White Paper for KR1280V2 Series Servers

Powered by AMD Processors

For KR1280-E2-A0-R0-00 and KR1280-E2-C0-R0-00

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Applicable Model

Model	Maintenance	Cooling
KR1280-E2-A0-R0-00	Rear access	Air cooling
KR1280-E2-C0-R0-00	Rear access	Cold-plate liquid cooling

Technical Support

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Preface

Abstract

This document describes the KR1280V2 AMD-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	2025/04/24	Initial release

Table of Contents

1 Product Overview

The KR1280V2 AMD-based system is a 1U2S rack server that is independently developed by us and powered by the 4th Gen AMD EPYC 9004 series processors. With a high core count, ultra-high memory bandwidth, and ultra-large I/O throughput, the server offers enhanced computing resources and performance for compute-intensive applications. Moreover, the server maintains the high quality and reliability of our last-generation servers, catering to a variety of application scenarios including the cloud service, cloud computing, and enterprise markets. Featuring high reliability, performance and scalability, as well as ease of operation and maintenance, streamlined management, and seamless ecological compatibility, it supports liquid cooling for efficient heat dissipation, leading to a notable reduction in the power usage effectiveness (PUE) of data centers.

Figure 1-1 Appearance (4 × 3.5-Inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Configuration)

Figure 1-2 Appearance (10 × 2.5-Inch Drive Configuration)

Figure 1-3 Appearance (12 × 2.5-Inch Drive Configuration)

Figure 1-4 Appearance (4 × 3.5-Inch Drive + 4 × 2.5-Inch Drive Configuration)

2 Features

2.1 Scalability and Performance

Table 2-1 Scalability and Performance

Technical Feature	Description
AMD EPYC 9004 Series Processors	Supports AMD EPYC 9004 series processors with up to 128 cores per processor, a TDP of up to 400 W, a max. boost frequency of 4.40 GHz, an L3 cache of up to 1,152 MB, and 4 xGMI links per CPU at up to 32 GT/s per link, delivering unrivaled processing performance. • Supports up to 2 processors with up to 256 cores and 512 threads, maximizing the concurrent execution of multi-threaded applications. • Provides a larger L2 cache of private 1 MB per core. • Supports AMD Turbo Core technology that automatically scales CPU speeds up to the maximum boost frequency at peak workloads, allowing processor cores to exceed the thermal design power (TDP) for a limited time. • Supports AMD Simultaneous Multi-Threading (SMT) technology that allows up to 2 threads to run on each core to improve the performance of multi-threaded applications. • Supports AMD Virtualization (AMD-V) technology that integrates hardware-level virtualization features, allowing the operating system to better leverage hardware to handle virtualized workloads. • Supports Advanced Vector Extensions 512 (AVX-512) that significantly accelerate the workloads that are strongly floating point compute intensive.
DIMM Form Factor	Up to 24 DDR5 ECC DIMMs (4,800 or 5,600 MT/s, RDIMMs), delivering superior speed, high availability, and a memory capacity of up to 6 TB.
Flexible Drive Configurations	Provides elastic and expandable storage solutions to meet different capacity and upgrade requirements.

Technical Feature	Description
Support for All-SSD Configuration	Delivers all-SSD configurations (up to 12 hot-swap NVMe SSDs), bringing higher I/O performance over all-HDD or HDD-SSD mixing configurations. An SSD can handle nearly hundredfold I/O operations per second (IOPS) compared to a typical HDD.
12 Gbps Serial Attached SCSI (SAS)	Doubles the internal storage data transfer rate of the 6 Gbps SAS solution, maximizing the performance of storage I/O-intensive applications.
Infinity Fabric Technology	Supports Infinity Fabric technology that integrates I/O dies (IODs) and PCIe 5.0 controllers into the processors to significantly reduce I/O latency and enhance overall system performance.
PCIe Expansion	Up to 3 standard PCIe 5.0 x16 slots.
OCP Expansion	Up to 2 OCP 3.0 slots that can flexibly support 1/10/25/40/100/200 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	SAS/SATA drives support RAID creation. The RAID card supports RAID levels 0/1/1E/10/5/50/6/60 and provides RAID cache, with data protection enabled by the super-capacitor in case of power failures. Supported RAID levels vary by RAID cards.
Reliability	• SSDs are much more reliable than traditional HDDs, increasing system uptime. • Our intelligent control technology combined with the cutting-edge air-cooling and cold-plate liquid cooling systems creates an optimum working environment to ensure stable running of the server. • The BMC monitors system parameters in real time and sends alerts in advance, enabling technicians to take appropriate measures in time to ensure stable operation and minimize system downtime.

Technical Feature	Description
Availability	• The LEDs on the front and rear panels and the BMC Web GUI indicate the status of key components and quickly lead technicians to failed (or failing) components, simplifying maintenance, speeding up troubleshooting, and improving system availability. • Provides 2 hot-swap PSUs with 1+1 redundancy and 8 hot-swap fan modules with N+1 redundancy. • Provides a CPU cold plate module, improving overall system availability.
Maintenance Efficiency	• The BMC management network port on the rear panel enables remote BMC O&M, improving O&M efficiency. • Based on humanization design, the server allows tool-less maintenance. With enhanced and optimized structural parts, the system allows quick component installation and removal, greatly reducing the O&M time.

2.3 Manageability and Security

Table 2-3 Manageability and Security

Technical Feature	Description
Remote Management	The BMC monitors the 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 service port with NC-SI enabled supports: • Being bonded to any network port of the OCP card or of the PCIe NIC that supports NC-SI. • Enablement/Disablement and configuration of Virtual Local Area Network (VLAN). VLAN is disabled by default. • Both IPv6 and IPv4 addresses. The IP addresses, subnet masks, and default gateways or prefix length of IPv6 address can be configured.
Unified Extensible	The industry-standard UEFI improves the efficiency of setup, configuration and update, and simplifies the error handling process.

Technical Feature	Description
Firmware Interface (UEFI)	
TPM & TCM	Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) provide advanced encryption.
AMD Secure Processor	AMD Secure Processor (ASP), a microcontroller within the AMD processor, provides enhanced security through hardware-based resistance to malicious software attacks.
AMD SEV	AMD Secure Encrypted Virtualization (SEV) technology protects Linux KVM virtual machines by transparently encrypting the memory of each VM with a unique key.
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.

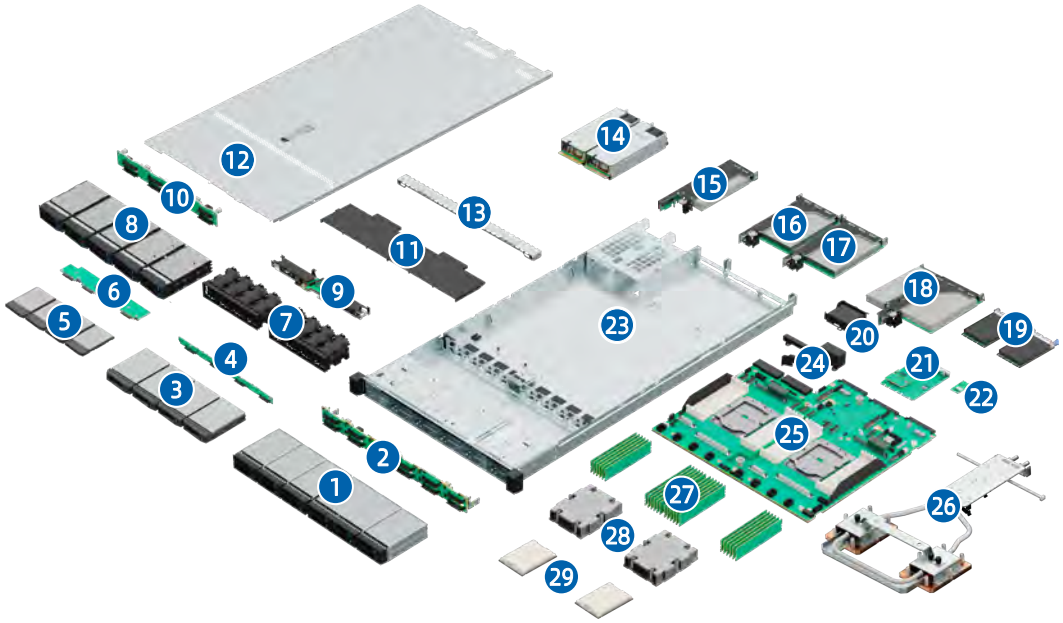
2.4 Energy Efficiency

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 of up to 94% at a load of 50%.
1+1 Redundant PSUs	Supports AC/DC power input with improved 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 and a CPU cold plate structure, lowering energy consumption from system cooling.
Power Capping and Power Control	Provides power capping and power control measures.
Staggered Spin-up of Drives	Supports staggered spin-up of drives, reducing power consumption during server startup.
Low Power Consumption	SSDs consume 80% less power than HDDs.

3 System Parts Breakdown

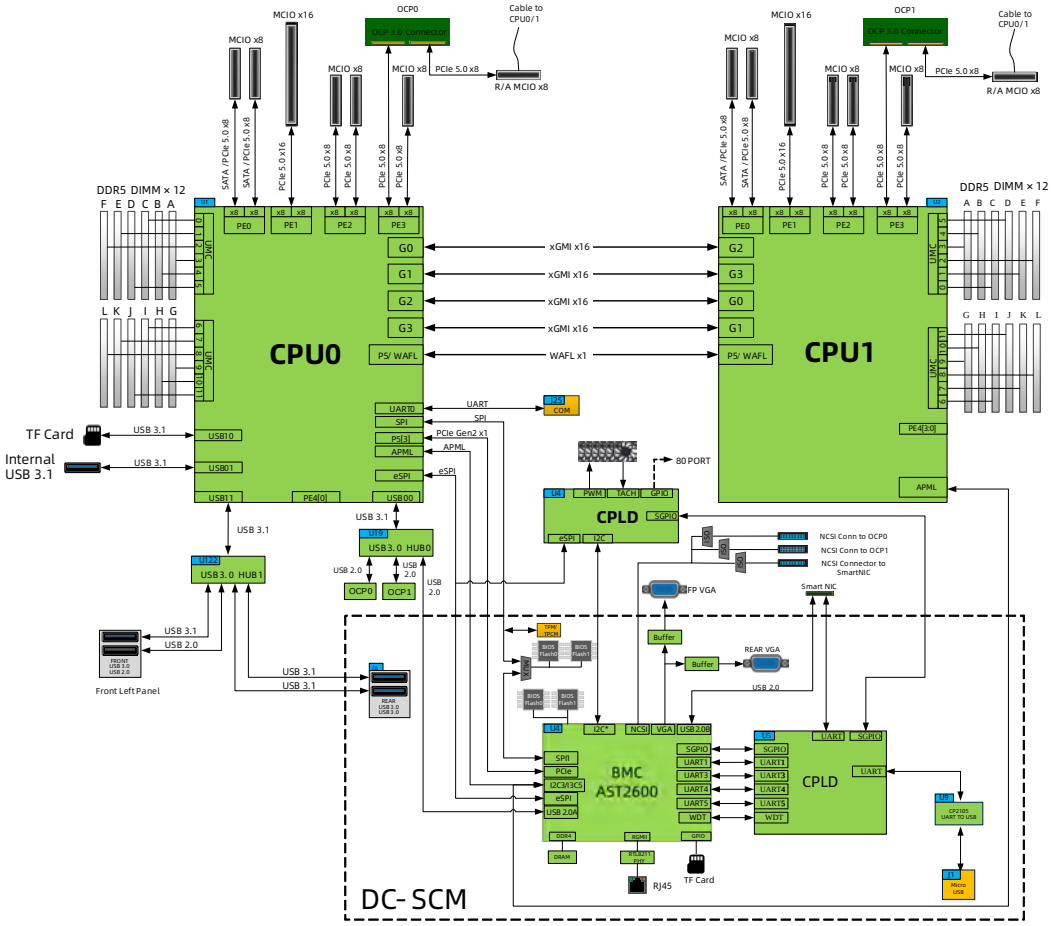
Figure 3-1 Exploded View



Item	Feature	Item	Feature
1	2.5-Inch Drive Module	16	PCIe Riser Module
2	12 × 2.5-Inch Drive Backplane	17	PCIe Riser Module
3	3.5-Inch Drive Module	18	PCIe Riser Module
4	4 × 3.5-Inch Drive Backplane	19	OCP 3.0 Card
5	2.5-Inch Drive Module	20	Super-Capacitor
6	4 × 2.5-Inch Drive Backplane	21	DC-SCM Board
7	Fan Module	22	TF Card Adapter
8	2.5-Inch Drive Module	23	Chassis
9	Internal M.2 SSD Module	24	PSU Air Duct
10	8 × 2.5-Inch Drive Backplane	25	Motherboard
11	Air Duct	26	Cold Plate Module
12	Top Cover	27	DIMM
13	Reinforcement Crossbar	28	Heatsink
14	PSU	29	CPU
15	PCIe Riser Module	-	-

4 System Logical Diagram

Figure 4-1 System Logical Diagram



- One or two AMD EPYC 9004 series processors.
- Up to 24 DIMMs.
- 4 xGMI links per CPU at up to 32 GT/s per link.
- Up to 3 PCIe 5.0 expansion slots and 2 dedicated slots for OCP 3.0 cards.
- The DC-SCM board integrates an AST2600 management chip and supports 1 VGA port, 1 BMC management network port, 1 system/BMC serial port, 1 TF card slot, and other connectors.

5 Hardware Description

5.1 Front Panel

5.1.1 4 × 3.5-Inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Configuration

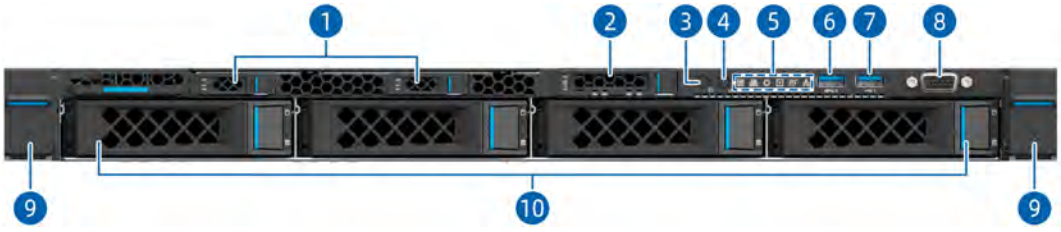
IMPORTANT

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

NOTE

Applicable model: KR1280-E2-A0-R0-00.

