White Paper for KR1180V3 Series Servers

Powered by Intel Processors

For KR1180-X3-A0-R0-00

Document Version: V1.0

Release Date: April 28, 2025

Copyright © 2025 KAYTUS SYSTEMS PTE. LTD. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without our prior written consent.

Applicable Model

Model	Maintenance	Cooling
KR1180-X3-A0-R0-00	Rear access	Air cooling

Technical Support

Global Service Hotline: (+1) 844-912-0007
Address: 1501 McCarthy Blvd, Milpitas, CA 95035
AIVRES SYSTEMS INC.
Website: https://aivres.com
Email: serversupport@aivres.com

Environmental Protection

Please dispose of product packaging by recycling at a local recycling center for a greener planet.

Trademarks

All the trademarks or registered trademarks mentioned herein may be the property of their respective holders. This document does not mark any product or brand with the symbol ® or ™.

Security Statement

We are intensely focused on server product safety and have placed a high priority on this. For a better understanding of our server products, carefully read through the following security risk statements.

- When servers are to be repurposed or retired, we recommend that you restore their firmware factory settings, delete information and clear logs from BIOS and BMC to protect data privacy. Meanwhile, we recommend that you wipe the drive data thoroughly and securely with trusted erasing tools. You can use KSManage Server Provisioning. Contact us for specific server models to which KSManage Server Provisioning is applicable.
- For server open source software statements, please contact us.
- Some interfaces and commands for production, assembly and return-to-depot, and advanced commands for locating faults, if used improperly, may cause equipment abnormality or business interruption. This is not described herein. Please contact us for such information.
- External ports of our servers do not use private protocols for communication.
- Our products will not initiatively obtain or use your personal data. Only when you consent to use certain functions or services, some personal data such as IP address and email address for alerts may be obtained or used during business operation or fault location. We have implemented necessary measures on product functions to ensure personal data security throughout the data lifecycle, including but not limited to data collection, storage, use, transmission, and destruction. Meanwhile, you are obligated to establish necessary user privacy policies in accordance with applicable national/regional laws and regulations to fully protect user personal data.
- Committed to product data security, we have implemented necessary measures on product functions to protect system operation and security data throughout its lifecycle in strict accordance with relevant laws, regulations and supervision

requirements. As the owner of system operation and security data, you are obligated to establish necessary data security policies and take adequate measures in accordance with applicable national/regional laws and regulations to fully protect system operation and security data.

- We will remain committed to the safety of our products and solutions to achieve better customer satisfaction. We have established emergency response procedures and action plans for security vulnerabilities, so that product safety issues can be dealt with in a timely manner. Please contact us for any safety problems found or necessary support on security vulnerabilities when using our products.

Disclaimer

The purchased products, services, and features shall be bound by the contract made between the customer and us. All or part of the products, services and features described herein may not be within your purchase or usage scope. Unless otherwise agreed in the contract, we make no express or implied statement or warranty on the contents herein. Images provided herein are for reference only and may contain information or features that do not apply to your purchased model. This document is only used as a guide. We shall not be liable for any damage, including but not limited to loss of profits, loss of information, interruption of business, personal injury, or any consequential damage incurred before, during, or after your use of our products. We assume you have sufficient knowledge of servers and are well trained in protecting yourself from personal injury or preventing product damage during operation and maintenance. The information in this document is subject to change without notice.

Preface

Abstract

This document describes the KR1180V3 Intel-based server's appearance, features, performance parameters, and software and hardware compatibility, providing in-depth information of the server.

Intended Audience

This document is intended for pre-sales engineers.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
DANGER	A potential for serious injury, or even death if not properly handled
WARNING	A potential for minor or moderate injury if not properly handled
CAUTION	A potential loss of data or damage to equipment if not properly handled
IMPORTANT	Operations or information that requires special attention to ensure successful installation or configuration
NOTE	Supplementary description of document information

Revision History

Version	Date	Description of Changes
V1.0	2025/04/28	Initial release

Table of Contents

1 Product Overview 1

2 Features 2

2.1 Scalability and Performance 2

2.2 Availability and Serviceability 3

2.3 Manageability and Security 4

2.4 Energy Efficiency 6

3 System Parts Breakdown 8

4 System Logical Diagram 9

5 Hardware Description 10

5.1 Front Panel 10

5.1.1 4 × 3.5-Inch Drive + 4 × E3.S Drive Configuration 10

5.1.2 8 × 2.5-Inch Drive + 2 × PCIe Slot Configuration 11

5.1.3 10 × 2.5-Inch Drive Configuration 11

5.2 Rear Panel 12

5.2.1 2 × PCIe Slot Configuration 12

5.2.2 3 × PCIe Slot Configuration 12

5.3 LEDs and Buttons 13

5.4 Port Description 16

5.5 Processor 16

5.6 DDR5 DIMMs 17

5.6.1 Identification 17

5.6.2 Memory Subsystem Architecture 18

5.6.3 Compatibility 19

5.6.4 DIMM Population Rules 20

5.6.5 DIMM Slot Layout 21

5.7 Storage 22
5.7.1 Drive Configurations 22
5.7.2 Drive Numbering 23
5.7.3 Drive LEDs 24
5.7.4 RAID Cards 26
5.8 Network 26
5.9 I/O Expansion 26
5.9.1 PCIe Expansion Cards 26
5.9.2 PCIe Slot Locations 27
5.9.3 PCIe Riser Module 28
5.9.4 PCIe Slot Description 29
5.10 PSUs 31
5.10.1 PSU Locations 31
5.10.2 PSU LED 31
5.11 Fan Module 32
5.12 LCD Module 33
5.12.1 Function 33
5.12.2 Interface 35
5.13 Boards 35
5.13.1 Motherboard 36
5.13.2 Drive Backplanes 37
6 Product Specifications 40
6.1 Technical Specifications 40
6.2 Environmental Specifications 42
6.3 Physical Specifications 44
7 Operating System and Hardware Compatibility 46
7.1 Supported Operating System 46

7.2 Hardware Compatibility 47
7.2.1 CPU Specifications 47
7.2.2 DIMM Specifications 47
7.2.3 Drive Specifications 47
7.2.4 SAS/RAID Card Specifications 48
7.2.5 NIC Specifications 48
7.2.6 HCA Card Specifications 49
7.2.7 PSU Specifications 49
8 Regulatory Information 51
8.1 Safety 51
8.1.1 General 51
8.1.2 Personal Safety 51
8.1.3 Equipment Safety 53
8.1.4 Transportation Precautions 54
8.1.5 Manual Handling Weight Limits 54
9 Limited Warranty 55
9.1 Warranty Service 55
9.1.1 Remote Technical Support 55
9.1.2 RMA Service 56
9.1.3 ARMA Service 56
9.1.4 9 × 5 × NBD Onsite Service 56
9.1.5 24 × 7 × 4 Onsite Service 57
9.2 Our Service SLA 57
9.3 Warranty Exclusions 57
10 System Management 59
10.1 Intelligent Management System BMC 59
10.2 KSManage 62

10.3 KSManage Tools 64
11 Certification 66
12 Appendix A 67
12.1 Thermal Restrictions 67
12.2 Power/Performance Profiles 68
12.3 Model 69
12.4 RAS Features 69
12.5 Sensor List 69
13 Appendix C Acronyms and Abbreviations 75
13.1 A - E 75
13.2 F - J 77
13.3 K - O 78
13.4 P - T 80
13.5 U - Z 82

1 Product Overview

The KR1180V3 Intel-based system is a 1U single-socket rack server powered by the Intel Xeon 6 processor built on the Birch Stream platform, meeting requirements for medium to low computing power and storage. Exceptional product specifications, a low cost, and a high performance per watt ratio bring customers a low-cost platform upgrade alternative, tackling high TCO and cross-NUMA problems. Configured with rich IO CPU SKUs, it offers expandability comparable to dual-socket configurations and supports all-flash and GPU configurations.

Figure 1-1 Appearance of 4 × 3.5-Inch Drive + 4 × E3.S Drive Configuration

Figure 1-2 Appearance of 10 × 2.5-Inch Drive Configuration

Figure 1-3 Appearance of 8 × 2.5-Inch Drive + 2 × PCIe Slot Configuration

2 Features

2.1 Scalability and Performance

Table 2-1 Scalability and Performance

Technical Feature	Description
Intel Xeon 6 Processor Built on the Birch Stream Platform	• Up to 144 cores per processor, a max. Turbo frequency up to 3.2 GHz, an L3 cache of 108 MB, and 4 UPI links per CPU at up to 24 GT/s per link. - One processor with up to144 cores and 144 threads, maximizing the concurrent execution of multi-threaded applications. - With the processor cache hierarchy optimization, a larger L2 cache of private 1 MB per core is provided, so that memory data can be put and processed directly in the L2 cache, improving the memory access performance and reducing the demand for L3 cache capacity. A single processor can share up to 108 MB of L3 cache. - Intel Turbo Boost Technology 2.0 automatically scales CPU speeds up to the max. Turbo frequency at peak workloads, allowing processor cores to exceed the thermal design power (TDP) for a limited time. - Intel Virtualization Technology provides hardware assist to the virtualization software, allowing the operating system to better use hardware to handle virtualization work. - Intel Advanced Vector Extensions 512 (Intel AVX-512), significantly improves floating-point performance for compute-intensive applications. - Intel Deep Learning Boost (Intel DL Boost) uses Vector Neural Network Instructions (VNNI), improving the performance for deep learning applications.
DDR5 DIMMs	Up to 16 DDR5 ECC DIMMs (RDIMMs, 6,400 MT/s at 1 DPC or 5,200 MT/s at 2 DPC), delivering superior speed, high availability, and a memory capacity of up to 1 TB.

Technical Feature	Description
Flexible Drive Configuration	Provides elastic and scalable storage solutions to meet different capacity and upgrade requirements.
All-SSD Configuration	Brings significantly higher I/O performance over all-HDD configuration or HDD-SSD mixing configuration.
Intel Integrated I/O Technology	The processors integrate the PCIe 5.0 controllers to reduce I/O latency and enhance overall system performance.
PCIe Expansion	• Up to 5 standard PCIe expansion cards. - Front: 2 × HHHL PCIe 4.0 x16 expansion card - Rear: 1 × FHHL PCIe 5.0 x16 expansion card + 2 × HHHL PCIe 5.0 x16 expansion card or 2 × FHHL PCIe 5.0 x16 expansion card
OCP Expansion	One OCP slot that can flexibly hold 1/10/25/100/200 Gb hot-plug OCP 3.0 cards.

2.2 Availability and Serviceability

Table 2-2 Availability and Serviceability

Technical Feature	Description
Hot-Swap SAS/SATA/NVMe Drives	Supports hot-swap SAS/SATA/NVMe drives and RAID cards with RAID levels 0/1/10/5/50/6/60, RAID cache and data protection enabled by the super-capacitor in case of power failures.
Reliability	• SSDs are much more reliable than traditional HDDs, increasing system uptime. • The BMC monitors system parameters in real time and sends alerts in advance, enabling technicians to take appropriate measures in time to minimize system downtime.
Availability	• The LEDs on the front and rear panels, the LCD module, and the BMC WebUI indicate the status of key components and quickly lead technicians to failed (or failing) components, simplifying maintenance and speeding up troubleshooting. • Provides 2 hot-swap PSUs with 1+1 redundancy and 8 hot-swap fan modules with N+1 redundancy.

Technical Feature	Description
O&M Efficiency	• The BMC management network port on the rear panel enables remote BMC O&M, improving O&M efficiency. • Online memory diagnosis helps technicians quickly identify the DIMM that needs servicing.

2.3 Manageability and Security

Table 2-3 Manageability and Security

Technical Feature	Description
Remote Management	The BMC monitors system operating status and enables remote management.
Network Controller Sideband Interface (NC-SI) Feature	Allows a network port to serve as a management port and a service port. The NC-SI feature is disabled by default and can be enabled/disabled through the BIOS or BMC. Notes: The NC-SI port supports the following features: • The NC-SI port can be bonded to any network port of the OCP card or of PCIe NIC that supports NC-SI. • Supports the enablement/disablement and configuration of Virtual Local Area Network (VLAN). VLAN is disabled by default. • Supports both IPv6 and IPv4 addresses. The subnet mask of IPv4 or prefix length of IPv6 subnet mask, IP addresses, and default gateways can be configured.
Intel PFR	Intel Platform Firmware Resilience (PFR) is a security technology that follows NIST SP 800-193 guidelines. Intel PFR helps protect platform assets, detects corrupted firmware as well as other malicious or erroneous behavior, and even restores platform firmware to a good state.
Unified Extensible Firmware Interface (UEFI)	The industry-standard UEFI improves the efficiency of setup, configuration and update, and simplifies the error handling process.
TPM & TCM	Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) provide advanced encryption.
Intel Trusted Execution Technology	Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks.

Technical Feature	Description
Firmware Update Mechanism	The firmware update mechanism based on digital signatures prevents unauthorized firmware updates.
UEFI Secure Boot	Protects the system from malicious bootloaders.
Hierarchical Password Protection in BIOS	Ensures system boot and management security.
BIOS Secure Flash and BIOS Lock Enable (BLE)	Reduce attacks from malicious software on the BIOS flash region.
Dual-Image Mechanism for BMC and BIOS	Recovers firmware upon detection of corrupted firmware.
BMC Secure Boot	Protects BMC from malicious tampering.
BMC Access Control Policies	Flexible BMC access control policies improve BMC management security.
Chassis Intrusion Detection	Enhances physical security.
BMC Management Security	Supports flexible BMC access control policies and double factor authentication.
Intel SGX Technology	Intel Software Guard Extensions (SGX) technology allows an application to run in its own isolated space, helping prevent malicious theft and modification of critical codes and data.
System Secure Erase Function	(Optional) System secure erase function can wipe data on the storage devices with one click.
Memory Protection Technology	Supports failed DIMM isolation, Single Device Data Correction (SDDC), patrol scrub, DDR command and address parity check and retry, memory thermal throttling, Adaptive Double Device Data Correction (ADDDC), and data scrambling.
DMPU for Fault Diagnosis	Takes snapshots of power sequence signal changes and CPU error signal changes, supports a virtual oscilloscope visualizing abnormal voltage signals, collects and analyzes out-of-band (OOB) logs of components, gathers BMC serial port logs, switches between UART topologies, and creates JBOD/RAID 0/RAID 1 with 2 TF cards.
Intelligent Runtime Update Technology (IRUT) Hitless Firmware Update	• Enables runtime firmware OOB modular update, delivering rapid and flexible firmware update • Offloads RAS to OS, improving system reliability • Updates System Management Mode (SMM) driver in real time • Modifies hardware registers in time, optimizing resource allocation

Technical Feature	Description
	• Supports fast boot, reducing boot time and improving business operational efficiency
Memory UCE Prevent and Repair (MUPR) for Intelligent Forewarning and Healing	• The core of the pre-UCE failure diagnosis and healing technology lies in the ability to forecast the change in the faulty memory cell, to accurately diagnose the memory error type and to fix the faulty memory cell in real time. It enables 24 × 7 monitoring of memory health status from multi-aspects. • It offers online monitoring of memory errors at cell, row/column and bank/die levels, compares with the memory UCE occurrence characteristics efficiently, and handles the faulty memory cell in time, thus significantly reducing the system downtime risk caused by memory faults.

