Intel® Server D50DNP Family

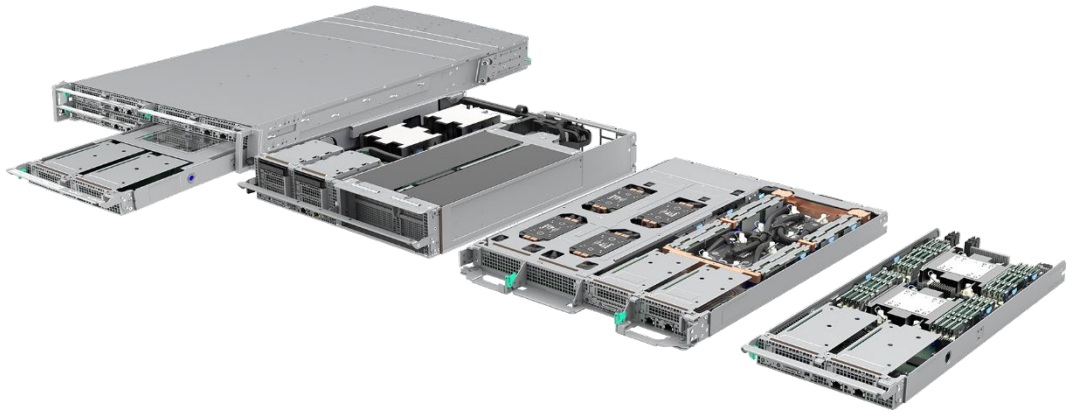
Intel® Server Board D50DNP
Intel® D50DNP Modules
Intel® Server System D50DNP

Configuration Guide

A reference document to identify available building blocks, integrated systems, accessories, and spare parts associated with the Intel® Server D50DNP Family.

Rev. 1.4

February 2024



D50DNP

Delivering Breakthrough Data Center System Innovation – Experience What's Inside!

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Document Revision History

Date	Revision	Changes
January 2023	1.0	Production Release
June 2023	1.1	• Changed content and description for DNPLCDMTM • Updated description for M.2 SSD cold plate kit • Added information for VROC support and license key • Removed VROC header from board illustration Figure 7. • Removed information about Intel® Optane™ PMem 300 series modules • Corrected trademarked names (PCIe*, NVMe* and MCIO*) to follow guideline • Replaced V100 bracket kit TNPACCLBZV100 with the bracket kit DNPACCLBZPVC for Intel® Data Center GPU Max Series Accelerator PCIe card • Corrected the product codes for Intel® Data Center GPU Max Series CBB spare part.
August 2023	1.2	• Changed cable iPN in the bracket kit DNPACCLBZPVC
December 2023	1.3	• Added requirement for two power supplies as the minimum for all chassis options • Corrected 2700W power supply efficiency to Titanium
February 2024	1.4	• Added 5th Gen Intel® Xeon® Scalable processor family support information

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1. Overview

This document provides a catalog of available Intel boards, modules, chassis, accessories, and spares for the Intel® Server D50DNP Family.

1.1 Product Family Overview

The Intel® Server D50DNP Family includes products that support demanding high-performance computing (HPC) and artificial intelligence (AI) applications and workloads. The building blocks in the product family allow custom development of server systems using an Intel-developed server board or density-optimized Intel® D50DNP Modules. The product family also includes fully integrated 2U rack-mount, multi-module systems. The Intel® Server D50DNP Family offers options to support liquid-cooled and air-cooled configurations.

The core products that define the high-performance, density-optimized Intel® Server D50DNP Family include:

- **Intel® Server Board D50DNP1SB** – Server board only product that offers the server system developers the choice of integrating the server board within their own modules and server chassis. The server board can also be used as a spare Field Replaceable Unit (FRU).
- **Intel® D50DNP Modules** – Options of density-optimized 1U and 2U modules (building block option and spare FRU) integrated with the Intel® Server Board D50DNP1SB.
- **Intel® Server Systems D50DNP** – Options of 2U rack-mount server systems configured with Intel® D50DNP Modules and integrated with Intel® Server Chassis FC2000.

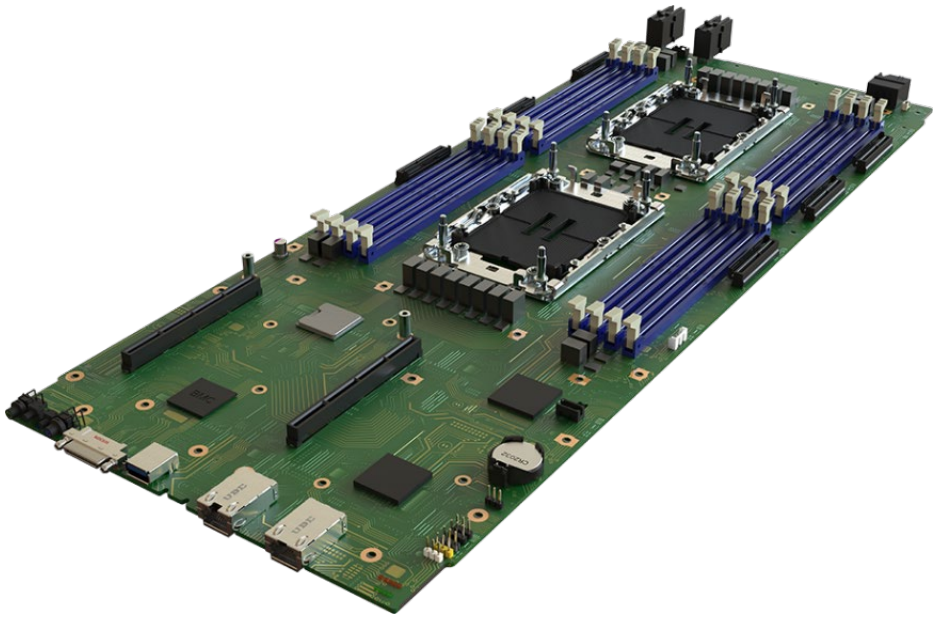


Figure 1. Intel® Server Board D50DNP1SB

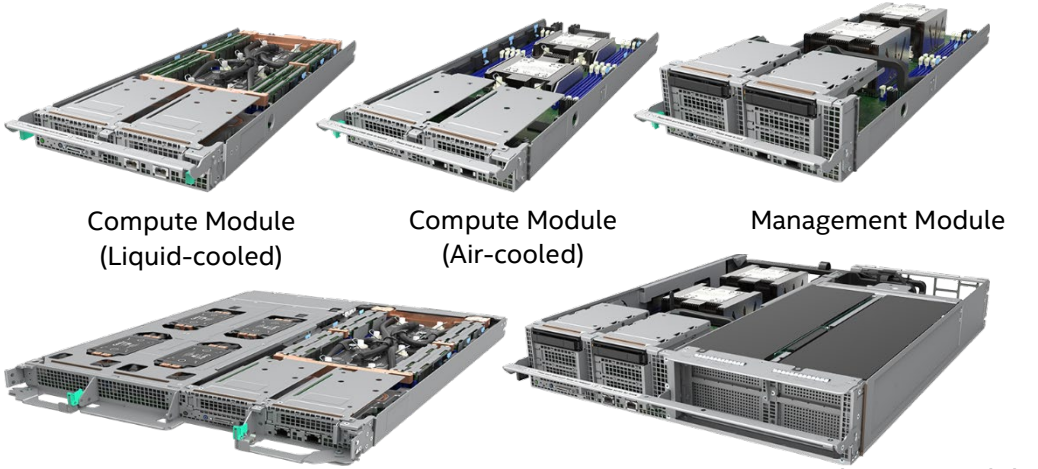


Figure 2. Intel® D50DNP Modules

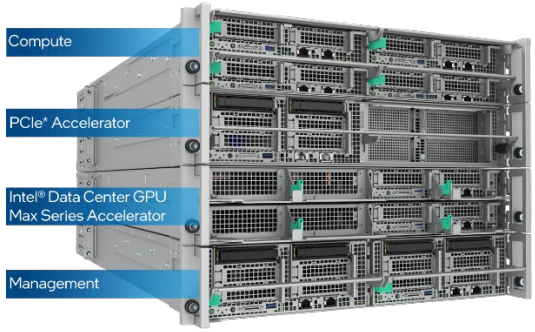


Figure 3. Intel® Server Systems D50DNP

The following options are available for ordering boards, modules, and systems:

L3 = Server board product.
L6 = Modules building block option with an integrated Intel® Server Board D50DNP1SB. The base configuration is non-functional out of the box. Additional integration of chassis and components is required.
L9 = Fully integrated system. Pre-configured. The base configuration is power-on ready. No operating system installed.

Important Note: Fully configured (power-on ready, no operating system) L9 systems are only orderable from Intel using its online Configure-To-Order (CTO) tool at orderconfigurator.intel.com (Intel NDA required) or by contacting your Intel sales representative.

1.2 Processor Support

The supported 4th & 5th Gen Intel® Xeon® Scalable Processor Family and Intel® Xeon® CPU Max Series processor shelves are identified as shown in the following figure.

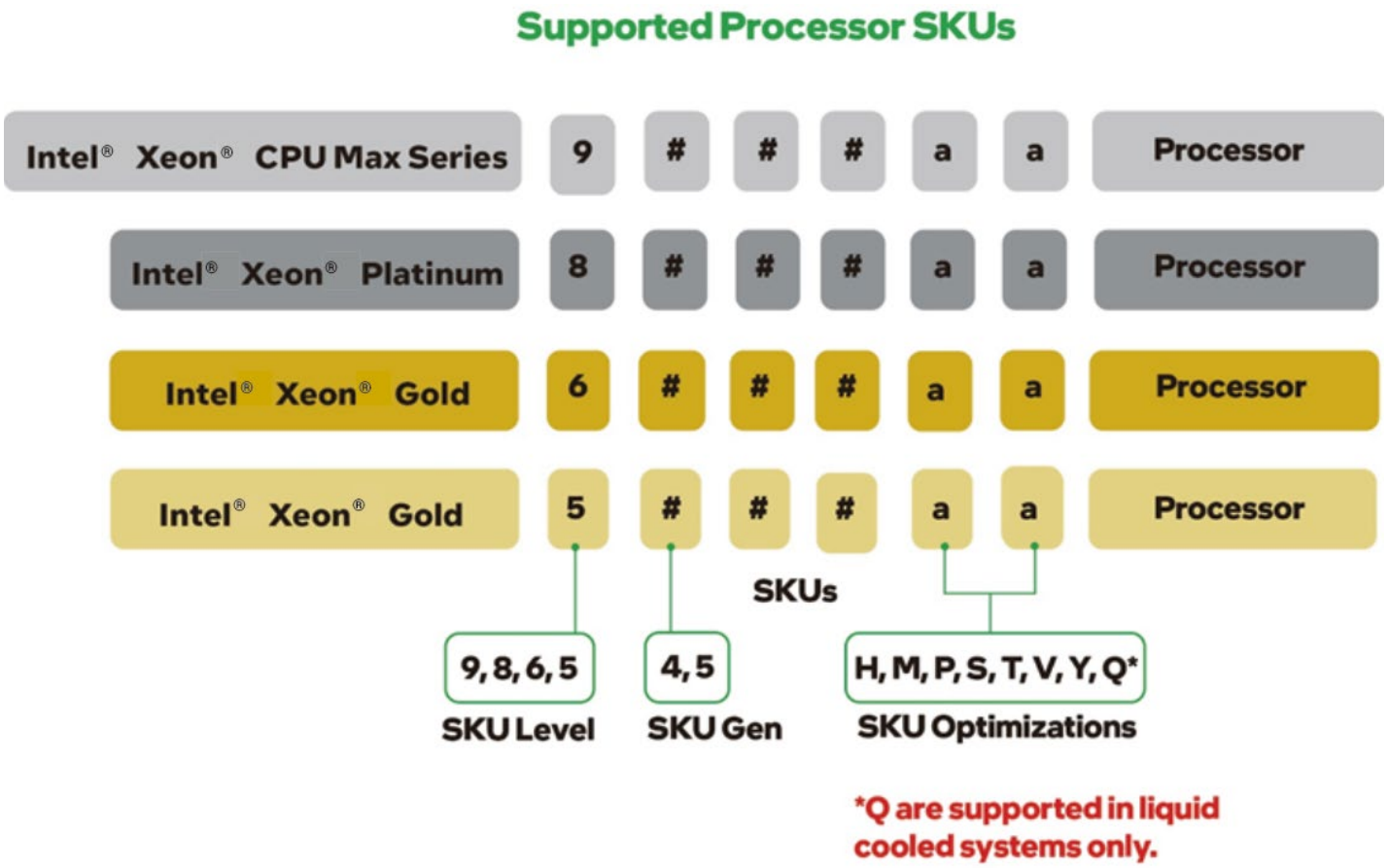


Figure 4. 4th & 5th Gen Intel® Xeon® Scalable Processor Family Identification

Notes:

- 4th & 5th Gen Intel® Xeon® Scalable processors SKUs that end in “N” or “U” are not supported. All other processor SKUs are supported.

Table 1. 4th & 5th Gen Intel® Xeon® Scalable Processor Family Feature Comparison

Feature	Platinum 8xxx Processors	Gold 6xxx Processors	Gold 5xxx Processors
Dual-socket Scalability	Yes	Yes	Yes
# of Intel® UPI 2.0 Links	4[1]	3	3
Intel® UPI 2.0 Speed for 4th Gen Intel® Xeon® Scalable Processor	16 GT/s	16 GT/s	16 GT/s
Intel® UPI 2.0 Speed for 5th Gen Intel® Xeon® Scalable Processor	20 GT/s	20 GT/s	20 GT/s
# of DDR5 Integrated Memory Controllers (IMC)	4	4	4
# of DDR5 Channels	8	8	8
# of PCIe* 5.0/CXL Lanes	80	80	80
Intel® Turbo Boost Technology	Yes	Yes	Yes
Intel® Hyper-Threading Technology (Intel® HT Technology)	Yes	Yes	Yes
Intel® Advanced Vector Extensions 512 (Intel® AVX-512) ISA Support	Yes	Yes	Yes
Intel® AVX-512 - # of 512b FMA Units	2	2	2
Processor RAS Capability	Advanced	Advanced	Advanced

Notes: (1) Intel® Server Board D50DNP1SB supports up to 3 Intel® UPI 2.0 links.

Table 2. Intel® Xeon® CPU Max Series Processor Family Features

Feature[1]	Intel® Xeon® CPU MAX Processors
HBM2e capacity per socket[2]	64 GB
Dual-socket Scalability	Yes
# of Intel® UPI 2.0 Links	4[3]
Intel® UPI 2.0 Speed	16 GT/s
# of DDR5 Integrated Memory Controllers (IMC)	4
# of DDR5 Channels	8
# of PCIe/CXL Lanes	80
Intel® Turbo Boost Technology	Yes
Intel® Hyper-Threading Technology	Yes
Intel® AVX-512 ISA Support	Yes
Intel® AVX-512 - # of 512b FMA Units	2
SGX enclave size up to (GB)[4]	512GB
Processor RAS Capability	Advanced

Notes: (1) Features may vary between processor MODELs. **(2)** Indicates new capabilities relative to 4th Gen Intel® Xeon® Scalable processors. **(3)** Intel® Server Board D50DNP1SB supports up to 3 Intel® UPI 2.0 links, **(4)** SGX available only for DDR5 in Flat mode.

1.3 Memory Support

The Intel® Server D50DNP Family supports DDR5 SDRAM DIMMs with the following features:

- Registered DDR5 DIMM (standard RDIMM, 3DS-RDIMM, and 9x4 RDIMM)
  Note: 3DS = 3-dimensional stacking.
- All DDR5 RDIMMs must support ECC.
- RDIMMs with thermal sensor on-DIMM (TSOD)
- RDIMM speeds of up to 5600 MT/s (for 5th Gen Intel® Xeon® Scalable processor 1 DPC)
- RDIMM speeds of up to 4800 MT/s (for 4th Gen Intel® Xeon® Scalable processor 1 DPC)
- RDIMM capacities of 8 GB, 16 GB, 32 GB, 64 GB, and 128 GB
- RDIMMs organized as Single Rank (SR), Dual Rank (DR)
- 3DS-RDIMM organized as Quad Rank (QR) or Octa Rank (OR)
  Note: DDR5 5600 128GB memory is under validation

1.3.1 Memory Subsystem Architecture

The Intel® Server Board D50DNP1SB includes eight memory slots per processor as shown in the following figure.

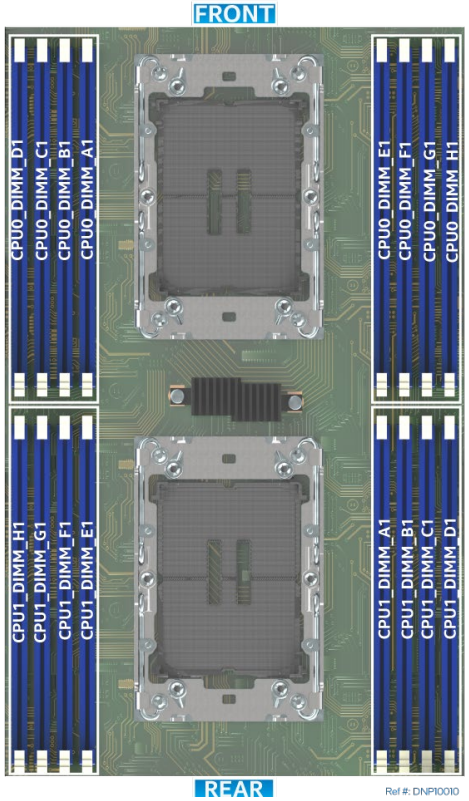


Figure 5. Memory Slot Layout

The following figure shows that each processor has four Integrated Memory Controllers (IMCs), each supporting two memory channels. Memory channels are identified by letters A through H. Each memory channel supports one memory slot.

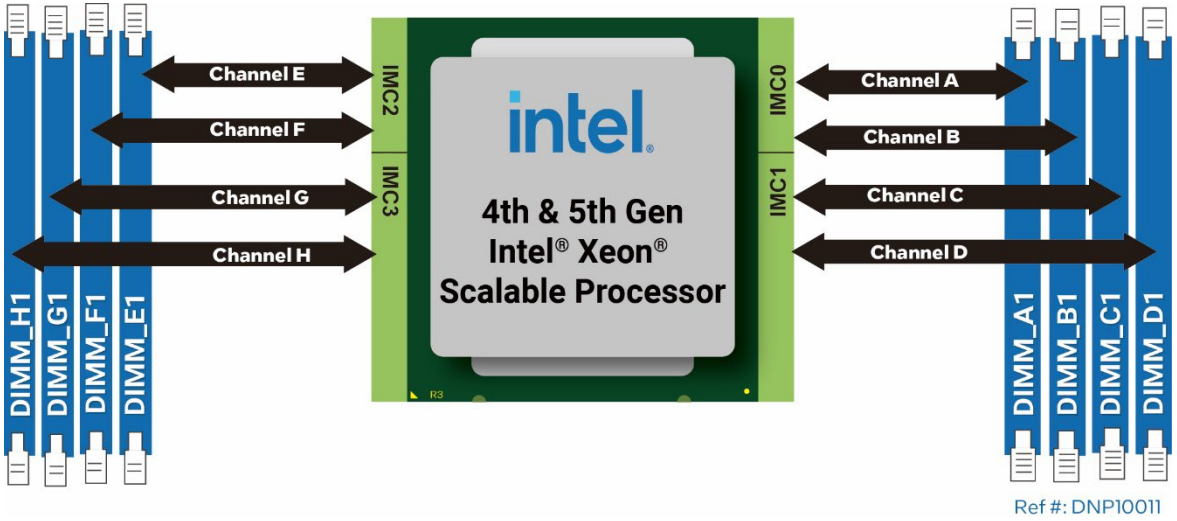


Figure 6. Memory Slot Connectivity for D50DNP1SB

To maintain proper airflow for air-cooled configurations, it is necessary to populate all memory slots with either memory modules or DIMM blanks. Preinstalled DIMM blanks must only be removed when installing a memory module in its place. Liquid-cooled configurations require all DIMM slots to be populated with DDR5 DIMMs.