Figure 5-1 Front View



Item	Feature	Item	Feature
1	E1.S Drive Bay	6	USB 3.0 Port
2	M.2 Drive Bay	7	USB 2.0 Port
3	Power Button and LED	8	VGA Port
4	UID/BMC RST Button and LED	9	Ear Latch
5	LEDs	10	3.5-Inch Drive Bay

5.1.2 4 × 3.5-Inch Drive + 4 × 2.5-Inch Drive Configuration

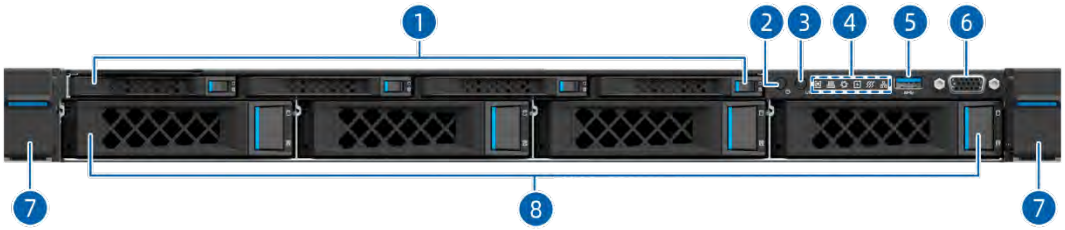
IMPORTANT

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

NOTE

Applicable model: KR1280-E2-A0-R0-00 and KR1280-E2-C0-R0-00.

Figure 5-2 Front View



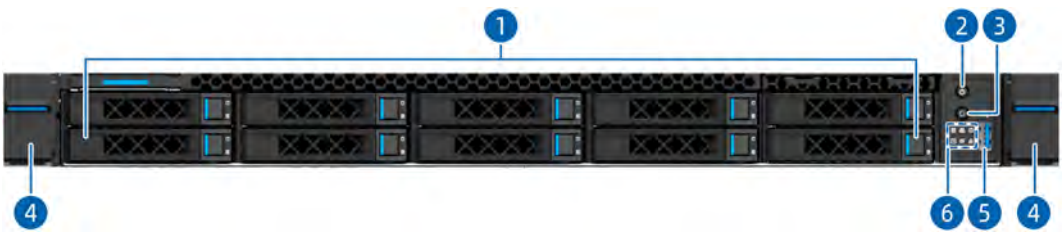
Item	Feature	Item	Feature
1	2.5-Inch Drive Bay	5	USB 3.0 Port
2	Power Button and LED	6	VGA Port
3	UID/BMC RST Button and LED	7	Ear Latch
4	LEDs	8	3.5-Inch Drive Bay

5.1.3 10 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR1280-E2-A0-R0-00 and KR1280-E2-C0-R0-00.

Figure 5-3 Front View



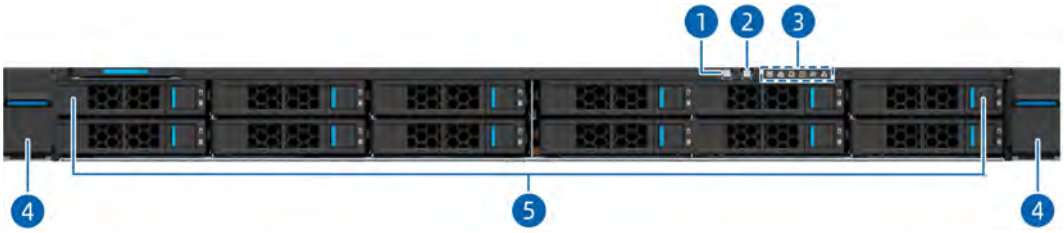
Item	Feature	Item	Feature
1	2.5-Inch Drive Bay	4	Ear Latch
2	Power Button and LED	5	USB 2.0 Port
3	UID/BMC RST Button and LED	6	LEDs

5.1.4 12 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR1280-E2-A0-R0-00 and KR1280-E2-C0-R0-00.

Figure 5-4 Front View

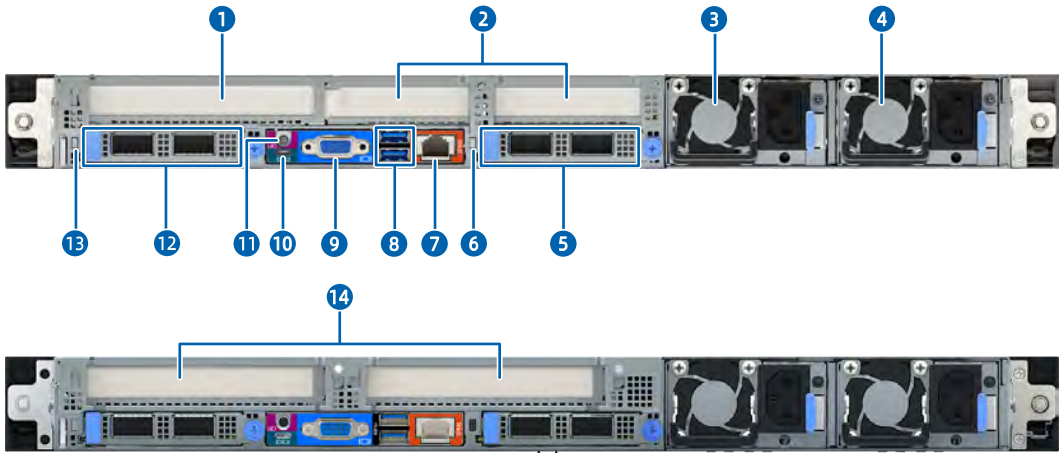


Item	Feature	Item	Feature
1	Power Button and LED	4	Ear Latch
2	UID/BMC RST Button and LED	5	2.5-Inch Drive Bay
3	LEDs	-	-

5.2 Rear Panel

5.2.1 KR1280-E2-A0-R0-00

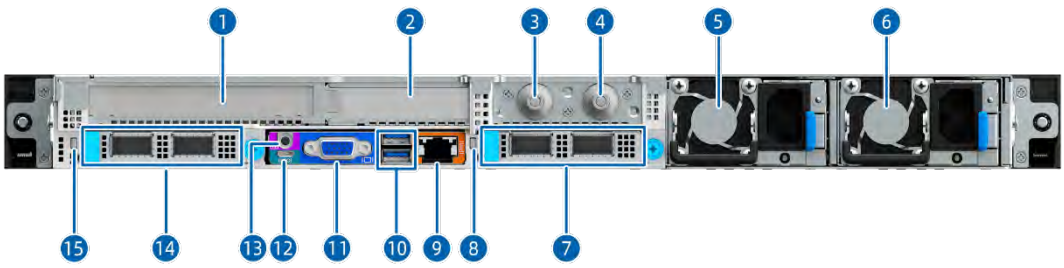
Figure 5-5 Rear View



Item	Feature	Item	Feature
1	FHHL PCIe Slot	8	USB 3.0 Port
2	HHHL PCIe Slot	9	VGA Port
3	PSU0	10	System/BMC Serial Port
4	PSU1	11	UID/BMC RST Button and LED
5	OCP 3.0 Card	12	OCP 3.0 Card
6	OCP 3.0 Card Hot-Plug Button and LED	13	OCP 3.0 Card Hot-Plug Button and LED
7	BMC Management Network Port	14	FHHL PCIe Slot

5.2.2 KR1280-E2-C0-R0-00

Figure 5-6 Rear View

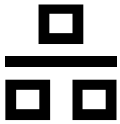


Item	Feature	Item	Feature
1	FHHL PCIe Slot	9	BMC Management Network Port
2	HHHL PCIe Slot	10	USB 3.0 Port
3	Quick Disconnect (inlet)	11	VGA Port
4	Quick Disconnect (outlet)	12	System/BMC Serial Port
5	PSU0	13	UID/BMC RST Button and LED
6	PSU1	14	OCP 3.0 Card
7	OCP 3.0 Card	15	OCP 3.0 Card Hot-Plug Button and LED
8	OCP 3.0 Card Hot-Plug Button and LED	-	-

5.3 LEDs and Buttons

Table 5-1 LED and Button Description

Item	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		UID/BMC RST Button and LED	• UID/BMC RST LED: - Solid blue = The UID LED is activated by the UID button or via the BMC • UID/BMC RST button: - Press and release the button to activate the UID LED.

Item	Icon	Feature	Description
			- Press and hold the button for 6 seconds to force a BMC reset.
3		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.
4		Memory Status LED	• Off = Normal • Blinking red (1 Hz) = A warning error occurs • Solid red = A critical error occurs
5		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
6		Power Status LED	• Off = Normal • Blinking red (1 Hz) = A warning error occurs • Solid red = A critical error occurs
7		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
8		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.

Item	Icon	Feature	Description
9	-	OCP 3.0 Card Hot-Plug Button and LED[1]	• OCP 3.0 card hot-plug LED: - Off = OCP card is powered off - Blinking green = OCP card is getting ready for hot-plugging or OCP card is being identified after being inserted - Solid green = OCP card is powered on • OCP 3.0 card hot-plug button: - With the LED solid on, press and release the button to power off the OCP 3.0 card. - With the LED off and the OCP 3.0 card installed, press and release the button to power on the OCP 3.0 card.

Note:

1. The server supports hot-plug OCP 3.0 cards. However, when the server is installed with the RHEL 8.x OS, the OCP 3.0 card hot-plug LED will illuminate orange (for about a few seconds) when you hot-insert an OCP 3.0 card. This is due to a conflict between the OCP 3.0 specification and the PCIe specification, but it does not affect the normal usage of the OCP 3.0 cards.

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

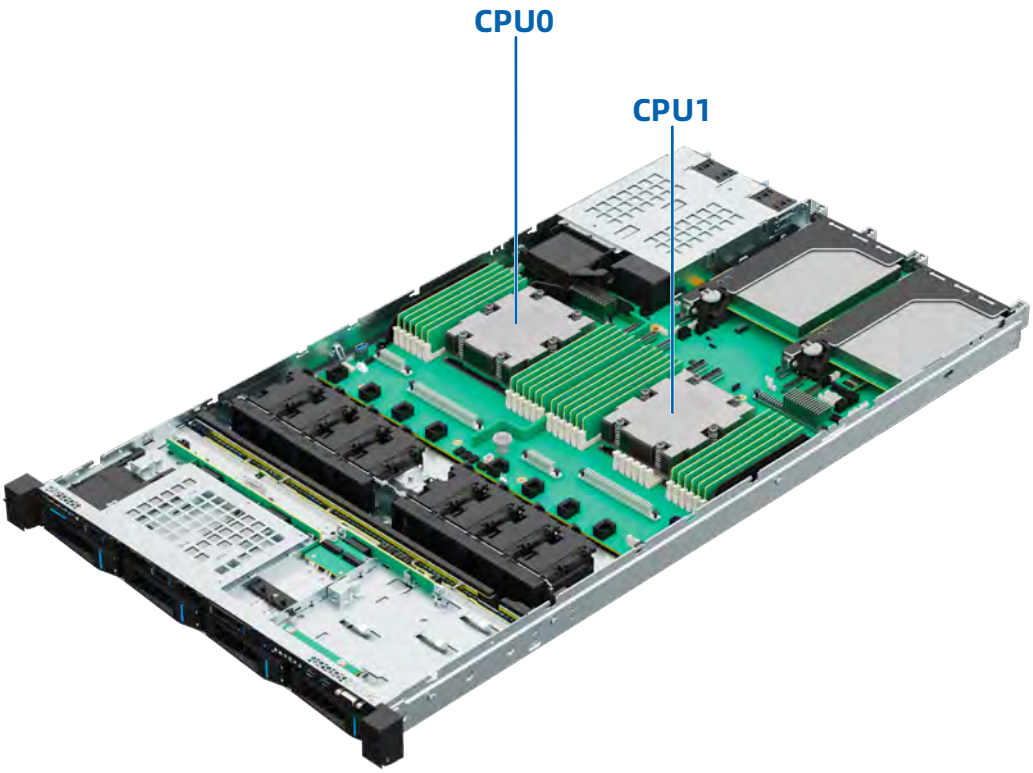
Item	Port	Description
1	VGA Port	Enables you to connect a display terminal to the system.

Item	Port	Description
2	USB 3.0 Port	Enables you to connect a USB 2.0/3.0 device to the system.
3	USB 2.0 port	Enables you to connect a USB 2.0 device to the system.
4	System/BMC Serial Port	• Enables you to debug and monitor the system. • Enables you to debug and monitor the BMC. Note: It is a micro USB serial port with a default baud rate of 115,200 bit/s.
5	BMC Management Network Port	Enables you to manage the server via the BMC management network port. Note: It is a Gigabit Ethernet port that supports 100 Mbps and 1,000 Mbps auto-negotiation.
6	PSU Socket	Enables you to connect a power cord. You can select the PSUs as needed. Note: Make sure that the rated power of each PSU is greater than that of the server.
7	OCP 3.0 Network Port	Enables you to connect the system to the network.
8	PCIe NIC Port	Enables you to connect the system to the network.

5.5 Processors

- Supports 1 or 2 processors.
- If only 1 processor is configured, install it in the CPU0 socket.
- The processors used in a server must bear the same part number (P/N code).
- For specific processor options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

Figure 5-7 Processor Locations



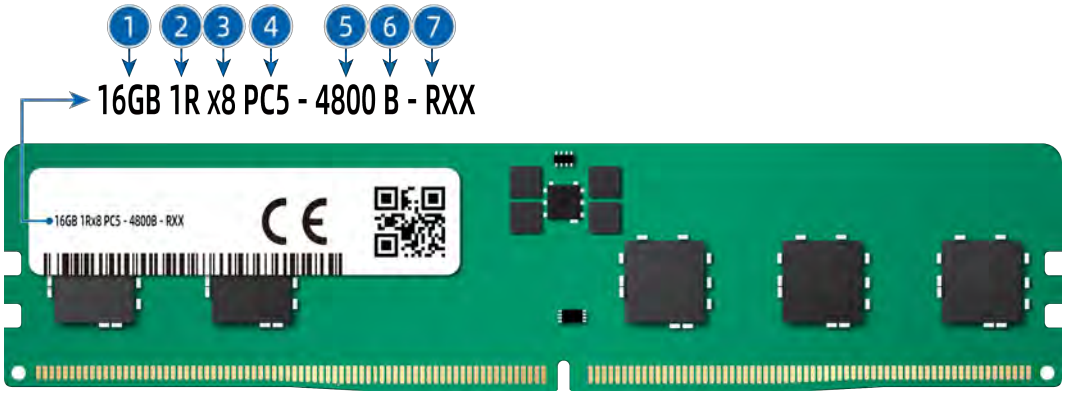
5.6 Memory

5.6.1 DDR5 DIMMs

1. Identification

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

Figure 5-8 DIMM Identification



Item	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	4,800 MT/s
6	CAS latency	• SDP 4800B = 40-39-39 • 3DS 4800B = 46-39-39 • SDP 5600B = 46-45-45 • 3DS 5600B = 52-45-45
7	DIMM type	R = RDIMM

2. Memory Subsystem Architecture

The server supports 24 DIMM slots and 12 memory channels per CPU.

