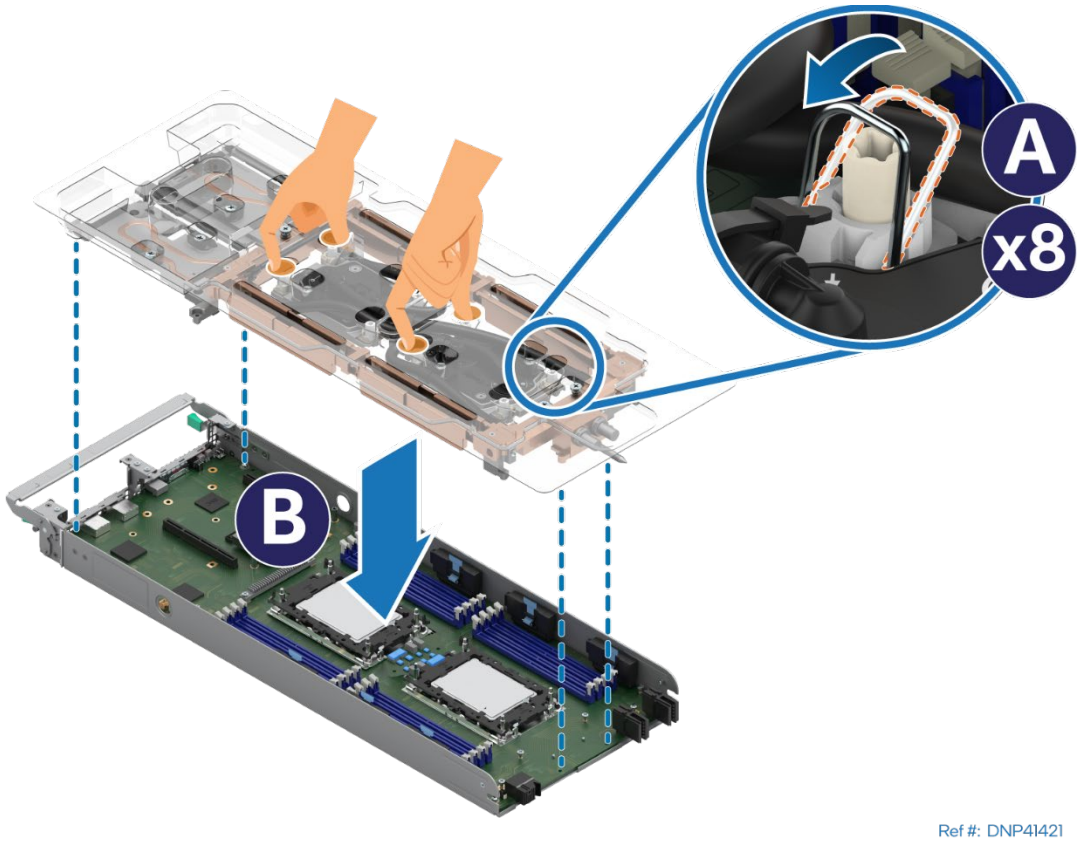


Figure 230. Installing Liquid-Cooling Loop

25. Set all eight anti-tilt wires on the cold plates to the inward position (see Letter A).
26. With your fingers, hold the liquid-cooling loop carrier and carefully place it into the module (see Letter B). Ensure that the processor cold plates are properly aligned with the bolster plate's alignment pins.

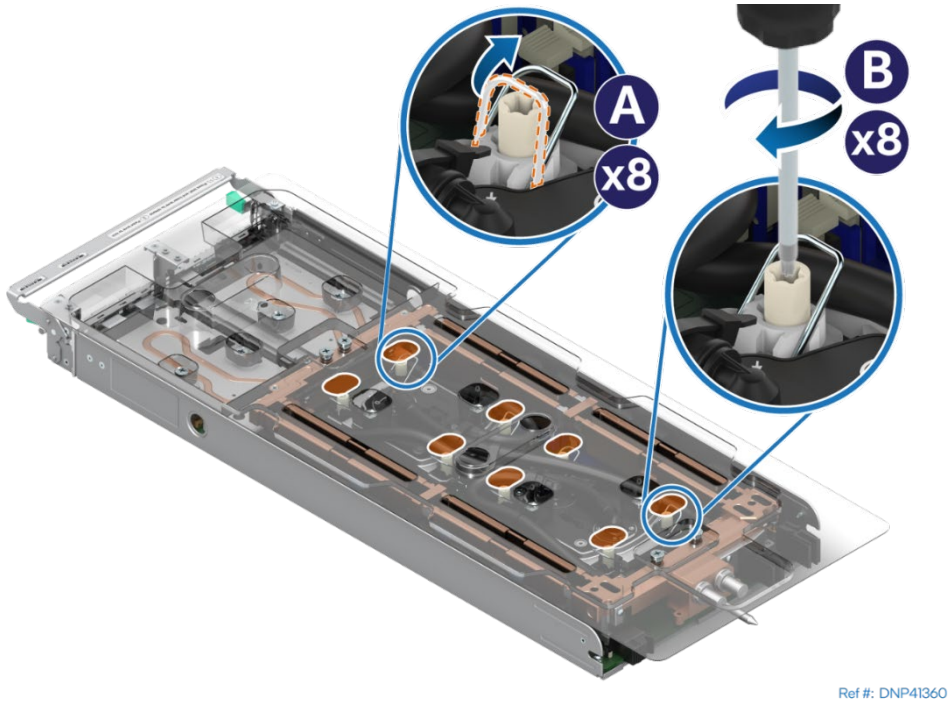


Figure 231. Securing the Processor Cold Plates

27. Set all eight anti-tilt wires on the cold plates to the outward position (see Letter A).
28. Tighten the fasteners on the cold plates to 8 in-lb using a Torx T30* screwdriver (see Letter B). No specific sequence is needed for tightening.

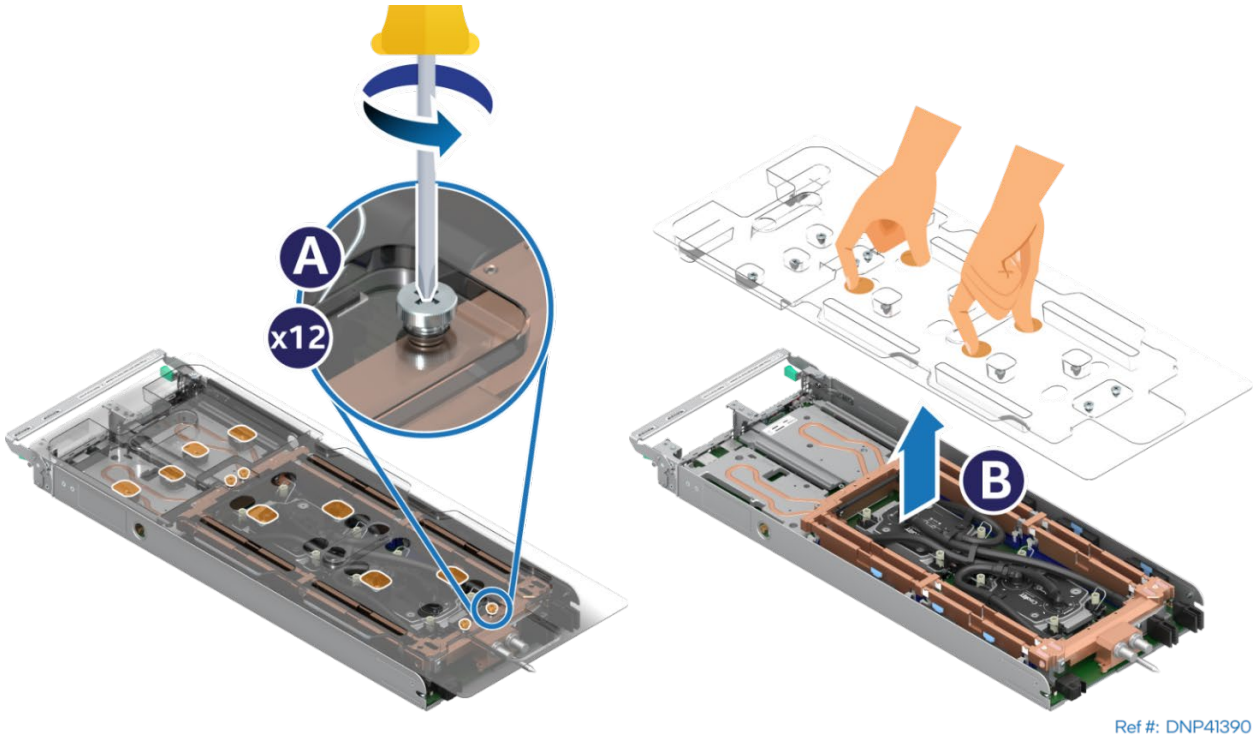


Figure 232. Removing the Liquid-Cooling Loop Carrier

29. Unscrew all 12 captive screws on the plastic carrier (see Letter A) and carefully lift the carrier up and away from the module (see Letter B).

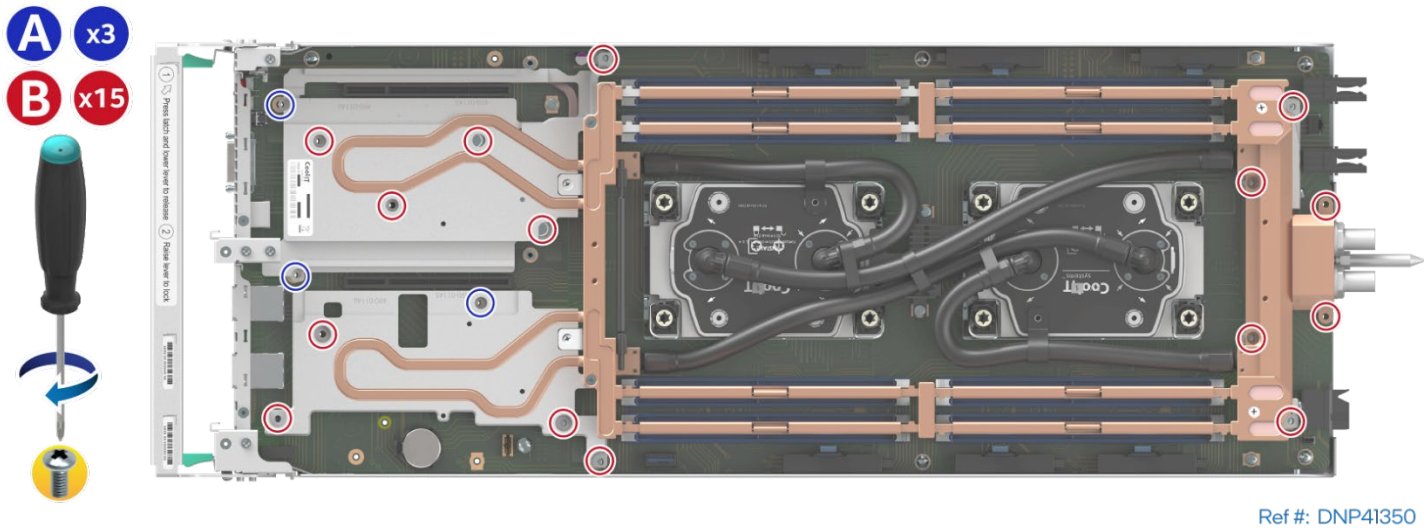


Figure 233. Securing the Liquid-Cooling Loop

30. Using three 8-mm long screws with washers (see Letter A), secure the liquid-cooling loop to the server board. Tighten to 5 in-lb.
31. Repeat the previous step using fifteen 12-mm long screws with washers (see Letter B). Tighten to 5 in-lb.

7.8 Add-In Card Replacement for Liquid-Cooled Modules (D50DNP1MHCPLC and D50DNP1MFALLC Modules)

1U liquid-cooled modules can accommodate up to two low-profile liquid-cooled PCIe* add-in cards. These models are supported:

- NVIDIA* MCX653105A-HDAL
- NVIDIA* MCX653106A-HDAL
- NVIDIA* MCX75310AAS-HEAL
- NVIDIA* MCX75310AAS-NEAL

Required Tools and Supplies

- Replacement liquid-cooled PCIe add-in card
- New thermal strips from the D50DNP M.2 heatsink liquid-cooled kit DNPM2LCHS (recommended)
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1

Note: The following steps to install PCIe add-in card should be performed along with the instructions for the add-in card.

---

1. Prepare the replacement PCIe add-in card by attaching the thermal pad to the ASIC or heat spreader as instructed in the card documentation.
2. Remove three crews securing the PCIe add-in card to the conduction plate.
3. Remove the selected riser assembly following procedure described in Section 7.5.1 or Section 7.5.2.
4. Pay attention not to damage or displace the thermal strips attached to the conduction plate.
5. Remove the PCIe add-in card following the description in Section 7.5.3.
6. Clean any residue left on the conduction plate from the thermal pad attached to the add-in card ASIC.
5. Install the replacement PCIe add-in card following the procedure described in Section 7.5.3.
6. Install the riser assembly into the module following the procedure described in Section 7.5.6.
7. Secure the PCIe add-in card to the conduction plate with three screws. Tighten to 5 in-lb.

7.9 PCIe* Accelerator Module Add-In Card Replacement (D50DNP2MFALAC Module)

The following instructions are used to replace the accelerator add-in cards on the PCIe accelerator module (D50DNP2MFALAC).

Required Tools and Supplies

- Replacement accelerator add-in card(s)
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1

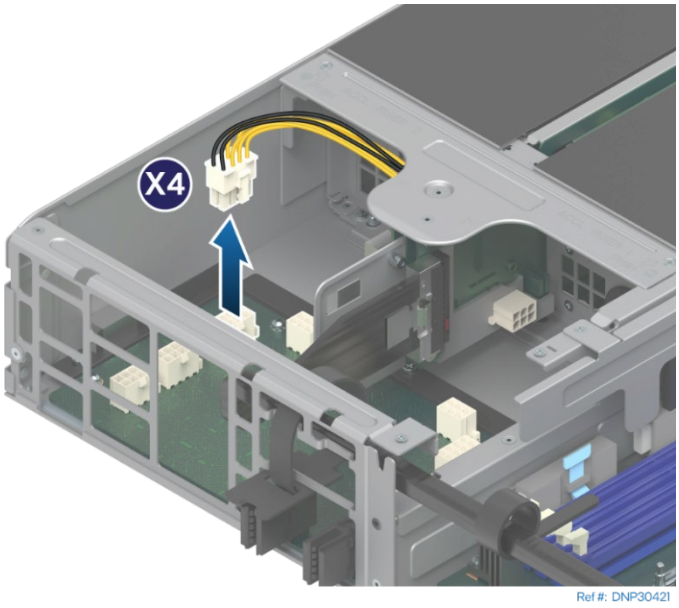


Figure 234. Disconnecting Add-In Card Power Cable

1. Disconnect all accelerator add-in card power cables from the connectors on the power board.

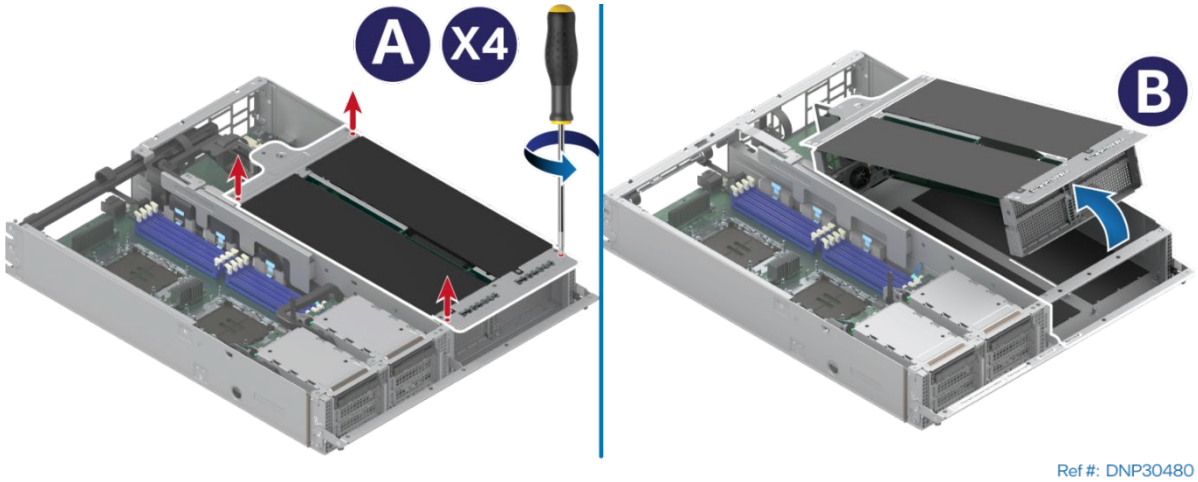


Figure 235. Removing PCIe Accelerator Module Riser Assembly

2. Loosen the four captive screws on the PCIe accelerator module assembly (see Letter A).
3. Carefully lift the PCIe accelerator module riser assembly up slightly. Then, tilt the front side away from the module (see Letter B).

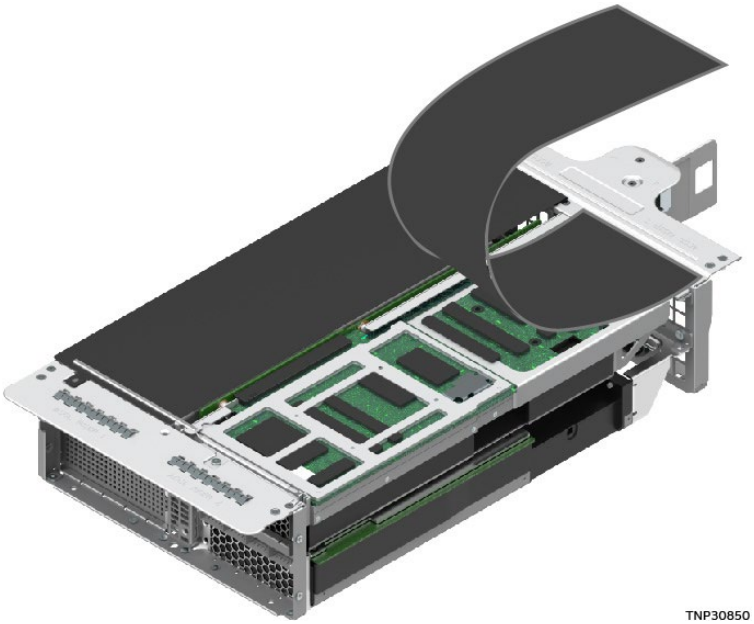


Figure 236. Lifting Flap on Front Side of Riser Assembly

4. Remove the screw that holds the flap and lift the flap up on the front side of the riser assembly.

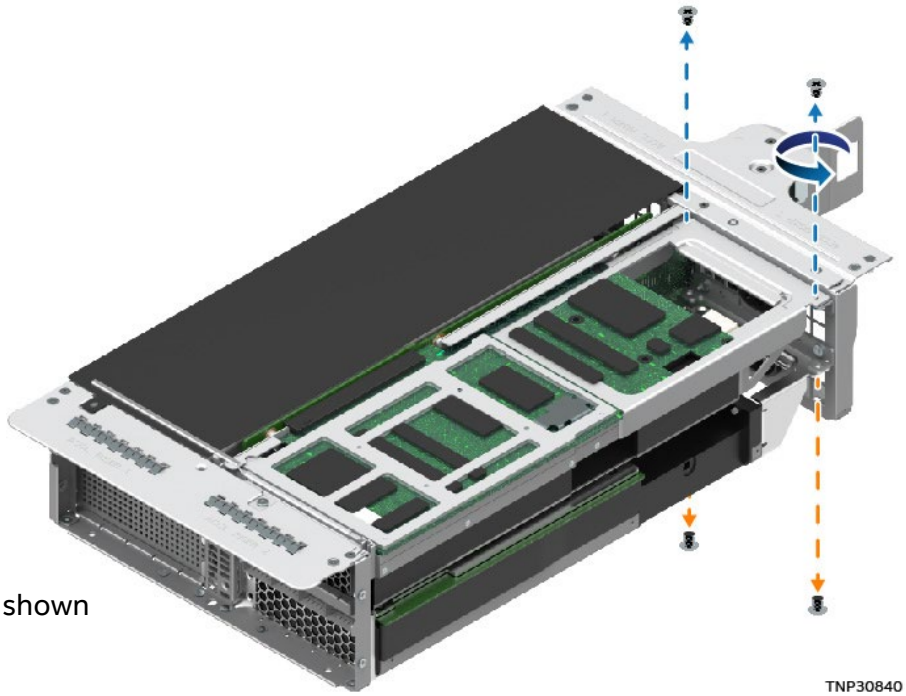


Figure 237. Detaching Accelerator Add-In Card from Riser Assembly

5. Remove the two screws on each corner of the back side to detach the accelerator add-in card from the riser assembly.

Note: The direction of the screws on the back side depends on whether the accelerator add-in card is in the top slot or bottom slot of the riser assembly.

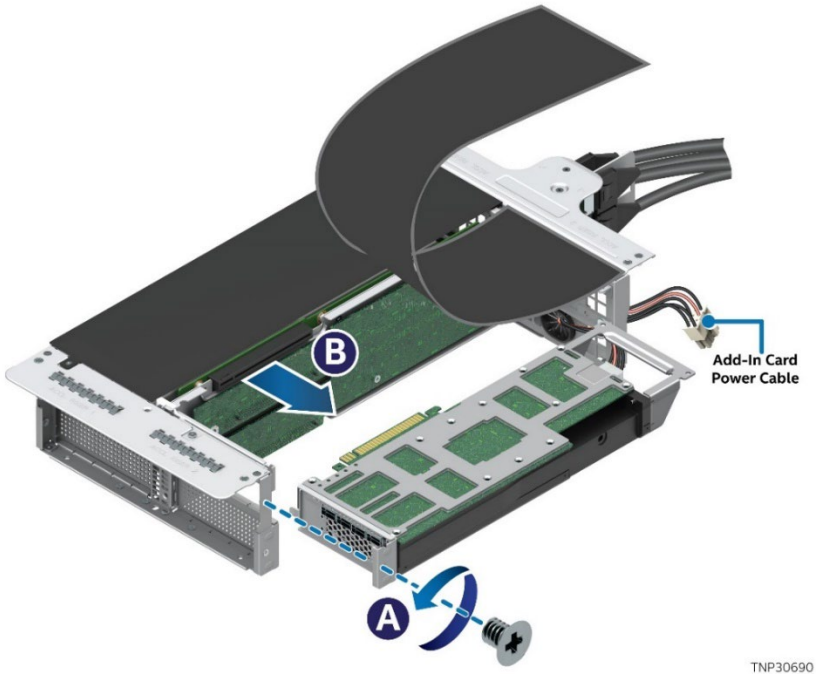


Figure 238. Removing Accelerator Add-In Card from Riser Assembly

6. Remove the screw on the metal bracket of the existing accelerator add-in card (see Letter A).
7. Carefully disengage the add-in card from the PCIe* slot and pull it away from the riser assembly (see Letter B).
8. Disconnect add-in card power cable (if present).

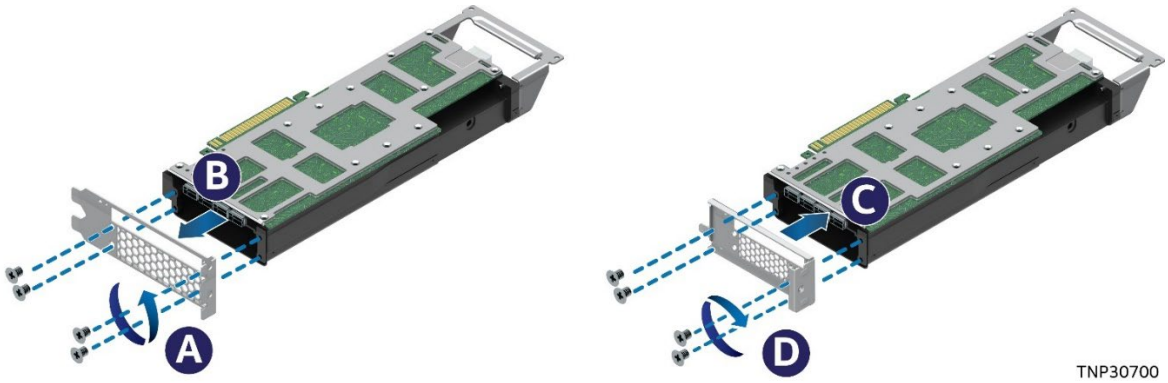


Figure 239. Replacing Add-In Card Metal Bracket

Note: The following steps to replace the accelerator add-in card metal bracket should be performed along with the instructions in the add-in card documentation.

9. Remove the screws that hold the original metal bracket on the new accelerator add-in card (see Letter A).
10. Uninstall the original metal bracket (see Letter B) from the new accelerator add-in card and replace it with the metal bracket from the existing add-in card (see Letter C).
11. Fasten the screws to secure the metal bracket to the new add-in card (see Letter D).
12. If the existing accelerator add-in card has the extension bracket, remove it, and install it on the new accelerator add-in card.

