# White Paper for KR2280V2 Series Servers

## Powered by Intel Processors

For KR2280-X2-A0-R0-00, KR2280-X2-C0-R0-00, and KR2280-X2-A0-F0-00

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# Applicable Model

| Model | Maintenance | Cooling |
|---|---|---|
| KR2280-X2-A0-R0-00 | Rear access | Air cooling |
| KR2280-X2-C0-R0-00 | Rear access | Cold-plate liquid cooling |
| KR2280-X2-A0-F0-00 | Front access | Air cooling |

# Technical Support

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

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

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

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# Preface

## Abstract

This document describes the KR2280V2 Intel-based server's appearance, features, performance parameters, and software and hardware compatibility, providing in-depth information of the server.

## Intended Audience

This document is intended for pre-sales engineers.

## Symbol Conventions

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

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

## Revision History

| Version | Date | Description of Changes |
| --- | --- | --- |
| V1.0 | 2025/04/24 | Initial release |

# Table of Contents

# 1 Product Overview

The KR2280V2 Intel-based system is a high-end 2-socket rack server that features the 4th/5th Gen Intel Xeon Scalable processors. It is designed for high-end IT applications such as cloud computing, big data, and deep learning. The server maintains the high quality and reliability of our servers, delivering exceptional computing performance, storage performance, and scalability. It provides a variety of options, such as front or rear I/O (front or rear accessed) configurations, overcoming O&M challenges in traditional data centers. In addition, it incorporates advanced cooling technologies such as cold-plate liquid cooling and extended volume air cooling (EVAC) to meet the diverse requirements of different industries and scenarios effectively.

Figure 1-1 12 × 3.5-Inch Drive Configuration

Figure 1-2 24 × 2.5-Inch Drive Configuration

Figure 1-3 25 × 2.5-Inch Drive Configuration

Figure 1-4 8 × 3.5-Inch Drive Configuration

Figure 1-5 8 × 2.5-Inch Drive Configuration

Figure 1-6 16 × 2.5-Inch Drive Configuration

Figure 1-7 9 × 3.5-Inch Drive Configuration

Figure 1-8 24 × E3.S/NVMe Drive Configuration

# 2 Features

## 2.1 Scalability and Performance

Table 2-1 Scalability and Performance

| Technical Feature | Description |
| --- | --- |
| 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids) | • Features 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids), with up to 64 cores per processor, a maximum TDP of 385 W, a max. Turbo frequency of 4.2 GHz, an L3 cache of 5 MB per core, and up to 4 UPI links per CPU at up to 20 GT/s per link, delivering unrivaled processing performance.<br>- With the processor cache hierarchy optimization, a larger L2 cache of private 1 MB per core is provided, so that memory data can be put and processed directly in the L2 cache, improving the memory access performance and reducing the demand on L3 cache capacity.<br>- Supports Intel Turbo Boost Technology 2.0 and automatically scales CPU speeds up to the max. Turbo frequency at peak workloads, allowing processor cores to exceed the thermal design power (TDP) for a limited time.<br>- Supports Intel Hyper-Threading Technology, allowing up to 2 threads to run on each core to improve the performance of multi-threaded applications.<br>- Supports Intel Virtualization Technology that provides hardware assistance to the virtualization software, allowing the operating system to better use hardware to handle virtualized workloads.<br>- Supports Intel Advanced Vector Extensions 512 (Intel AVX-512), significantly improving floating-point performance for compute-intensive applications.<br>- Supports Intel Deep Learning Boost (Intel DL Boost) that uses Vector Neural Network Instructions (VNNI), improving the performance for deep learning applications. |

| Technical Feature | Description |
|---|---|
| DDR5 DIMMs | Up to 32 DDR5 ECC DIMMs (5,600 MT/s, RDIMMs), delivering superior speed, high availability, and a memory capacity of up to 4 TB. |
| Flexible Drive Configurations | Provides elastic and expandable storage solutions to meet different capacity and upgrade requirements. |
| Support for All-SSD Configuration | Delivers all-SSD configurations, bringing higher I/O performance over all-HDD or HDD-SSD mixing configurations. |
| 24 Gbps Serial Attached SCSI (SAS) | Quadruples the internal storage data transfer rate of the 6 Gbps SAS solution, maximizing the performance of storage I/O-intensive applications. |
| Intel Integrated I/O Technology | The processors integrate the PCIe 5.0 controllers to significantly reduce I/O latency and enhance overall system performance. |
| PCIe Expansion | • Up to 13 HHHL PCIe expansion cards, further improving I/O performance.<br>• Up to 4 dual-slot GPUs. |
| OCP 3.0 Card | Up to 2 OCP 3.0 slots that can flexibly support 1/10/25/100/200 Gb hot-plug OCP 3.0 cards. |

## 2.2 Availability and Serviceability

Table 2-2 Availability and Serviceability

| Technical Feature | Description |
|---|---|
| Hot-Swap SAS/SATA/NVMe/E3.S Drives | Supports hot-swap drives and RAID cards with RAID levels 0/1/1E/10/5/50/6/60, RAID cache, and data protection enabled by the super-capacitor in case of power failures. |
| Reliability | • SSDs are much more reliable than traditional HDDs, increasing system uptime.<br>• Our intelligent control technology combined with the cutting-edge air-cooling technology and CPU cold-plate liquid cooling system creates an optimum working environment to ensure stable running of the server.<br>• The BMC monitors system parameters in real time and sends alerts in advance, enabling technicians |

| Technical Feature | Description |
|---|---|
| | to take appropriate measures in time to ensure stable operation and minimize system downtime. |
| Availability | • The LEDs on the front and rear panels, the LCD module, and the BMC Web GUI indicate the status of key components and quickly lead technicians to failed (or failing) components, simplifying maintenance and speeding up troubleshooting.<br>• Features 2 hot-swap PSUs with 1+1 redundancy.<br>• Offers 6 hot-swap fan modules with N+1 redundancy (redundancy not supported by 6038 fans), improving overall system availability.<br>• Provides a CPU cold plate module, improving overall system availability. |
| Maintenance Efficiency | • The BMC management network port enables local BMC O&M, improving O&M efficiency.<br>• 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. |
| 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.<br>Notes:<br>The NC-SI port supports the following features:<br>• The NC-SI port can be bonded to any network port of the OCP card or of the PCIe NIC that supports NC-SI.<br>• Supports the enablement/disablement and configuration of Virtual Local Area Network ID (VLAN ID). VLAN is disabled by default. |

| Technical Feature | Description |
|---|---|
| | • Supports both IPv6 and IPv4 addresses. The subnet mask of IPv4 or prefix length of IPv6 subnet mask, IP addresses, and default gateways can be configured. |
| Intel PFR | Intel Platform Firmware Resilience (PFR) technology is supported. |
| Unified Extensible Firmware Interface (UEFI) | The industry-standard UEFI improves the efficiency of setup, configuration and update, and simplifies the error handling process. |
| TPM & TCM | Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) provide advanced encryption. |
| Intel Trusted Execution Technology | Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks. |
| 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. |
| Optional Front Bezel with a Lock | Prevents unauthorized users from removing or installing drives, thus ensuring the security of local data. |
| CPU Cold Plate Module | The CPU cold plate module improves the server's adaptability. |

| Technical Feature | Description |
|---|---|
| BMC Management Security | • Supports flexible BMC access control policies and double factor authentication.<br>• Supports system lockdown mode, protecting the system from inadvertent or malicious changes. With this function enabled, users cannot perform some risky configurations, including restoring factory defaults, setting networks, modifying/deleting users and updating firmware.<br>• Supports Kerberos-based Single Sign-On (SSO). |

## 2.4 Energy Efficiency

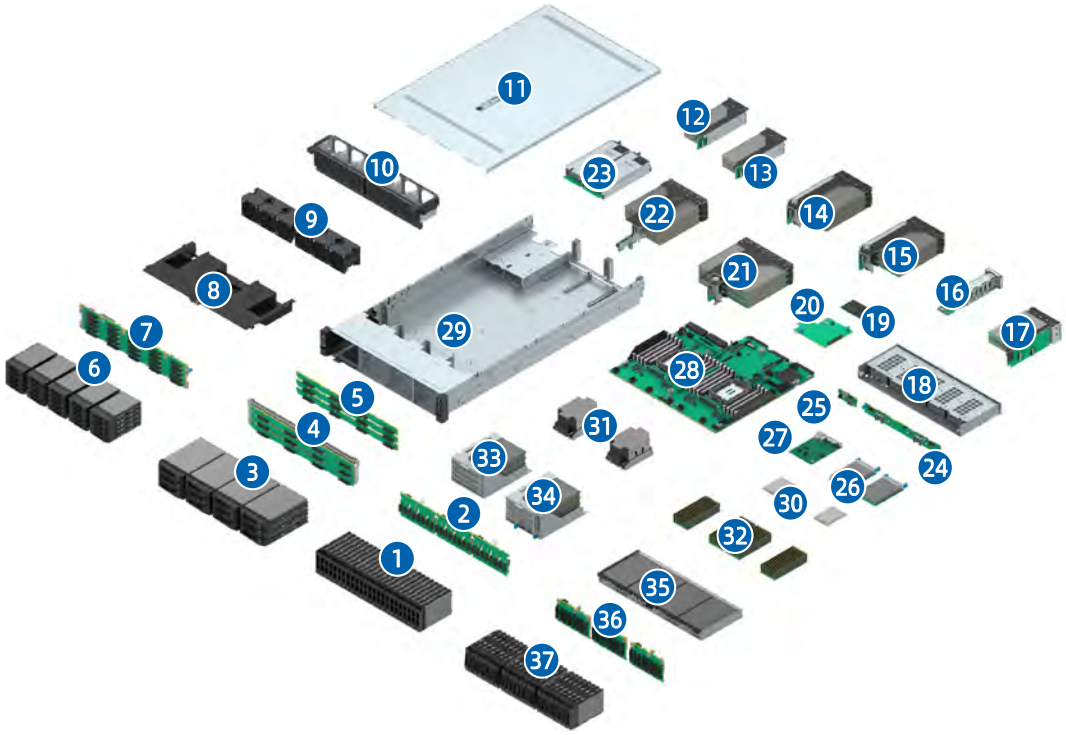
Table 2-4 Energy Efficiency

| Technical Feature | Description |
|---|---|
| 80 Plus Platinum/Titanium PSUs | Equipped with 80 Plus Platinum/Titanium PSUs of different power efficiency levels, with power efficiency up to 96% 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 CPU cold plates, 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. |
| Intel Intelligent Power Capability | Supports Intel Intelligent Power Capability (IIPC) to optimize energy usage in the processor cores by turning computing functions on only when needed. |
| Low Energy Consumption | Supports low-voltage $4^{th}$/$5^{th}$ Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids), consuming |

| Technical Feature | Description |
| --- | --- |
| | less energy and meeting the demands of data centers and telecommunications environments constrained by power and thermal limits. |