Table 5-3 DIMM Slot List

CPU	Channel ID	Silk Screen
CPU0	Channel A	CPU0_CAD0
	Channel B	CPU0_CBD0
	Channel C	CPU0_CCD0
	Channel D	CPU0_CDD0

CPU	Channel ID	Silk Screen
	Channel E	CPU0_CED0
	Channel F	CPU0_CFD0
	Channel G	CPU0_CGD0
	Channel H	CPU0_CHD0
	Channel I	CPU0_CID0
	Channel J	CPU0_CJD0
	Channel K	CPU0_CKD0
	Channel L	CPU0_CLD0
CPU1	Channel A	CPU1_CAD0
	Channel B	CPU1_CBD0
	Channel C	CPU1_CCD0
	Channel D	CPU1_CDD0
	Channel E	CPU1_CED0
	Channel F	CPU1_CFD0
	Channel G	CPU1_CGD0
	Channel H	CPU1_CHD0
	Channel I	CPU1_CID0
	Channel J	CPU1_CJD0
	Channel K	CPU1_CKD0
	Channel L	CPU1_CLD0

3. Compatibility

Refer to the following rules to select 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.

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

- DDR5 DIMMs can be used with the AMD EPYC 9004 series processors. The maximum memory capacity supported is identical for different CPU models.

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

Item		Value			
Capacity per DDR5 DIMM (GB)		16	32	64	128
Type		RDIMM	RDIMM	RDIMM	RDIMM
Rated speed (MT/s)		4,800/5,600	4,800/5,600	4,800/5,600	4,800/5,600
Operating voltage (V)		1.1	1.1	1.1	1.1
Maximum number of DDR5 DIMMs supported in a server[a]		24	24	24	24
Maximum capacity of DDR5 DIMMs supported in a server (GB)[b]		384	768	1,536	3,072
Actual speed (MT/s)	1 DPC[c]	4,800	4,800	4,800	4,800
a: The maximum number of DDR5 DIMMs supported is based on the dual-CPU configuration. The number is halved for the single-CPU configuration. b: It indicates the maximum memory capacity supported when all the DIMM slots are populated with DDR5 DIMMs. c: 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.					

4. Population Rules

General population rules for DDR5 DIMMs:

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

5. DIMM Slot Layout

Up to 24 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 5-9 DIMM Slot Layout

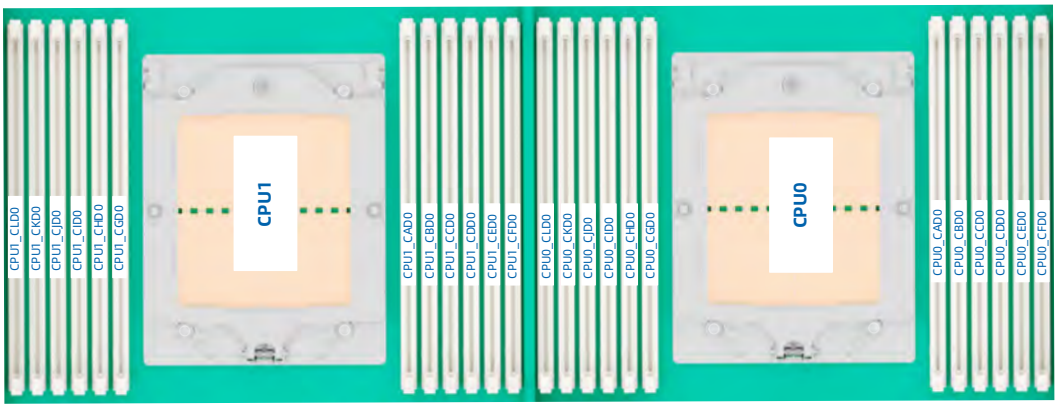


Table 5-5 DDR5 DIMM Population Rules (Single-CPU Configuration)

DDR QTY	CPU0											
	CLD0	CKD0	CJD0	CID0	CHD0	CGD0	CAD0	CBD0	CCD0	CDD0	CED0	CFD0
1							●					
2						●	●					
4				●		●	●		●			
6				●	●	●	●	●	●			
8		●		●	●	●	●	●	●		●	
10		●	●	●	●	●	●	●	●	●	●	
12	●	●	●	●	●	●	●	●	●	●	●	●

Table 5-6 DDR5 DIMM Population Rules (Dual-CPU Configuration)

DDR QTY	CPU0												CPU1											
	CLD0	CKD0	CJD0	CID0	CHD0	CGD0	CAD0	CBD0	CCD0	CDD0	CED0	CFD0	CLD0	CKD0	CJD0	CID0	CHD0	CGD0	CAD0	CBD0	CCD0	CDD0	CED0	CFD0
2							●												●					
4						●	●											●	●					
8				●		●	●		●							●		●	●		●			
12				●	●	●	●	●	●							●	●	●	●	●	●			
16		●		●	●	●	●	●	●		●			●		●	●	●	●	●	●		●	
20		●	●	●	●	●	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●	
24	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

5.7 Storage

5.7.1 Drive Configurations

NOTE

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

1. KR1280-E2-A0-R0-00

Table 5-7 Drive Configurations

Configuration	Front Drives	Internal Drives	Drive Management Mode
10 × 2.5-Inch Drive Configuration	10 × 2.5-inch drive (drive bays with physical drive No. 0 to 9 support SAS/SATA drives)	2 × M.2 SSD	• SAS/SATA drive: RAID card/CPU • Internal M.2 SSD: CPU
	10 × 2.5-inch drive (drive bays with physical drive No. 0 to 9 support NVMe drives)	-	NVMe drive: CPU
4 × 3.5-Inch Drive + 4 × 2.5-Inch Drive Configuration	4 × 3.5-inch drive + 4 × 2.5-inch drive (drive bays with physical drive No. 0 to 7 support SAS/SATA/NVMe drives)	-	• SAS/SATA drive: RAID card/CPU • NVMe drive: CPU
4 × 3.5-Inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Configuration	• 2 × E1.S SSD (drive bays with physical drive No. 0 to 1 support NVMe E1.S SSDs) • 2 × M.2 SSD (drive bays with physical drive No. 2 to 3 support SATA M.2 SSDs) • 4 × 3.5-inch drive (drive bays with	-	• SAS/SATA drive or front M.2 SSD: RAID card/CPU • Front E1.S SSD: CPU • NVMe drive: CPU/Trimode RAID card

Configuration	Front Drives	Internal Drives	Drive Management Mode
	physical drive No. 4 to 7 support SAS/SATA/NVMe drives)		
12 × 2.5-Inch Drive Configuration	12 × 2.5-inch drive (drive bays with physical drive No. 0 to 11 support SAS/SATA drives)	2 × M.2 SSD	• SAS/SATA drive: RAID card/CPU • Internal M.2 SSD: CPU
	12 × 2.5-inch drive (drive bays with physical drive No. 0 to 11 support NVMe drives)	-	NVMe drive: CPU

2. KR1280-E2-C0-R0-00

Table 5-8 Drive Configurations

Configuration	Front Drives	Internal Drives	Drive Management Mode
10 × 2.5-Inch Drive Configuration	10 × 2.5-inch drive (drive bays with physical drive No. 0 to 9 support SAS/SATA drives)	2 × M.2 SSD	• SAS/SATA drive: RAID card/CPU • Internal M.2 SSD: CPU
	10 × 2.5-inch drive (drive bays with physical drive No. 0 to 9 support NVMe drives)	-	NVMe drive: CPU
4 × 3.5-Inch Drive + 4 × 2.5-Inch Drive Configuration	4 × 3.5-inch drive + 4 × 2.5-inch drive (drive bays with physical drive No. 0 to 7 support SAS/SATA/NVMe drives)	-	• SAS/SATA drive: RAID card/CPU • NVMe drive: CPU
12 × 2.5-Inch Drive Configuration	12 × 2.5-inch drive (drive bays with physical drive No. 0 to 11 support SAS/SATA drives)	2 × M.2 SSD	• SAS/SATA drive: RAID card/CPU

Configuration	Front Drives	Internal Drives	Drive Management Mode
			• Internal M.2 SSD: CPU
	12 × 2.5-inch drive (drive bays with physical drive No. 0 to 11 support NVMe drives)	-	NVMe drive: CPU

5.7.2 Drive Numbering

1. 4 × 3.5-Inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Configuration

NOTE

Applicable model: KR1280-E2-A0-R0-00.

Figure 5-10 Drive Numbering

Configuration	Physical Drive No.	Drive No. Identified by the BMC	Front/Rear	Drive Number Identified by an 8i/16i RAID Card
2 × E1.S + 2 × M.2	0 - 1	0 - 1	Front	-
	2 - 3	2 - 3	Front	0 - 1
4 × SAS/SATA	4 - 7	4 - 7	Front	2 - 5/0 - 3
4 × NVMe	4 - 7	4 - 7	Front	0 - 3

2. 4 × 3.5-Inch Drive + 4 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR1280-E2-A0-R0-00 and KR1280-E2-C0-R0-00.

Figure 5-11 Drive Numbering

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

3. 10 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR1280-E2-A0-R0-00 and KR1280-E2-C0-R0-00.

Figure 5-12 Drive Numbering

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

4. 12 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR1280-E2-A0-R0-00 and KR1280-E2-C0-R0-00.

Figure 5-13 Drive Numbering

Configuration	Physical Drive No.	Drive No. Identified by the BMC	Front/Rear	Drive Number Identified by a 16i RAID Card
12 × SAS/SATA	0 - 11	0 - 11	Front	0 - 11
12 × NVMe	0 - 11	0 - 11	Front	-

5.7.3 Drive LEDs

1. SAS/SATA Drive LEDs

Figure 5-14 SAS/SATA Drive LEDs

Activity LED (①)	Locator/Error LED (②)			Description
Green	Blue	Red		
Off	Off	RAID created	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 5-15 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

5.7.4 RAID Cards

RAID cards provide 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 slots support OCP 3.0 cards. Users can select the OCP 3.0 cards as needed.
- The PCIe expansion slots support PCIe NICs. Users can select the PCIe cards as needed.
- For specific NIC options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

5.9 I/O Expansion

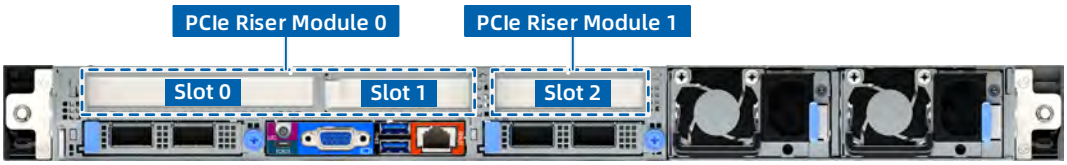
5.9.1 PCIe Expansion Cards

PCIe expansion cards provide network expansion capabilities.

- Up to 3 PCIe 5.0 expansion slots and 2 dedicated slots for OCP 3.0 cards.
- 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 5-16 PCIe Slots

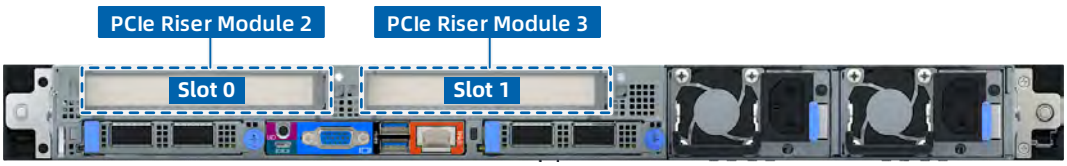


NOTE

Applicable model: KR1280-E2-A0-R0-00.

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

Figure 5-17 PCIe Slots



NOTE

Applicable model: KR1280-E2-A0-R0-00.

- Slot 0 resides in PCIe riser module 2.
- Slot 1 resides in PCIe riser module 3.

Figure 5-18 PCIe Slots

NOTE

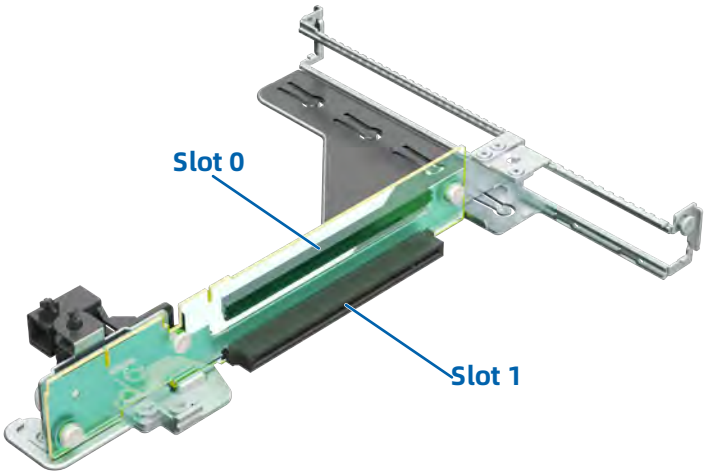
Applicable model: KR1280-E2-C0-R0-00.