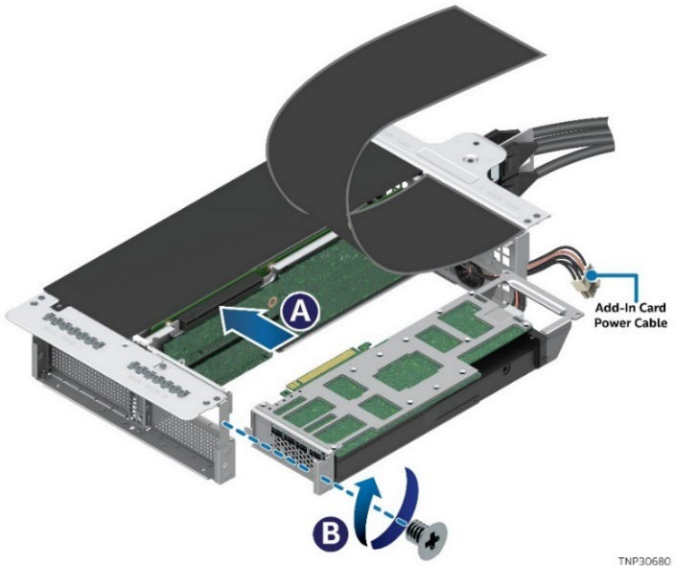


Figure 240. Installing Accelerator Add-In Card in Riser Assembly

13. Connect the power cable to the new add-in card if needed and route the power cable through the plastic shield opening in the rear of the riser assembly.
14. Align the bracket of the accelerator add-in card with the opening of the riser assembly.
15. Carefully push the add-in card into the PCIe* slot (see Letter A). Ensure that the add-in card is fully seated.
16. Fasten the screw on the metal bracket to secure the accelerator add-in card to the riser assembly (see Letter B).

Flap not shown in figure

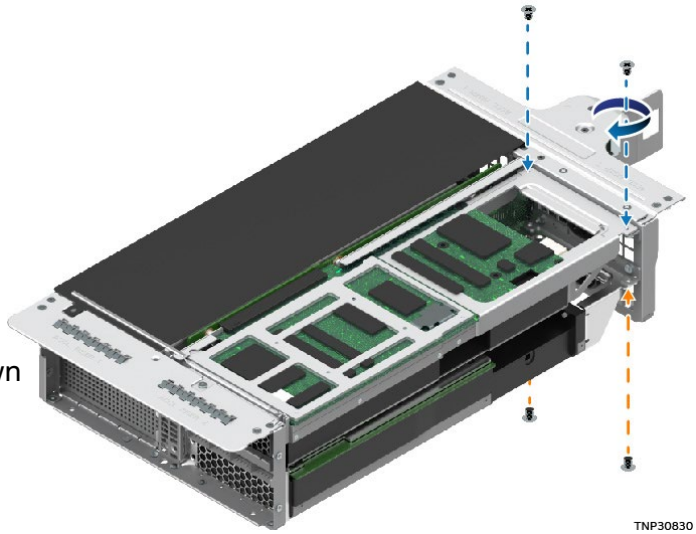


Figure 241. Securing the Accelerator Add-In Card in the Riser Assembly

17. Fasten the two screws on each corner of the back side to firmly attach the accelerator add-in card to the riser assembly.

Note: The direction of the screws on the back side depends on whether the accelerator add-in card is in the top slot or bottom slot of the riser assembly.

18. Repeat step 5 through step 17 to replace other accelerator add-in cards as needed.
19. Install the screw that holds the flap on the front side of the riser assembly.

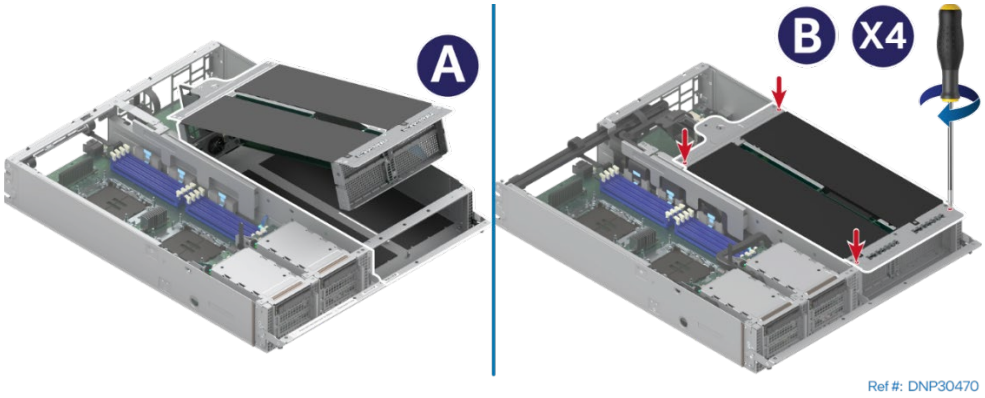


Figure 242. Installing PCIe* Accelerator Module Riser Assembly

20. Install the PCIe accelerator module riser assembly by tilting the front side down to the module (see Letter A).
21. Fasten the captive screws to secure the PCIe accelerator module riser assembly to the module (see Letter B).

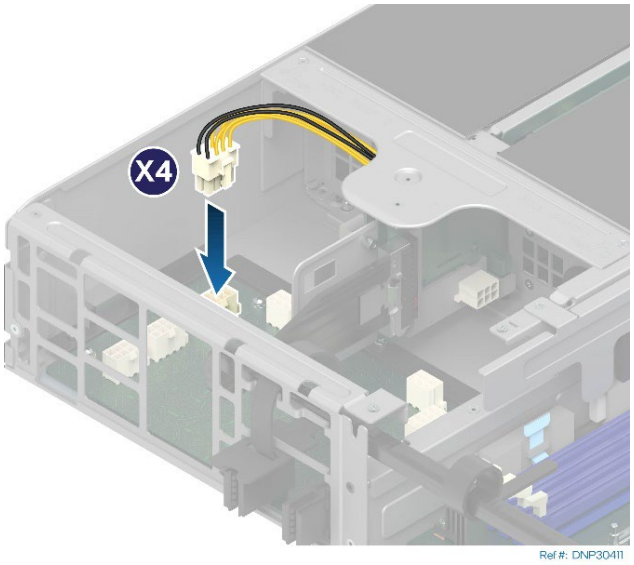


Figure 243. Connecting Add-In Card Power Cable

22. Connect all accelerator add-in card power cables to the connectors on the power board.

7.10 PCIe* Accelerator Module Riser Card Replacement (D50DNP2MFALAC Module)

The following section provides instructions for replacing the riser card for the accelerator add-in card section on the PCIe accelerator module (D50DNP2MFALAC). The left PCIe add-in cards in the accelerator add-in card section are plugged into the PCIe slots on the right riser card. The right PCIe add-in cards are plugged into the PCIe slots on the left riser card.

Required Tools and Supplies

- Intel accelerator riser card spare kit (DNPACCLRISER1 or DNPACCLRISER2)
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdrivers #1 and #2

1. Remove the accelerator add-in cards from the accelerator riser assembly. Follow step 1 through step 8 of Section 7.9.

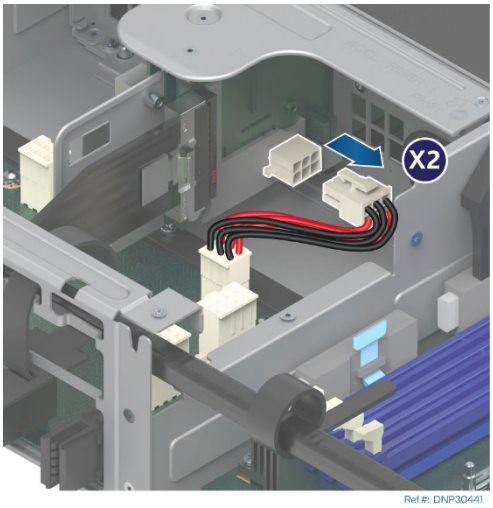


Figure 244. Disconnecting Riser Card Power Cable

2. Disconnect the power cables from the accelerator riser cards.

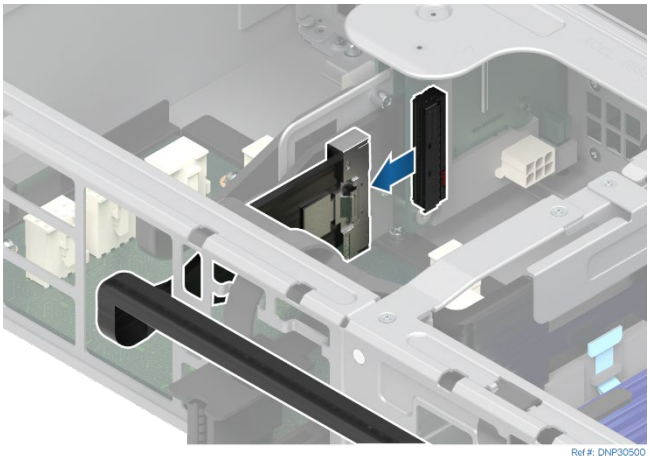


Figure 245. Disconnecting External MCIO* Cable

4. Remove the Velcro tape securing MCIO* cables to accelerator riser assembly and disconnect two MCIO cables from the external connectors on the accelerator riser cards.

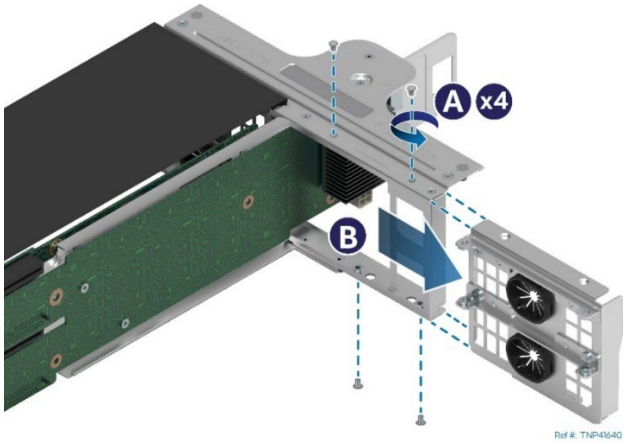


Figure 246. Accelerator Riser Assembly Rear Bracket Removal

5. Using a Phillips* head screwdriver #1, remove the screws that secure the rear bracket to the riser assembly (see Letter A).
6. Slide the rear bracket and remove it from the riser assembly (see Letter B).

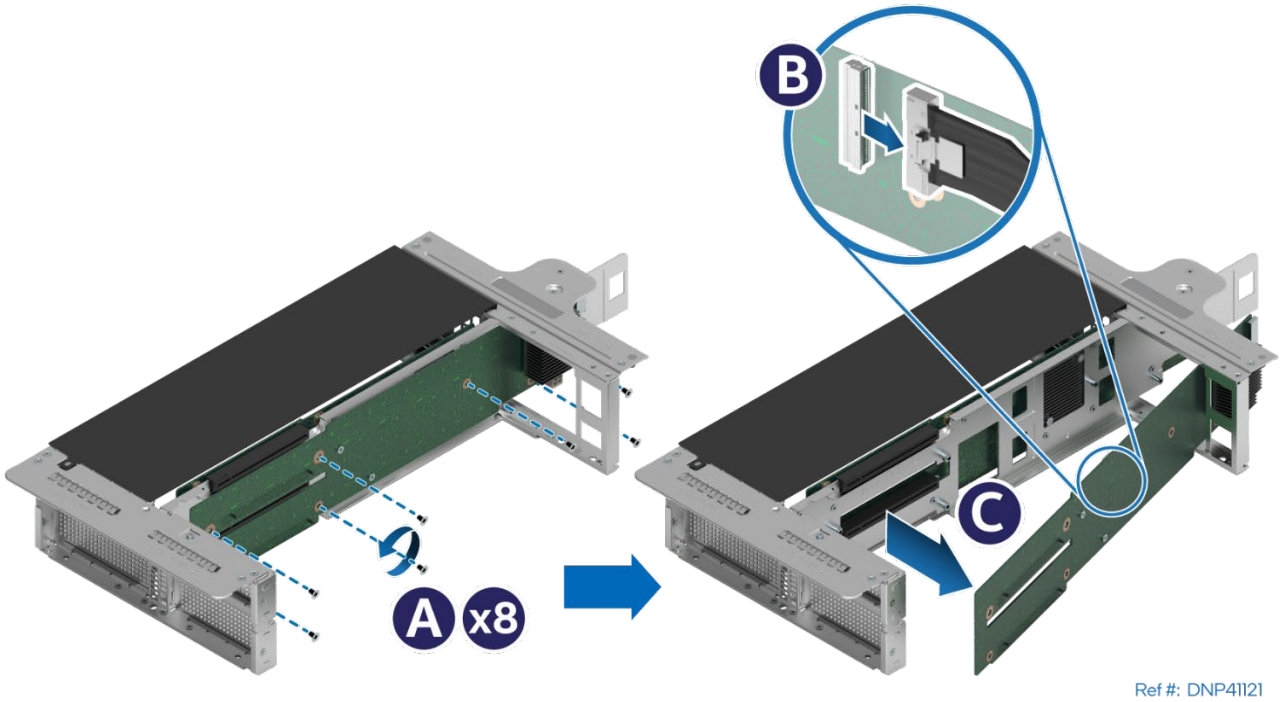


Figure 247. Accelerator Riser Card Removal

7. Using a Phillips* head screwdriver #2, remove the screws that secure the accelerator riser card to the riser assembly (see Letter A).
8. Disconnect the MCIO* cable on the inner side of the accelerator riser card (see Letter B).
9. Remove the accelerator riser card away from the riser assembly (see Letter C).

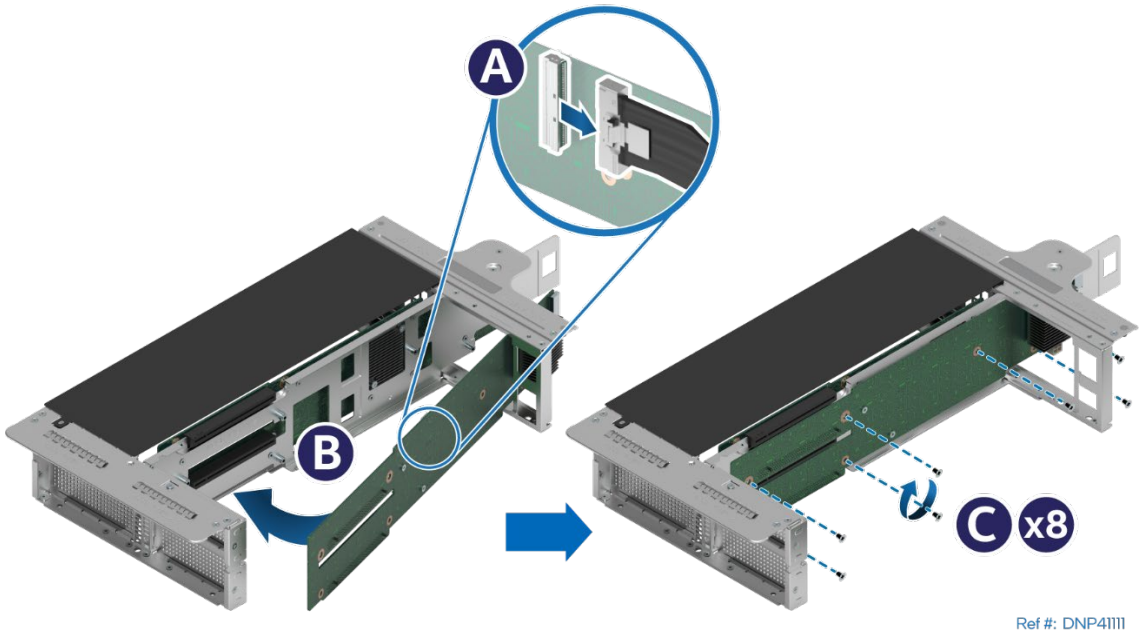


Figure 248. Accelerator Riser Card Installation

10. Locate and unpack the new accelerator riser card for replacement.
11. Reattach the MCIO cable on the inner side of the accelerator riser card (see Letter A).
12. Slide the accelerator riser card in and align it with the screw holes on the riser assembly (see Letter B).
13. Using a Phillips* head screwdriver #2, fasten the screws to secure the accelerator riser card to the riser assembly. Tighten to 5 in-lb. (see Letter C).

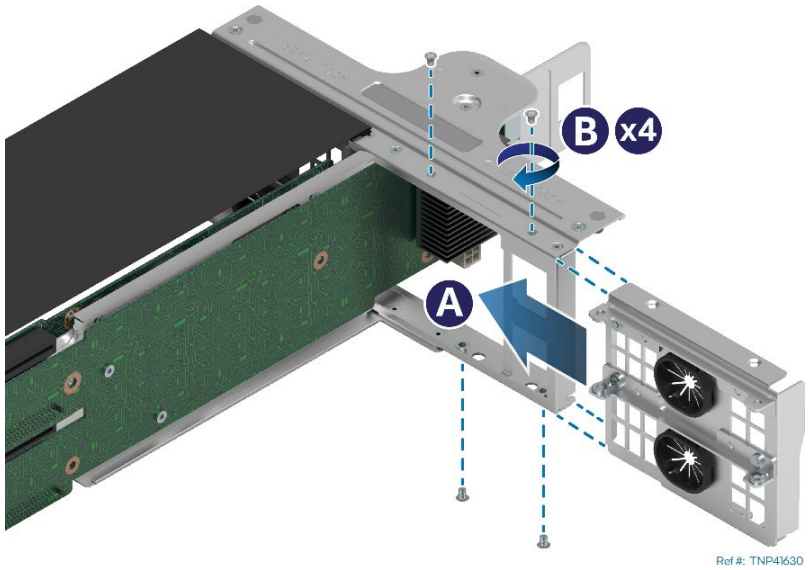


Figure 249. Accelerator Riser Assembly Rear Bracket Installation

14. Slide the rear bracket into the riser assembly (see Letter A).
15. Using a Phillips* head screwdriver #1, fasten the screws to secure the rear bracket to the riser assembly. Tighten to 5 in-lb (see Letter B).

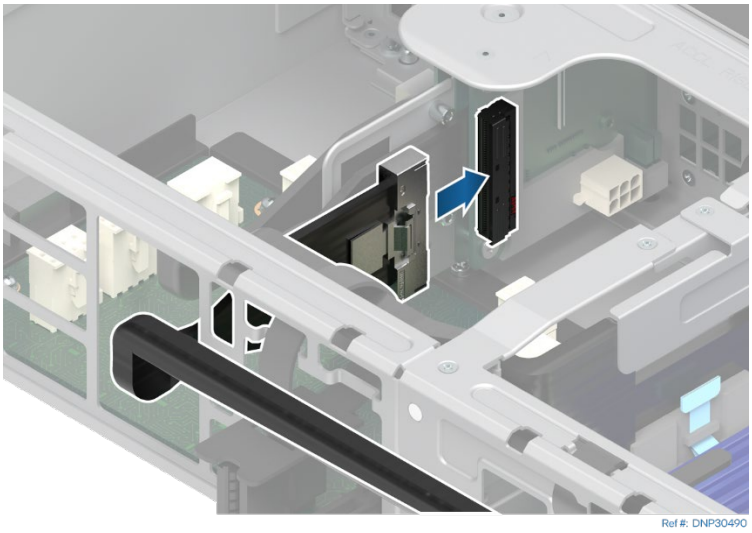


Figure 250. Connecting MCIO* Cables

23. Connect the MCIO cables to the external connectors on the accelerator riser cards. Tie the cables to the riser assembly with Velcro tape.

Note: Each MCIO cable has the number printed on it. Connect each MCIO cable to the MCIO connector on the accelerator riser cards that has the same number.

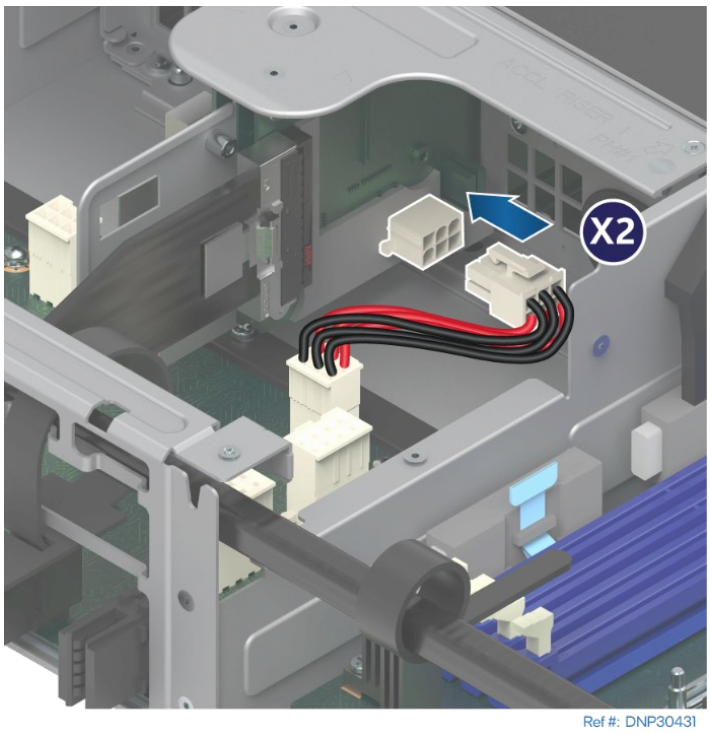


Figure 251. Connecting Riser Card Power Cables

15. Connect the power cables to the accelerator riser cards.
16. Reinstall the accelerator add-in cards to the accelerator riser assembly following steps 13 through 17 of the Section 7.9.
17. Reinstall the accelerator riser assembly to the PCIe* accelerator module follow step 19 through 22 of Section 7.9.

7.11 PCIe* Accelerator Module Power Connector Board Replacement (D50DNP2MFALAC Module)

The following description provides power connector board replacement instructions for the PCIe accelerator module (D50DNP2MFALAC).

Required Tools and Supplies

- Power connector board spare kit (DNPACCLCNBRD)
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1 and #2

1. Remove the accelerator add-in cards and PCIe riser cards from the accelerator riser assembly to disconnect all MCIO cables. Follow steps 1 through step 9 of Section 7.10.

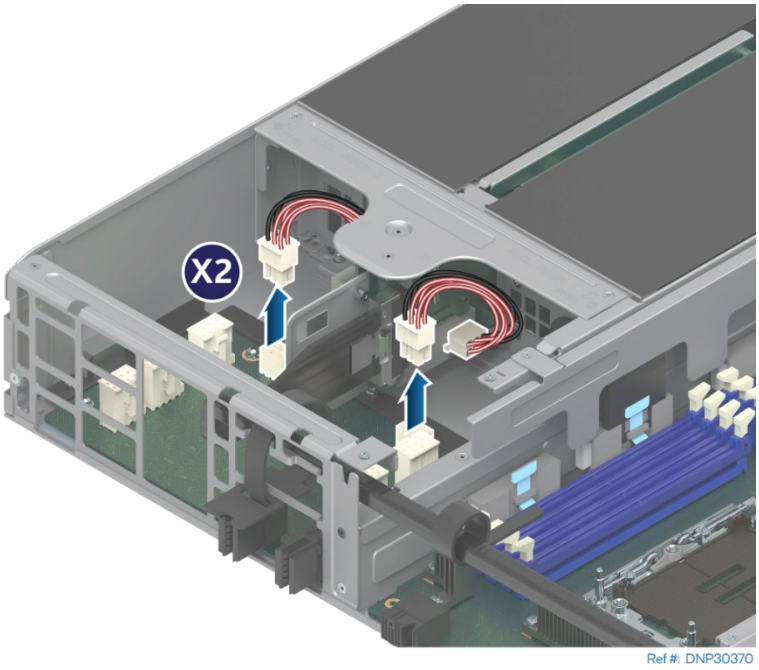


Figure 252. Disconnecting Riser Card Power Cables

2. Disconnect both riser card power cables from the connectors on the accelerator power board.
3. Disconnect the I2C cable from the accelerator power board.