# 3 System Parts Breakdown

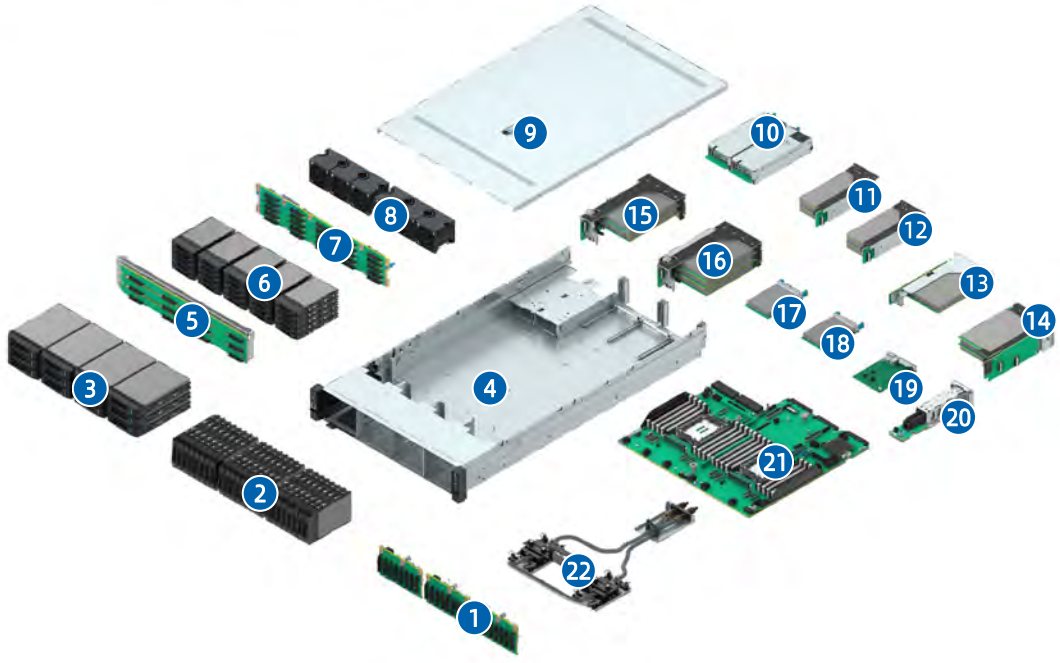
Figure 3-1 Exploded View - Air Cooling Configuration




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Front E3.S/NVMe Drive Module × 24 | 20 | M.2 Adapter |
| 2 | Front 8-Drive Backplane × 3 | 21 | PCIe Riser Module 5 (rear panel) |
| 3 | Front 3.5-Inch Drive Module × 12 | 22 | PCIe Riser Module 6 (rear panel) |
| 4 | Front 12-Drive Backplane | 23 | PSU × 2 |
| 5 | Front 4-Drive Backplane × 3 | 24 | Rear 8-Drive Backplane |
| 6 | Front 2.5-Inch Drive Module × 25 | 25 | Rear 2-Drive Backplane |
| 7 | Front 25-Drive Backplane | 26 | OCP 3.0 Card × 2 |
| 8 | System Air Duct | 27 | DC-SCM Board |
| 9 | Fan Module × 6 | 28 | Motherboard |
| 10 | Fan Cage | 29 | Chassis |

| Item | Feature | Item | Feature |
|---|---|---|---|
| 11 | Top Cover | 30 | CPU × 2 |
| 12 | PCIe Riser Module 4 (rear panel) | 31 | Heatsink × 2 |
| 13 | PCIe Riser Module 3 (rear panel) | 32 | DIMM × 32 |
| 14 | PCIe Riser Module 1 (rear panel) | 33 | PCIe Riser Module 10 (front panel) |
| 15 | PCIe Riser Module 0 (rear panel) | 34 | PCIe Riser Module 11 (front panel) |
| 16 | Rear M.2 SSD Module | 35 | Mid 3.5-Inch Drive Module × 4 |
| 17 | PCIe Riser Module 2 (rear panel) | 36 | Front 8-Drive Backplane × 3 |
| 18 | Rear Drive Module (with ten 2.5-inch drives) | 37 | Front 2.5-Inch Drive Module × 24 |
| 19 | M.2 SSD × 2 | - | - |

Figure 3-2 Exploded View - Liquid Cooling Configuration



| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Front 8-Drive Backplane × 3 | 12 | PCIe Riser Module 3 (rear panel) |
| 2 | Front 2.5-Inch Drive Module × 24 | 13 | PCIe Riser Module 8/9 (rear panel) |
| 3 | Front 3.5-Inch Drive Module × 12 | 14 | PCIe Riser Module 2 (rear panel) |
| 4 | Chassis | 15 | PCIe Riser Module 1 (rear panel) |
| 5 | Front 12-Drive Backplane | 16 | PCIe Riser Module 0 (rear panel) |
| 6 | Front 2.5-Inch Drive Module × 25 | 17 | OCP 3.0 Card |
| 7 | Front 25-Drive Backplane | 18 | OCP 3.0 Card |
| 8 | Fan Module × 6 | 19 | DC-SCM Board |
| 9 | Top Cover | 20 | Rear M.2 SSD Module |
| 10 | PSU × 2 | 21 | Motherboard |
| 11 | PCIe Riser Module 4 (rear panel) | 22 | Cold Plate Module |

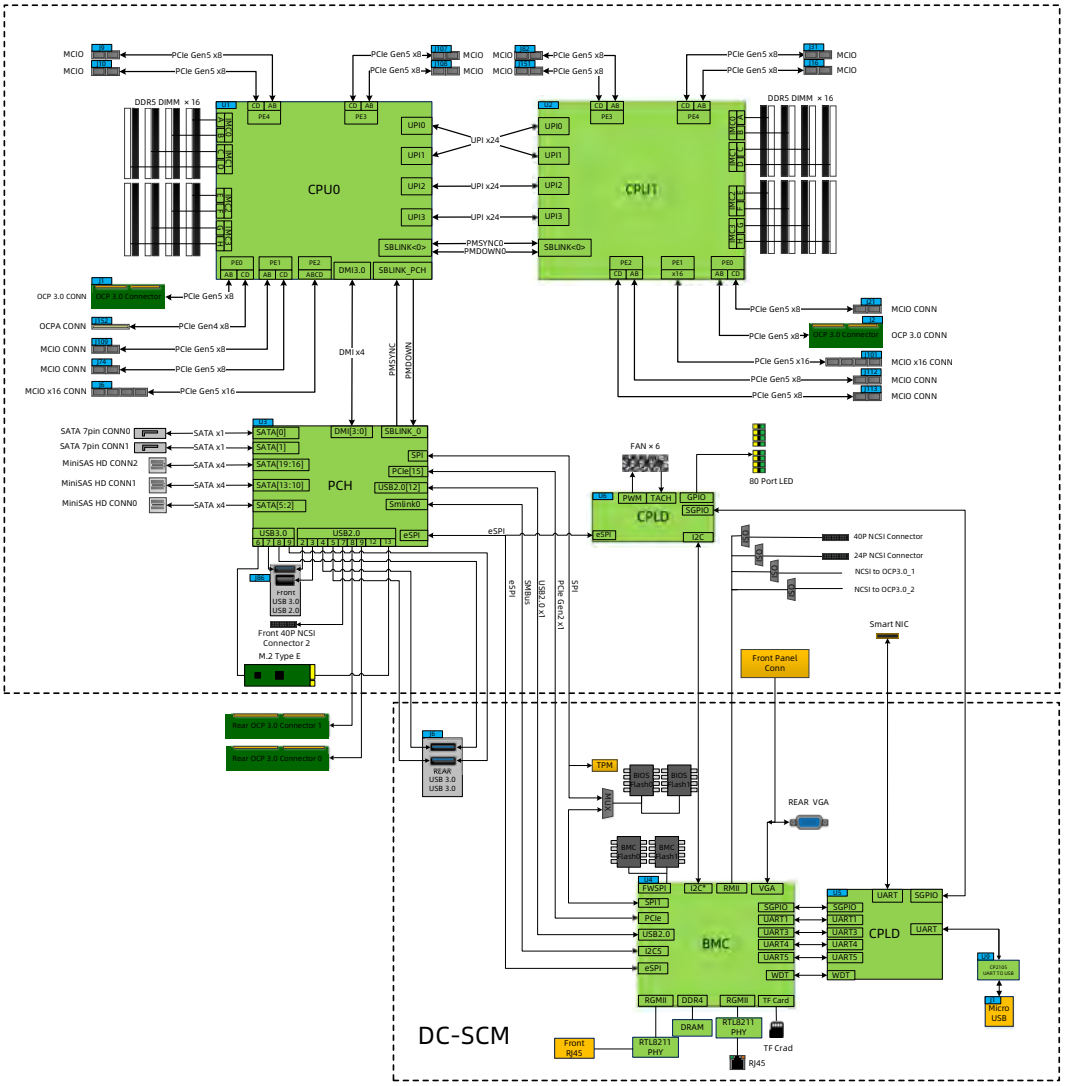
# 4 System Logical Diagram

NOTE

- Motherboard 1 (with 1 RAID mezz connector) applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-A0-F0-00.
- Motherboard 2 (with 2 M.2 connectors) applicable model: KR2280-X2-A0-R0-00, KR2280-X2-C0-R0-00, and KR2280-X2-A0-F0-00.

## 4.1 System Logical Diagram of Motherboard 1

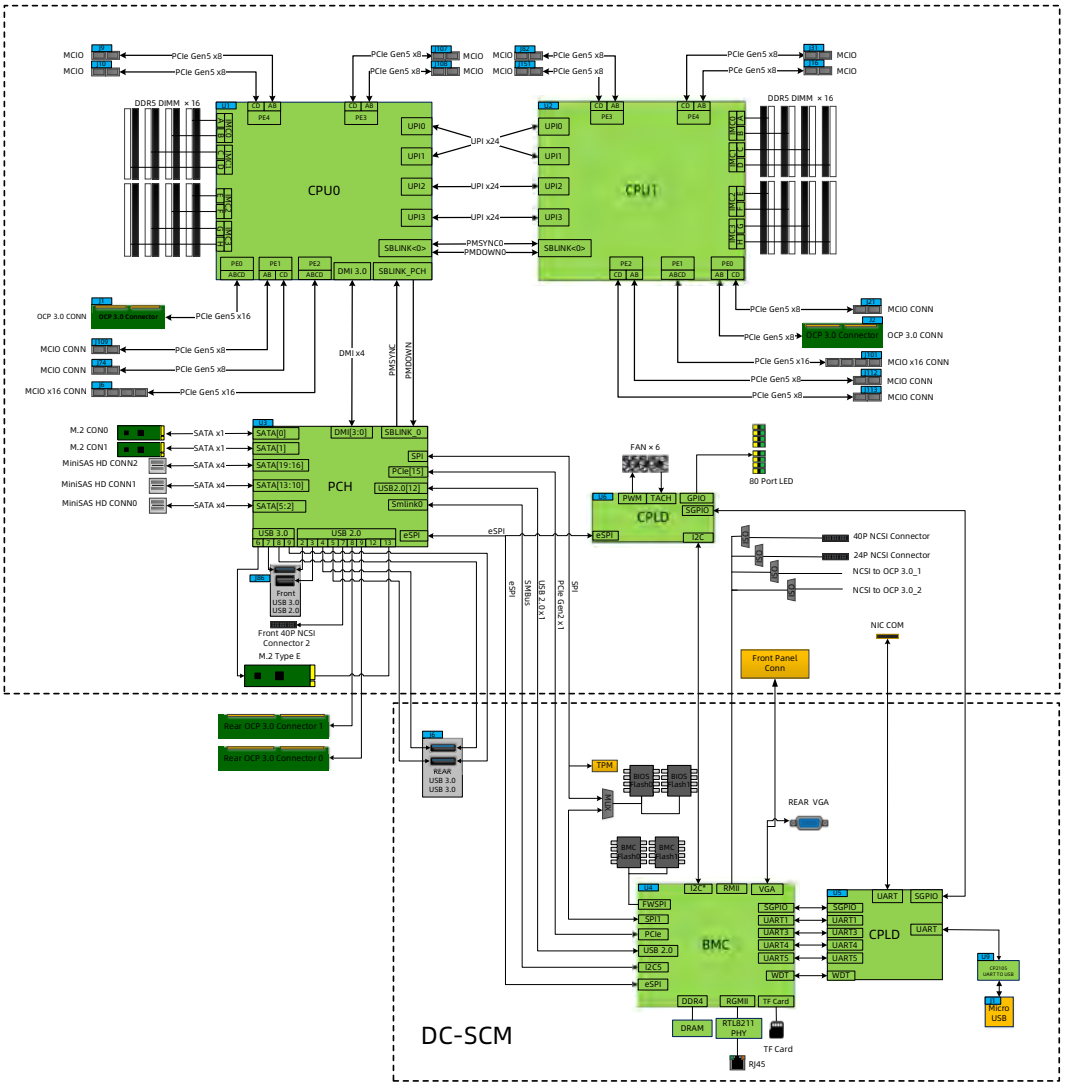
Figure 4-1 System Logical Diagram of Motherboard 1



- Up to two 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids).
- Up to 32 DIMMs.
- Four UPI links per CPU at up to 20 GT/s per link.
- Up to 13 PCIe expansion slots and 2 OCP 3.0 slots. CPU0 and CPU1 each supports 1 OCP 3.0 card.
- The RAID mezz card is connected to CPU0 via the PCIe bus, and is connected to the drive backplanes via the SAS signal cables. Multiple local storage configurations are supported through different drive backplanes.
- The motherboard integrates the Emmitsburg (EBG) Platform Controller Hub (PCH) to support 3 USB 3.0 ports, 14 SATA 3.0 drive connectors, and 1 TF card adapter.
- The DC-SCM board integrates a BMC management chip and supports 1 VGA port, 1 BMC management network port, 1 system/BMC serial port, 1 TF card slot, and other connectors.