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

5.9.3 PCIe Riser Modules

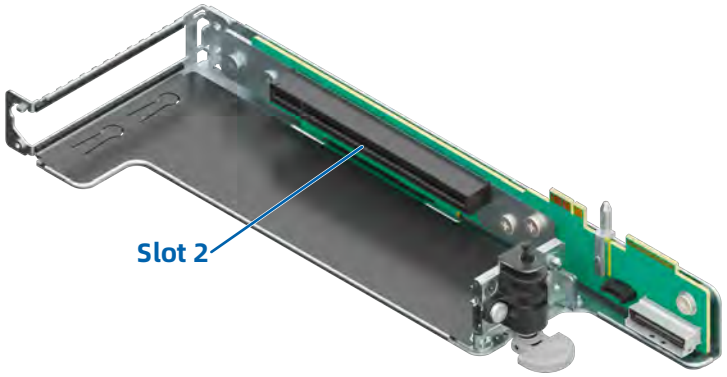
- PCIe Riser Module 0 (2 × PCIe x16 Slot)

Figure 5-19 PCIe Riser Module 0



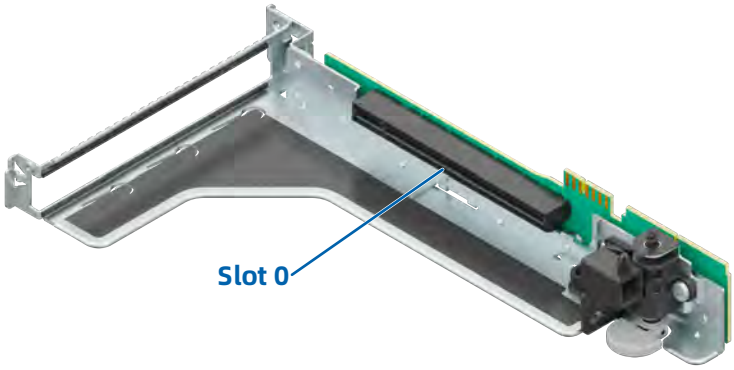
- PCIe Riser Module 1 (1 × PCIe x16 Slot)

Figure 5-20 PCIe Riser Module 1



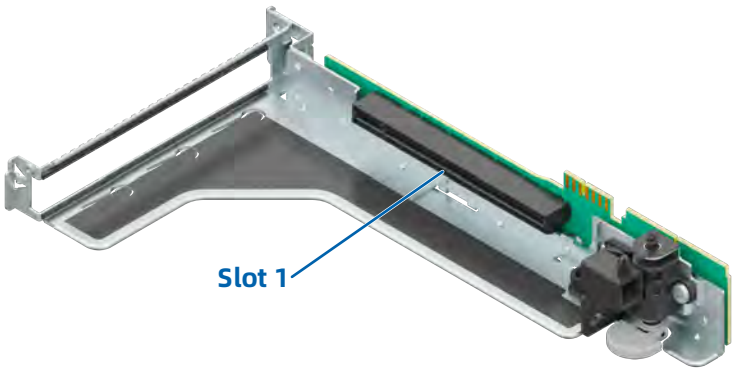
- PCIe Riser Module 2 (1 × PCIe x16 Slot)

Figure 5-21 PCIe Riser Module 2



- PCIe Riser Module 3 (1 × PCIe x16 Slot)

Figure 5-22 PCIe Riser Module 3



5.9.4 PCIe Slot Description

Table 5-9 PCIe Slot Description - 3 × PCIe Expansion Card

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port No.	Form Factor
Slot 0	CPU1	PCIe 4.0/5.0	x16	x16	PE1/PE2	FHHL
Slot 1	CPU1	PCIe 4.0/5.0	x16	x16	PE2/PE0	HHHL
Slot 2	CPU0	PCIe 4.0/5.0	x16	x16	PE2	HHHL
OCP 3.0 Slot	CPU0	PCIe 5.0	x16	x8/x16	PE3AB/PE3ABCD	SFF OCP 3.0
OCP 3.0 Slot	CPU1	PCIe 5.0	x16	x8/x16	PE3AB/PE3ABCD	SFF OCP 3.0

Table 5-10 PCIe Slot Description - 2 × PCIe Expansion Card

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port No.	Form Factor
Slot 0	CPU1	PCIe 4.0/5.0	x16	x16	PE1/PE2	FHHL
Slot 1	CPU1	PCIe 4.0/5.0	x16	x16	PE1/PE2	FHHL
OCP 3.0 Slot	CPU0	PCIe 5.0	x16	x8/x16	PE3AB/PE3ABCD	SFF OCP 3.0
OCP 3.0 Slot	CPU1	PCIe 5.0	x16	x8/x16	PE3AB/PE3ABCD	SFF OCP 3.0

5.10 PSUs

- The server supports 1 or 2 PSUs.
- The server supports AC or DC power input.
- The PSUs are hot-swappable.
- The server supports 2 PSUs in 1+1 redundancy.

- The server must use PSUs with the same part number (P/N code).
- The PSUs provide short circuit protection.

Figure 5-23 PSU Locations

5.10.1 PSU LED

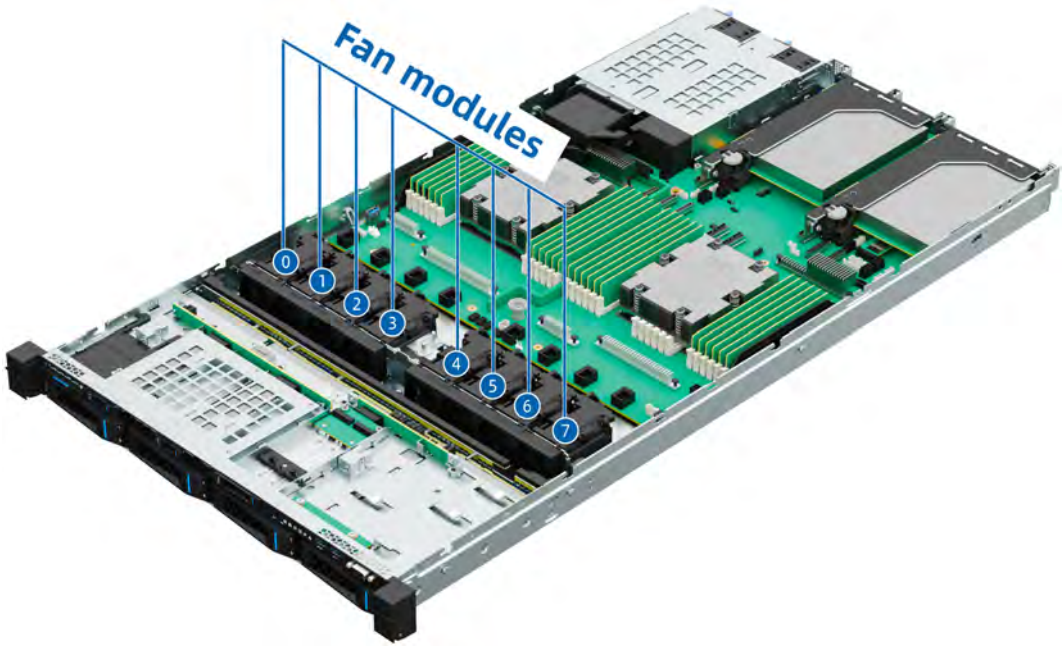
Figure 5-24 PSU LED Description

Item	PSU LED (①) Status	Description
1	Solid green	Normal
2	Off	No AC/DC input to the PSU
3	Solid amber	PSU critical event causing a shutdown (possible causes: PSU overtemperature protection, PSU overcurrent protection, PSU overvoltage protection, short circuit protection)
4	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)
5	Blinking green (1 Hz)	PSU operating in standby mode with normal input
6	Blinking green (on for 2 seconds and off for 1 second)	PSU in sleep state for cold redundancy
7	Blinking green (2 Hz)	PSU firmware updating

5.11 Fan Modules

- The server supports eight 4056 fan modules.
- The fan modules are hot-swappable.
- The fan modules support N+1 redundancy, which means that the server can continue working properly when a single fan fails.
- The server supports intelligent fan speed control.
- The server must use fan modules with the same part number (P/N code).

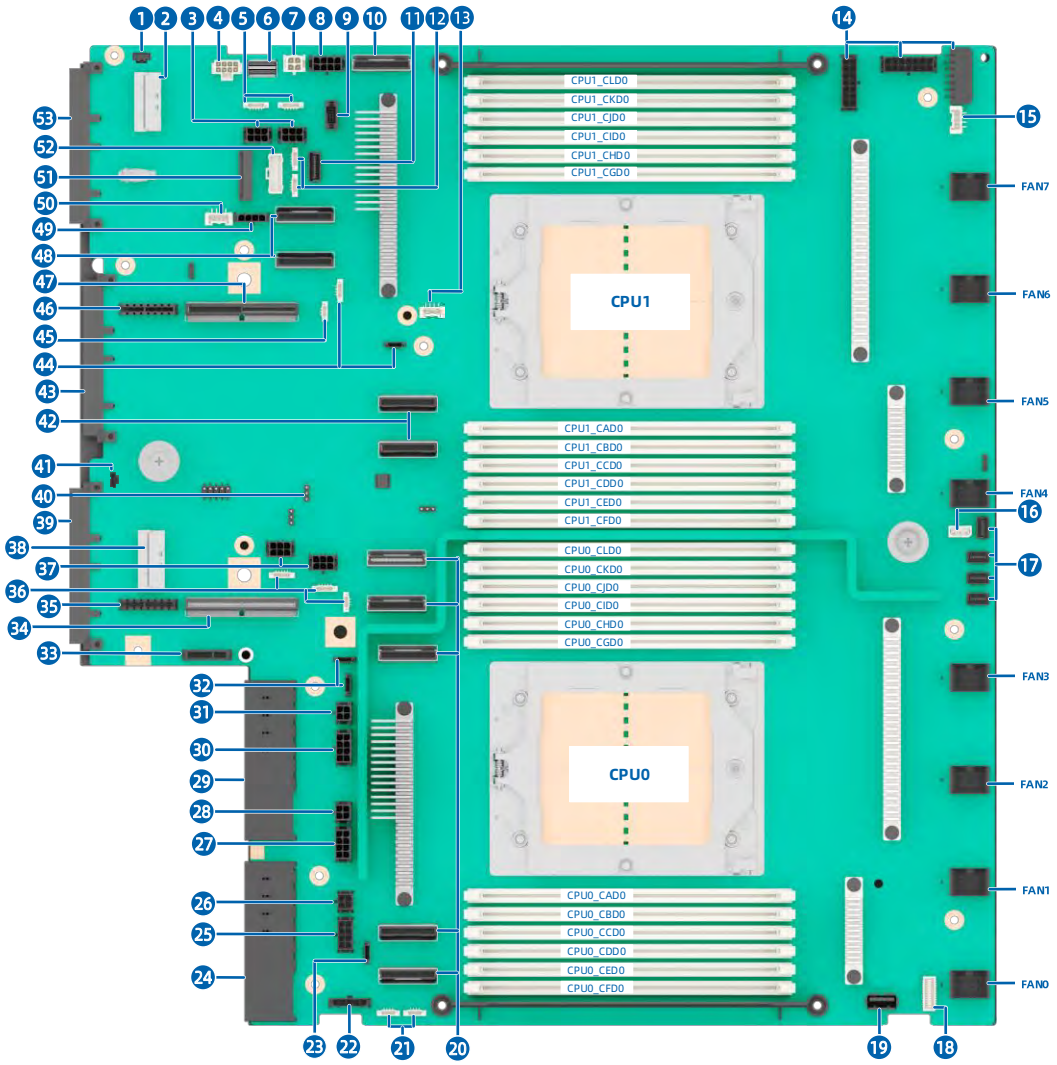
Figure 5-25 Fan Module Locations



5.12 Boards

5.12.1 Motherboard

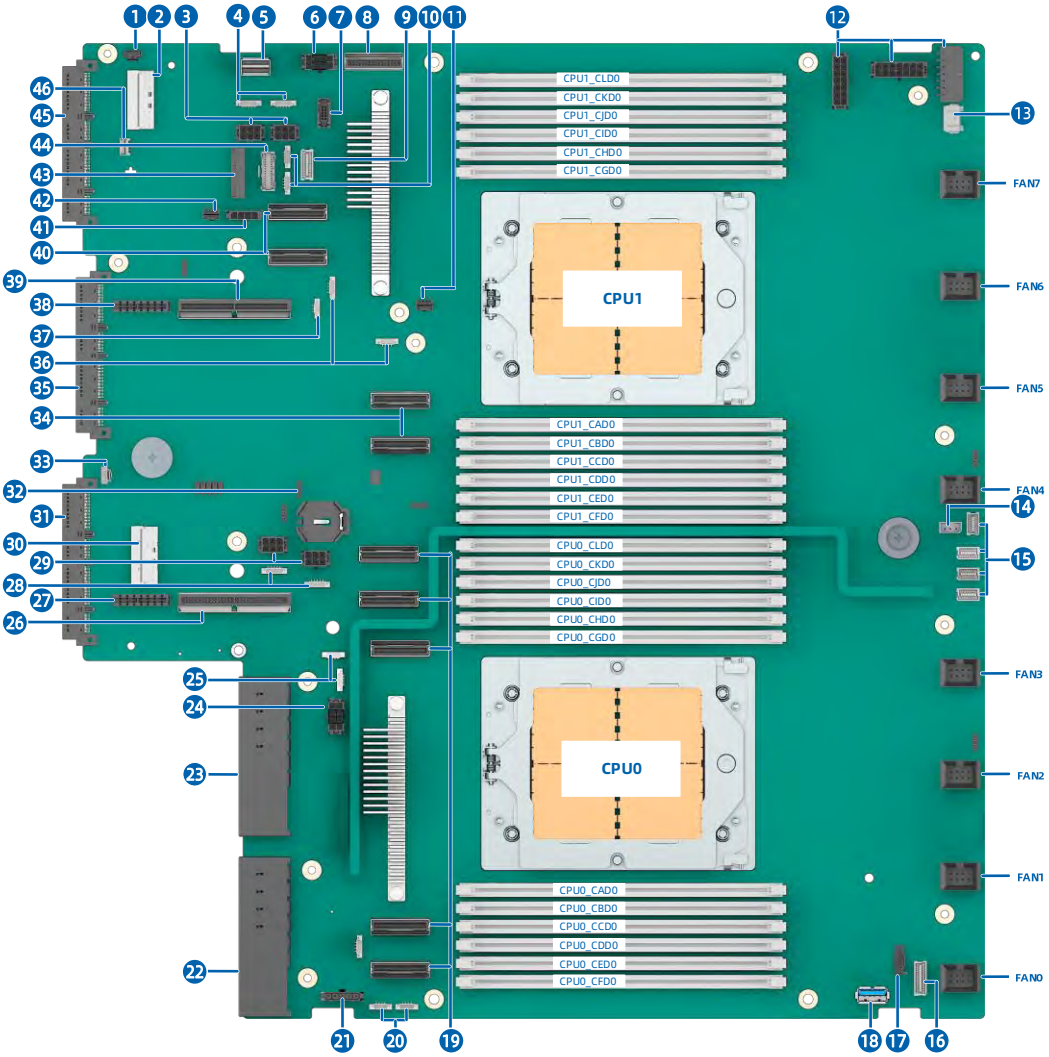
Figure 5-26 Motherboard 1



Item	Feature	Item	Feature
1	OCP 3.0 Card Hot-Plug Button and LED Connector	28	GPU2 Power Connector
2	OCP 3.0 MCIO x8 Connector	29	PSU0 Connector
3	GPU Riser/Rear Drive BP Power Connector	30	GPU1 Power Connector
4	Mid-Drive Power Connector	31	GPU1 Power Connector
5	I²C Connector	32	I²C Connector
6	Right Control Panel Connector	33	Riser Power Connector