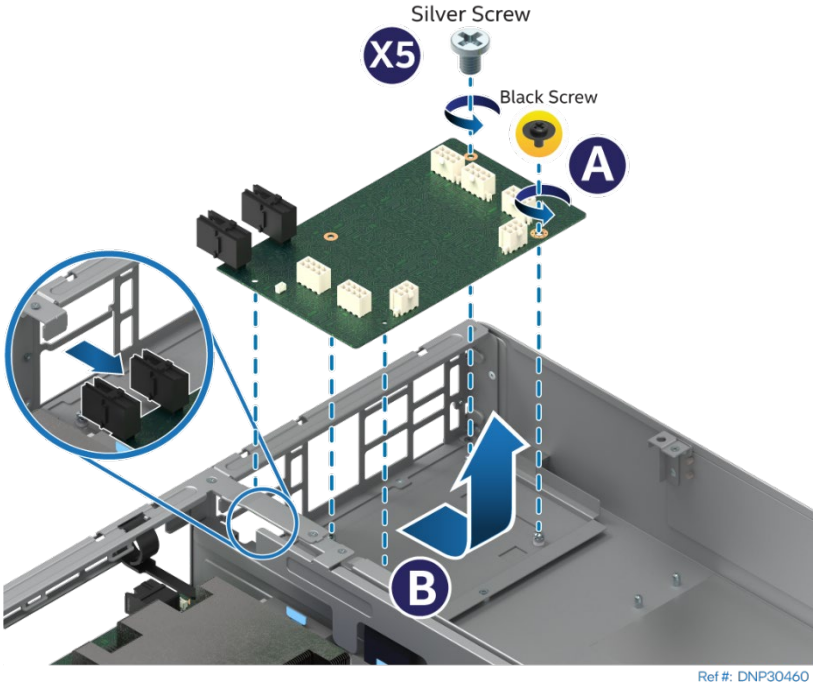


Figure 253. PCIe* Accelerator Module Power Connector Board Removal

4. Remove the black screw and the silver screws that secure the power connector board to the PCIe accelerator module using a Phillips* head screwdriver #2 (see Letter A).
5. Carefully remove the power connector board by lifting it up and away from the module (see Letter B).
6. Locate and unpack the new power connector board for replacement.

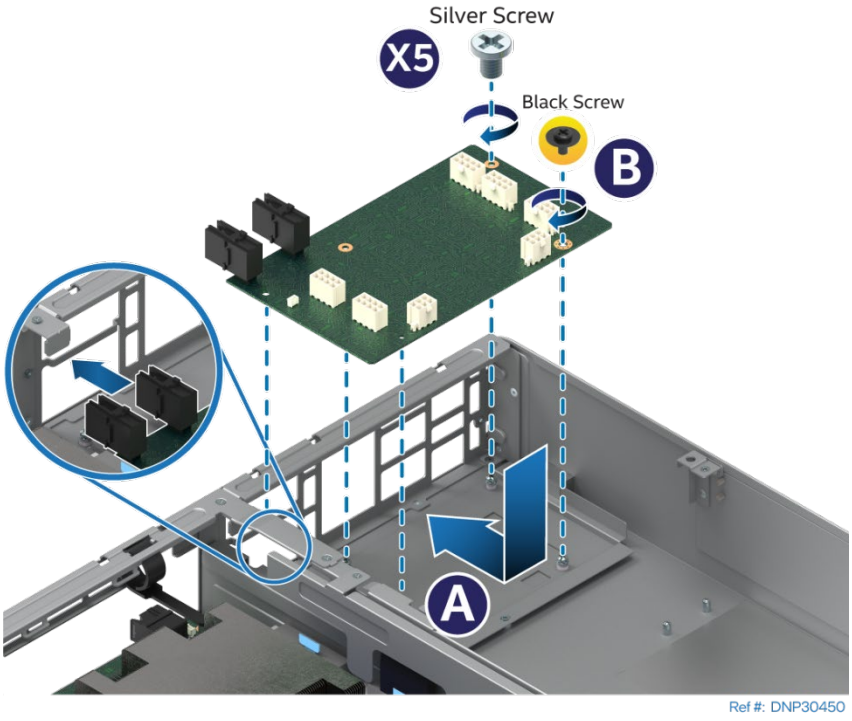


Figure 254. PCIe* Accelerator Module Power Connector Board Installation

7. Lower the power connector board into the slot in the module and slide it until all the screw holes are aligned (see Letter A).
8. Secure the power connector board to the module with the black screw and the silver screws using a Phillips* head screwdriver #2 (see Letter B).

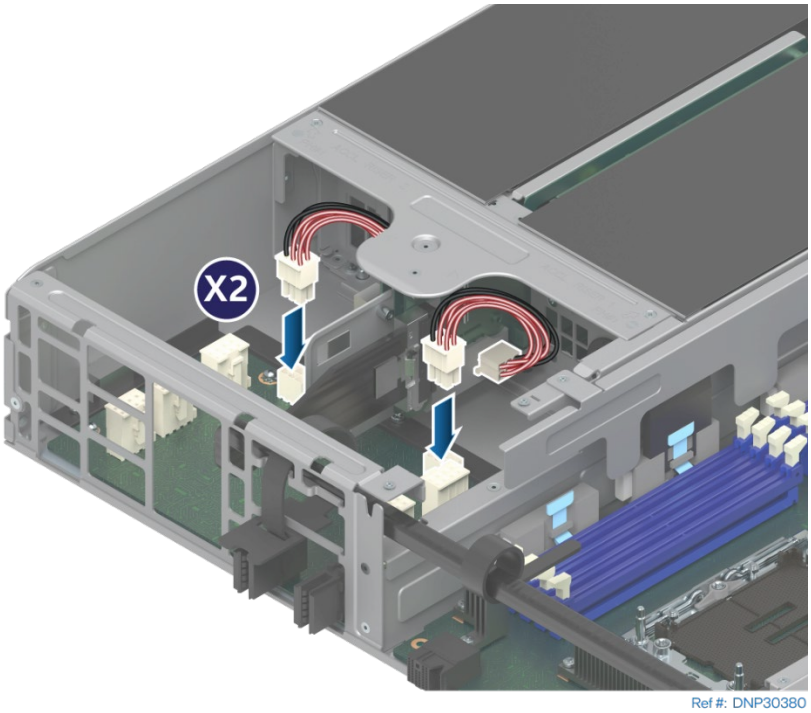


Figure 255. Connecting the Riser Card Power Cables

9. Connect the riser card power cables to the connectors on the power board.
10. Reconnect the I2C cable to the accelerator power board.
11. Reassemble the riser card assembly and install add-in cards following steps 11 through 17 of Section 7.10.

7.12 Power Supply Replacement

Required Tools and Supplies

- Intel spare power supply module
- Anti-static wrist strap and conductive workbench pad (recommended)

Note: The replacement figures in this section only display air-cooled chassis. However, the power supply replacement is the same, regardless of chassis type.

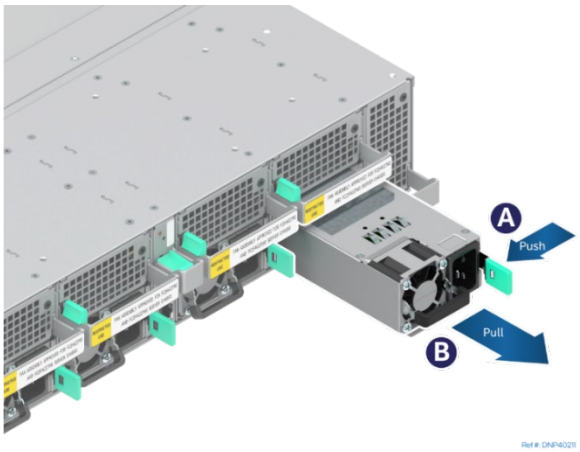


Figure 256. Removing Power Supply

1. Identify the faulty power supply.
2. Detach the power cord from the power supply to be removed.
3. Push and hold the green latch in the direction shown (see Letter A).
4. Use the handle to pull the power supply module from the system fan assembly (see Letter B).

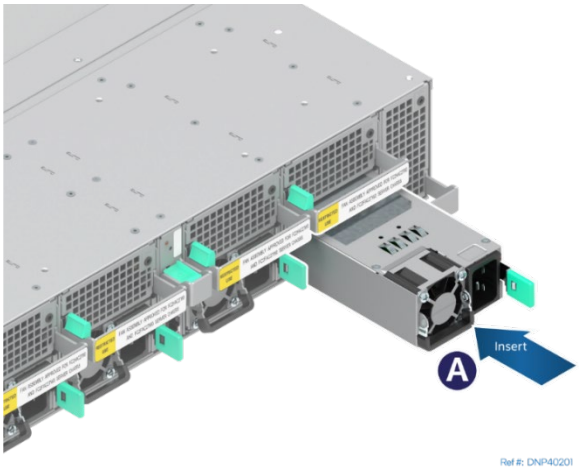


Figure 257. Installing Power Supply

5. Insert the power supply module into the system fan assembly (see Letter A).
6. Push the power supply module into the system fan assembly until it locks into place.

7.13 Server Board Replacement

Before performing this procedure, review all the safety and ESD precautions found in the Safety Warnings section at the beginning of this document.

Note: All components removed from the module must be kept on an ESD safe work surface or into an ESD safe bin or bag while full module/system disassembly and reassembly is in progress.

Required Tools and Supplies

- New Intel® Server Board D50DNP1SB
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #2
- ESD gloves

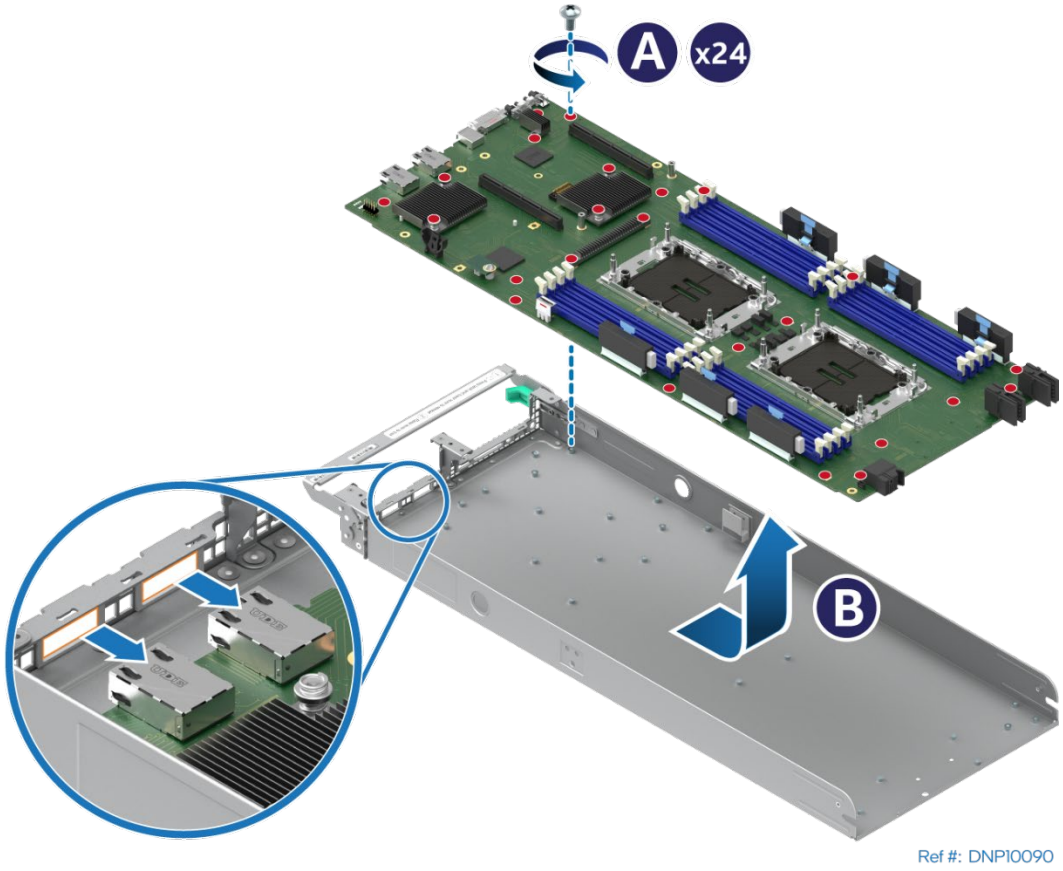


Figure 258. Server Board Removal

1. Remove the module from the chassis (see Section 7.1).
2. For air-cooled modules, remove the air duct (see Section 7.2).
3. Remove riser card assemblies (see Section 7.5).
4. Remove all options installed onto the server board.
5. Remove all memory modules (see Section 7.4).
6. For the liquid-cooled module, remove the liquid-cooling loop (see Section 7.7).
7. Remove processors (see Section 7.3).
8. Remove 24 screws securing the server board to the module tray (see Letter A).

9. Lift the rear edge of the board to disengage it from standoffs and slide the server board slightly towards the back of the module tray. Then, carefully lift the server board from the module tray (see Letter B) and place it in an anti-static bag.

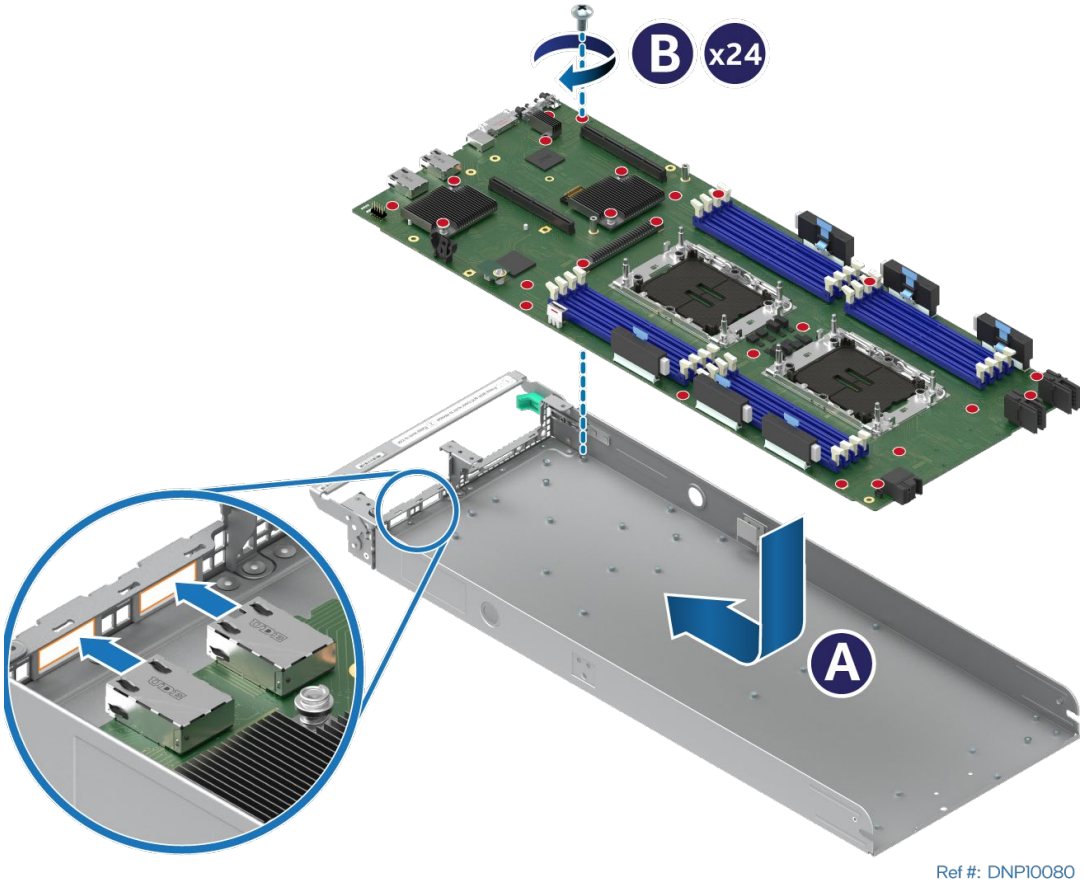


Figure 259. Server Board Installation

10. Remove the new server board from its anti-static bag.
11. Carefully lower the server board into the module tray.
12. Slide the server board slightly toward the front of the module tray until the connectors go through the cut-out on the front panel and the holes at the rear edge of the board align with standoffs in the module tray (see Letter A).
13. Fasten the server board to the module tray using all the screws (see Letter B). Tighten to 5 in-lb.
14. Reinstall processors (see Section 7.3).
15. For the liquid-cooled module, reinstall the liquid-cooling loop (see Section 7.7).
16. Reinstall memory modules (see Section 7.4).
17. Reinstall riser card assemblies (see Section 7.5).
18. Reinstall all options previously removed from the server board.
19. For air-cooled modules, reinstall the air duct (see Section 7.2).
20. Reinstall the module in the chassis (see Section 7.1).

7.14 System Fan Replacement

Required Tools and Supplies

- Intel spare fan assembly
- Anti-static wrist strap and conductive workbench pad (recommended)

The Intel® Server System D50DNP supports two system fan configurations as shown in the following figures: one for liquid-cooled configurations and one for air-cooled configurations.

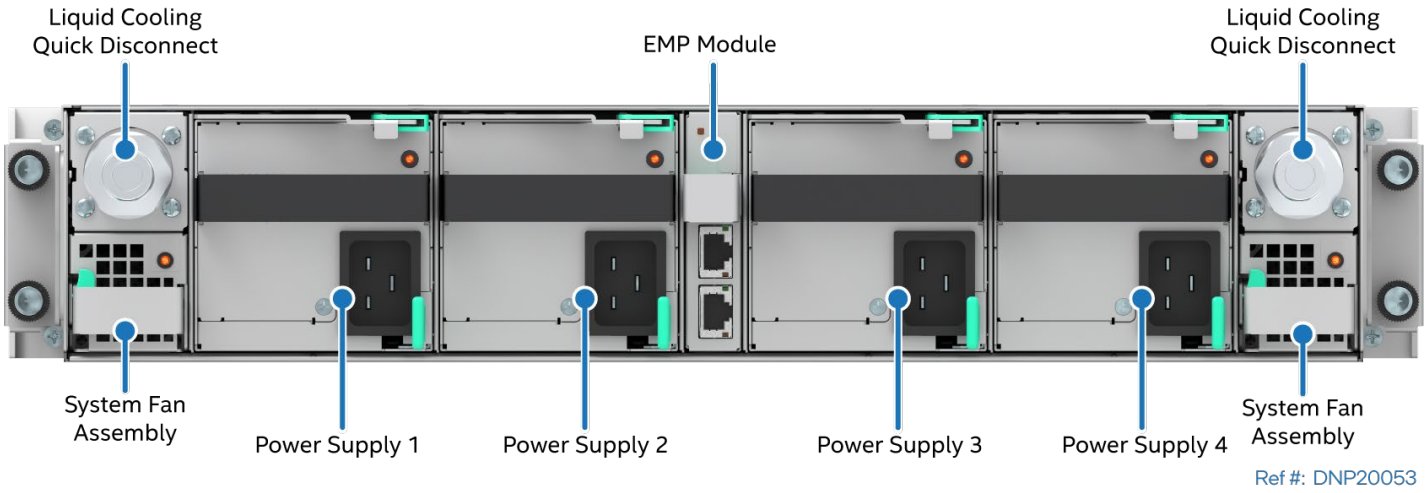


Figure 260. System Fan Configuration in Liquid-Cooled System

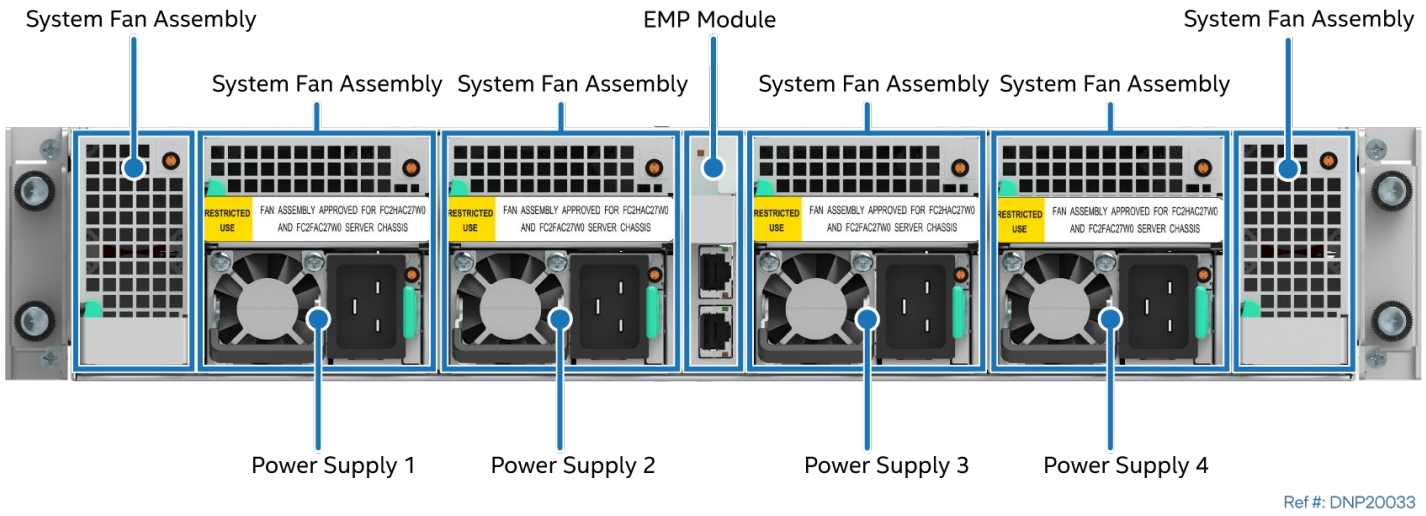


Figure 261. System Fan Configuration in Air-Cooled System

The system is designed to support fan redundancy. If a single fan rotor fails, system management engages various system thermal controls to maintain system thermals below maximum limits. The system fans are hot swappable.

In air-cooled configurations, the following system fans are hot swappable:

- Four managed 60-mm dual rotor system fans

Important Note: Only install 60-mm system fans (FCXX60MMACFAN) that are designed for the Intel® Server D50DNP chassis (FC2HAC27W0 and FC2FAC27W0). See following figure. Do not install 60-mm system fans from previous Intel server product generations.

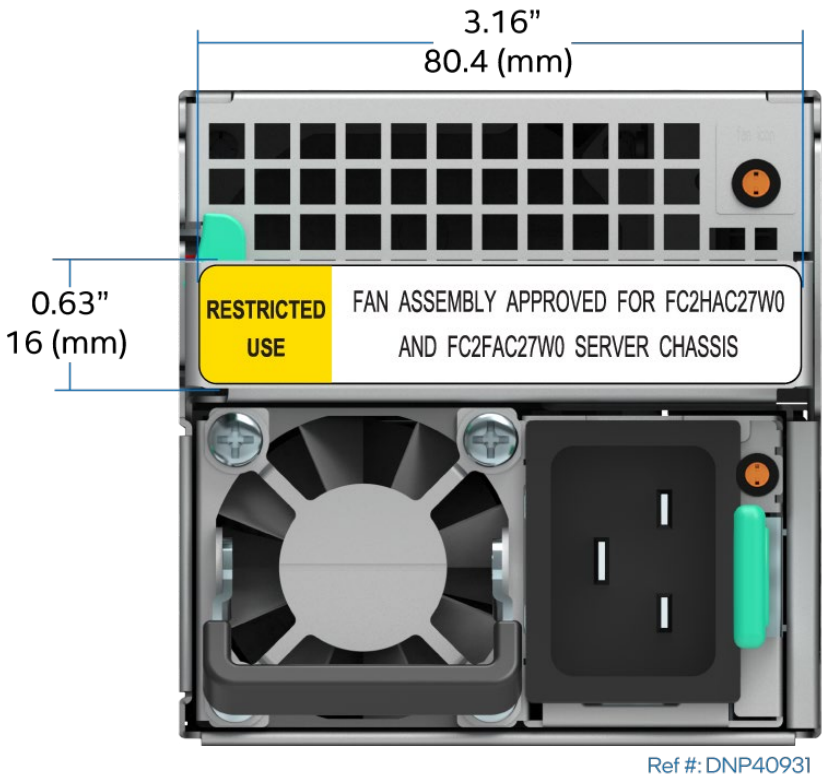


Figure 262. 60-mm System Fan FCXX60MMACFAN

- Four managed 40-mm dual rotor system fans, two fans per assembly

In liquid-cooled configurations, the following system fans are hot swappable:

- Two managed 40-mm dual rotor system fans, one fan per assembly

In air-cooled system configurations, each 60-mm system fan shares the same assembly housing with a power supply module. The power supply module must be removed from the fan assembly before removing the assembly housing from the chassis. Hot swap for these system fans can only be supported when the system is configured to support n + 1 power supply redundancy. Attempting to hot swap one of these fans in power non-redundant configuration or when power redundancy is lost causes the entire system to shut down, unless the failed fan is in the same assembly as a failed power supply.

Note: The following figures show the air-cooled 60-mm system fans. However, the removal and installation steps in this section apply to all system fans.