2.4 Energy Efficiency

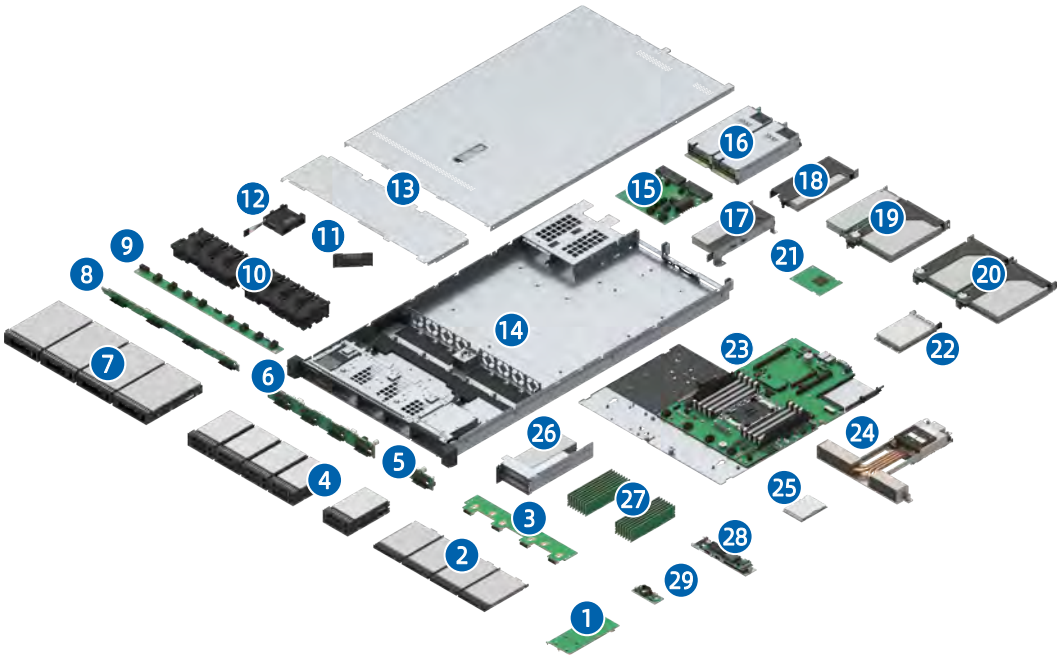
Table 2-4 Energy Efficiency

Technical Feature	Description
80 Plus Platinum/Titanium PSUs	Equipped with 80 Plus Platinum/Titanium PSUs of different power efficiency levels, with a power efficiency up to 96% at a load of 50%.
1+1 Redundant PSUs	AC/DC power input improves power conversion efficiency.
VRD Solution	Features the high-efficiency single-board voltage regulator-down (VRD) solution, reducing DC-DC conversion loss.
Intelligent Fan Speed Control and CPU Frequency Scaling	Supports Proportional-Integral-Derivative (PID) intelligent fan speed control and intelligent CPU frequency scaling, conserving energy.
System Cooling Design	Offers a fully-optimized system cooling design with energy-efficient cooling fans, lowering energy consumption from system cooling.
Power Capping and Power Control	Provides power capping and power control measures.
Staggered Spin-up of Drives	Staggered spin-up of drives reduces power consumption during server startup.

Technical Feature	Description
Intel Intelligent Power Capability	Intel Intelligent Power Capability (IIPC) optimizes energy usage in the processor cores by turning computing functions on only when needed.
Low Energy Consumption	Low-voltage Intel Xeon 6 processor built on the Birch Stream platform draw less energy to satisfy the demands of power and thermally constrained data centers and telecommunications environments.
Power/Performance Profile	Supports various typical power/performance profiles such as performance, balance/energy efficiency, and power. Users can switch among power/performance profiles simply by changing BIOS options. The factory default setting is Custom mode (Parameter settings of Custom mode bring forth performance close to that of Performance mode). Other modes can be customized or configured through BIOS options.

3 System Parts Breakdown

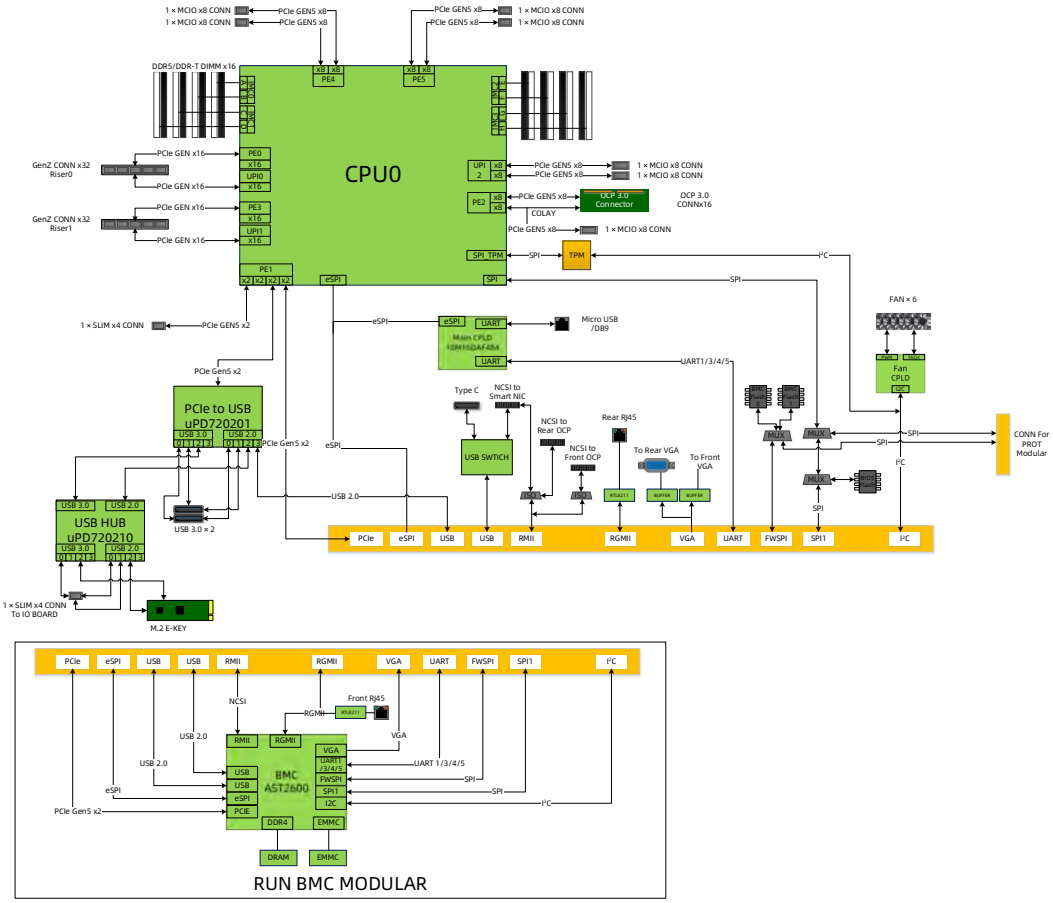
Figure 3-1 Exploded View



Item	Feature	Item	Feature
1	TSOM Module	16	PSU
2	E3.S SSD Module	17	Internal LP PCIe Riser Module
3	E3.S Drive Backplane	18	Rear LP PCIe Riser Module
4	2.5-Inch Drive Module	19	Rear Butterfly PCIe Riser Module
5	2 × 2.5-Inch Drive Backplane	20	Rear FH PCIe Riser Module
6	8 × 2.5-Inch Drive Backplane	21	RunBMC Management Board
7	3.5-Inch Drive Module	22	OCP 3.0 Card
8	3.5-Inch Drive Backplane	23	Motherboard
9	Fan Board	24	Heatsink
10	Fan Module	25	CPU
11	Air Duct	26	Front LP PCIe Riser Module
12	Super-Capacitor	27	DIMM
13	Top Cover	28	M.2 SSD Module
14	Chassis	29	M.2 Drive Backplane
15	PDB	-	-

4 System Logical Diagram

Figure 4-1 System Logical Diagram



- One Intel Xeon 6 processor built on the Birch Stream platform.
- Up to 16 DDR5 DIMMs.
- Up to 2 front PCIe 4.0 expansion slots, 3 rear PCIe 5.0 expansion slots and one rear OCP 3.0 card.
- The RAID card is connected to the CPU via the PCIe bus, and to the drive backplanes via SAS signal cables. Multiple local storage specifications are supported through different drive backplanes.
- The motherboard uses controllers to support 3 USB 3.0 ports, 1 USB 2.0/LCD port, 2 PCIe/SATA M.2 SSD connectors and 1 TF card connector.
- The RunBMC management board integrates an AST2600 management chip, and supports 1 VGA port, 1 BMC management network port, and other connectors.

5 Hardware Description

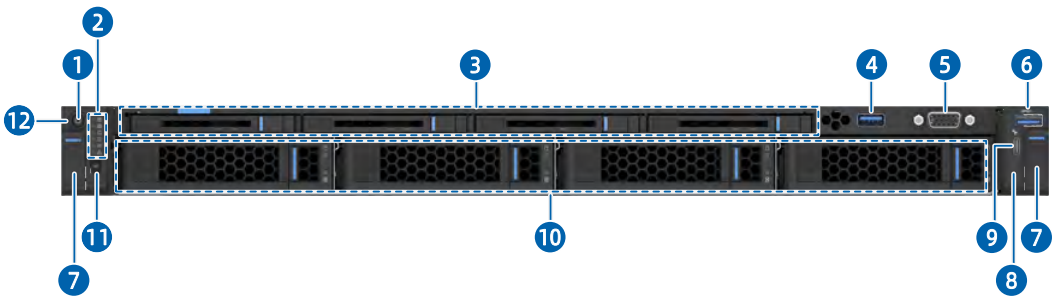
5.1 Front Panel

5.1.1 4 × 3.5-Inch Drive + 4 × E3.S Drive Configuration

IMPORTANT

A 3.5-inch drive tray can accommodate a 2.5-inch drive.

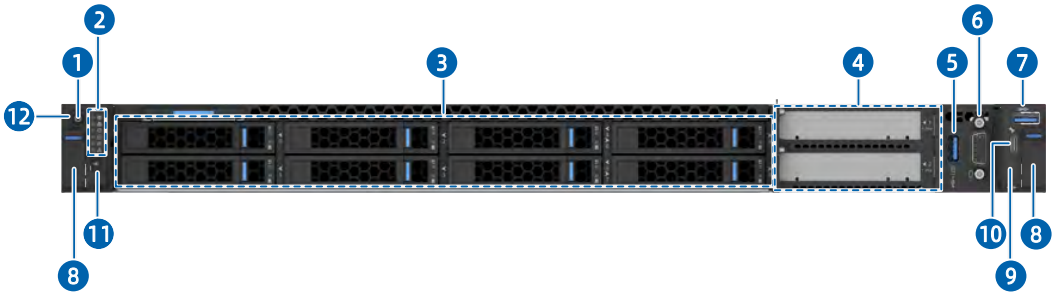
Figure 5-1 Front View



Item	Feature	Item	Feature
1	Power Button and LED	7	Ear Latch
2	LEDs	8	USB Type-C Status LED
3	E3.S Drive Bay	9	USB Type-C Port
4	USB 2.0/LCD Port	10	3.5-Inch Drive Bay
5	VGA Port	11	UID/BMC RST Button and LED
6	USB 3.0 Port	12	System Load Status LED

5.1.2 8 × 2.5-Inch Drive + 2 × PCIe Slot Configuration

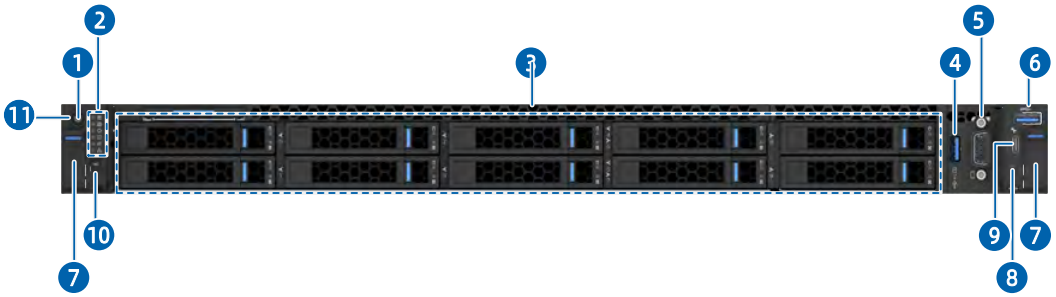
Figure 5-2 Front View



Item	Feature	Item	Feature
1	Power Button and LED	7	USB 3.0 Port
2	LEDs	8	Ear Latch
3	2.5-Inch Drive Bay	9	USB Type-C Status LED
4	PCIe Riser Module	10	USB Type-C Port
5	USB 2.0/LCD Port	11	UID/BMC RST Button and LED
6	VGA Port	12	System Load Status LED

5.1.3 10 × 2.5-Inch Drive Configuration

Figure 5-3 Front View

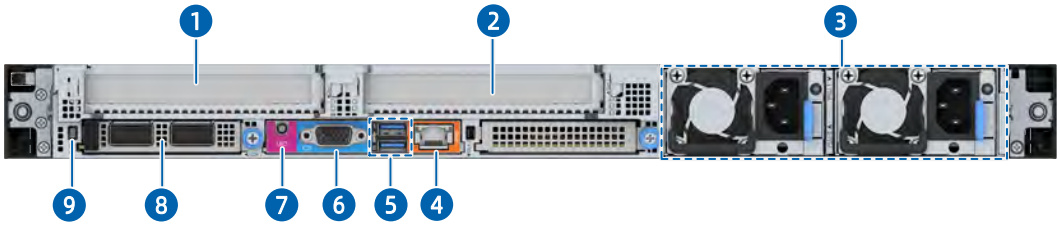


Item	Feature	Item	Feature
1	Power Button and LED	7	Ear Latch
2	LEDs	8	USB Type-C Status LED
3	2.5-Inch Drive Bay	9	USB Type-C Port
4	USB 2.0/LCD Port	10	UID/BMC RST Button and LED
5	VGA Port	11	System Load Status LED
6	USB 3.0 Port	-	-

5.2 Rear Panel

5.2.1 2 × PCIe Slot Configuration

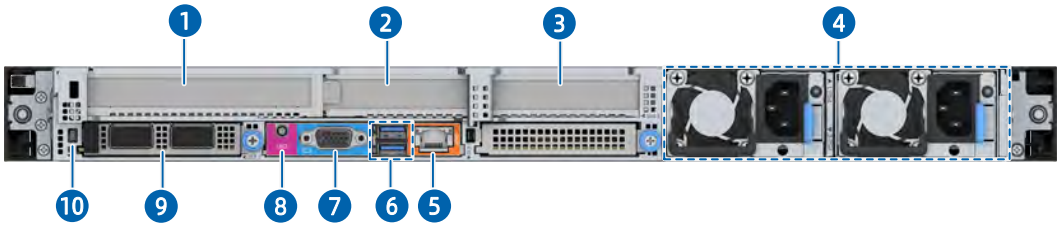
Figure 5-4 Rear View



Item	Feature	Item	Feature
1	PCIe Slot 1	6	VGA Port
2	PCIe Slot 2	7	UID/BMC RST Button and LED
3	PSU	8	OCP 3.0 Card
4	BMC Management Network Port	9	OCP 3.0 Card Hot-Plug Button and LED
5	USB 3.0 Port	-	-

5.2.2 3 × PCIe Slot Configuration

Figure 5-5 Rear View

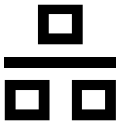


Item	Feature	Item	Feature
1	PCIe Slot 1	6	USB 3.0 Port
2	PCIe Slot 2	7	VGA Port
3	PCIe Slot 3	8	UID/BMC RST Button and LED
4	PSU	9	OCP 3.0 Card
5	BMC Management Network Port	10	OCP 3.0 Card Hot-Plug Button and LED

5.3 LEDs and Buttons

Table 5-1 LED and Button Description

No.	Icon	Feature	Description
1		Power Button and LED	• Power LED: - Off: No power - Solid green: Power-on state - Solid orange: Standby state • Power button: - Press and release the button to power on the system from the standby state - Press and hold the button for 6 seconds to force a shutdown from the power-on state
2		System Status LED	• Off: Normal • Blinking red (1 Hz): A warning error is detected on CPU, memory, power supply, drive, fan, etc. • Solid red: A critical error is detected on CPU, memory, power supply, drive, fan, etc.
3		Memory Status LED	• Off: Normal • Blinking red (1 Hz): A warning error occurs • Solid red: A critical error occurs
4		Fan Status LED	• Off: Normal • Blinking red (1 Hz): A warning error occurs • Solid red: A critical error occurs, including fan failure and fan absence
5		Power Status LED	• Off: Normal • Blinking red (1 Hz): A warning error occurs • Solid red: A critical error occurs

No.	Icon	Feature	Description
6		System Overheat LED	• Off: Normal • Blinking red (1 Hz): A warning error occurs, including Proc Hot, resulting in CPU throttling • Solid red: A critical error occurs, including CPU Thermal Trip/PCH Hot/MEM Hot
7		Network Status LED	• Off: No network connection • Blinking green: Network connected with data being transmitted • Solid green: Network connected without data being transmitted Note: It only indicates the status of the self-developed OCP card.
8		UID/BMC RST Button and LED	• UID/BMC RST LED: - Off: The server is not connected to power, or the UID LED is not activated when the server is in standby or power-on state - Gradually turning blue within 2 seconds and then gradually turning off within 2 seconds: PFR authentication in progress (Note: The server can be powered on only after this LED turns off.) - Blinking blue (4 Hz): PFR authentication fails and the firmware images cannot be recovered - Blinking blue (1 Hz): The UID LED is activated by the UID button or via the BMC when the server is in standby state - Solid blue: The UID LED is activated by the UID button or via the BMC when the server is in power-on state • UID/BMC RST Button:

No.	Icon	Feature	Description
			- Press and release the button to activate the UID LED. - Press and hold the button for 6 seconds to force the BMC to reset.
9	-	USB Type-C Status LED	• Connected to a terminal: - Off: Not connected to a terminal - Blinking green (2 Hz) for 3 seconds and then off: Port function is disabled - Solid green: Connected to a terminal • Connected to a USB storage device: - Off: Not connected to a USB storage device - Blinking red (1 Hz): Job fails or is completed with an error reported - Blinking green (2 Hz): Job in progress - Blinking green (2 Hz) 5 times and then off: Port function is disabled - Solid green: Job is completed successfully
10		System Load Status LED	• Solid green: 0 < load ≤ 30% • Solid blue: 30% < load ≤ 80% • Solid yellow: 80% < load ≤ 100%

NOTE

- Warning error: Errors that result in redundancy degradation or loss, and other errors that have a minor impact on the system running and that require attention.
- Critical error: Errors that result in system crash/restart or part failure, and other errors that have a major impact on the system running and that require immediate action.