Item	Feature	Item	Feature
7	GPU0 Connector	34	MCIO x16 Slot (CPU0)
8	GPU0 Power Connector	35	Riser Power Connector
9	VPP Connector	36	I²C Connector
10	MCIO x8 Connector (CPU1)	37	GPU Riser/Rear Drive BP Power Connector
11	M.2_SB Connector	38	OCP 3.0 MCIO x8 Connector
12	I²C Connector	39	OCP 3.0 Card Connector
13	Leak Detection Connector	40	CMOS Jumper
14	Front Drive BP Power Connector	41	OCP 3.0 Card Hot-Plug Button and LED Connector
15	Sensor Connector	42	MCIO x8 Connector (CPU1)
16	Intrusion Detection Connector	43	DC-SCM Connector
17	SGPIO Connector	44	I²C Connector
18	Left Control Panel Connector	45	NIC_COM Connector
19	USB 3.0 Port	46	PCIE_CPU1 Power Connector
20	MCIO x8 Connector (CPU0)	47	MCIO x16 Connector (CPU1)
21	I²C Connector	48	MCIO x8 Connector (CPU1)
22	Capacitor Board Power Connector	49	Smart_LAN Power Connector
23	I²C Connector	50	Leak Detection Connector
24	PSU1 Connector	51	System TF Card Adapter Connector
25	GPU3 Power Connector	52	NC-SI Connector
26	GPU3 Power Connector	53	OCP 3.0 Card Connector
27	GPU2 Power Connector	-	-

Figure 5-27 Motherboard 2

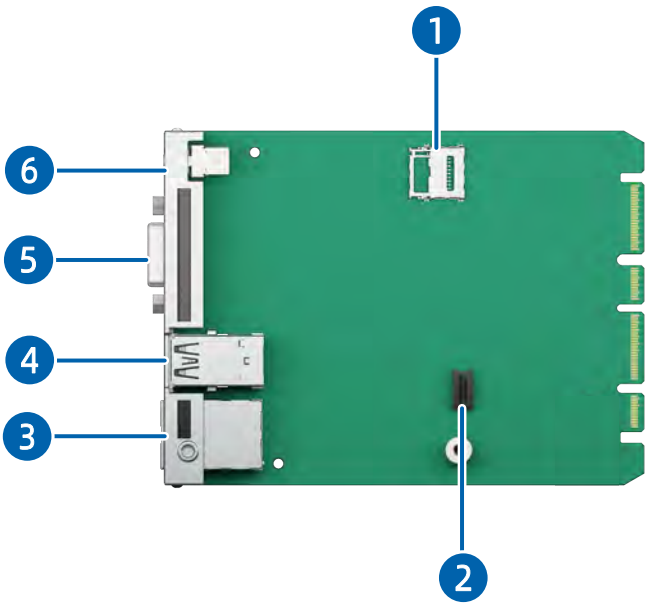


Item	Feature	Item	Feature
1	OCP 3.0 Card Hot-Plug Button and LED Connector	24	GPU1 Power Connector
2	OCP 3.0 MCIO x8 Connector	25	I²C Connector
3	GPU Riser/Rear Drive BP Power Connector	26	MCIO x16 Connector (CPU0)
4	I²C Connector	27	Riser Power Connector
5	Right Control Panel Connector	28	I²C Connector
6	GPU0 Power Connector	29	GPU Riser/Rear Drive BP Power Connector
7	VPP Connector	30	OCP 3.0 MCIO x8 Connector
8	MCIO x8 Connector (CPU1)	31	OCP 3.0 Card Connector

Item	Feature	Item	Feature
9	M.2_SB Connector	32	CMOS Jumper
10	I^2C Connector	33	OCP 3.0 Card Hot-Plug Button and LED Connector
11	Leak Detection Connector	34	MCIO x8 Connector (CPU1)
12	Front Drive BP Power Connector	35	DC-SCM Connector
13	Sensor Connector	36	I^2C Connector
14	Intrusion Detection Connector	37	NIC_COM Connector
15	SGPIO Connector	38	Riser Power Connector
16	Left Control Panel Connector	39	MCIO x16 Connector (CPU1)
17	HDT Connector	40	MCIO x8 Connector (CPU1)
18	USB 3.0 Port	41	Smart_LAN Power Connector
19	MCIO x8 Connector (CPU0)	42	Leak Detection Connector
20	I^2C Connector	43	System TF Card Adapter Connector
21	Capacitor Board Power Connector	44	NC-SI Power Connector
22	PSU1 Connector	45	OCP 3.0 Card Connector
23	PSU0 Connector	46	IPMB Connector

5.12.2 DC-SCM Board

Figure 5-28 DC-SCM Board



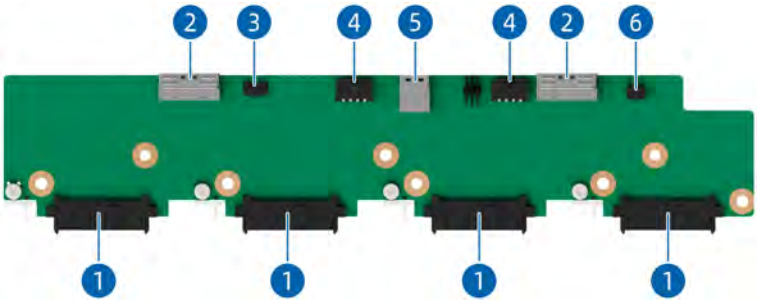
Item	Feature	Item	Feature
1	BMC TF Card Slot	4	USB 3.0 Port
2	TCM/TPM Connector	5	VGA Port
3	BMC Management Network Port	6	System/BMC Serial Port

5.12.3 Drive Backplanes

1. Front Drive Backplanes

- 4 × 2.5-Inch SAS/SATA/NVMe Drive Backplane

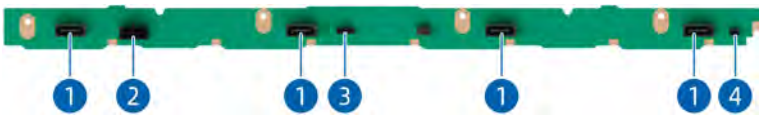
Figure 5-29 4 × 2.5-Inch SAS/SATA/NVMe Drive Backplane



Item	Feature	Item	Feature
1	Drive Connector	4	Power Connector
2	MCIO x8 Connector	5	Slimline x4 Connector
3	BMC_I²C Connector	6	VPP Connector

- 4 × 3.5-Inch SAS/SATA Drive Backplane

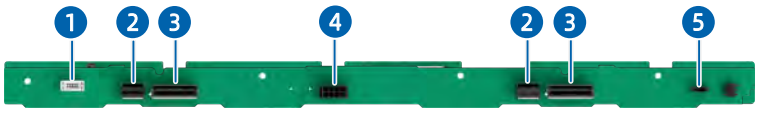
Figure 5-30 4 × 3.5-Inch SAS/SATA Drive Backplane



Item	Feature	Item	Feature
1	7-Pin SATA Connector	3	SGPIO Connector
2	Power Connector	4	BMC_I²C Connector

- 4 × 3.5-Inch SAS/SATA/NVMe Drive Backplane

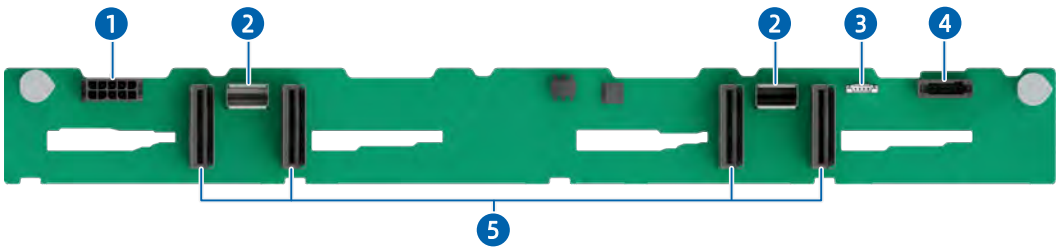
Figure 5-31 4 × 3.5-Inch SAS/SATA/NVMe Drive Backplane



Item	Feature	Item	Feature
1	VPP Connector	4	Power Connector
2	Slimline x4 Connector	5	BMC_I²C Connector
3	MCIO x8 Connector	-	-

- 8 × 2.5-Inch SAS/SATA/NVMe Drive Backplane

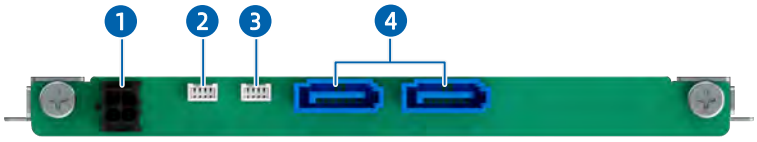
Figure 5-32 8 × 2.5-Inch SAS/SATA/NVMe Drive Backplane



Item	Feature	Item	Feature
1	Power Connector	4	VPP Connector
2	Slimline x4 Connector	5	MCIO x8 Connector
3	BMC_I²C Connector	-	-

- 2 × M.2 Drive Backplane

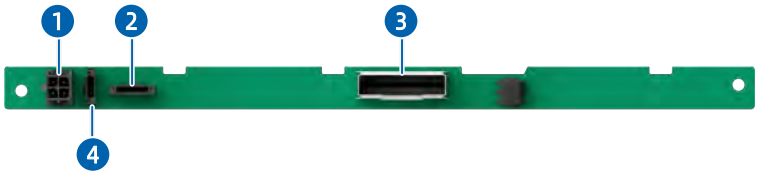
Figure 5-33 2 × M.2 Drive Backplane



Item	Feature	Item	Feature
1	Power Connector	3	BMC_I²C Connector
2	SGPIO Connector	4	7-Pin SATA Connector

- 2 × E1.S Drive Backplane

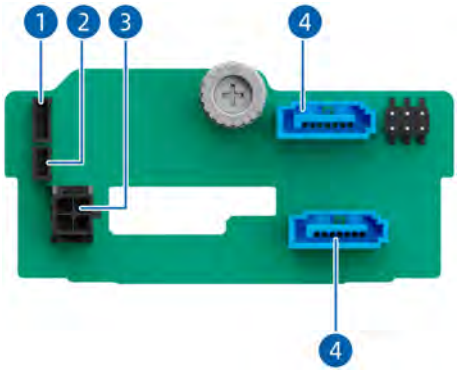
Figure 5-34 2 × E1.S Drive Backplane



Item	Feature	Item	Feature
1	Power Connector	3	Slimline x4 Connector
2	VPP Connector	4	BMC_I²C Connector

- 2 × 2.5-Inch SAS/SATA Drive Backplane

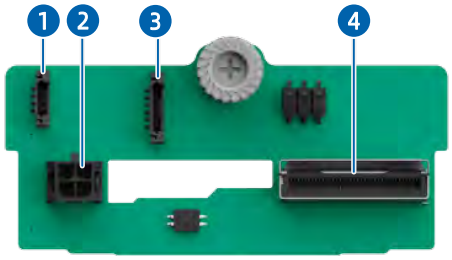
Figure 5-35 2 × 2.5-Inch SAS/SATA Drive Backplane



Item	Feature	Item	Feature
1	SGPIO Connector	3	Power Connector
2	BMC_I²C Connector	4	7-Pin SATA Connector

- 2 × 2.5-Inch NVMe Drive Backplane

Figure 5-36 2 × 2.5-Inch NVMe Drive Backplane



Item	Feature	Item	Feature
1	BMC_I²C Connector	3	VPP Connector
2	Power Connector	4	MCIO x8 Connector

6 Product Specifications

6.1 KR1280-E2-A0-R0-00

6.1.1 Technical Specifications

Table 6-1 Technical Specifications

Item	Description
Form Factor	1U rack server
Processor	Supports 1 or 2 processors. • AMD EPYC 9004 series processor • Integrated memory controllers and 12 memory channels per processor • Integrated PCIe 5.0 controllers and 128 PCIe lanes per processor • 4 xGMI links per CPU at up to 32 GT/s per link • Up to 128 cores per processor • Max. boost frequency of 4.40 GHz • L3 cache up to 1,152 MB • TDP up to 400 W Note: The information above is for reference only. See 7.2 Hardware Compatibility for details.
Memory	Supports 24 DIMM slots. • Up to 24 DDR5 DIMMs • 12 memory channels per processor and 1 DIMM per channel • Actual speed up to 4,800 MT/s • RDIMMs supported • 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). • ECC memory protection Note: The information above is for reference only. See 7.2 Hardware Compatibility for details.