Intel DDR5 DIMM Support Disclaimer:

Intel validates and only supports system configurations where all installed DDR5 DIMMs have matching "Identical" or "Like" attributes (see the 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. As shipped by Intel, all DDR5 DIMMs in a given L9 server system 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 differ.

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 not the same revision # or model # or 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 3. 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**	**May be Different**	Memory Vendor Name
DIMM Part #	**Match**	**May be Different**	Memory Vendor Part #
DIMM Revision #	**Match**	**May be 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 (5600 MT/s is for 5th Gen Xeon only)
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

1.4 Intel® Server Board D50DNP Overview

The Intel® Server D50DNP1SB is shown in the following figure.

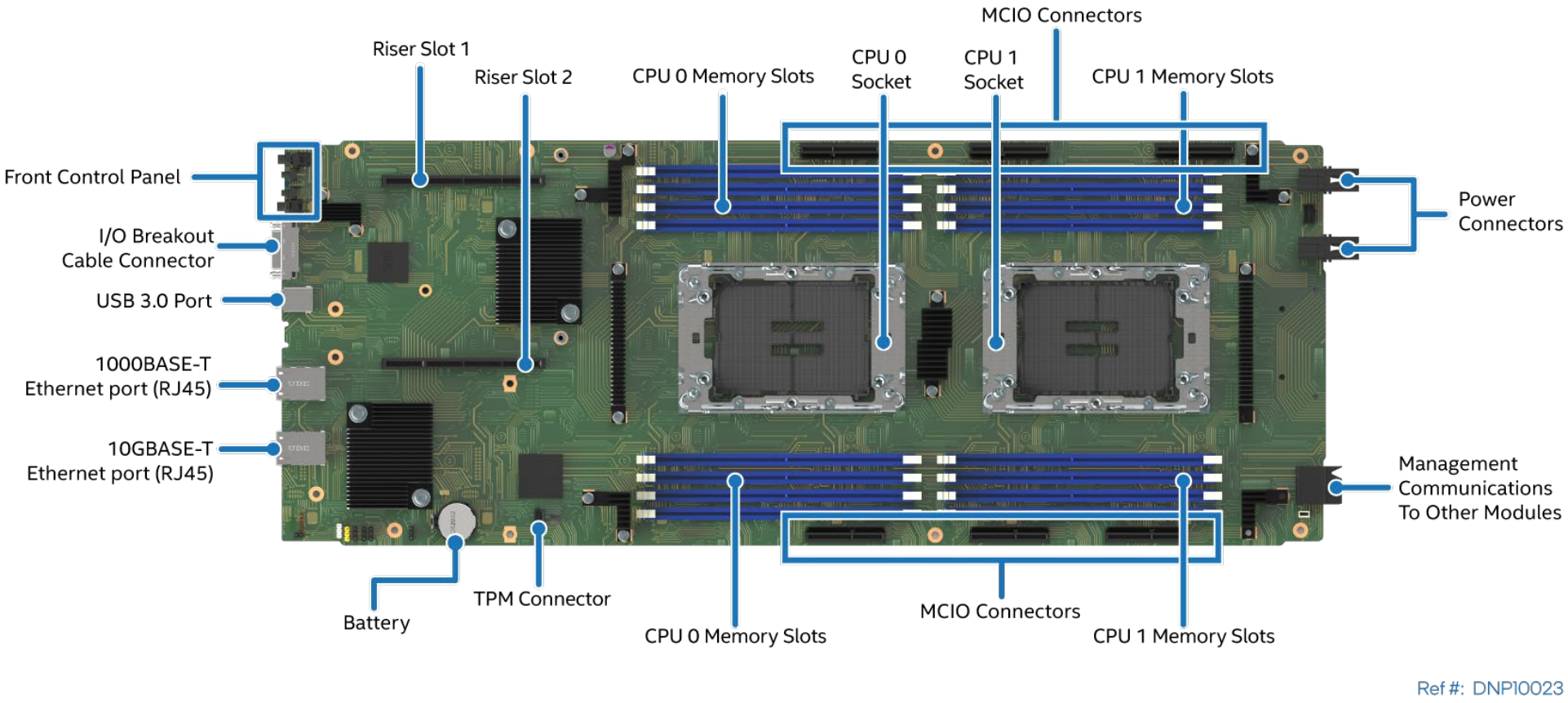


Figure 7. Intel® Server Board D50DNP1SB

Table 4. Intel® Server Board D50DNP Features

Feature	D50DNP1SB

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 Platform Controller Hub (PCH) chipset
	• Features enabled on this server board:
	  ○ SATA III support
	  ○ USB 3.0 support
	  ○ PCIe* 3.0 support

Memory Support	• Up to 16 DDR5 SDRAM RDIMMs. See Section 1.3 for details. • Registered DDR5 DIMM (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 **Note:** The memory speed supported depends on the installed processor.
Front Panel Support	

I/O Ports	• One USB 3.0 port
	• One I/O breakout cable connector supporting the following:
	  ○ Two USB 3.0 ports (dual-stack)
	  ○ One DE-15 VGA connector
	  ○ One serial port connector. The port follows Advanced Technology pinout specifications.
	Note: The I/O breakout cable is available as an accessory option (iPC **AXXCONNTDBG**).

Networking	• One external 10GBASE-T Ethernet port (RJ45) • One external 1000BASE-T Ethernet port (RJ45) dedicated to server management
LEDs	• Board status • Board ID
Buttons	• Power • Board ID • Cold reset • Non-maskable interrupt (NMI)

Feature	D50DNP1SB
Expansion Options	
Riser Slots	**Riser Slot 1 options:** • 1U riser card with single PCIe* 5.0 x16 slot (x16 electrical, x16 mechanical) supporting one low profile PCIe add-in card. PCIe 5.0 lanes are routed from CPU 1 through an MCIO* cable. • 2U riser card with two PCIe 5.0 x16 slots (x16 electrical, x16 mechanical), 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 CPU 1 through an MCIO cable. PCIe lanes for the U.2 SSD are routed from the CPU 1. **Riser Slot 2 options:** • 1U riser card with single PCIe 5.0 x16 slot (x16 electrical, x16 mechanical) supporting one low profile PCIe add-in card. PCIe 5.0 lanes routed from CPU 0. • 2U riser card with two PCIe 5.0 x16 slots (x16 electrical, x16 mechanical), 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 CPU 1 through an MCIO cable. PCIe lanes for the U.2 SSD are routed from the CPU 0.
Storage Support	**Via riser assemblies:** • Each 1U or 2U riser assembly 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 • Each 2U riser assembly can accommodate one 2.5" U.2 NVMe SSD. PCIe lanes for the U.2 SSD in Riser 1 are routed from the CPU 1. PCIe lanes for the U.2 SSD in Riser 2 are routed from the CPU 0. • PCIe lanes routed from processor/chipset support Intel® VMD and Intel® VROC 8.0 (NVMe-based RAID). VROC support requires an Intel® VROC license (accessory option, – iPC **VROCSTANKEY**) to be installed.
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 Support	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) – iPC **AXXTPMCHNE8** (accessory option) • Trusted platform module 2.0 (rest of the world) – iPC **AXXTPMENC9** (accessory option) • Intel® Trust Domain Extensions (Intel® TDX) (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 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

Feature	D50DNP1SB		
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 mode is not supported)		
Module Support	• D50DNP1MHCPAC • D50DNP1MHEVAC	• D50DNP1MHCPLC • D50DNP2MHSVAC	• D50DNP1MFALLC • D50DNP2MFALAC

1.5 Intel® D50DNP Modules Overview

The Intel® Server D50DNP Family offers a variety of modules, where each module within a system configuration is independently operated from the others. The installed modules within a chassis share resources like power and cooling. The following table describes how an Intel® Server System D50DNP can be configured.

Table 5. Intel® D50DNP Modules

Module Type	iPC	Height	Width	Cooling	Maximum Processor TDP[1]	Modules per Chassis
Compute	D50DNP1MHCPAC	1U	Half width	Air-cooled	250 W	Up to four
	D50DNP1MHEVAC				270 W	
	D50DNP1MHCPLC			Liquid-cooled	385 W[2]	
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[2]	Up to two
PCIe* Accelerator	D50DNP2MFALAC	2U	Full width	Air-cooled	350 W	One

Note: (1) See the Intel® Server D50DNP Family technical product specification for detailed information on TDP.
(2) Support for CPU with 385W TDP in Liquid-cooled configuration is under validation.

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

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

For mixed node configurations, the customer must consider the lowest ambient temperature required by the installed processors in the modules. The module requiring the lowest ambient temperature will define the ambient requirements for the whole system, even if other modules allow higher ambient temperature.