# 4.2 System Logical Diagram of Motherboard 2

Figure 4-2 System Logical Diagram of Motherboard 2




- Up to two 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids).
- Up to 32 DIMMs.
- Four UPI links per CPU at up to 20 GT/s per link.
- Up to 13 PCIe expansion slots and 2 OCP 3.0 slots. CPU0 and CPU1 each supports 1 OCP 3.0 card.
- The motherboard integrates the Emmitsburg (EBG) Platform Controller Hub (PCH) to support 3 USB 3.0 ports, 14 SATA 3.0 drive connectors, and 1 TF card adapter.

- The DC-SCM board integrates a BMC 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 12 × 3.5-Inch Drive Configuration

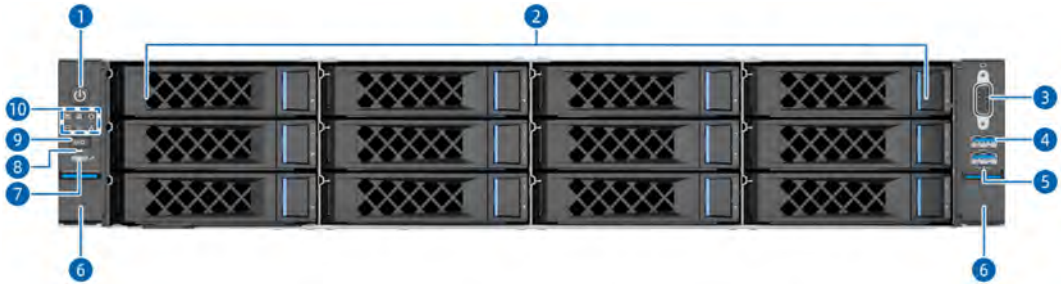
IMPORTANT

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

NOTE

Applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-C0-R0-00.

Figure 5-1 Front View



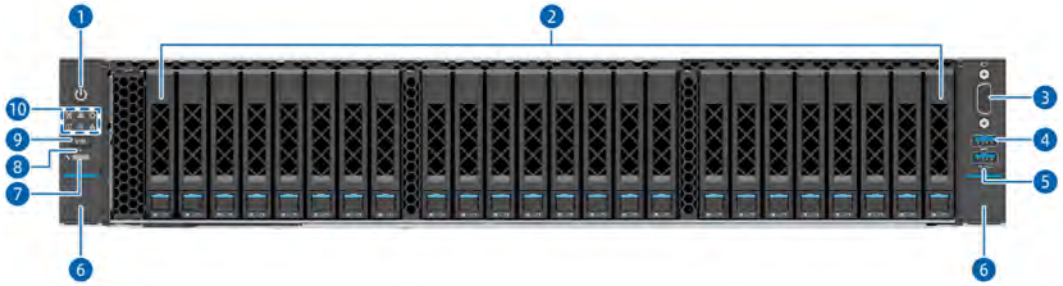

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Button and LED | 6 | Ear Latch |
| 2 | 3.5-Inch Drive Bay | 7 | USB Type-C Port (optional) |
| 3 | VGA Port | 8 | USB Type-C Status LED (optional) |
| 4 | USB 3.0 Port | 9 | UID/BMC RST Button and LED |
| 5 | USB 2.0/LCD Port | 10 | LEDs |

## 5.1.2 24 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-C0-R0-00.

Figure 5-2 Front View



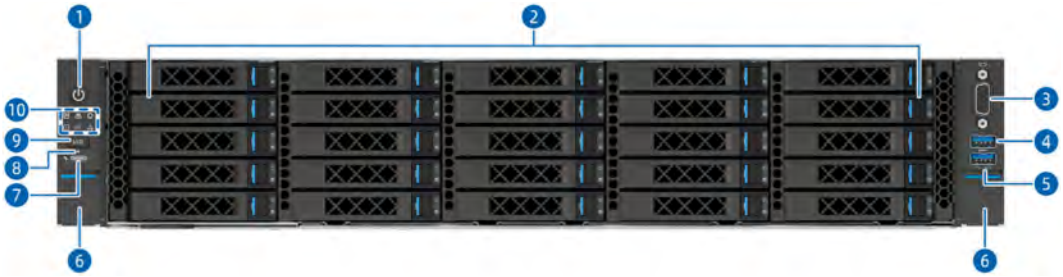

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Button and LED | 6 | Ear Latch |
| 2 | 2.5-Inch Drive Bay | 7 | USB Type-C Port (optional) |
| 3 | VGA Port | 8 | USB Type-C Status LED (optional) |
| 4 | USB 3.0 Port | 9 | UID/BMC RST Button and LED |
| 5 | USB 2.0/LCD Port | 10 | LEDs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

## 5.1.3 25 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-C0-R0-00.

Figure 5-3 Front View



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

## 5.1.4 8 × 3.5-Inch Drive Configuration

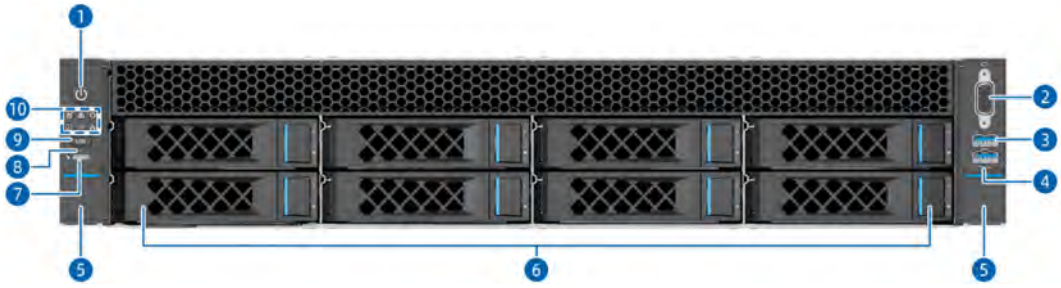
IMPORTANT

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

NOTE

Applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-C0-R0-00.

Figure 5-4 Front View



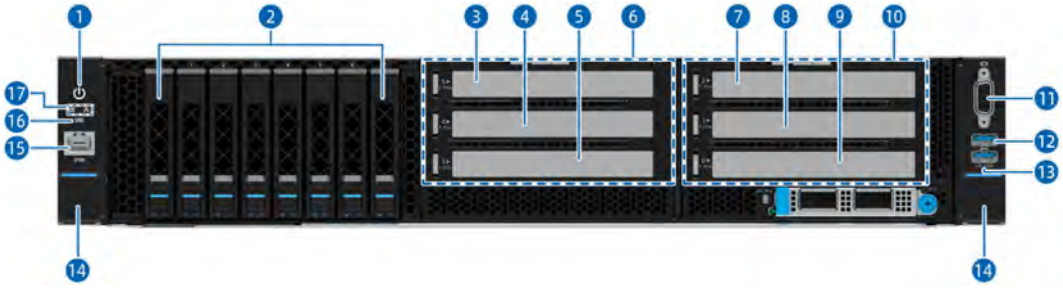

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Button and LED | 6 | 3.5-Inch Drive Bay |
| 2 | VGA Port | 7 | USB Type-C Port |
| 3 | USB 3.0 Port | 8 | USB Type-C Status LED |
| 4 | USB 2.0/LCD Port | 9 | UID/BMC RST Button and LED |
| 5 | Ear Latch | 10 | LEDs |

## 5.1.5 8 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-F0-00.

Figure 5-5 Front View




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Button and LED | 10 | PCIe Riser Module 11 |
| 2 | 2.5-Inch Drive Bay | 11 | VGA Port |
| 3 | F_PCIe Slot 5 | 12 | USB 3.0 Port |
| 4 | F_PCIe Slot 4 | 13 | USB 2.0/LCD Port |
| 5 | F_PCIe Slot 3 | 14 | Ear Latch |
| 6 | PCIe Riser Module 10 | 15 | BMC Management Network Port |
| 7 | F_PCIe Slot 2 | 16 | UID/BMC RST Button and LED |
| 8 | F_PCIe Slot 1 | 17 | LEDs |
| 9 | F_PCIe Slot 0 | - | - |

## 5.1.6 16 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-F0-00.

Figure 5-6 Front View


| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Button and LED | 8 | USB 3.0 Port |
| 2 | 2.5-Inch Drive Bay | 9 | USB 2.0/LCD Port |
| 3 | F_PCIe Slot 2 | 10 | Ear Latch |
| 4 | F_PCIe Slot 1 | 11 | BMC Management Network Port |
| 5 | F_PCIe Slot 0 | 12 | UID/BMC RST Button and LED |
| 6 | PCIe Riser Module 11 | 13 | LEDs |
| 7 | VGA Port | - | - |

## 5.1.7 9 × 3.5-Inch Drive Configuration

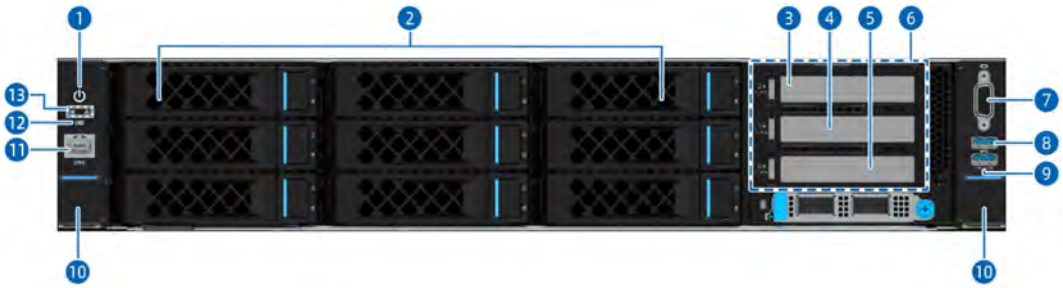
IMPORTANT

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

NOTE

Applicable model: KR2280-X2-A0-F0-00.

