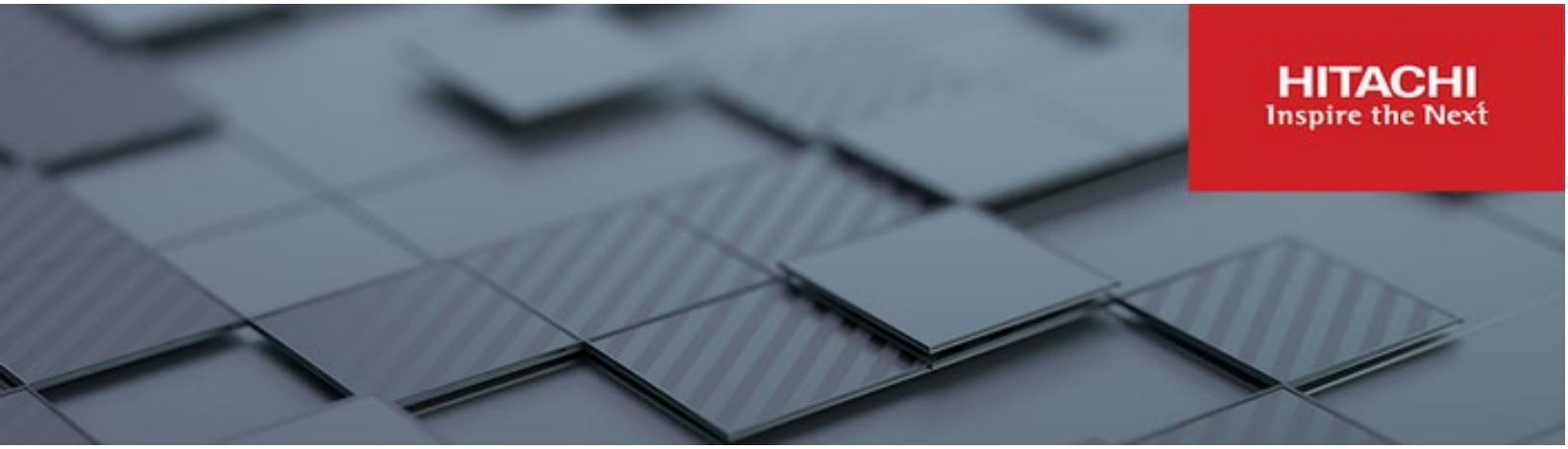

Hitachi Advanced Server HA810 G3

v9.1

TechSpecs

This document provides at a-glance information about the Hitachi Advanced Server HA810 G3. It includes platform information, standard and optional features, core options, and technical specifications.

MK-90HAS8038-00

October 2023

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Preface

About this document

This document describes the Hitachi Advanced Server HA810 G3. It includes platform information, standard and optional features, core options, and technical specifications.

Document conventions

This document uses the following typographic convention:

Convention	Description
Bold	• Indicates text in a window, including window titles, menus, menu options, buttons, fields, and labels. Example: **Click OK**. • Indicates emphasized words in list items.
Italic	Indicates a document title or emphasized words in text.
`Monospace`	Indicates text that is displayed on screen or entered by the user. Example: `pairdisplay -g oradb`

Intended audience

This document is intended for the person who installs, administers, and troubleshoots servers and storage systems. Hitachi Vantara assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Accessing product downloads

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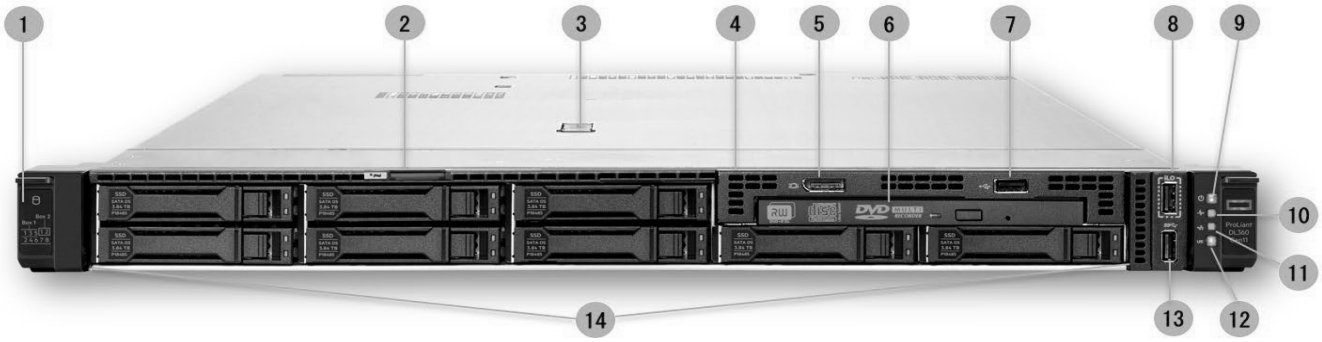
Chapter 1: Overview

Hitachi Advanced Server HA810 G3

Do you need to efficiently expand or refresh your IT infrastructure to propel the business? Adaptable for diverse workloads and environments, the compact 1U Hitachi Advanced Server HA810 G3 delivers enhanced performance with the right balance of expandability and density. Designed for supreme versatility and resiliency while backed by a comprehensive warranty, the Hitachi Advanced Server HA810 G3 is ideal for IT infrastructure, either physical, virtual, or containerized.

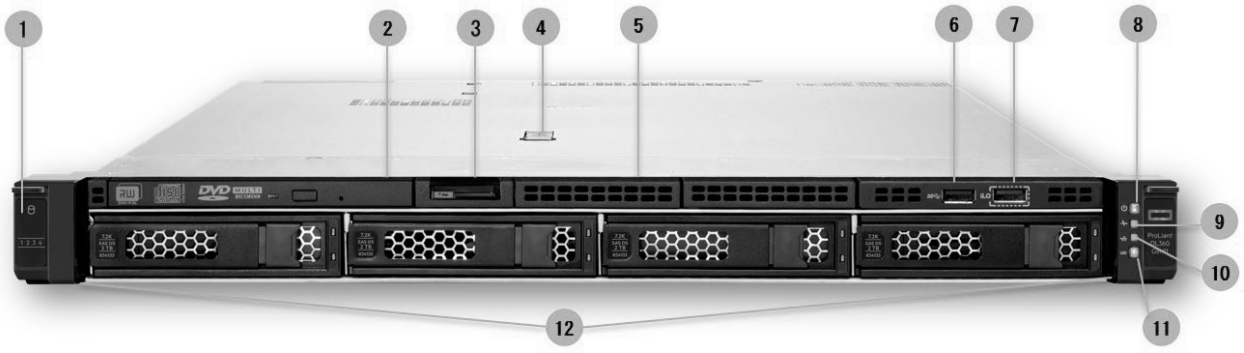
The Hitachi Advanced Server HA810 G3 supports the 4th Generation Intel® Xeon® Scalable Processors with up to 60 cores, plus 4800 MT/s DDR5 Smart Memory up to 4.0 TB per socket. Introducing PCIe Gen5 and Intel® Software Guard Extensions (SGX) support on the dual-socket segment, the Hitachi Advanced Server HA810 G3 complements Gen10 Plus reach by delivering premium compute, memory, networking communication, discrete graphic, I/O, and security capabilities for customers focused on performance at any cost. HA810 G3 server is an excellent choice of daily business and workloads in General Compute, Database Management, Virtual Desktop Infrastructure, Content Delivery Network, Edge Acceleration and Intelligent Video Analytics.