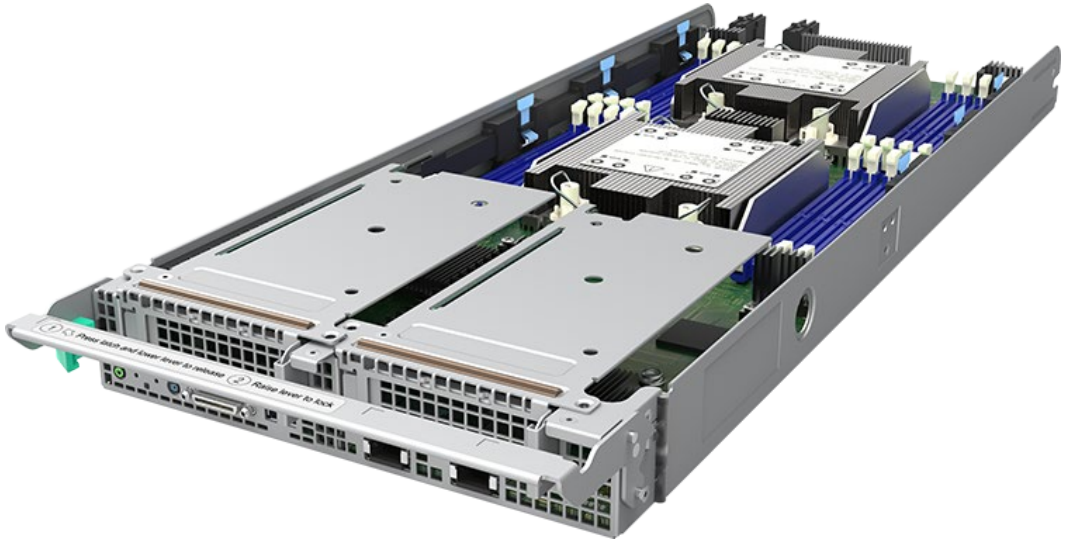


Figure 8. 1U Air-Cooled Compute Module D50DNP1MHCPAC with Standard Heat Sinks

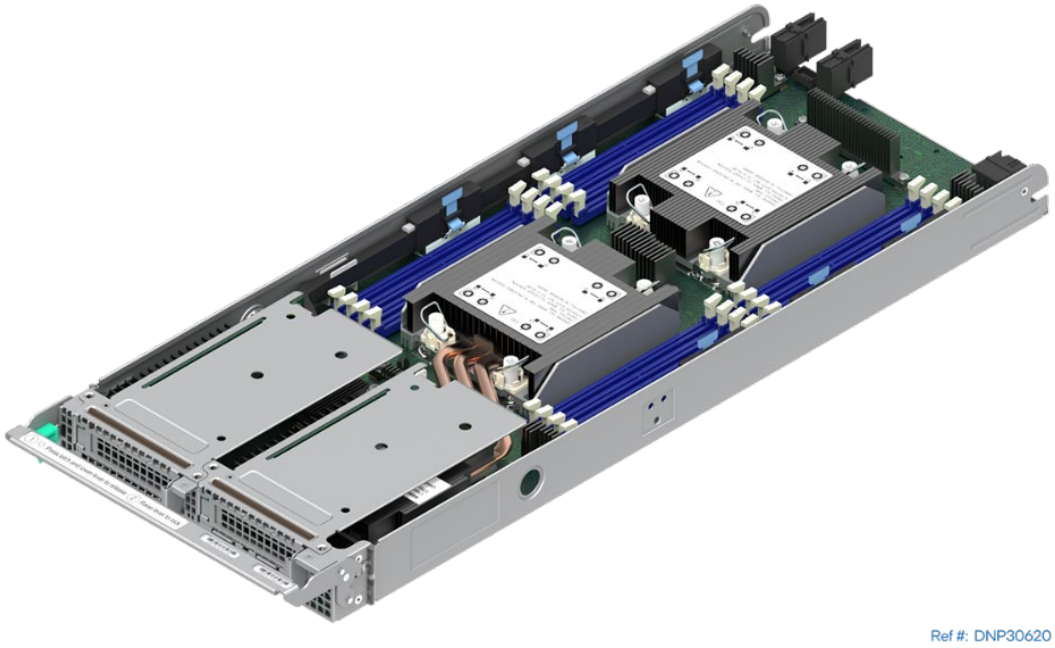


Figure 9. 1U Air-cooled Compute Module D50DNP1MHEVAC with EVAC heat sink

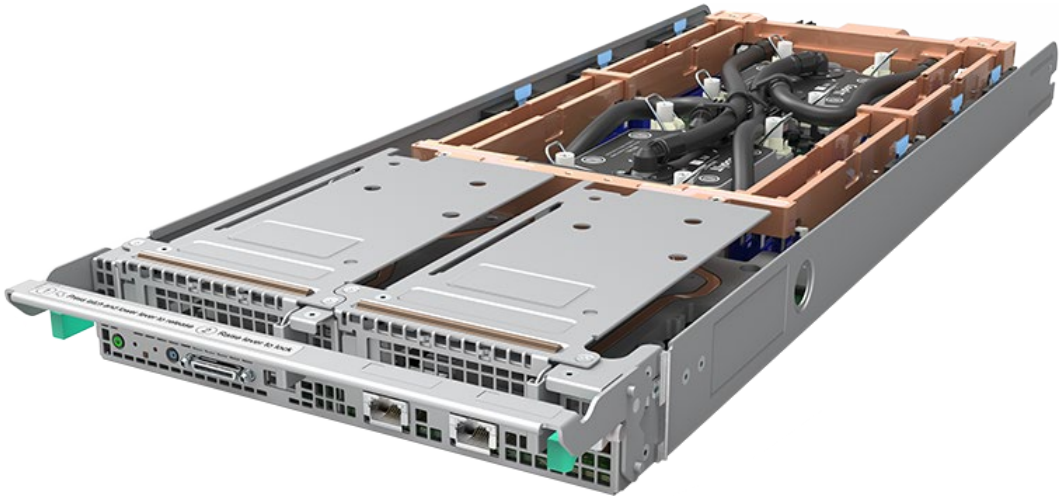


Figure 10. 1U Liquid-Cooled Compute Module D50DNP1MHCPLC

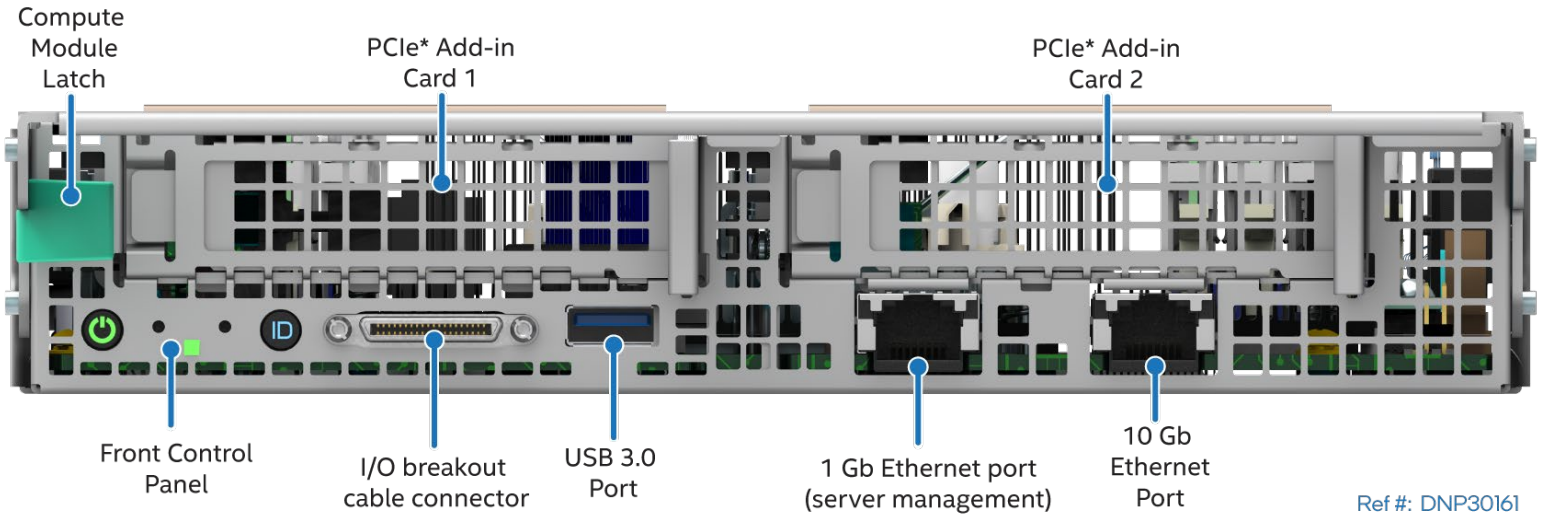


Figure 11. 1U Compute Module Front Panel Features

Figure 12. 2U Air-Cooled Management Module D50DNP2MHSVAC

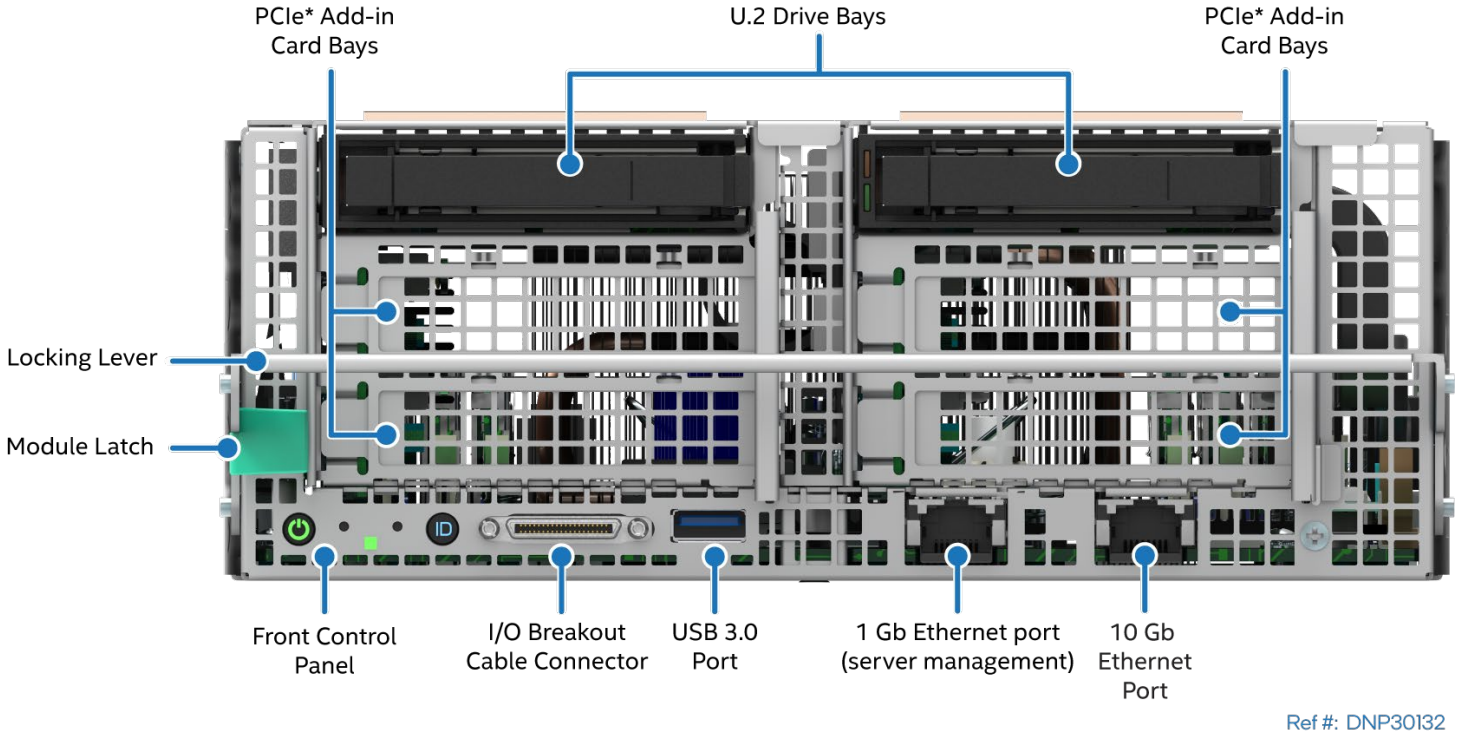


Figure 13. 2U Management Module Front Panel Features

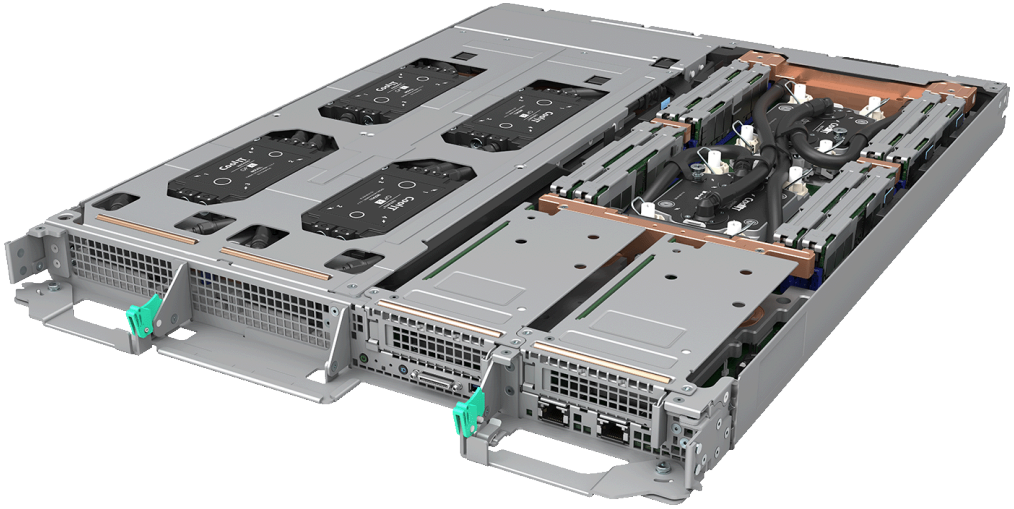


Figure 14. 1U Intel® Data Center GPU Max Series Accelerator Module D50DNP1MFALLC

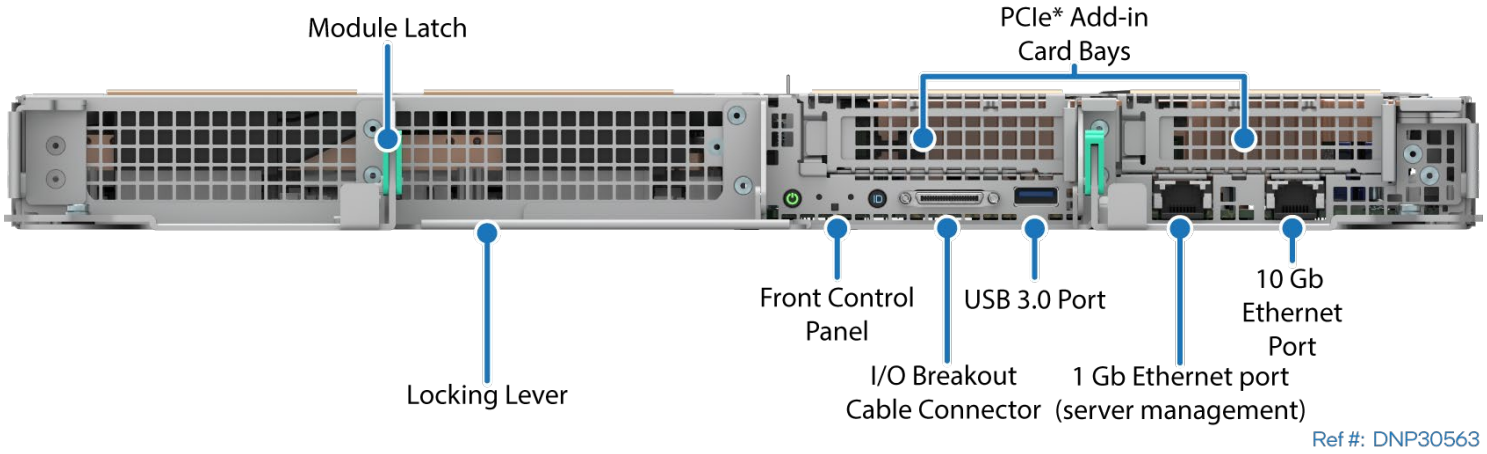


Figure 15. 1U Intel® Data Center GPU Max Series Accelerator Module Front Panel Features

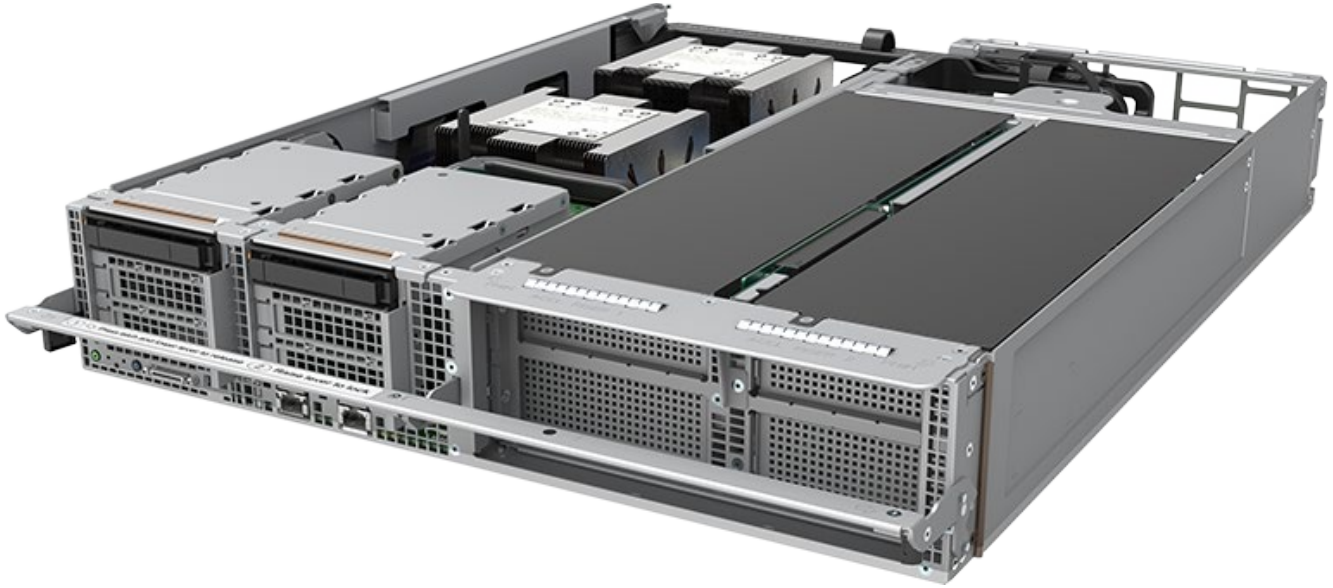


Figure 16. 2U Air-Cooled 2U PCIe* Accelerator Module D50DNP2MFALAC

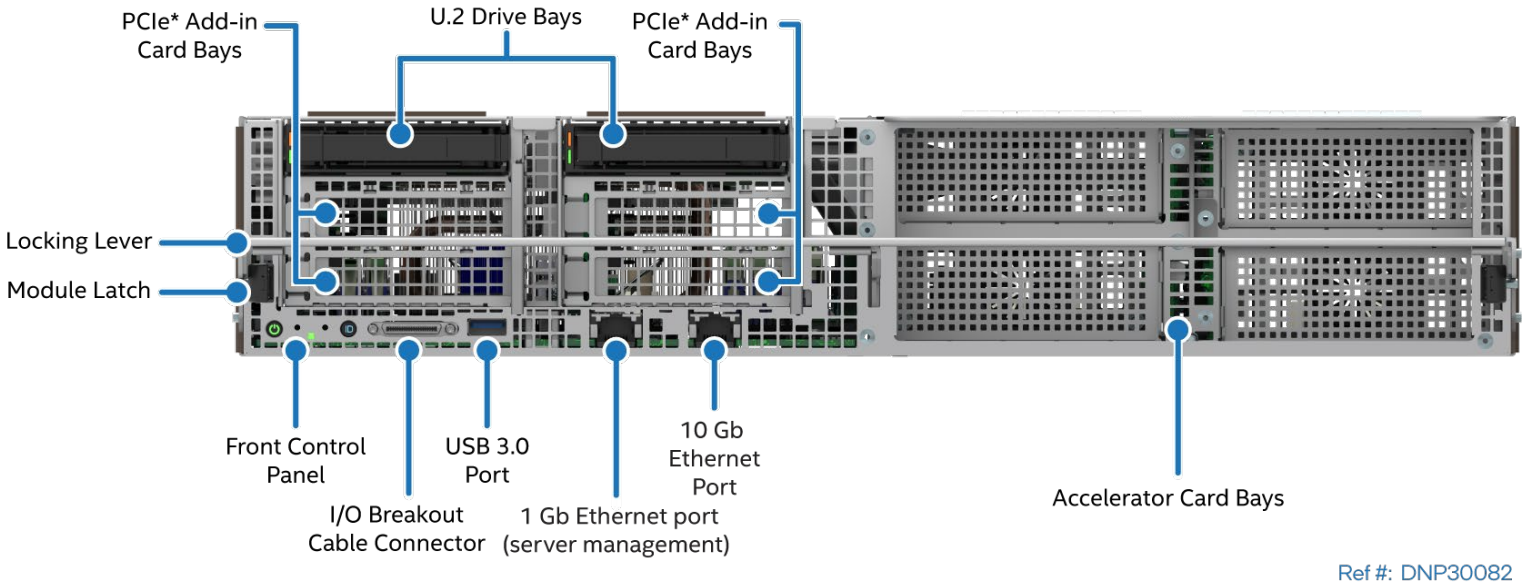


Figure 17. 2U PCIe Accelerator Module Front Panel Features

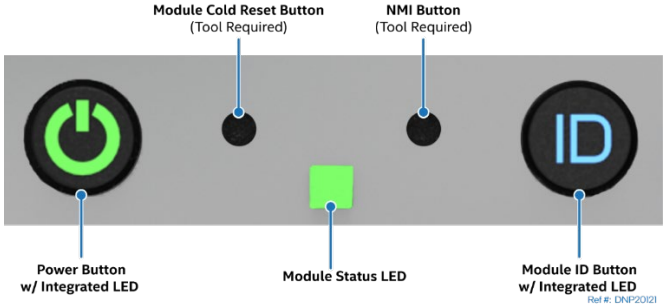


Figure 18. Front Control Panel Features for All Modules

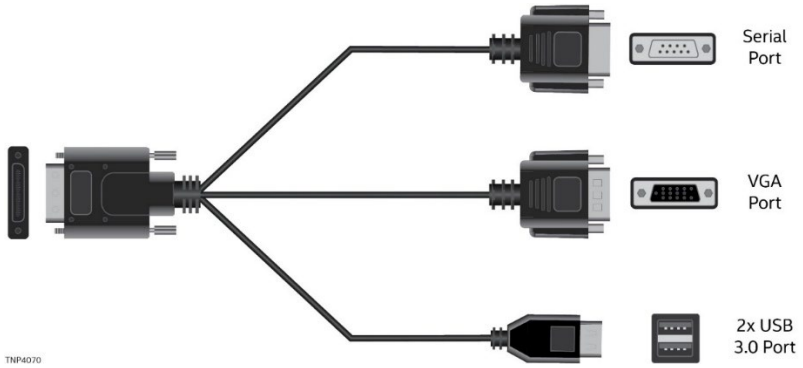


Figure 19. I/O Breakout Cable Connector Identification

1.6 Intel® Server System D50DNP / Chassis Overview

As a building block, the Intel® Server D50DNP Family includes four Intel® Server Chassis FC2000 products. These four chassis-only products are listed below. See Table 6 for a list of system and chassis-only features.

- 2U half-width configuration, liquid-cooled – iPC **FC2HLC30W0**
  - Supports up to four 1U half-width liquid-cooled modules
- 2U full-width configuration, liquid-cooled – iPC **FC2FLC30W0**
  - Supports up to two 1U full-width liquid-cooled modules
- 2U half-width configuration, air-cooled – iPC **FC2HAC27W0**
  - Supports up to four 1U half-width modules
  - Supports up to two 2U half-width air-cooled modules
  - Supports one 2U half-width module and two 1U half-width air-cooled modules
- 2U full-width configuration, air-cooled – iPC **FC2FAC27W0**
  - Supports one 2U full-width air-cooled module

Table 6. Intel® Server Chassis D50DNP Feature Set

Feature	Description			
	Chassis model iPC FC2HLC30W0	**Chassis model iPC FC2FLC30W0**	**Chassis model iPC FC2HAC27W0**	**Chassis model iPC 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 modules (liquid-cooled)	• Up to two 1U full-width Intel® Data Center GPU Max Series Accelerator 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 2U full-width PCIe* Accelerator Module (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 D50DNP chassis (iPC **FCXX60MMACFAN**). Do not install 60-mm system fans from previous Intel® Server product generations. ○ Four 40 x 40 x 40 mm fans • One 40-mm fan per installed power supply unit (PSU)	
Power	Supports up to four 3000 W AC liquid-cooled power supplies with power redundancy support (dependent on system configuration). Minimum two power supplies are required for any configuration. PSUs are sold separately.		Supports up to four 2700 W AC air-cooled power supplies with power redundancy support (dependent on system configuration). Minimum 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 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 (dependent on Intel® D50DNP Module)			
Operating Temp.	10–35°C ambient temperature			
Server Management	Optional Ethernet Management Port (EMP) to consolidate management of the Intel® D50DNP Modules			

All systems in the Intel® Server D50DNP Family feature front-loading modules. The following illustrations provide system views for all supported system configurations.