5.4 Port Description

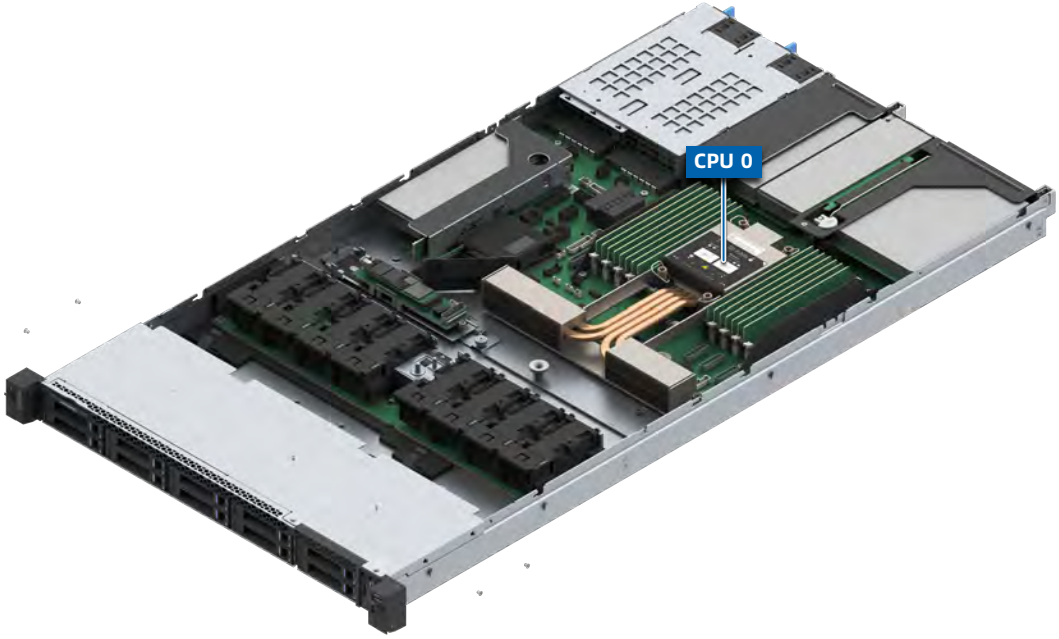
Table 5-2 Port Description

No.	Port	Description
1	VGA Port	Enables you to connect a display terminal to the system.
2	USB 3.0 Port	Enables you to connect a USB device to the system.
3	USB 2.0/LCD Port	Enables you to connect a USB device or an LCD module to the system.
4	USB Type-C Port	Enables the BMC to read a USB flash drive or an external device to access the BMC.
5	BMC Management Network Port	Enables you to manage the server. Note: It is a Gigabit Ethernet port that supports 100/1,000 Mbps auto-negotiation.
6	OCP 3.0 Network Port	Enables you to connect the system to the network.
7	PCIe NIC Port	Enables you to connect the system to the network.

5.5 Processor

- Supports 1 processor.
- For specific processor options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

Figure 5-6 Processor Location



5.6 DDR5 DIMMs

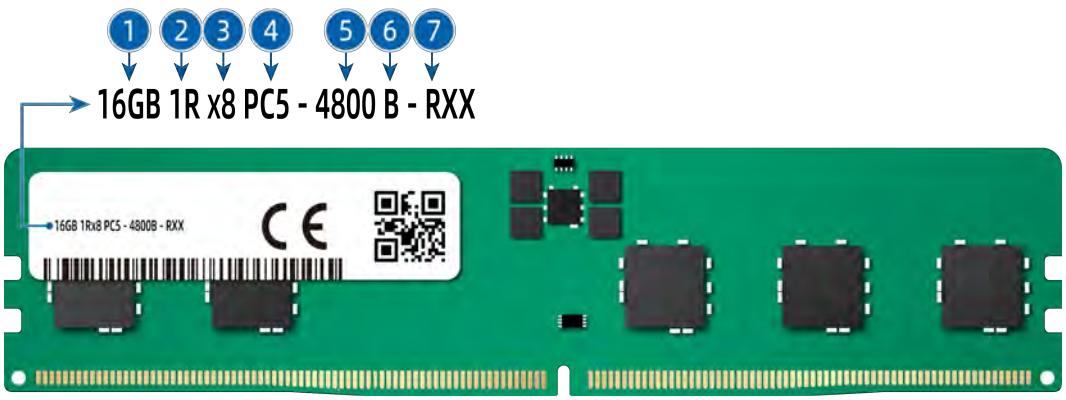
5.6.1 Identification

To determine DIMM characteristics, refer to the label attached to the DIMM and the following figure and table.

NOTE

The following content is for illustrative purpose only. For supported DIMMs, refer to 7.2.2 DIMM Specifications.

Figure 5-7 DIMM Identification



No.	Description	Example
1	Capacity	• 16 GB • 32 GB • 64 GB • 128 GB • 256 GB
2	Rank(s)	• 1R = Single rank • 2R = Dual rank • 2S2R = Two ranks of two high stacked 3DS DRAM • 2S4R = Four ranks of two high stacked 3DS DRAM • 4R = Quad rank
3	Data width of DRAM	• x4 = 4 bits • x8 = 8 bits
4	DIMM slot type	PC5 = DDR5
5	Maximum memory speed	• 4,800MT/s • 5,600MT/s • 6,400MT/s
6	CAS latency	• SDP 4800B = 40-39-39 • 3DS 4800B = 46-39-39 • SDP 5600B = 46-45-45 • 3DS 5600B = 52-45-45 • SDP 6400B = 52-52-52
7	DIMM type	R = RDIMM

5.6.2 Memory Subsystem Architecture

The server supports 16 DIMM slots and 8 memory channels per CPU.

Table 5-3 DIMM Slot List

CPU	Channel ID	Silk Screen
CPU0	Channel 0	CPU0_C0D0
		CPU0_C0D1
	Channel 1	CPU0_C1D0
		CPU0_C1D1
	Channel 2	CPU0_C2D0

CPU	Channel ID	Silk Screen
		CPU0_C2D1
	Channel 3	CPU0_C3D0
		CPU0_C3D1
	Channel 4	CPU0_C4D0
		CPU0_C4D1
	Channel 5	CPU0_C5D0
		CPU0_C5D1
	Channel 6	CPU0_C6D0
		CPU0_C6D1
	Channel 7	CPU0_C7D0
		CPU0_C7D1

5.6.3 Compatibility

Refer to the following rules to configure the DDR5 DIMMs.

IMPORTANT

- A server must use DDR5 DIMMs with the same part number (P/N code). All DDR5 DIMMs operate at the same speed, which is the lowest of:
  - Memory speed supported by a specific CPU.
  - Maximum operating speed of a specific memory configuration.
- Mixing DDR5 DIMMs of different specifications (capacity, bit width, rank, height, etc.) is not supported.
- The maximum memory capacity supported is different for different CPU models.
- The maximum number of DIMMs supported varies by CPU type, DIMM type and rank quantity.
- For specific system component options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

NOTE

Maximum number of DIMMs supported per channel ≤ Maximum number of ranks supported per channel ÷ Number of ranks per DIMM.

Table 5-4 DDR5 DIMM Specifications

Parameter		Value	
Capacity per DDR5 DIMM (GB)		32	64
Type		RDIMM	RDIMM
Rated speed (MT/s)		6,400	6,400
Operating voltage (V)		1.1	1.1
Maximum number of DDR5 DIMMs supported in a server		16	16
Maximum capacity of DDR5 DIMMs supported in a server (GB)[1]		512	1,024
Actual speed (MT/s)	1 DPC[2]	6,400	6,400
	2 DPC[2]	5,200	5,200
Notes: 1. It indicates the maximum memory capacity supported when all the DIMM slots are populated with DDR5 DIMMs. The maximum DDR5 capacity varies by CPU type. 2. DIMM Per Channel (DPC) is the number of DIMMs per memory channel. The information above is for reference only. Consult your local sales representative for details.			

5.6.4 DIMM Population Rules

General population rules for DDR5 DIMMs:

- Install DIMMs only when the corresponding processor is installed.
- Install dummies in the empty DIMM slots.

Population rules for DDR5 DIMMs in specific modes:

- Memory sparing mode
  - Follow the general population rules.
  - Each channel must have a valid online spare configuration.
  - Each channel can have a different online spare configuration.
  - Each channel with a DIMM installed must have a spare rank.
- Memory mirroring mode
  - Follow the general population rules.
  - Each processor supports 8 integrated memory controllers (iMCs). Each iMC has 2 channels to be populated with DIMMs. Installed DIMMs must be of the same capacity and organization.

5.6.5 DIMM Slot Layout

Up to 16 DDR5 DIMMs can be installed in a server, and a balanced DIMM configuration is recommended for optimal memory performance. DIMM configuration must be compliant with the DIMM population rules.

Figure 5-8 DIMM Slot Layout

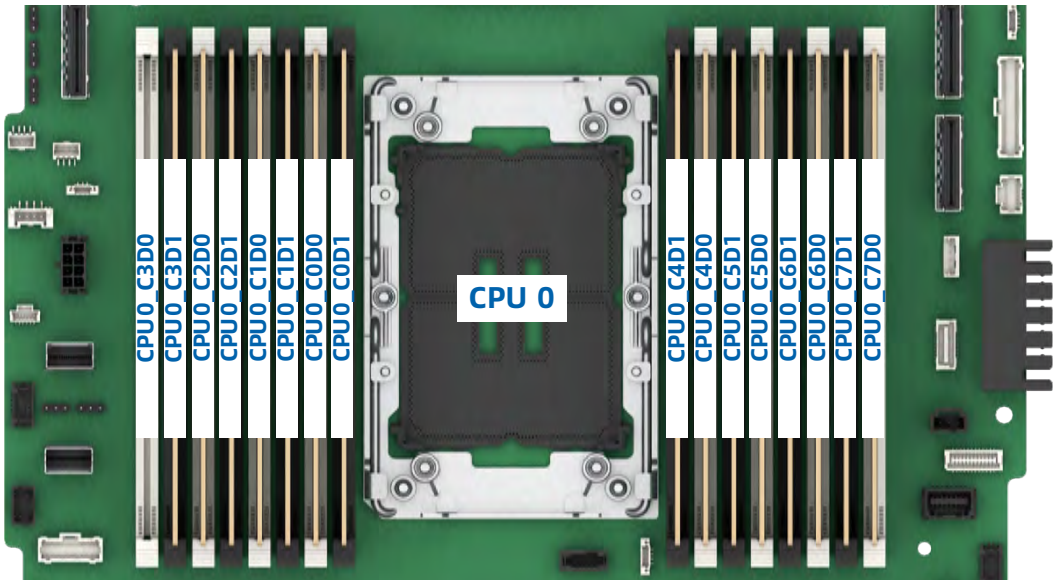


Table 5-5 DDR5 DIMM Population Rules for 6700E-Series CPU Configuration

DDR	CPU0															
QTY	C0D0	C0D1	C1D0	C1D1	C2D0	C2D1	C3D0	C3D1	C4D0	C4D1	C5D0	C5D1	C6D0	C6D1	C7D0	C7D1
1	●															
4	●				●				●				●			
8	●		●		●		●		●		●		●		●	
16	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Table 5-6 Population Requirements for 6700E-Series CPU Configuration

Capacity	Organization	Supported Population	
		1 DPC	2 DPC
32 GB	1R x4	√	×
	2R x8	√	×
64 GB	2R x4	√	√

5.7 Storage

CAUTION

Mixing of storage controllers may result in drive letter drift under the OS.

5.7.1 Drive Configurations

NOTE

For the physical drive No. of each configuration, refer to 5.7.2 Drive Numbering.

Table 5-7 Drive Configurations

Config.	Front Drives	Rear Drives	Internal Drives	Drive Management Mode
8 × 2.5-Inch Drive Config.	8 × 2.5-inch drive (Drive bays with physical drive No. 0 to 7 support SAS/SATA/NVMe drives)	/	SATA/NVMe M.2 SSD × 2	• NVMe drive: CPU • SAS/SATA drive: PCIe RAID card
10 × 2.5-Inch Drive Config.	10 × 2.5-inch drive (Drive bays with drive No. 0 to 9 support SAS/SATA/NVMe drives)	/	SATA/NVMe M.2 SSD × 2	• NVMe drive: CPU • SAS/SATA drive: PCIe RAID card
4 × 3.5-Inch Drive + 4 × E3.S Drive Config.	• 4 × E3.S drive (Drive bays with drive No. 0 to 3 support E3.S SSDs only) • 4 × 3.5-inch drive (Drive bays with drive No. 4 to 7 support SAS/SATA/NVMe drives)	/	SATA/NVMe M.2 SSD × 2	• NVMe drive: CPU • SAS/SATA drive: PCIe RAID card • E3.S SSD: CPU

5.7.2 Drive Numbering

1. 4 × 3.5-Inch Drive + 4 × E3.S Drive Configuration

Figure 5-9 Drive Numbering

Config.	Physical Drive No.	Drive No. Identified by the BMC	Front/Rear	Drive No. Identified by the 16i RAID Card
4 × E3.S	0 to 3	0 to 3	Front	-
4 × SAS/SATA	4 to 7	4 to 7	Front	4 to 7
4 × NVMe	4 to 7	4 to 7	Front	-

2. 8 × 2.5-Inch SAS/SATA/NVMe Drive Configuration

Figure 5-10 Drive Numbering

Config.	Physical Drive No.	Drive No. Identified by the BMC	Front/Rear	Drive No. Identified by the 16i RAID Card
8 × SAS/SATA	0 to 7	0 to 7	Front	0 to 7
8 × NVMe	0 to 7	0 to 7	Front	-

3. 10 × 2.5-Inch SAS/SATA/NVMe Drive Configuration

Figure 5-11 Drive Numbering

Config.	Physical Drive No.	Drive No. Identified by the BMC	Front/Rear	Drive No. Identified by the 16i RAID Card
10 × SAS/SATA	0 to 9	0 to 9	Front	0 to 9
10 × NVMe	0 to 9	0 to 9	Front	-

5.7.3 Drive LEDs

1. SAS/SATA Drive LEDs

Figure 5-12 SAS/SATA Drive LEDs

Activity LED (①)	Locator/Error LED (②)			Description
Green	Blue	Red		
Off	Off	RAID	RAID not created	Drive absent
		Solid on	Off	
Solid on	Off	Off		Drive present but not in use
Blinking (4 Hz)	Off	Off		Drive present and in use
Blinking (4 Hz)	Solid pink			Copyback/Rebuild in progress
Solid on	Solid on	Off		Drive selected but not in use
Blinking (4 Hz)	Solid on	Off		Drive selected and in use
Off	Solid on	Off		Drive is selected but fails
Any status	Off	Solid on		Drive fails

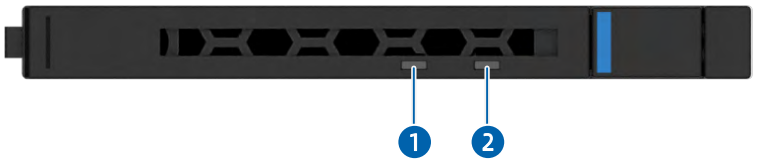
2. NVMe Drive LEDs

Figure 5-13 NVMe Drive LEDs

Activity LED (①)	Locator/Error LED (②)		Description
Green	Blue	Red	
Off	Off	Off	Drive absent
Solid on	Off	Off	Drive present but not in use
Blinking (4 Hz)	Off	Off	Drive present and in use
Blinking (4 Hz)	Solid pink		Copyback/Rebuild/Initializing/Verifying in progress
Solid on	Solid on	Off	Drive selected but not in use
Blinking (4 Hz)	Solid on	Off	Drive selected and in use
Off	Solid on	Off	Drive is selected but fails
Any status	Off	Solid on	Drive fails

3. E3.S SSD LEDs

Figure 5-14 E3.S SSD LEDs



Locator/Error LED (①)		Activity LED (②)	Description
Blue	Amber	Green	
Off	Off	Off	Drive absent
Off	Off	Solid on	Drive present but not in use
Off	Off	Blinking (4 Hz)	Drive present and in use

Locator/Error LED (①)		Activity LED (②)	Description
Blue	**Amber**	**Green**	
Solid on	Off	Blinking (4 Hz)	Drive selected
Solid purple		Off	Copyback/Rebuild/Initializing/Verifying in progress
Off	Solid on	Off	Drive fails

5.7.4 RAID Cards

- The RAID card provides functions such as RAID configuration, RAID level migration, and drive roaming.
- For specific RAID card options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

5.8 Network

NICs provide network expansion capabilities.