8 SFF Front View – 8 SFF + optional Universal Media Bay, optical drive, Display Port, USB2.0 and SAS drives shown

1. Drive support label
2. Serial number/iLO information pull tab
3. Quick removal access panel
4. Universal Media Bay (optional):
   - Option: Optical drive bay + Display port & USB 2.0 port kit (shown)
   - Option : 2SFF 24G x4 NVMe/SAS (TriMode) U.3 BC Cage
5. Display Port (optional – shown)
6. Optical drive (optional – shown)
7. USB2.0 port (optional)
8. iLO Service port
9. Power On/Standby button and system power LED
10. Health LED
11. NIC status LED
12. Unit ID button/LED
13. USB 3.2 Gen1 port
14. Drive bays, optional backplanes:
    - Option: 8 SFF 24G x1 NVMe/SAS (TriMode) U.3 BC
    - Option: 8 SFF 24G x4 NVMe/SAS (TriMode) U.3 BC

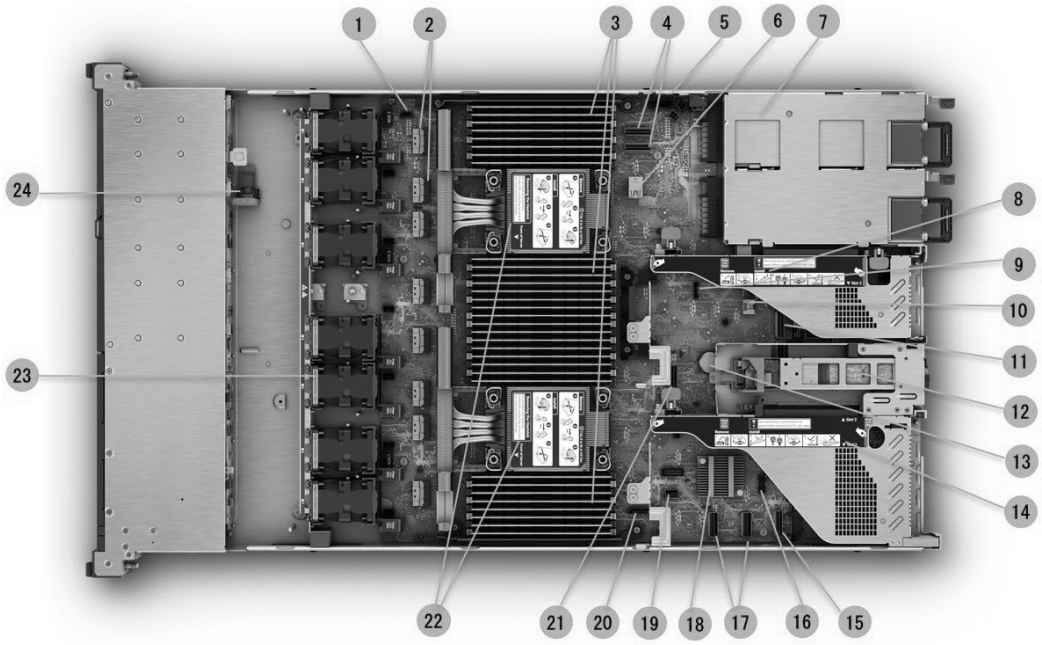
Note: Optional- Systems Insight Display (SID) module is available for 8SFF CTO Server, and will be installed at the left-hand side of iLO Service port and USB 3.2 Gen1 port.



4 LFF Front View – 4 LFF + optional Optical drive, Display Port, USB2.0 and SAS drives shown

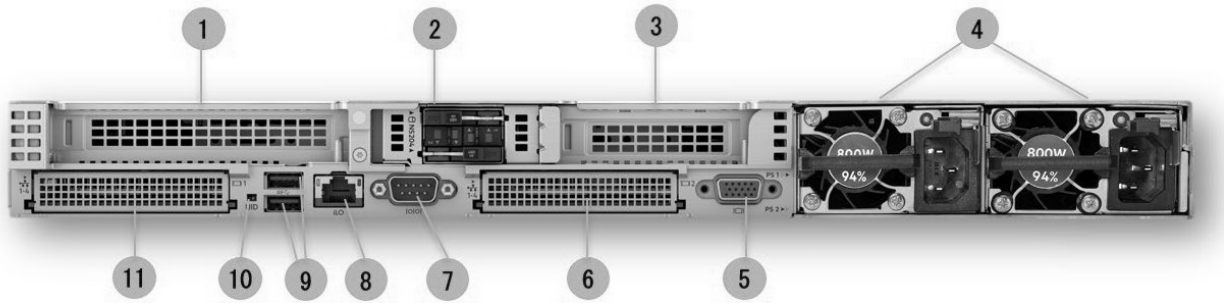
1. Drive support label
2. Optical drive (optional – shown)
3. Serial number/iLO information pull tab
4. Quick removal access panel
5. Option: Display port & USB 2.0 port bundle Kit (blank shown)
6. USB 3.2 Gen1 port
7. iLO Service Port
8. Power On/Standby button and system power LED
9. Health LED
10. NIC status LED
11. Unit ID button/LED
12. SAS/SATA drive bays (12G x1 SAS LP BP embedded)

Note: Systems Insight Display (SID) module is not available in 4LFF CTO Server.



Internal View - Standard for all HA810 G3

1. Liquid Cooling Module connector
2. x8 SlimSAS ports (1A to 4A, 1B to 4B)
3. DDR5 DIMM Slots (fully populated 32 DIMMs shown)
4. Socket 2 MCIO ports (1 & 2)
5. Backplane Power connector
6. Internal USB port (top USB 3.2 Gen1 and bottom USB 2.0)
7. Redundant Power Supply (1 & 2 as shown)
8. Secondary (CPU 2) Riser PCIe 5.0
    - Option: Low Profile x16
    - Option: Full height x16 (lose Slot 2 on Primary Riser)
9. SID connector (optional feature, 8SFF only)
10. Energy Pack connector
11. OCP Slot port
12. NS204i-u NVMe Hot Plug Boot Optimized Storage Device (optional – shown)
13. System Battery
14. Primary (CPU1) Riser PCIe 5.0
    - 1x 16 FH and 1x16 LP slots
15. OCP Slot port
16. Front Display Port and USB 2.0 connector (optional feature)
17. LP SlimSAS ports (1 & 2)
18. Chipset
19. Front I/O and USB 3.2 Gen1 connector
20. SATA Optical port
21. Socket 1 MCIO connector
22. CPU 1 (bottom) and CPU 2 (top) (shown with High Performance Heatsink)
    - Hot plug (dual rotor) High Performance Fan Kit (7 fans)
    - Option: Closed-loop Liquid Cooling Heat Sink Fan FIO Bundle Kit
23. Hybrid Capacitor or Storage Battery holder



Rear View - Standard for all HA810 G3

1. Slot 1 x16 PCIe 5.0 – Full Height
2. Slot 2 x16 PCIe 5.0 – Low Profile*
   Note: *Shown with optional hot-plug NS204i-u Boot Device (cabled, PCIe connection is not required)
3. Option: Slot 3 x16 PCIe 5.0 (Requires 2nd processor)
   - Low Profile and Full Height options
4. Redundant Power Supply (1 & 2 as shown)
5. Video (VGA) port
6. OCP 3.0 Slot 2: x16* PCIe 5.0[1,2] (Requires 2nd Processor)
7. Serial port (optional - shown)
8. iLO Management Port
9. USB 3.2 Gen1 Ports
10. Uint ID Indicator LED
11. OCP 3.0 Slot 1: x16***** PCIe 5.0[2]

Note:

[1]Supports various NICs, up to 200GbE

[2]Or supports each slot with x8 PCIe 5.0 under on processor, with the selection of "P51911-B21, CPU1 to the "OCP2 x8 Enablement Kit".