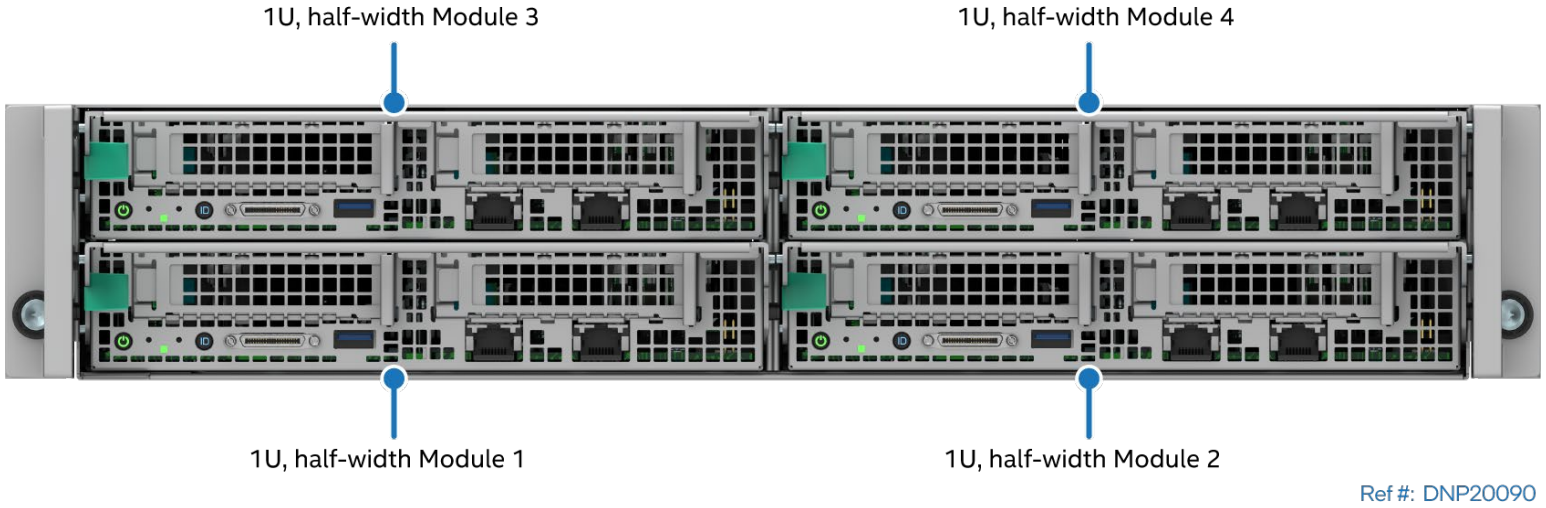


Figure 20. Module Identification for Four Half-Width Module System Configuration Chassis iPCs FC2HLC30W0 and FC2HAC27W0

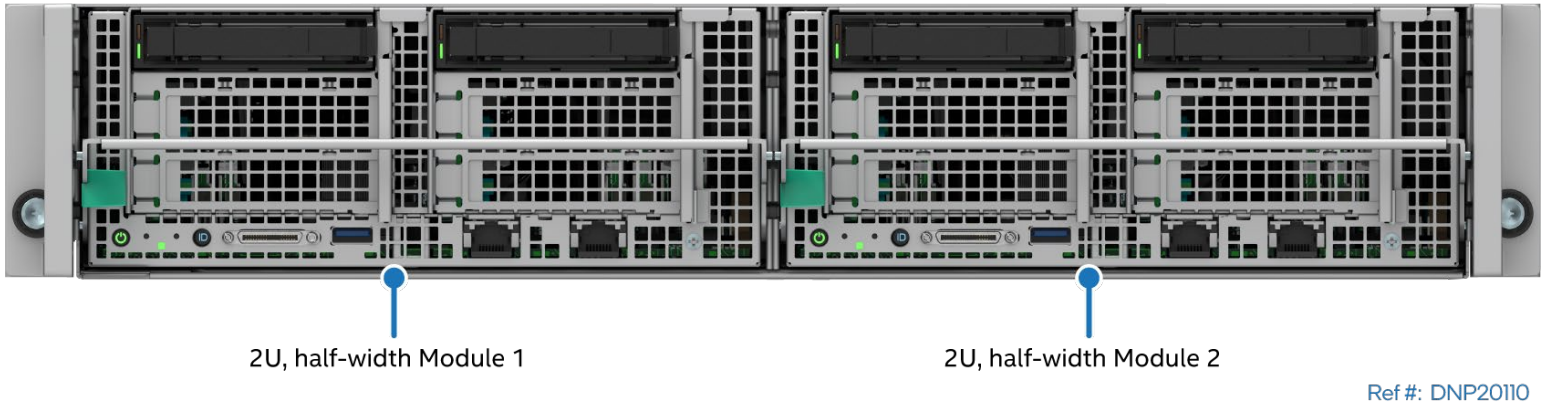


Figure 21. Module Identification for Two Half-Width Module System Configuration Chassis iPC FC2HAC27W0

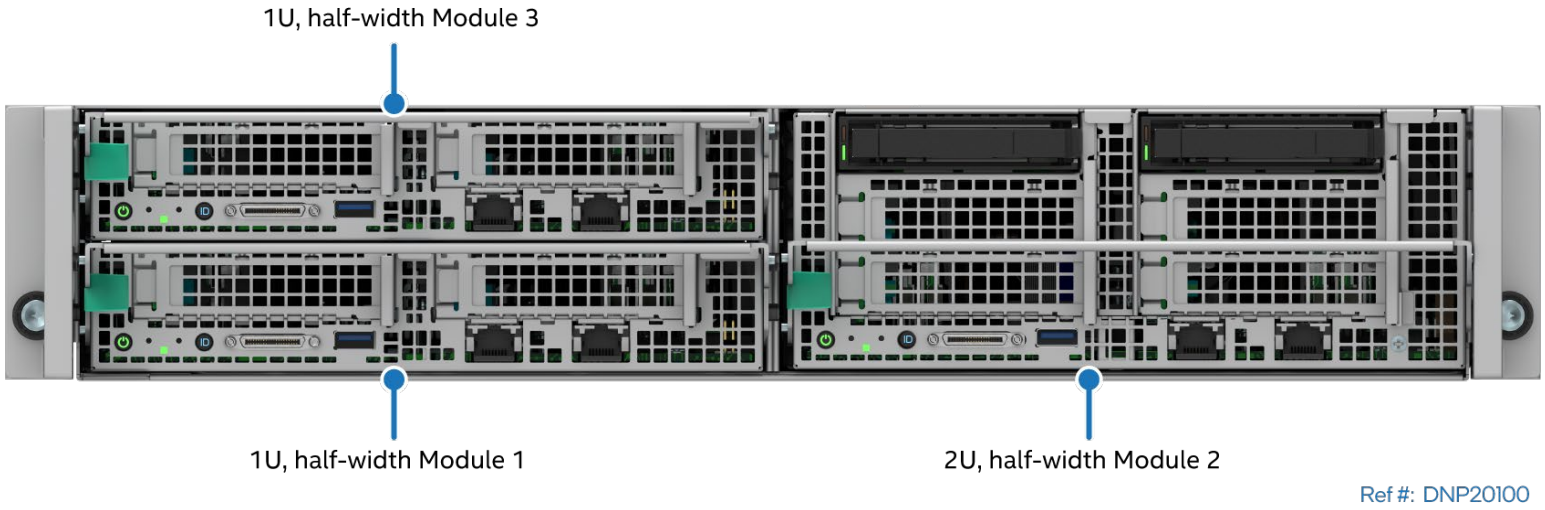


Figure 22. Module Identification for Three Half-Width Module System Configuration Chassis iPC FC2HAC27W0

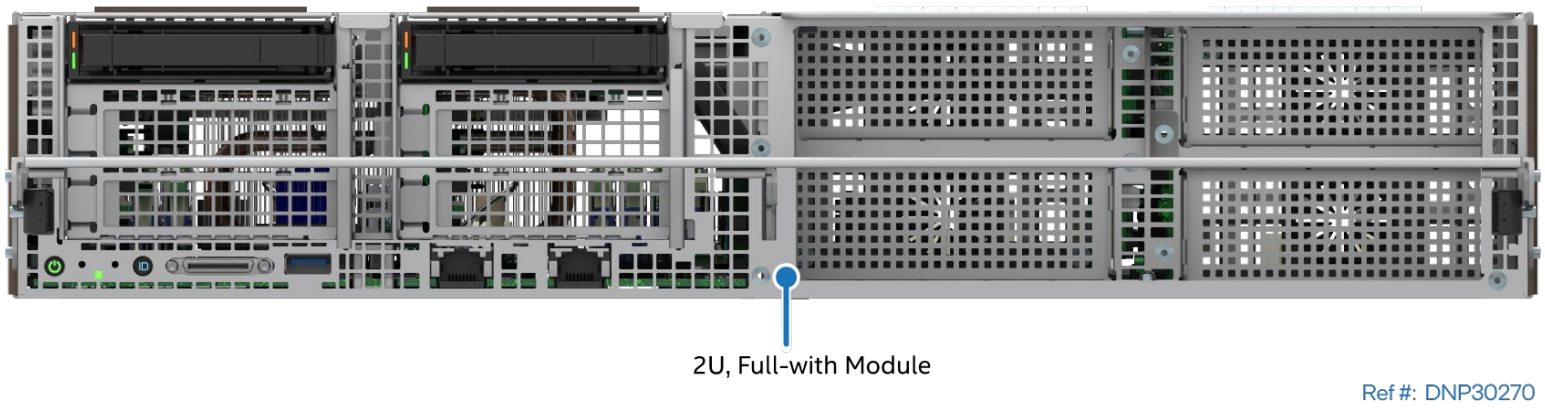


Figure 23. Module Identification for One Full-Width Module System Configuration Chassis iPC FC2FAC27W0

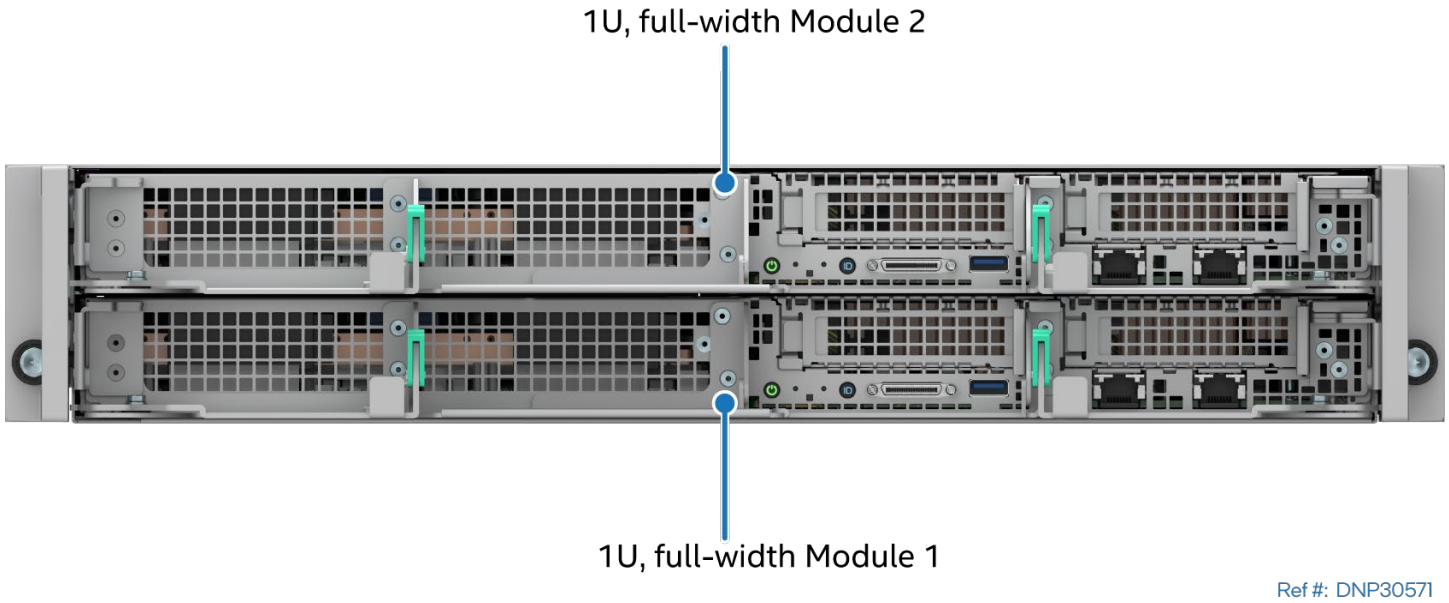


Figure 24. Module Identification for Two Full-Width Module System Configuration Chassis iPC FC2FLC30W0

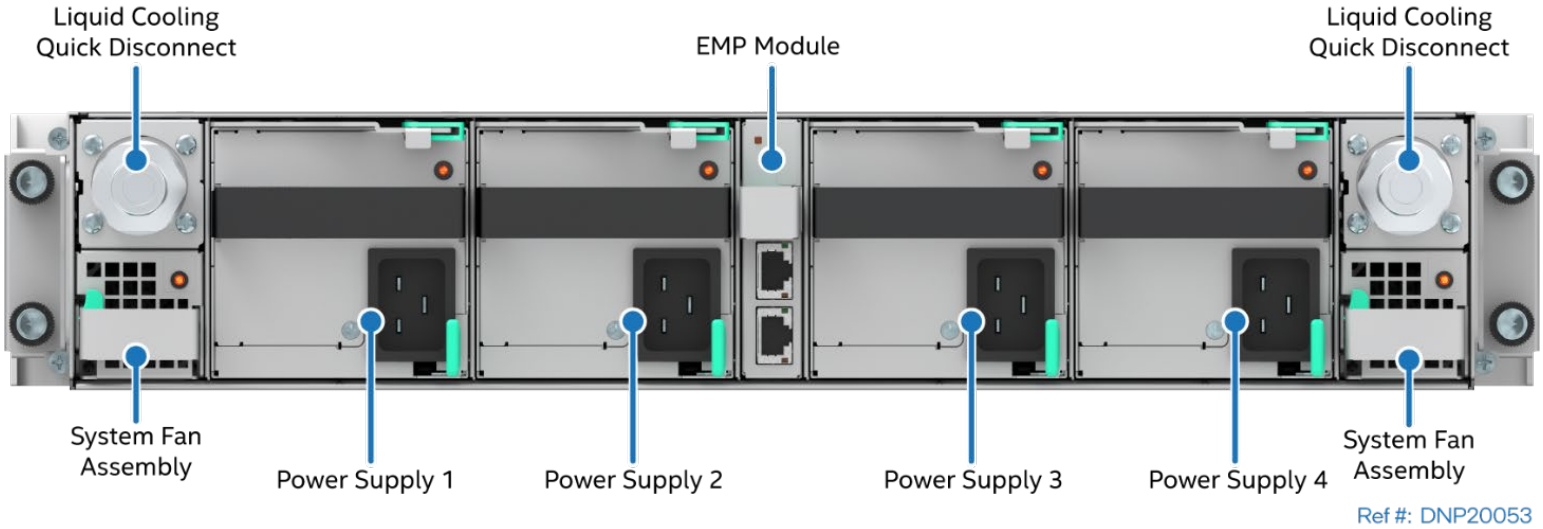


Figure 25 Liquid-Cooled System Back View

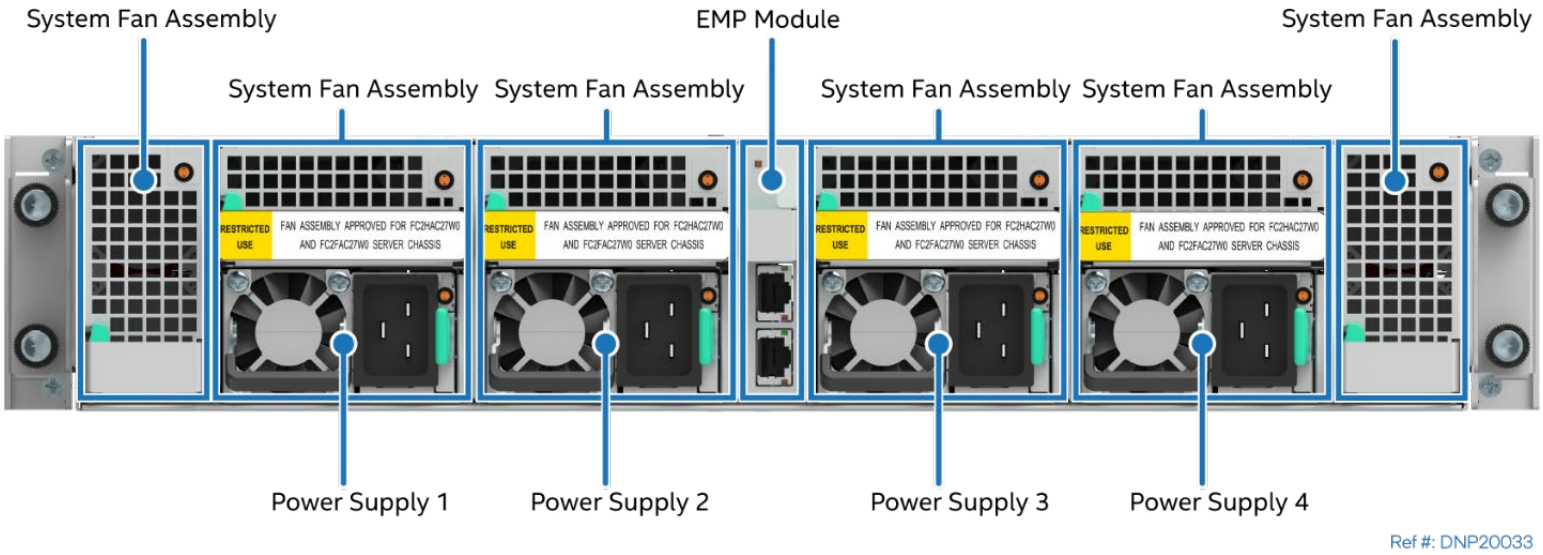


Figure 26. Air-Cooled System Back View

1.7 Reference Documents and Support Collaterals

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

Table 7. 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

Topic	Document Title or Support Collateral	Document Classification
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. Server Building Block Options

Server building blocks are offered to provide the option of choosing from available Intel® Server D50DNP Family components to create a custom system configuration from the chassis up. Each building block component and optional accessory is purchased separately and assembled by a system integrator. At a minimum, a base functional system using building blocks requires the following:

- Liquid or air cooled 2U Intel® Server Chassis from the FC2000 chassis family
- Up to four 1U or up to two 2U modules from the Intel® D50DNP Module options (see Table 5 for details)
- Two processors per module
- Memory
- Storage devices
- Liquid-cooling kit (required for liquid-cooled Intel® D50DNP Modules only)

Note: Mixing liquid-cooled modules with air-cooled modules in a single system is not supported.

For mixed module configurations, the customer must consider the lowest ambient temperature required by the installed processors in the modules. The module requiring the lowest ambient temperature will define the ambient requirements for the whole system even if other installed modules allow higher ambient temperature.

Optional Intel accessories include the following:

- I/O breakout cable with support for serial port, video port, and USB 2.0 ports
- Advanced System Management Key to enable advanced system management features on Integrated BMC Web Console.
- Intel® Virtual RAID on CPU (Intel® VROC) activation key for use with NVMe* SSDs
- Intel® Trusted Platform Module (TPM) 2.0
- M.2 SSD cooling kit
- Accelerator add-in card specific kit with metal bracket and power cable (required for accelerator module D50DNP2MFALAC only)
- Liquid-cooled voltage regulator thermal interface material compound and application tools (required for liquid-cooled Intel® D50DNP Modules only)

See Chapter 3 for available accessory options.

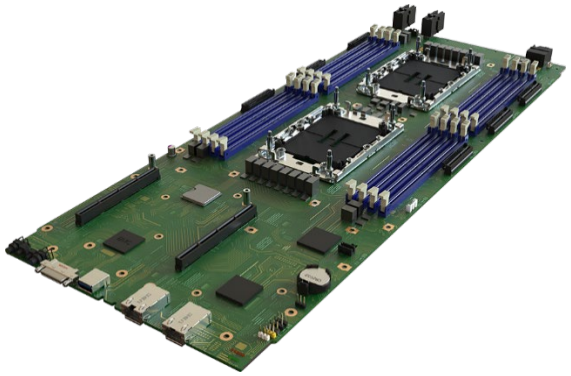
2.1 Intel® Server Board D50DNP Options

The product tables in this section provide order code information and detailed descriptions of the board option. The parts listed as included are ship along components in the product BOM.

For optional accessories, see Chapter 3.

Note: Items identified with an iPC (Intel product code) are orderable building block options, accessories, or spare FRUs. In an effort to provide the complete product bill of materials, the ship along components list in each product table includes items identified by description and by iPN (Intel part number). The iPN information is provided for reference only. These components are not orderable as spares or accessories.

Table 8. Intel® Server Board D50DNP1SB Specifications

Intel® Server Board D50DNP1SB Intel® Server Board D50DNP		
	**Order Information** **iPC** D50DNP1SB **MM#** 99ARWL **UPC** 735858532273 **EAN** 5032037263856 **MOQ** 1	**Product Information** **Product type** Server board only product or spare FRU **Form factor** Half-Width **Packaged gross wt.** 3.23 kg **Un-packaged net wt.** 1.88 kg **Dimensions** 566.34 x 211.58 x 2.23 mm (L x W x H)
Included	**Required Items (sold separately) for board purchased as building block**	**Optional Accessories (sold separately) for board purchased as building block**
(16) DIMM slots with support for standard DDR5 memory modules (6) Mini Cool Edge IO (MCIO*) connectors with x16 PCIe* 5.0 lanes (2) XCC processor carrier clip, for 4th & 5th Gen Intel® Xeon® Scalable processor family – iPC **AXXSPRXCCCC** (2) HBM processor carrier clip, for Intel® Xeon® CPU Max Series processor family – iPC **AXXSPRHBMCC** (2) MCC processor carrier clip, for 4th Gen Intel® Xeon® Scalable processor family – iPC **AXXSPRMCCCC** See Table 4 for the complete board feature set.	(2) 4th or 5th Gen Intel® Xeon® Scalable family or Intel® Xeon® CPU Max Series processors See Section 1.2 for supported processors. Up to (16) ECC DDR5 SDRAM DIMMs See Section 1.3 for supported memory.	(1) Advanced System Management Key to enable advanced system management features on Integrated BMC Web Console – iPC **ADVSYSMGMTKEY** (1) Intel® Virtual RAID on CPU (Intel® VROC) Standard Key – iPC **VROCSTANKEY** (1) Intel® Trusted Platform Module (TPM) 2.0 – iPC **AXXTPMENC9** (1) Intel® Trusted Platform Module (TPM) 2.0 China version – iPC **AXXTPMCHNE8** **Note:** One of the two TPM iPCs above can be chosen. See Chapter 3 for all available accessory options.