Item	Description
Storage	• Front: - Up to 4 × 2.5/3.5-inch SAS/SATA/NVMe drive (hot-swap) + 2 × E1.S SSD (hot-swap) + 2 × M.2 SSD or - Up to 10 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or - Up to 12 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or - Up to 4 × 2.5/3.5-inch SAS/SATA/NVMe drive (hot-swap) + 4 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) • Internal: Up to 2 × SATA M.2 SSD or 2 × PCIe M.2 SSD
Network	Provides multiple network expansion capabilities. • Up to 2 OCP 3.0 cards (1/10/25/40/100/200 Gb) • 1/10/25/40/100 Gb PCIe NICs
I/O Expansion	Supports PCIe expansion slots. • Up to 3 × PCIe x16 slot • 2 × OCP 3.0 x16 card Note: The information above is for reference only. See 5.9.2 PCIe Slot Locations and 5.9.4 PCIe Slot Description for details.
Port	Supports multiple kinds of ports. • Front (4 × 3.5-inch drive + 2 × E1.S SSD + 2 × M.2 SSD configuration): - 1 × USB 2.0 port - 1 × USB 3.0 port - 1 × VGA port • Front (10 × 2.5-inch drive configuration): - 1 × USB 2.0 port • Front (4 × 3.5-inch drive + 4 × 2.5-inch drive configuration): - 1 × USB 3.0 port - 1 × VGA port • Rear: - 2 × USB 3.0 port - 1 × VGA port - 1 × BMC management network port - 1 × system/BMC serial port • Internal: 1 × USB 3.0 port Note:

Item	Description
	OS installation on the USB storage media is not recommended.
Display	Integrated VGA on the DC-SCM board 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 • KSManage • KSManage Tools
Security Features	• Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) • 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

6.1.2 Environmental Specifications

Table 6-2 Environmental Specifications

Item	Description
Temperature[1,2,3]	• Operating: 5°C to 45°C (41°F to 113°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
Operating Altitude	≤3,050 m (10,007 ft)

Item	Description
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) • Silver coupon: 200 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)
Acoustic Noise[4,5,6]	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: 6.99 B - LpAm: 56.4 dBA • Operating: - LWAd: 7.46 B - LpAm: 63.4 dBA

Notes:

1. Some high-TDP CPU configurations support an operating temperature range of 10°C to 35°C (50°F to 95°F).

2. Standard operating temperature:

- 10°C to 35°C (50°F to 95°F) is the standard operating temperature range at sea level. At the 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 with server configurations.
- Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

3. Expanded operating temperature:

- For some configurations, the supported system inlet ambient temperature can be expanded to 5°C to 10°C (41°F to 50°F) and 35°C to 45°C (95°F to 113°F) at sea level. At an altitude of 0 to 950 m (0 to 3,117 ft), derate the maximum allowable operating temperature by 1°C per 305 m (1°F per 556 ft). At an altitude of 950 to 3,050 m (3,117 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 175 m (1°F per 319 ft).
- For some configurations, the supported system inlet ambient temperature can be expanded to 35°C to 45°C (95°F to 113°F) at sea level. At an altitude of 0 to 950 m (0 to 3,117 ft), derate the maximum allowable operating temperature by 1°C per 305 m (1°F per 556 ft). At an altitude of 950 to 3,050 m (3,117 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 125 m (1°F per 228 ft).
- Any fan failure or operations under the expanded operating temperature may lead to system performance degradation.

4. 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.

5. The sound levels shown here were measured based on the specific configurations of a server. Sound levels vary with server configurations, workloads, ambient temperatures, and other factors. These values are for reference only and subject to change without further notice.

6. 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.

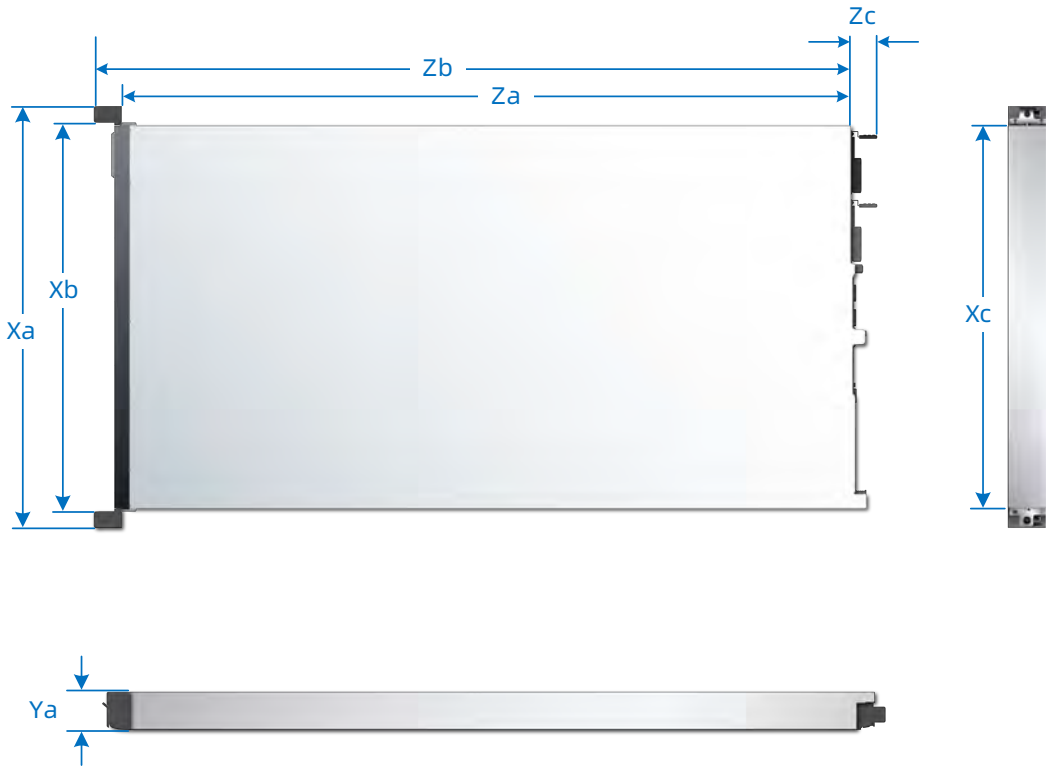
6.1.3 Physical Specifications

Table 6-3 Physical Specifications

Item	Description
Dimensions (W × H × D)	800-mm-deep chassis: • Chassis: 438 × 43.05 × 800 mm (17.24 × 1.69 × 31.50 in.) • Outer packaging: 600 × 240 × 1,090 mm (23.62 × 9.45 × 42.91 in.) 850-mm-deep chassis: • Chassis: 438 × 43.05 × 850 mm (17.24 × 1.69 × 33.46 in.) • Outer packaging: 600 × 240 × 1,090 mm (23.62 × 9.45 × 42.91 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 (19 in.) - Depth: Above 1,000 mm (39.37 in.) • Installation requirements for the server rails are as follows: - L-bracket rails: Servers must be installed with appropriate intervals. - Ball-bearing pull-out rail kit: The distance between the front and rear mounting flanges ranges from 685.8 to 914.4 mm (27 to 36 in.).
Weight	• Net weight: - 4 × 3.5-inch drive + 2 × E1.S SSD + 2 × M.2 SSD configuration: 29.2 kg (64.37 lbs) - 4 × 3.5-inch drive + 4 × 2.5-inch drive configuration: 27.5 kg (60.63 lbs) - 10 × 2.5-inch drive configuration: 24.8 kg (54.67 lbs)

	- 12 × 2.5-inch drive configuration: 28 kg (61.73 lbs) • Packaging material weight (including packaging box, rails, and accessory box): 9.5 kg (20.94 lbs) Note: The server weight varies by configuration.

Figure 6-1 Chassis Dimensions



Model	Za	Zb	Zc	Xa	Xb	Xc	Ya
KR1280-E2-A0-R0-00	800 mm (31.50 in.)	830 mm (32.68 in.)	30.18 mm (1.19 in.)	482 mm (18.98 in.)	438 mm (17.24 in.)	438 mm (17.24 in.)	43.05 mm (1.69 in.)
	850 mm (33.46 in.)	880 mm (34.65 in.)	30.18 mm (1.19 in.)	482.1 mm (18.98 in.)	438 mm (17.24 in.)	438 mm (17.24 in.)	43.05 mm (1.69 in.)

6.2 KR1280-E2-C0-R0-00

6.2.1 Technical Specifications

Table 6-4 Technical Specifications

Item	Description
Form Factor	1U rack server
Processor	Supports 1 or 2 processors. • AMD EPYC 9004 series processor • Integrated memory controllers and 12 memory channels per processor • Integrated PCIe 5.0 controllers and 128 PCIe lanes per processor • 4 xGMI links per CPU at up to 32 GT/s per link • Up to 128 cores per processor • Max. boost frequency of 4.40 GHz • L3 cache up to 1,152 MB • TDP up to 400 W Note: The information above is for reference only. See 7.2 Hardware Compatibility for details.
Memory	Supports 24 DIMM slots. • Up to 24 DDR5 DIMMs • Each processor supports 12 memory channels with 1 DIMM per channel • Actual speed up to 4,800 MT/s • RDIMMs supported • 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). • ECC memory protection Note: The information above is for reference only. See 7.2 Hardware Compatibility for details.
Storage	• Front: - Up to 4 × 2.5/3.5-inch SAS/SATA/NVMe drive (hot-swap) + 4 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or

Item	Description
	- Up to 10 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or - Up to 12 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) • Internal: Up to 2 × SATA M.2 SSD or 2 × PCIe M.2 SSD
Network	Provides multiple network expansion capabilities. • Up to 2 OCP 3.0 cards (1/10/25/40/100/200 Gb) • 1/10/25/40/100 Gb PCIe NICs
I/O Expansion	Supports PCIe expansion slots. • Up to 2 × PCIe x16 slot • 2 × OCP 3.0 x16 card Note: The information above is for reference only. See 5.9.2 PCIe Slot Locations and 5.9.4 PCIe Slot Description for details.
Port	Supports multiple kinds of ports. • Front (10 × 2.5-inch drive configuration): - 1 × USB 2.0 port • Front (4 × 3.5-inch drive + 4 × 2.5-inch drive configuration): - 1 × USB 3.0 port - 1 × VGA port • Rear: - 2 × USB 3.0 port - 1 × VGA port - 1 × BMC management network port - 1 × system/BMC serial port • Internal: 1 × USB 3.0 port Note: OS installation on the USB storage media is not recommended.
Display	Integrated VGA on the DC-SCM board 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.
Cold Plate	• Material: copper

Item	Description
	• Coolant: deionized water, PG25, etc. • Coolant particle size (diameter): ≤50 μm • Flow rate: 1 to 1.4 L/min per node, depending on the actual condition • Inlet liquid temperature: <50°C (122°F) • Outlet liquid temperature: varying by configuration • Operating pressure: <50 psi • Maximum transient pressure: 100 psi • Quick disconnect: TSC/D-4Z02BSSJE and DAG03-8000117216A
System Management	• UEFI • BMC • NC-SI • KSManage • KSManage Tools
Security Features	• Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) • 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

6.2.2 Environmental Specifications

Table 6-5 Environmental Specifications

Item	Description
Temperature[1,2,3]	• Operating: 5°C to 45°C (41°F to 113°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

Item	Description
Operating Altitude	≤3,050 m (10,007 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) • Silver coupon: 200 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)
Acoustic Noise[4,5,6]	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: 5.81 B - LpAm: 44 dBA • Operating: - LWAd: 6.35 B - LpAm: 50.4 dBA

Notes:

1. Some high-TDP CPU configurations support an operating temperature range of 10°C to 35°C (50°F to 95°F).

2. Standard operating temperature:

- 10°C to 35°C (50°F to 95°F) is the standard operating temperature range at sea level. At the 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 with server configurations.
- Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

3. Expanded operating temperature:

- For some configurations, the supported system inlet ambient temperature can be expanded to 5°C to 10°C (41°F to 50°F) and 35°C to 45°C (95°F to 113°F) at sea level. At an altitude of 0 to 950 m (0 to 3,117 ft), derate the maximum allowable operating temperature by 1°C per 305 m (1°F per 556 ft). At an altitude of 950 to 3,050 m (3,117 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 175 m (1°F per 319 ft).
- For some configurations, the supported system inlet ambient temperature can be expanded to 35°C to 45°C (95°F to 113°F) at sea level. At an altitude of 0 to 950 m (0 to 3,117 ft), derate the maximum allowable operating temperature by 1°C per 305 m (1°F per 556 ft). At an altitude of 950 to 3,050 m (3,117 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 125 m (1°F per 228 ft).

- Any fan failure or operations under the expanded operating temperature may lead to system performance degradation.

4. 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.

5. The sound levels shown here were measured based on the specific configurations of a server. Sound levels vary with server configurations, workloads, ambient temperatures, and other factors. These values are for reference only and subject to change without further notice.

6. 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.

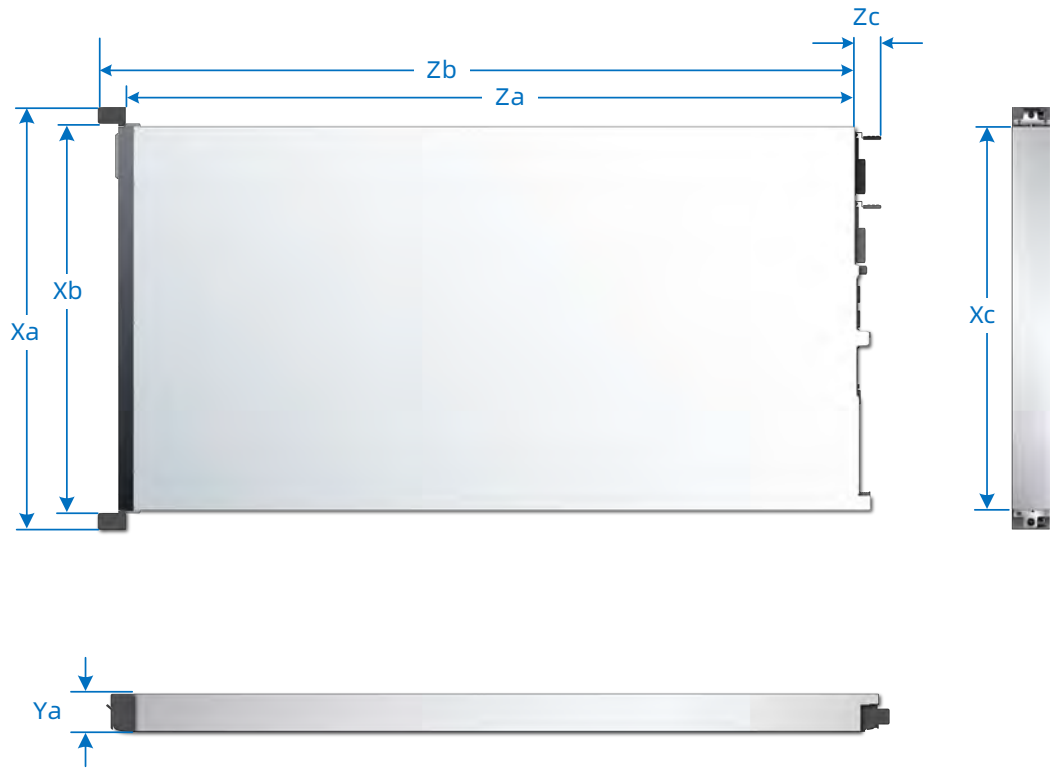
6.2.3 Physical Specifications

Table 6-6 Physical Specifications

Item	Description
Dimensions (W × H × D)	800-mm-deep chassis: • Chassis: 438 × 43.05 × 800 mm (17.24 × 1.69 × 31.50 in.) • Outer packaging: 600 × 240 × 1,090 mm (23.62 × 9.45 × 42.91 in.) 850-mm-deep chassis: • Chassis: 438 × 43.05 × 850 mm (17.24 × 1.69 × 33.46 in.) • Outer packaging: 600 × 240 × 1,090 mm (23.62 × 9.45 × 42.91 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 (19 in.) - Depth: Above 1,000 mm (39.37 in.) • Installation requirements for the server rails are as follows: - L-bracket rails: Servers must be installed with appropriate intervals. - Ball-bearing pull-out rail kit: The distance between the front and rear mounting flanges ranges from 685.8 to 914.4 mm (27 to 36 in.).
Weight	• Net weight: - 4 × 3.5-inch drive + 4 × 2.5-inch drive configuration: 27.5 kg (60.63 lbs) - 10 × 2.5-inch drive configuration: 24.8 kg (54.67 lbs)

Item	Description
	- 12 × 2.5-inch drive configuration: 28 kg (61.73 lbs) • Packaging material weight (including packaging box, rails, and accessory box): 9.5 kg (20.94 lbs) Note: The server weight varies by configuration.