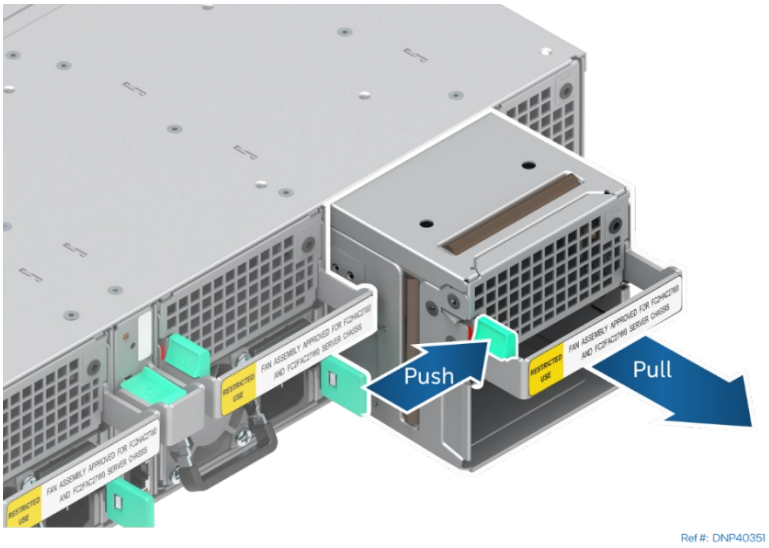


Figure 263. Removing System Fan

1. If present, remove the power supply (see Section 7.12) from the system fan assembly to be removed.
2. While pushing the green latch in the direction shown, use the handle to pull the system fan assembly out of the bay.

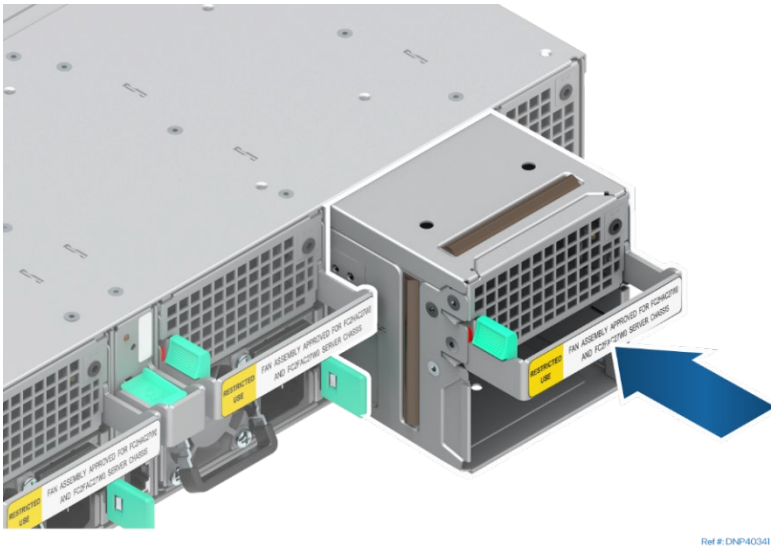


Figure 264. Installing System Fan

3. Ensure that no power supply is preinstalled in the system fan assembly.
4. Insert the system fan assembly into the open fan assembly bay.

Note: 40-mm fans are used on the sides; 60-mm fans are used in the four center bays (air-cooled system only).

5. Push in the system fan assembly until it locks into place.

7.15 Power Distribution Board (PDB) Assembly Replacement

Required Tools and Supplies

- Power distribution board spare kit FCXXPDBASSMBL2
- Anti-static wrist strap and conductive workbench pad (recommended)
- Phillips* head screwdriver #1 and #2

1. Ensure that the system power is off and then disconnect the power supply cord(s). Then, remove it from the rack.

Important Safety Notes: Due to the weight of a fully configured system, Intel recommends:
- Use a mechanical lift to aid with the removal of the system from the rack.
- Or remove all installed modules from the system and use at least two people to remove the system from the rack.

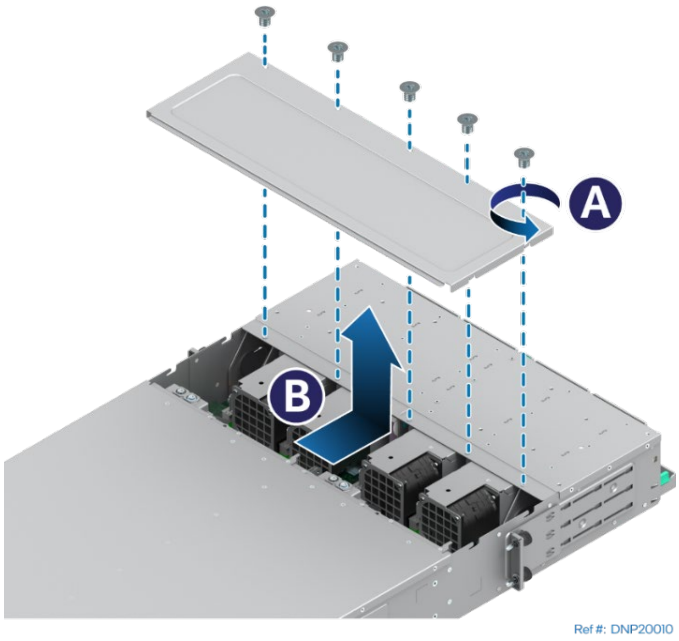


Figure 265. Removing Back Cover

2. Remove all modules from the server chassis (see Section 7.1.1).
3. Locate the chassis back cover and remove the five screws with a Phillips* head screwdriver #1 (see Letter A).
4. Slide the cover towards the back and lift it up (see Letter B).

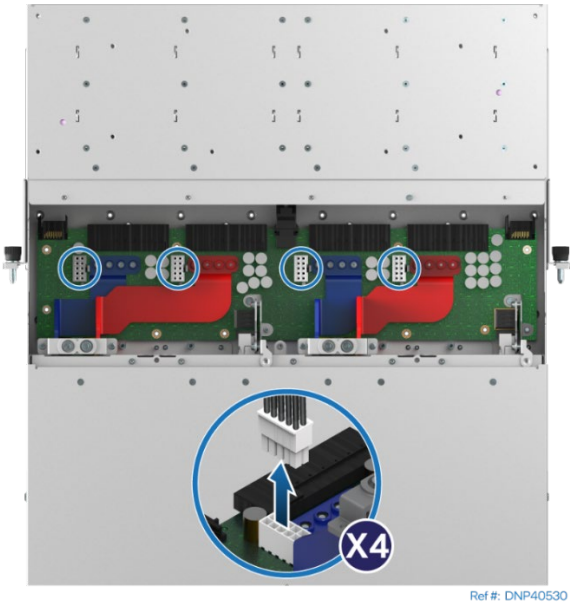


Figure 266. Disconnecting System Fan Power Cables

5. Locate and disconnect the system fan power cables from the power distribution board by pressing inwards on each clip and lifting them up.
6. Remove the power supplies (see Section 7.12).
7. Remove the system fans (see Section 7.14).
8. Remove the EMP module or EMP module blank if installed (see Section 3.10).
9. If the system is liquid-cooled, remove the chassis plumbing following accompanying instructions.

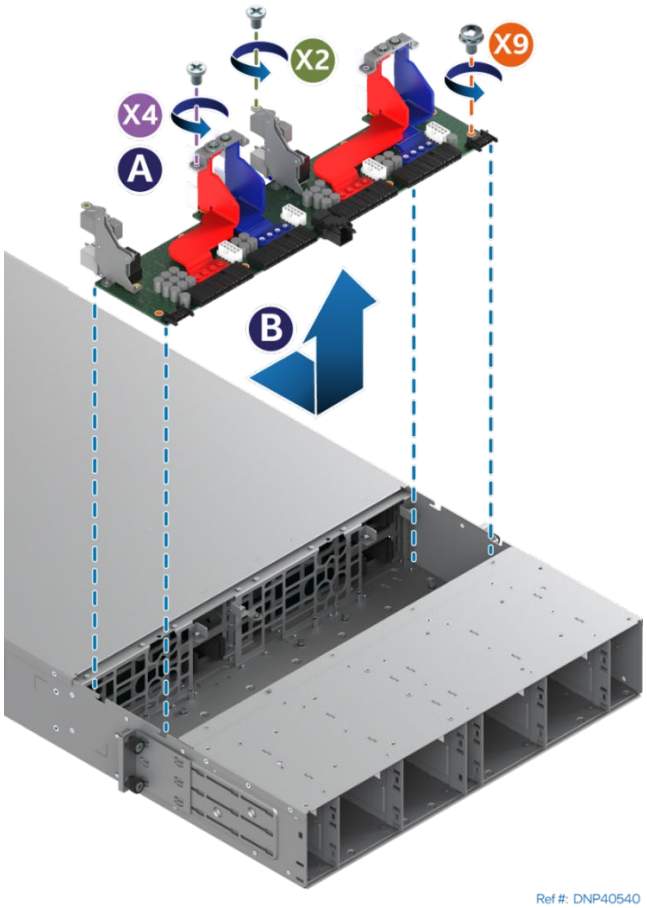


Figure 267. Removing Power Distribution Board

10. Remove the screws securing the power distribution board (PDB) to the chassis with a Phillips* head screwdriver #2 (see Letter A).
11. Remove the PDB by lifting it upwards, tilting up the front side of the PDB, and then lifting the board out (see Letter B).

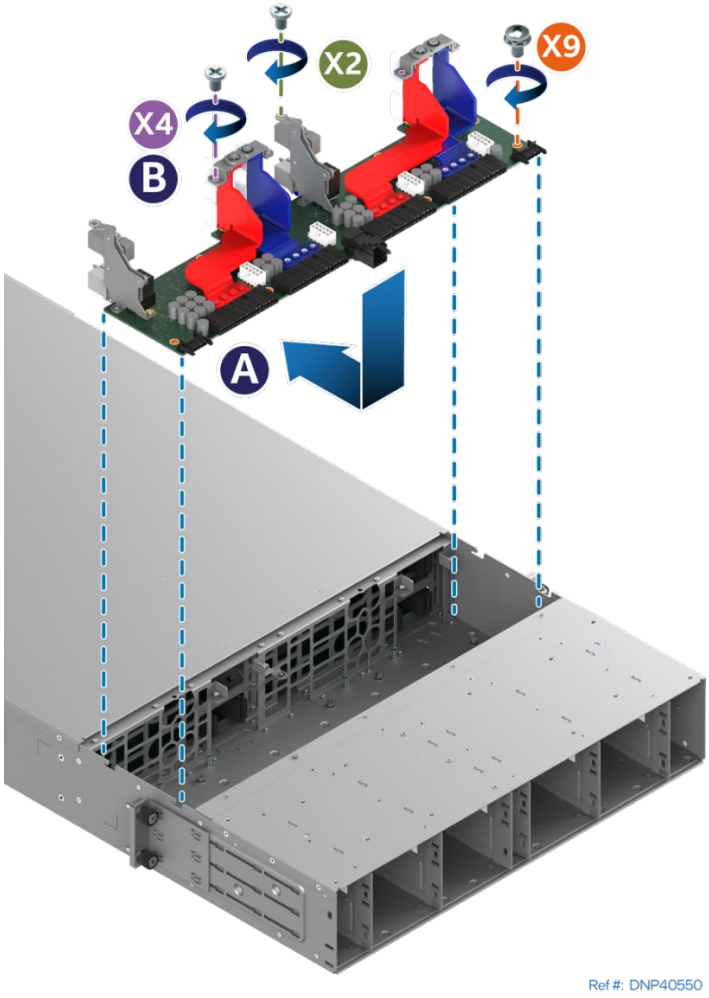


Figure 268. Installing the Power Distribution Board

12. Remove the new power distribution board (PDB) from its package.
13. Lower the PDB into the chassis, tilting down the back side and then sliding the board to the front (see Letter A).
14. Secure the power distribution board using a Phillips* head screwdriver #2 and the provided screws (see Letter B).

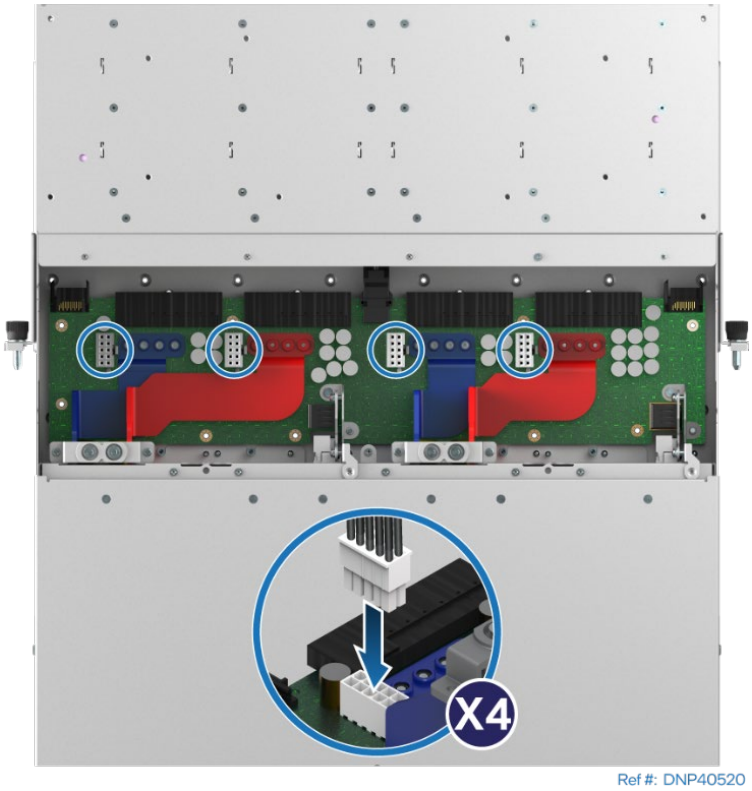


Figure 269. Connecting System Fan Power Cables

15. Locate and connect the system fan cables by pressing inwards on each clip and pressing them down into the appropriate connector.

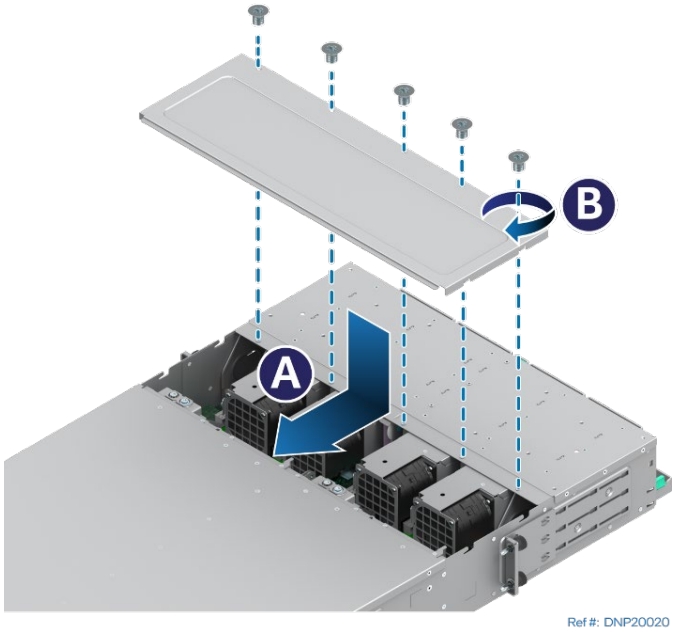


Figure 270. Securing Back Cover

16. Place the back cover over the top of the chassis and slide it towards the front (see Letter A).
17. Secure the back cover with a Phillips* head screwdriver #1 and the five screws (see Letter B).
18. If the system is liquid-cooled, install the chassis plumbing following accompanying instructions.
19. Install the EMP module if available, or an EMP module blank (see Section 3.10).
20. Install the system fan assemblies (see Section 7.14).
21. Install the power supplies (see Section 7.12).

7.16 Internal Chassis Rail Replacement

The Intel® Server System D50DNP includes internal rails to support 1U modules in the upper part of the chassis. If the internal rails become damaged or worn out, this section provides the instructions necessary to replace them.

Required Tools and Supplies

- Chassis rail spare kit FCXX1USPPRT
- Anti-static wrist strap and conductive workbench pad (recommended)

Note: To maintain optimal performance of the system, Intel recommends replacing ALL internal rails at once.

1. Ensure that the system power is off and then disconnect the power supply cord(s).
2. Remove the server chassis from the rack and place it on a flat surface.

   Important Safety Notes: Due to the weight of a fully configured system, Intel recommends:
   - Use a mechanical lift to aid with the removal of the system from the rack.
   - Or remove all installed modules from the system and use at least two people to remove the system from the rack.

3. Remove the modules from the bays selected for service (see Section 7.1.1).
4. Locate the internal rails in the upper part of the inner walls of the chassis.

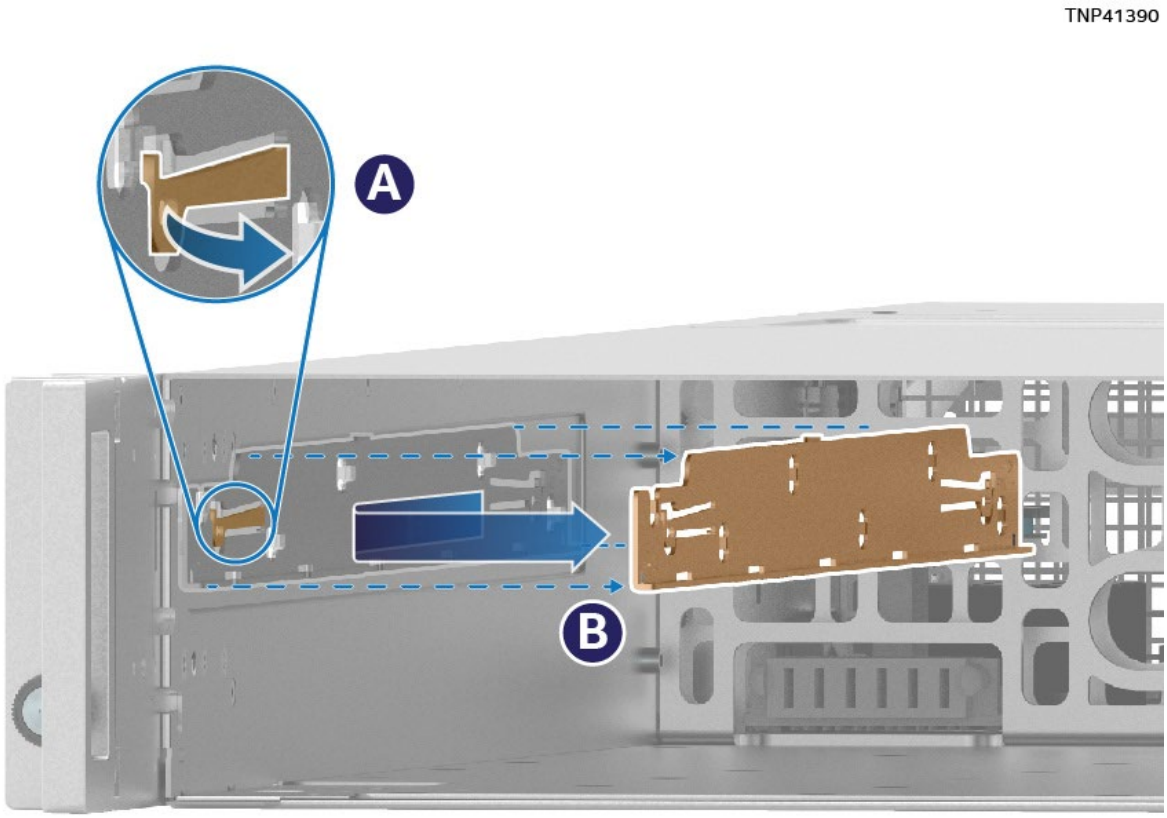


Figure 271. Removing Internal Chassis Rail

5. Release the rail latch (see Letter A).
6. Slide the rail towards the front of the chassis to remove it (see Letter B).

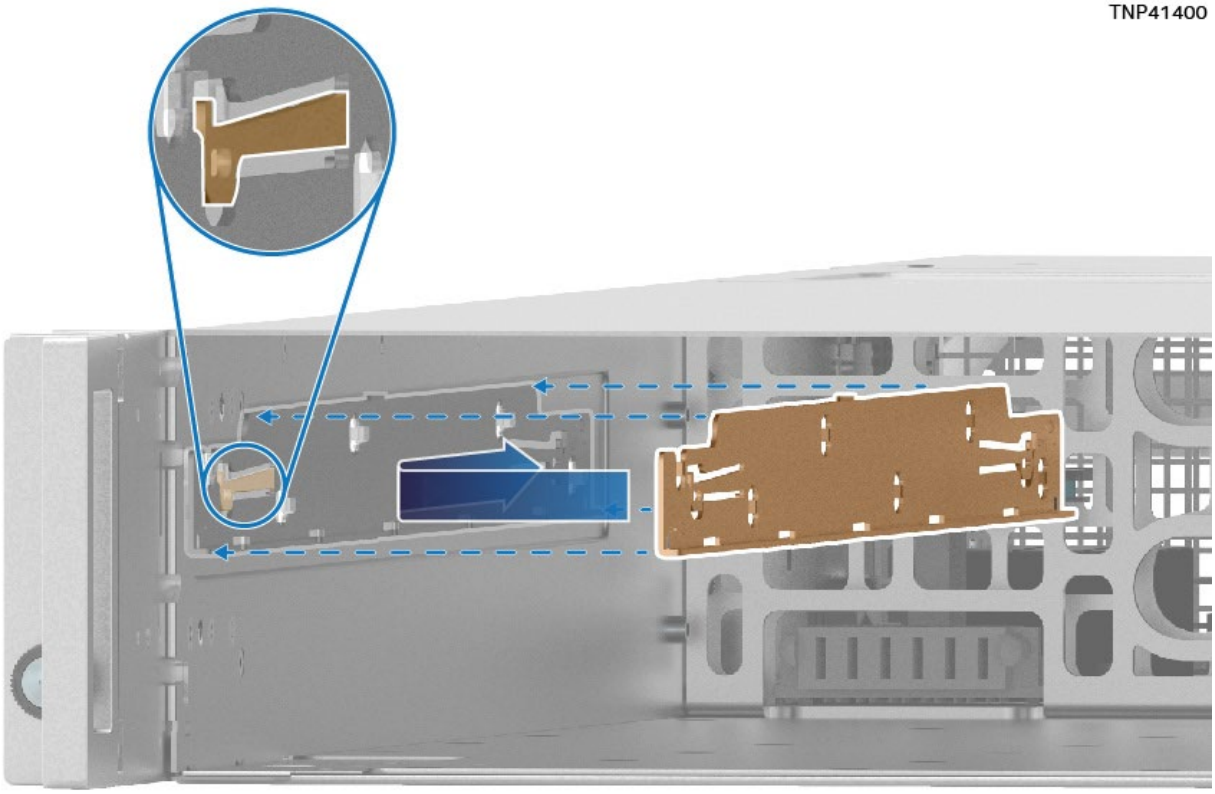


Figure 272. Installing Internal Chassis Rail

7. Place the new rail inside the chassis aligning the keying pins of the rail with the cut outs in the chassis inner wall.
8. Slide the rail into the chassis inner wall towards the back of the chassis until it locks into place.

7.17 System Battery Replacement

Required Tools and Supplies

- Compatible CR2032 lithium battery
- Anti-static wrist strap and conductive workbench pad (recommended)

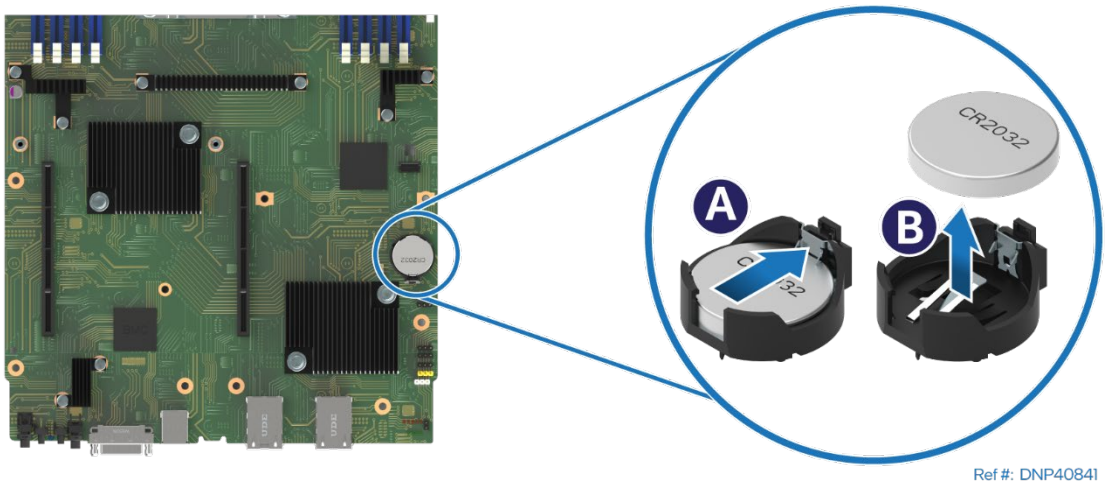


Figure 273. Removing System Battery

1. Remove the selected module from the server chassis (see Section 7.1.1).
2. Remove the right riser assembly from the module (see Section 7.5).
3. Locate the battery on the server board.
4. Gently press the metal clip as shown to release the battery (see Letter A).
5. Remove the battery from the plastic socket (see Letter B).
6. Dispose of the battery according to local laws.