2.2 Intel® D50DNP Module Options

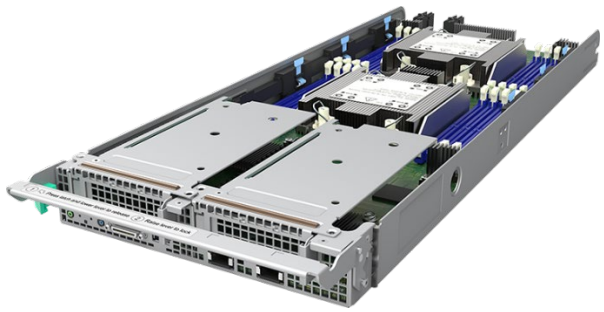
The product tables found in this section provide order code information and detailed descriptions for each available module building block. The sections of each table identify:

- **Included** – The ship along components of the specified module product code (product BOM).
- **Required items** – Hardware required to be installed to the base system to achieve basic functionality using the default system feature set. Required items are sold separately.
- **Optional accessories** – Some of the available accessories that can be installed to enhance the basic feature set of the server board/chassis. Optional accessories are sold separately. Additional accessories are listed in Chapter 3.

Note: Items identified with an iPC (Intel product code) are orderable building block options, accessories, or spare FRUs. In an effort to provide the complete product bill of materials, the ship along components list in each product table include items identified by description and by iPN (Intel part number). The iPN information is provided for reference only. These components are not orderable as spares or accessories.

Table 9. Compute Module D50DNP1MHCPAC Specifications

Compute Module D50DNP1MHCPAC
Compute Module 1U Half-Width Air-Cooled



Order Information

iPC	D50DNP1MHCPAC
MM#	99ARWP
UPC	735858532280
EAN	5032037263863
MOQ	1

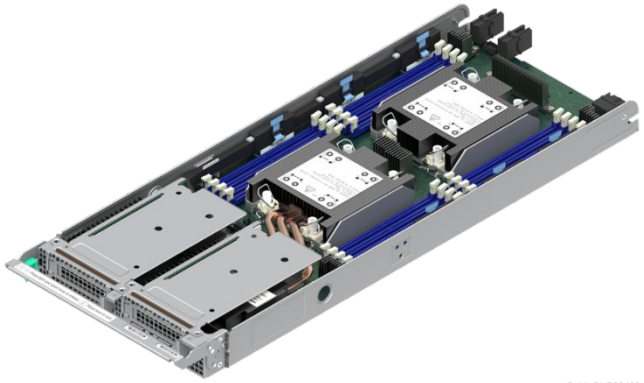
Product Information

Product type	L6 Compute module building block or spare FRU
Form factor	Density-optimized 1U
Packaged gross wt.	5.79 kg
Un-packaged net wt.	4.21 kg
Dimensions	591.4 x 216 x 40.6 mm (L x W x H)

Included	Required Items (sold separately) for module purchased as building block	Optional Accessories (sold separately) for module purchased as building block
(1) Intel® Server Board D50DNP1SB – iPC **D50DNP1SB** (1) 1U half-width module tray – iPN **M44835-xxx** (1) 1U compute module air duct – iPN **M44897-xxx** (2) 1U riser bracket to support riser cards DNP1URISER and DNP1UMRISER – iPN **M44890-xxx** (1) 1U low-profile PCIe* standard riser card – iPC **DNP1URISER** (1) 1U low-profile PCIe MCIO* riser card – iPC **DNP1UMRISER** (1) MCIO cable for 1U left riser – iPN **M40563-xxx** (1) 1U air-cooled heat sink front – iPC **DNP1UHSF** (1) 1U air-cooled heat sink back – iPC **DNP1UHSB**	(2) 4th or 5th Gen Intel® Xeon® Scalable family processors See Section 1.2 for supported processors. Up to (16) ECC DDR5 SDRAM DIMMs Order number of DIMM Blank kits (iPC **DNPDMMBLNK**) to populate DIMM slots not occupied by memory DIMMs. Each DIMM Blank kit contains 4 DIMM Blanks See Section 1.3 for supported memory. (1) one heat sink kit for each air-cooled M.2 SSD – iPC **DNPM2HS**	(1) I/O breakout cable – iPC **AXXCONNTDBG** (1) Advanced System Management Key to enable advanced system management features on Integrated BMC Web Console – iPC **ADVSYSMGMTKEY** (1) Intel® Virtual RAID on CPU (Intel® VROC) Standard Key – iPC **VROCSTANKEY** (1) Intel® Trusted Platform Module (TPM) 2.0 – iPC **AXXTPMENC9** (1) Intel® Trusted Platform Module (TPM) 2.0 China version – iPC **AXXTPMCHNE8** **Note:** One of the two TPM iPCs above can be chosen. See Chapter 3 for all available accessory options.

Table 10. Compute Module D50DNP1MHEVAC Specifications

Compute Module D50DNP1MHEVAC
Compute Module 1U Half-Width EVAC Air-Cooled



Order Information

iPC	D50DNP1MHEVAC
MM#	99ARWR
UPC	735858532297
EAN	5032037263870
MOQ	1

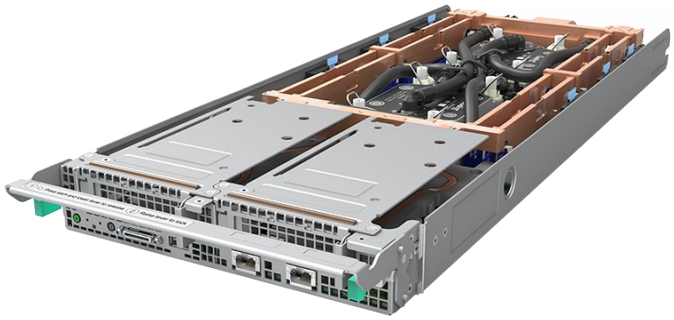
Product Information

Product type	L6 Compute module building block or spare FRU
Form factor	Density-optimized 1U
Packaged gross wt.	6.08 kg
Un-packaged net wt.	4.5 kg
Dimensions	591.4 x 216 x 40.6 mm (L x W x H)

Included	Required Items (sold separately) for module purchased as building block	Optional Accessories (sold separately) for module purchased as building block
(1) Intel® Server Board D50DNP1SB – iPC **D50DNP1SB** (1) 1U half-width module tray – iPN **M44835-xxx** (1) 1U compute module air duct – iPN **M44897-xxx** (2) 1U riser bracket to support riser cards DNP1URISER and DNP1UMRISER – iPN **M44890-xxx** (1) 1U low-profile PCIe* MCIO* riser card – iPC **DNP1UMRISER** (1) MCIO cable for 1U left riser – iPN **M40563-xxx** (1) 1U air-cooled EVAC heat sink – iPC **DNPEVACHS** (1) 1U air-cooled heat sink back – iPC **DNP1UHSB**	(2) 4th or 5th Gen Intel® Xeon® Scalable family processors See Section 1.2 for supported processors. Up to (16) ECC DDR5 SDRAM DIMMs Order number of DIMM Blank kits (iPC **DNPDMMBLNK**) to populate DIMM slots not occupied by memory DIMMs. Each DIMM Blank kit contains 4 DIMM Blanks See Section 1.3 for supported memory. (1) one heat sink kit for each air-cooled M.2 SSD – iPC **DNPM2HS**	(1) I/O breakout cable – iPC **AXXCONNTDBG** (1) Advanced System Management Key to enable advanced system management features on Integrated BMC Web Console – iPC **ADVSYSMGMTKEY** (1) Intel® Virtual RAID on CPU (Intel® VROC) Standard Key – iPC **VROCSTANKEY** (1) Intel® Trusted Platform Module (TPM) 2.0 – iPC **AXXTPMENC9** (1) Intel® Trusted Platform Module (TPM) 2.0 China version – iPC **AXXTPMCHNE8** **Note:** One of the two TPM iPCs above can be chosen. See Chapter 3 for all available accessory options.

Table 11. Compute Module D50DNP1MHCPLC Specifications

Compute Module D50DNP1MHCPLC
Compute Module 1U Half-Width Liquid-Cooled



Order Information

iPC	D50DNP1MHCPLC
MM#	99ARWT
UPC	735858532303
EAN	5032037263887
MOQ	1

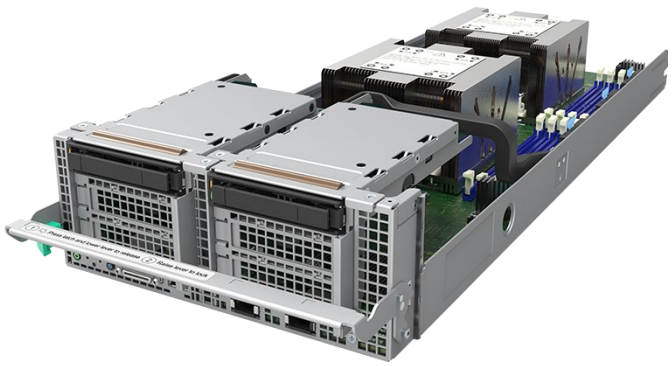
Product Information

Product type	L6 compute module building block or spare FRU
Form factor	Density-optimized 1U
Packaged gross wt.	9.8 kg
Un-packaged net wt.	7.5 kg
Dimensions	591.4 x 216 x 40.6 mm (L x W x H)

Included	Required Items (sold separately) for module purchased as building block	Optional Accessories (sold separately) for module purchased as building block
(1) Intel® Server Board D50DNP1SB – iPC **D50DNP1SB** (1) 1U half-width liquid-cooled module tray – iPN **M60276 -xxx** (2) 1U riser bracket to support riser cards DNP1URISER and DNP1UMRISER – iPN **M44890-xxx** (1) 1U low-profile PCIe* standard riser card – iPC **DNP1URISER** (1) 1U low-profile PCIe MCIO* riser card – iPC **DNP1UMRISER** (1) MCIO cable for 1U left riser – iPN **M40563-xxx** (1) D50DNP compute module liquid-cooling loop – iPC **DNPLCLPCM**	(2) 4th or 5th Gen Intel® Xeon® Scalable family or Intel® Xeon® CPU Max Series processors. See Section 1.2 for supported processors. (16) ECC DDR5 SDRAM DIMMs. See Section 1.3 for supported memory. (1) M.2 heat sink liquid-cooled for each liquid-cooled M.2 SSD – iPC **DNPM2LCHS**	(1) I/O breakout cable – iPC **AXXCONNTDBG** (1) Advanced System Management Key to enable advanced system management features on Integrated BMC Web Console – iPC **ADVSYSMGMTKEY** (1) Intel® Virtual RAID on CPU (Intel® VROC) Standard Key – iPC **VROCSTANKEY** (1) Intel® Trusted Platform Module (TPM) 2.0 – iPC **AXXTPMENC9** (1) Intel® Trusted Platform Module (TPM) 2.0 China version – iPC **AXXTPMCHNE8** **Note:** One of the two TPM iPCs above can be chosen. (1) Liquid-cooling VR TIM application tools – iPC **TNPLCVRTLS** (1) Liquid-cooling VR TIM application nozzle – iPC **TNPLCVRTNZ** (1) Liquid-cooling VR TIM compound – iPC **TNPLCVRCMPD** **TNPLCVRTLS, TNPLCVRTNZ,** and **TNPLCVRCMPD** are to be used for installation or replacement of D50DNP compute module liquid-cooling loop. See the *Intel® Server D50DNP Family Integration and Service Guide* for usage instructions. See Chapter 3 for all available accessory options.

Table 12. Management Module D50DNP2MHSVAC Specifications

Management Module D50DNP2MHSVAC
Management Module 2U Half-Width Air-Cooled



Order Information

iPC	D50DNP2MHSVAC
MM#	99ARWV
UPC	735858532310
EAN	5032037263894
MOQ	1

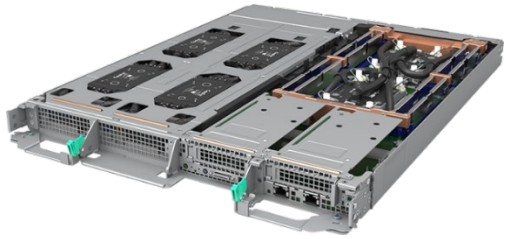
Product Information

Product type	L6 management module building block or spare FRU
Form factor	Density-optimized 2U
Packaged gross wt.	6.81 kg
Un-packaged net wt.	4.73 kg
Dimensions	591.4 x 216 x 81.9 mm (L x W x H)

Included	Required Items (sold separately) for module purchased as building block	Optional Accessories (sold separately) for module purchased as building block
(1) Intel® Server Board D50DNP1SB – iPC **D50DNP1SB** (1) 2U half-width module tray – iPN **M44836-xxx** (1) 2U management module air duct – iPN **M44894-xxx** (1) MCIO* cable for 2U right riser – iPN **M40564-xxx** (1) MCIO cable for 2U left riser – iPN **M40565-xxx** (2) 2U riser bracket to support riser card DNP2UMRISER – iPN **M44892-xxx** (2) 2U low-profile PCIe* MCIO riser card – iPC **DNP2UMRISER** (2) U.2 PCIe NVMe* SSD adapter card – iPN **K50874-xxx** (2) 2.5" tool-less SSD drive carrier – iPN **J36439-xxx** (1) 2U air-cooled heat sink front – iPC **DNP2UHSF** (1) 2U air-cooled heat sink back – iPC **DNP2UHSB**	(2) 4th or 5th Gen Intel® Xeon® Scalable family or Intel® Xeon® CPU Max Series processors. See Section 1.2 for supported processors. Up to (16) ECC DDR5 SDRAM DIMMs. See Section 1.3 for supported memory. Order number of DIMM Blank kits (iPC **DNPDMMBLNK**) to populate DIMM slots not occupied by memory DIMMs. Each DIMM Blank kit contains 4 DIMM Blanks	(1) I/O breakout cable – iPC **AXXCONNTDBG** (1) Advanced System Management Key to enable advanced system management features on Integrated BMC Web Console – iPC **ADVSYSMGMTKEY** (1) Intel® Virtual RAID on CPU (Intel® VROC) Standard Key – iPC **VROCSTANKEY** (1) Intel® Trusted Platform Module (TPM) 2.0 – iPC **AXXTPMENC9** (1) Intel® Trusted Platform Module (TPM) 2.0 China version – iPC **AXXTPMCHNE8** **Note:** One of the two TPM iPCs above can be chosen. (1) one heat sink kit for each air-cooled M.2 SSD – iPC **DNPM2HS** See Chapter 3 for all available accessory options.

Table 13. Intel® Data Center GPU Max Series Accelerator Module D50DNP1MFALLC Specifications

Intel® Data Center GPU Max Series D50DNP1MFALLC
Intel® Data Center GPU Max Series Accelerator Module 1U Full-Width Liquid-Cooled



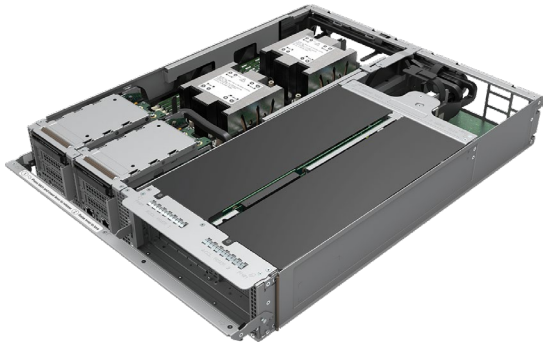
Order Information	
iPC	D50DNP1MFALLC
MM#	99ARWW
UPC	735858532327
EAN	5032037263900
MOQ	1

Product Information	
Product type	Spare FRU only
Form factor	Density-optimized 1U
Packaged gross wt.	19.06 kg
Un-packaged net wt.	14.23 kg
Dimensions	597.7 x 437.1 x 40.6 mm (L x W x H)

Included	Required Items (sold separately) for module purchased as building block	Optional Accessories (sold separately) for module purchased as building block
(1) Intel® Server Board D50DNP1SB – iPC **D50DNP1SB** (1) Intel® Data Center GPU Max Series carrier baseboard (CBB) – iPC **DNPLCPVCCBB** (1) 1U full-width liquid-cooled module tray – iPN **M62560 -xxx** (1) MCIO* cable from carrier baseboard to server board P1_PE0 connector – iPN **M82302 -xxx** (1) MCIO cable from carrier baseboard to server board P0_PE2 connector – iPN **M82304 -xxx** (1) MCIO cable from carrier baseboard to server board P0_PE1 connector – iPN **M82313 -xxx** (1) MCIO cable from carrier baseboard to server board P1_PE3 connector – iPN **M82316 -xxx** (1) Signal cable to connect carrier baseboard to server board J_MISC connector – iPN **M82334 -xxx** (2) 1U riser bracket to support riser cards DNP1URISER and DNP1UMRISER – iPN **M44890-xxx** (1) 1U low-profile PCIe* standard riser card – iPC **DNP1URISER** (1) 1U low-profile PCIe MCIO riser card – iPC **DNP1UMRISER** (1) MCIO cable for 1U left riser – iPN **M40563-xxx** (1) D50DNP compute module liquid-cooling loop – iPC **DNPLCLPCM** (1) D50DNP accelerator module liquid-cooling loop – iPC **DNPLCLPAM** (1) Power cable to connect 12 V to 48 V converter board to carrier baseboard – iPN **M52679 -xxx** (1) Power cable to connect 12 V to 48 V converter board to carrier baseboard – iPN **M52680 -xxx** (1) Signal cable to connect the top and bottom sides of power distribution board converter – iPN M82332 -xxx	(2) 4th or 5th Gen Intel® Xeon® Scalable family or Intel® Xeon® CPU Max Series processors. See Section 1.2 for supported processors. (16) ECC DDR5 SDRAM DIMMs. See Section 1.3 for supported memory. (1) M.2 heat sink liquid-cooled for each liquid-cooled M.2 SSD – iPC **DNPM2LCHS**	(1) I/O breakout cable – iPC **AXXCONNTDBG** (1) Advanced System Management Key to enable advance system management features on Integrated BMC Web Console. – iPC **ADVSYSMGMTKEY** (1) Intel® Virtual RAID on CPU (Intel® VROC) Standard Key – iPC **VROCSTANKEY** (1) Intel® Trusted Platform Module (TPM) 2.0 – iPC **AXXTPMENC9** (1) Intel® Trusted Platform Module (TPM) 2.0 China version – iPC **AXXTPMCHNE8** **Note:** One of two TPM iPCs above can be chosen. (1) Liquid-cooling VR TIM application tools – iPC **TNPLCVRTLS** (1) Liquid-cooling VR TIM application nozzle – iPC **TNPLCVRTNZ** (1) Liquid-cooling VR TIM compound – iPC **TNPLCVRCMPD** **TNPLCVRTLS, TNPLCVRTNZ,** and **TNPLCVRCMPD** are to be used for installation or replacement of D50DNP compute module liquid-cooling loop. See the *Intel® Server D50DNP Family Integration and Service Guide* for usage instructions. See Chapter 3 for all available accessory options.