What’s new

- All new HA810 G3 server
- New 4th Generation Intel® Xeon® Scalable Processors (Extreme Core Count die/ XCC die; Medium Core Count/ MCC)
- New PCIe 5.0 support
- New DDR5 SmartMemory – Registered (RDIMM), 4800MT/s
- New G3 Storage Controllers
- New NS204i-u G3 NVMe Hot Plug Boot Optimized Storage Device
- New Storage SSD and HDD support
- New iLO6 support
- Nvidia A2 and L4 GPU support
- New 4th Generation Intel® Xeon® Scalable Processors (Medium Core Count die/ MCC die)
- New HA810 G3 Standard Heatsink & Standard Fan Kit
- New Self-encrypting Drives
- 500W Flex Slot Platinum Hot Plug Low Halogen Power Supply Kit
- 800W Flex Slot Titanium Hot Plug Low Halogen Power Supply Kit
- 1600W Flex Slot -48VDC Hot Plug Power Supply Kit
- Hitachi Advanced Server for vSAN
- Azure Stack HCI
- OpenBMC Capable through iLO6 Transfer of Ownership Process
- 96GB 2Rx4 PC5-4800B-R Smart Kit
- 1800W-2200W Flex Slot Titanium Hot Plug Power Supply Kit

Platform information

Form factor

- 1U rack

Chassis types

- 8 SFF Basic Carrier (BC) drive bays:
  - 24G x1 NVMe/SAS (TriMode) U.3 (PCIe4.0) or
  - 24G x4 NVMe/SAS (TriMode) U.3 (PCIe4.0)
- With options for additional 2 SFF BC drive bays: 24G x4 NVMe/SAS (TriMode) U.3 (PCIe4.0)
- With options for additional optical drive, 1x USB3.2 Gen1 and 1x Display Port
- 4 LFF Low Profile (LP) drive bays: 12G x1 SAS/SATA
- With additional options for optical drive, 1x USB3.2 Gen1, and 1x Display Port

System fans

- For 4 LFF and 8+2 SFF chassis
  - Choice of 1P (one processor) Standard Fan Kit, 2P (two processors) Standard Fan Kit, Performance Fan Kits and Closed-loop Liquid Cooling Heatsink Fan FIO Bundle Kit

Note:

- Standard Fan Kit: Dual rotor hot plug Standard Fan kit (includes 5 fans) for processors below 185W TDP.
- Optional 2P standard Fan Kit: Dual rotor hot plug 2P Standard Fan Kit (includes 2 fans) for second processor.
- Performance Fan Kit: Dual rotor hot plug High Performance Fan Kit available (includes 7 fans), for one or two processors from 186W to 270W TDP. Or one processor with 300W TDP.
- The HA810 G3 will support up to 7 fans with fan redundancy built in. One fan rotor failure will place server in degraded mode but fully functional. Two fan rotor failures could provide warning and imminent server shutdown.
- Closed-loop Liquid Cooling Heat Sink Fan FIO Bundle Kit supports one or two processors go beyond 271W TDP, as factory installation kit only. Customer self-repair or self-field upgrade is not allowed.
- Direct Liquid Cooling Heatsink Fan FIO Bundle Kit supports two processors go beyond 271W TDP, with enhanced thermal condition.

Processors

Up to 2 of the following, depending on model.

- The 2nd digit of the processor model number “x4xx” is used to denote the processor generation (i.e., 4 = New 4th Generation Intel® Xeon® Scalable Processors).

Note:

- All information provided here is subject to change without notice. Intel may make changes to specifications and product descriptions at any time, without notice. Please contact your Intel representative to obtain the latest Intel product specifications and roadmaps.
- For more information regarding Intel® Xeon® Scalable Processors, please see the following http://www.intel.com/xeon.

New 4th Generation Intel® Xeon® Scalable Processors numbering convention.

Workload

New 4th Generation Intel® Xeon® Scalable Processors		
Processor Suffix	**Description**	**Offering**
H	DB and Analytics	Highest core counts. Database and Analytics usages benefit from DSA and IAA accelerators.
M	Media Transcode	Optimized around AVX frequencies to deliver better performance/watt around Media, AI, and HPC workloads.
N	Network/5G/Edge (High TPT/Low latency)	Designed for NFV and networking workloads, such as: L3 forwarding, 5G UPF, OVS DPDK, VPP FIB router, VPP IPsec, web server/NGINX, vEPC, vBNG, and vCMTS.
S	Storage and HCI	Optimized for Storage UMA use cases with increased UPI Bandwidth for vs Mainline SKUs.
P	Cloud - IaaS	Designed for cloud IaaS environments to deliver higher frequencies at constrained TDPs.
Q	Liquid Cooling	Liquid cooled processors with higher frequency and performance at same TDP.
U	One Socket Optimized	Optimized for targeted platforms adequately served by the cores, memory bandwidth and IO capacity. Available from a single processor configuration.
V	Cloud- SaaS	Optimized for orchestration efficiency that delivers higher core counts and VMs per rack.
Y	Speed Select1	Intel® SST-Performance Profile (PP) increases base frequency when fewer cores are enabled. Allows greater flexibility, deployment options, and platform longevity.

Note:

- Covers the Intel public offering only.
- New Built-in Accelerators.
    - 1 to 8 socket support
    - Intel® Data Streaming Accelerator (DSA)
    - Intel® Dynamic Load Balancer (DLB)
    - Intel® Quick Assist Technology (QAT)
    - Intel® In-Memory Analytics Accelerator (IAA)
- Increased memory bandwidth with 8 channels DDR5, up to 4800 MT/s, 4.0TB maximum RAM per socket.
- Increased I/O bandwidth up to 80 PCIe 5.0 lanes per socket, and new Compute Express Link (CXL).
- Built-in AI Acceleration: Intel® Advanced Matrix Extension (AMX).
- Hardware-enhanced Security: Enhanced Intel® Software Guard Extensions (SGX) – with new cryptographic memory integrity.
- Increased Multi-Socket Bandwidth with new UPI2.0 (up to 16GT/s) with maximum 4 UPI Links.
- New FlexBus I/O Interface PCIe5.0 + CXL.
- 1 The 4th Generation Intel® Xeon® Scalable Processors are featured with Intel Speed Select Technology (SST) for Infrastructure as Service, Networking and Virtualized environments workloads. The SST includes,
    - SST- Performance Profile
    - SST- Base Frequency
    - SST- Core Power
    - SST- Turo Frequency
- Default setting in ROM-Based Setup Utility (RBSU) as shown.

Intel® SST Features	RBSU Options	Granular Control over CPU Performance	Default Setting
SST- Performance Profile	Dynamic Intel® Speed Select Technology – Performance Profile	Allows the CPU to run in one of three performance profiles.	CPU hardware-based. Enabled by default
SST-Base Frequency	Intel® Speed Select Technology – Base Frequency	Enables some CPU cores to run at a higher base frequency in return for other cores running at a lower base frequency.	Disabled by default
SST-Core Power	Intel® Speed Select Technology – Core Power	Allows software to prioritize with cores will receive excess power after satisfying minimum requirements.	Disabled by default
Intel SST Turbo Frequency	Intel® Turbo Boost Technology	Allows software-selected cores to achieve a higher max turbo frequency by reducing other cores' max turbo frequency.	Enabled by default

4th Generation Intel® Xeon® Scalable Processor Family (Platinum)								
Intel® Xeon® Models	**Frequency**	**Cores**	**L3 Cache**	**Power**	**UPI**	**DDR5**	**SGX Enclave size**	**Die**
Platinum 8490H Processor	1.9 GHz	60	112.5 MB	350W	4	4800 MT/s	512 GB	XCC
Platinum 8480+ Processor	2.0 GHz	56	105 MB	350W	4	4800 MT/s	512 GB	XCC
Platinum 8470 Processor	2.0 GHz	52	105 MB	350W	4	4800 MT/s	512 GB	XCC
Platinum 8470Q Processor	2.1 GHz	52	105 MB	350W	4	4800 MT/s	512 GB	XCC
Platinum 8470N Processor	1.7 GHz	52	105 MB	300W	3	4800 MT/s	128 GB	XCC
Platinum 8468 Processor	2.1 GHz	48	105 MB	350W	4	4800 MT/s	512 GB	XCC
Platinum 8468V Processor	2.4 GHz	48	97.5 MB	330W	3	4800 MT/s	128 GB	XCC
Platinum 8462Y+ Processor	2.8 GHz	32	60.0 MB	300W	3	4800 MT/s	128 GB	MCC
Platinum 8460Y[1]+[2] Processor	2.0 GHz	40	105 MB	300W	4	4800 MT/s	128 GB	XCC
Platinum 8458P Processor	2.7 GHz	44	82.5 MB	350W	3	4800 MT/s	512 GB	XCC
Platinum 8452Y[1] Processor	2.0 GHz	36	67.5 MB	300W	4	4800 MT/s	128GB	XCC
Platinum 8444H Processor	2.9 GHz	16	45.0 MB	270W	4	4800 MT/s	512 GB	XCC

Note:

- One or two processor(s) with TDP equal to or greater than 186W through 270W require High Performance Heatsink Kit (P48905-B21) and High-Performance Fan Kit (P48908-B21).
- Two processors with TDP equal or greater than 271W require Closed-loop Liquid Cooling Heat Sink Fan FIO Bundle Kit (P48906-B21).
- In 300Watt processor one socket configuration, the air cooling with Performance Heatsinks & Performance Fan Kits can be supported. Field upgrade to two socket is not supported with air cooling solution.
- [1]Supports Intel® Speed Select Performance Profile (SST-PP), even though not being a “Y” processor.
- [2] +: Feature Plus: Support AMX, DLB, DSA, IAA and QAT additionally.
- Intel® Speed Select enabled processors: Platinum 8468V, 8460Y+, 8458P and 8452Y.