Figure 5-7 Front View



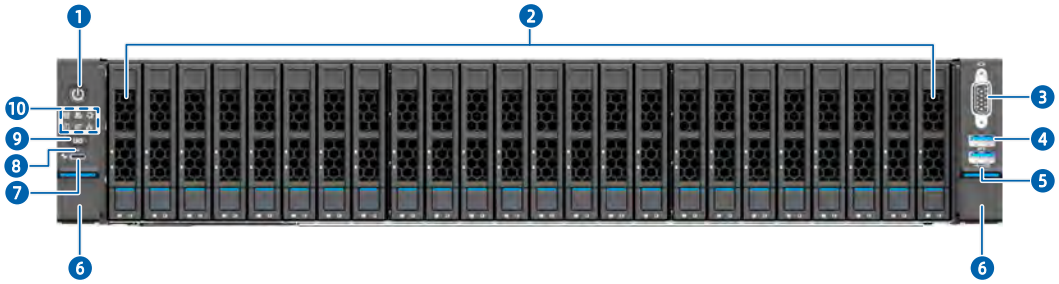
| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Button and LED | 8 | USB 3.0 Port |
| 2 | 3.5-Inch Drive Bay | 9 | USB 2.0/LCD Port |
| 3 | F_PCIe Slot 2 | 10 | Ear Latch |
| 4 | F_PCIe Slot 1 | 11 | BMC Management Network Port |
| 5 | F_PCIe Slot 0 | 12 | UID/BMC RST Button and LED |
| 6 | PCIe Riser Module 12 | 13 | LEDs |
| 7 | VGA Port | - | - |

## 5.1.8 24 × E3.S/NVMe Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-R0-00.

Figure 5-8 Front View




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Button and LED | 6 | Ear Latch |
| 2 | E3.S/NVMe Drive Bay | 7 | USB Type-C Port (optional) |
| 3 | VGA Port | 8 | USB Type-C Status LED (optional) |
| 4 | USB 3.0 Port | 9 | UID/BMC RST Button and LED |
| 5 | USB 2.0/LCD Port | 10 | LEDs |

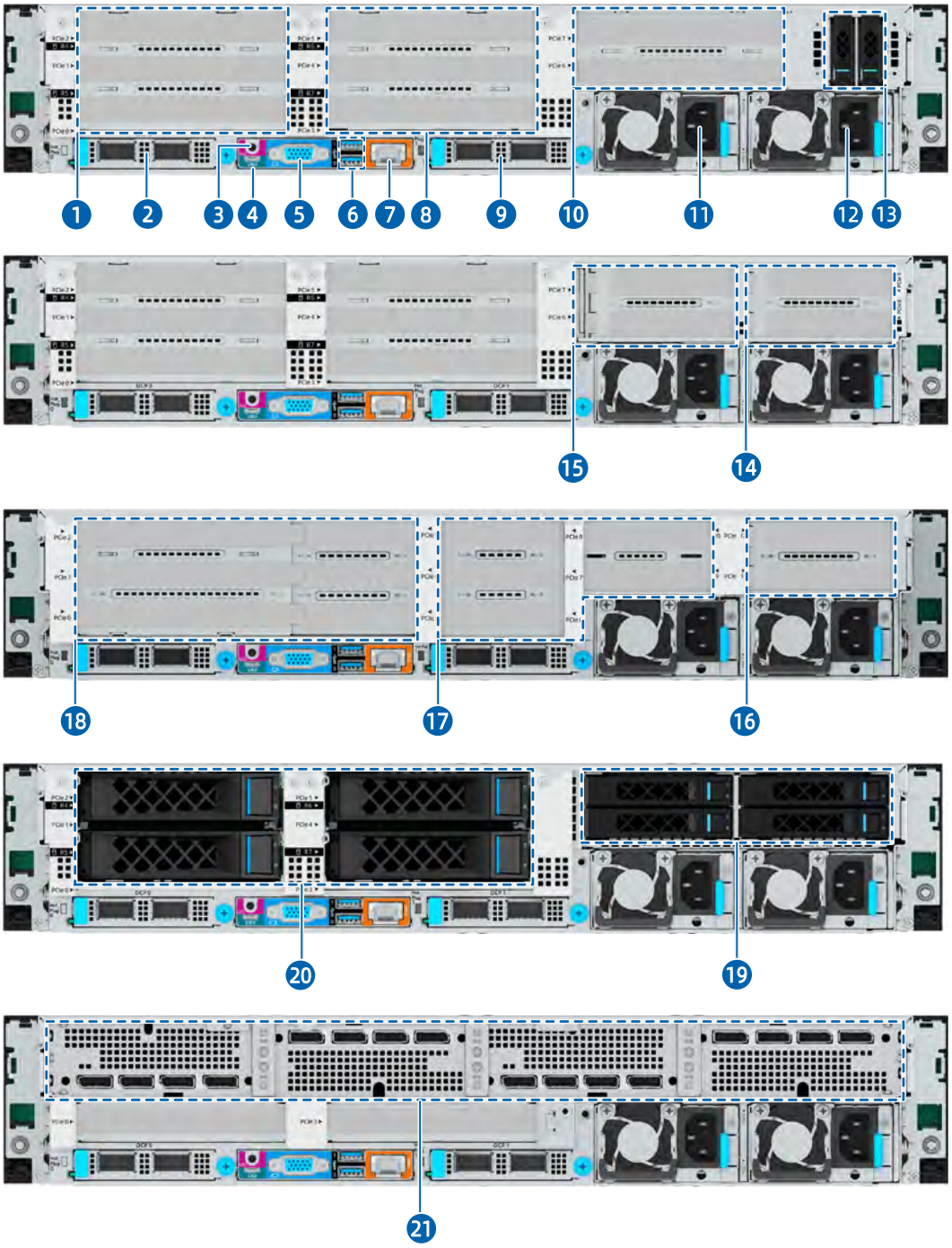
# 5.2 Rear Panel

## 5.2.1 KR2280-X2-A0-R0-00

IMPORTANT

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

Figure 5-9 Rear View

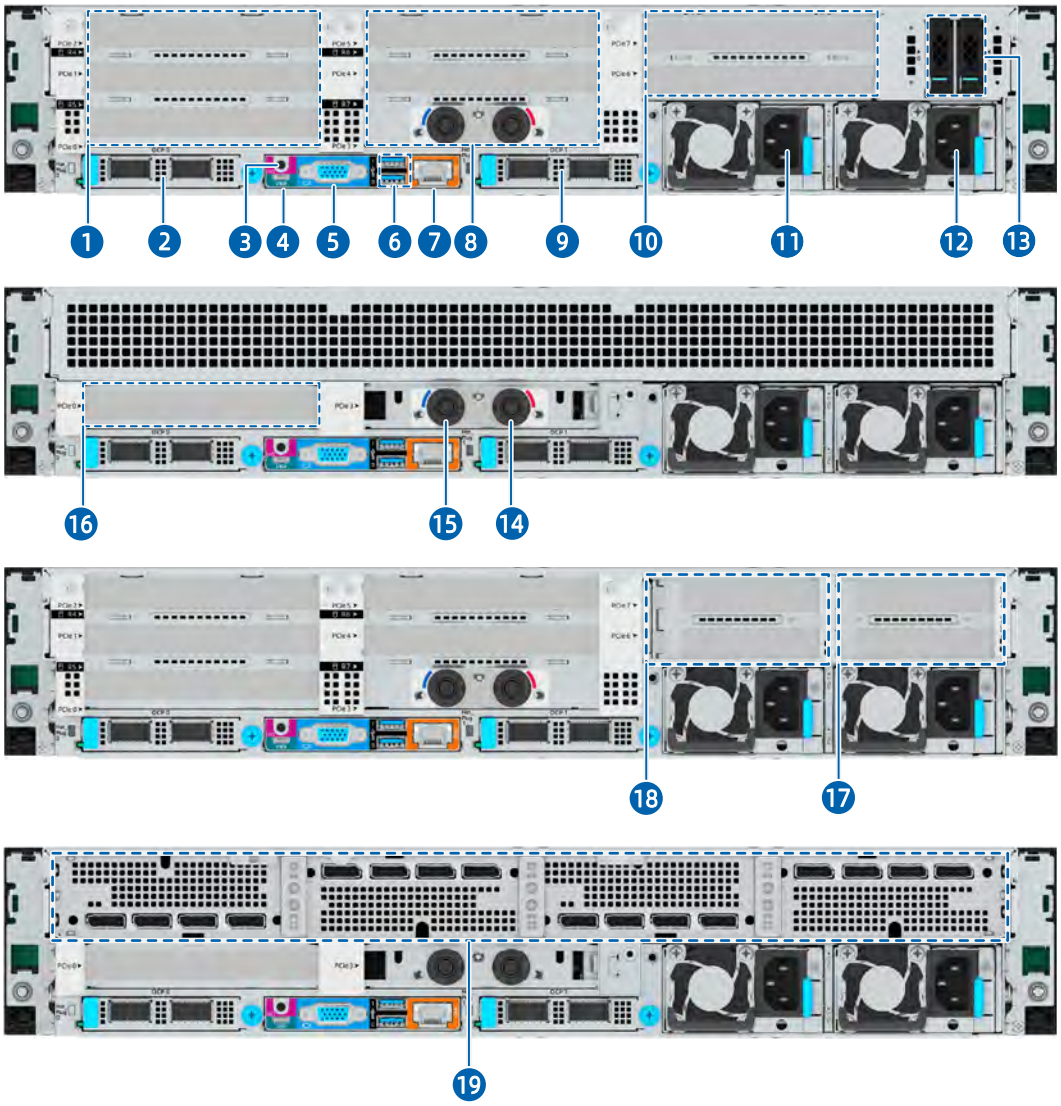



| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | PCIe Riser Module 0 | 12 | PSU1 |
| 2 | OCP 3.0 Card 0 | 13 | M.2/E1.S Drive Bay |
| 3 | UID/BMC RST Button and LED | 14 | PCIe Riser Module 4 |
| 4 | System/BMC Serial Port | 15 | PCIe Riser Module 3 |
| 5 | VGA Port | 16 | PCIe Riser Module 7 |

| Item | Feature | Item | Feature |
|---|---|---|---|
| 6 | USB 3.0 Port | 17 | PCIe Riser Module 6 |
| 7 | BMC Management Network Port | 18 | PCIe Riser Module 5 |
| 8 | PCIe Riser Module 1 | 19 | 2.5-Inch Drive Bay |
| 9 | OCP 3.0 Card 1 | 20 | 3.5-Inch Drive Bay |
| 10 | PCIe Riser Module 2 | 21 | GPU |
| 11 | PSU0 | - | - |

## 5.2.2 KR2280-X2-C0-R0-00

Figure 5-10 Rear View



| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | PCIe Riser Module 0 | 11 | PSU0 |
| 2 | OCP 3.0 Card 0 | 12 | PSU1 |
| 3 | UID/BMC RST Button and LED | 13 | M.2/E1.S Drive Bay |
| 4 | System/BMC Serial Port | 14 | Quick Disconnect (outlet) |
| 5 | VGA Port | 15 | Quick Disconnect (inlet) |
| 6 | USB 3.0 Port | 16 | PCIe Riser Module 8 |
| 7 | BMC Management Network Port | 17 | PCIe Riser Module 3 |
| 8 | PCIe Riser Module 1 | 18 | PCIe Riser Module 4 |
| 9 | OCP 3.0 Card 1 | 19 | GPU |
| 10 | PCIe Riser Module 2 | - | - |

### 5.2.3 KR2280-X2-A0-F0-00

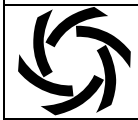
Figure 5-11 Rear View


| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | UID/BMC RST Button and LED | 4 | USB 3.0 Port |
| 2 | System/BMC Serial Port | 5 | PSU0 |
| 3 | VGA Port | 6 | PSU1 |