Table 14. PCIe* Accelerator Module D50DNP2MFALAC Specifications

PCIe Accelerator Module D50DNP2MFALAC
PCIe Accelerator Module 2U Full-Width Air-Cooled



Order Information

iPC	D50DNP2MFALAC
MM#	99ARWX
UPC	735858532334
EAN	5032037263917
MOQ	1

Product Information

Product type	L6 accelerator module building block or spare FRU
Form factor	Density-optimized 2U
Packaged gross wt.	13.95 kg
Un-packaged net wt.	10.25 kg
Dimensions	591.25 x 437.1 x 82.1 mm (L x W x H)

Included

(1) Intel® Server Board D50DNP1SB – iPC **D50DNP1SB**
(1) 2U half-width module tray – iPN **M44884-xxx**
(1) 2U PCIe accelerator module air duct – iPN **M44898-xxx**
(1) MCIO* cable from 2U riser card to server board P1_PE2 – iPN **M44308-xxx**
(1) MCIO cable from 2U riser card to server board P1_PE4 – iPN **M44307-xxx**
(1) MCIO cable from accelerator riser 1 connector J_MCIO_2 to server board P0_PE1 connector – iPN **M44299-xxx**
(1) MCIO cable from accelerator riser 1 connector J_MCIO_1 to server board P0_PE2 connector – iPN **M44300-xxx**
(1) MCIO cable from accelerator riser 2 connector J_MCIO_4 to server board P1_PE3 connector – iPN **M44305-xxx**
(1) MCIO cable from accelerator riser 2 connector J_MCIO_3 to server board P1_PE0 connector –iPN **M44306-xxx**
(2) 2U riser bracket to support riser card DNP2UMRISER – iPN **M44892-xxx**
(2) 2U low-profile PCIe MCIO riser card – iPC **DNP2UMRISER**
(2) U.2 PCIe NVMe* SSD adapter card – iPN **K50874-xxx**
(2) 2.5" tool-less SSD drive carrier – iPN **J36439-xxx**
(1) 2U air-cooled heat sink front – iPC **DNP2UHSF**
(1) 2U air-cooled heat sink back – iPC **DNP2UHSB**
(1) 2U PCIe accelerator riser card 1 – iPC **DNPACCLRISER1**
(1) 2U PCIe accelerator riser card 2 – iPC **DNPACCLRISER2**
(1) Accelerator module power connector board – iPC **DNPACCLNBRD**

Required Items (sold separately) for module purchased as building block

(2) 4th or 5th Gen Intel® Xeon® Scalable family or Intel® Xeon® CPU Max Series processors.
See Section 1.2 for supported processors.

Up to (16) ECC DDR5 SDRAM DIMMs.
See Section 1.3 for supported memory.

Order number of DIMM Blank kits (iPC **DNPDMMBLNK**) to populate DIMM slots not occupied by memory DIMMs. Each DIMM Blank kit contains 4 DIMM Blanks

Optional Accessories (sold separately) for module purchased as building block

(1) I/O breakout cable – iPC **AXXCONNTDBG**
(1) Advanced System Management Key to enable advance system management features on Integrated BMC Web Console – iPC **ADVSYSMGMTKEY**
(1) Intel® Virtual RAID on CPU (Intel® VROC) Standard Key – iPC **VROCSTANKEY**
(1) Intel® Trusted Platform Module (TPM) 2.0 – iPC **AXXTPMENC9**
(1) Intel® Trusted Platform Module (TPM) 2.0 China version – iPC **AXXTPMCHNE8**
Note: One of the two TPM iPCs above can be chosen.
(1) one heat sink kit for each air-cooled M.2 SSD – iPC **DNPM2HS**
(1) Accelerator Module card kit A100 – iPC **TNPACCLBZA100**
(1) Accelerator Module card kit DC – iPC **TNPACCLBZDC**
(1) Accelerator Module card kit PVC – iPC **DNPACCLBZPVC**
(1) Accelerator Module card kit E810 - iPC **DNPACCLBZ810A**
Note: Each accelerator add-in card requires matching accelerator card kit.
Note: Accelerator module D50DNP2MFALAC supports up to four accelerator add-in cards of the same type. Mixed types in a single module are not supported. See the *Intel® Server D50DNP Family Technical Product Specification* for detailed information on the support for accelerator add-in cards.

See Chapter 3 for all available accessory options.

PCIe Accelerator Module D50DNP2MFALAC PCIe Accelerator Module 2U Full-Width Air-Cooled		
Included	**Required Items (sold separately) for chassis purchased as building block**	**Optional Accessories (sold separately) for chassis purchased as building block**
(2) Power cable to connect DNPACCLRISER1 and DNPACCLRISER 2 to DNPACCLNBRD – iPN **M44103 -xxx** (1) Signal cable to connect DNPACCLNBRD to server board J_APB connector – iPN **M44104 -xxx**		

2.3 Intel® Server Chassis FC2000 Options

The product tables found in this section provide order code information and detailed descriptions for each available chassis option. The parts listed as included are ship along components in the product BOM.

Note: Items identified with an iPC (Intel product code) are orderable building block options, accessories, or spare FRUs. In an effort to provide the complete product bill of materials, the ship along components list in each product table include items identified by description and by iPN (Intel part number). The iPN information is provided for reference only. These components are not orderable as spares or accessories.

Table 15. Intel® Server Chassis FC2HAC27W0 Specifications

Intel® Server Chassis FC2HAC27W0
Intel® Server Chassis FC2000 v2 Half-Width Configuration Air-Cooled No PSUs

Order Information

iPC	FC2HAC27W0
MM#	99ARXW
UPC	735858532341
EAN	5032037263924
MOQ	1

Product Information

Product type	Chassis building block for Intel® Server System D50DNP or spare FRU
Chassis form factor	2U rack mount
Packaged gross wt.	39.42 kg
Un-packaged net wt.	27.42 kg
Chassis dimensions	865 x 441.8 x 86.8 mm (L x W x H)
Package dimensions	1192 x 758 x 317 mm (L x W x H)

Included	Required Items (sold separately) for chassis purchased as building block	Optional Accessories (sold separately) for chassis purchased as building block
(1) 2U chassis FC2000 (4) Air-cooled fan assembly with integrated dual rotor 60mm fan – iPC **FCXX60MMACFAN** (2) Air-cooled fan assembly with integrated dual rotor 40mm fan – iPC **FCXX40MMACFAN** (1) Power distribution board assembly – iPC **FCXXPDBASSMBL2** (1) Tool less rack rail mount kit – iPC **FCXXRAILKIT** (4) Internal rail kit – iPC **FCXX1USPPRT** (1) EMP module filler	Intel® D50DNP Modules See Section 1.6 for Intel® D50DNP Modules supported by this chassis. Each chassis slot not occupied by a module must be filled with 1U module blank – iPC **AXXFC1UHWBLANK** From (2) and up to (4) 2700 W power supply units – iPC **FCXX27CRPSAC** Each PSU slot not occupied by a PSU must be filled with PSU blank – iPC **FCXXBLANKAC**	(1) Ethernet Management Port Module – iPC **AXXFCEMP** See Chapter 3 for all available accessory options. **Note about power supply units:** See the *Intel® Server D50DNP Family Technical Product Specification* and Intel® Power Calculator Tool https://servertools.intel.com/tools/power-calculator/ to determine the quantity of power supply units based on specific configuration and workload.

Table 16. Intel® Server Chassis FC2FAC27W0 Specifications

Intel® Server Chassis FC2FAC27W0
Intel® Server Chassis FC2000 v2 Full-Width Configuration Air-Cooled No PSUs

Order Information

iPC	FC2FAC27W0
MM#	99ARXZ
UPC	735858532358
EAN	5032037263931
MOQ	1

Product Information

Product type	Chassis building block for Intel® Server System D50DNP or spare FRU
Chassis form factor	2U rack mount
Packaged gross wt.	38.26 kg
Un-packaged net wt.	26.26 kg
Chassis dimensions	865 x 441.8 x 86.8 mm (L x W x H)
Package dimensions	1192 x 758 x 317 mm (L x W x H)

Included	Required Items (sold separately) for chassis purchased as building block	Optional Accessories (sold separately) for chassis purchased as building block
(1) 2U chassis FC2000 (4) Air-cooled fan assembly with integrated dual rotor 60mm fan – iPC **FCXX60MMACFAN** (2) Air-cooled fan assembly with integrated dual rotor 40mm fan – iPC **FCXX40MMACFAN** (1) Power distribution board assembly – iPC **FCXXPDBASSMBL2** (1) Tool less rack rail mount kit – iPC **FCXXRAILKIT** (1) EMP module filler	Intel® D50DNP Modules See Section 1.6 for Intel® D50DNP Modules supported by this chassis. From (2) and up (4) 2700 W power supply units – iPC **FCXX27CRPSAC** Each PSU slot not occupied by a PSU must be filled with PSU blanks – iPC **FCXXBLANKAC**	(1) Ethernet management port module – iPC **AXXFCEMP** See Chapter 3 for all available accessory options. **Note about power supply units:** See the *Intel® Server D50DNP Family Technical Product Specification* and Intel® Power Calculator Tool https://servertools.intel.com/tools/power-calculator/ to determine the quantity of power supply units based on specific configuration and workload.

Table 17. Intel® Server Chassis FC2HLC30W0 Specifications

Intel® Server Chassis FC2HLC30W0
Intel® Server Chassis FC2000 v2 Half-Width Configuration Liquid-Cooled No PSUs

Order Information

iPC	FC2HLC30W0
MM#	99ARZ1
UPC	735858532365
EAN	5032037263948
MOQ	1

Product Information

Product type	Chassis building block for Intel® Server System D50DNP or spare FRU
Chassis form factor	2U rack mount
Packaged gross wt.	40.98 kg
Un-packaged net wt.	28.98 kg
Chassis dimensions	865 x 441.8 x 86.8 mm (L x W x H)
Package dimensions	1192 x 758 x 317 mm (L x W x H)

Included	Required Items (sold separately) for chassis purchased as building block	Optional Accessories (sold separately) for chassis purchased as building block
(1) 2U chassis FC2000 (2) Liquid-cooled fan assembly with integrated dual rotor 40mm fan – iPC **FCXX40MMLCFAN** (1) Chassis plumbing assembly kit – iPC **FCXXLCMDMFD** (1) Power distribution board assembly – iPC **FCXXPDBASSMBL2** (1) Tool less rack rail mount kit – iPC **FCXXRAILKIT** (4) Internal rail kit – iPC **FCXX1USPPRT** (1) EMP module filler	Intel® D50DNP Modules. See Section 1.6 for Intel® D50DNP Modules supported by this chassis. Each chassis slot not occupied by a module must be filled with 1U module blank – iPC **AXXFC1UHWBLANK** From (2) and up (4) 3000 W power supply units – iPC **FCXX30CRPSLC** Each PSU slot not occupied by a PSU must be filled with PSU blanks – iPC **FCXXBLANKLC**	(1) Ethernet management port module – iPC **AXXFCEMP** See Chapter 3 for all available accessory options. **Note about power supply units:** See the *Intel® Server D50DNP Family Technical Product Specification* and Intel® Power Calculator Tool https://servertools.intel.com/tools/power-calculator/ to determine the quantity of power supply units based on specific configuration and workload.

Table 18. Intel® Server Chassis FC2FLC30W0 Specifications

Intel® Server Chassis FC2FLC30W0
Intel® Server Chassis FC2000 v2 Full-Width Configuration Liquid-Cooled No PSUs

Order Information

iPC	FC2FLC30W0
MM#	99ARZ2
UPC	735858532372
EAN	5032037263955
MOQ	1

Product Information

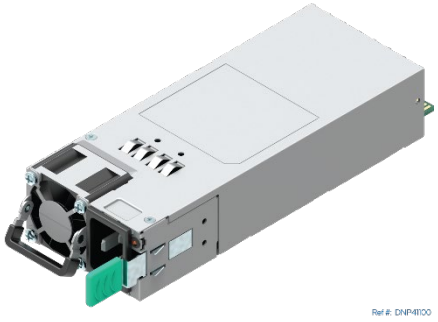
Product type	Chassis building block for Intel® Server System D50DNP or spare FRU
Chassis form factor	2U rack mount
Packaged gross wt.	40.42 kg
Un-packaged net wt.	28.38 kg
Chassis dimensions	865 x 441.8 x 86.8 mm (L x W x H)
Package dimensions	1192 x 758 x 317 mm (L x W x H)

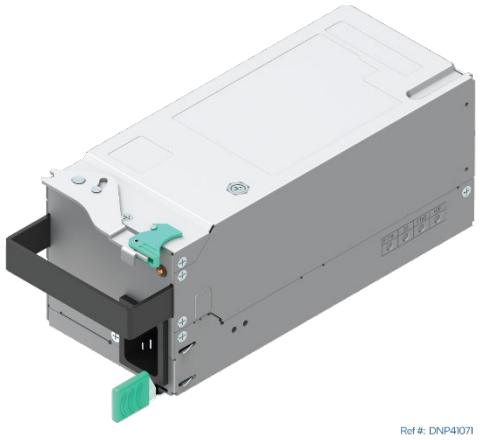
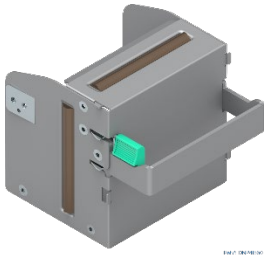
Included	Required Items (sold separately) for chassis purchased as building block	Optional Accessories (sold separately) for chassis purchased as building block
((1) 2U chassis FC2000 (2) Liquid-cooled fan assembly with integrated dual rotor 40mm fan – iPC **FCXX40MMLCFAN** (1) Chassis plumbing assembly kit – iPC **FCXXLCMDMFD** (1) Power distribution board assembly – iPC **FCXXPDBASSMBL2** (1) Tool less rack rail mount kit – iPC **FCXXRAILKIT** (4) Internal rail kit – iPC **FCXX1USPPRT** (1) EMP module filler	Intel® D50DNP Modules. See Section 1.6 for Intel® D50DNP Modules supported by this chassis. Each chassis slot not occupied by a module must be filled with 1U module blank – iPC **AXXFC1UFWBLANK** From (2) and up (4) 3000 W power supply units – iPC **FCXX30CRPSLC** Each PSU slot not occupied by a PSU must be filled with PSU blanks – iPC **FCXXBLANKLC**	(1) Ethernet management port module – iPC **AXXFCEMP** See Chapter 3 for all available accessory options. **Note about power supply units:** See the *Intel® Server D50DNP Family Technical Product Specification* and Intel® Power Calculator Tool https://servertools.intel.com/tools/power-calculator/ to determine the quantity of power supply units based on specific configuration and workload.

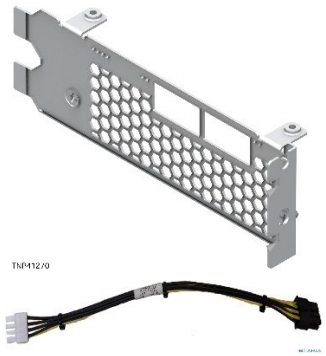
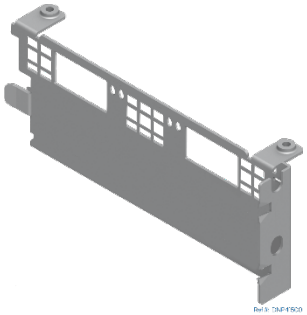
3. Accessory Options

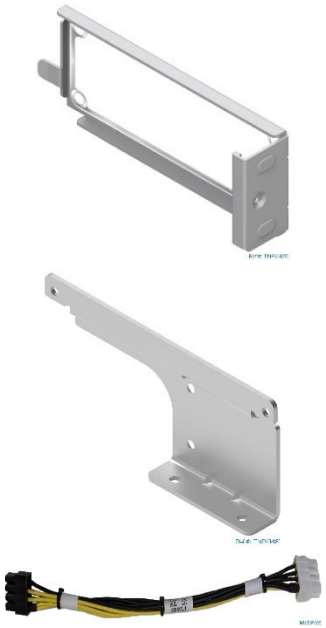
The following sections identify available accessory kits supported in the Intel® Server D50DNP Family.