Figure 6-2 Chassis Dimensions



Model	Za	Zb	Zc	Xa	Xb	Xc	Ya
KR1280-E2-C0-R0-00	800 mm (31.50 in.)	830 mm (32.68 in.)	30.18 mm (1.19 in.)	482 mm (18.98 in.)	438 mm (17.24 in.)	437 mm (17.20 in.)	43.05 mm (1.69 in.)
	850 mm (33.46 in.)	880 mm (34.65 in.)	30.18 mm (1.19 in.)	482.1 mm (18.98 in.)	438 mm (17.24 in.)	437 mm (17.20 in.)	43.05 mm (1.69 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.
- Hardware compatibility may vary slightly from model to model. Contact your sales representatives to confirm the 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 representative 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 Systems

Table 7-1 Supported Operating Systems

OS Version
Windows Server 2019
Red Hat Enterprise Linux 8.6
Red Hat Enterprise Linux 9.0
VMware ESXi 7.0 P06

NOTE

After installing Linux OS, add **iommu=pt** in the OS. See the OS installation guide on our website for details.

7.2 Hardware Compatibility

7.2.1 CPU Specifications

Table 7-2 CPU Specifications

Model	Cores	Threads	Base Frequency (GHz)	Max. Boost Frequency (GHz)	Cache (MB)	TDP (W)
9684X	96	192	2.55	3.40	1,152	400
9184X	16	32	3.55	3.85	768	320
9124	16	32	3.00	3.70	64	200
9224	24	48	2.50	3.70	64	200
9254	24	48	2.90	4.15	128	200
9334	32	64	2.70	3.85	128	210
9354	32	64	3.25	3.80	256	280
9454	48	96	2.75	3.80	256	290
9534	64	128	2.45	3.70	256	280
9554	64	128	3.10	3.75	256	360
9634	84	168	2.25	3.10	384	290
9654	96	192	2.40	3.70	384	360
9734	112	224	2.40	3.00	256	340
9754	128	256	2.40	3.10	256	360
9174F	16	32	4.10	4.15	256	320
9274F	24	48	4.05	4.10	256	320
9374F	32	64	3.85	4.10	256	320
9474F	48	96	3.60	3.95	256	360

NOTE

CPU TDP limits vary in air cooling and liquid cooling configurations. See 12.1 Operating Temperature Specification Limits for details.

7.2.2 DIMM Specifications

Table 7-3 DIMM Specifications

Type	Capacity (GB)	Speed (MT/s)	Data Width	Organization
RDIMM	16	4,800	x72	1R x8
RDIMM	32	4,800	x72	2R x8
RDIMM	64	4,800	x72	2R x4
RDIMM	16	5,600	x72	1R x8
RDIMM	32	5,600	x72	2R x8
RDIMM	64	5,600	x72	2R x4
RDIMM	128	4,800	x72	2R x4

NOTE

For air-cooling and cold-plate liquid-cooling configurations, hardware limits apply when 128 GB DIMMs are used. Refer to 12.1 Thermal Restrictions for details.

7.2.3 Drive Specifications

Table 7-4 HDD Specifications

Type	Speed in rpm	Capacity	Max. Qty.
2.5-Inch SAS HDD	10k	600 GB/1.2 TB/1.8 TB/2.4 TB	12
3.5-Inch SAS HDD	7.2k	10/12/14/16/18 TB	4
3.5-Inch SATA HDD	7.2k	6/8/10/12/16/18/20 TB	4

Table 7-5 SATA SSD Specifications

Type	Capacity	Max. Qty.
SATA SSD	240 GB	12
SATA SSD	480 GB	12
SATA SSD	960 GB	12
SATA SSD	1.92 TB	12
SATA SSD	3.84 TB	12
SATA SSD	7.68 TB	12

Table 7-6 U.2 NVMe SSD Specifications

Type	Capacity	Max. Qty.
U.2 NVMe SSD	960 GB	10
U.2 NVMe SSD	1.92 TB	10
U.2 NVMe SSD	3.84 TB	10
U.2 NVMe SSD	7.68 TB	10

Table 7-7 M.2 SSD Specifications

Type	Capacity	Max. Qty.
SATA M.2 SSD	240 GB	2
SATA M.2 SSD	480 GB	2
PCIe M.2 SSD	960 GB	2
PCIe M.2 SSD	1.92 TB	2
PCIe M.2 SSD	3.84 TB	2

7.2.4 SAS/RAID Card Specifications

Table 7-8 SAS/RAID Card Specifications

Type	Description
SAS Card	SAS_PM8222_PM8222_8_SAS3_PCIE
	SAS_PM8222_SmartHBA_8_SAS3_PCIE3

Type	Description
	SAS_BRCM_8R0_9500-8i_SMSAS3_PCIE4
	SAS_BRCM_16R0_9500-16i_SMSAS3_PCIE4
	SAS_BRCM_24R0_9600-24i_SMSAS4_PCIE4
	SAS_I_ZQ_8238SHBA_16R0_12G_PCIE3_M
RAID Card	RAID_L_8R0_9560-8i_4G_HDM12G_PCIE
	RAID_L_16R0_9560-16i_8GB_SMSAS3_PCIE4
	RAID_L_8R0_9560-8i_4G_HDM12G_PCIE4
	RAID_L_16R0_9560-16i_8GB_SMSAS3_PCIE4
	RAID_PM8204_RA_8_2GB_SAS3_PCIE3
	RAID_PM8204_RA_8_4GB_SAS3_PCIE3

NOTE

- Mixing SAS/RAID cards from different manufacturers may cause drive letter confusion.
- When the front drives are connected to SAS/RAID cards and internal/rear M.2 drives are directly connected to CPUs, the drive letter confusion may occur.
- When more than one drive controller (including storage controllers such as onboard controllers and RAID cards) is configured, the drive letter confusion may occur in the OS.
- The async discovery probing feature added in newer versions of some operating systems may increase the likelihood of drive letter confusion.

7.2.5 NIC Specifications

Table 7-9 OCP Card Specifications

Type	Description	Speed (Gbps)	Port Qty.
OCP 3.0 Card	NIC_Andes-M6_X710_10G_LC_O3x8_2_M7	10	2
	NIC_M_25G_MCX562A-ACAB_LC_OCP3x16_2_XR	25	2
	NIC_Andes-M6_E810_25G_LC_OCP3x8_2	25	2
	NIC_Andes-M6_E810_25G_LC_OCP3x8_2	25	2

Type	Description	Speed (Gbps)	Port Qty.
	NIC_I_M_I350_1G_RJ_PCIEx4-G2_4_OCP	1	4
	NIC_M_25G_MCX623432AN_LC_OCP3x16_2_XR	25	2
	NIC_M_25G_MCX631432AN_LC_OCP3x8_2_XR	25	2
	NIC_M_100G_MCX623436AN_LC_OCP3x16_2_XR	100	2
	NIC_M_200G_MCX753436MS_LC_OCP3x16_2_XR	200	2

Table 7-10 PCIe NIC Specifications

Type	Description	Speed (Gbps)	Port Qty.
PCIe NIC	NIC_SND_W_I350-AM2_RJ_PCI-E4X_1KM_Dual	1	2
	NIC_M_25G_MCX512A-ACAT_LC_PCIEx8_2_XR	25	2
	NIC_Andes-M6_E810_25G_LC_PCIex8_2	25	2
	NIC_Vostok_X710_10G_LC_PCIEx8_2	10	2
	NIC_Andes-M6_E810_25G_LC_PCIEx8_2	25	2
	NIC_I_Vostok_I350_1G_RJ_PCIEx4_4	1	4
	NIC_M_25G_MCX631102AN_LC_PCIEx8_2_XR	25	2
	NIC_I_Haydn_BCM_25G_LC_PCIEx8-G3_2	25	2

7.2.6 PSU Specifications

The server supports up to 2 PSUs that follow the Intel Common Redundant Power Supply (CRPS) specification. The PSUs share a common electrical and structural design that allows for hot-swap 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 Vdc 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)

- 1,600 W Platinum PSU: 1,000 W (110 Vac), 1,600 W (230 Vac)
- 2,000 W Platinum PSU: 1,000 W (110 Vac), 2,000 W (230 Vac)
- 800 W Titanium PSU: 800 W (110 Vac), 800 W (230 Vac)
- 1,300 W Titanium PSU: 1,000 W (110 Vac), 1,300 W (230 Vac)
- 1,600 W Titanium PSU: 1,000 W (110 Vac), 1,600 W (230 Vac)
- 2,000 W Titanium PSU: 1,000 W (110 Vac), 2,000 W (230 Vac)

CAUTION

At a rated input voltage of 110 Vac, the output power of a 1,300/1,600/2,000 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 PSU: 800 W (-48 Vdc)
  - 1,300 W 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.

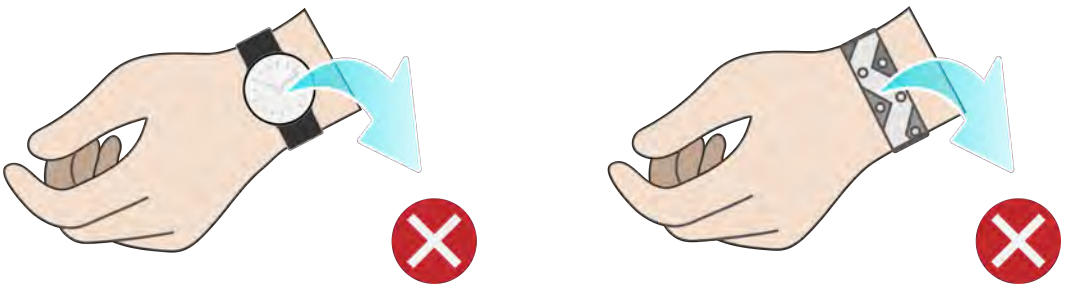
8.1.2 Personal Safety

- 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.

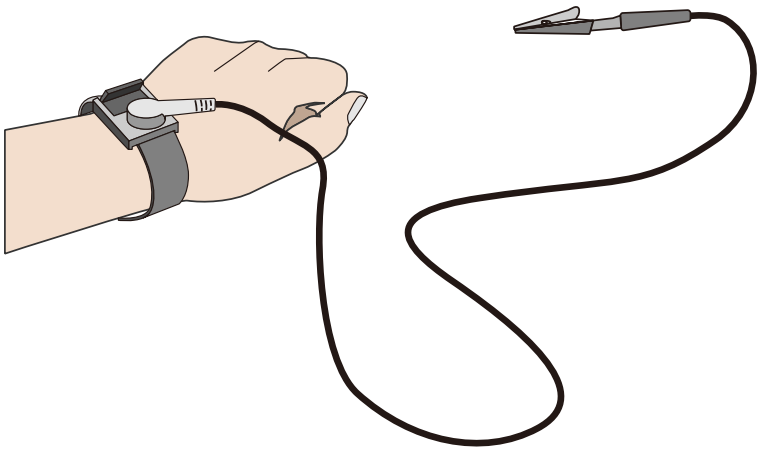
Figure 8-2 Removing Conductive Objects



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 optical fiber cable, 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 expansion 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

Organization	Weight Limit (kg/lbs)
	• 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 1.13. 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 1.13
- 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 • RESTful • 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.

Feature	Description
Alert Management	Supports rich automatic remote alert capabilities, including proactive alerting mechanisms such as SNMP Trap (v1/v2c/v3), email alerts and syslog remote alerts to ensure 24 × 7 reliability.
Remote Console KVM	Supports HTML5- and Java-based remote console 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

Feature	Description
	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 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 V3.0. 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.

Feature	Description
System Information Display	Displays the server basic information such as the information and health status of major server components, including CPU, memory, power supply, device inventory, hard drive, network adapter, 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.
Power Policy	To set how the server operating system reacts under the BMC's control when AC power is reconnected to the server.
One-Key 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, 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	• Batch asset import, automatic asset discovery, and full lifecycle management of assets • 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

Feature	Description
	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) • 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.
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, using the TF card as the carrier.