4th Generation Intel® Xeon® Scalable Processor Family (Gold 6)								
Intel® Xeon® Models	**Frequency**	**Cores**	**L3 Cache**	**Power**	**UPI**	**DDR5**	**SGX Enclave size**	**Die**
Gold 6458Q Processor	3.1 GHz	32	60.0 MB	350W	3	4800 MT/s	128 GB	MCC
Gold 6454S Processor	2.2 GHz	32	60.0 MB	270W	4	4800 MT/s	128 GB	XCC
Gold 6448Y Processor	2.1 GHz	32	60.0 MB	225W	3	4800 MT/s	128 GB	MCC
Gold 6448H Processor	2.4 GHz	32	60.0 MB	250W	3	4800 MT/s	512 GB	MCC
Gold 6444Y Processor	3.6 GHz	16	45.0 MB	270W	3	4800 MT/s	128 GB	MCC
Gold 6442Y Processor	2.6 GHz	24	60.0 MB	225W	3	4800 MT/s	128 GB	MCC
Gold 6438Y+ Processor	2.0 GHz	32	60.0 MB	205W	3	4800 MT/s	128 GB	MCC
Gold 6438N Processor	2.0 GHz	32	60.0 MB	205W	3	4800 MT/s	128 GB	MCC
Gold 6434 Processor	3.7 GHz	8	22.5 MB	195W	3	4800 MT/s	128 GB	MCC
Gold 6430 Processor	2.1 GHz	32	60.0 MB	270W	3	4400 MT/s	128 GB	XCC
Gold 6426Y Processor	2.5 GHz	16	37.5 MB	185W	3	4800 MT/s	128 GB	MCC
Gold 6421N Processor[1]	1.8 GHz	32	60.0 MB	185W	N/A	4400 MT/s	128 GB	MCC

4th Generation Intel® Xeon® Scalable Processor Family (Gold 6)								
Gold 6418H Processor	2.1 GHz	24	60.0 MB	185W	3	4800 MT/s	512 GB	MCC
Gold 6416H Processor	2.2 GHz	18	45.0 MB	165W	3	4800 MT/s	512 GB	MCC
Gold 6414U Processor[1]	2.0 GHz	32	60.0 MB	250W	N/A	4800 MT/s	128 GB	XCC

Note:

- One or two processor(s).
- [1]Single socket capable, no dual socket support.
- One or two processor(s) with TDP equal to or greater than 186W through 270W or one processor with TDP equals 300W, require High Performance Heatsink Kit (P48905-B21.p) and High-Performance Fan Kit (P48908-B21.p) together.
- In 300W processor one socket configuration, the air cooling with Performance Heatsinks & Performance Fan Kits can be supported together. Field upgrade to two socket is not supported with air cooling solution.
- One or two processors with TDP equal or greater than 271W require Closed-loop Liquid Cooling Heat Sink Fan FIO Bundle Kit (P48906-B21.p).

4th Generation Intel® Xeon® Scalable Processor Family (Gold 5)								
Intel® Xeon® Models	**Frequency**	**Cores**	**L3 Cache**	**Power**	**UPI**	**DDR5**	**SGX Enclave size**	**Die**
Gold 5420+ Processor	2.0 GHz	28	52. 5MB	205W	3	4400 MT/s	128 GB	MCC
Gold 5418Y Processor	2.0 GHz	24	45.0 MB	185W	3	4400 MT/s	128 GB	MCC
Gold 5418N Processor	1.8 GHz	24	45.0 MB	165W	3	4000 MT/s	128 GB	MCC
Gold 5416S Processor	2.0 GHz	16	30.0 MB	150W	3	4400 MT/s	128 GB	MCC
Gold 5415+Processor	2.9 GHz	8	22.5 MB	150W	3	4400 MT/s	128 GB	MCC
Gold 5411N[1] Processor	1.9 GHz	24	45.0 MB	165W	N/A	4400 MT/s	128 GB	MCC

Note:

- One or two processor(s).
- [1]Single socket capable, no dual socket support.

4th Generation Intel® Xeon® Scalable Processor Family (Silver)								
Intel® Xeon® Models	**Frequency**	**Cores**	**L3 Cache**	**Power**	**UPI**	**DDR5**	**SGX Enclave size**	**Die**
Silver 4416+ Processor	2.0 GHz	20	37.5MB	165W	2	4000 MT/s	64 GB	MCC
Silver 4410Y Processor	2.0 GHz	12	30.0 MB	150W	2	4000 MT/s	64 GB	MCC

Note: One or two processor(s).

4th Generation Intel® Xeon® Scalable Processor Family (Bronze)								
Intel® Xeon® Models	**Frequency**	**Cores**	**L3 Cache**	**Power**	**UPI**	**DDR5**	**SGX Enclave size**	**Die**
Bronze 3408U Processor	1.8 GHz	8	22.5 MB	125W	N/A	4000 MT/s	64 GB	MCC

Note: [1]Single socket capable, no dual socket support.

Chipset

- Intel® C741 Chipset (Code Name: Product formerly Emmitsburg).

Note: For more information regarding Intel® chipsets, see the following URL:

https://www.intel.com/content/www/us/en/products/chipsets/server-chipsets.html.

System management chipset

iLO 6 ASIC

Note: Read and learn more in the **iLO QuickSpecs**.

Memory

Type	DDR5 Smart Memory	Registered (RDIMM)
DIMM Slots Available	32	16 DIMM slots per processor, 8 channels per processor, 2 DIMMs per channel.
Maximum capacity (RDIMM)	4.0TB	32 x 128GB RDIMM @ 4800 MT/s

Memory protection

Advanced ECC

Advanced ECC uses single device data correction to detect and correct single and all multibit error that occurs within a single DRAM chip.

Online spare

Memory online spare mode detects a rank that is degrading and switches operation to the spare rank.

PCIe expansion slots

Primary Riser (default in chassis)					
Expansion Slots #	**Technology**	**Bus Width**	**Connector Width**	**Processor**	**Slot Form Factor**
1	PCIe 5.0	x16	x16	CPU 1	Full-height, up to 9.5” length (or half- length card).
2	PCIe 5.0	x16	x16	CPU 1	Half-height (Low-profile), up to 9.5” length (or half-length card).

Note: The specifications above correspond with the default primary butterfly riser, which comes with CTO chassis.

Secondary Riser*					
Expansion Slots #	**Technology**	**Bus Width**	**Connector Width**	**Processor**	**Slot Form Factor (two options)**
3	PCIe 5.0	x16	x16	CPU 2	Full-height, up to 9.5” length (or half- length card). Slot 2 will be not available.
					Half-height (Low-profile), up to 9.5” length (or up to half-length card). Slot 2 is available.