## 5.3 LEDs and Buttons

Table 5-1 LED and Button Description

| Icon | Feature | Description |
|---|---|---|
|  | Power Button and LED | • Power LED:<br>- Off = No power |

| Icon | Feature | Description |
|---|---|---|
| | | - Solid green = Power-on state<br>- Solid orange = Standby state<br>• Power button:<br>- Press and release the button to power on the system from the standby state.<br>- Press and hold the button for 6 seconds to force a shutdown from the power-on state. |
|  | UID/BMC RST Button and LED | • UID/BMC RST LED:<br>- Gradually turning blue within 2 seconds and then gradually turning off within 2 seconds = PFR authentication is in progress (Note: The server can be powered on only after this LED turns off.)<br>- Blinking blue (4 Hz) = PFR authentication fails and the firmware images cannot be recovered<br>- Solid blue = The UID LED is activated by the UID button or via the BMC<br>• UID/BMC RST button:<br>- Press and release the button to activate the UID LED<br>- Press and hold the button for 6 seconds to force a BMC reset |
|  | System Status LED | • Off = Normal<br>• Blinking red (1 Hz) = A warning error is detected on CPU, memory, power supply, drive, fan, etc.<br>• Solid red = A critical error is detected on CPU, memory, power supply, drive, fan, etc. |
|  | Memory Status LED | • Off = Normal<br>• Blinking red (1 Hz) = A warning error occurs<br>• Solid red = A critical error occurs |
|  | Fan Status LED | • Off = Normal<br>• Blinking red (1 Hz) = A warning error occurs |

| Icon | Feature | Description |
|---|---|---|
| | | • Solid red = A critical error occurs, including fan failure and fan absence |
|  | Power Status LED | • Off = Normal<br>• Blinking red (1 Hz) = A warning error occurs<br>• Solid red = A critical error occurs |
|  | System Overheat LED | • Off = Normal<br>• Blinking red (1 Hz) = A warning error occurs, including Proc Hot, resulting in CPU throttling<br>• Solid red = A critical error occurs, including CPU Thermal Trip/PCH Hot/MEM Hot |
|  | Network Status LED | • Off = No network connection<br>• Blinking green = Network connected with data being transmitted<br>• Solid green = Network connected without data being transmitted<br>Note:<br>It only indicates the status of the self-developed OCP card. |
|  | USB Type-C Status LED | • Connected to a terminal:<br>- Off = Not connected to a terminal<br>- Blinking green (2 Hz) for 3 seconds and then off = Port function is disabled<br>- Solid green = Connected to a terminal<br>• Connected to a USB storage device:<br>- Off = Not connected to a USB storage device<br>- Blinking red (1 Hz) = Job fails or is completed with an error reported<br>- Blinking green (2 Hz) = Job in progress<br>- Blinking green (2 Hz) 5 times and then off = Port function is disabled<br>- Solid green = Job is completed successfully |
| - | OCP 3.0 Card Hot-Plug Button and LED[Note 1] | • OCP 3.0 card hot-plug LED:<br>- Off = OCP card is powered off |

| Icon | Feature | Description |
|---|---|---|
| | | - Blinking green = OCP card is getting ready for hot-plugging or OCP card is being identified after installation<br>- Solid green = OCP card is powered on<br>• OCP 3.0 card hot-plug button:<br>- With the LED solid on, press and release the button to power off the OCP 3.0 card.<br>- With the LED off and the OCP 3.0 card installed, press and release the button to power on the OCP 3.0 card. |
| - | PSU LED | • Solid green = Normal<br>• Off = No AC/DC input to the PSU<br>• Solid amber = PSU critical event causing a shutdown (possible causes: PSU overtemperature protection, PSU overcurrent protection, PSU overvoltage protection, short circuit protection)<br>• 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)<br>• Blinking green (1 Hz) = PSU operating in standby state with normal input<br>• Blinking green (on for 2 seconds and off for 1 second) = PSU in sleep state for cold redundancy<br>• Blinking green (2 Hz) = PSU firmware updating |

Note 1: The OCP 3.0 card is hot-pluggable. Under Red Hat Enterprise Linux 8.x, the OCP 3.0 card hot-plug LED is lit orange for several seconds after the card is hot plugged into its slot. This does not affect the normal use of the card. It is caused by the conflict between the OCP NIC 3.0 design specification and the PCIe hot-plug specification.

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 attention.

## 5.4 Port Description

Table 5-2 Port Description

| Port | Description |
| --- | --- |
| VGA Port | Enables you to connect a display terminal to the system. |
| USB 3.0 Port | Enables you to connect a USB 3.0/2.0 device to the system. |
| USB 2.0/LCD Port | Enables you to connect a USB 2.0 device or an LCD module to the system. |
| USB Type-C Port | Enables you to connect a USB storage device to the system for automatic log copying to the USB device and automatic configuration importing to the BMC.<br>Note:<br>The BMC provides USB management interfaces, for searching and configuring functions of the BMC management network port. It provides the function to enable/disable the USB management function (enabled by default), and displays the USB device access status of being connected or disconnected. Also, the BMC records operations on the USB device in the audit logs after the device is connected to the system. |
| System/BMC Serial Port | • System serial port: enables you to capture system logs.<br>• BMC serial port: enables you to capture BMC logs and debug the BMC. |
| BMC Management Network Port | Enables you to manage the server.<br>Note:<br>It is a Gigabit Ethernet port that supports 100 Mbps and 1,000 Mbps auto-negotiation. |
| PSU Socket | Connected through a power cord. You can select the PSUs as needed. |

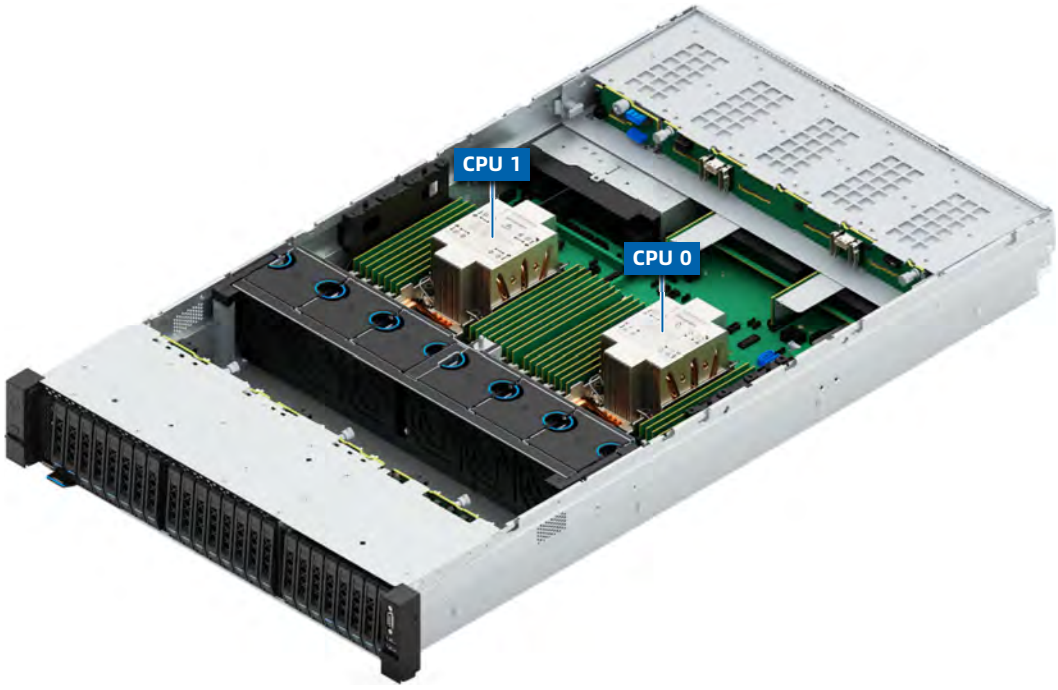
| Port | Description |
| --- | --- |
| | Note:<br>Make sure that the rated power of each PSU is greater than that of the server. |
| OCP 3.0 Network Port | Enables you to connect the system to the network. |
| PCIe NIC Port | Enables you to connect the system to the network. |

## 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 5-12 Processor Locations



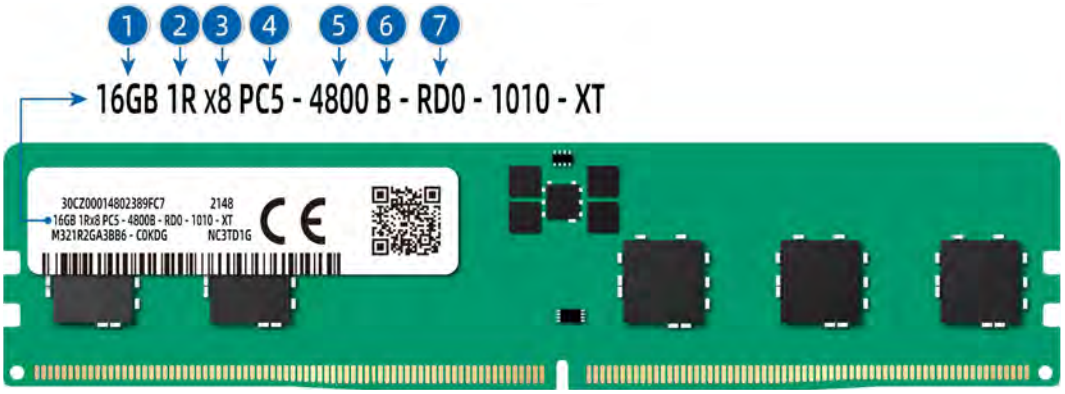
# 5.6 Memory

## 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 5-13 DIMM Identification




| Item | Description | Example |
|---|---|---|
| 1 | Capacity | • 16 GB<br>• 32 GB<br>• 64 GB<br>• 128 GB<br>• 256 GB |
| 2 | Rank(s) | • 1R = Single rank<br>• 2R = Dual rank<br>• 2S2R = Two ranks of two high stacked 3DS DRAM<br>• 2S4R = Four ranks of two high stacked 3DS DRAM<br>• 4R = Quad rank |
| 3 | Data width of DRAM | • x4 = 4 bits<br>• x8 = 8 bits |
| 4 | DIMM slot type | PC5 = DDR5 |
| 5 | Maximum memory speed | • 4,800 MT/s<br>• 5,600 MT/s |
| 6 | CAS latency | B = 4800 40-39-39 |

| Item | Description | Example |
|---|---|---|
| 7 | DIMM type | R = RDIMM |

## 2. Memory Subsystem Architecture

The server supports 32 DIMM slots and 8 memory channels per CPU.

Table 5-3 DIMM Slot List

| CPU | Channel ID | Silk Screen |
|---|---|---|
| CPU0 | Channel 0 | CPU0_C0D0 |
| | | CPU0_C0D1 |
| | Channel 1 | CPU0_C1D0 |
| | | CPU0_C1D1 |
| | Channel 2 | CPU0_C2D0 |
| | | CPU0_C2D1 |
| | Channel 3 | CPU0_C3D0 |
| | | CPU0_C3D1 |
| | Channel 4 | CPU0_C4D0 |
| | | CPU0_C4D1 |
| | Channel 5 | CPU0_C5D0 |
| | | CPU0_C5D1 |
| | Channel 6 | CPU0_C6D0 |
| | | CPU0_C6D1 |
| | Channel 7 | CPU0_C7D0 |
| | | CPU0_C7D1 |
| CPU1 | Channel 0 | CPU1_C0D0 |
| | | CPU1_C0D1 |
| | Channel 1 | CPU1_C1D0 |
| | | CPU1_C1D1 |
| | Channel 2 | CPU1_C2D0 |
| | | CPU1_C2D1 |
| | Channel 3 | CPU1_C3D0 |
| | | CPU1_C3D1 |
| | Channel 4 | CPU1_C4D0 |
| | | CPU1_C4D1 |
| | Channel 5 | CPU1_C5D0 |
| | | CPU1_C5D1 |
| | Channel 6 | CPU1_C6D0 |
| | | CPU1_C6D1 |
| | Channel 7 | CPU1_C7D0 |
| | | CPU1_C7D1 |

# 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 memory options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

- DDR5 DIMMs can be used with the 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids). The maximum memory capacity supported is identical for different CPU models.
- The maximum number of DIMMs supported varies by the CPU type, DIMM type and rank quantity.