- The OCP slot supports an OCP 3.0 card. Users can select the OCP 3.0 card as needed.
- The PCIe slots support PCIe NICs. Users can select the PCIe NICs as needed.
- For specific NIC options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

5.9 I/O Expansion

5.9.1 PCIe Expansion Cards

PCIe expansion cards provide system expansion capabilities. Up to 5 standard PCIe expansion cards are supported.

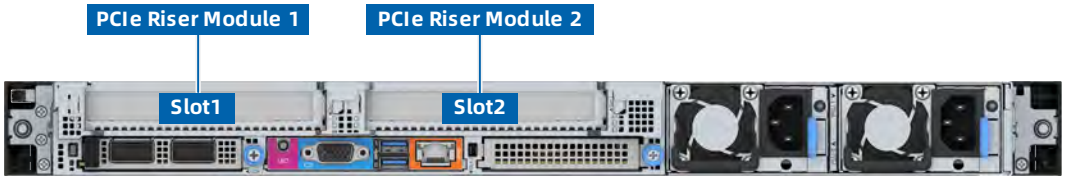
- Front: 2 × HHHL PCIe 4.0 x16 expansion card
- Rear: 1 × FHHL PCIe 5.0 x16 expansion card + 2 × HHHL PCIe 5.0 x16 expansion card or 2 × FHHL PCIe 5.0 x16 expansion card
- For specific PCIe expansion card options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

5.9.2 PCIe Slot Locations

Figure 5-15 2 × Front PCIe Slot Configuration

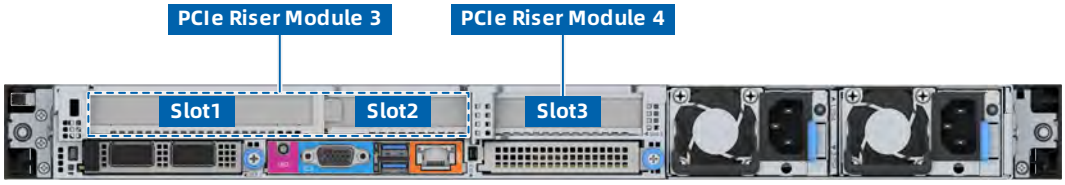
Slot 1 and slot 2 reside in PCIe riser module 0.

Figure 5-16 2 × Rear PCIe Slot Configuration



- Slot 1 resides in PCIe riser module 1.
- Slot 2 resides in PCIe riser module 2.

Figure 5-17 3 × PCIe Slot Configuration



- Slot 1 and Slot 2 reside in PCIe riser module 3.
- Slot 3 resides in PCIe riser module 4.

5.9.3 PCIe Riser Module

Figure 5-18 PCIe Riser Module 0 (Two PCIe x16 slots)

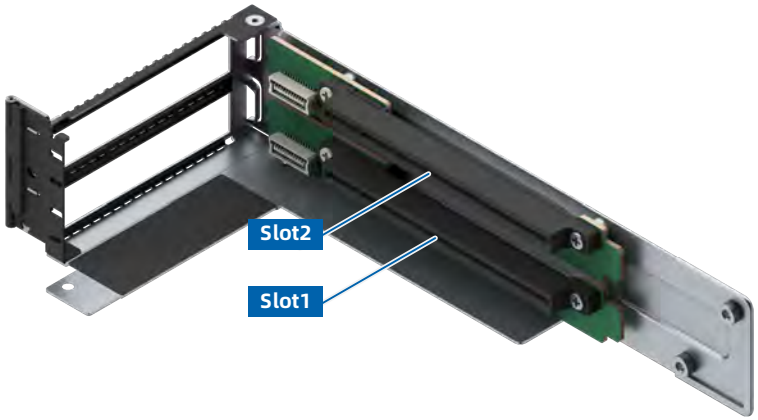


Figure 5-19 PCIe Riser Module 1/2 (One PCIe x16 slot)

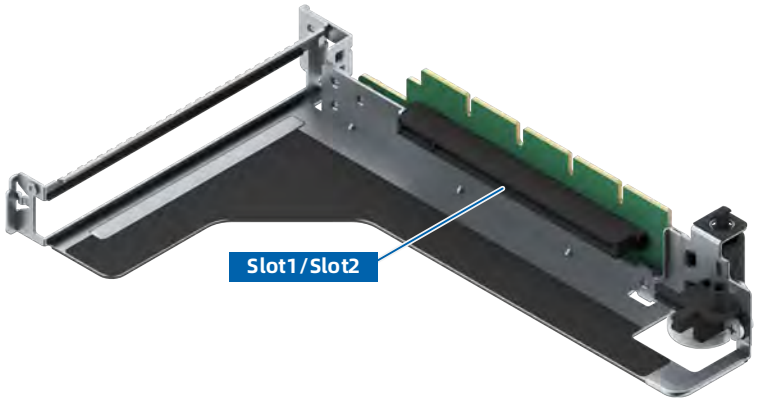


Figure 5-20 PCIe Riser Module 3 (Two PCIe x16 slots)

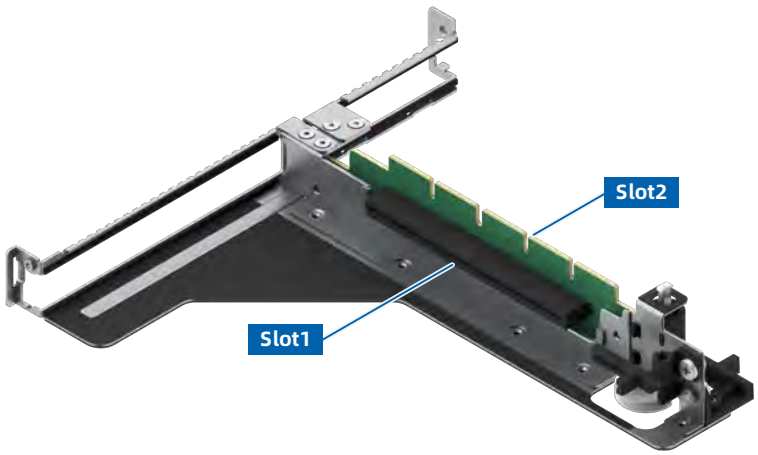
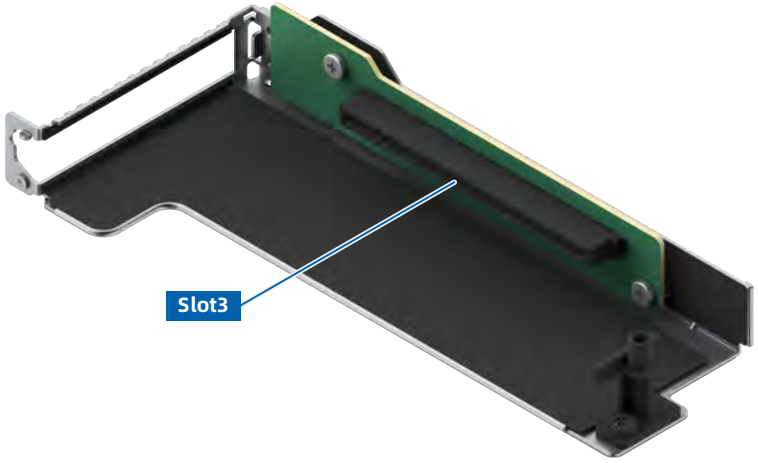


Figure 5-21 PCIe Riser Module 4 (One PCIe x16 slot)



5.9.4 PCIe Slot Description

NOTE

- When the CPU is absent, its corresponding PCIe slots are not available.
- RIO: CPUs that support rich-IO can use its UPI links as PCIe links to provide more PCIe lanes.

1. Front PCIe Slot Description

Table 5-8 PCIe Slot Description - 2 × PCIe Slot (RIO)

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port	Form Factor
Slot 1	CPU0	PCIe 4.0	x16	x8	UPI2	HHHL
Slot 2	CPU0	PCIe 4.0	x16	x8	UPI2	HHHL

2. Rear PCIe Slot Description

- 2 × PCIe Slot Configuration

Table 5-9 PCIe Slot Description (RIO & Non-RIO)

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port	Form Factor
Slot 1	CPU0	PCIe 5.0	x16	x16	PE0	FHHL
Slot 2	CPU0	PCIe 5.0	x16	x16	PE3	FHHL
OCP 3.0	CPU0	PCIe 5.0	x16	x16	PE2	SFF

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port	Form Factor
Slot						

Table 5-10 PCIe Slot Description (Non-RIO)

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port	Form Factor
Slot 1	CPU0	PCIe 5.0	x16	x8	PE0	FHHL
Slot 2	CPU0	PCIe 5.0	x16	x8	PE0	HHHL
OCP 3.0 Slot	CPU0	PCIe 5.0	x16	x16	PE2	SFF

Table 5-11 PCIe Slot Description (RIO)

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port	Form Factor
Slot 1	CPU0	PCIe 5.0	x16	x16	UPI0	FHHL
Slot 2	CPU0	PCIe 5.0	x16	x16	PE0	HHHL
OCP 3.0 Slot	CPU0	PCIe 5.0	x16	x16	PE2	SFF

- 3 × PCIe Slot Configuration

Table 5-12 PCIe Slot Description (Non-RIO)

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port	Form Factor
Slot 1	CPU0	PCIe 5.0	x16	x8	PE0	FHHL
Slot 2	CPU0	PCIe 5.0	x16	x8	PE0	HHHL
Slot 3	CPU0	PCIe 5.0	x16	x16	PE5	HHHL
OCP 3.0 Slot	CPU0	PCIe 5.0	x16	x16	PE2	SFF

Table 5-13 PCIe Slot Description (RIO)

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port	Form Factor
Slot 1	CPU0	PCIe 5.0	x16	x16	UPI0	FHHL
Slot 2	CPU0	PCIe 5.0	x16	x16	PE0	HHHL

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port	Form Factor
Slot 3	CPU0	PCIe 5.0	x16	x16	UPI2	HHHL
OCP 3.0 Slot	CPU0	PCIe 5.0	x16	x16	PE2	SFF

5.10 PSUs

- Supports 1 or 2 PSUs.
- Supports AC or DC input.
- The PSUs are hot-swappable.
- When 2 PSUs are configured, the PSUs offer 1+1 redundancy.
- The server must use PSUs with the same part number (P/N code).
- The PSUs provide short circuit protection.

5.10.1 PSU Locations

Figure 5-22 PSU Locations

5.10.2 PSU LED

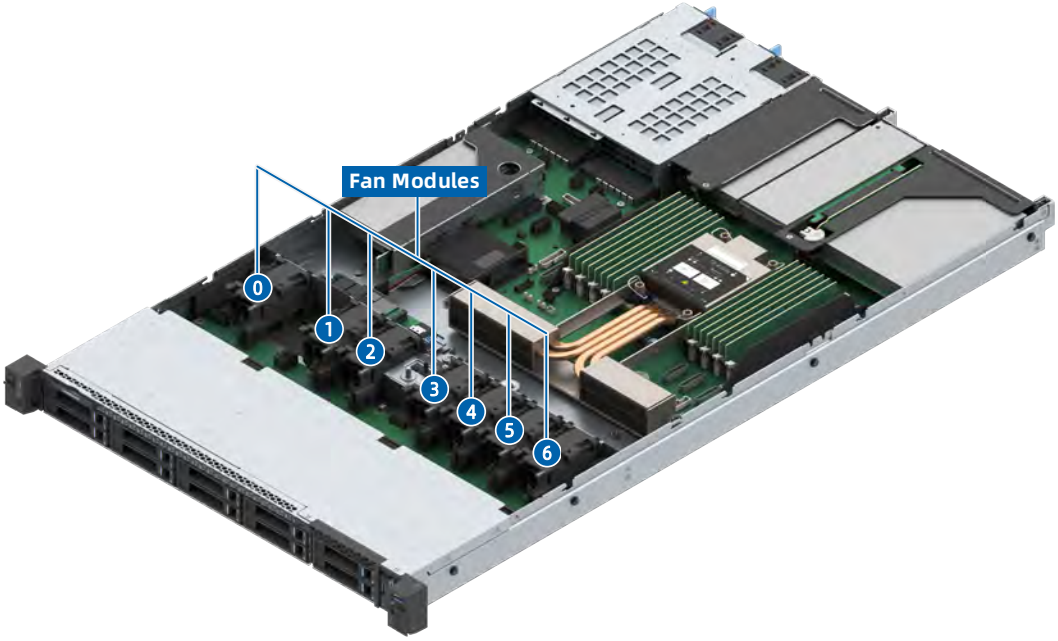
Figure 5-23 PSU LED Description

PSU LED (①) Status	Description
Solid green	Normal
Off	No AC/DC input to the PSU
Solid amber	PSU critical event causing a shutdown (possible causes: PSU overtemperature protection, PSU overcurrent protection, PSU overvoltage protection, short circuit protection)
Blinking amber (1 Hz)	PSU warning event where the PSU continues to operate (possible causes: PSU overtemperature warning, PSU overcurrent warning, excessively low fan speed warning)
Blinking green (1 Hz)	PSU operating in standby state with normal input
Blinking green (on for 2 seconds and off for 1 second)	PSU in sleep state for cold redundancy
Blinking green (2 Hz)	PSU firmware updating

5.11 Fan Module

- Supports eight 4056 fan modules. The mainstream configuration uses seven 4056 fan modules. The server can be customized to hold eight or six 4056 fan modules.
- The fan modules are hot-swappable.
- The server supports fan modules in N+1 redundancy, which means that the server can continue working properly when a rotor of a dual-rotor fan fails.
- The server supports intelligent fan speed control.
- The server must use fan modules with the same part number (P/N code).