Note:

- All PCIe Slots support Wake-on-Lane (WoL) feature.
- If Secondary riser is selected, then 2 Processor must be selected.
- If secondary riser is not selected and "NS204i-u Rear Cbl Kit" is not selected, then maximum 2 quantity of PCIe cards can be selected at Slot1 & Slot2. If secondary riser is not selected and "NS204i-u Rear Cbl Kit" is selected, then maximum 1 quantity of PCIe cards can be selected at Slot1.
- If secondary FH riser is installed, then primary PCIe Slot2 cannot be used, maximum 2 quantity of PCIe cards can be selected at Slot 1 & Slot3. If secondary FH riser is not selected, then maximum 1 quantity of FH PCIe cards can be selected at Slot1 & Slot3.
- If Secondary LP riser and "NS204i-u Rear Cbl Kit" are selected, then maximum 2 quantity of PCIe cards can be selected at Slot 1 & Slot3. If Secondary LP riser is selected and "NS204i-u Rear Cbl Kit" is not selected, then maximum 3 quantity of PCIe cards can be selected.

OCP expansion slots

OCP3.0 Slot Priority Support Matrix						
Rear wall		**Selected OCP cards (Qty & type)**				
		2	**1**	**1**	**1**	**2**
OCP Slots #	**Share NIC Feature**	**1xOROC[1] + 1x NIC[2]**	**1xNIC**	**2xNICs**	**1xOROC**	**2x OROCs**
1	N/A	OROC	(Secondary)	NIC	OROC (Primary)	OROC[4] (Primary)
2	Available (Incl. Wake-on-Lane)	NIC	NIC (Primary)	NIC (Primary)	No support[3]	OROC[4]

Note:

- [1] OCP form factor internal controller.
- [2] OCP Networking card.
- [3] If only 1 OROC card is selected, by default connected from 8SFF backplane to OCP Slot1. And there is no controller cable can connect from 8SFF Backplane to OCP Slot 2.
- [4]If 2 OROC cards are selected, by default the 8SFF controller cable is connected to OCP Slot1 (the comparably higher-end OROC card to be selected by default) and the 2SFF backplane is connected to OCP Slot2 with another OROC card selected (comparably less high-end one) with 2FF controller cable.
- In 4LFF & 8SFF CTO Server, each OCP slots are in design with up to x16 electrical PCIe5.0 lanes through OCP enablement kits.

Internal storage devices

Optical drive

Available on 8 SFF and 4 LFF CTO Servers as an option (DVD-ROM or DVD-RW).

Hard drives

None ship standard.

Storage controllers

NVMe boot devices

- NS204i-u NVMe Hot Plug Boot Optimized Storage Device (P48183-B21.p) [1]
- Hitachi Advanced Server HA810 G3 NS204i-u Rear Cable Kit (P54702-B21.p)
- Hitachi Advanced Server HA810 G3 NS204i-u Internal Cable Kit (P48920-B21.p)

HA810 G3 NS204i-u Enablement Kit Support Matrix				
Enablement Kit	**Description**	**Field Inst.**	**NS204i-u Location**	**Hot-plug Capability**
P54702-B21.p	Hitachi Advanced Server HA810 G3 NS204i-u Rear Cable Kit	Yes	PCIe Slot 2[2]	Yes
P48920-B21.p	Hitachi Advanced Server HA810 G3 NS204i-u Internal Cable Kit	Yes	Internal	No support

Notes:

- [1]x4 PCIe Gen3.0 OS Boot device includes 2x 480GB M.2 NVMe SSDs, with preconfigured hardware RAID1.
- [2]Removing the original PCIe Slot 2 cage and re-install the dedicated HA810 G3 NS204i-u cage, latch and cables in the P54702-B21. The NS204i-u will take up PCIe Slot 2 space only. The PCIe Slot 1 (FHHL) and PCIe Slot 3 (to be Low Profile) are available in the system with the selection of optional “Hitachi Advanced Server HA810 G3 x16 LP Riser Kit (P48903-B21)”.

Performance RAID controllers

- MR216i-p G3 x16 Lanes without Cache PCI SPDM Plug-in Storage Controller
- MR216i-o G3 x16 Lanes without Cache OCP SPDM Storage Controller
- MR408i-o G3 x8 Lanes 4GB Cache OCP SPDM Storage Controller
- MR416i-o G3 x16 Lanes 8GB Cache OCP SPDM Storage Controller
- MR416i-p G3 x16 Lanes 8GB Cache PCI SPDM Plug-in Storage Controller
- SR932i-p G3 x32 Lanes 8GB Wide Cache PCI SPDM Plug-in Storage Controller[1,2]

Note:

- PE80xx NVMe drives are not supported.
- [1]Requires x16 physical and electrical riser slot.
- [2]If second controller is required, must select secondary FH riser.

Maximum storage

Storage	Capacity	Configuration
Hot Plug SFF SAS HDD	24.0 TB	8+2 x 2.4 TB (with optional 2 SFF cage on UMB)
Hot Plug SFF SATA HDD	20.0 TB	8+2 x 2.0 TB (with optional 2 SFF cage on UMB)
Hot Plug SFF SAS SSD	15.3 TB	8+2 x 15.36 TB (with optional 2 SFF cage on UMB)
Hot Plug SFF SATA SSD	76.8 TB	8+2 x 7.68 TB (with optional 2 SFF cage on UMB)
Hot Plug SFF U.3 NVMe PCIe SSD	153.6 TB	8+2 x 15.36 TB (with optional 2 SFF cage on UMB)
Hot Plug LFF SAS HDD	80.0 TB	4 x 20 TB
Hot Plug LFF SATA HDD	80.0 TB	4 x 20 TB
Hot Plug LFF SAS SSD	30.72 TB	4 x 7.68 TB
Hot Plug LFF SATA SSD	3.84 TB	4 x 960 GB
M.2 NVMe SSD	960 GB	2 x 480 GB (shipped with optional NS204i-u G3 NVMe Hot Plug Boot Optimized Storage Device): Available with external or internal version

Graphics

Integrated video standard

- Video modes up to 1920 x 1200 @ 60 Hz (32 bpp)
- 16 MB Video Memory

iLO 6 on system management memory

- 32 MB Flash
- 8 Gbit DDR4 with ECC protection

Power supply

- 500W Flex Slot Platinum Hot Plug Low Halogen Power Supply Kit

  Note: Available in 94% efficiency.

- 800W Flex Slot Platinum Hot Plug Low Halogen Power Supply Kit

  Note: Available in 94% efficiency.

- 800W Flex Slot Titanium Hot Plug Low Halogen Power Supply Kit

  Note: Available in 96% efficiency.

- 1000W Flex Slot Titanium Hot Plug Low Halogen Power Supply Kit
  Note: Available in 96% efficiency.
- 1600W Flex Slot -48VDC Hot Plug Power Supply Kit
- 1600W Flex Slot Platinum Hot Plug Low Halogen Power Supply Kit
  Note:
  - Available in 94% efficiency.
  - 1600W Platinum Power supplies only support high line voltage (200 VAC to 240 VAC).
- 1800W-2200W Flex Slot Titanium Hot Plug Power Supply Kit
  Note:
  - Available in 96% efficiency.
  - 1800-2200W Titanium Power supply only supports high line voltage (200 VAC to 240 VAC).

Flexible Slot (Flex Slot) Power Supplies share a common electrical and physical design that allows for hot plug, tool-less installation into Hitachi Advanced Server G3 Performance Servers. Flex Slot power supplies are certified for high-efficiency operation and offer multiple power output options, allowing users to "right-size" a power supply for specific server configurations. This flexibility helps to reduce power waste, lower overall energy costs, and avoid "trapped" power capacity in the data center.

All pre-configured servers ship with a standard 6-foot IEC C-13/C-14 jumper cord (A0K02A). This jumper cord is also included with each standard AC power supply option kit.