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 (4,800 MT/s) Specifications

| Item | | Value | | | |
|---|---|---|---|---|---|
| Capacity per DDR5 DIMM (GB) | | 16 | 32 | 64 | 128 |
| Type | | RDIMM | RDIMM | RDIMM | RDIMM |
| Rated speed (MT/s) | | 4,800 | 4,800 | 4,800 | 4,800 |
| Operating voltage (V) | | 1.1 | 1.1 | 1.1 | 1.1 |
| Maximum number of DDR5 DIMMs supported in a server[a] | | 32 | 32 | 32 | 32 |
| Maximum capacity of DDR5 DIMMs supported in a server (GB)[b] | | 512 | 1,024 | 2,048 | 4,096 |
| Actual speed (MT/s) | 1 DPC[c] | 4,800 | 4,800 | 4,800 | 4,800 |
| | 2 DPC | 4,400 | 4,400 | 4,400 | 4,400 |

| Item | Value |
| --- | --- |
| a: The maximum number of DDR5 DIMMs supported is based on the dual-CPU configuration. The number is halved for the single-CPU configuration.<br>b: It indicates the maximum memory capacity supported when all the DIMM slots are populated with DDR5 DIMMs. The maximum DDR5 capacity varies by the CPU type.<br>c: DIMM Per Channel (DPC) is the number of DIMMs per memory channel.<br>The information above is for reference only. Consult your local sales representative for details. | |

Table 5-5 DDR5 DIMM (5,600 MT/s) Specifications

| Item | | Value | | | |
| --- | --- | --- | --- | --- | --- |
| Capacity per DDR5 DIMM (GB) | | 16 | 32 | 64 | 128 |
| Type | | RDIMM | RDIMM | RDIMM | RDIMM |
| Rated speed (MT/s) | | 5,600 | 5,600 | 5,600 | 5,600 |
| Operating voltage (V) | | 1.1 | 1.1 | 1.1 | 1.1 |
| Maximum number of DDR5 DIMMs supported in a server[a] | | 32 | 32 | 32 | 32 |
| Maximum capacity of DDR5 DIMMs supported in a server (GB)[b] | | 512 | 1,024 | 2,048 | 4,096 |
| Actual speed (MT/s) | 1 DPC[c] | 5,600 | 5,600 | 5,600 | 5,600 |
| | 2 DPC | 4,400 | 4,400 | 4,400 | 4,400 |
| a: The maximum number of DDR5 DIMMs supported is based on the dual-CPU configuration. The number is halved for the single-CPU configuration.<br>b: It indicates the maximum memory capacity supported when all the DIMM slots are populated with DDR5 DIMMs. The maximum DDR5 capacity varies by the CPU type.<br>c: DIMM Per Channel (DPC) is the number of DIMMs per memory channel. When DDR5 DIMMs are used with the Sapphire Rapids CPU, the actual speed is 4,800 MT/s at 1 DPC.<br>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.

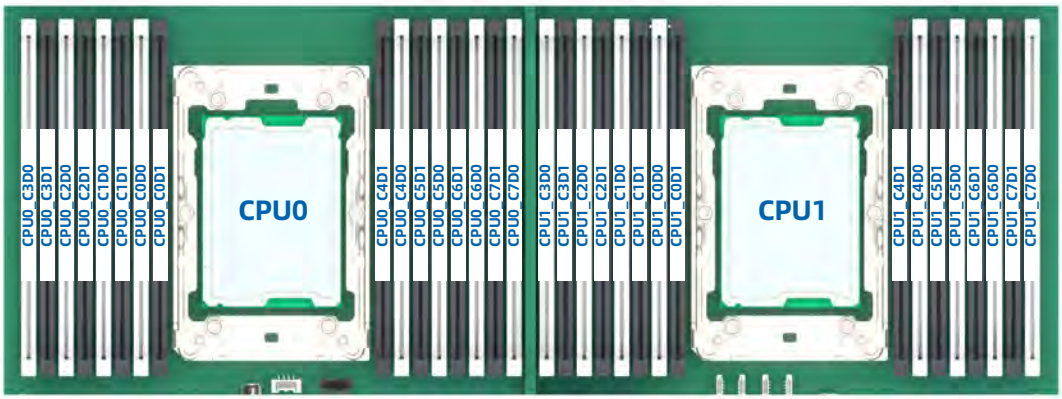
Population rules for DDR5 DIMMs in specific modes:

- Memory sparing mode
  - Follow the general population rules.
  - Each channel must have a valid online spare configuration.
  - Each channel can have a different online spare configuration.
  - Each channel with a DIMM installed must have a spare rank.
- Memory mirroring mode
  - Follow the general population rules.
  - Each processor supports 4 integrated memory controllers (iMCs). Each iMC has 2 channels to be populated with DIMMs. Installed DIMMs must be of the same capacity and organization.
  - In a multi-processor configuration, each processor must have a valid memory mirroring configuration.

## 5. DIMM Slot Layout

Up to 32 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 5-14 DIMM Slot Layout




Detailed DIMM population rules are as follows:

- Single-CPU (Sapphire Rapids/Emerald Rapids) Configuration

NOTE

For 24 Gb DRAM chip-based DIMMs used with Sapphire Rapids CPUs, follow Table 5-10 DDR5 DIMM Population Rules and Table 5-11 DDR5 DIMM Population Rules

for installation.

Table 5-6 DDR5 DIMM Population Rules

| DDR5 QTY | CPU0 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 |
| 1 | | | | | | | V | | | | | | | | | |
| 2 | | | | | | | V | | | | | | | V | | |
| 4 | | | V | | | | V | | | V | | | | V | | |
| 6 | V | | V | | | | V | | | V | | V | | V | | |
| 8 | V | | V | | V | | V | | | V | | V | | V | | V |
| 12 | V | | V | V | V | | V | V | V | V | | V | V | V | | V |
| 16 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |

- Dual-CPU (Sapphire Rapids/Emerald Rapids) Configuration

NOTE

For 24 Gb DRAM chip-based DIMMs used with Sapphire Rapids CPUs, follow Table 5-10 DDR5 DIMM Population Rules and Table 5-11 DDR5 DIMM Population Rules for installation.

Table 5-7 DDR5 DIMM Population Rules

| DDR5 QTY | CPU0 | | | | | | | | | | | | | | | | CPU1 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 |
| 2 | | | | | | | V | | | | | | | | | | | | | | | | V | | | | | | | |
| 4 | | | | | | | V | | | | | | | V | | | | | | | | | V | | | | | | V | |
| 8 | | | V | | | | V | | | V | | | | V | | | | | V | | | | V | | | V | | | V | |
| 12 | V | | V | | | | V | | | V | | V | | V | | | V | | V | | | | V | | | V | | V | | V | |
| 16 | V | | V | | V | | V | | | V | | V | | V | | V | V | | V | | V | | V | | | V | | V | | V | |
| 24 | V | | V | V | V | | V | V | V | V | | V | V | V | | V | V | | V | V | V | | V | V | V | V | | V | V | V | |
| 32 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |

- Single-CPU (HBM CPU) Configuration

Table 5-8 DDR5 DIMM Population Rules

| DDR5 QTY | CPU0 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 |
| 0 | | | | | | | | | | | | | | | | |
| 1 | | | | | | | V | | | | | | | | | |
| 2 | | | | | | | V | | | | | | | V | | |
| 4 | | | V | | | | V | | | V | | | | V | | |
| 8 | V | | V | | V | | V | | | V | | V | | V | | V |
| 16 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |

- Dual-CPU (HBM CPU) Configuration

Table 5-9 DDR5 DIMM Population Rules

| DDR5 QTY | CPU0 | | | | | | | | | | | | | | | | CPU1 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 |
| 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | V | | | | | | | | | | | | | | | | V | | | | | | | |
| 4 | | | | | | | V | | | | | | V | | | | | | | | | | V | | | | | | V | |
| 8 | | | V | | | | V | | | V | | | V | | | | | | V | | | | V | | | V | | | V | |
| 16 | V | | V | | V | | V | | | V | | V | | V | | V | V | | V | | V | | V | | | V | | V | | V |
| 32 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |

- Single-CPU (Sapphire Rapids) and 24 Gb DRAM Chip-Based DIMM Configuration

Table 5-10 DDR5 DIMM Population Rules

| DDR5 QTY | CPU0 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 |
| 8 | V | | V | | V | | V | | | V | | V | | V | | V |
| 16 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |

- Dual-CPU (Sapphire Rapids) and 24 Gb DRAM Chip-Based DIMM Configuration

Table 5-11 DDR5 DIMM Population Rules

| DDR5 QTY | CPU0 | | | | | | | | | | | | | | | | CPU1 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 |
| 16 | V | | V | | V | | V | | | V | | V | | V | | V | V | | V | | V | | V | | | V | | V | | V | |
| 32 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |

NOTE

In Table 5-10 and Table 5-11, 24 Gb DRAM chip-based DIMMs indicate 24/48/96 GB DIMMs only. These 24/48/96 GB DIMMs feature 24 Gb DRAM chips only.

# 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. KR2280-X2-A0-R0-00

Table 5-12 Drive Configurations

| Config. | Front Drives | Rear Drives | Internal Drives | Drive Management Mode |
|---|---|---|---|---|
| 12 × 3.5-Inch Drive Config. | 12 × 3.5-inch drive (Drive bays with physical drive No. 0 to 11 support SAS/SATA/NVMe drives only) | • 4 × 3.5-inch SAS/SATA drive<br>• 4 × 2.5-inch SAS/SATA/NVMe drive<br>• 2 × M.2/E1.S SSD | 2 × internal M.2 SATA SSD | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU<br>• M.2/E1.S SSD: CPU |
| 24 × 2.5-Inch Drive Config. | 24 × 2.5-inch drive (Drive bays with physical drive No. 0 to 23 support SAS/SATA/NVMe drives) | • 4 × 3.5-inch SAS/SATA drive<br>• 4 × 2.5-inch SAS/SATA/NVMe drive<br>• 2 × M.2 SSD | - | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU<br>• 2 × M.2 SSD: CPU |
| 25 × 2.5-Inch Drive Config. | 25 × 2.5-inch drive (Drive bays with physical drive No. 0 to 24 support SAS/SATA drives only) | • 3 × 2.5-inch SAS/SATA drive<br>• 2 × E1.S SSD | - | • SAS/SATA drive: PCIe RAID card<br>• 2 × E1.S SSD: CPU |
| | 25 × 2.5-inch drive (Drive bays with physical drive No. 0 to 20 support SAS/SATA drives only, and drive bays with physical drive No. 21 to 24 support SAS/SATA/NVMe drives) | - | - | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU |

| Config. | Front Drives | Rear Drives | Internal Drives | Drive Management Mode |
|---|---|---|---|---|
| 8 × 3.5-Inch Drive Config. | 8 × 3.5-inch drive (Drive bays with physical drive No. 0 to 7 support SAS/SATA/NVMe drives only) | - | - | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU |
| 24 × E3.S Drive Config. | 24 × 2.5-inch drive (Drive bays with physical drive No. 0 to 23 support E3.S drives only) | 2 × M.2 SSD | - | • E3.S drive: CPU<br>• 2 × M.2 SSD: CPU |

## 2. KR2280-X2-C0-R0-00

Table 5-13 Drive Configurations

| Config. | Front Drives | Internal Drives | Drive Management Mode |
|---|---|---|---|
| 12 × 3.5-Inch Drive Config. | 12 × 3.5-inch drive (Drive bays with physical drive No. 0 to 11 support SAS/SATA/NVMe drives only) | 2 × internal M.2 SATA SSD | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU |
| 24 × 2.5-Inch Drive Config. | 24 × 2.5-inch drive (Drive bays with physical drive No. 0 to 23 support SAS/SATA/NVMe drives) | - | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU |
| 25 × 2.5-Inch Drive Config. | 25 × 2.5-inch drive (Drive bays with physical drive No. 0 to 24 support SAS/SATA drives only) | - | SAS/SATA drive: PCIe RAID card |
| | 25 × 2.5-inch drive (Drive bays with physical drive No. 0 to 20 support SAS/SATA drives only, and drive bays with physical drive | - | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU |

| Config. | Front Drives | Internal Drives | Drive Management Mode |
|---|---|---|---|
| | No. 21 to 24 support SAS/SATA/NVMe drives) | | |
| 8 × 3.5-Inch Drive Config. | 8 × 3.5-inch drive (Drive bays with physical drive No. 0 to 7 support SAS/SATA/NVMe drives) | - | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU |

### 3. KR2280-X2-A0-F0-00

Table 5-14 Drive Configurations

| Config. | Front Drives | Drive Management Mode |
|---|---|---|
| 9 × 3.5-Inch Drive Config. | 9 × 3.5-inch drive (Drive bays with physical drive No. 0 to 6 support SAS/SATA drives only, and drive bays with physical drive No. 7 to 8 support SAS/SATA/NVMe drives) | SAS/SATA drive: PCIe RAID card |
| 8 × 2.5-Inch Drive Config. | 8 × 2.5-inch drive (Drive bays with physical drive No. 0 to 7 support SAS/SATA/NVMe drives) | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU |
| 16 × 2.5-Inch Drive Config. | 16 × 2.5-inch drive (Drive bays with physical drive No. 0 to 15 support SAS/SATA/NVMe drives) | • SAS/SATA drive: PCIe RAID card<br>• NVMe drive: CPU |

## 5.7.2 Drive Numbering

NOTE

The drive numbers identified by RAID cards in this section are those designated by 8i RAID cards.