Figure 5-24 Fan Module Locations



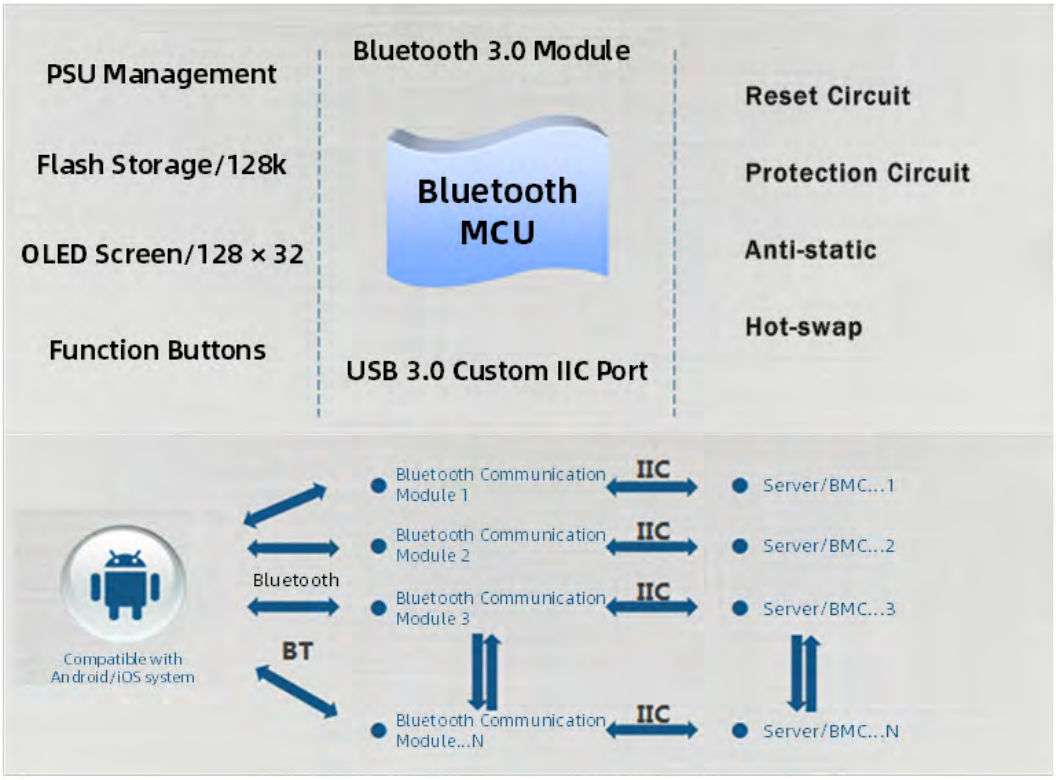
5.12 LCD Module

5.12.1 Function

The LCD module reads server-related information from the BMC, such as the operating status of processors and memories, network status, logs, and alerts, and transmits the information to client mobile terminals via Bluetooth.

The LCD module synchronizes information with the BMC through I^2C and can display information on an LCD screen or in the app. The server's basic information, system status and alert diagnosis can be displayed in the app via Bluetooth, facilitating the operation and maintenance.

Figure 5-25 How LCD Subsystem Works



5.12.2 Interface

Figure 5-26 App Home Screen

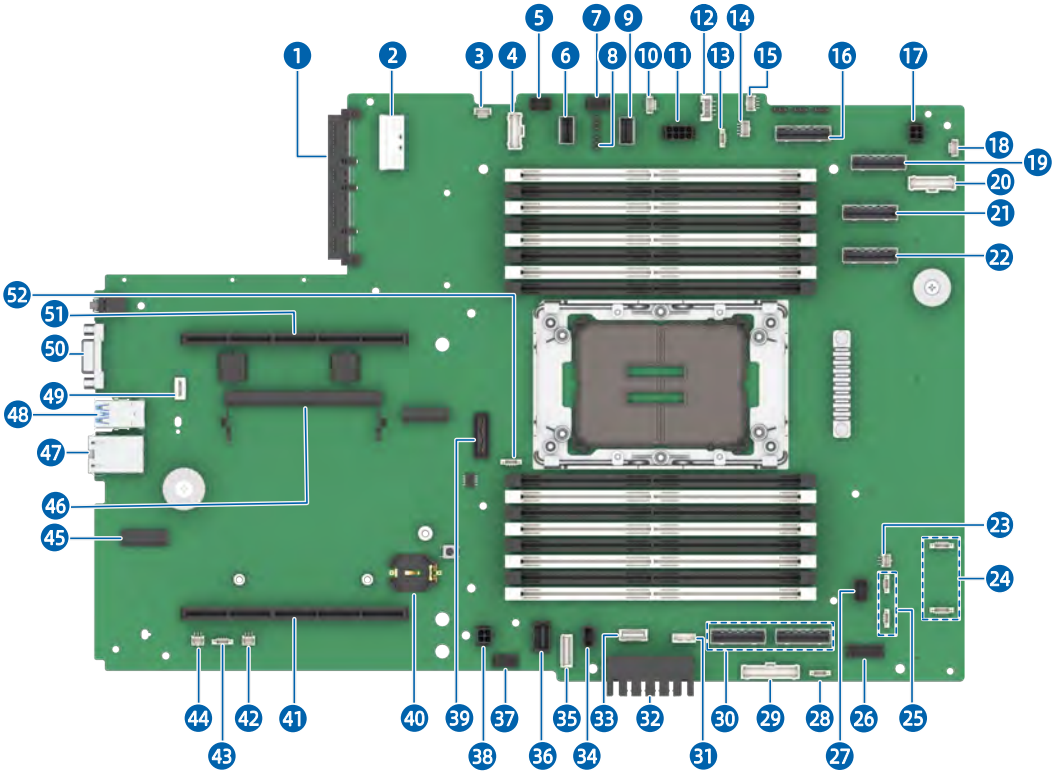
5.13 Boards

NOTE

The figures below may differ from the actual configuration.

5.13.1 Motherboard

Figure 5-27 Motherboard Layout

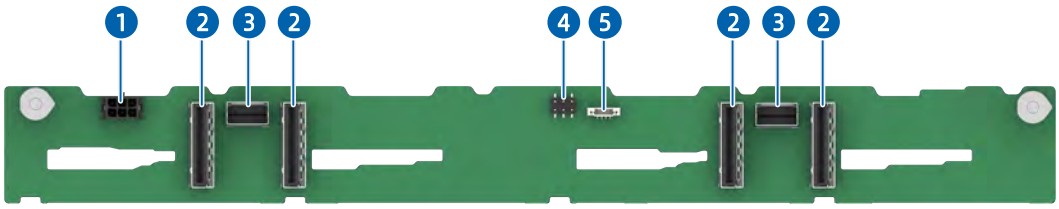


Item	Feature	Item	Feature
1	OCP 3.0 Card Connector	27	Drive BP I²C Connector
2	MCIO x8 Connector	28	DMPU/TSOM I²C Connector
3	OCP 3.0 Card Hot-Plug Button and LED Connector	29	PDB Sideband Connector
4	NC-SI Connector	30	MCIO x8 Connector
5	Drive BP I²C Connector	31	RAID Key Connector
6	Right Control Panel Connector	32	PDB Power Connector
7	PCIe Riser I²C Connector	33	Front Panel USB Type-C Port Connector
8	CMOS Jumper	34	Intrusion Detection Connector
9	M.2 Adapter Slimline x4 Connector	35	Left Control Panel Connector
10	NVMe M.2 Adapter I²C Connector	36	Drive BP I²C Connector
11	Smart NIC Power Connector	37	PCIe Riser I²C Connector
12	Inlet Temperature Sensor Connector	38	NVMe M.2 Adapter Power Connector
13	Smart NIC UART Connector	39	XDP Connector

Item	Feature	Item	Feature
14	Leak Detection Connector	40	Button Cell Battery Socket
15	Leak Simulation Connector	41	Gen-Z x32 Connector
16	MCIO x8 Connector	42	DMPU UART Connector
17	Front OCP 3.0 Card Power Connector	43	DB9 Breakout Board Signal Connector
18	Front OCP 3.0 Card Hot-Plug Button and LED Connector	44	DMPU UART Connector
19	MCIO x8 Connector	45	TF Card/USB Adapter Connector
20	Front OCP 3.0 Card Sideband Connector	46	BMC Module Signal Connector
21	MCIO x8 Connector	47	BMC Management Network Port
22	MCIO x8 Connector	48	USB 3.0 Port
23	DMPU UART Connector (3V3)	49	TPM Connector
24	RAID Riser I^3C Connector	50	VGA Port
25	DMPU UART Connector (1V8)	51	Gen-Z x32 Connector
26	Fan Board Signal Connector	52	Smart NIC Presence Detection and Clock Selection Connector

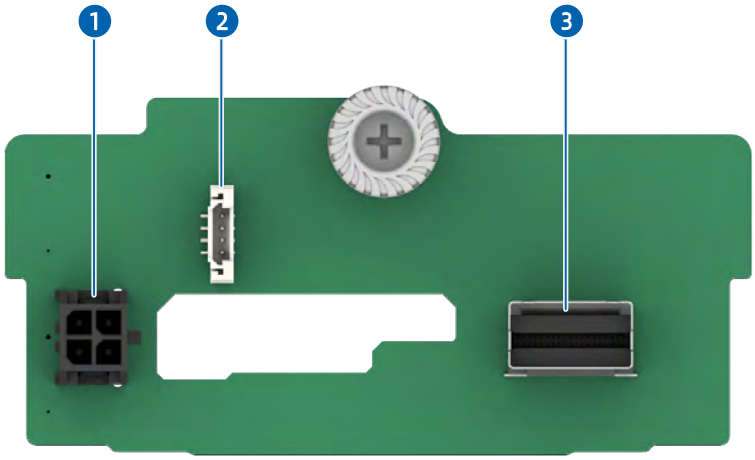
5.13.2 Drive Backplanes

Figure 5-28 8 × 2.5-Inch SAS/SATA/NVMe Drive Backplane



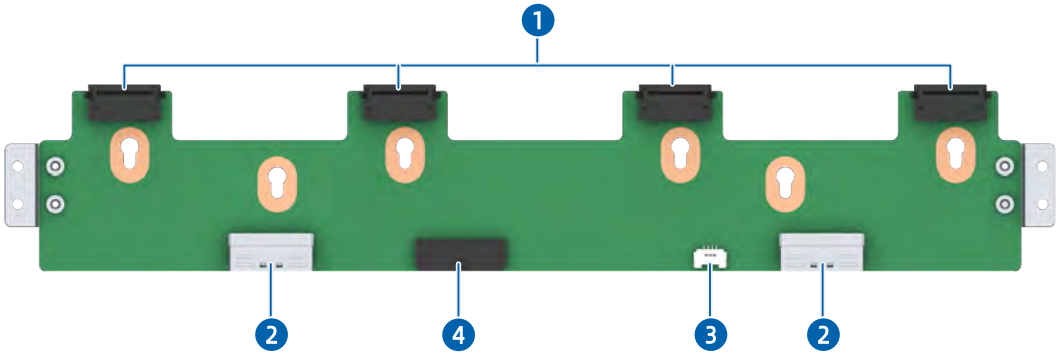
Item	Feature	Item	Feature
1	Power Connector	4	CPLD JTAG Connector
2	MCIO x8 Connector	5	Front Drive BP I^2C Connector
3	Slimline x4 Connector	-	-

Figure 5-29 2 × 2.5-Inch SAS/SATA Drive Backplane



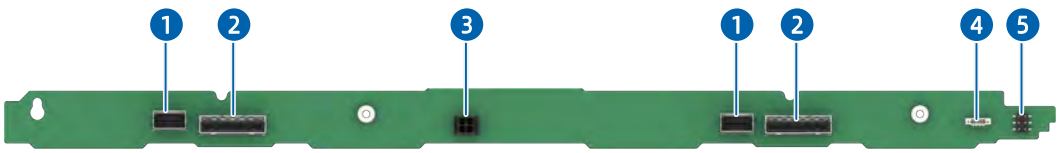
Item	Feature	Item	Feature
1	Power Connector	3	Slimline x4 Connector
2	Front Drive BP I²C Connector	-	-

Figure 5-30 4 × E3.S Drive Backplane



Item	Feature	Item	Feature
1	E3.S SSD Connector	3	Drive BP I²C Connector
2	MCIO x8 Connector	4	Power Connector

Figure 5-31 4 × 3.5-Inch SAS/SATA/NVMe Drive Backplane



Item	Feature	Item	Feature
1	Slimline x4 Connector	4	Front Drive BP I²C Connector

2	MCIO x8 Connector	5	CPLD JTAG Connector
3	Power Connector	-	-

6 Product Specifications

6.1 Technical Specifications

Table 6-1 Technical Specifications

Item	Specifications
Form Factor	1U rack server
Processor	One Intel Xeon 6 processor built on the Birch Stream platform. • Integrated memory controllers and 8 memory channels per processor • Integrated PCIe 5.0 controllers and 88 PCIe lanes per processor • Up to 144 cores per CPU • Four UPI links per CPU at up to 24 GT/s per link • Max. Turbo frequency up to 3.2 GHz • L3 cache up to 108 MB per CPU • TDP up to 330 W Note: The information above is for reference only. Refer to 7.2 Hardware Compatibility for details.
DIMM	Up to 16 DDR5 DIMMs • RDIMMs supported • Up to 6,400 MT/s (1 DPC) • Up to 5,200 MT/s (2 DPC) • Mixing DDR5 DIMMs of different specifications (capacity, bit width, rank, height, etc.) is not supported. • A server must use DDR5 DIMMs with the same part number (P/N code). Note: The information above is for reference only. Refer to 7.2 Hardware Compatibility for details.
Storage	• Supports multiple drive configurations. Refer to 7.2 Hardware Compatibility for details. • Front: - Up to 10 × 2.5-inch SAS/SATA/NVMe drive (hot-swap).or - Up to 4 × 3.5-inch SAS/SATA/NVMe drive (hot-swap) + 4 × E3.S drive (hot-swap) • Internal:

Item	Specifications
	- Up to 2 × SATA/NVMe M.2 SSD
Network	• One onboard 1 GbE port • One 1/10/25/100/200 Gb OCP 3.0 card (hot-plug) • 1/10/25/40/100 Gb PCIe NICs • One BMC management network port of 100/1,000 Mbps auto-negotiation
I/O Expansion	• Up to 5 standard PCIe expansion cards. - Front: 2 × HHHL PCIe 4.0 x16 expansion card - Rear: 1 × FHHL PCIe 5.0 x16 expansion card + 2 × HHHL PCIe 5.0 x16 expansion card or 2 × FHHL PCIe 5.0 x16 expansion card • One 1/10/25/100/200 Gb OCP 3.0 card. Refer to 5.9.2 PCIe Slot Locations and 5.9.4 PCIe Slot Description for details.
Port	• Front: - 1 × USB 2.0/LCD port - 1 × USB 3.0 port - 1 × VGA port - 1 × USB Type-C port • Rear: - 2 × USB 3.0 port - 1 × VGA port - 1 × BMC management network port Note: OS installation on the USB storage media is not recommended.
Graphics card	Integrated VGA on the motherboard with a video memory of 64 MB and a maximum 16M color resolution of 1,920 × 1,200 at 60 Hz Notes: • The integrated VGA can support a maximum resolution of 1,920 × 1,200 only when the video driver matching the OS version is installed; otherwise, only the default resolution of the OS is supported. • When both the front and rear VGA ports are connected to monitors, only the monitor connected to the front VGA port works.
System Management	• UEFI • BMC • NC-SI

Item	Specifications
	• KSManage • KSManage Tools
Security Features	• Intel Platform Firmware Resilience (PFR) • Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) • Intel Trusted Execution Technology • Firmware update mechanism based on digital signatures • UEFI Secure Boot • Hierarchical BIOS password protection • BIOS Secure Flash and BIOS Lock Enable (BLE) • BMC and BIOS dual-image mechanism • Chassis intrusion detection • System secure erase (optional) • Memory protection technologies • DMPU for fault diagnosis • IRUT hitless firmware update • MUPR for intelligent forewarning and healing

6.2 Environmental Specifications

Table 6-2 Environmental Specifications

Item	Description
Temperature[1,2]	• Operating: 5°C to 35°C (41°F to 95°F) • Storage (packed): -40°C to 70°C (-40°F to 158°F) • Storage (unpacked): -40°C to 70°C (-40°F to 158°F)
Relative Humidity (RH, non-condensing)	• Operating: 5% to 90% RH • Storage (packed): 5% to 95% RH • Storage (unpacked): 5% to 95% RH
Altitude	• Operating: 0 to 3,050 m (0 to 10,007 ft) • Shipping (storage): 0 to 12,000 m (0 to 39,370 ft)
Corrosive Gaseous Contaminants	Maximum growth rate of corrosion film thickness: • Copper coupon: 300 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)

Item	Description
	• Silver coupon: 200 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)
Acoustic Noise[3,4,5]	Noise emissions are measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). Listed are the declared A-weighted sound power levels (LWAd) and the declared average bystander position A-weighted sound pressure levels (LpAm) at a server operating temperature of 23°C (73.4°F): • Idle: - LWAd: 6.1 Bels - LpAm: 48.0 dBA • Operating: - LWAd: 7.2 Bels - LpAm: 61 dBA

Notes:

1. The mainstream configuration supports operating at 5°C to 35°C (41°F to 95°F); the customized configuration supports operating at 5°C to 45°C (41°F to 113°F). Contact your sales representative for more information.