Interfaces

Serial	1 port - Optional
Video	1 Front - Display port (optional) 1 Rear - VGA port (standard on all models) **Note:** Both ports are not active simultaneously.
Network Ports	None. Choice of OCP or stand up card, supporting a wide arrange of NIC adapters. BTO models will come pre-selected with a primary networking card.
iLO Remote Mgmt Port at rear	1 GbE Dedicated
Front iLO Service Port	1 standard
MicroSD Slot	Optional via 32GB microSD RAID1 USB Boot Device **Note:** • MicroSD cards are not hot-pluggable, server must be powered down before removal. • There is limited supply on MicroSD cards and may not be available in G3.
USB	5 standard on all models: 1 front, 2 rear, 2 internal +1 optional at the front • Front: 1 USB 3.2 Gen1 + iLO service port • Rear: 2 USB 3.2 Gen1 • Internal: 1 USB 3.2 Gen1 + 1 USB 2.0 • Optional: 1 Front USB 2.0
Systems Insight Display (SID)	Optional for 8SFF CTO Server model

Operating systems and virtualization software

- Microsoft Windows Server
- VMware ESXi
- Red Hat Enterprise Linux (RHEL)
- SUSE Linux Enterprise Server (SLES)
- Oracle Linux and Oracle VM

- **SAP Linux**

Note:

- For Windows Server and Microsoft Hyper-V Server, will be certified when shipment is available.
- RHEL and Citrix will be certified at a later timeframe.

Industry standard compliance

- ACPI 6.4 Compliant
- PCIe 5.0 Compliant
- WOL Support
- Microsoft® Logo certifications
- PXE Support
- VGA
- Display Port

  Note: This support is on the optional Universal Media Bay.

- USB 3.2 Gen1 Compliant
- USB 2.0 Compliant (only on optional Universal Media Bay and embedded internal USB)
- USB NIC Driver in UEFI for Factory
- UEFI (Unified Extensible Firmware Interface Forum) Class 3 Support
- UEFI (Unified Extensible Firmware Interface Forum) 2.7 support

  Note: UEFI is the default for the HA810 G3.

- OCP 3.0 SFF NIC Support
- OCP 3.0 SFF Storage Support
- Embedded TPM Support Energy Star
- SMBIOS 3.4
- Redfish API
- IPMI 2.0
- Secure Digital 4.0
- Advanced Encryption Standard (AES)
- Triple Data Encryption Standard (3DES)
- SNMP v3
- TLS 1.2
- DMTF Systems Management Architecture for Server Hardware Command Line (SMASH CLP)
- Active Directory v1.0
- ASHRAE A3/A4

Server UEFI

Unified Extensible Firmware Interface (UEFI) is an industry standard that provides better manageability and more secured configuration than the legacy ROM while interacting with your server at boot time. Hitachi Advanced G3 servers have a UEFI Class 2 implementation to support UEFI Mode.

UEFI enables numerous new capabilities specific to Hitachi Advanced Servers such as:

- Secure Boot and Secure Start enable for enhanced security
- Embedded UEFI Shell
- Operating system specific functionality
- Mass Configuration Deployment Tool using iLO RESTful API that is Redfish API Conformant
- Support for > 2.2 TB (using GPT) boot drives
- PXE boot support for IPv6 networks
- USB 3.2 Gen1 Stack
- Workload Profiles for simple performance optimization

UEFI Boot Mode only:

- TPM 2.0 Support
- iSCSI Software Initiator Support
- NVMe Boot Support
- HTTP/HTTPs Boot support as a PXE alternative
- Platform Trust Technology (PTT) can be enabled
- Boot support for option cards that only support a UEFI option ROM

Note: For UEFI Boot Mode, boot environment and OS image installations should be configured properly to support UEFI. Enabling TPM 2.0 no longer requires TPM module option kit for G3. It is an embedded feature yet disabled for shipments to China.

Embedded management

Integrated Lights-Out (iLO)

Monitor your servers for ongoing management, service alerting, reporting and remote management with iLO.

UEFI

Configure and boot your servers securely with industry standard Unified Extensible Firmware Interface (UEFI).

OpenBMC support

OpenBMC Capable through iLO6 Transfer of Ownership Process. Learn more at

OpenBMC Support.

Intelligent Provisioning

Hassle free server and OS provisioning for one or more servers with Intelligent Provisioning.

iLO RESTful API

iLO RESTful API is DMTF Redfish API information and offers simplified server management automation such as configuration and maintenance tasks based on modern industry standards.

Security

- UEFI Secure Boot and Secure Start support
- Immutable Silicon Root of Trust
- FIPS 140-3 validation (iLO 6 certification in progress)
- Common Criteria certification (iLO 6 certification in progress)
- Configurable for PCI DSS compliance
- Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser
- Support for Commercial National Security Algorithms (CNSA)
- iLO Security Modes
- Granular control over iLO interfaces
- Smart card (PIV/CAC) and Kerberos based 2-factor Authentication
- Tamper-free updates – components digitally signed and verified
- Secure Recovery – recover critical firmware to known good state on detection of compromised firmware
- Ability to rollback firmware
- Secure erase of NAND/User Data
- TPM 2.0 (Trusted Platform Module 2.0)
  Note: Enabling TPM 2.0 no longer requires TPM module option kit for G3. It is an embedded feature yet disabled for shipments to China.
- Bezel Locking Kit option
- Chassis Intrusion detection option

Warranty

This product is covered by a global limited warranty and supported by Hitachi Vantara Services and a worldwide network of Authorized Channel Partners resellers. Hardware diagnostic support and repair are available for three years from the date of purchase.

Server management

Hitachi Advanced Server iLO

iLO licenses offer smart remote functionality without compromise, for all Hitachi Advanced servers. The license includes the fully integrated remote console, virtual keyboard, video, and mouse (KVM), multi-user collaboration, console record and replay, and GUI-based and scripted virtual media and virtual folders. You can also activate the enhanced security and power management functionality.

Chapter 2: Service and support

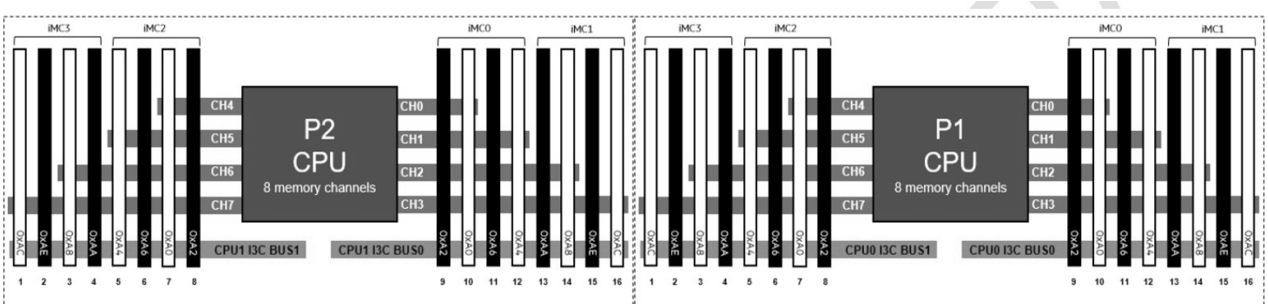
Parts and materials

Hitachi Vantara will provide supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives.

Memory population guidelines



Front End / Hitachi Advanced Server HA810 G3

Note:

- Listed below are general Memory Module Population Rules supported by the processor for reference.
- There is no longer a need to install DIMMs in pairs in non-RAS modes.
- The same information is displayed alternatively by rank, by speed, or by qty. That is, when viewing by rank, selecting a particular rank will then show the DIMM qty vs DIMM speed tradeoff/combinations. All DIMMs must be either all DDR5 DIMMs or DDR5 and Crow Pass DIMMs.
- There should be at least one DDR5 DIMM per socket.
- When one DIMM is used in a channel, it must be populated in DIMM slot farthest away from the CPU (DIMM slot 0) of a given channel.
- For 16 + 0 configuration with 1R + 2R mixed rank population, on each channel always populated the higher electrical load (2R) in DIMM0 followed by single rank DIMM in DIMM1.
- A maximum of 8 logical ranks (ranks seen by the host) per channel is allowed.
- For a DDR5 DIMM and Crow Pass DIMM in a channel, the DDR5 DIMM must be populated in the farthest DIMM slot (0), while CPS has to be in the nearest slot (1).
- All DIMMs in a Processor socket must have the same number of ranks (unless explicitly

specified otherwise).