Table 19. Miscellaneous Accessory Options

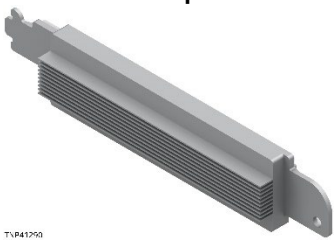
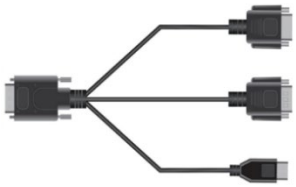
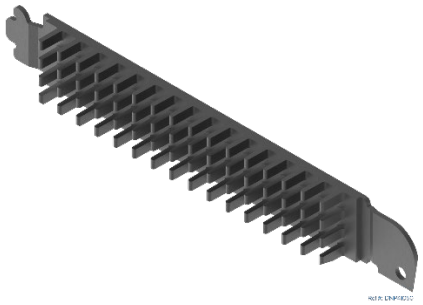
Description / Image	Order Information	Product Information
2700 W Power Supply Common Redundant Power Supply 	**iPC** FCXX27CRPSAC **MM#** 99AZAM **UPC** 735858532389 **EAN** 5032037263962 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Server Chassis FC2000 v2 Half-Width Configuration Air-Cooled • Intel® Server Chassis FC2000 v2 Full-Width Configuration Air-Cooled **Product Overview:** 2700 W AC common redundant power supply, 80 Plus* Titanium efficiency. **Kit Includes:** (1) 2700 W power supply unit Minimum two power supply units per chassis are required. See the Intel® Server D50DNP Family technical product specification and Intel® Power Calculator Tool https://servertools.intel.com/tools/power-calculator/ to determine the quantity of power supply units based on specific configuration and workload.
Intel® Server Chassis FC2000 Blank Filler for Air-Cooled PSU 	**iPC** FCXXBLANKAC **MM#** 99ARZ4 **UPC** 735858532396 **EAN** 5032037263979 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Server Chassis FC2000 v2 Half-Width Configuration Air-Cooled • Intel® Server Chassis FC2000 v2 Full-Width Configuration Air-Cooled **Product Overview:** Intel® Server Chassis FC2000 Blank Filler for Air-Cooled PSU **Kit Includes:** (1) Intel® Server Chassis FC2000 Blank Filler for Air-Cooled PSU

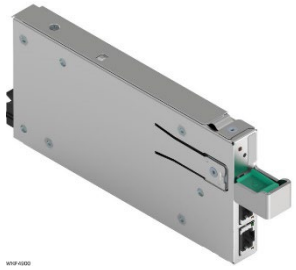
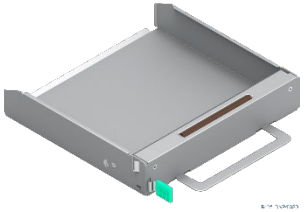
Description / Image	Order Information	Product Information
3000 W Power Supply, liquid-cooled Common Redundant Power Supply  	**iPC** FCXX30CRPSLC **MM#** 99ARZ3 **UPC** 735858524247 **EAN** 5032037256384 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Server Chassis FC2000 v2 half-width configuration liquid-cooled • Intel® Server Chassis FC2000 v2 full-width configuration liquid-cooled **Product Overview:** 3000 W AC liquid-cooled common redundant power supply 80 Plus* Titanium efficiency. The power connector on 3000 W AC power supply follows the International Electrotechnical Commission (IEC) 320 C22 standard. **Kit Includes:** (1) 3000 W power supply unit, liquid-cooled Minimum two power supply units per chassis are required. See the Intel® Server D50DNP Family technical product specification and Intel® Power Calculator Tool https://servertools.intel.com/tools/power-calculator/ to determine the quantity of power supply units based on specific configuration and workload.
Intel® Server Chassis FC2000 Blank Filler for Liquid-Cooled PSU 	**iPC** FCXXBLANKLC **MM#** 99ARZ5 **UPC** 735858532402 **EAN** 5032037263986 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Server Chassis FC2000 v2 half-width configuration liquid-cooled • Intel® Server Chassis FC2000 v2 full-width configuration liquid-cooled **Product Overview:** Intel® Server Chassis FC2000 Blank Filler for Liquid-Cooled PSU **Kit Includes:** (1) Intel® Server Chassis FC2000 Blank Filler for Liquid-Cooled PSU

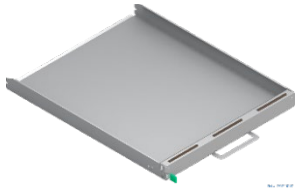
Description / Image	Order Information	Product Information
PCIe* Accelerator Module Card Kit DC 	**iPC** TNPACCLBZDC **MM#** 99A2AR **UPC** 735858469425 **EAN** 5032037207997 **MOQ** 1	**Product Type:** Accessory **Where Used:** • PCIe accelerator module 2U Full-Width Air-Cooled **Product Overview:** Supports Programmable Acceleration Card with Intel® Stratix® 10 SX FPGA add-in card in PCIe accelerator module 2U full-width air-cooled. Each card kit can only support one Intel® Stratix® 10 SX FPGA accelerator add-in card. The kit must be ordered for each card. **Kit Includes:** (1) Front metal bracket – iPN K85872-xxx (1) Power cable – iPN K73545-xxx, used to connect the add-in card to the accelerator module connector board. (2) Screws M3 x 5.5 mm
PCIe Accelerator Module Card Kit E810 	**iPC** DNPACCLBZ810A **MM#** 99C212 **UPC** 735858532631 **EAN** 5032037264211 **MOQ** 1	**Product Type:** Accessory **Where Used:** • PCIe accelerator module 2U Full-Width Air-Cooled **Product Overview:** Supports Intel® E810 Network Interface card in PCIe accelerator module 2U Full-Width Air-Cooled. Each PCIe accelerator module card kit E810 can only support one Intel® E810 Network Interface card. One kit must be ordered for each card. **Kit Includes:** (1) Front metal bracket – iPN M65598-xxx

Description / Image	Order Information	Product Information
PCIe* Accelerator Module Card Kit for Intel® Data Center GPU Max Series Accelerator Add-In Card 	**iPC** DNPACCLBZPVC **MM#** 99ARX3 **UPC** 735858532419 **EAN** 5032037263993 **MOQ** 1	**Product Type:** Accessory **Where Used:** • PCIe accelerator module 2U Full-Width Air-Cooled **Product Overview:** Supports Intel® Data Center GPU Max Series Accelerator add-in card in PCIe accelerator module 2U Full-Width Air-Cooled. Each kit can only support one Intel® Data Center GPU Max Series Accelerator add-in card. The kit must be ordered for each card. **Kit Includes:** (1) Front metal bracket – iPN M65385-xxx (1) Power cable – iPN N23117-xxx, used to connect the add-in card to the accelerator module connector board. (4) Screws M3 x 5.5 mm
PCIe Accelerator Module Card Kit A100 	**iPC** TNPACCLBZA100 **MM#** 99AJJC **UPC** 735858484893 **EAN** 5032037221658 **MOQ** 1	**Product Type:** Accessory **Where Used:** • PCIe accelerator module 2U Full-Width Air-Cooled **Product Overview:** Supports Nvidia* Tesla* A100 40/80 GB accelerator add-in card in PCIe accelerator module 2U Full-Width Air-Cooled. Each PCIe accelerator module card kit A100 can only support one Nvidia* Tesla* A100 40/80 GB accelerator add-in card. The kit must be ordered for each card. **Kit Includes:** (1) Front metal bracket – iPN M33267-xxx (1) Rear extension bracket – iPN M33268-xxx (1) Power cable – iPN M44106-xxx, used to connect the add-in card to the accelerator module connector board. (4) Screws M3 x 5.5 mm

Description / Image	Order Information	Product Information
Liquid-Cooling VR TIM Application Tools 	**iPC** TNPLCVRTLS **MM#** 99AAKL **UPC** 735858474306 **EAN** 5032037212298 **MOQ** 1	**Product Type:** Accessory **Where Used:** • Compute module 1U half-width liquid-cooled • Intel® Data Center GPU Max Series Accelerator module 1U full-width liquid-cooled **Product Overview:** To be used only for applying thermal interface material on CPU voltage regulators when installing or replacing compute module liquid-cooling loop DNPLCLPCM on Intel® D50DNP liquid-cooled modules. See the *Intel® Server D50DNP Family Integration and Service Guide* for installation, replacement, and usage instructions. **Kit Includes:** (1) dispenser with plunger
Liquid-Cooling VR TIM Application Nozzles 	**iPC** TNPLCVRTNZ **MM#** 99AF47 **UPC** 735858476263 **EAN** 5032037214148 **MOQ** 1	**Product Type:** Accessory **Where Used:** • Compute module 1U half-width liquid-cooled • Intel® Data Center GPU Max Series Accelerator module 1U full-width liquid-cooled **Product Overview:** To be used only for applying thermal interface material on CPU voltage regulators when installing or replacing compute module liquid-cooling loop DNPLCLPCM on Intel® D50DNP liquid-cooled modules. See the *Intel® Server D50DNP Integration and Service Guide* for installation, replacement, and usage instructions. **Kit Includes:** (10) Nozzles
Liquid-Cooling VR TIM Compound 	**iPC** TNPLCVRCMPD **MM#** 99AAKM **UPC** 735858474313 **EAN** 5032037212304 **MOQ** 1	**Product Type:** Accessory **Where Used:** • Compute module 1U half-width liquid-cooled • Intel® Data Center GPU Max Series Accelerator module 1U full-width liquid-cooled **Product Overview:** To be used only for applying thermal interface material on CPU voltage regulators when installing or replacing compute module liquid-cooling loop DNPLCLPCM on Intel® D50DNP liquid-cooled modules. See the *Intel® Server D50DNP Family Integration and Service Guide* for installation, replacement, and usage instructions. **Kit Includes:** (1) two-component cartridge

Description / Image	Order Information	Product Information
M.2 Cold Plate Liquid-cooled Kit 	**iPC** DNPM2LCHS **MM#** 99ARJG **UPC** 735858526029 **EAN** 5032037258098 **MOQ** 1	**Product Type:** Accessory **Where Used:** • Compute module 1U half-width liquid-cooled • Intel® Data Center GPU Max Series Accelerator module 1U full-width liquid-cooled **Product Overview:** M.2 heat sink spare kit for liquid-cooled modules. **Kit Includes:** (1) M.2 cold plate (2) M3 screw (2) thermal pads (long and short) (1) Riser bracket (1) spare thermal strips set
I/O Breakout Cable 	**iPC** AXXCONNTDBG **MM#** 999D47 **UPC** 735858424349 **EAN** 5032037166638 **MOQ** 1	**Product Type:** Accessory **Where Used:** • All Intel® D50DNP Module options **Product Overview:** I/O breakout cable connector kit, compatible with all Intel® D50DNP Module options. Supports the following ports: (1) serial port (1) VGA DE-15 port (2) USB 3.0 / 2.0 ports **Kit Includes:** (1) I/O Breakout Cable
M.2 Heat Sink Air-cooled Kit 	**iPC** DNPM2HS **MM#** 99ARXM **UPC** 735858532556 **EAN** 5032037264136 **MOQ** 1	**Product Type:** Accessory **Where Used:** • Compute module 1U half-width air-cooled • Compute module 1U half-width EVAC air-cooled • Management module 2U half-width air-cooled • PCIe* accelerator module 2U full-width air-cooled **Product Overview:** M.2 heat sink kit for air-cooled modules. One kit is required for each M.2 SSD **Kit Includes:** (1) M.2 heat sink with thermal pad attached (1) Thermal pad for SSD (1) M3 screw (1) Installation instructions

Description / Image	Order Information	Product Information
DIMM Blank 	**iPC** DNPDMMBLNK **MM#** 99ARXP **UPC** 735858532563 **EAN** 5032037264143 **MOQ** 1	**Product Type:** Accessory **Where Used:** • Compute module 1U half-width air-cooled • Compute module 1U half-width EVAC air-cooled • Management module 2U half-width air-cooled • PCIe* accelerator module 2U full-width air-cooled **Product Overview:** To maintain proper airflow for air-cooled configurations, it is necessary to populate all memory slots with either memory modules or DIMM blanks. Order number of DIMM Blank kits to populate DIMM slots not occupied by memory DIMMs. Each DIMM Blank kit contains 4 DIMM Blanks **Kit Includes:** (4) Blanks per pack
Ethernet Management Port Module 	**iPC** AXXFCEMP **MM#** 999D48 **UPC** 735858425988 **EAN** 5032037168182 **MOQ** 1	**Product Type:** Accessory **Where Used:** • All Intel® Server Chassis D50DNP options **Product Overview:** Ethernet management port (EMP) module accessory kit, compatible with all Intel® Server Chassis D50DNP. • Offers management of all compute modules in the chassis over single 1Gbps Ethernet LAN • Port forwarding • Hot-swappable • Two RJ45 ports allow daisy-chain up to 8 systems with one Ethernet connection **Kit Includes:** (1) Ethernet management port module
1U Half-Width Module Blank 	**iPC** AXXFC1UHWBLANK **MM#** 99C0HF **UPC** 735858532624 **EAN** 5032037264204 **MOQ** 1	**Product Type:** Accessory **Where Used:** • Intel® Server Chassis FC2000 v2 half-width configuration air-cooled • Intel® Server Chassis FC2000 v2 half-width configuration liquid-cooled **Product Overview:** This part is needed to fill module slots not occupied by modules in the air-cooled and liquid-cooled Intel® Server Chassis FC200 v2 family half-width. **Kit Includes:** (1) 1U half-width module blank

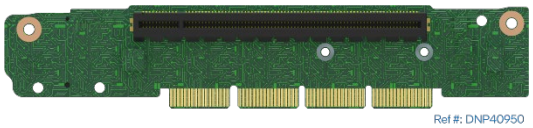
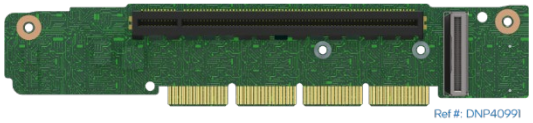
Description / Image	Order Information	Product Information
1U Full-Width Module Blank 	**iPC** AXXFC1UFWBLANK **MM#** 99AT17 **UPC** 735858532617 **EAN** 5032037264198 **MOQ** 1	**Product Type:** Accessory **Where Used:** • Intel® Server Chassis FC2000 v2 full-width configuration liquid-cooled **Product Overview:** This part is used to fill module slots not occupied by modules in the liquid-cooled Intel® Server Chassis FC200 v2 family full-width. **Kit Includes:** (1) 1U full-width module blank
Intel® Trusted Platform Module (TPM) 2.0 Not supported in China 	**iPC** AXXTPMENC9 **MM#** 99C8ZW **UPC** 00735858527378 **EAN** 5032037259385 **MOQ** 1	**Product Type:** Accessory **Where Used:** • All Intel® D50DNP Module options **Product Overview:** A TPM is a hardware-based security device that addresses the growing concern on boot process integrity and offers better data protection. TPM protects the system start-up process by ensuring that it is tamper-free before releasing system control to the operating system. A TPM device provides secured storage to store data, such as security keys and passwords. In addition, a TPM device has encryption and hash functions. AXXTPMENC9 implements TPM as per TPM PC Client specifications revision 2.0 by the Trusted Computing Group (TCG) **Kit Includes:** (1) AXXTPMENC9 TPM module (1) Phillips head screw (1) Tamper resistant head screw (1) plastic anchor (standoff)

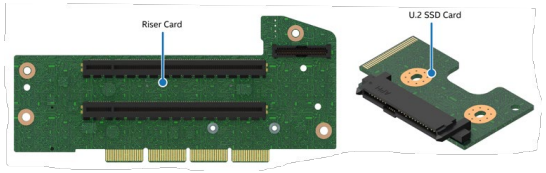
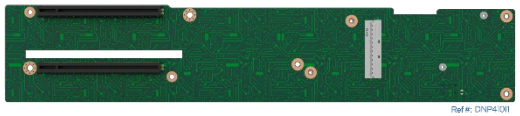
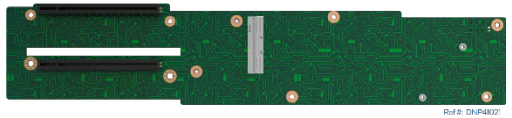
Description / Image	Order Information	Product Information
Intel® Trusted Platform Module (TPM) 2.0 China compatible 	**iPC** AXXTPMCHNE8 **MM#** 960608 **UPC** 00735858347341 **EAN** 5032037107068 **MOQ** 1	**Product Type:** Accessory **Where Used:** • All Intel® D50DNP Module options **Product Overview:** **Note:** AXXTPMCHNE8 compatible for use in China. A TPM is a hardware-based security device that addresses the growing concern on boot process integrity and offers better data protection. TPM protects the system start-up process by ensuring that it is tamper-free before releasing system control to the operating system. A TPM device provides secured storage to store data, such as security keys and passwords. In addition, a TPM device has encryption and hash functions. AXXTPMCHNE8 implements TPM as per TPM PC Client specifications revision 2.0 by the Trusted Computing Group (TCG) **Kit Includes:** (1) AXXTPMCHENC8 TPM module (1) Phillips head screw (1) Tamper resistant head screw (1) plastic anchor (standoff)
Advanced System Management Key **No Image**	**iPC** ADVSYSMGMTKEY **MM#** 99AJX5 **UPC** N/A **EAN** N/A **MOQ** 1	**Product Type:** Accessory **Where Used:** • All Intel® D50DNP Module options **Product Overview:** Software electronic key to be uploaded to the BMC. **Note:** Enables advance system management features of Integrated BMC Web Console. For more information, see the *Intel® Server D50DNP Family Technical Product Specification*. **Kit Includes:** (1) Advanced System Management software license key
Intel® Virtual RAID on CPU – Standard License Activation Key No Image	**iPC** VROCSTANKEY **MM#** 99CAGD **UPC** N/A **EAN** N/A **MOQ** 1	**Product type:** Accessory **Where used:** • All Intel® D50DNP Module options **Product overview:** Intel® VROC activation license key used to enable RAID levels 0 and 1 for Intel and non-Intel NVMe* SSDs. **Kit includes:** (1) Standard Intel® VROC activation license key

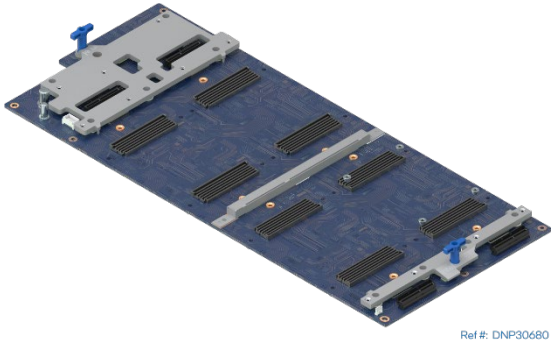
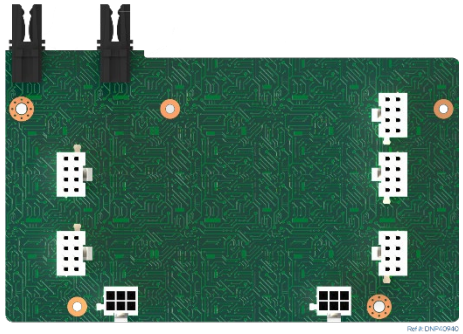
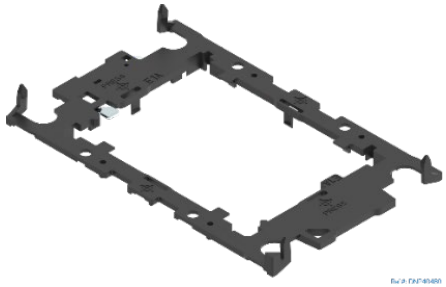
4. Spare and Replacement Parts (FRUs)

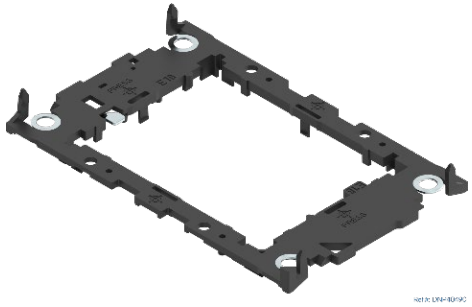
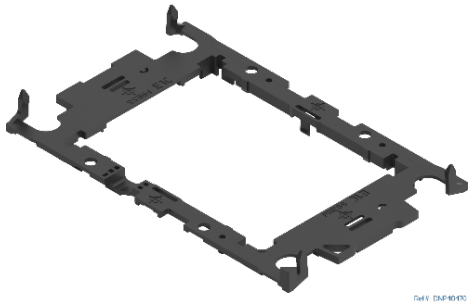
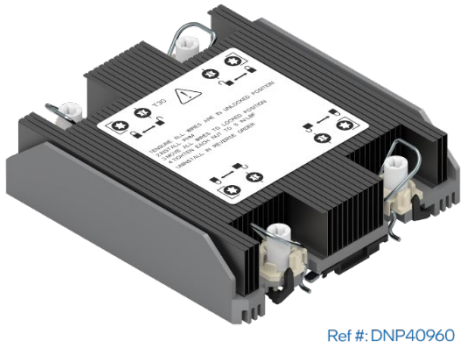
System integrators and distributors may choose to hold additional stock of individual system components. Intel makes available the following spare and replacement parts (FRUs) compatible with the specified Intel® Server family.