2. Standard operating temperature:

- 5°C to 35°C (41°F to 95°F) is the standard operating temperature range at sea level. At an altitude of 0 to 3,050 m (0 to 10,007 ft), derate the maximum allowable temperature by 1°C per 305 m (1 °F per 556 ft). No direct sustained sunlight is permitted. The maximum temperature gradient is 20°C/h (36°F/h). Both the altitude and the maximum temperature gradient vary by server configuration.
- Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

3. This document lists the LWAd and LpAm of the product at a 23°C (73.4°F) ambient environment. All measurements are conducted in conformance with ISO 7779 (ECMA 74) and declared in conformance with ISO 9296 (ECMA 109). Contact your sales representative for more information.

4. The sound levels shown here were measured based on the specific configurations of a server. Sound levels vary by server configuration, workload ambient temperature, and other factors. These values are for reference only and subject to change without further notice.

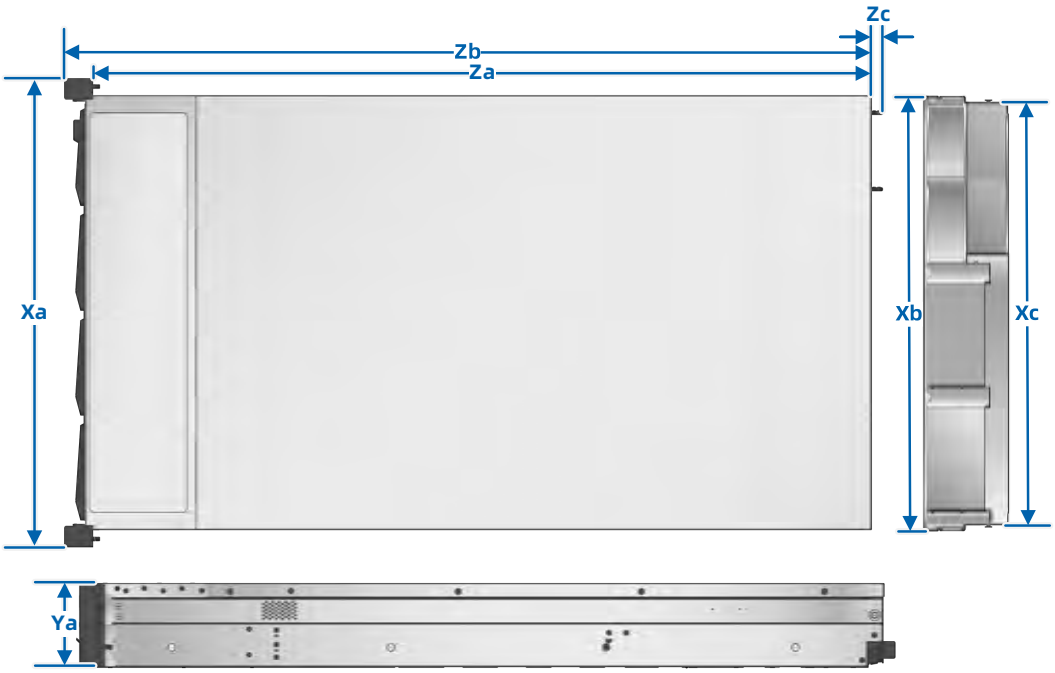
5. Product conformance to cited normative standards is based on sample testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

6.3 Physical Specifications

Table 6-3 Physical Specifications

Item	Description
Outer Packaging Dimensions (L × W × H)	1,030 × 650 × 240 mm (40.55 × 25.59 × 9.45 in.)
Installation Dimension Requirements	• Installation requirements for the cabinet are as follows: - General cabinet compliant with the International Electrotechnical Commission 297 (IEC 297) standard - Width: 482.6 mm (18.98 in.) - Depth: above 1,000 mm (39.37 in.) • Installation requirements for the server rails are as follows: - Static rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.). - Ball-bearing slide rail kit: The distance between the front and rear mounting flanges ranges from 609 mm to 914 mm (23.98 to 35.98 in.)
Weight	• 10 × 2.5-inch drive configuration - Net weight: 17 kg (37.48 lbs) - Gross weight: 23.9 kg (52.69 lbs) (including the server, packaging box, rails and accessory box) • 8 × 2.5-inch drive + 2 × PCIe slot configuration - Net weight: 17 kg (37.48 lbs) - Gross weight: 23.9 kg (52.69 lbs) (including the server, packaging box, rails and accessory box) • 4 × 3.5-inch drive + 4 × E3.S drive configuration - Net weight: 17.5 kg (38.58 lbs) - Gross weight: 23.8 kg (52.47 lbs) (including the server, packaging box, rails and accessory box) Note: The server weight varies by configuration.

Figure 6-1 Chassis Dimensions



Model	Xa	Xb	Xc	Ya	Za	Zb	Zc
KR1180-X3-A0-R0-00	482 mm (18.98 in.)	442.8 mm (17.43 in.)	437.6 mm (17.23 in.)	43.05 mm (1.69 in.)	778.54 mm (30.65 in.)	810 mm (31.89 in.)	30 mm (1.18 in.)

7 Operating System and Hardware Compatibility

This section describes the OS and hardware compatibility of the server. For the latest compatibility configuration and the component models not listed in this document, contact your local sales representative.

IMPORTANT

- Using incompatible components may cause the server to work abnormally, and such failures are not covered by technical support or warranty.
- The hardware compatibility may vary by model. Contact your sales representatives for detailed hardware configurations during the pre-sales phase.
- The server performance is strongly influenced by application software, middleware and hardware. The subtle differences in them may lead to performance variation in the application and test software.
  - For requirements on the performance of specific application software, contact your sales representatives to confirm the detailed hardware and software configurations during the pre-sales phase.
  - For requirements on hardware performance consistency, define specific configuration requirements (for example, specific drive models, RAID cards, or firmware versions) during the pre-sales phase.

7.1 Supported Operating System

Table 7-1 Supported Operating Systems

OS Version
Windows 2022
SLES 15.6
RHEL 9.4
Ubuntu 24.04
KeyarchOS 5.8 SP2

7.2 Hardware Compatibility

7.2.1 CPU Specifications

The server supports one Intel Xeon 6 processor. The 6700 series supports a max Turbo frequency of up to 3.2 GHz.

Table 7-2 CPU Specifications

Model	Cores	Threads	Base Frequency (GHz)	Max. Turbo Frequency (GHz)	Cache (MB)	TDP (W)
6710E	64	64	2.4	3.2	96	205
6740E	96	96	2.4	3.2	96	250
6746E	112	112	2.4	2.7	96	250
6756E	128	128	1.8	2.6	96	225
6766E	144	144	1.9	2.7	108	250
6780E	144	144	2.2	3.0	108	330

7.2.2 DIMM Specifications

The server supports up to 16 DDR5 DIMMs. Each processor supports 8 memory channels with up to 2 DIMMs per channel. RDIMMs are supported.

Table 7-3 DIMM Specifications

Type	Capacity (GB)	Speed (MT/s)	Data Width	Organization
RDIMM	64	6,400	x72	2R x4

7.2.3 Drive Specifications

Table 7-4 HDD Specifications

Type	Speed in rpm	Capacity (TB)	Max. Qty.
SAS HDD	10k	1.8/2.4	10
	7.2k	8/10/16/20	10
SATA HDD	7.2k	6/8/12/16/18/24	10

Table 7-5 SAS/SATA SSD Specifications

Type	Capacity (GB)	Max. Qty.
SATA SSD	240	10
SATA SSD	480	10

Table 7-6 U.2 NVMe SSD Specifications

Type	Capacity (TB)	Max. Qty.
U.2 NVMe SSD	1.6	10
U.2 NVMe SSD	1.92	10
U.2 NVMe SSD	3.2	10
U.2 NVMe SSD	3.84	10
U.2 NVMe SSD	6.4	10
U.2 NVMe SSD	7.68	10

Table 7-7 M.2 SSD Specifications

Type	Capacity	Max. Qty.
M.2 SATA SSD	240 GB	2
M.2 SATA SSD	480 GB	2
M.2 PCIe SSD	960 GB	2
M.2 PCIe SSD	1.92 TB	2

7.2.4 SAS/RAID Card Specifications

Table 7-8 SAS/RAID Card Specifications

Type	Model & Description
SAS card	SAS Card_BRCM_8R0_9500-8i_SMSAS3_PCIE4
RAID card	RAID Card_BRCM_8R0_9560-8i-_4G_SMSAS3_PCIE4

7.2.5 NIC Specifications

Table 7-9 OCP Card Specifications

Type	Model & Description	Speed (Gbps)	Port Qty.
OCP 3.0 Card	NIC_M_25G_MCX631432AN_LC_OCP3x8_2_XR	25	2

Table 7-10 PCIe NIC Specifications

Type	Model & Description	Speed (Gbps)	Port Qty.
PCIe NIC	NIC_I_10G_X710T2L_RJ_PCIEx8_2_XR	10	2

7.2.6 HCA Card Specifications

Table 7-11 HCA Card Specifications

Type	Model & Description	Speed (Gbps)	Port Qty.
HCA cards	HCA Card_M_1-HDR4X100_MCX653105A-HDAT_PCIE X16	200	1

7.2.7 PSU Specifications

The server supports up to 2 PSUs in 1+1 redundancy that follow the Intel Common Redundant Power Supply (CRPS) specification. The PSUs share a common electrical and structural design that allows for hot-swapping and tool-less installation into the server with the PSUs locking automatically after being inserted into the power bay. The CRPS PSUs are 80 Plus Platinum or Titanium rated with various output powers, allowing customers to choose as needed.

- The following rated 110 Vac and 230 Vac PSUs in 1+1 redundancy are supported:
  - 550 W Platinum PSU: 550 W (110 Vac), 550 W (230 Vac)
  - 800 W Platinum PSU: 800 W (110 Vac), 800 W (230 Vac)
  - 1,300 W Platinum PSU: 1,000 W (110 Vac), 1,300 W (230 Vac)
  - 800 W Titanium PSU: 800 W (230 Vac)
  - 1,300 W Titanium PSU: 1,300 W (230 Vac)

  Note: At a rated input voltage of 110 Vac, the output power of a 1,300 W PSU will be derated to 1,000 W.

  Operating voltage range:

  - 110 Vac: 90 Vac to 132 Vac
  - 230 Vac: 180 Vac to 264 Vac
- The following rated -48 Vdc PSUs in 1+1 redundancy are supported:

- 800 W -48 Vdc PSU: 800 W (-48 Vdc)
- 1,300 W -48 Vdc PSU: 1,300 W (-48 Vdc)

Operating voltage range:

- -48 Vdc: -40 Vdc to -72 Vdc

8 Regulatory Information

8.1 Safety

8.1.1 General

- Strictly comply with local laws and regulations while installing the equipment. The safety instructions in this section are only a supplement to local safety regulations.
- To ensure personal safety and to prevent damage to the equipment, all personnel must strictly observe the safety instructions in this section and on the device labels.
- People performing specialized activities, such as electricians and electric forklift operators, must possess qualifications recognized by the local government or authorities.

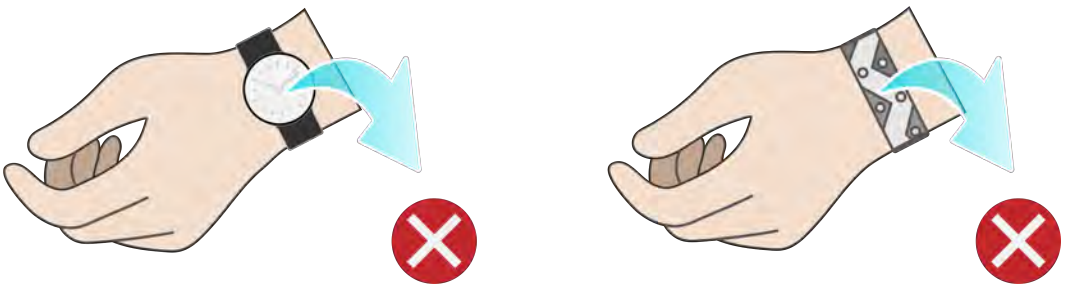
8.1.2 Personal Safety

- Only personnel certified or authorized by us are allowed to perform the installation procedures.
- Stop any operation that could cause personal injury or equipment damage. Report to the project manager and take effective protective measures.
- Working during thunderstorms, including but not limited to handling equipment, installing cabinets and installing power cords, is forbidden.
- Do not carry the weight over the maximum load per person allowed by local laws or regulations. Arrange appropriate installation personnel and do not overburden them.
- Installation personnel must wear clean work clothes, work gloves, safety helmets and safety shoes, as shown in Figure 8-1.

Figure 8-1 Protective Clothing

- Before touching the equipment, put on ESD clothes and ESD gloves or an ESD wrist strap, and remove any conductive objects such as wrist watches or metal jewelry, as shown in Figure 8-2, in order to avoid electric shock or burns.

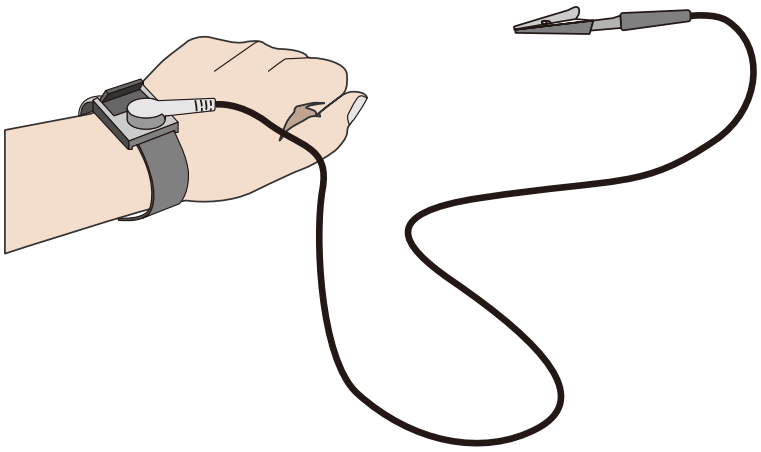
Figure 8-2 Removing Conductive Objects



How to put on an ESD strap (Figure 8-3).

1. Put your hand through an ESD wrist strap.
2. Tighten the strap buckle to ensure a snug fit.
3. Plug the alligator clip of the ESD wrist strap into the corresponding jack on the grounded cabinet or grounded chassis.

Figure 8-3 Wearing an ESD Wrist Strap



- Use tools correctly to avoid personal injury.
- When moving or lifting equipment above shoulder height, use lifting devices and other tools as necessary to avoid personal injury or equipment damage due to equipment slippage.
- The power sources of the server carry a high voltage. Direct contact or indirect contact through damp objects with the high-voltage power source is fatal.
- To ensure personal safety, ground the server before connecting power.
- When using ladders, always have someone hold and guard the bottom of the ladders. In order to prevent injury, never use a ladder alone.
- When connecting, testing or replacing fiber optic cables, avoid looking into the optical port without eye protection in order to prevent eye damage from laser light.

8.1.3 Equipment Safety

- To ensure personal safety and prevent equipment damage, use only the power cords and cables that come with the server. Do not use them with any other equipment.
- Before touching the equipment, put on ESD clothing and ESD gloves to prevent static electricity from damaging the equipment.
- When moving the server, hold the bottom of the server. Do not hold the handles of any module installed in the server, such as PSUs, fan modules, drive modules, or motherboard. Handle the equipment with care at all times.
- Use tools correctly to avoid damage to the equipment.
- Connect the power cords of active and standby PSUs to different PDUs to ensure high system reliability.

- To ensure equipment safety, always ground the equipment before powering it on.

8.1.4 Transportation Precautions

Contact the manufacturer for precautions before transportation as improper transportation may damage the equipment. The precautions include but are not limited to:

- Hire a trusted logistics company to move all equipment. The transportation process must comply with international transportation standards for electronic equipment. Always keep the equipment being transported right-side up. Avoid collision, moisture, corrosion, packaging damage or contamination.
- Transport the equipment in its original packaging.
- If the original packaging is unavailable, separately package heavy and bulky components (such as chassis, blade servers and blade switches), and fragile components (such as optical modules and PCIe cards).
- Power off all equipment before shipping.