- x8 DIMMs and x4 DIMMs cannot be mixed in the same channel or same Processor socket.
- Mixing of non-3DS and 3DS RDIMMs is not allowed in the same channel, across different channels, and across different sockets.
- 9x4 RDIMMs cannot be mixed with another DIMM types (Crow Pass 10x4RDIMMs or Non 9x4 RDIMMs).
- All DDR5 DIMMs must operate at the same speed per Processor socket.
- Rank mixing is not allowed on a channel except for Standard RDIMM 1 Rank + 2 Rank combination, when all 16 DIMMs for a Processor socket is populated.
- Mixing vendor is allowed for RDIMMs, but it is not allowed for 3DS RDIMMS.

Hitachi Advanced Server G3 16 slot per CPU DIMM population order																
DIMM population order																
DIMM slot	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
1 DIMM			3		5		7			10		12		14		
2 DIMMs[2]										10						
4 DIMMs[2]			3							10						
6 DIMMs			3				7			10				14		16
8 DIMMs[1,2]	1		3		5		7			10				14		16
12 DIMMs	1	2	3		5	6	7			10	11	12		14	15	16
16 DIMMs[1,2]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Note:

- Omitted DIMM counts/socket not qualified by Intel.
- [1] Supports SGX (Software Guard Extensions).
- [2] Support Hemi (hemisphere mode).

General memory population rules and guidelines

- DIMMs should be installed in quantities of even numbers.
- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two-processor system, only half of the DIMM slots are available.
- To maximize performance, it is recommended to balance the total memory capacity between all installed processors.
- When two processors are installed, balance the DIMMs across the two processors.
- White DIMM slots denote the first slot to be populated in a channel.
- Mixing of DIMM types (UDIMM, RDIMM, and LRDIMM) is not supported.
- The maximum memory speed is a function of the memory type, memory configuration, and processor model.
- The maximum memory capacity is a function of the number of DIMM slots on the platform, the largest DIMM capacity qualified on the platform, and the number and model of installed processors qualified on the platform.

SKU P/N	**P43322-B21.p**	**P43328-B21.p**	**P43331-B21.p**
SKU Description	16GB (1x16GB) Single Rank x8 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	32GB (1x32GB) Dual Rank x8 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	64GB (1x64GB) Dual Rank x4 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit
DIMM Capacity	16GB	32GB	64GB
DIMM Rank	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)
Voltage	1.1 V	1.1 V	1.1 V
DRAM Depth [bit]	2G	2G	4G
DRAM Width [bit]	x8	x8	x4
DRAM Density	16Gb	16Gb	16Gb
CAS Latency	40-39-39	40-39-39	40-39-39
DIMM Native Speed	4800 MT/s	4800 MT/s	4800 MT/s

SKU P/N	**P43334-B21.p**	
SKU Description	128GB (1x128GB) Quad Rank x4 DDR5- 4800 CAS-46-39-39 EC8 Registered 3DS Smart Memory Kit	

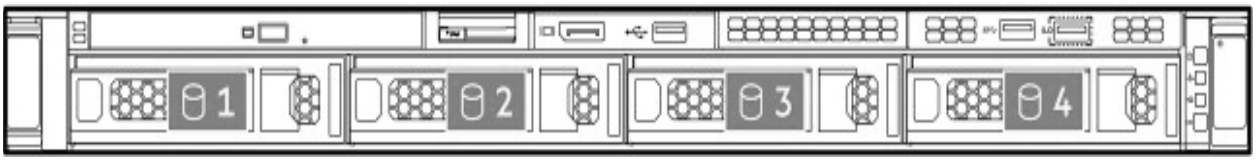
DIMM Capacity	128GB	
DIMM Rank	Quad Rank (4R)	
Voltage	1.1 V	
DRAM Depth [bit]	4G	
DRAM Width [bit]	x4	
DRAM Density	16Gb	
CAS Latency	40-39-39	
DIMM Native Speed	4800 MT/s	

Note: The maximum memory speed is a function of the memory type, memory configuration, and processor model.

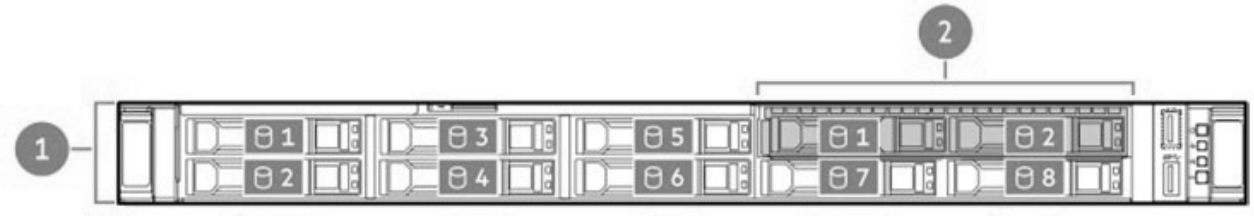
DDR5 memory options part number decoder

Note: Capacity references are rounded to the common gigabyte (GB) values.

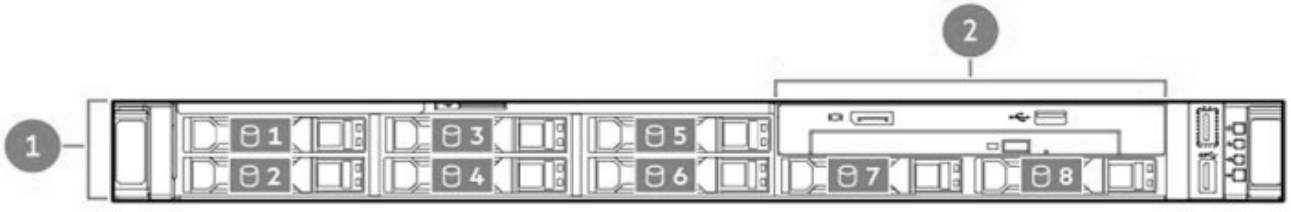
- 8GB = 8,192 MB
- 16GB = 16,384 MB
- 32GB = 32,768 MB
- 64GB = 65,536 MB
- 128GB = 131,072 MB
- 256GB = 262,144 MB
- 512GB = 524,288 MB



4 LFF device bay numbering



8 SFF + 2 SFF (optional) device bay numbering



8 SFF+ ODD device bay (optional through Media Bay)

Box	Description
1	Bays 1-8
2	Bays 1 and 2

Chapter 3: Technical specifications

System Unit

Dimensions (Height x Width x Depth)

SFF Drives

- 4.29 x 43.46 x 75.31 cm
- 1.69 x 17.11 x 29.65 in

LFF Drives

- 4.29 x 43.46 x 77.31 cm
- 1.69 x 17.11 x 30.43 in

Weight (approximate)

- 14.56 kg (32.1 lb)
  SFF minimum: One drive, one processor, one power supply, two heatsinks, one Smart Array controller, and five fans.
- 20.44 kg (45.07 lb)
  SFF maximum: Ten drives, two processors, two power supplies, two heatsinks, one Smart Array controller and seven fans.
- 14.95 kg (32.96 lb)
  LFF minimum: One drive, one processor, one power supply, two heatsinks, one Smart Array controller and five fans.
- 21.58 kg (47.58 lb)
  LFF maximum: Four drives, two processors, two power supplies, two heatsinks, one Smart Array controller and seven fans.