# 1. 12 × 3.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-C0-R0-00.

Figure 5-15 Physical Drive Numbering


| Config. | Physical Drive No. | Drive No. Identified by the BMC | Front/Rear | Drive Number Identified by an 8i RAID Card |
|---|---|---|---|---|
| 12 × SAS/SATA | 0 to 11 | 0 to 11 | Front | 0 to 11 |
| 12 × NVMe | 0 to 11 | 0 to 11 | Front | - |

# 2. 24 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-C0-R0-00.

Figure 5-16 Physical Drive Numbering


| Config. | Physical Drive No. | Drive No. Identified by the BMC | Front/Rear | Drive Number Identified by an 8i RAID Card |
|---|---|---|---|---|
| 24 × SAS/SATA | 0 to 7 | 0 to 7 | Front | 0 to 7 |
| | 8 to 15 | 8 to 15 | Front | 0 to 7 |
| | 16 to 23 | 16 to 23 | Front | 0 to 7 |
| 24 × NVMe | 0 to 23 | 0 to 23 | Front | - |

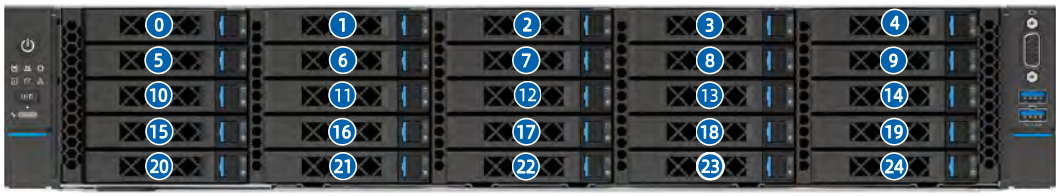
| Config. | Physical Drive No. | Drive No. Identified by the BMC | Front/Rear | Drive Number Identified by an 8i RAID Card |
|---|---|---|---|---|
| 8 × SAS/SATA + 16 × NVMe | 0 to 7 | 0 to 7 | Front | 0 to 7 |
| | 8 to 23 | 8 to 23 | Front | - |
| 16 × SAS/SATA + 8 × NVMe | 0 to 7 | 0 to 7 | Front | 0 to 7 |
| | 8 to 15 | 8 to 15 | Front | 0 to 7 |
| | 16 to 23 | 16 to 23 | Front | - |

## 3. 25 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-C0-R0-00.

Figure 5-17 Physical Drive Numbering



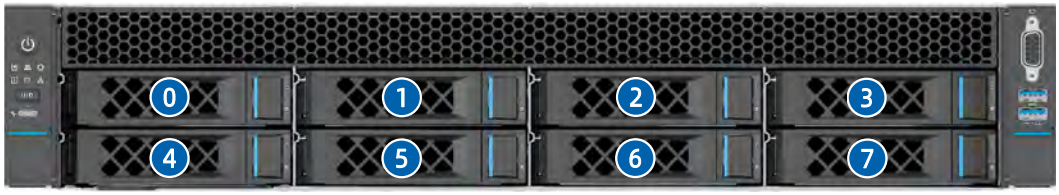

| Config. | Physical Drive No. | Drive No. Identified by the BMC | Front/Rear | Drive Number Identified by an 8i RAID Card |
|---|---|---|---|---|
| 25 × SAS/SATA | 0 to 24 | 0 to 24 | Front | 0 to 24 |
| 21 × SAS/SATA + 4 × NVMe | 0 to 20 | 0 to 20 | Front | 0 to 20 |
| | 21 to 24 | 21 to 24 | Front | - |

## 4. 8 × 3.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-C0-R0-00.

Figure 5-18 Physical Drive Numbering




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

## 5. 8 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-F0-00.

Figure 5-19 Physical Drive Numbering


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

## 6. 16 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-F0-00.

Figure 5-20 Physical Drive Numbering


| Config. | Physical Drive No. | Drive No. Identified by the BMC | Front/Rear | Drive Number Identified by an 8i RAID Card |
|---|---|---|---|---|
| 16 × SAS/SATA | 0 to 7 | 0 to 7 | Front | 0 to 7 |
| | 8 to 15 | 8 to 15 | Front | 0 to 7 |
| 16 × NVMe | 0 to 15 | 0 to 15 | Front | - |

## 7. 9 × 3.5-Inch Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-F0-00.

Figure 5-21 Physical Drive Numbering

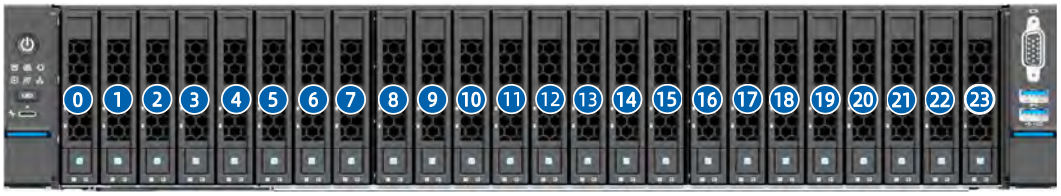

| Config. | Physical Drive No. | Drive No. Identified by the BMC | Front/Rear | Drive Number Identified by an 8i RAID Card |
|---|---|---|---|---|
| 9 × SAS/SATA | 0 to 8 | 0 to 8 | Front | 0 to 8 |
| 7 × SAS/SATA + 2 × NVMe | 0 to 6 | 0 to 6 | Front | 0 to 6 |
| | 7 to 8 | 7 to 8 | Front | - |

## 8. 24 × E3.S Drive Configuration

NOTE

Applicable model: KR2280-X2-A0-R0-00.

Figure 5-22 Physical Drive Numbering




| Config. | Physical Drive No. | Drive No. Identified by the BMC | Front/Rear | Drive Number Identified by an 8i RAID Card |
|---|---|---|---|---|
| 24 × E3.S | 0 to 23 | 0 to 23 | Front | - |

## 5.7.3 Drive LEDs

### 1. SAS/SATA Drive LEDs

Figure 5-23 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 5-24 NVMe Drive LEDs


Figure 5-25 NVMe Drive LEDs

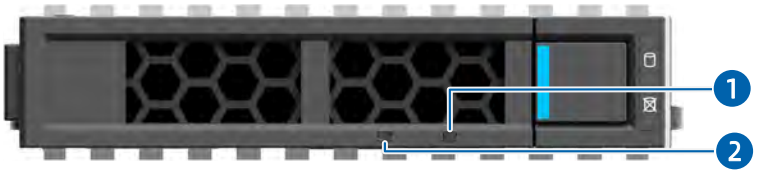

When the VMD function is enabled and the latest VMD driver is installed, the NVMe drives support surprise hot swap, and the LEDs can be lit up.

Table 5-15 NVMe Drive LED Description

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

### 3. E3.S Drive LEDs

Figure 5-26 E3.S Drive LEDs




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

## 5.7.4 RAID Cards

The 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

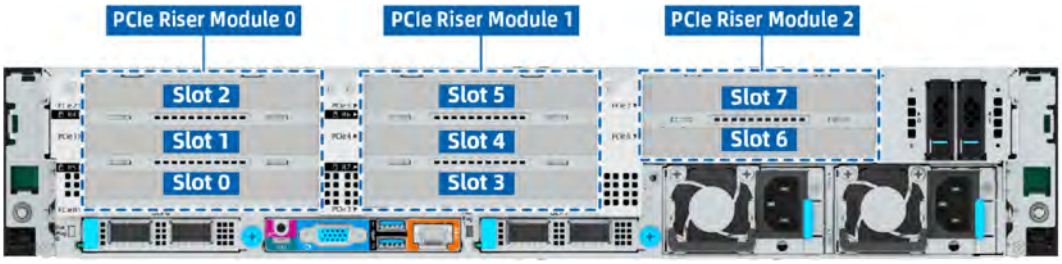
## 5.9.1 PCIe Expansion Cards

PCIe expansion cards provide network expansion capabilities.

- Up to 13 PCIe expansion slots.
- The OpROM resources are limited in the Legacy mode and may not satisfy the OpROM resource demand of the PCIe cards. Consult your local sales representative for details.
- 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 5-27 PCIe Slots - 8 × Rear PCIe Slot

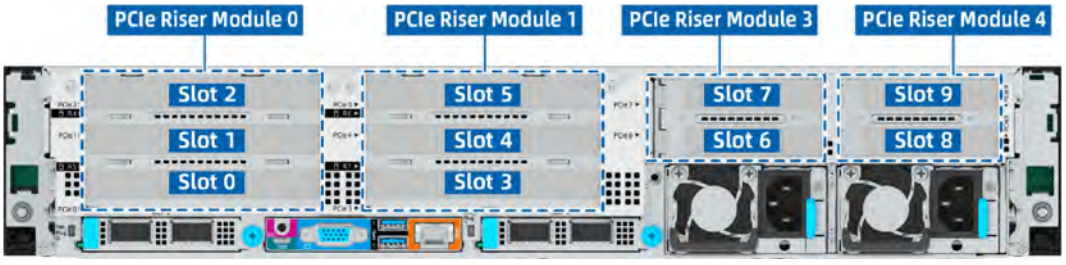



NOTE

Applicable model: KR2280-X2-A0-R0-00.

- Slot 2, slot 1, and slot 0 reside in PCIe riser module 0.
- Slot 5, slot 4, and slot 3 reside in PCIe riser module 1.
- Slot 7 and slot 6 reside in PCIe riser module 2.

Figure 5-28 PCIe Slots - 10 × Rear PCIe Slot

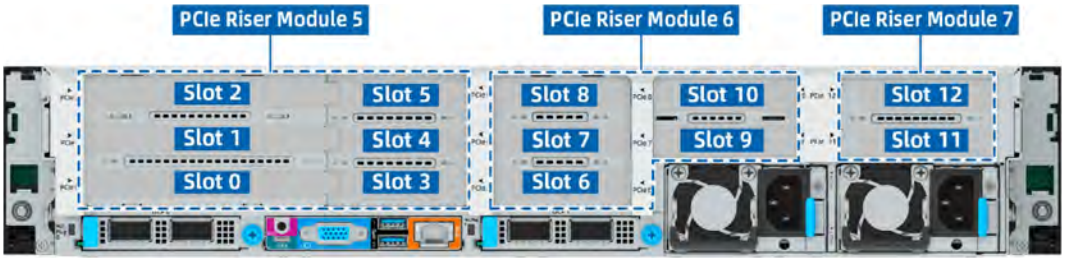


NOTE

Applicable model: KR2280-X2-A0-R0-00.

- Slot 2, slot 1, and slot 0 reside in PCIe riser module 0.
- Slot 5, slot 4, and slot 3 reside in PCIe riser module 1.
- Slot 7 and slot 6 reside in PCIe riser module 3.
- Slot 9 and slot 8 reside in PCIe riser module 4.