8.1.5 Manual Handling Weight Limits

CAUTION

Observe local laws or regulations regarding the manual handling weight limits per person. The limits shown on the equipment and in the document are recommendations only.

Table 8-1 lists the manual handling weight limits per person specified by some organizations.

Table 8-1 Manual Handling Weight Limits per Person

Organization	Weight Limit (kg/lbs)
European Committee for Standardization (CEN)	25/55.13
International Organization for Standardization (ISO)	25/55.13
National Institute for Occupational Safety and Health (NIOSH)	23/50.72
Health and Safety Executive (HSE)	25/55.13
General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ)	• Male: 15/33.08 • Female: 10/22.05

9 Limited Warranty

This limited warranty applies only to the original purchasers of our products who are direct customers or distributors of us (“Customer”).

We warrant all our hardware products, if properly used and installed, to be free from defects in material and workmanship within the warranty period. The term “Hardware Product” is limited to the hardware components and required firmware. The term “Hardware Product” DOES NOT include software applications or programs, and DOES NOT include products or peripherals that are not supplied by us. We may, at our discretion, repair or replace the defective parts. Repair or replacement parts may be new, used, or equivalent to new in performance and reliability. Repair or replacement parts are warranted to be free of defects in material or workmanship for ninety (90) calendar days or for the remainder of the warranty period of the product, whichever is longer.

Service offerings may vary by geographic region. Please contact your representative to identify service levels and needs for your region.

9.1 Warranty Service

Our warranty service includes 24 × 7 remote technical support, RMA (Return Material Authorization) Service, ARMA (Advanced Return Material Authorization) Service, 9 × 5 × NBD (Next Business Day) Onsite Service and 24 × 7 × 4 Onsite Service.

9.1.1 Remote Technical Support

The 24 × 7 remote technical support can be obtained through hotline, e-mail, and Service Portal*[1]. Through hotline and e-mail support, our engineers help customers diagnose the causes of malfunctions and provide solutions. Service Portal*[1] provides access to firmware, customized update files, and related manuals for Hardware Products. Customer may also access the Service Portal*[1] to submit an RMA request or an ARMA request for parts replacement or repair.

Information needed when requesting support:

- Contact name, phone number, e-mail address
- System serial number, part number, model and location (address) of the product needing service
- Detailed description of problem, logs (SELs and blackbox logs, and any other related logs from OS), screenshot of issue, pictures of damaged/faulty parts, etc.

9.1.2 RMA Service

Standard Replacement: When a hardware failure occurs, Customer may submit an RMA request to us via e-mail or Service Portal*[1]. We will review and approve the RMA submission at our own discretion, and provide an RMA number and return information that Customer may use to return the defective part(s) for the RMA service. We will ship out replacement part(s) within one (1) business day after receiving the defective part(s) and cover one-way shipment.

NOTE

- Customer should return the defective parts in original packaging to our designated service center at their own expense.
- After our further diagnosing and testing, if the defective parts conform to our repair policy, we will ship out the repair or replacement parts at our own expense; otherwise, we will return the defective parts at Customer's expense.
- If Customer needs to designate a logistics company, allocation of the shipping cost to us/Customer will be redefined.

9.1.3 ARMA Service

Advanced Replacement: If a problem with our hardware products cannot be resolved via hotline or e-mail support and replacement part(s) are required, we will ship out replacement part(s) in advance within one (1) business day. Customer should return defective part(s) within five (5) business days after receiving the replacement(s). The shipping cost coverage varies by region. Contact your sales representative for details.

NOTE

- Customer should return the defective parts in original packaging to our designated service center.
- We will ship out the replacement parts at our own expense after completing remote diagnosis.
- If Customer needs to designate a logistics company, allocation of the shipping cost to us/Customer will be redefined.

9.1.4 9 × 5 × NBD Onsite Service

When we ultimately determine that an onsite service call is required to repair or replace a defect, the call will be scheduled in accordance with the Response Time

Commitment. The response time is measured from the time when the remote troubleshooting is completed and logged to the arrival of a service engineer and parts to Customer location for repair.

NOTE

9 × 5 × NBD: Our service engineer typically arrives at the customer's data center on the next business day. Service engineers are available on local business day from 9:00 am to 6:00 pm local time. Calls received/dispatches after 5:00 pm local time will require an additional day for the service engineer to arrive.

9.1.5 24 × 7 × 4 Onsite Service

When we ultimately determine that an onsite service call is required to repair or replace a defect, the call will be scheduled in accordance with the Response Time Commitment. The response time is measured from the time when the remote troubleshooting is completed and logged to the arrival of a service engineer and parts to Customer location for repair.

NOTE

24 × 7 × 4: Our service engineer typically arrives at the customer site within 4 hours. Service engineers are available at any time, including weekends and local national holidays.

9.2 Our Service SLA

We offer a variety of Service Level Agreements (SLA)*[2] to meet customer requirements.

- RMA Service
- ARMA Service
- 9 × 5 × NBD Onsite Service
- 24 × 7 × 4 Onsite Service

9.3 Warranty Exclusions

We do not guarantee that there will be no interruptions or mistakes during the use of the products. We will not undertake any responsibility for the losses arising from any operation not conducted according to instructions intended for Hardware Products.

The Limited Warranty does not apply to

- expendable or consumable parts, such as, but not limited to, batteries or protective coatings that are designed to diminish over time, unless failure has occurred during DOA period due to a defect in material or workmanship;
- any cosmetic damage, such as, but not limited to, scratches, dents, broken plastics, metal corrosion, or mechanical damage, unless failure has occurred during DOA period due to a defect in material or workmanship;
- damage or defects caused by accident, misuse, abuse, contamination, improper or inadequate maintenance or calibration or other external causes;
- damage or defects caused by operation beyond the parameters as stipulated in the user documentation;
- damage or defects by software, interfacing, parts or supplies not provided by us;
- damage or defects by improper storage, usage, or maintenance;
- damage or defects by virus infection;
- loss or damage in transit which is not arranged by us;
- Hardware Products that have been modified or serviced by non-authorized personnel;
- any damage to or loss of any personal data, programs, or removable storage media;
- the restoration or reinstallation of any data or programs except the software installed by us when the product is manufactured;
- any engineering sample, evaluation unit, or non-mass production product that is not covered under warranty service;
- any solid-state drive (SSD) which has reached its write endurance limit.

In no event will we be liable for any direct loss of use, interruption of business, lost profits, lost data, or indirect, special, incidental or consequential damages of any kind regardless of the form of action, whether in contract, tort (including negligence), strict liability or otherwise, even if we have been advised of the possibility of such damage, and whether or not any remedy provided should fail of its essential purpose.

*1 Service Portal availability is subject to customer type and customer location. Please contact your representative to learn more.

*2 Not all SLA offerings are available at all customer locations. Some SLA offerings may be limited to geolocation and/or customer type. Please contact your representative to learn more.

10 System Management

10.1 Intelligent Management System BMC

BMC, a remote server management system, supports mainstream management specifications in the industry such as IPMI 2.0 and Redfish 1.18. BMC features high operational reliability, easy serviceability for different business scenarios, accurate and comprehensive fault diagnosis capabilities, and industry-leading security reinforcement capabilities.

BMC supports:

- IPMI 2.0
- Redfish 1.18
- SNMP v1/v2c/v3
- HTML5/Java remote consoles (Keyboard, Video, Mouse)
- remote virtual media
- login via web browsers
- intelligent fault diagnosis

Table 10-1 BMC Features

Feature	Description
Management Interface	Supports extensive remote management interfaces for various server O&M scenarios. The supported interfaces include: • IPMI • SMASH CLP • SNMP • HTTPS • Web GUI • Redfish • Syslog
Accurate and Intelligent Fault Location	IDL, a fault diagnosis system, offers accurate and comprehensive hardware fault location capabilities, and outputs detailed fault causes and handling suggestions.
Alert Management	Supports rich automatic remote alert capabilities, including proactive alerting mechanisms such as SNMP Trap

Feature	Description
	(v1/v2c/v3), email alerts, and syslog remote alerts to ensure 24 × 7 reliability.
Remote Console KVM	Supports HTML5- and Java-based remote consoles to remotely control and operate the monitor/mouse/keyboard of the server, providing highly available remote management capabilities without on-site operation.
Virtual Network Console (VNC)	Supports mainstream third-party VNC clients without relying on Java, improving management flexibility.
Remote Virtual Media	Supports virtualizing local images, USB devices, and folders as media devices of remote servers, simplifying OS installation, file sharing, and other O&M tasks.
Web GUI	Supports the visual management interface developed by us, displaying abundant information of the server and components, and offers easy-to-use Web GUIs.
Crash Screenshot and Crash Video Recording	• Supports automatic crash screenshot and crash video recording (video needs to be enabled manually) to capture the last screen and video before crash. • Provides manual screenshot, which can quickly capture the screen for easy inspection at scheduled time.
Dual Flash and Dual Image	Supports dual flash and dual image, enabling automatic flash failover in case of software or flash corruption, improving operational reliability.
Power Capping	Supports power capping, increasing deployment density and reducing energy consumption.
IPv4/IPv6	Supports both IPv4 and IPv6, enhancing network deployment flexibility.
Auto-Switching of Management Network Port	Supports auto-switching between the dedicated management network port and shared management network port, providing customers with flexible network deployment solutions for different management network deployment scenarios.
BMC Self-Diagnosis and Self-Recovery System	• Supports the reliable dual watchdog mechanism for hardware and software, enabling automatic restoration of BMC in case of BMC abnormality. • Provides a thermal protection mechanism, which is automatically triggered when the BMC is abnormal to ensure that the fan operates at safe speeds to avoid system overheating. • Supports self-diagnosis of processors, memory modules, and storage devices of BMC, and automatically cleans the

Feature	Description
	workload to restore to normal when the device usage rate is too high.
Power Control	Supports virtual power buttons for power on/off, power cycle and reset.
UID LED	Supports remote lighting of the UID LED for locating the server in the server room.
Secure Firmware Update	• Supports firmware update based on secure digital signatures, and mismatch prevention mechanism for firmware from different manufacturers and firmware for different models. • Supports firmware update of BMC/BIOS/CPLD/PSU.
Serial Port Redirection	Supports remote redirection of the system serial port, BMC serial port and other serial ports, and directs the server-side serial port output to the local administrator via the network for server debugging.
Storage Information Display	Displays RAID logical array information and drive information, and supports remote RAID creation for improved deployment efficiency.
User Role Management	Supports user detail management based on user roles and flexible creation of user roles with different privileges, and provides more user roles to allow administrators to grant different privileges to O&M personnel.
Security Features	Adopts the industry-leading server security baseline standard. SSH, HTTPS, SNMP and IPMI use secure and reliable algorithms. BMC offers capabilities including secure update and boot and security reinforcement mechanisms such as anti-replay, anti-injection, and anti-brute force.
Double Factor Authentication	Supports double factor authentication for local BMC users. Users need to log in to the BMC with both password and certificate, thus to prevent attacks caused by password leakage.
Configuration Exporting and Importing	To import and export the existing system configurations.
System Information Display	Displays the server basic information such as the information and health status of key server components, including CPU, memory, power supply, device inventory, drive, NIC and security chip.
Fan Management	Displays the status, current speed, duty ratio, and other information of a fan module. You can select the fan control mode and preset the speed for each fan module in the Manual Fan Control mode.

Feature	Description
Power Policy	To set how the server operating system reacts under the BMC's control when AC power is reconnected to the server.
One-Click Erasing	To perform non-recoverable erasing on all storage devices of the server, preventing data leakage when the server is to be retired.
System Lockdown	After this feature is enabled, some parameters of the server cannot be set and some operations cannot be performed on the server.

10.2 KSManage

The server is compatible with the latest version of KSManage.

KSManage is a new-generation infrastructure O&M management platform for data centers. Built on cutting-edge O&M concepts, KSManage provides users with leading and efficient overall management solutions for data centers to ensure advanced infrastructure management. This platform provides a rich set of functions such as centralized asset management, in-depth fault diagnosis, component fault early warning, intelligent energy consumption management, 3D automatic topologies, and stateless automatic deployment. With these functions, users can implement centralized O&M of servers, storage devices, network devices, security devices, and edge devices, effectively improving O&M efficiency, reducing O&M costs, and ensuring the secure, reliable, and stable operation of data centers.

KSManage offers:

- lightweight deployment in multiple scenarios and full lifecycle management of devices
- high reliability and on-demand scalability enabled by 1 to N data collectors
- intelligent asset management and real-time tracking of asset changes
- comprehensive monitoring for overall business control
- intelligent fault diagnosis for reduced maintenance time
- second-level performance monitoring for real-time status of devices
- batch configuration, deployment and update, shortening the time needed to bring the production environment online
- improved firmware version management efficiency
- standardized northbound interfaces for easy integration and interfacing

Table 10-2 KSManage Features

Feature	Description
Home	Display of basic information (data centers, server rooms, cabinets, assets and alerts), quick addition of devices and custom home page
Assets	• Automatic asset discovery and batch asset import • Online asset management combined with offline asset management enabled by IoT solutions brings integrated digital asset management • Management of the full range of our server family, including general-purpose rack servers, AI servers, multi-node servers, edge servers and all-in-one servers • Management of our general-purpose disk arrays and distributed storage devices • Management of network devices (switches, routers, etc.), security devices (firewalls, load balancers, etc.), cabinets and clouds • Management of data centers • Asset warranty information management, asset inventory reports for server acceptance, asset attribute expansion, etc.
Monitor	• Display of real-time alerts, history alerts, blocked alerts and events • Fault prediction of drives and memories • Custom inspection plan and inspection result management • Notification record viewing • Intelligent fault diagnosis and analysis, automatic fault reporting and repair ticket viewing • Trap management and Redfish management • Management of monitoring rules, such as alert rules, notification rules, blocking rules, alert noise reduction rules, compression rules and fault reporting rules, and redefinition of above rules
Control	• Quick start of firmware update, OS installation, power management, drive data erasing and stress test • Batch firmware update (BMC/BIOS/RAID Card/NIC/Drive/HBA Card/MB CPLD/BP CPLD/PSU) • Batch firmware configuration (BMC/BIOS)

Feature	Description
	• Batch RAID configuration and OS deployment for servers • Secure and quick drive data erasing • CPU and memory stress test • Automatic firmware baseline management • BMC and BIOS snapshot management • Repositories for update files
Energy Efficiency	• Overview of data center power consumption trend chart and carbon emission trend chart • Setting of server dynamic power consumption policies and minimum power consumption policies • Carbon asset and carbon emission management
Log	• Fault log record management • Diagnosis record and diagnosis rule management
Topologies	• Centralized management of multiple data centers and panoramic 3D views, including dynamic display of power consumption, temperature, alerts and cabinet capacity of the data center • Network topologies
Reports	• Management of warranty information reports, alert reports, asset reports, hardware reports and performance reports • Export of reports in .xlsx format
System	• Password management, alert forwarding and data dump • Customized KSManage parameters
Security	Security control of KSManage via a set of security policies such as user management, role management, authentication management (local authentication and LDAP authentication) and certificate management

10.3 KSManage Tools

Table 10-3 Features of KSManage Tools

Feature	Description
KSManage Kits	A lightweight automatic batch O&M tool for servers, mainly used for server deployment, routine maintenance, firmware update, fault handling, etc.