Input requirements (per power supply)

Rated line voltage

- For 1800-2200W (Titanium): 200 to 240 VAC
- For 1600W (Platinum): 200 to 240 VAC
- For 1000W (Titanium): 100 to240 VAC
- For 800W (Platinum): 100 to 240 VAC
- For 800W (Titanium): 100 to 240 VAC
- For 500W (Platinum): 100 to 240 VAC
- For 1600W (-48 VDC): -40 to -72 VdC

British Thermal Unit (BTU) rating

Maximum

- For 1800-2400W (Titanium) Power Supply: 6497BTU/hr (at 200 VAC), 7230 BTU/hr (at 220 VAC), 7962 BTU/hr (at 240 VAC)
- For 1600W (Platinum) Power Supply: 5918 BTU/hr (at 200 VAC), 5888 BTU/hr (at 220 VAC), 5884 BTU/hr (at 240 VAC)
- For 1000W (Titanium) Power Supply: 3741 BTU/hr (at 100 VAC), 3596 BTU/hr (at 200 VAC), 3582 BTU/hr (at 240 VAC)
- For 800W (Platinum) Power Supply: 3067 BTU/hr (at 100 VAC), 2958 BTU/hr (at 200 VAC), 2949 BTU/hr (at 240 VAC)
- For 1600W (48VDC) Power Supply: 6026 BTU/hr (at -40 VDC), 6000 BTU/hr (at -48 VDC), 5989 BTU/hr (at -72 VDC)
- For 500W (Platinum) Power Supply: 1999 BTU/hr (at 100 VAC), 1912 BTU/hr (at 200 VAC), 1904 BTU/hr (at 240 VAC)

Power supply output (per power supply)

Rated steady-state power

- For 1800W-2200W (Titanium) Power Supply: 1799W (at 200 VAC), 2000W (at 220 VAC), 2200W (at 240 VAC), 2200W (at 240 VDC) input for China only
- For 1600W (Platinum) Power Supply: 1600W (at 240 VAC), 1600W (at 240 VDC) input for China only
- For 1000W (Titanium) Power Supply: 1000W (at 100 VAC), 1000W (at 240 VAC), 1000W (at 240 VDC) input for China only
- For 800W (Platinum) Power Supply: 800W (at 100 VAC), 800W (at 240 VAC), 800W (at 240 VDC) input for China only
- For 800W (Titanium) Power Supply: 800W (at 200 VAC), 800W (at 240 VAC), 800W (at 240 VDC) input for China only
- For 1600W (-48VDC) Power Supply: 1600W (at -40 Vdc), 1600W (at -72Vdc)
- For 500W (Platinum) Power Supply: 500W (at 100 VAC), 500W (at 240 VAC), 500W (at 240 VDC) input for China only

Maximum peak power

- For 1800W-2200W (Titanium) Power Supply: 2200W (at 240 VAC). 2200W (at 240 VDC) input for China only
- For 1600W (Platinum) Power Supply: 1600W (at 240 VAC), 1600W (at 240 VDC) input for China only
- For 1000W (Titanium) Power Supply: 1000W (at 100 VAC), 1000W (at 240 VAC), 1000W (at 240 VDC) input for China only
- For 800W (Platinum) Power Supply: 800W (at 100 VAC), 800W (at 240 VAC), 800W (at 240 VDC) input for China only
- For 800W (Titanium) Power Supply: 800W (at 200 VAC), 800W (at 240 VAC), 800W (at 240 VDC) input for China only
- For 1600W (-48VDC) Power Supply: 1600W (at -40 Vdc), 1600W (at -72Vdc)
- For 500W (Platinum) Power Supply: 500W (at 100 VAC), 500W (at 240 VAC), 500W (at 240 VDC) input for China only

System inlet temperature

- **Standard operating support (Level 2 support)**
  10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 20°C/hr (36°F/hr). The upper limit and rate of change may be limited by the type and number of options installed.

  System performance during standard operating support may be reduced if operating with a fan fault or above 30°C (86°F) or above 27°C (81°F) at 900M.

  10° to 35°C (50° to 95°F) at 900M with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 20°C/hr (36°F/hr). The upper limit and rate of change may be limited by the type and number of options installed.
  System performance during standard operating support may be reduced if operating with a fan fault or above 27°C (81°F) at 900M and 30°C (86°F) at sea level.

  With Standard Operating Support, there shall be no processor performance drop.

- **Extended ambient operating support (Level 3 and Level 4 support)**
  For approved hardware configurations, the supported system inlet range is extended to be: 5° to 10°C (41° to 50°F) and 35° to 40°C (95° to 104°F) at sea level with an altitude derating of 1.0°C per every 175 m (1.8°F per every 574 ft) above 900 m (2953 ft) to a maximum of 3050 m (10,000 ft).

  For approved hardware configurations, the supported system inlet range is extended to be: 40° to 45°C (104° to 113°F) at sea level with an altitude derating of 1.0°C per every 125 m (1.8°F per every 410 ft) above 900 m (2953 ft) to a maximum of 3050 m (10,000 ft).

  With Extended Ambient Operating Support, Processor performance drop would be expected. The approved hardware configurations for this system require the High Performance Fan Kit (P26477-B21).

  System performance may be reduced if operating in the extended ambient operating range or with a fan fault.

- **Non-operating**

  -30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).

Relative humidity (non-condensing)

- **Operating**
  8% to 90% - Relative humidity (Rh), 28°C maximum wet bulb temperature, non-condensing.

- **Non-operating**
  5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.

- **Operating**
  -12°C DP and 8% Rh to 21°C DP 80% - Relative humidity (Rh), 21°C maximum wet bulb temperature, non-condensing.

- **Non-operating**
  -12°C DP and 8% Rh to 21°C DP 80% - Relative humidity (Rh), 21°C maximum wet bulb temperature, non-

condensing.

Altitude

- **Operating**
  3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

- **Non-operating**
  9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

Acoustic noise

Listed are the declared mean A-Weighted sound power levels (LWA,m), declared average bystander position A-Weighted sound pressure levels (LpAm), and the statistical adder for verification (Kv) is a quantity to be added to the declared mean A-weighted sound power level. LWA,m when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). The listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels. Please have your Hitachi Vantara representative provide information for further technical details regarding the configurations listed below.

Test case	1	2	3	4	5	6	7	8
Idle								
LWA, m	5.1B	4.7B	4.7B	5.0B	4.7B	4.7B	4.7B	5.2B
LpAm	37dBA	35dBA	36dBA	37dBA	36dBA	36dBA	36dBA	38dBA
Kv	0.4B	0.4B	0.4B	04B	0.4B	0.4B	0.4B	0.4B
Operating								
LW,m	5.3B	5.0B	5.2B	5.3B	5.1B	5.4B	5.5B	6.0B
LpAm	40dBA	37dBA	39dBA	41dBA	37dBA	41dBA	41dBA	49dBA
Kv	0.4B	0.4B	0.4B	0.4B	0.4B	0.4B	0.4B	0.4B

Note:

- Acoustics levels presented here are generated by the test configuration only. Acoustics levels will vary depending on system configuration. Values are subject to change without notification and are for reference only.
- The declared mean A-weighted sound power level, LWA,m, is computed as the arithmetic average of the measured.
- A-weighted sound power levels for a randomly selected sample, rounded to the nearest 0,1 B.
- The declared mean A-weighted emission sound pressure level, LpA,m, is computed as the arithmetic average of the measured A-weighted emission sound pressure levels at the bystander positions for a randomly selected sample, rounded to the nearest 1 dB.
- The statistical adder for verification, Kv, is a quantity to be added to the declared mean A-weighted sound power level, LWA,m, such that there will be a 95 % probability of acceptance, when using the verification procedures of ISO 9296, if no more than 6,5 % of the batch of new equipment, has A-weighted sound power levels greater than (LWA,m + Kv).
- The quantity, LWA,c (formerly called LWAd), can be computed from the sum of LWA,m and Kv.
- All measurements made to conform to ISO 7779 / ECMA-74 and declared to conform to ISO 9296 / ECMA-109.
- B, dB, abbreviations for bels and decibels, respectively, where 1 B = 10 dB.
- The results in this declaration apply only to the model numbers listed above when operating and tested according to the indicated modes and standards. A system with additional configuration components or increased operating functionality may increase the noise emission values.
- System under abnormal conditions may increase the noise level, persons in the vicinity of the product [cabinet] for extended periods of time should consider wearing hearing protection or using other means to reduce noise exposure.

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