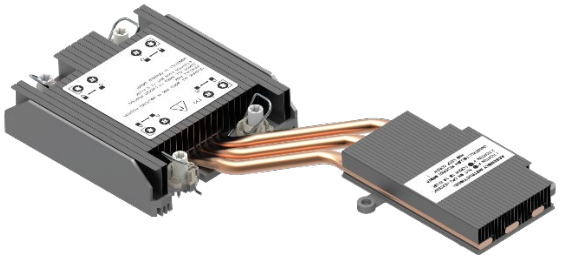
Table 20. Spare and Replacement Parts

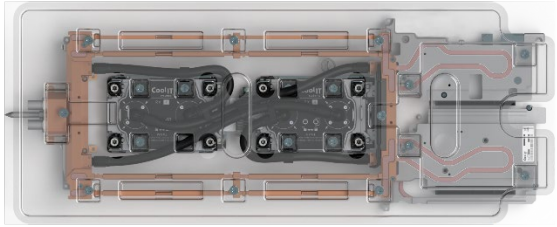
Description / Image	Order Information	Product Information
1U PCIe* x16 Standard Riser Card For Riser Slot #2  	**iPC** DNP1URISER **MM#** 99ARX4 **UPC** 735858532426 **EAN** 5032037264006 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Any 1U Module **Product Overview:** Supports one low-profile PCIe 5.0 (x16 electrical, x16 mechanical) add-in card and one SATA/PCIe 80/110 mm M.2 device Can only be used in Riser Slot #2 on the server board **Kit Includes:** (1) Riser card DNP1URISER (1) M.2 standoff and screw
1U PCIe x16 MCIO* Riser Card For Riser Slot #1  	**iPC** DNP1UMRISER **MM#** 99ARX5 **UPC** 735858532433 **EAN** 5032037264013 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Any 1U Module **Product Overview:** Supports one low-profile PCIe 5.0 (x16 electrical, x16 mechanical) add-in card and one SATA/PCIe 80/110 mm M.2 device Can only be used in Riser Slot #1 on the server board **Kit Includes:** (1) –Riser card DNP1UMRISER (1) M.2 standoff and screw

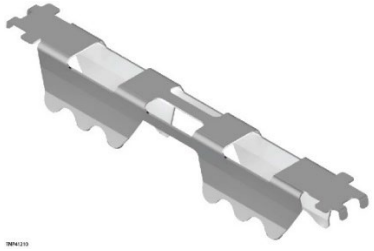
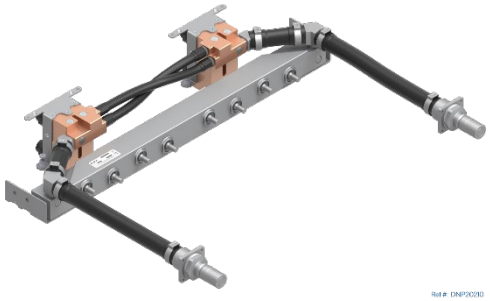
Description / Image	Order Information	Product Information
2U PCIe* x16 Riser Card For Both Riser Slots 	**iPC** DNP2UMRISER **MM#** 99ARX6 **UPC** 735858532440 **EAN** 5032037264020 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Management module 2U half-width air-cooled • PCIe accelerator module 2u full-width air-cooled **Product Overview:** Supports up to two low-profile PCIe 5.0 (x16 electrical, x16 mechanical) add-in cards, one 2.5" U.2 PCIe NVMe* SSD, and one SATA/PCIe 80/110 mm M.2 device. Can be used in both Riser Slots #1 or #2 on the server board **Kit Includes:** (1) 2U riser card (1) U.2 PCIe NVMe SSD adapter card (1) M.2 standoff and screw
PCIe Accelerator Module Riser Card 1 	**iPC** DNPACCLRISER1 **MM#** 99ARX7 **UPC** 735858532464 **EAN** 5032037264044 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • PCIe accelerator module 2U full-width air-cooled **Product Overview:** Supports up to 2 full height, full length, double width PCIe 5.0 (x16 electrical, x16 mechanical) add-in cards for acceleration solutions. **Kit Includes:** (1) Accelerator module riser card 1
PCIe Accelerator Module Riser Card 2 	**iPC** DNPACCLRISER2 **MM#** 99ARX8 **UPC** 735858532471 **EAN** 5032037264051 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • PCIe accelerator module 2U full-width air-cooled **Product Overview:** Supports up to 2 full height, full length, double width PCIe 5.0 (x16 electrical, x16 mechanical) add-in cards for acceleration solutions. **Kit Includes:** (1) Accelerator module riser card 2

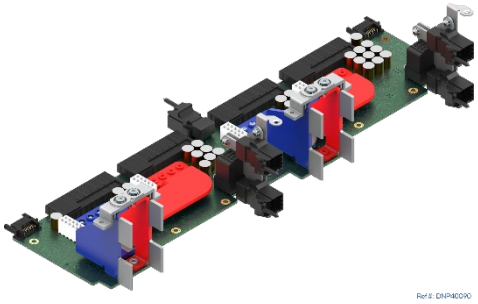
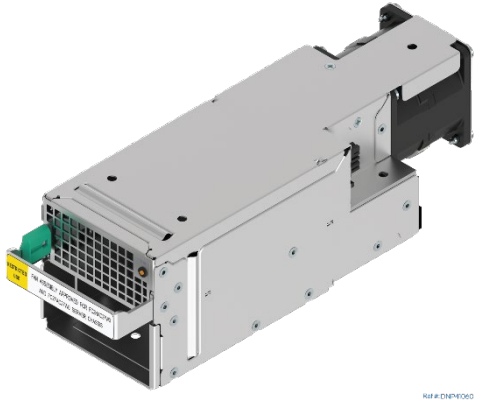
Description / Image	Order Information	Product Information
Intel® Data Center GPU Max Series Accelerator Module Carrier Base Board  	**iPC** A4C00A00B02 **MM#** 99C7PN **UPC** 00735858531160 **EAN** 5032037262743 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Data Center GPU Max Series Accelerator module 1U full-width liquid-cooled **Product Overview:** Spare Intel® Data Center GPU Max Series Accelerator Carrier Base Board. **Kit Includes:** (1) Carrier Base Board.
PCIe* Accelerator Module Connector Board 	**iPC** DNPACCLCNBRD **MM#** 99ARX9 **UPC** 735858532488 **EAN** 5032037264068 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • PCIe accelerator module 2U full-width air-cooled **Product Overview:** Power connector board for air-cooled 2U Accelerator Compute Module. **Kit Includes:** (1) PCIe accelerator module connector board
D50DNP CPU Carrier Clip E1A 	**iPC** AXXSPRXCCCC **MM#** 99ARX0 **UPC** 735858518642 **EAN** 5032037251518 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Any Compute module **Product Overview:** The processor carrier clip is used to attach the processor to the heat sink before the PHM is installed onto the processor socket. The type of the processor carrier clips (E1A or E1B) is defined by the processor model. **Kit Includes:** (1) CPU Carrier Clip E1A for 4th & 5th Gen Intel® Xeon® Scalable Processor XCC models

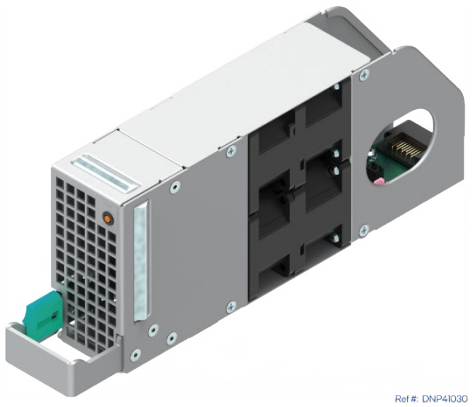
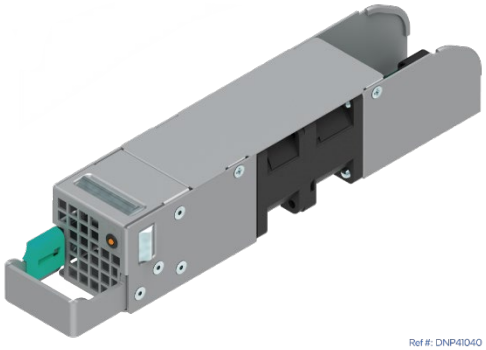
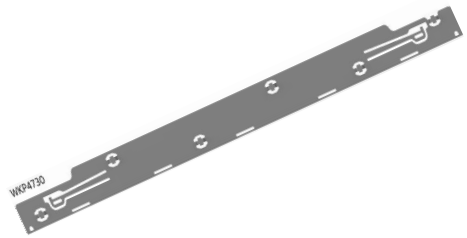
Description / Image	Order Information	Product Information
D50DNP CPU Carrier Clip E1B 	**iPC** AXXSPRMCCCC **MM#** 99ARX2 **UPC** 735858518659 **EAN** 5032037251525 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Any Compute module **Product Overview:** The processor carrier clip is used to attach the processor to the heat sink before the PHM is installed onto the processor socket. The type of the processor carrier clips (E1A or E1B) is defined by the processor model. **Kit Includes:** (1) CPU Carrier Clip E1B for 4th & 5th Gen Intel® Xeon® Scalable Processor MCC models
D50DNP CPU Carrier Clip E1C 	**iPC** AXXSPRHBMCC **MM#** 99ARX1 **UPC** 735858518666 **EAN** 5032037251532 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Any Compute module **Product Overview:** The processor carrier clip is used to attach the processor to the heat sink before the PHM is installed onto the processor socket. **Kit Includes:** (1) CPU Carrier Clip E1C for Intel® Xeon® CPU Max Series Processors
1U Air-Cooled Heat Sink Front 	**iPC** DNP1UHSF **MM#** 99ARXA **UPC** 735858532495 **EAN** 5032037264075 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Compute module 1U half-width air-cooled **Product Overview:** Standard heat sink for 1U air-cooled Intel® D50DNP Modules, front position. **Kit Includes:** (1) Heat sink with thermal pad applied to the bottom side

Description / Image	Order Information	Product Information
1U Air-Cooled Heat Sink Rear  Ref #: DNP40970	**iPC** DNP1UHSB **MM#** 99ARJC **UPC** 735858532501 **EAN** 5032037264082 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Compute module 1U half-width air-cooled • Compute module 1U half-width EVAC air-cooled **Product Overview:** Standard heat sink for 1U air-cooled Intel® D50DNP Modules, rear position. **Kit Includes:** (1) Heat sink with thermal pad applied to the bottom side
1U EVAC Heat Sink  Ref #: DNP40770	**iPC** DNPEVACHS **MM#** 99ARXH **UPC** 735858532532 **EAN** 5032037264112 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Compute module 1U half-width EVAC air-cooled **Product Overview:** EVAC heat sink available only for front position in 1U air-cooled modules **Kit Includes:** (1) EVAC heat sink with thermal pad applied to the bottom side
2U Air-Cooled Heat Sink Front  Ref #: DNP40980	**iPC** TNP2UHSF **MM#** 99ARXD **UPC** 735858532518 **EAN** 5032037264099 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Management module 2U half-width air-cooled • PCIe* accelerator module 2U full-width air-cooled **Product Overview:** Standard heat sink for 2U air-cooled Intel® D50DNP Modules, front position. **Kit Includes:** (1) Heat sink with thermal pad applied to the bottom side

Description / Image	Order Information	Product Information
2U Air-Cooled Heat Sink Rear  Ref #: DNP41000	**iPC** TNP2UHSB **MM#** 99ARXF **UPC** 735858532525 **EAN** 5032037264105 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Management module 2U half-width air-cooled • PCIe* accelerator module 2U full-width air-cooled **Product Overview:** Standard heat sink for 2U air-cooled Intel® D50DNP Modules, rear position. **Kit Includes:** (1) Heat sink with thermal pad applied to the bottom side
Compute Module Liquid-Cooling Loop 	**iPC** DNPLCLPCM **MM#** 99ARXJ **UPC** 735858526302 **EAN** 5032037258371 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Compute module 1U half-width liquid-cooled • Intel® Data Center GPU Max Series Accelerator module 1U full-width liquid-cooled **Product Overview:** Liquid-cooling loop spare kit for 1U liquid-cooled modules. Additional components (TNPLCVRTLS, TNPLCVRTNZ, TNPLCVRCMPD) are required for applying thermal interface material on CPU voltage regulators **Kit Includes:** (1) Passive Cold Plate Loop Assembly (1) Plastic carrying case (1) Memory cooling kit (1) Screw Kit
Intel® Data Center GPU Max Series Accelerator Module Liquid-Cooling Loop  Ref #: DNP30690	**iPC** DNPLCLPAM **MM#** 99ARXK **UPC** 735858526319 **EAN** 5032037258388 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Data Center GPU Max Series Accelerator module 1U full-width liquid-cooled **Product Overview:** Liquid-cooling loop spare kit for 1U Intel® Data Center GPU Max Series Accelerator liquid-cooled modules **Kit Includes:** (1) Passive Cold Plate Loop Assembly

Description / Image	Order Information	Product Information
Liquid-Cooling Loop DIMM Clip Kit Spare Kit for Liquid-Cooling Loop 	**iPC** DNPLCDIMMCLIPM **MM#** 99ARXR **UPC** 00735858526333 **EAN** 5032037258401 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Compute module 1U half-width liquid-cooled • Intel® Data Center GPU Max Series Accelerator module 1U full-width liquid-cooled **Product Overview:** DIMM retention clip and mylar pads spare kit. To be installed in memory cooling assemblies in the liquid-cooling loop. **Kit Includes:** (4) Pieces of DIMM Clip and Mylar pads.
DIMM PMIC Thermal Interface Material (TIM) Kit Spare Kit for Liquid-Cooling Loop	**iPC** DNPLCDMTM **MM#** 99ARXR **UPC** 735858526326 **EAN** 5032037258395 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Compute module 1U half-width liquid-cooled • Intel® Data Center GPU Max Series Accelerator module 1U full-width liquid-cooled **Product Overview:** DIMM PMIC thermal interface material spare kit. To be attached to a DIMM PMIC component in the liquid-cooling loop. **Kit Includes:** (4) Pieces of DIMM PMIC thermal interface material pads (iPN N15655-001).
Liquid-Cooled Chassis Manifold 	**iPC** FCXXLCMDMFD **MM#** 99ARJR **UPC** 735858526296 **EAN** 5032037258364 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Server Chassis FC2000 v2 half-width configuration liquid-cooled • Intel® Server Chassis FC2000 v2 full-width configuration liquid-cooled **Product Overview:** Liquid-cooled chassis manifold for chassis plumbing connections spare kit. **Kit Includes:** (1) Liquid-cooled chassis manifold assembly (1) installation instruction

Description / Image	Order Information	Product Information
Power Distribution Board Assembly 	**iPC** FCXXPDBASSMBL2 **MM#** 99ARZ7 **UPC** 735858532570 **EAN** 5032037264150 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** All chassis models **Product Overview:** Power distribution board assembly spare kit. **Kit Includes:** (1) Power distribution board
Spare Fan Assembly with Integrated Dual Rotor 60 mm Fan For Air-Cooled Chassis 	**iPC** FCXX60MMACFAN **MM#** 99AT13 **UPC** 735858532600 **EAN** 5032037264181 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Server Chassis FC2000 v2 Half-Width Configuration Air-Cooled • Intel® Server Chassis FC2000 v2 Full-Width Configuration Air-Cooled **Product Overview:** Fan assembly with integrated dual rotor 60 mm fan for air-cooled chassis. **Kit Includes:** (1) Fan assembly with integrated dual rotor 60 mm fan

Description / Image	Order Information	Product Information
Spare Fan Assembly with Integrated Dual Rotor 40 mm Fan For Air-Cooled Chassis  	**iPC** FCXX40MMACFAN **MM#** 99ARZ8 **UPC** 735858532587 **EAN** 5032037264167 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Server Chassis FC2000 v2 Half-Width Configuration Air-Cooled • Intel® Server Chassis FC2000 v2 Full-Width Configuration Air-Cooled **Product Overview:** Fan assembly with two integrated dual rotor 40 mm fans for air-cooled chassis. **Kit Includes:** (1) Fan assembly with integrated dual rotor 40 mm fan
Spare Fan Assembly with Integrated Dual Rotor 40 mm Fan For Liquid-Cooled Chassis  	**iPC** FCXX40MMLCFAN **MM#** 99ARZ9 **UPC** 735858532594 **EAN** 5032037264174 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Server Chassis FC2000 v2 half-width configuration liquid-cooled • Intel® Server Chassis FC2000 v2 full-width configuration liquid-cooled **Product Overview:** Fan assembly with integrated dual rotor 40 mm fan for liquid-cooled chassis. **Kit Includes:** (1) Fan assembly with integrated dual rotor 40 mm fan
Internal Rail Kit  	**iPC** FCXX1USPPRT **MM#** 999D4H **UPC** 735858426053 **EAN** 5032037168250 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** • Intel® Server Chassis FC2000 v2 Half-Width Configuration Air-Cooled • Intel® Server Chassis FC2000 v2 Full-Width Configuration Liquid-Cooled **Product Overview:** Internal rail spare kit for 1U compute modules. One kit is used for 2U system supporting four 1U half-width modules, combination of two 1U modules and one 2U module or two 1U full-width modules. **Kit Includes:** (4) Rails.

Description / Image	Order Information	Product Information
Fixed Rail 	**iPC** FCXXRAILKIT **MM#** 999D4J **UPC** 735858425971 **EAN** 5032037168175 **MOQ** 1	**Product Type:** Spare FRU **Where Used:** All chassis models **Product Overview:** Maximum supported weight: 330 lbs. (150kg) Tool-less chassis installation **Kit Includes:** (1) fixed rail kit

Appendix A. Glossary

Term	Definition
Intel® AVX-512	Intel® Advanced Vector Extensions 512
BOM	Bill of Materials
CRPS	Common Redundant Power Supply
DDR5	Double-Data Rate 5
DIMM	Dual Inline Memory Module
DPC	DIMMs per Channel
DR	Double Rank
EAN	International Article Number (Barcode)
ECC	Error Correcting Code
EMP	Ethernet Management Port
FRU	Field Replaceable Unit
iPC	Intel Product Code – used to identify an orderable Intel product
iPN	Intel part number – an internal part number issued to a component within a product bill of material (BOM). Individual Intel part numbers are not orderable unless it is included within an orderable Intel product code (iPC)
KVM	Keyboard, Video, Mouse
MM#	Material Master number - used to identify an orderable Intel product
MOQ	Minimum Order Quantity
NMI	Non-Maskable Interrupt
NVMe*	NVM Express – based on Non-Volatile Memory Host Controller Interface Specification (NVMHCI)
OR	Octa Rank
PCIe*	PCI Express
PMem	Persistent Memory
QR	Quad Rank
RDIMM	Registered DIMM
SDRAM	Synchronous Dynamic Random Access Memory
SMP	Server Management Processor
SSD	Solid State Drive
SR	Single Rank
Intel® UPI	Intel® Ultra Path Interconnect
UPC	Universal Product Code (Barcode)
VROC	Intel® Virtual RAID on CPU