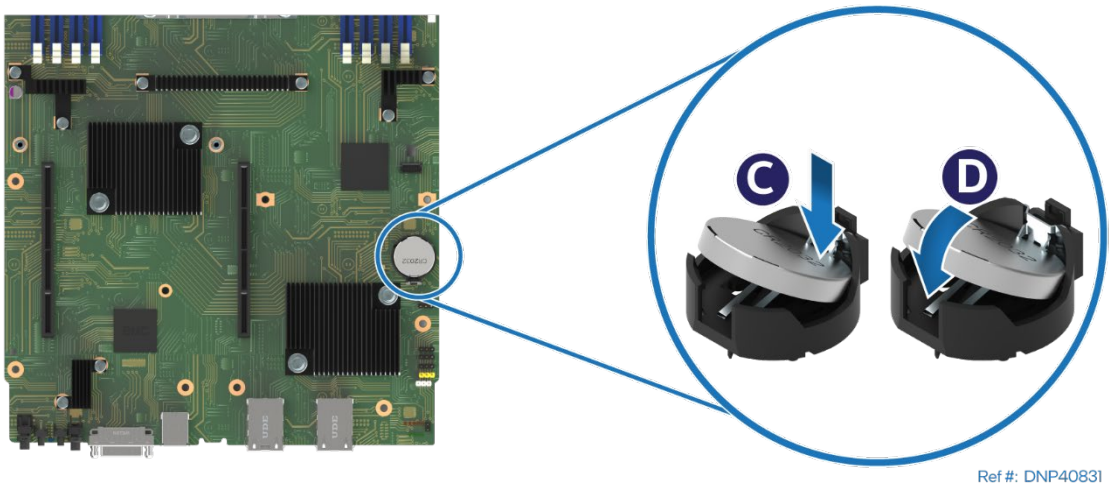


Figure 274. Installing System Battery

7. Remove the new lithium battery from its package.
8. Observing the correct polarity, insert the battery into the battery socket (see Letters C and D).
9. Reinstall the riser assembly (see Section 7.5).
10. Reinstall the module in the chassis (see Section 7.1.2).
11. Use the BIOS Setup Utility to restore BIOS settings and reset the system time and date.

Appendix A. Getting Help

Available Intel support options with your Intel Server System:

1. 24x7 support through Intel's support webpage at https://www.intel.com/content/www/us/en/support/products/1201/server-products.html

   Information available at the support site includes:

   - Latest BIOS, firmware, drivers, and utilities
   - Product documentation, setup, and service guides
   - Full product specifications, technical advisories, and errata
   - Compatibility documentation for memory, hardware add-in cards, and operating systems
   - Server and chassis accessory parts list for ordering upgrades or spare parts
   - A searchable knowledge base to search for product information throughout the support site

   Quick Links:

Use the following links for support on Intel Server Boards and Server Systems	**Download Center** http://www.intel.com/support/downloadserversw	**BIOS Support Page** http://www.intel.com/support/serverbios	**Troubleshooting Boot Issue** http://www.intel.com/support/tsboot
Use the following links for support on Intel® Data Center Block (DCB) Integrated Systems* * Intel DCB comes pre-populated with processors, memory, storage, and peripherals based on how it was ordered through the Intel Configure to Order tool.	**Download Center** http://www.intel.com/support/downloaddcbsw	**Technical Support Documents** http://www.intel.com/support/dcb	**Warranty and Support Info** http://www.intel.com/support/dcbwarranty

2. If a solution cannot be found at Intel's support site, submit a service request via Intel's online service center at https://supporttickets.intel.com/servicecenter?lang=en-US. In addition, you can also view previous support requests. (Login required to access previous support requests).

3. Contact an Intel support representative using one of the support phone numbers available at https://www.intel.com/content/www/us/en/support/contact-support.html (charges may apply).

Intel also offers Partner Alliance Program members around-the-clock 24x7 technical phone support on Intel server boards, server chassis, server RAID controller cards, and Intel® Server Management at https://www.intel.com/content/www/us/en/partner-alliance/overview.html.

Note: The 24x7 support number is available after logging in to the Intel Partner Alliance website.

Warranty Information

To obtain warranty information, visit http://www.intel.com/p/en_US/support/warranty.

Appendix B. Memory Population Rules

B.1 DDR5 DIMM Population Rules

Notes:

- Intel does not provide support for systems populated with “Un-like” (non-matching) DIMMs. However, the system may still operate if all the mixed DDR5 DIMM population rules are followed. Validation and support of these configurations is the sole responsibility of the original system integrator.
- For best compatibility and system operation, Intel highly recommends that all installed DIMMs have “identical” or “like” attributes as defined in the Intel DDR5 support disclaimer.

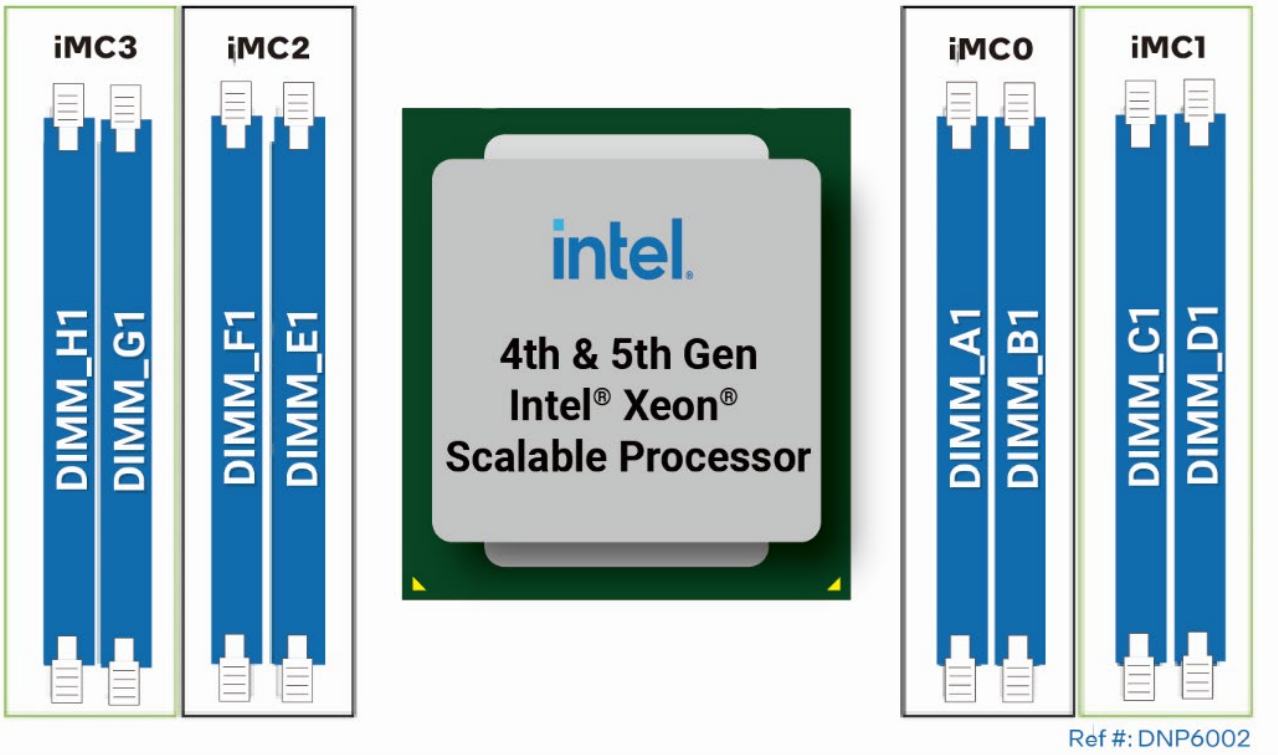
- DDR5 DIMM can be installed in any slot.
- Mixing DDR5 DIMM rules:
  - Mixing DDR5 DIMMs of different speeds and latencies is not supported within or across processors. If a mixed configuration is encountered, the BIOS attempts to operate at the highest common speed and the lowest latency possible.
  - Mixing DDR5 DIMM types (standard RDIMM, 3DS-RDIMM, 9x4 RDIMM) within or across processors is not supported. This will result in a fatal error halt during memory initialization.
- For RDIMM or 3DS RDIMM, same DIMM construction should be used across all slots on a socket
  - No x4 mixing with x8 across a socket
  - No 16Gb / 24Gb mixing
- DDR5 DIMM capacity must be the same for all populated slots.
- Memory slots associated with a given processor are unavailable if the corresponding processor socket is not populated.
- Processor sockets are self-contained and autonomous. However, all memory subsystem support (such as memory RAS and error management) in the BIOS Setup utility are applied commonly for both installed processors.
- For best system performance, memory must be installed in all eight channels for each installed processor.
- For best system performance in dual processor configurations, installed DDR5 DIMM type and population for DDR5 DIMMs configured to CPU 1 must match DDR5 DIMM type and population configured to CPU 0.

B.2 Recommended Memory Configurations

This section provides the recommended memory population configurations for the Intel® Server Board D50DNP1SB. For best system performance in dual-processor configurations, installed memory type and population must be the same for both processors.

See the following figures and tables to identify the memory slot locations and recommended population configurations.

Table 10. Standard DDR5 DIMM per Socket Population Configurations



# of DIMMs	IMC 3		IMC 2		IMC 0		IMC 1	
	CH H	CH G	CH F	CH E	CH A	CH B	CH C	CH D
	Slot 1	Slot 1	Slot 1	Slot 1	Slot 1	Slot 1	Slot 1	Slot 1
1	–	–	–	–	DDR5	–	–	–
	–	–	–	DDR5	–	–	–	–
	–	–	–	–	–	DDR5	–	–
	–	–	DDR5	–	–	–	–	–
2	–	DDR5	–	–	DDR5	–	–	–
	–	–	–	DDR5	–	–	DDR5	–
4	–	DDR5	–	DDR5	DDR5	–	DDR5	–
6	–	DDR5	DDR5	DDR5	DDR5	–	DDR5	DDR5
	DDR5	DDR5	–	DDR5	DDR5	DDR5	DDR5	–
	DDR5	–	DDR5	DDR5	–	DDR5	DDR5	DDR5
	DDR5	DDR5	DDR5	–	DDR5	DDR5	–	DDR5
8	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5	DDR5

Note: Liquid-cooled configurations require all DIMM slots to be populated with DDR5 DIMMs.

B.3 Intel® DDR5 DIMM Support Disclaimer

Intel DDR5 DIMM Support Disclaimer

Intel validates and only supports system configurations where all installed DDR5 DIMMs have matching "Identical" or "Like" attributes (see following table). A system configured concurrently with DDR5 DIMMs from different vendors are supported by Intel if all other DDR5 "Like" DIMM attributes match.

Intel does not perform system validation testing. Intel does not support system configurations where all populated DDR5 DIMMs do not have matching "Like" DIMM attributes as listed in the following table.

Intel only supports Intel server systems configured with DDR5 DIMMs that have been validated by Intel and are listed on Intel's Tested Memory list for the given Intel server product family.

Intel configures and ships pre-integrated L9 server systems. All DDR5 DIMMs in a given L9 server system as shipped by Intel are identical. All installed DIMMs have matching attributes as the attributes listed in the *"Identical" DDR5 DIMM Attributes* column in the following table.

When purchasing more than one integrated L9 server system with the same configuration from Intel, Intel reserves the right to use "Like" DIMMs between server systems. At a minimum, "Like" DIMMS have matching DIMM attributes as listed in the following table. However, the DIMM model #, revision #, or vendor may be different.

For warranty replacement, Intel makes every effort to ship back an exact match to the one returned. However, Intel may ship back a validated "Like" DIMM. A "Like" DIMM may be from the same vendor but may not be the same revision # or model #, or it may be an Intel validated DIMM from a different vendor. At a minimum, all "Like" DIMMs shipped from Intel match attributes of the original part according to the definition of "Like" DIMMs in the following table.

Table 11. DDR5 DIMM Attributes Table for "Identical" and "Like" DIMMs

- DDR5 DIMMs are considered "Identical" when ALL listed attributes between the DIMMs match
- Two or more DDR5 DIMMs are considered "Like" DIMMs when all attributes minus the Vendor, and/or DIMM Part # and/or DIMM Revision#, are the same.

Attribute	"Identical" DDR5 DIMM Attributes	"Like" DDR5 DIMM Attributes	Possible DDR5 Attribute Values
Vendor	**Match**	**Maybe Different**	Memory Vendor Name
DIMM Part #	**Match**	**Maybe Different**	Memory Vendor Part #
DIMM Revision #	**Match**	**Maybe Different**	Memory Vendor Part Revision #
SDRAM Type	**Match**	**Match**	DDR5
DIMM Type	**Match**	**Match**	RDIMM, 9x4 RDIMM
Speed (MT/s)	**Match**	**Match**	4000, 4400, 4800 , 5600
Voltage	**Match**	**Match**	1.1 V
DIMM Size (GB)	**Match**	**Match**	16 GB, 32 GB, 64 GB, 128 GB, 256 GB
Organization	**Match**	**Match**	2Gx80; 4Gx80; 8Gx80; 16Gx80; 32Gx80
DIMM Rank	**Match**	**Match**	1R, 2R, 4R, 8R
DIMM Raw Card (RC)	**Match**	**Match**	RC A, RC B, RC C, RC D, RC E, RC F
DRAM Width	**Match**	**Match**	x4, x8
DRAM Density	**Match**	**Match**	16Gb

Note: Memory Speed 5600 MT/s is supported on 5th Gen Intel® Xeon® Scalable processor only.

Appendix C. System Status LED State Definitions

The control panel provides push button controls and LED indicators. This section provides a description for each front control panel feature.

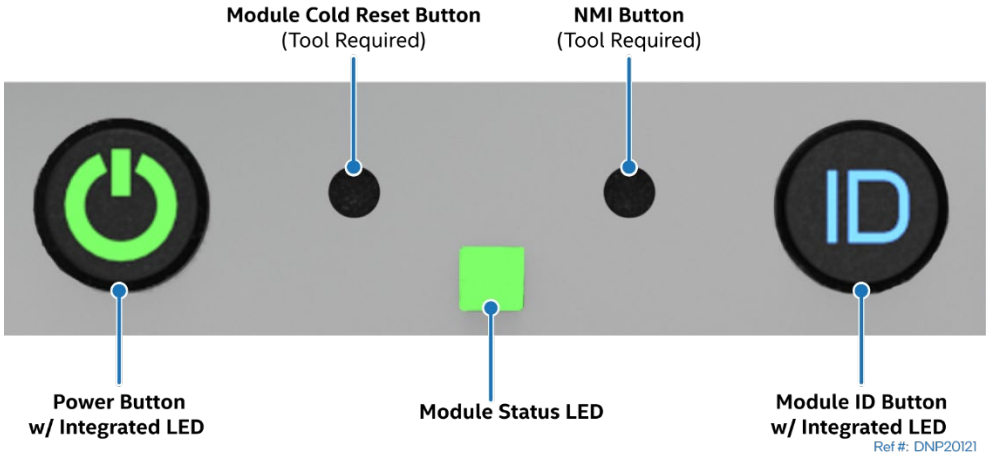


Figure 275. Front Control Panel Features

- **Power button with integrated LED**: Toggles the module power on and off. This button also functions as a sleep button if enabled by an ACPI compliant operating system. Pressing this button sends a signal to the integrated BMC that either powers on or powers off the module. The integrated LED is a single color (green) and supports different indicator states as defined in the following table.

Note: After AC power is connected, several subsystems are initialized and low-level FRU discovery is performed. This process can take up to 90 seconds. When this process is completed, the Status LED turns solid on, indicating that the system is ready to be powered on.

Table 12. Power / Sleep LED Functional States

Power Mode	LED	Module State	Description
Non-ACPI	Off	Power-off	Module power is off, and the BIOS has not initialized the chipset.
	On	Power-on	Module power is on
ACPI	Off	S5	Mechanical is off and the operating system has not saved any context to the storage drive.
	On	S0	Module and the operating system are up and running.

- **Module ID button with integrated LED**: Toggles the integrated blue ID LED on and off. The module ID LED is used to identify an Intel® D50DNP Module within a chassis for maintenance when installed in a rack of similar server systems. The module ID LED can also be toggled on and off remotely using the IPMI "`Chassis Identify`" command that causes the LED to blink for 15 seconds.
- **NMI Button**: When the NMI button is pressed, it puts the Intel® D50DNP Module in a halt state and issues a non-maskable interrupt (NMI). This process can be useful when performing diagnostics for a given issue where a memory dump is necessary to help determine the cause of the problem. To prevent an inadvertent module halt, the actual NMI button is located behind the front control panel faceplate. The NMI button is only accessible by using a small-tipped tool like a pin or paper clip.
- **Module cold reset button**: When pressed, this button reboots and re-initializes the Intel® D50DNP Module. Unlike the power button, the reset button does not disconnect the power to the module. It just starts the module's power-on self-test (POST) sequence over again.

- **Module status LED**: The module status LED is a bicolor (green/amber) indicator that shows the current health of the module. The module status LED states are driven by the integrated platform management subsystem. The table below provides a description of each supported LED state.

Table 13. Intel® D50DNP Module Status LED State Definitions

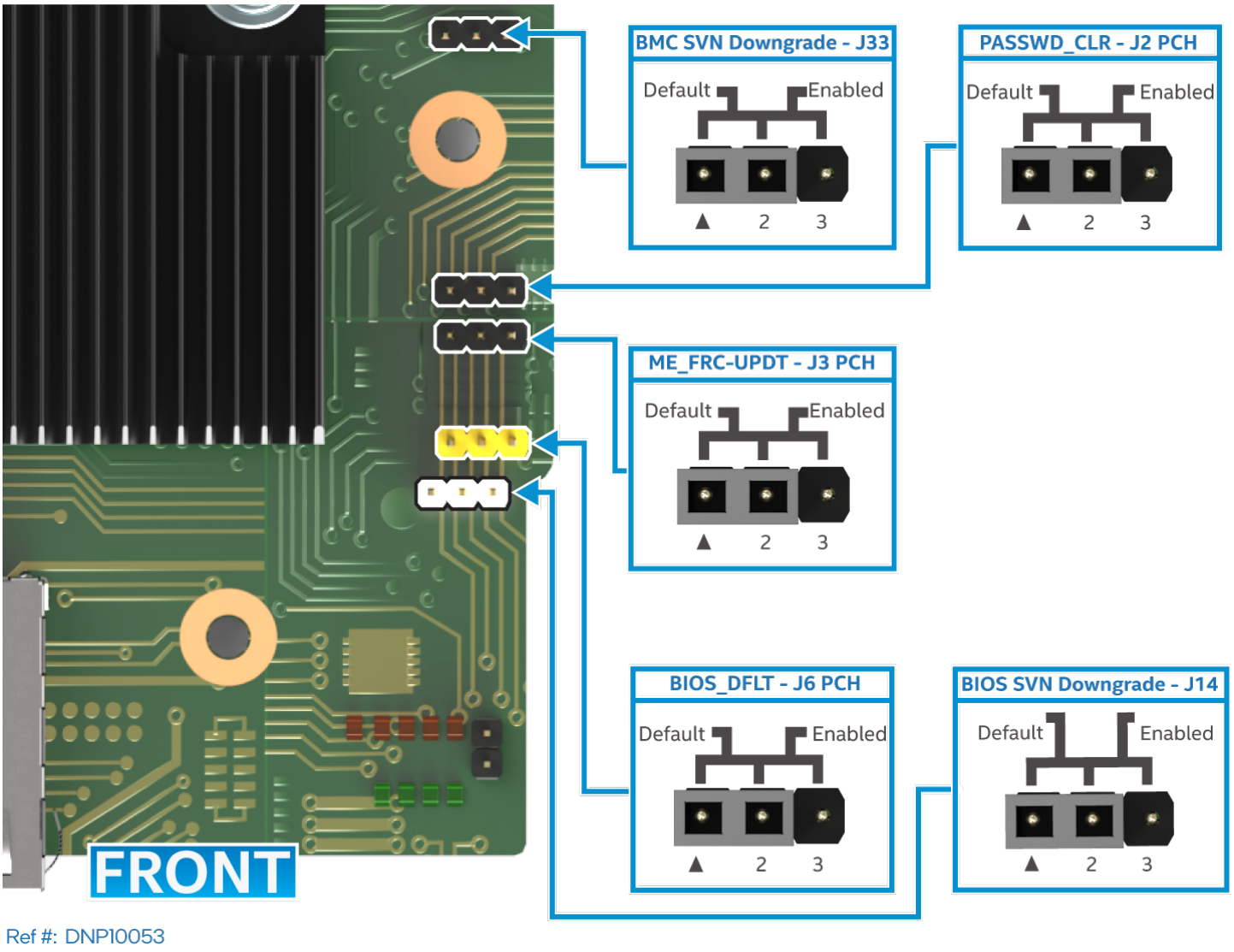
LED State	Module State	Module Status Description
Off	No AC power to system.	• System power is not present. • Module is in EuP Lot6 off mode.
Solid green	Module is operating normally.	• Module is in S5 soft-off state. • Module is running (in S0 State) and its status is healthy. The module is not exhibiting any errors. Source power is present, the BMC has booted, and manageability functionality is up and running. • After a BMC reset, and with the module ID LED solid on, the BMC is booting Linux*. Control has been passed from BMC U-Boot to BMC Linux*. The BMC is in this state for roughly 10–20 seconds.
Blinking green	Module is operating in a degraded state although still functioning; or module is operating in a redundant state but with an impending failure warning.	• Redundancy loss such as fan or power-supply (when Power Cold Redundancy is enabled). Applies only if the associated platform subsystem has redundancy capabilities. • Fan warning or failure when the number of fully operational fans is more than the minimum number needed to cool the system. • Non-critical threshold crossed: temperature, voltage, input power to power supply, output current for main power rail from power supply and processor thermal control sensors. • Power supply predictive failure occurred while redundant power supply configuration was present. • Cannot use all installed memory (more than 1 memory module installed). • Correctable errors over a threshold and migrating to a spare memory module (memory sparing). This situation indicates that the module no longer has spare memory modules (a redundancy lost condition). • In mirrored configuration, when memory mirroring takes place and the module loses memory redundancy. • Battery failure. • BMC executing in U-Boot (this is indicated by module ID LED blinking at 3 Hz while status blinking at 1 Hz). Module is in degraded state (no manageability). BMC U-Boot is running but has not transferred control to BMC Linux*. The module is in this state 6–8 seconds after BMC reset while it pulls the Linux* image from flash. • BMC watchdog has reset the BMC. • Power unit sensor offset for configuration error is asserted. • SSD hot swap controller (HSC) is off-line or degraded.
Blinking green and amber alternatively	Module is initializing after AC power is applied.	• PFR in the process of updating/authenticating/recovering when AC power is connected, module firmware being updated. • Module not ready to take power button event/signal.
Blinking amber	Module is operating in a degraded state with an impending failure warning, although still functioning. Module is likely to fail.	• Critical threshold crossed: voltage, temperature, input power to power supply, output current for main power rail from power supply and PROCHOT sensors. • VRD hot asserted. • Minimum number of fans to cool the system not present. • Storage drive fault. • Power unit redundancy sensor: insufficient resources offset (indicates not enough power supplies present). • In non-sparing and non-mirroring mode, if the threshold of correctable errors is crossed within the window. • Invalid firmware image detected during boot or firmware update.

LED State	Module State	Module Status Description

Solid amber	Critical/non-recoverable: module is halted.
	
	Fatal alarm: module has failed or shut down.
		• CPU CATERR signal asserted.
		• MSID mismatch detected (CATERR also asserts for this case).
		• CPU 0 is missing.
		• CPU thermal trip.
		• No power good: power fault.
		• Memory module failure when there is only 1 memory module present and hence no good memory is present.
		• Runtime memory uncorrectable error in non-redundant mode.
		• DIMM thermal trip or equivalent.
		• SSB thermal trip or equivalent.
		• Processor ERR2 signal asserted.
		• BMC/video memory test failed (module ID LED shows blue/solid-on for this condition).
		• Both U-Boot BMC firmware images are bad (module ID LED shows blue/solid-on for this condition).
		• 240 VA fault.
		• Fatal error in processor initialization:
		  ◦ Processor family not identical
		  ◦ Processor model not identical
		  ◦ Processor cache size not identical
		  ◦ Cannot synchronize processor frequency
		  ◦ Cannot synchronize Intel® UPI link frequency
		• BMC fail authentication with nonrecoverable condition, system hangs at T-1; boot PCH only, system hangs; PIT failed, system lockdown

Appendix D. Onboard Configuration and Service Jumpers

The server board includes several jumper blocks to configure, protect, or recover specific features of the server board. The following figure identifies the location of each jumper block on the server board. Pin 1 of each jumper is identified by an arrowhead (▼) silkscreened on the server board next to the pin. Please read the Intel® Server D50DNP Family Technical Product Specification for details.