11 Certifications

Table 11-1 Certifications

Country/Region	Certification	Mandatory/Voluntary
EU	CE	Mandatory
International	CB	Voluntary
US	FCC	Mandatory
	UL	Voluntary
Korea	E-Standby	Mandatory
	KC	Mandatory

12 Appendix A

12.1 Thermal Restrictions

12.1.1 KR1280-E2-A0-R0-00

Table 12-1 Thermal Restrictions

Config.	Max. Operating Temp.: 30°C (86°F)	Max. Operating Temp.: 35°C (95°F)	Max. Operating Temp.: 40°C (104°F)	Max. Operating Temp.: 45°C (113°F)
10 × 2.5-Inch Drive Configuration	• With 1U EVAC heatsinks used, CPU (2 pcs) TDP ≤300 W • With up to 2 front drives and 1U EVAC heatsinks used, only 9654 CPUs (360 W, 2 pcs) supported • With 128 GB DIMMs used, front drives ≤4	• With 1U EVAC heatsinks used, CPU (2 pcs) TDP ≤300 W • With 1U standard heatsinks used, only 9334 CPUs (210 W, 2 pcs) supported • NICs ≤100 Gb • GPUs not supported • With 128 GB DIMMs used, front drives ≤4	• With 1U EVAC heatsinks used, CPU (2 pcs) TDP ≤240 W • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported	• With up to 2 front drives and 1U EVAC heatsinks used, only 9334 CPUs (210 W, 2 pcs) supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported
4 × 3.5-Inch Drive + 4 × 2.5-Inch Drive Configuration	• With 1U EVAC heatsinks used, CPU	• With 1U EVAC heatsinks used, CPU	• With 1U EVAC heatsinks used, CPU	• With up to 2 front 2.5-inch drives and 1U EVAC

Config.	Max. Operating Temp.: 30°C (86°F)	Max. Operating Temp.: 35°C (95°F)	Max. Operating Temp.: 40°C (104°F)	Max. Operating Temp.: 45°C (113°F)
	(2 pcs) TDP ≤300 W • With up to 2 front 2.5-inch drives and 1U EVAC heatsinks used, only 9654 CPUs (360 W, 2 pcs) supported • With 128 GB DIMMs used, front 3.5-inch drives ≤2	(2 pcs) TDP ≤300 W • With 1U standard heatsinks used, only 9334 CPUs (210 W, 2 pcs) supported • NICs ≤100 Gb • GPUs not supported • With 128 GB DIMMs used, front 3.5-inch drives ≤2	(2 pcs) TDP ≤240 W • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported	heatsinks used, only 9334 CPUs (210 W, 2 pcs) supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported
12 × 2.5-Inch Drive Configuration	• With 1U EVAC heatsinks used, CPU (2 pcs) TDP ≤300 W • With no front drive and with 1U EVAC heatsinks used, only 9654 CPUs (360 W, 2 pcs) supported • With 128 GB DIMMs	• With 1U EVAC heatsinks used, CPU (2 pcs) TDP ≤300 W • With 1U standard heatsinks used, only 9334 CPUs (210 W, 2 pcs) supported • NICs ≤100 Gb • GPUs not supported	• With 1U EVAC heatsinks used, CPU (2 pcs) TDP ≤240 W • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported	• With up to 2 front drives and 1U EVAC heatsinks used, only 9334 CPUs (210 W, 2 pcs) supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported

Config.	Max. Operating Temp.: 30°C (86°F)	Max. Operating Temp.: 35°C (95°F)	Max. Operating Temp.: 40°C (104°F)	Max. Operating Temp.: 45°C (113°F)
	used, front drives ≤4	• With 128 GB DIMMs used, front drives ≤4		
4 × 3.5-Inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Configuration	• With 1U EVAC heatsinks used, CPU (2 pcs) TDP ≤300 W • With no front drive and with 1U EVAC heatsinks used, only 9654 CPUs (360 W, 2 pcs) supported • With 128 GB DIMMs used, front 3.5-inch drives ≤2	• With 1U EVAC heatsinks used, CPU (2 pcs) TDP ≤300 W • With 1U standard heatsinks used, only 9334 CPUs (210 W, 2 pcs) supported • NICs ≤100 Gb • GPUs not supported • With 128 GB DIMMs used, front 3.5-inch drives ≤2	• With 1U EVAC heatsinks used, CPU (2 pcs) TDP ≤240 W • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported	• With up to 2 front 2.5-inch drives and 1U EVAC heatsinks used, only 9334 CPUs (210 W, 2 pcs) supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported

12.1.2 KR1280-E2-C0-R0-00

Table 12-2 Thermal Restrictions

Config.	Max. Operating Temp.: 30°C (86°F)	Max. Operating Temp.: 35°C (95°F)	Max. Operating Temp.: 40°C (104°F)	Max. Operating Temp.: 45°C (113°F)
10 × 2.5-Inch Drive Configuration	• All options supported • With 128 GB DIMMs used, front drives ≤4	• All CPUs supported • NICs ≤100 Gb • GPUs not supported • With 128 GB DIMMs used, front drives ≤4	• All CPUs supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported	• All CPUs supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported
4 × 3.5-Inch Drive + 4 × 2.5-Inch Drive Configuration	• All options supported • With 128 GB DIMMs used, front 3.5-inch drives ≤2	• All CPUs supported • NICs ≤100 Gb • GPUs not supported • With 128 GB DIMMs used, front 3.5-inch drives ≤2	• All CPUs supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported	• All CPUs supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported
12 × 2.5-Inch Drive Configuration	• All options supported • With 128 GB DIMMs used, front drives ≤4	• All CPUs supported • NICs ≤100 Gb • GPUs not supported • With 128 GB DIMMs used, front drives ≤4	• All CPUs supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported	• All CPUs supported • NICs ≤25 Gb • GPUs not supported • 128 GB DIMMs not supported

12.2 Models

Table 12-3 Models

Model	Description
KR1280-E2-A0-R0-00	Global
KR1280-E2-C0-R0-00	Global

12.3 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.

12.4 Sensor List

Table 12-4 Sensor List

Sensor	Description	Sensor Location	Description
Inlet_Temp	Air inlet temperature	Right mounting ear	-
Outlet_Temp	Air outlet temperature	DC-SCM board	-
CPUx_Temp	CPUx core temperature	CPUx	x indicates the CPU number with a value of 0 - 1
CPUx_VR_Temp	CPUx VR temperature	CPUx	x indicates the CPU number with a value of 0 - 1
CPUx_DIMM_T	The maximum temperature among DDR5 DIMMs of CPUx	DIMMs of CPUx	x indicates the CPU number with a value of 0 - 1
PSUx_Inlet_Temp	Air inlet temperature of PSUx	PSUx	x indicates the PSU number with a value of 0 - 1
HDD_MAX_Temp	The maximum temperature among all drives	Drives	-

Sensor	Description	Sensor Location	Description
NVMe_Temp	The maximum temperature among all NVMe drives	NVMe drives	-
OCP_NIC_Temp	OCP card temperature	OCP cards	-
OCP_NIC_SFP_Temp	The temperature of optical modules on OCP cards	Optical modules on OCP cards	-
OCP_RAID_Temp	OCP RAID card temperature	OCP RAID card	-
PCIe_NIC_Temp	The maximum temperature among all PCIe NICs	PCIe NICs	-
PCIe_NIC_SFP_Temp	The temperature of optical modules on PCIe NICs	Optical modules on PCIe NICs	-
RAID_Temp	The maximum temperature among all PCIe RAID cards	PCIe RAID cards	-
GPUx_Temp	GPUx temperature	GPUx	x indicates the GPU number with a value of 0 - 2
SYS_12V	12 V voltage supplied by the motherboard to CPUs	Motherboard	-
SYS_5V	5 V voltage supplied by the motherboard to the BMC	Motherboard	-
SYS_3V3	3.3 V voltage supplied by the motherboard to the BMC	Motherboard	-

Sensor	Description	Sensor Location	Description
P12V_STBY	P12V standby voltage of the motherboard	Motherboard	-
P5V_STBY	P5V standby voltage of the motherboard	Motherboard	-
P3V3_STBY	P3V3 standby voltage of the motherboard	Motherboard	-
P1V8_STBY	P1V8 standby voltage of the motherboard	Motherboard	-
P1V05_USB	P1V05 USB voltage of the motherboard	Motherboard	-
PVDD33_S5	PVDD33_S5 voltage of the motherboard	Motherboard	-
PVDDCR_CPU0_P0	CPU0-P0-PVDDCR voltage of the motherboard	Motherboard	-
PVDDCR_CPU0_P1	CPU0-P1-PVDDCR voltage of the motherboard	Motherboard	-
PVDDCR_CPU1_P0	CPU1-P0-PVDDCR voltage of the motherboard	Motherboard	-
PVDDCR_CPU1_P1	CPU1-P1-PVDDCR voltage of the motherboard	Motherboard	-
PVDDIO_Px	CPUx_PVDDIO voltage of the motherboard	Motherboard	x indicates the CPU number with a value of 0 - 1
P12V_CPUx_DIMM1	CPUx_DIMM1_P12V voltage of the motherboard	Motherboard	x indicates the CPU number with a value of 0 - 1

Sensor	Description	Sensor Location	Description
PSUx_VIN	PSUx input voltage	PSUx	x indicates the PSU number with a value of 0 - 1
PSUx_VOUT	PSUx output voltage	PSUx	x indicates the PSU number with a value of 0 - 1
RTC_Battery	RTC battery voltage	Motherboard RTC battery	-
FANx_Speed	FANx speed	FANx	x indicates the fan module number with a value of 0 - 7
FANx_F_Speed			
FANx_R_Speed			
Total_Power	Total power	PSUs	-
PSUx_PIN	PSUx input power	PSUx	x indicates the PSU number with a value of 0 - 1
PSUx_POUT	PSUx output power	PSUx	x indicates the PSU number with a value of 0 - 1
FAN_Power	Total fan power	Fan modules	-
CPU_Power	Total CPU power	Motherboard	-
Memory_Power	Total memory power	Motherboard	-
Disk_Power	Total drive power	Motherboard	-
CPUx_Status	CPUx status	CPUx	x indicates the CPU number with a value of 0 - 1
CPUx_CmDn	DIMM health status of CPUx	DIMM of CPUx	x indicates the CPU number with a value of 0 - 1, m indicates the memory channel number with a value of A - L, and n indicates the DIMM number with a value of 0

Sensor	Description	Sensor Location	Description
FANx_Status	FANx status	FANx	x indicates the fan number with a value of 0 - 7
FAN_Redundant	Fan redundancy status	Fan modules	-
PCIe_Status	The status of PCIe device (including PCIe bus, slots and cards)	PCIe expansion card	-
Power_Button	The power button is pressed	Motherboard and power button	-
Watchdog2	Watchdog	Motherboard	-
Sys_Health	System health status	Management module	-
UID_Button	UID button status	Motherboard	-
k_HDD_x	DRIVEx status	Drive backplane	k indicates front, internal or rear, with a value of F/I/R respectively, and x indicates the drive number
PSU_Redundant	PSU redundancy status	PSUs	
PSU_Mismatch	PSU model mismatch	PSUs	
PSUx_Status	PSUx status	PSUx	x indicates the PSU number with a value of 0 - 1
Intrusion	Chassis-opening activity	Motherboard	-
Leakage_Detect	Leak detection	Motherboard	-
SysShutdown	System shutdown cause	-	-
ACPI_PWR	ACPI power status		

Sensor	Description	Sensor Location	Description
SysRestart	System restart cause		
BIOS_Boot_Up	BIOS boot up complete		
System_Error	Emergency system errors		
POST_Status	POST status		
BMC_Boot_Up	BMC boot up complete		

13 Appendix B 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
AMD	Advanced Micro Devices, Inc.
AMD SEV	AMD Secure Encrypted Virtualization
AMD-V	AMD Virtualization
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
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASP	AMD Secure Processor
AVX	Advanced Vector Extensions

B

BIOS	Basic Input Output System
BLE	BIOS Lock Enable
BMC	Baseboard Management Controller
BP	Backplane

BIS	Bureau of Indian Standards
BSMI	Bureau of Standards, Metrology and Inspection in Taiwan

C

CAS	Column Address Strobe
CB	Certification Body
CCC	China Compulsory Certificate
CE	Conformitè Europëenne
CECP	China Energy Conservation Program
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

DC	Direct Current
DCMI	Data Center Manageability Interface
DC-SCM	Data Center-ready Secure Control Module
DDP	Dual Die Package
DDR5	Double Data Rate 5
DIMM	Dual In-line Memory Module
DOA	Dead on Arrival
DPC	DIMM Per Channel
DRAM	Dynamic Random Access Memory

E

EAC	Eurasian Conformity
ECC	Error-Correcting Code
ECMA	European Computer Manufacturer Association
ESD	Electrostatic Discharge
EVAC	Extended Volume Air Cooling
E1.S	Enterprise & Data Center SSD Form Factor 1 Unit Short

13.2 F - J

F

FCC	Federal Communications Commission
FHFL	Full-height full-length
FHHL	Full-height half-length

G

GPU	Graphics Processing Unit
GUI	Graphical User Interface

H

HBA	Host Bus Adapter
HDD	Hard Disk Drive
HDT	Hardware Debug Tool
HHHL	Half-height half-length
HSE	Health and Safety Executive
HTML	HyperText Markup Language
HTTPS	Hypertext Transfer Protocol Secure

I

IEC	International Electrotechnical Commission
I/O	Input/Output
IOD	I/O Die
IOPS	Input/Output Operations Per Second
IP	Internet Protocol
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISA	International Society of Automation
ISO	International Organization for Standardization

13.3 K - O

K

KC	Korea Certification
KVM	Keyboard, Video, Monitor

L

LAN	Local Area Network
LC	Lucent Connector
LDAP	Lightweight Directory Access Protocol
LED	Light-Emitting Diode

M

MCIO	Mini Cool Edge IO

N

NBD	Next Business Day
NC-SI	Network Controller Sideband Interface
NIC	Network Interface Card
NIOSH	National Institute for Occupational Safety and Health
NOM	Norma Oficial Mexican
NVMe	Non-Volatile Memory Express

O

OCP	Open Compute Project
O&M	Operations and Maintenance
OS	Operating System

13.4 P - T

P

PCH	Platform Controller Hub
PCI	Peripheral Component Interconnect
PCIe	Peripheral Component Interconnect Express
PDU	Power Distribution Unit
PID	Proportional Integral Derivative
POST	Power-on self-test
PPR	Post Package Repair

PSU	Power Supply Unit
PUE	Power Usage Effectiveness
PXE	Pre-boot Execution Environment

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
RJ45	Registered Jack 45
RMA	Return Material Authorization
RST	Reset
RTC	Real Time Clock

S

SAS	Serial Attached SCSI
SATA	Serial Advanced Technology Attachment
SCSI	Small Computer System Interface
SDDC	Single Device Data Correction
SDP	Single Die Package
SEL	System Event Log
SEV	Secure Encrypted Virtualization
SFF	Small Form Factor
SFP	Small Form-factor Pluggable

SGPIO	Serial General Purpose Input Output
SII	Standards of Institution of Israel
SLA	Service Level Agreements
SNMP	Simple Network Management Protocol
SSD	Solid State Drive
SSH	Secure Shell
Syslog	System Log

T

TCM	Trusted Cryptography Module
TDP	Thermal Design Power
TF	T-Flash
TPM	Trusted Platform Module

13.5 U - Z

U

UEFI	Unified Extensible Firmware Interface
UID	Unit Identification Device
UKCA	UK Conformity Assessed
UL	Underwriters Laboratories
UMC	Unified Memory Controller
USB	Universal Serial Bus

V

VGA	Video Graphics Array

VLAN	Virtual Local Area Network
VM	Virtual Machine
VNC	Virtual Network Console
VPP	Virtual Pin Port
VR	Voltage Regulator
VRD	Voltage Regulator Down

X

xGMI	Inter-chip Global Memory Interconnect