Feature	Description
KSManage Boot	A unified batch management platform for bare metals, with features including firmware management, hardware configuration, system deployment and migration, stress test and in-band management
KSManage Server CLI	Fast integration with third-party management platforms, delivering a new O&M mode of Infrastructure as Code (IaC)
KSManage Driver	Operates under the OS and gets system asset and performance information via the in-band mode, providing users with more comprehensive server management capabilities
KSManage Server Provisioning	Offers users with RAID configuration, intelligent OS installation, firmware update, hardware diagnosis, secure erasing and software upgrade

11 Certification

Table 11-1 Certification

Country/Region	Certification	Mandatory/Voluntary
International	CB	Voluntary
EU	CE	Mandatory
US	FCC	Mandatory
	UL	Voluntary
EAEU	EAC	Mandatory
	EAC-RoHS	Mandatory
	FSS	Mandatory
Korea	E-Standby	Voluntary
	KC	Mandatory
Australia	RCM	Mandatory
Taiwan, China	BSMI	Mandatory

12 Appendix A

12.1 Thermal Restrictions

Table 12-1 Thermal Restrictions

Config.	Max. Operating Temp.: 30°C (86°F)	Max. Operating Temp.: 35°C (95°F)
8 × 2.5-Inch SAS/SATA/NVMe Drive + 2 × PCIe Slot + EVAC Heatsink Config.	• 4056 Fan × 7 • DIMM ≤16pcs • CPU TDP ≤330 W • PCIe Slot 1 and Slot 2 do not support NICs >25 Gb or RAID cards. • PCIe Slot 3 does not support NICs >400 Gb.	• 4056 Fan × 7 • DIMM ≤16pcs • CPU TDP ≤330 W • PCIe Slot 1 and Slot 2 do not support NICs >25 Gb or RAID cards. • PCIe Slot 3 does not support NICs >200 Gb.
8 × 2.5-Inch SAS/SATA/NVMe Drive + 2 × PCIe Slot + Standard Heatsink Config.	• 4056 Fan × 7 • DIMM ≤16pcs • CPU TDP ≤ 205 W • PCIe Slot 1 and Slot 2 do not support NICs >25 Gb or RAID cards. • PCIe Slot 3 does not support NICs >400 Gb.	• 4056 Fan × 7 • DIMM ≤16pcs • CPU TDP ≤ 205 W • PCIe Slot 1 and Slot 2 do not support NICs >25 Gb or RAID cards. • PCIe Slot 3 does not support NICs >400 Gb.
4 × 3.5-Inch SAS/SATA/NVMe Drive + 4 × E3.S Dummy + EVAC Heatsink Config.	• 4056 Fan × 7 • DIMM ≤16pcs • CPU TDP ≤330 W • PCIe Slot 1 and Slot 2 do not support NICs >25 Gb or RAID cards. • PCIe Slot 3 does not support NICs >400 Gb.	• 4056 Fan × 7 • DIMM ≤16pcs • CPU TDP ≤330 W • PCIe Slot 1 and Slot 2 do not support NICs >25 Gb or RAID cards. • PCIe Slot 3 does not support NICs >200 Gb.
4 × 3.5-Inch SAS/SATA/NVMe Drive + 4 × E3.S Dummy + Standard	• 4056 Fan × 7 • DIMM ≤16pcs • CPU TDP ≤ 205 W	• 4056 Fan × 7 • DIMM ≤16pcs • CPU TDP ≤ 205 W

Config.	Max. Operating Temp.: 30°C (86°F)	Max. Operating Temp.: 35°C (95°F)
Heatsink Config.	• PCIe Slot 1 and Slot 2 do not support NICs >25 Gb or RAID cards. • PCIe Slot 3 does not support NICs >400 Gb.	• PCIe Slot 1 and Slot 2 do not support NICs >25 Gb or RAID cards. • PCIe Slot 3 does not support NICs >400 Gb.

NOTE

- The maximum operating temperature will drop by 5°C (9°F) if a single fan fails.
- Single fan failure may affect system performance.
- The current thermal restrictions are validated based on the non-RIO CPU, which only supports RAID cards or x8 NIC cards (NICs <100 Gb) in slot 1 and slot 2, and x16 NIC cards in slot 3.

12.2 Power/Performance Profiles

Table 12-2 Power/Performance Profiles

Profile	Note
Balance/Energy Efficiency	-
Power Saving	-
Low Latency	-
Virtualization - Performance	-
OLTP	Online Transaction Processing
Static Base Frequency	-
Single Core High Performance	-
Virtualization - Balance	-
I/O Sensitive	-
Comprehensive Performance	-
Memory Low Latency - Performance	-
Memory Low Latency - Balance	-
SpecPower	Provides the ultimate energy efficiency ratio
Balance/Energy Efficiency - OBB	Based on workloads, not controlled by the OS policy
Custom	Default mode

12.3 Model

Table 12-3 Model

Certified Model	Description
KR1180-X3-A0-R0-00	Global

12.4 RAS Features

The server supports a variety of RAS (Reliability, Availability, and Serviceability) features. By configuring these features, the server can provide greater reliability, availability, and serviceability.

12.5 Sensor List

Table 12-4 Sensor List

Sensor	Description	Sensor Location	Note
Inlet_Temp	Air inlet temperature	Right mounting ear	-
Outlet_Temp	Air outlet temperature	Rear of the motherboard	-
CPUx_Temp	CPU core temperature	CPUx	x indicates the CPU number with a value of 0
CPUx_Margin_Temp	CPUx margin temperature before it reaches the throttling frequency	CPUx	x indicates the CPU number with a value of 0
CPUx_DIMM_Temp	The maximum temperature among CPUx DIMMs	CPUx DIMMs	x indicates the CPU number with a value of 0
CPUx_VR_Temp	The maximum temperature among VR chips of CPUx	CPUx	x indicates the CPU number with a value of 0
PSUx_Inlet_Temp	PSUx temperature	PSUs	x indicates the PSU number with a value of 0 to 1

Sensor	Description	Sensor Location	Note
GPUx_Temp	GPUx temperature	GPUs	x indicates the GPU number with a value of 1 to 2
GPU_MEM_MAX_T	The maximum video memory temperature among all GPUs	GPUs	-
GPU_TLM_MIN_T	The minimum T.Limit temperature among all GPUs	GPUs	-
M.2_Temp	The maximum temperature among all M.2 SSDs	M.2 adapter	-
RAID_Temp	The maximum temperature among all RAID cards	RAID cards	-
SSD_MAX_Temp	The maximum temperature among all SAS and SATA SSDs	SAS and SATA SSDs	-
HDD_MAX_Temp	The maximum temperature among all SAS and SATA HDDs	SAS and SATA HDDs	-
OCP_NIC_Temp	The temperature of an OCP card	OCP cards	-
OCP_NIC_SFP_Temp	The maximum temperature among all OCP card optical modules	OCP cards	-
PCIe_NIC_Temp	The maximum temperature among all PCIe NICs	PCIe NICs	-
PCIe_SFP_Temp	The maximum temperature among all optical modules of PCIe NICs, BF2 NICs, BF3 NICs, HBA cards, and HCA cards	PCIe NICs, BF2 NICs, BF3 NICs, HBA cards, and HCA cards	-

Sensor	Description	Sensor Location	Note
PCIe_HBA_Temp	The maximum temperature among all HBA cards	HBA cards	-
PCIe_HCA_Temp	The maximum temperature among all HCA cards	HCA cards	-
CPU_Tjmax	The maximum temperature of the CPU core	Motherboard	-
CPU_TControl	CPU core temperature	Motherboard	-
BP_Front_Temp	Front backplane temperature	Drive Backplanes	-
NVME_F_MAX_T	The maximum temperature among all front NVMe drives	NVMe drives	-
NVME_I_R_MAX_T	The maximum temperature among all internal and rear NVMe drives	NVMe drives	-
SYS_12V	Motherboard 12 V voltage	Motherboard	-
SYS_5V	Motherboard 5 V voltage	Motherboard	-
SYS_3V3	Motherboard 3.3 V voltage	Motherboard	-
RTC_Battery	Battery voltage	Motherboard RTC battery	-
PSUx_VIN	PSUx input voltage	Motherboard	x indicates the PSU number with a value of 0 to 1
PSUx_VOUT	PSUx output voltage	Motherboard	x indicates the PSU number with a value of 0 to 1
PVCCIN_CPUx	CPUx voltage	CPUx	x indicates the CPU number with a value of 0

Sensor	Description	Sensor Location	Note
PVNN_MAIN_CPUx	CPUx voltage	CPUx	x indicates the CPU number with a value of 0
SYS_1V8	Motherboard 1.8 V voltage	Motherboard	-
Air_Pressure	Air pressure	Motherboard	-
CPU_ResourceRate	CPU utilization rate	CPU	-
MEM_ResourceRate	Memory utilization rate	DIMM	-
PSUx_IOUT	PSUx output current	PSUx	x indicates the PSU number with a value of 0 to 1
PSUx_PIN	PSUx input power	PSUx	x indicates the PSU number with a value of 0 to 1
PSUx_POUT	PSUx output power	PSUx	x indicates the PSU number with a value of 0 to 1
CPUx_Power	CPUx power	CPUx	x indicates the CPU number with a value of 0
Total_Power	Total system input power	PSU	-
CPU_Total_Power	Total CPU power	CPU	-
MEM_Total_Power	Total memory power	DIMM	-
Fan_Total_Power	Total fan power	Fan	-
FANx_F_Speed	FANx front rotor speed	Fan	x indicates the fan number with a value of 0, 2 to 7
FANx_R_Speed	FANx rear rotor speed	Fan	x indicates the fan number with a value of 0, 2 to 7
FAN_Redundant	Fan redundancy status	Fan	-
FANx_Status	FANx status	Fan	x indicates the fan number with a value of 0, 2 to 7
FANx_Present	FANx presence status	Fan	x indicates the fan number with a value of 0, 2 to 7

Sensor	Description	Sensor Location	Note
CPUx_Status	CPUx status	CPUx	x indicates the CPU number with a value of 0
CPUx_CXDY	CPUx DIMM status	CPUx DIMM	• x indicates the CPU number with a value of 0 • X indicates the memory channel number under CPUx with a value of 0 to 7 • Y indicates the DIMM number with a value of 0 to 1
F_HDDx	Front HDDx health status	Front HDDs	x indicates the drive number with a value of 0 to 11
PSU_Redundant	PSU redundancy status	PSU	-
PSU_Mismatch	PSU models mismatch	PSU	-
PSUx_Status	PSUx status	PSUx	x indicates the PSU number with a value of 0 to 1
LeakageSensor	Leakage status	Motherboard	-
BMC_Boot_Up	Records BMC boot event	Virtual sensor	-
BIOS_Boot_Up	BIOS bootup complete	Virtual sensor	-
Sys_Health	Management system health status	Management module	-
SEL_Status	Records SEL is almost full or has been cleared	Virtual sensor	-
POST_Status	POST status	Virtual sensor	-

Sensor	Description	Sensor Location	Note
CPU Thermal Trip	CPU overtemperature status	CPU	
BMC_Status	BMC status	Virtual sensor	-
UID_Button	UID button is pressed	UID button	
Power_Button	Power button is pressed	Power button	
SysRestart	System restart information	Virtual sensor	
PWR_Drop	Motherboard power failure	Motherboard	
PWR_On_TMOUT	Power-on timeout	Motherboard	-
System_Error	System emergency errors	Virtual sensor	-
Intrusion	Monitors chassis-opening activity (chassis intrusion detection)	Motherboard	-
CPU_Config	CPU configuration status	CPU	-
ACPI_PWR	ACPI power status	Virtual sensor	-
Watchdog2	Watchdog	Motherboard	-
SysShutdown	System power status detected by the BMC	Virtual sensor	-
TPM_Verify	Security status information verified by TPM	TPM	-
PWR_CAP_Fail	Power capping status	Motherboard	-
PCIe_Status	The status of PCIe device (including PCIe bus, slots and cards)	PCIe expansion card	-

13 Appendix C Acronyms and Abbreviations

13.1 A - E

A

AC	Alternating Current
ACPI	Advanced Configuration and Power Interface
ADDDC	Adaptive Double Device Data Correction
AI	Artificial Intelligence
ANSI	American National Standards Institute
AQSIQ	General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China
ARMA	Advanced Return Material Authorization
AVX	Advanced Vector Extensions

B

BIOS	Basic Input Output System
BLE	BIOS Lock Enable
BMC	Baseboard Management Controller
BP	Backplane
BSMI	Bureau of Standards, Metrology, and Inspection

C

CAS	Column Address Strobe

CB	Certification Body
CE	Conformite Europeenne
CEN	European Committee for Standardization
CLI	Command-Line Interface
CMOS	Complementary Metal-Oxide-Semiconductor
CPLD	Complex Programmable Logic Device
CPU	Central Processing Unit
CRPS	Common Redundant Power Supply

D

DB9	D-subminiature 9-pin
DC	Direct Current
DDR5	Double Date Rate 5
DIMM	Dual In-Line Memory Module
DL	Deep Learning
DOA	Dead on Arrival
DPC	DIMMs Per Channel
DRAM	Dynamic Random Access Memory
DMPU	Digital Motion Processing Unit

E

EAC	Eurasian Conformity
ECC	Error-Correcting Code
ECMA	European Computer Manufacturers Association
ESD	Electrostatic Discharge
E3.S	Enterprise & Data Center SSD Form Factor 3 Unit Short

EU	European Union
EVAC	Extended Volume Air Cooling

13.2 F - J

F

FCC	Federal Communications Commission
FH	Full-Height
FHHL	Full-Height Half-Length
FSS	Federal Security Service

G

GbE	Gigabit Ethernet
GPU	Graphics Processing Unit
GUI	Graphical User Interface

H

HBA	Host Bus Adapter
HCA	Host Channel Adapter
HDD	Hard Disk Drive
HHHL	Half-Height Half-Length
HSE	Health and Safety Executive
HTML5	HyperText Markup Language 5
HTTPS	HyperText Transfer Protocol Secure

I

I/O	Input/Output
I^2C	Inter-Integrated Circuit
ID	Identification
IDL	Intelligent Diagnose Log
IEC	International Electrotechnical Commission
IIPC	Intel Intelligent Power Capability
IP	Internet Protocol
IPMI	Intelligent Platform Management Interface
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
IRUT	Intelligent Runtime Update Technology
ISA	International Society of Automation
ISO	International Organization for Standardization

J

JBOD	Just a Bunch of Disks
JTAG	Joint Test Action Group

13.3 K - O

K

KVM	Keyboard, Video, Mouse

L

LCD	Liquid Crystal Display

LDAP	Lightweight Directory Access Protocol
LED	Light Emitting Diode
LFF	Large Form Factor

M

MCIO	Mini Cool Edge Input/Output
MUPR	Memory UCE Prevent and Repair

N

NBD	Next Business Day
NC-SI	Network Controller Sideband Interface
NIC	Network Interface Card
NIOSH	National Institute for Occupational Safety and Health
NVMe	Non-Volatile Memory Express
NUMA	Non-Uniform Memory Access

O

O&M	Operations and Maintenance
OCP	Open Compute Project
OLTP	Online Transaction Processing
OOB	Out-of-Band
OS	Operating System

13.4 P - T

P

PCH	Platform Controller Hub
PCIe	Peripheral Component Interconnect Express
PDB	Power Distribution Board
PFR	Platform Firmware Resilience
PID	Proportional-Integral-Derivative
POST	Power On Self Test
PSU	Power Supply Unit

R

RAID	Redundant Arrays of Independent Disks
RAS	Reliability, Availability, Serviceability
RCM	Regulatory Compliance Mark
RDIMM	Registered Dual In-line Memory Module
RH	Relative Humidity
RHEL	Red Hat Enterprise Linux
RIO	Rapid I/O
RMA	Return Material Authorization
RoHS	Restriction of Hazardous Substances
RTC	Real Time Clock

S

SAS	Serial Attached SCSI (Small Computer System Interface)
SATA	Serial Advanced Technology Attachment

SDDC	Single Device Data Correction
SDP	Single Die Package
SEL	System Event Log
SFF	Small Form Factor
SFP	Small Form-factor Pluggable
SGX	Software Guard Extensions
SKU	Stock Keeping Unit
SLA	Service Level Agreements
SLES	SUSE Linux Enterprise Server
SMM	System Management Mode
SNMP	Simple Network Management Protocol
SRF	Sierra Forest
SSD	Solid State Drive
SSH	Secure Shell

T

TCM	Trusted Cryptography Module
TCO	Total Cost of Ownership
TDP	Thermal Design Power
TF	TransFlash
TPM	Trusted Platform Module
TSOM	Transport, Storage, Operation Monitor

13.5 U - Z

U

UART	Universal Asynchronous Receiver/Transmitter
UCE	Uncorrectable Error
UEFI	Unified Extensible Firmware Interface
UID	Unit Identification
UL	Underwriter Laboratories
UPI	Ultra Path Interconnect
USB	Universal Serial Bus

V

VGA	Video Graphics Array
VLAN	Virtual Local Area Network
VNC	Virtual Network Console
VNNI	Vector Neural Network Instructions
VRD	Voltage Regulator-Down

X

XDP	eXtend Debug Port