Ref #: DNP10053

Figure 276. Jumper Block Location

Appendix E. POST Code Diagnostic LEDs

To help troubleshooting system hang conditions that occur during a system POST process, the server board includes a bank of eight diagnostic LEDs on the front edge of the board. These diagnostic LEDs are used during POST to represent halt error codes or POST progress codes.

During the system boot process, memory reference code (MRC) and system BIOS execute several memory initialization and platform configuration routines, each of which is assigned a hexadecimal POST progress code number. As each routine is started, the given POST progress code number is displayed on the diagnostic LEDs. If a system hangs during POST execution, the displayed POST progress code can be used to identify the last POST routine that was run before the error occurred, helping to isolate the possible cause of the hang condition even when video is not available.

These diagnostic LEDs are equivalent to the legacy "Port 80 POST codes", and a Legacy I/O Port 80 output will be displayed as a Diagnostic LED code. Each POST progress code or halt error code is represented by eight LEDs, four green LEDs and four amber LEDs. The codes are divided into two nibbles, an upper nibble and a lower nibble. The upper nibble bits are represented by amber diagnostic LEDs and the lower nibble bits are represented by green diagnostic LEDs. If the bit is set, the corresponding LED is lit. If the bit is clear, the corresponding LED is off. For each set of nibble bits, LED with lowest number represents the least significant bit (LSB) and LED with highest number represents the most significant bit (MSB).

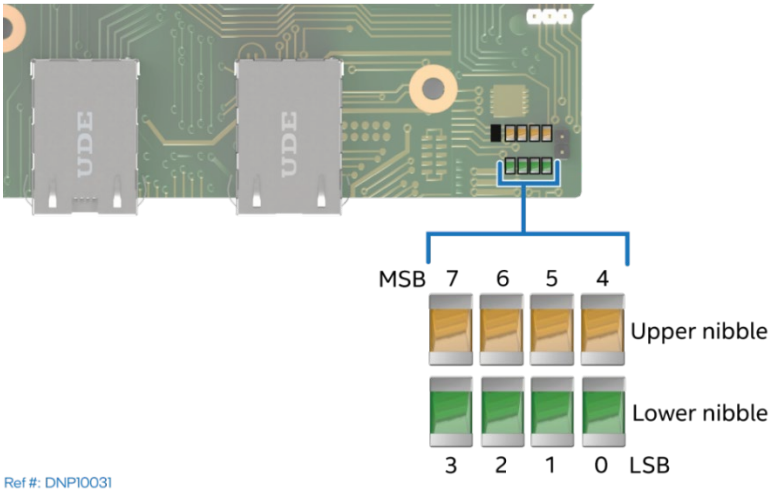


Figure 277. Intel® Light-Guided Diagnostics - POST Code LED Location

In the following example, the BIOS sends a hexadecimal value of AC to the diagnostic LEDs. The LEDs are decoded as shown in the following table.

Table 14. Diagnostic LED Code Example

LEDs		Upper Nibble AMBER LEDs				Lower Nibble GREEN LEDs			
		MSB							LSB
		LED #7	LED #6	LED #5	LED #4	LED #3	LED #2	LED #1	LED #0
		8h	4h	2h	1h	8h	4h	2h	1h
Status		**ON**	OFF	**ON**	OFF	**ON**	**ON**	OFF	OFF
Read Value	Binary	1	0	1	0	1	1	0	0
	Hexadecimal	**A**h				**C**h			
Result		**AC**h							

Upper nibble bits = 1010b = **A**h; Lower nibble bits = 1100b = **C**h; the two Hex Nibble values are combined to create a single **AC**h POST Progress Code.

E.1 Early POST Memory Initialization MRC Diagnostic Codes

Memory initialization at the beginning of POST includes multiple functions: discovery, channel training, validation that the DIMM population is acceptable and functional, initialization of the IMC and other hardware settings, and initialization of applicable RAS configurations.

The MRC progress codes are displayed to the diagnostic LEDs that show the execution point in the MRC operational path at each step.

Table 15. Memory Reference Code (MRC) Progress Codes

MRC Progress Code (Hex)	Upper Nibble				Lower Nibble				Description
	8h	4h	2h	1h	8h	4h	2h	1h	
70	0	1	1	1	0	0	0	0	HBM Training
71	0	1	1	1	0	0	0	1	HBM internal use.
72	0	1	1	1	0	0	1	0	HBM internal use.
73	0	1	1	1	0	0	1	1	NVRAM sync.
7E	0	1	1	1	1	1	1	0	MRCinternal sync.
B0	1	0	1	1	0	0	0	0	Detect DIMM population
B1	1	0	1	1	0	0	0	1	Initialize clock
B2	1	0	1	1	0	0	1	0	Gather remaining SPD data
B3	1	0	1	1	0	0	1	1	Gets memory ready to be written and read.
B4	1	0	1	1	0	1	0	0	Evaluate RAS modes and save rank information.
B5	1	0	1	1	0	1	0	1	MRCinternal dispatch.
B6	1	0	1	1	0	1	1	0	DDRIO initialize.
B7	1	0	1	1	0	1	1	1	Train DDR5 channels
0	0	0	0	0	0	0	0	0	Train DDR5 channels: Receive enable training
3	0	0	0	0	0	0	1	1	Train DDR5 channels: Read DQ/DQS training
4	0	0	0	0	0	1	0	0	Train DDR5 channels: Write DQ/DQS training
11	0	0	0	1	0	0	0	1	Train DDR5 channels: End of channel training.
77	0	1	1	1	0	1	1	1	Train DDR5 channels: Write leveling training.
B8	1	0	1	1	1	0	0	0	Initialize CLTT/OLTT
B9	1	0	1	1	1	0	0	1	Hardware memory test and initialization
BA	1	0	1	1	1	0	1	0	Execute software memory initialization
BB	1	0	1	1	1	0	1	1	Program memory map and interleaving
BC	1	0	1	1	1	1	0	0	Program RAS configuration
BE	1	0	1	1	1	1	1	0	Execute BSSA RMT
BF	1	0	1	1	1	1	1	1	MRC is done

If a major memory initialization error occurs, preventing the system from booting with data integrity, the MRC displays a fatal error code on the diagnostic LEDs, and a system halt command is executed. Fatal MRC error halts do not change the state of the system status LED and they do not get logged as SEL events. Table 19 lists all MRC fatal errors that are displayed to the diagnostic LEDs.

Note: Fatal MRC errors display codes that may be the same as BIOS POST progress codes displayed later in the POST process.

Table 16. MRC Fatal Error Codes

MRC fatal error code (Hex)	Upper Nibble				Lower Nibble				MRC fatal error code explanation (with MRC internal minor code)
	8h	4h	2h	1h	8h	4h	2h	1h	
E8	1	1	1	0	1	0	0	0	No usable memory error. 01h = No memory was detected from SPD read, or invalid configuration that causes no operable memory. 02h = Memory DIMMs on all channels of all sockets are disabled due to hardware memory test error. 03h = No memory installed. All channels are disabled.
E9	1	1	1	0	1	0	0	1	Memory is locked by Intel® TXT and is inaccessible.
EA	1	1	1	0	1	0	1	0	DDR5 channel training error. 01h = Error on read DQ/DQS (Data/Data Strobe) initialization. 02h = Error on receive enable. 03h = Error on write leveling. 04h = Error on write DQ/DQS (Data/Data Strobe.
EB	1	1	1	0	1	0	1	1	Memory test failure. 01h = Software memory test failure. 02h = Hardware memory test failed.
ED	1	1	1	0	1	1	0	1	DIMM configuration population error. 01h = Different DIMM types (RDIMM, 3DS-RDIMM) are detected installed in the system. 02h = Violation of DIMM population rules. 03h = The third DIMM slot cannot be populated when QR DIMMs are installed. 04h = UDIMMs are not supported. 05h = Unsupported DIMM voltage.
EF	1	1	1	0	1	1	1	1	Indicates a CLTT table structure error.

E.2 BIOS POST Progress Codes

The following table provides a list of all POST progress codes.

Table 17. POST Progress Codes

Post progress code (Hex)	Upper Nibble				Lower Nibble				Description
	8h	4h	2h	1h	8h	4h	2h	1h	
Security (SEC) Phase									
01	0	0	0	0	0	0	0	1	First POST code after CPU reset
02	0	0	0	0	0	0	1	0	Microcode load begins
03	0	0	0	0	0	0	1	1	CRAM initialization begins
04	0	0	0	0	0	1	0	0	PEI cache when disabled
05	0	0	0	0	0	1	0	1	SEC core at power-on start
06	0	0	0	0	0	1	1	0	Early CPU initialization during SEC phase
Intel® UPI RC (fully leverage without platform change)									
A1	1	0	1	0	0	0	0	1	Collect information such as SBSP, boot mode, reset type, etc.
A3	1	0	1	0	0	0	1	1	Setup minimum path between SBSP and other sockets
A6	1	0	1	0	0	1	1	0	Sync up with PBSPs
A7	1	0	1	0	0	1	1	1	Topology discovery and route calculation
A8	1	0	1	0	1	0	0	0	Program final route
A9	1	0	1	0	1	0	0	1	Program final IO SAD setting
AA	1	0	1	0	1	0	1	0	Protocol layer and other uncore settings
AB	1	0	1	0	1	0	1	1	Transition links to full speed operation
AE	1	0	1	0	1	1	1	0	Coherency settings
AF	1	0	1	0	1	1	1	1	Intel® UPI initialization is done
Pre-EFI Initialization (PEI) Phase									
10	0	0	0	1	0	0	0	0	PEI core
11	0	0	0	1	0	0	0	1	CPU PEIM
15	0	0	0	1	0	1	0	1	Platform type initialization
19	0	0	0	1	1	0	0	1	Platform PEIM initialization
Integrated I/O (IIO) Progress Codes									
E0	1	1	1	0	0	0	0	0	IIO early initialization entry
E1	1	1	1	0	0	0	0	1	IIO pre-link training
E2	1	1	1	0	0		1	0	IIO EQ programming
E3	1	1	1	0	0	0	1	1	IIO link training
E4	1	1	1	0	0	1	0	0	Internal use
E5	1	1	1	0	0	1	0	1	IIO early initialization exit
E6	1	1	1	0	0	1	1	0	IIO late initialization entry
E7	1	1	1	0	0	1	1	1	IIO PCIe* ports initialization
E8	1	1	1	0	1	0	0	0	IIO IOAPIC initialization
E9	1	1	1	0	1	0	0	1	IIO VTD initialization
EA	1	1	1	0	1	0	1	0	IIO IOAT initialization
EB	1	1	1	0	1	0	1	1	IIO DXF initialization
EC	1	1	1	0	1	1	0	0	IIO NTB initialization
ED	1	1	1	0	1	1	0	1	IIO security initialization
EE	1	1	1	0	1	1	1	0	IIO late initialization exit
EF	1	1	1	0	1	1	1	1	IIO ready to boot
MRC Progress Codes – At this point, the MRC progress code sequence is executed									

Post progress code (Hex)	Upper Nibble				Lower Nibble				Description
	8h	4h	2h	1h	8h	4h	2h	1h	
31	0	0	1	1	0	0	0	1	Memory installed
32	0	0	1	1	0	0	1	0	CPU PEIM (CPU initialization)
33	0	0	1	1	0	0	1	1	CPU PEIM (cache initialization)
34	0	0	1	1	0	1	0	0	CPU BSP selection
35	0	0	1	1	0	1	0	1	CPU AP initialization
36	0	0	1	1	0	1	1	0	CPU SMM initialization
4F	0	1	0	0	1	1	1	1	DXE IPL started
Memory Feature Progress Codes									
C1	1	1	0	0	0	0	0	1	Memory POR check
C2	1	1	0	0	0	0	1	0	Internal use
C3	1	1	0	0	0	0	1	1	Internal use
C4	1	1	0	0	0	1	0	0	Internal use
C5	1	1	0	0	0	1	0	1	Memory early initialization
C6	1	1	0	0	0	1	1	0	Display DIMM information in debug mode
C7	1	1	0	0	0	1	1	1	JEDEC NVDIMM training
C9	1	1	0	0	1	0	0	1	Setup SVL and scrambling
CA	1	1	0	0	1	0	1	0	Internal use
CB	1	1	0	0	1	0	1	1	Check RAS support
CC	1	1	0	0	1	1	0	0	PMem ADR initialization
CD	1	1	0	0	1	1	0	1	Internal use
CE	1	1	0	0	1	1	1	0	Memory late initialization
CF	1	1	0	0	1	1	1	1	Determine MRC boot mode
D0	1	1	0	1	0	0	0	0	MKTME early initialization
D1	1	1	0	1	0	0	0	1	SGX early initialization
D2	1	1	0	1	0	0	1	0	Memory margin test
D3	1	1	0	1	0	0	1	1	Internal use
D5	1	1	0	1	0	1	0	1	Internal use
D6	1	1	0	1	0	1	1	0	Offset training result
Driver Execution Environment (DXE) Phase									
60	0	1	1	0	0	0	0	0	DXE core started
62	0	1	1	0	0	0	1	0	DXE setup initialization
68	0	1	1	0	1	0	0	0	DXE PCI host bridge initialization
69	0	1	1	0	1	0	0	1	DXE NB initialization
6A	0	1	1	0	1	0	1	0	DXE NB SMM initialization
70	0	1	1	1	0	0	0	0	DXE SB initialization
71	0	1	1	1	0	0	0	1	DXE SB SMM initialization
72	0	1	1	1	0	0	1	0	DXE SB devices initialization
78	0	1	1	1	1	0	0	0	DXE ACPI initialization
79	0	1	1	1	1	0	0	1	DXE CSM initialization
7D	0	1	1	1	1	1	0	1	DXE removable media detect
7E	0	1	1	1	1	1	1	0	DXE removable media detected
90	1	0	0	1	0	0	0	0	DXE BDS started
91	1	0	0	1	0	0	0	1	DXE BDS connect drivers
92	1	0	0	1	0	0	1	0	DXE PCI bus start
93	1	0	0	1	0	0	1	1	DXE PCI bus HPC initialization

Post progress code (Hex)	Upper Nibble				Lower Nibble				Description
	8h	4h	2h	1h	8h	4h	2h	1h	
94	1	0	0	1	0	1	0	0	DXE PCI bus enumeration
95	1	0	0	1	0	1	0	1	DXE PCI bus resource requested
96	1	0	0	1	0	1	1	0	DXE PCI bus assign resource
97	1	0	0	1	0	1	1	1	DXE CON_OUT connect
98	1	0	0	1	1	0	0	0	DXE CON_IN connect
99	1	0	0	1	1	0	0	1	DXE SIO initialization
9A	1	0	0	1	1	0	1	0	DXE USB start
9B	1	0	0	1	1	0	1	1	DXE USB reset
9C	1	0	0	1	1	1	0	0	DXE USB detected
9D	1	0	0	1	1	1	0	1	DXE USB enabled
A1	1	0	1	0	0	0	0	1	DXE IDE start
A2	1	0	1	0	0	0	1	0	DXE IDE reset
A3	1	0	1	0	0	0	1	1	DXE IDE detected
A4	1	0	1	0	0	1	0	0	DXE IDE enabled
A5	1	0	1	0	0	1	0	1	DXE SCSI start
A6	1	0	1	0	0	1	1	0	DXE SCSI reset
A7	1	0	1	0	0	1	1	1	DXE SCSI detected
A8	1	0	1	0	1	0	0	0	DXE SCSI enabled
AB	1	0	1	0	1	0	1	1	DXE SETUP start
AC	1	0	1	0	1	1	0	0	DXE SETUP input waiting
AD	1	0	1	0	1	1	0	1	DXE ready to boot
AE	1	0	1	0	1	1	1	0	DXE legacy boot
AF	1	0	1	0	1	1	1	1	DXE exit boot services
B0	1	0	1	1	0	0	0	0	RT set virtual address map start
B1	1	0	1	1	0	0	0	1	RT set virtual address map end
B2	1	0	1	1	0	0	1	0	DXE legacy option ROM initialization
B3	1	0	1	1	0	0	1	1	DXE reset system
B4	1	0	1	1	0	1	0	0	DXE USB hot plug
B5	1	0	1	1	0	1	0	1	DXE PCI bus hot plug
B8	1	0	1	1	1	0	0	0	PWRBTN shutdown
B9	1	0	1	1	1	0	0	1	SLEEP shutdown
C0	1	1	0	0	0	0	0	0	End of DXE
C7	1	1	0	0	0	1	1	1	DXE ACPI enabled
0	0	0	0	0	0	0	0	0	Clear POST code
BDS Phase									
51	0	1	0	1	0	0	0	1	BDS video selection.
52	0	1	0	1	0	0	1	0	BDS after trust console.
53	0	1	0	1	0	0	1	1	BDS end of DXE.
54	0	1	0	1	0	1	0	0	BDS ready to lock.
55	0	1	0	1	0	1	0	1	BDS connect device.
56	0	1	0	1	0	1	1	0	BDS before enter setup.
57	0	1	0	1	0	1	1	1	BDS load boot options.
58	0	1	0	1	1	0	0	0	BDS exit boot services.
S3 Resume									
E0	1	1	1	0	0	0	0	0	S3 resume PEIM (S3 started)

Post progress code (Hex)	Upper Nibble				Lower Nibble				Description
	8h	4h	2h	1h	8h	4h	2h	1h	
E1	1	1	1	0	0	0	0	1	S3 resume PEIM (S3 boot script)
E2	1	1	1	0	0	0	1	0	S3 resume PEIM (S3 video repost)
E3	1	1	1	0	0	0	1	1	S3 resume PEIM (S3 operating system wake)

Appendix F. POST Error Codes

Most error conditions encountered during POST are reported using POST error codes. These codes represent specific failures, warnings, or information. POST error codes may be displayed in the Error Manager display screen in the BIOS Setup utility and are logged to the System Event Log (SEL). Logged events are available to system management applications, including remote and Out of Band (OOB) management.

There are exception cases in early initialization where system resources are not adequately initialized for handling POST Error Code reporting. These cases are primarily fatal error conditions resulting from initialization of processors and memory, and they are handled by a diagnostic LED display with a system halt.

The table below lists the supported POST error codes. Each error code is assigned an error type that determines the action the BIOS takes when the error is encountered. Error types include minor, major, and fatal. The BIOS action for each is defined as follows:

- **Minor:** An error message may be displayed on the POST screen or in the BIOS setup utility Error Manager and the POST error code is logged to the SEL. The system continues booting in a degraded state. The user may want to replace the erroneous unit. The POST Error Pause option setting in the BIOS setup utility does not have any effect on this error.
- **Major:** An error message is posted to the Error Manager screen and an error is logged to the SEL. If the BIOS setup utility “Post Error Pause” option is enabled, operator intervention is required to continue booting the system. If the BIOS setup utility “POST Error Pause” option is disabled, the system continues to boot.

  Note: For `0048` (password check failed), the system halts and then, after the next reset/reboot, displays the error code on the Error Manager screen.

- **Fatal:** If the system cannot boot, POST halts the system with a halt error code on the diagnostic LEDs. The system cannot boot unless the error is resolved. The faulty component must be replaced.

Note: The POST error codes in the following table are common to all current generation Intel server platforms. Features present on a given server board/system determine which of the listed error codes are supported.

Table 18. POST Error Messages and Handling

POST Error Code	Error Message	Corrective Action	Type
0012	System RTC date/time not set	Set date and time	Major
0048	Password check failed	Put right password.	Major
0140	PCI component encountered a PERR error		Major
0141	PCI resource conflict		Major
0146	PCI out of resources error	Enable Memory Mapped I/O above 4 GB item at SETUP to use 64-bit MMIO.	Major
0147	Some option ROMs are not loaded because the verification fails when the Secure Boot option is enabled.		Minor
0191	Processor core/thread count mismatch detected	Use identical CPU type.	Fatal
0192	Processor cache size mismatch detected	Use identical CPU type.	Fatal
0194	Processor family mismatch detected	Use identical CPU type.	Fatal
0195	Processor Intel® UPI link frequencies unable to synchronize		Fatal
0196	Processor model mismatch detected	Use identical CPU type.	Fatal
0197	Processor frequencies unable to synchronize	Use identical CPU type.	Fatal
5220	BIOS Settings reset to default settings		Major
5221	Passwords cleared by jumper		Major
5224	Password clear jumper is Set	Recommend reminding user to install BIOS password as BIOS admin password is the main keys for several BIOS security features.	Major
8130	CPU 0 disabled		Major
8131	CPU 1 disabled		Major
8160	CPU 0 unable to apply microcode update		Major
8161	CPU 1 unable to apply microcode update		Major
8170	CPU 0 failed Self-Test (BIST)		Major
8171	CPU 1 failed Self-Test (BIST)		Major
8180	CPU 0 microcode update not found		Minor
8181	CPU 1 microcode update not found		Minor
8190	Watchdog timer failed on last boot.		Major
8198	OS boot watchdog timer failure.		Major
8300	Baseboard Management Controller failed self-test.		Major
8305	Hot Swap Controller failure		Major
83A0	Management Engine (ME) failed self-test.		Major
83A1	Management Engine (ME) Failed to respond.		Major
84F2	Baseboard management controller failed to respond		Major
84F3	Baseboard Management Controller in Update Mode.		Major
84F4	Baseboard Management Controller Sensor Data Record empty.	Update right SDR.	Major
84FF	System Event Log full	Clear SEL through EWS or SELVIEW utility.	Minor
85FC	Memory component could not be configured in the selected RAS mode		Major
8501	Memory Population Error	Plug DIMM at right population.	Major
8502	PMem invalid DIMM population found on the system.	Follow valid POR for PMem DIMM.	Major
8520	Memory failed test/initialization CPU0_DIMM_A1	Remove the disabled DIMM.	Major

POST Error Code	Error Message	Corrective Action	Type
8521	Memory failed test/initialization CPU0_DIMM_A2	Remove the disabled DIMM.	Major
8522	Memory failed test/initialization CPU0_DIMM_A3	Remove the disabled DIMM.	Major
8523	Memory failed test/initialization CPU0_DIMM_B1	Remove the disabled DIMM.	Major
8524	Memory failed test/initialization CPU0_DIMM_B2	Remove the disabled DIMM.	Major
8525	Memory failed test/initialization CPU0_DIMM_B3	Remove the disabled DIMM.	Major
8526	Memory failed test/initialization CPU0_DIMM_C1	Remove the disabled DIMM.	Major
8527	Memory failed test/initialization CPU0_DIMM_C2	Remove the disabled DIMM.	Major
8528	Memory failed test/initialization CPU0_DIMM_C3	Remove the disabled DIMM.	Major
8529	Memory failed test/initialization CPU0_DIMM_D1	Remove the disabled DIMM.	Major
852A	Memory failed test/initialization CPU0_DIMM_D2	Remove the disabled DIMM.	Major
852B	Memory failed test/initialization CPU0_DIMM_D3	Remove the disabled DIMM.	Major
852C	Memory failed test/initialization CPU0_DIMM_E1	Remove the disabled DIMM.	Major
852D	Memory failed test/initialization CPU0_DIMM_E2	Remove the disabled DIMM.	Major
852E	Memory failed test/initialization CPU0_DIMM_E3	Remove the disabled DIMM.	Major
852F	Memory failed test/initialization CPU0_DIMM_F1	Remove the disabled DIMM.	Major
8530	Memory failed test/initialization CPU0_DIMM_F2	Remove the disabled DIMM.	Major
8531	Memory failed test/initialization CPU0_DIMM_F3	Remove the disabled DIMM.	Major
8532	Memory failed test/initialization CPU0_DIMM_G1	Remove the disabled DIMM.	Major
8533	Memory failed test/initialization CPU0_DIMM_G2	Remove the disabled DIMM.	Major
8534	Memory failed test/initialization CPU0_DIMM_G3	Remove the disabled DIMM.	Major
8535	Memory failed test/initialization CPU0_DIMM_H1	Remove the disabled DIMM.	Major
8536	Memory failed test/initialization CPU0_DIMM_H2	Remove the disabled DIMM.	Major
8537	Memory failed test/initialization CPU0_DIMM_H3	Remove the disabled DIMM.	Major
8538	Memory failed test/initialization CPU1_DIMM_A1	Remove the disabled DIMM.	Major
8539	Memory failed test/initialization CPU1_DIMM_A2	Remove the disabled DIMM.	Major
853A	Memory failed test/initialization CPU1_DIMM_A3	Remove the disabled DIMM.	Major
853B	Memory failed test/initialization CPU1_DIMM_B1	Remove the disabled DIMM.	Major
853C	Memory failed test/initialization CPU1_DIMM_B2	Remove the disabled DIMM.	Major
853D	Memory failed test/initialization CPU1_DIMM_B3	Remove the disabled DIMM.	Major
853E	Memory failed test/initialization CPU1_DIMM_C1	Remove the disabled DIMM.	Major
853F (Go to 85C0)	Memory failed test/initialization CPU1_DIMM_C2	Remove the disabled DIMM.	Major
8540	Memory disabled.CPU0_DIMM_A1	Remove the disabled DIMM.	Major
8541	Memory disabled.CPU0_DIMM_A2	Remove the disabled DIMM.	Major
8542	Memory disabled.CPU0_DIMM_A3	Remove the disabled DIMM.	Major
8543	Memory disabled.CPU0_DIMM_B1	Remove the disabled DIMM.	Major
8544	Memory disabled.CPU0_DIMM_B2	Remove the disabled DIMM.	Major
8545	Memory disabled.CPU0_DIMM_B3	Remove the disabled DIMM.	Major
8546	Memory disabled.CPU0_DIMM_C1	Remove the disabled DIMM.	Major
8547	Memory disabled.CPU0_DIMM_C2	Remove the disabled DIMM.	Major
8548	Memory disabled.CPU0_DIMM_C3	Remove the disabled DIMM.	Major
8549	Memory disabled.CPU0_DIMM_D1	Remove the disabled DIMM.	Major
854A	Memory disabled.CPU0_DIMM_D2	Remove the disabled DIMM.	Major
854B	Memory disabled.CPU0_DIMM_D3	Remove the disabled DIMM.	Major
854C	Memory disabled.CPU0_DIMM_E1	Remove the disabled DIMM.	Major

POST Error Code	Error Message	Corrective Action	Type
854D	Memory disabled.CPU0_DIMM_E2	Remove the disabled DIMM.	Major
854E	Memory disabled.CPU0_DIMM_E3	Remove the disabled DIMM.	Major
854F	Memory disabled.CPU0_DIMM_F1	Remove the disabled DIMM.	Major
8550	Memory disabled.CPU0_DIMM_F2	Remove the disabled DIMM.	Major
8551	Memory disabled.CPU0_DIMM_F3	Remove the disabled DIMM.	Major
8552	Memory disabled.CPU0_DIMM_G1	Remove the disabled DIMM.	Major
8553	Memory disabled.CPU0_DIMM_G2	Remove the disabled DIMM.	Major
8554	Memory disabled.CPU0_DIMM_G3	Remove the disabled DIMM.	Major
8555	Memory disabled.CPU0_DIMM_H1	Remove the disabled DIMM.	Major
8556	Memory disabled.CPU0_DIMM_H2	Remove the disabled DIMM.	Major
8557	Memory disabled.CPU0_DIMM_H3	Remove the disabled DIMM.	Major
8558	Memory disabled.CPU1_DIMM_A1	Remove the disabled DIMM.	Major
8559	Memory disabled.CPU1_DIMM_A2	Remove the disabled DIMM.	Major
855A	Memory disabled.CPU1_DIMM_A3	Remove the disabled DIMM.	Major
855B	Memory disabled.CPU1_DIMM_B1	Remove the disabled DIMM.	Major
855C	Memory disabled.CPU1_DIMM_B2	Remove the disabled DIMM.	Major
855D	Memory disabled.CPU1_DIMM_B3	Remove the disabled DIMM.	Major
855E	Memory disabled.CPU1_DIMM_C1	Remove the disabled DIMM.	Major
855F (Go to 85D0)	Memory disabled.CPU1_DIMM_C2	Remove the disabled DIMM.	Major
8560	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_A1		Major
8561	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_A2		Major
8562	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_A3		Major
8563	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_B1		Major
8564	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_B2		Major
8565	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_B3		Major
8566	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_C1		Major
8567	Memory encountered a Serial Presence Detection (SPD) failure.CPU0_DIMM_C2		Major
8568	Memory encountered a Serial Presence Detection (SPD) failure.CPU0_DIMM_C3		Major
8569	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_D1		Major
856A	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_D2		Major
856B	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_D3		Major
856C	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_E1		Major
856D	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_E2		Major

POST Error Code	Error Message	Corrective Action	Type
856E	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_E3		Major
856F	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_F1		Major
8570	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_F2		Major
8571	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_F3		Major
8572	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_G1		Major
8573	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_G2		Major
8574	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_G3		Major
8575	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_H1		Major
8576	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_H2		Major
8577	Memory encountered a Serial Presence Detection(SPD) failure.CPU0_DIMM_H3		Major
8578	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_A1		Major
8579	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_A2		Major
857A	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_A3		Major
857B	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_B1		Major
857C	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_B2		Major
857D	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_B3		Major
857E	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_C1		Major
857F (Go to 85E0)	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_C2		Major
85C0	Memory failed test/initialization CPU1_DIMM_C3	Remove the disabled DIMM.	Major
85C1	Memory failed test/initialization CPU1_DIMM_D1	Remove the disabled DIMM.	Major
85C2	Memory failed test/initialization CPU1_DIMM_D2	Remove the disabled DIMM.	Major
85C3	Memory failed test/initialization CPU1_DIMM_D3	Remove the disabled DIMM.	Major
85C4	Memory failed test/initialization CPU1_DIMM_E1	Remove the disabled DIMM.	Major
85C5	Memory failed test/initialization CPU1_DIMM_E2	Remove the disabled DIMM.	Major
85C6	Memory failed test/initialization CPU1_DIMM_E3	Remove the disabled DIMM.	Major
85C7	Memory failed test/initialization CPU1_DIMM_F1	Remove the disabled DIMM.	Major
85C8	Memory failed test/initialization CPU1_DIMM_F2	Remove the disabled DIMM.	Major
85C9	Memory failed test/initialization CPU1_DIMM_F3	Remove the disabled DIMM.	Major
85CA	Memory failed test/initialization CPU1_DIMM_G1	Remove the disabled DIMM.	Major
85CB	Memory failed test/initialization CPU1_DIMM_G2	Remove the disabled DIMM.	Major
85CC	Memory failed test/initialization CPU1_DIMM_G3	Remove the disabled DIMM.	Major

POST Error Code	Error Message	Corrective Action	Type
85CD	Memory failed test/initialization CPU1_DIMM_H1	Remove the disabled DIMM.	Major
85CE	Memory failed test/initialization CPU1_DIMM_H2	Remove the disabled DIMM.	Major
85CF	Memory failed test/initialization CPU1_DIMM_H3	Remove the disabled DIMM.	Major
85D0	Memory disabled.CPU1_DIMM_C3	Remove the disabled DIMM.	Major
85D1	Memory disabled.CPU1_DIMM_D1	Remove the disabled DIMM.	Major
85D2	Memory disabled.CPU1_DIMM_D2	Remove the disabled DIMM.	Major
85D3	Memory disabled.CPU1_DIMM_D3	Remove the disabled DIMM.	Major
85D4	Memory disabled.CPU1_DIMM_E1	Remove the disabled DIMM.	Major
85D5	Memory disabled.CPU1_DIMM_E2	Remove the disabled DIMM.	Major
85D6	Memory disabled.CPU1_DIMM_E3	Remove the disabled DIMM.	Major
85D7	Memory disabled.CPU1_DIMM_F1	Remove the disabled DIMM.	Major
85D8	Memory disabled.CPU1_DIMM_F2	Remove the disabled DIMM.	Major
85D9	Memory disabled.CPU1_DIMM_F3	Remove the disabled DIMM.	Major
85DA	Memory disabled.CPU1_DIMM_G1	Remove the disabled DIMM.	Major
85DB	Memory disabled.CPU1_DIMM_G2	Remove the disabled DIMM.	Major
85DC	Memory disabled.CPU1_DIMM_G3	Remove the disabled DIMM.	Major
85DD	Memory disabled.CPU1_DIMM_H1	Remove the disabled DIMM.	Major
85DE	Memory disabled.CPU1_DIMM_H2	Remove the disabled DIMM.	Major
85DF	Memory disabled.CPU1_DIMM_H3	Remove the disabled DIMM.	Major
85E0	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_C3		Major
85E1	Memory encountered a Serial Presence Detection (SPD) failure. CPU1_DIMM_D1		Major
85E2	Memory encountered a Serial Presence Detection (SPD) failure.CPU1_DIMM_D2		Major
85E3	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_D3		Major
85E4	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_E1		Major
85E5	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_E2		Major
85E6	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_E3		Major
85E7	Memory encountered a Serial Presence Detection (SPD) failure.CPU1_DIMM_F1		Major
85E8	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_F2		Major
85E9	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_F3		Major
85EA	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_G1		Major
85EB	Memory encountered a Serial Presence Detection (SPD) failure. CPU1_DIMM_G2		Major
85EC	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_G3		Major
85ED	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_H1		Major
85EE	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_H2		Major

POST Error Code	Error Message	Corrective Action	Type
85EF	Memory encountered a Serial Presence Detection(SPD) failure.CPU1_DIMM_H3		Major
8604	POST Reclaim of non-critical NVRAM variables		Minor
8605	BIOS Settings are corrupted		Major
8606	NVRAM variable space was corrupted and has been reinitialized		Major
8607	Recovery boot has been initiated. **Note:** The primary BIOS image may be corrupted, or the system may hang during POST. A BIOS update is required.		Fatal
A100	BIOS ACM Error		Major
A421	PCI component encountered a SERR error		Fatal
A5A0	PCI Express component encountered a PERR error		Minor
A5A1	PCI Express component encountered an SERR error		Fatal
A6A0	DXE Boot Services driver: Not enough memory available to shadow a Legacy Option ROM.	Disable option ROM at setup to save runtime memory.	Minor

F.1 POST Error LED Codes

Before system video initialization, the BIOS and BMC use POST error LED codes to inform users on error conditions. These POST error LED codes may be displayed alongside other codes on the diagnostic LEDs. This LED is the replacement of the beeper that was used to emit auditable error codes on the previous generation platforms. See the following figure for POST error LED location. The BIOS POST error LED code descriptions are listed in Table 19 and the BMC POST error LED code descriptions are listed in Table 20.

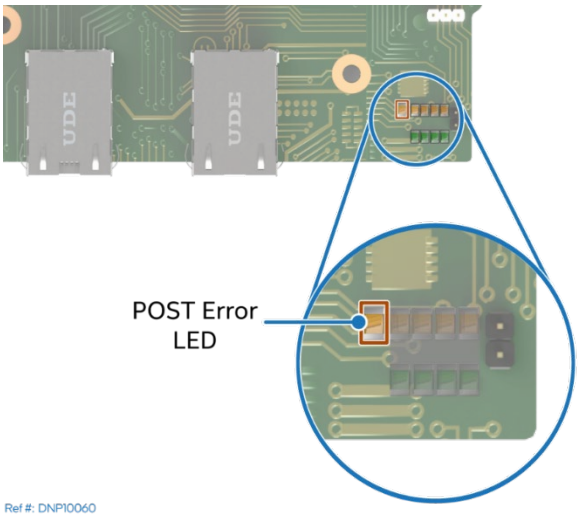


Figure 278. POST Error LED Location

Table 19. POST Error LED Codes

POST Error LED Sequence	Error Message	POST Progress Code	Description
3 short	Memory error	Multiple	System halted because a fatal error related to the memory was detected.
3 long and 1 short	CPU mismatch error	E5	System halted because a fatal error related to the CPU family/model/cache/UPI speed mismatch was detected.

The integrated BMC may generate LED codes based on detection of failure conditions. These LED codes are translated into visual LED sequences each time the problem is discovered, such as on each power-up attempt, but are not lit continuously.

Codes that are common across Intel server boards and systems that use same generation chipset are listed in the following table. Each digit in the code is represented by corresponding number of LED flashes.

Table 20. Integrated BMC POST Error LED Codes

LED Sequence	Reason for LED Blink	Associated Sensors
1-5-1-2	VR watchdog timer sensor assertion.	VR watchdog timer
1-5-1-4	A PSU reports a failure, or the BMC detects the presence of a PSU model that is incompatible with one or more other PSUs in the system.	PS status
1-5-2-1	No CPUs installed or the first CPU socket is empty.	CPU missing sensor
1-5-2-2	CPU CAT Error (IERR) assertion.	CPU Status sensor.
1-5-2-3	CPU ERR2 timeout assertion.	CPU ERR2 Timeout sensor.
1-5-2-4	MSID mismatch occurs if a processor is installed into a system board that has incompatible power capabilities.	MSID mismatch sensor
1-5-2-5	CPU population error.	CPU 0 Status sensor.
1-5-4-2	DC power unexpectedly lost (power good dropout): Power unit sensors report power unit failure offset.	Power fault
1-5-4-4	Power control fault (power good assertion timeout).	Power unit: Soft power control failure offset

F.2 Processor Initialization Error Summary

The table below describes mixed processor conditions and actions for all Intel server boards and Intel server systems designed with the Intel® Xeon® Scalable processor family architecture. The errors fall into one of the following categories:

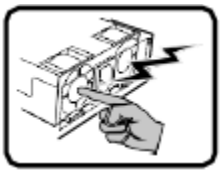
- **Fatal**: The system halts with a halt error code on the diagnostic LEDs and a corresponding sequence consisting of three long flashes and one short flash is sent to the POST Error Code LED. The system cannot boot unless the error is resolved. The faulty component must be replaced.
- **Major**: If the BIOS setup option "POST Error Pause" is enabled, the system goes directly to the BIOS setup Error Manager to display the error and logs the POST error code to SEL. User intervention is required to continue booting the system. If the BIOS setup option "POST Error Pause" is disabled, the system continues to boot and no prompt for the error is given, although the POST error code is logged to the BIOS setup Error Manager and to the SEL.
- **Minor:** An error message may be displayed on the POST screen or in the BIOS Setup Error Manager screen and the POST error code is logged to the SEL. The system continues booting in a degraded state. The user may want to replace the erroneous unit. The "POST Error Pause" option setting in the BIOS setup utility does not affect this error.

Table 21. Mixed Processor Configurations Error Summary

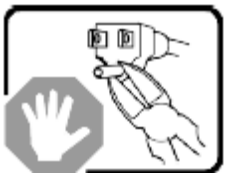
Error	Severity	System Action when BIOS Detects the Error Condition
Processor family not identical	Fatal	• Halts with error code "0xE5" on the diagnostic LED. • Sends three long flashes and one short flash to the POST Error LED. • Does not boot until the fault condition is remediated.
Processor model not identical	Fatal	• Halts with error code "0xE5" on the diagnostic LED. • Sends three long flashes and one short flash to the POST Error LED. • Does not boot until the fault condition is remediated.
Processor cache or home agent not identical	Fatal	• Halts with error code "0xE5" on the diagnostic LED. • Sends three long flashes and one short flash to the POST Error LED. • Does not boot until the fault condition is remediated.
Processor frequency (speed) not identical	Fatal	• Halts with error code "0xE5" on the diagnostic LED. • Sends three long flashes and one short flash to the POST Error LED. • Does not boot until the fault condition is remediated.
Processor Intel® UPI link frequencies not identical	Fatal	• Halts with error code "0xE5" on the diagnostic LED. • Sends three long flashes and one short flash to the POST Error LED. • Does not boot until the fault condition is remediated.
Processor microcode update failed	Major	• Logs the POST error code "81 6x" into the SEL. • If the "POST Error Pause" is enabled, the BIOS loads the BIOS Error Manager to present error message "816x: Processor 0x unable to apply microcode update" on the screen. • If the "POST Error Pause" is disabled in the BIOS Setup continues to boot in a degraded state.
Processor microcode update missing	Minor	• Logs the POST error code "81 8x" into the SEL. • The system continues to boot in a degraded state, regardless of the "POST Error Pause" setting in the BIOS setup. • The Error Manager in BIOS Setup will present the message "818x: Processor microcode update not found"

Appendix G. Product Safety – Multi-Language

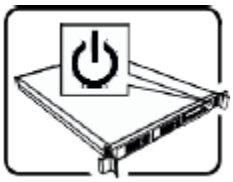
WARNING: English (US)



The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Refer servicing only to qualified personnel.



Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.

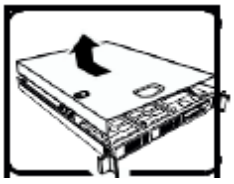


The power button on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the electrical outlet or power supply.

The power cord is considered the disconnect device to the main (AC) power. The socket outlet that the system is pluged into, shall be installed near the equipment and shall be easily accessible.

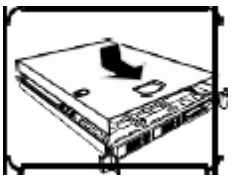
SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps:

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by pressing the power button.
3. Unplug all AC power cords from the system or from electrical outlets.
4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system.
5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.
6. Do not operate the system with the chassis covers removed.



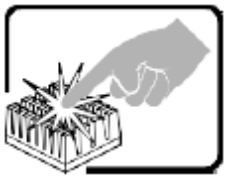
After you have completed the six SAFETY steps above, you can remove the system covers. To do this:

1. Unlock and remove the padlock from the back of the system if a padlock has been installed.
2. Remove and save all screws from the covers.
3. Remove the covers.



For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers:

1. Check first to make sure you have not left loose tools or parts inside the system.
2. Check that cables, add-in boards, and other components are properly installed.
3. Attach the covers to the chassis with the screws removed earlier and tighten them firmly.
4. Insert and lock the padlock to the system to prevent unauthorized access inside the system.
5. Connect all external cables and the AC power cord(s) to the system.



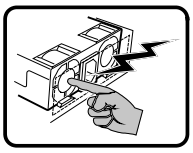
A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.

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

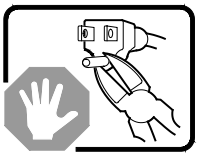
The system is designed to operate in a typical office environment. Choose a site that is:

- Clean and free of airborne particles (other than normal room dust).
- Well ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded electrical outlet.
- Provided with sufficient space to access the power supply cord(s), because they serve as the product's main power disconnect.

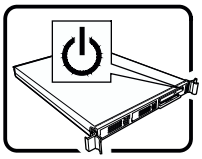
ОСТОРОЖНО: русский



Блок питания данного изделия не содержит деталей, подлежащих обслуживанию пользователем. В этом изделии может быть несколько блоков питания. Обслуживание должно выполняться только квалифицированным персоналом.



Не модифицируйте и не используйте прилагаемый кабель питания, если он не соответствует требуемому типу. Если в устройстве несколько блоков питания, то к каждому блоку питания прилагается отдельный кабель питания.

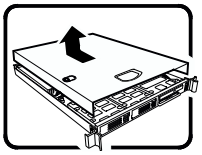


При нажатии кнопки питания не отключается питание системы от электросети. Чтобы отключить подачу питания переменного тока в систему, необходимо отсоединить все кабели питания от электрической розетки или блока питания.

Кабель питания считается размыкателем питания переменного тока. Электрическая розетка, к которой подключается система, должна находиться рядом с оборудованием и быть легко доступной.

ИНСТРУКЦИИ ПО ТЕХНИКЕ БЕЗОПАСНОСТИ. Каждый раз перед снятием крышек корпуса для доступа к внутренней части системы выполняйте следующие действия:

1. Выключите все периферийные устройства, подключенные к системе.
2. Выключите систему, нажав кнопку питания.
3. Отсоедините все кабели питания от системы или электрических розеток.
4. Промаркируйте и отсоедините все кабели, подключенные к разъемам или портам ввода/вывода на задней панели системы.
5. Для обеспечения защиты от электростатического разряда при работе с компонентами надевайте антистатический браслет, прикрепленный к заземленной части корпуса системы (любой неокрашенной металлической поверхности).
6. Запрещается работать с системой, когда крышки корпуса сняты.

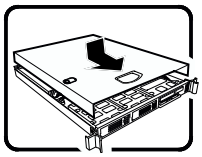


Крышки корпуса системы можно снимать, когда выполнены все шесть описанных выше мер безопасности. Для этого:

1. Откройте и снимите навесной замок (если имеется) с задней части системы.
2. Выверните все винты с крышек и сохраните их.
3. Снимите крышки.

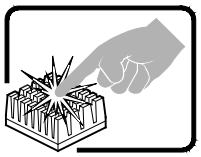
(продолжение)

ОСТОРОЖНО: русский (продолжение)

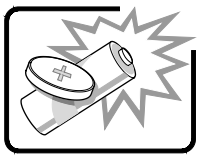


Для обеспечения надлежащего охлаждения и воздушного потока всегда устанавливайте на место крышки корпуса перед включением системы. Работа системы без установленных крышек может привести к повреждению компонентов системы. Чтобы установить крышки, выполните следующие действия:

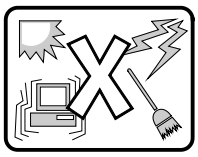
1. Сначала проверьте, не осталось ли в системе незакрепленных инструментов или деталей.
2. Убедитесь, что кабели, платы расширения и другие компоненты установлены правильно.
3. Закрепите крышки на корпусе, завернув и надежно затянув винты, снятые ранее.
4. Установите и закройте навесной замок для предотвращения несанкционированного доступа внутрь системы.
5. Подключите к системе все внешние кабели и кабели питания.



Микропроцессор и теплоотвод могут нагреваться во время работы системы. На некоторых деталях платы и корпуса могут быть острые выступы и кромки. Соблюдайте осторожность. Рекомендуется использовать защитные перчатки.



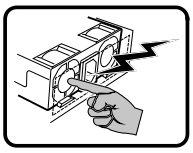
В случае неправильной замены аккумулятора существует опасность взрыва. При замене используйте только те же или эквивалентные модели аккумуляторов, рекомендованные производителем оборудования. Утилизируйте использованные аккумуляторы в соответствии с инструкциями производителя.



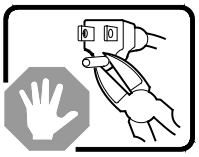
Система предназначена для работы в обычной офисной среде. Место установки системы должно соответствовать следующим требованиям:

- Помещение должно быть чистым, в воздухе не должно быть взвешенных частиц (кроме обычной пыли).
- Место установки должно хорошо вентилироваться и находиться вдали от источников тепла (включая прямой солнечный свет).
- Место установки должно находиться вдали от источников вибрации или механических ударов.
- Место установки должно быть изолировано от сильных электромагнитных полей, создаваемых электрическими устройствами.
- В регионах, где часто бывает гроза, рекомендуется подключать систему к сетевому фильтру и отключать телекоммуникационные линии от модема во время грозы.
- В помещении должна быть правильно заземленная электрическая розетка.
- Должен быть оставлен достаточный зазор для доступа к кабелям питания, которые служат размыкателем электропитания системы.

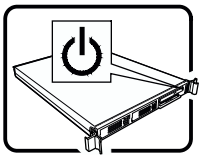
УВАГА! Українська



Джерело живлення в цьому виробі не містить жодних частин, які користувачі могли б обслуговувати самостійно. Цей виріб може містити більше одного джерела живлення. Обслуговувати його може виключно кваліфікований персонал.



Не намагайтеся модифікувати шнур живлення змінного струму з комплекту або користуватися ним, якщо він не відповідає потрібному типу. Виріб із джерелами живлення більше одного має окремі шнури живлення змінного струму для кожного джерела.

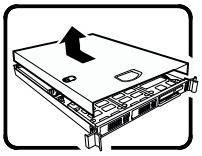


Кнопка живлення на системі не вимикає живлення змінного струму системи. Щоб позбавити систему змінного струму, слід вийняти всі шнури живлення змінного струму зі стінних розеток або джерел живлення.

Вважається, що шнур(и) живлення є пристроями вимкнення основного живлення (змінного струму). Розетка електромережі, до якої підключається система, мусить бути розташована поруч із обладнанням і легкодоступна.

КРОКИ БЕЗПЕКИ: Щоразу, знімаючи корпус для доступу до внутрішніх частин системи, виконуйте ці кроки:

1. Вимкніть усі периферійні пристрої, підключені до системи.
2. Вимкніть систему, натиснувши кнопку живлення.
3. Вийміть шнури живлення змінного струму із системи чи стінних розеток.
4. Позначте і від'єднайте всі кабелі, підключені до з'єднувачів входу/виходу або портів ззаду на системі.
5. Працюючи з компонентами, захищайтеся від електростатичних розрядів (ЕР), вдягаючи антистатичний ремінець-браслет, прикріплений до елемента заземлення корпусу - будь-якої непофарбованої металевої поверхні.
6. Не використовуйте систему з відкритим корпусом.

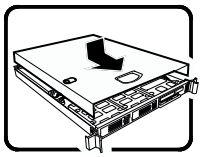


Після виконання шести наведених вище кроків БЕЗПЕКИ можна знімати корпус (кришки) з системи. Для цього виконайте такі дії:

1. Розблокуйте і зніміть замок ззаду на системі, якщо його встановлено.
2. Зніміть і збережіть всі гвинти з кришок.
3. Зніміть усі кришки.

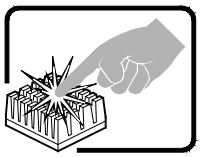
продовження

УВАГА! Українська (продовження)

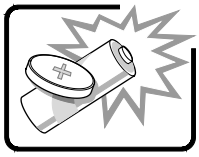


Для правильного охолодження та вентиляції завжди повертайте на місце кришки корпусу перед увімкненням системи. Робота системи без кришок може пошкодити деталі системи. Щоб установити кришки, виконайте такі дії:

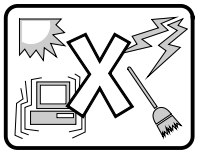
1. Спочатку переконайтеся, що всередині системи не залишилося деталей або незакріплених інструментів.
2. Перевірте, чи правильно встановлено кабелі, розширювальні плати та інші компоненти.
3. Прикріпіть кришки до корпусу знятими раніше гвинтами та надійно їх затягніть.
4. Вставте в систему і зафіксуйте замок, щоб запобігти неавторизованому доступу до нього.
5. Підключіть усі зовнішні кабелі та шнур(и) живлення змінного струму до системи.



Під час роботи системи мікропроцесор і радіатор можуть розігрітися до гарячого. Деякі частини корпусу і плат можуть мати гострі шипи або краї. Із ними слід поводитися обережно. Можна вдягти захисні рукавички.



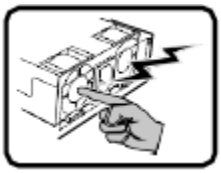
Загроза вибуху, якщо батарею замінено на неправильну. Замінюйте лише таким самим або еквівалентним типом, рекомендованим виробником. Утилізуйте використані батареї згідно з інструкціями виробника.



Систему створено для роботи в типовому офісному приміщенні. Виберіть місце, яке:

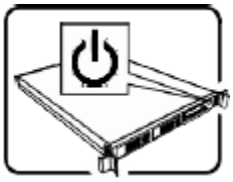
- Чисте і де немає в повітрі інших дрібних часточок, окрім звичайного побутового пилу.
- Добре провітрюється, розташоване далеко від джерел тепла, включно з прямим сонячним промінням.
- Розташоване далеко від джерел вібрації і струсів.
- Ізольоване від сильних електромагнітних полів, спричинених електроприладами.
- У регіонах, де часто проходять грози, радимо підключати пристрій через пристрій захисту від викидів напруги та відключити телекомунікаційні лінії від модему під час грози.
- Оснащене правильно заземленими стінними розетками електромережі.
- Має достатньо простору для доступу до шнура(ів) живлення, оскільки вони слугують основними вимикачами виробу.

AVERTISSEMENT: Français



Le bloc d'alimentation de ce produit ne contient aucune pièce pouvant être réparée par l'utilisateur. Ce produit peut contenir plus d'un bloc d'alimentation. Veuillez contacter un technicien qualifié en cas de problème.

Ne pas essayer d'utiliser ni modifier le câble d'alimentation CA fourni, s'il ne correspond pas exactement au type requis. Le nombre de câbles d'alimentation CA fournis correspond au nombre de blocs d'alimentation du produit.



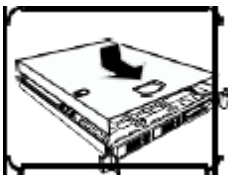
Notez que le commutateur CC de mise sous tension /hors tension du panneau avant n'éteint pas l'alimentation CA du système. Pour mettre le système hors tension, vous devez débrancher chaque câble d'alimentation de sa prise.

CONSIGNES DE SÉCURITÉ: Lorsque vous ouvrez le boîtier pour accéder à l'intérieur du système, suivez les consignes suivantes:

1. Mettez hors tension tous les périphériques connectés au système.
2. Mettez le système hors tension en mettant l'interrupteur général en position OFF (bouton-poussoir).
3. Débranchez tous les cordons d'alimentation c.a. du système et des prises murales.
4. Identifiez et débranchez tous les câbles reliés aux connecteurs d'E-S ou aux accès derrière le système.
5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier).
6. Ne faites pas fonctionner le système tandis que le boîtier est ouvert.

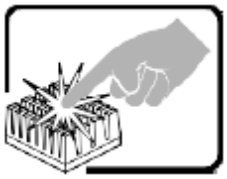
Une fois TOUTES les étapes précédentes accomplies, vous pouvez retirer les panneaux du système. Procédez comme suit:

1. Si un cadenas a été installé sur à l'arrière du système, déverrouillez-le et retirez-le.
2. Retirez toutes les vis des panneaux et mettez-les dans un endroit sûr.
3. Retirez les panneaux.



Afin de permettre le refroidissement et l’aération du système, réinstallez toujours les panneaux du boîtier avant de mettre le système sous tension. Le fonctionnement du système en l’absence des panneaux risque d’endommager ses pièces. Pour installer les panneaux, procédez comme suit:

1. Assurez-vous de ne pas avoir oublié d’outils ou de pièces démontées dans le système.
2. Assurez-vous que les câbles, les cartes d’extension et les autres composants sont bien installés.
3. Revissez solidement les panneaux du boîtier avec les vis retirées plus tôt.
4. Remettez le cadenas en place et verrouillez-le afin de prévenir tout accès non autorisé à l’intérieur du système.
5. Rebranchez tous les cordons d’alimentation c. a. et câbles externes au système.



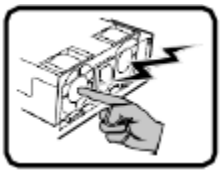
Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Nous vous recommandons l'usage de gants de protection.

Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le fabricant. Disposez des piles usées selon les instructions du fabricant.

Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être:

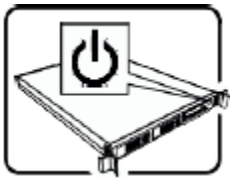
- Propre et dépourvu de poussière en suspension (sauf la poussière normale).
- Bien aéré et loin des sources de chaleur, y compris du soleil direct.
- A l'abri des chocs et des sources de vibrations.
- Isolé de forts champs électromagnétiques générés par des appareils électriques.
- Dans les régions sujettes aux orages magnétiques il est recommandé de brancher votre système à un suppresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage.
- Muni d'une prise murale correctement mise à la terre.
- Suffisamment spacieux pour vous permettre d'accéder aux câbles d'alimentation (ceux-ci étant le seul moyen de mettre le système hors tension).

WARNUNG: Deutsch



Benutzer können am Netzgerät dieses Produkts keine Reparaturen vornehmen. Das Produkt enthält möglicherweise mehrere Netzgeräte. Wartungsarbeiten müssen von qualifizierten Technikern ausgeführt werden.

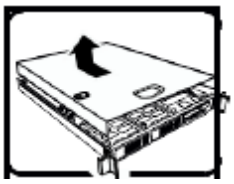
Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich nicht genau um den erforderlichen Typ handelt. Ein Produkt mit mehreren Netzgeräten hat für jedes Netzgerät ein eigenes Netzkabel.



Der Wechselstrom des Systems wird durch den Ein-/Aus-Schalter für Gleichstrom nicht ausgeschaltet. Ziehen Sie jedes Wechselstrom-Netzkabel aus der Steckdose bzw. dem Netzgerät, um den Stromanschluß des Systems zu unterbrechen.

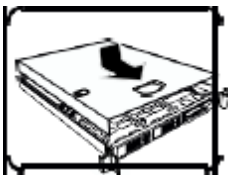
SICHERHEISMASSNAHMEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten:

1. Schalten Sie alle an Ihr System angeschlossenen Peripheriegeräte aus.
2. Schalten Sie das System mit dem Hauptschalter aus.
3. Ziehen Sie den Stromanschlußstecker Ihres Systems aus der Steckdose.
4. Auf der Rückseite des Systems beschriften und ziehen Sie alle Anschlußkabel von den I/O Anschlüssen oder Ports ab.
5. Tragen Sie ein geerdetes Antistatik Gelenkband, um elektrostatische Ladungen (ESD) über blanke Metallstellen bei der Handhabung der Komponenten zu vermeiden.
6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.



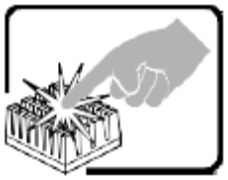
Nachdem Sie die oben erwähnten ersten sechs SICHERHEITSSCHRITTE durchgeführt haben, können Sie die Abdeckung abnehmen, indem Sie:

1. Öffnen und entfernen Sie die Verschlußeinrichtung (Padlock) auf der Rückseite des Systems, falls eine Verschlußeinrichtung installiert ist.
2. Entfernen Sie alle Schrauben der Gehäuseabdeckung.
3. Nehmen Sie die Abdeckung ab.



Zur ordnungsgemäßen Kühlung und Lüftung muß die Gehäuseabdeckung immer wieder vor dem Einschalten installiert werden. Ein Betrieb des Systems ohne angebrachte Abdeckung kann Ihrem System oder Teile darin beschädigen. Um die Abdeckung wieder anzubringen:

1. Vergewissern Sie sich, daß Sie keine Werkzeuge oder Teile im Innern des Systems zurückgelassen haben.
2. Überprüfen Sie alle Kabel, Zusatzkarten und andere Komponenten auf ordnungsgemäßen Sitz und Installation.
3. Bringen Sie die Abdeckungen wieder am Gehäuse an, indem Sie die zuvor gelösten Schrauben wieder anbringen. Ziehen Sie diese gut an.
4. Bringen Sie die Verschlußeinrichtung (Padlock) wieder an und schließen Sie diese, um ein unerlaubtes Öffnen des Systems zu verhindern.
5. Schließen Sie alle externen Kabel und den AC Stromanschlußstecker Ihres Systems wieder an.



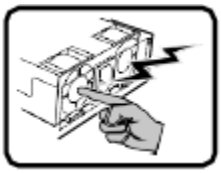
Der Mikroprozessor und der Kühler sind möglicherweise erhitzt, wenn das System in Betrieb ist. Außerdem können einige Platinen und Gehäuseteile scharfe Spitzen und Kanten aufweisen. Arbeiten an Platinen und Gehäuse sollten vorsichtig ausgeführt werden. Sie sollten Schutzhandschuhe tragen.

Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.

Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der Standort sollte:

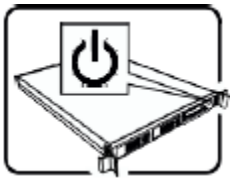
- sauber und staubfrei sein (Hausstaub ausgenommen);
- gut gelüftet und keinen Heizquellen ausgesetzt sein (einschließlich direkter Sonneneinstrahlung);
- keinen Erschütterungen ausgesetzt sein;
- keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen;
- in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen;
- mit einer geerdeten Wechselstromsteckdose ausgerüstet sein;
- über ausreichend Platz verfügen, um Zugang zu den Netzkabeln zu gewährleisten, da der Stromanschluß des Produkts hauptsächlich über die Kabel unterbrochen wird.

AVVERTENZA: Italiano



Rivolgersi ad un tecnico specializzato per la riparazione dei componenti dell'alimentazione di questo prodotto. È possibile che il prodotto disponga di più fonti di alimentazione.

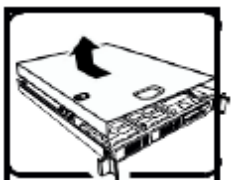
Non modificare o utilizzare il cavo di alimentazione in c.a. fornito dal produttore, se non corrisponde esattamente al tipo richiesto. Ad ogni fonte di alimentazione corrisponde un cavo di alimentazione in c.a. separato.



L'interruttore attivato/disattivato nel pannello anteriore non interrompe l'alimentazione in c.a. del sistema. Per interromperla, è necessario scollegare tutti i cavi di alimentazione in c.a. dalle prese a muro o dall'alimentazione di corrente.

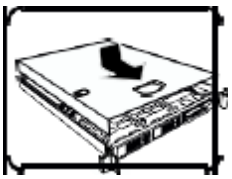
PASSI DI SICUREZZA: Qualora si rimuovano le coperture del telaio per accedere all'interno del sistema, seguire i seguenti passi:

1. Spegnere tutti i dispositivi periferici collegati al sistema.
2. Spegnere il sistema, usando il pulsante spento/acceso dell'interruttore del sistema.
3. Togliere tutte le spine dei cavi del sistema dalle prese elettriche.
4. Identificare e sconnettere tutti i cavi attaccati ai collegamenti I/O od alle prese installate sul retro del sistema.
5. Qualora si tocchino i componenti, proteggersi dallo scarico elettrostatico (SES), portando un cinghia anti-statica da polso che è attaccata alla presa a terra del telaio del sistema – qualsiasi superficie non dipinta – .
6. Non far operare il sistema quando il telaio è senza le coperture.



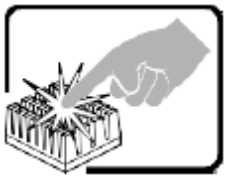
Dopo aver seguito i sei passi di SICUREZZA sopracitati, togliere le coperture del telaio del sistema come seque:

1. Aprire e rimuovere il lucchetto dal retro del sistema qualora ve ne fosse uno installato.
2. Togliere e mettere in un posto sicuro tutte le viti delle coperture.
3. Togliere le coperture.



Per il giusto flusso dell'aria e raffreddamento del sistema, rimettere sempre le coperture del telaio prima di riaccendere il sistema. Operare il sistema senza le coperture al loro proprio posto potrebbe danneggiare i componenti del sistema. Per rimettere le coperture del telaio:

1. Controllare prima che non si siano lasciati degli attrezzi o dei componenti dentro il sistema.
2. Controllare che i cavi, dei supporti aggiuntivi ed altri componenti siano stati installati appropriatamente.
3. Attaccare le coperture al telaio con le viti tolte in precedenza e avvitarle strettamente.
4. Inserire e chiudere a chiave il lucchetto sul retro del sistema per impedire l'accesso non autorizzato al sistema.
5. Ricollegare tutti i cavi esterni e le prolunghe AC del sistema.



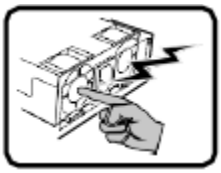
Se il sistema è stato a lungo in funzione, il microprocessore e il dissipatore di calore potrebbero essere surriscaldati. Fare attenzione alla presenza di piedini appuntiti e parti taglienti sulle schede e sul telaio. È consigliabile l'uso di guanti di protezione.

Esiste il pericolo di un esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.

Il sistema è progettato per funzionare in un ambiente di lavoro tipo. Scegliere una postazione che sia:

- Pulita e libera da particelle in sospensione (a parte la normale polvere presente nell'ambiente).
- Ben ventilata e lontana da fonti di calore, compresa la luce solare diretta.
- Al riparo da urti e lontana da fonti di vibrazione.
- Isolata dai forti campi magnetici prodotti da dispositivi elettrici.
- In aree soggette a temporali, è consigliabile collegare il sistema ad un limitatore di corrente. In caso di temporali, scollegare le linee di comunicazione dal modem.
- Dotata di una presa a muro correttamente installata.
- Dotata di spazio sufficiente ad accedere ai cavi di alimentazione, i quali rappresentano il mezzo principale di scollegamento del sistema.

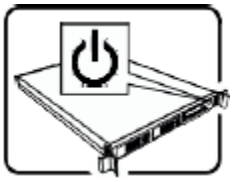
ADVERTENCIAS: Español



El usuario debe abstenerse de manipular los componentes de la fuente de alimentación de este producto, cuya reparación debe dejarse exclusivamente en manos de personal técnico especializado. Puede que este producto disponga de más de una fuente de alimentación.

No intente modificar ni usar el cable de alimentación de corriente alterna, si no corresponde exactamente con el tipo requerido.

El número de cables suministrados se corresponden con el número de fuentes de alimentación de corriente alterna que tenga el producto.



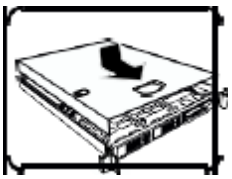
Nótese que el interruptor activado/desactivado en el panel frontal no desconecta la corriente alterna del sistema. Para desconectarla, deberá desenchufar todos los cables de corriente alterna de la pared o desconectar la fuente de alimentación.

INSTRUCCIONES DE SEGURIDAD: Cuando extraiga la tapa del chasis para acceder al interior del sistema, siga las siguientes instrucciones:

1. Apague todos los dispositivos periféricos conectados al sistema.
2. Apague el sistema presionando el interruptor encendido/apagado.
3. Desconecte todos los cables de alimentación CA del sistema o de las tomas de corriente alterna.
4. Identifique y desconecte todos los cables enchufados a los conectores E/S o a los puertos situados en la parte posterior del sistema.
5. Cuando manipule los componentes, es importante protegerse contra la descarga electrostática (ESD). Puede hacerlo si utiliza una muñequera antiestática sujetada a la toma de tierra del chasis — o a cualquier tipo de superficie de metal sin pintar.
6. No ponga en marcha el sistema si se han extraído las tapas del chasis.

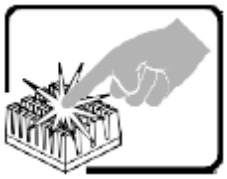
Después de completar las seis instrucciones de SEGURIDAD mencionadas, ya puede extraer las tapas del sistema. Para ello:

1. Desbloquee y extraiga el bloqueo de seguridad de la parte posterior del sistema, si se ha instalado uno.
2. Extraiga y guarde todos los tornillos de las tapas.
3. Extraiga las tapas.



Para obtener un enfriamiento y un flujo de aire adecuados, reinstale siempre las tapas del chasis antes de poner en marcha el sistema. Si pone en funcionamiento el sistema sin las tapas bien colocadas puede dañar los componentes del sistema. Para instalar las tapas:

1. Asegúrese primero de no haber dejado herramientas o componentes sueltos dentro del sistema.
2. Compruebe que los cables, las placas adicionales y otros componentes se hayan instalado correctamente.
3. Incorpore las tapas al chasis mediante los tornillos extraídos anteriormente, tensándolos firmemente.
4. Inserte el bloqueo de seguridad en el sistema y bloquéelo para impedir que pueda accederse al mismo sin autorización.
5. Conecte todos los cables externos y los cables de alimentación CA al sistema.



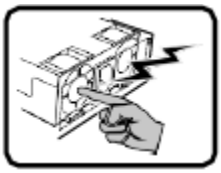
Si el sistema ha estado en funcionamiento, el microprocesador y el disipador de calor pueden estar aún calientes. También conviene tener en cuenta que en el chasis o en el tablero puede haber piezas cortantes o punzantes. Por ello, se recomienda precaución y el uso de guantes protectores.

Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante.

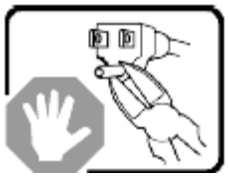
El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar:

- Limpio y libre de partículas en suspensión (salvo el polvo normal).
- Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa.
- Alejado de fuentes de vibración.
- Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos.
- En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltaje y desconectar el módem de las líneas de telecomunicación durante las tormentas.
- Provisto de una toma de tierra correctamente instalada.
- Provisto de espacio suficiente como para acceder a los cables de alimentación, ya que éstos hacen de medio principal de desconexión del sistema.

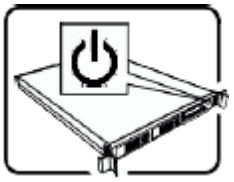
אזהרה: עברית



אספקת החשמל במוצר זה לא מכילה חלקים שניתנים לשירות על ידי משתמש. ייתכן שיש יותר ממקור אספקת חשמל אחד במוצר זה. לקבלת שירות יש לפנות רק אל אנשים המוסמכים לכך.



אין לנסות לשנות את כבל החשמל ז"ח המסופק, או לשנותו, אם הוא לא מהסוג המדויק הנדרש. למוצר עם יותר ממקור אספקת חשמל אחד יצורף כבל חשמל נפרד לכל מקור אספקת חשמל.

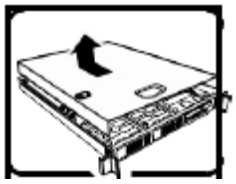


מתג ההפעלה במערכת לא מכבה את מערכת חשמל ז"ח. להסרת חשמל ז"ח מהמערכת, יש לנתק כל כבל חשמל ז"ח משקע הקיר או מאספקת החשמל.

כבל(י) החשמל נחשב(ים) להתקן(ני) ניתוק מקור אספקת חשמל ז"ח. שקע הקיר שאליו מחוברת המערכת יותקן בסמוך לציוד ויהיה נגיש בקלות.

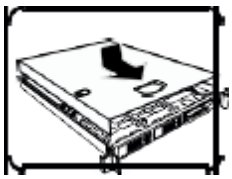
שלבי בטיחות: בכל פעם שמסירים את מכסי המעטפת כדי לגשת לחלק הפנימי של המערכת, יש לבצע את הצעדים הבאים:

1. לכבות את כל ההתקנים ההיקפיים שמחוברים למערכת.
2. לכבות את המערכת על ידי לחיצה על מתג ההפעלה.
3. לנתק את כל כבלי חשמל ז"ח מהמערכת או משקעי הקיר.
4. לתייג את כל הכבלים המחוברים למחברי קלט/פלט או ליציאות בגב המערכת ולנתק אותם.
5. לספק הגנה מסוימת מפריקות אלקטרוסטטיות (ESD) על ידי חבישת רצועת שורש כף יד אנטיסטטית שמחוברת להארקת המעטפת של המערכת - כל משטח מתכת לא צבוע - בעת הטיפול ברכיבים.
6. אין להפעיל את המערכת כשמכסי המעטפת מוסרים.



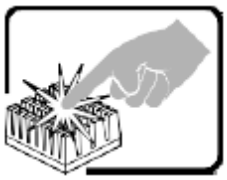
לאחר השלמת ששת שלבי הבטיחות לעיל, באפשרותכם להסיר את מכסי המערכת. כדי לעשות זאת:

1. יש לפתוח את המנעול התלוי ולהסירו מגב המערכת אם אכן הותקן בה מנעול תלוי.
2. יש להסיר את כל הברגים של המכסים ולשמור אותם.
3. יש להסיר את המכסים.



לקירור ולזרימת אוויר תקינים, יש תמיד להתקין מחדש את מכסי המעטפת לפני הפעלת המערכת. הפעלת המערכת ללא המכסים במקומם, עלולה לגרום נזק לחלקי המערכת. להתקנת המכסים:

1. יש לבדוק תחילה כדי לוודא שלא נשארו כלים או חלקים רופפים בתוך המערכת.
2. יש לבדוק שהכבלים, הלוחות הנוספים ורכיבים אחרים מותקנים כראוי.
3. יש לחבר את המכסים למעטפת עם הברגים שהוסרו קודם לכן ולהדק אותם בחוזקה למקומם.
4. יש להכניס את מנעול התליה למערכת ולנעול אותו כדי למנוע גישה בלתי מורשית לפנים המערכת.
5. יש לחבר את כל הכבלים החיצוניים ואת כבל(י) חשמל ז"ח למערכת.



מעבד המיקרו ומפזר החום עלולים להיות לוהטים כשהמערכת פועלת. כמו כן, ייתכנו סיכות וקצוות חדים בחלקי לוח ומעטפת שונים. יש לגעת בזהירות. יש לשקול עטיית כפפות מגן.

סכנת פיצוץ אם הסוללה מוחלפת באופן שגוי. יש להחליף רק באותו סוג או שווה ערך שמומלץ על ידי יצרן הציוד. יש להשליך סוללות משומשות על פי הוראות היצרן.

המערכת נועדה לפעול בסביבה משרדית טיפוסית. יש לבחור אתר שהוא:

- נקי וחופשי מחלקיקים נישאים באוויר (למעט אבק שקיים באופן רגיל בחדר).
- מאוורר היטב ורחוק ממקורות חום כולל אור שמש ישיר.
- יש להרחיק ממקורות רטט או זעזועים פיזיים.
- מבודד משדות אלקטרומגנטיים חזקים שנגרמים על ידי מכשירים חשמליים.
- באזורים שרגישים לסערות חשמל, אנו ממליצים לחבר את המערכת למדכא נחשול, ובמהלך סערה חשמלית לנתק קווי תקשורת שמחוברים למודם שלכם.
- בעל שקע קיר מוארק כהלכה.
- בעל מספיק מקום לגישה חופשית לכבל(י) החשמל, מכיוון שהוא/הם משמש(ים) לניתוק רשת החשמל למוצר.

Appendix H. Glossary

Term	Definition
1U	One rack unit (1.75 inches)
2U	Two rack units (3.5 inches)
ADR	Asynchronous DRAM
BIOS	Basic input output system; non-volatile firmware
BMC	Baseboard management controller
CDU	Coolant distribution unit
Chassis	Casing containing the server modules and fans/liquid-cooling plumbing
DIMM	Dual inline memory module
EFI	Extensible Firmware Interface
EMP module	Ethernet management port module
ESD	Electrostatic discharge
FRU	Field replacement unit
MCIO*	Mini cool edge I/O
PHM	Processor heat sink module
MRC	Memory reference code
NVMe*	Non-Volatile Memory Express
OAM*	Open Compute Project* (OCP*) Accelerator Module
OOB	Out of band
PCIe*	Peripheral Component Interconnect Express*
PDB	Power distribution board
POST	Power-on self-test
PTH	Plated through hole
Rack	Casing containing one or multiple chassis
SDR	Sensor data record
SEL	System event log
SSD	Solid state drive
SUP	System update package
SMT	Surface-mount technology
TIM	Thermal interface material
VR	Voltage regulator