Figure 5-29 PCIe Slots - 13 × Rear PCIe Slot

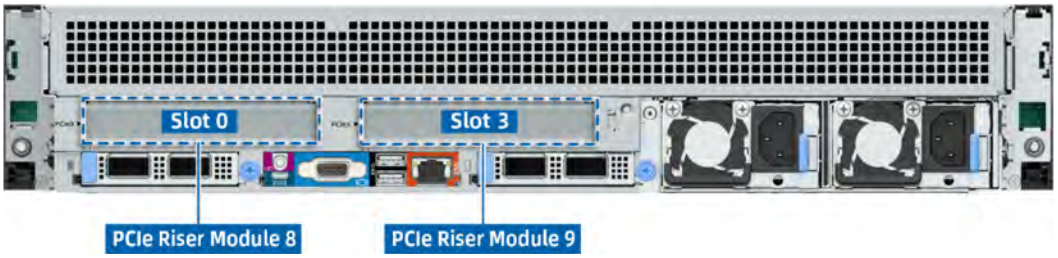



NOTE

Applicable model: KR2280-X2-A0-R0-00.

- Slot 2, slot 1, slot 0, slot 5, slot 4, and slot 3 reside in PCIe riser module 5.
- Slot 8, slot 7, slot 6, slot 10, and slot 9 reside in PCIe riser module 6.
- Slot 12 and slot 11 reside in PCIe riser module 7.

Figure 5-30 PCIe Slots - 4 × Rear GPU + 2 × Rear PCIe Slot




NOTE

Applicable model: KR2280-X2-A0-R0-00.

- The upper 1U space can accommodate 4 dual-slot GPUs.
- Slot 0 resides in PCIe riser module 8.
- Slot 3 resides in PCIe riser module 9.

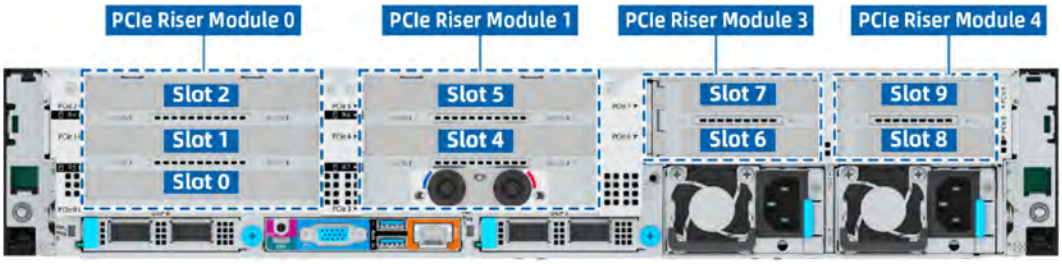
Figure 5-31 PCIe Slots - 7 × Rear PCIe Slot


NOTE

Applicable model: KR2280-X2-C0-R0-00.

- Slot 2, slot 1, and slot 0 reside in PCIe riser module 0.
- Slot 5 and slot 4 reside in PCIe riser module 1.
- Slot 7 and slot 6 reside in PCIe riser module 2.

Figure 5-32 PCIe Slots - 9 × Rear PCIe Slot




NOTE

Applicable model: KR2280-X2-C0-R0-00.

- Slot 2, slot 1, and slot 0 reside in PCIe riser module 0.
- Slot 5 and slot 4 reside in PCIe riser module 1.
- Slot 7 and slot 6 reside in PCIe riser module 3.

- Slot 9 and slot 8 reside in PCIe riser module 4.

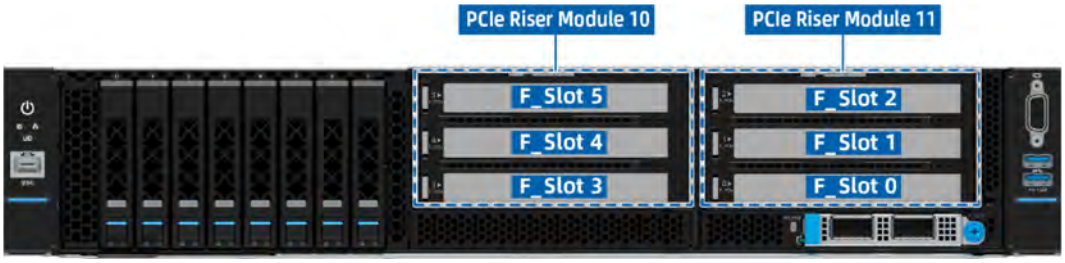
Figure 5-33 PCIe Slots - 4 × Rear GPU + 1 × Rear PCIe Slot


NOTE

Applicable model: KR2280-X2-C0-R0-00.

- The upper 1U space can accommodate 4 dual-slot GPUs.
- Slot 0 resides in PCIe riser module 8.

Figure 5-34 PCIe Slots - 6 × Front PCIe Slot




NOTE

Applicable model: KR2280-X2-A0-F0-00.

- F_Slot 5, F_Slot 4, and F_Slot 3 reside in PCIe riser module 10.
- F_Slot 2, F_Slot 1, and F_Slot 0 reside in PCIe riser module 11.

Figure 5-35 PCIe Slots - 3 × Front PCIe Slot


NOTE

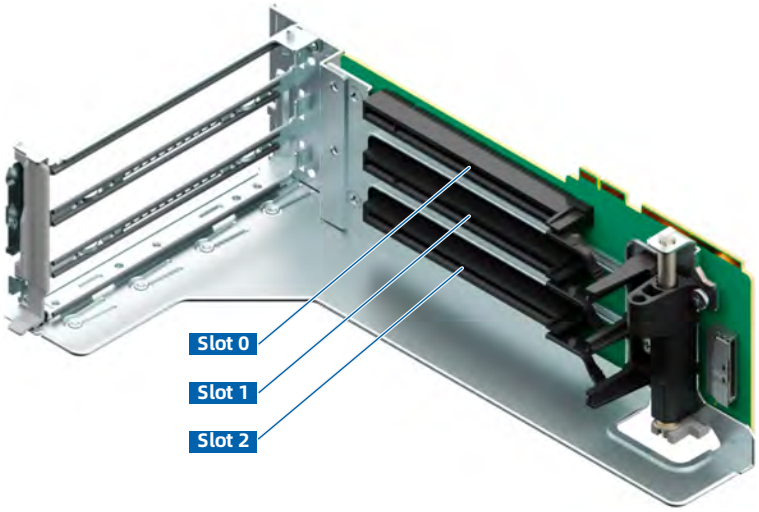
Applicable model: KR2280-X2-A0-F0-00.

F_Slot 2, F_Slot 1, and F_Slot 0 reside in PCIe riser module 12.

## 5.9.3 PCIe Riser Modules

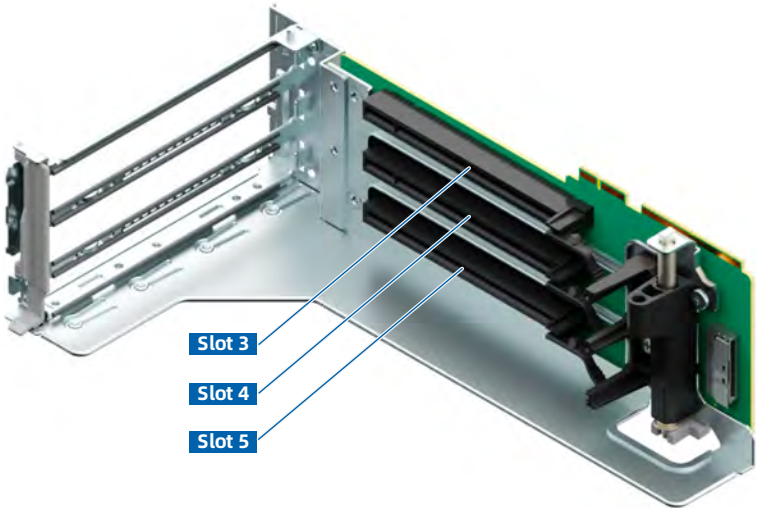
- PCIe Riser Module 0 (with 3 PCIe x16 slots)

Figure 5-36 PCIe Riser Module 0




- PCIe Riser Module 1 (with 3 PCIe x16 slots)

Figure 5-37 PCIe Riser Module 1

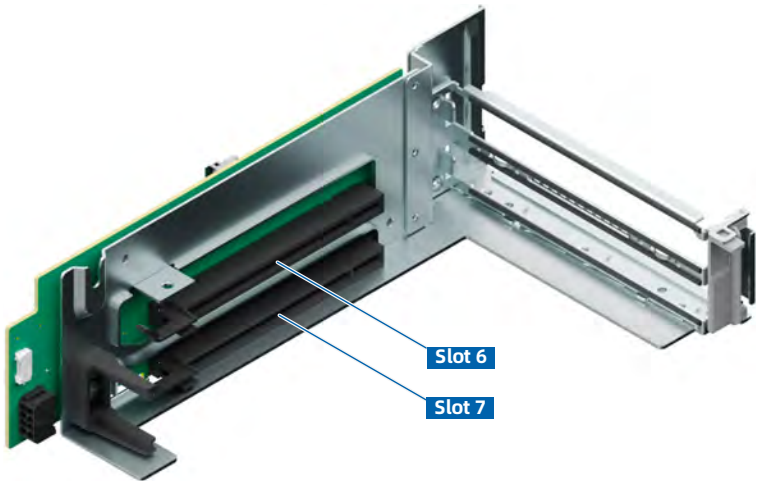



NOTE

Slot 3 is unavailable for KR2280-X2-C0-A0-00.

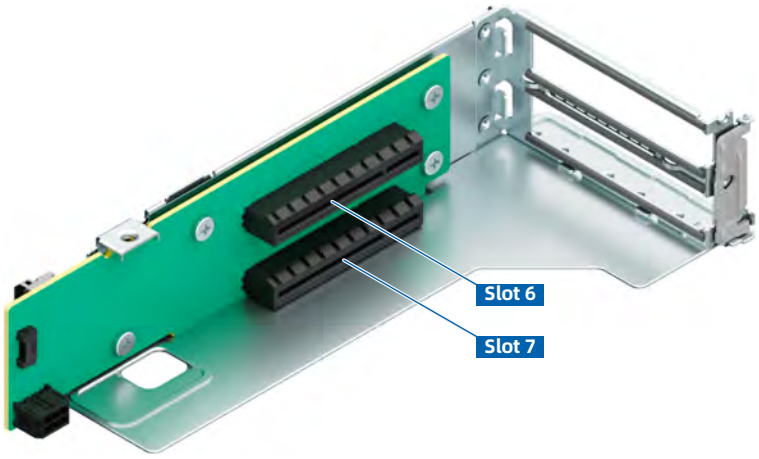
- PCIe Riser Module 2 (with 2 PCIe x16 slots)

Figure 5-38 PCIe Riser Module 2



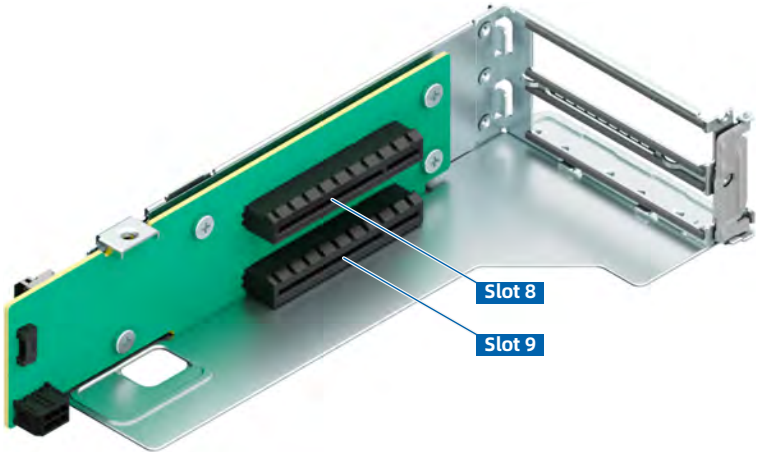

- PCIe Riser Module 3 (with 2 PCIe x8 slots)

Figure 5-39 PCIe Riser Module 3



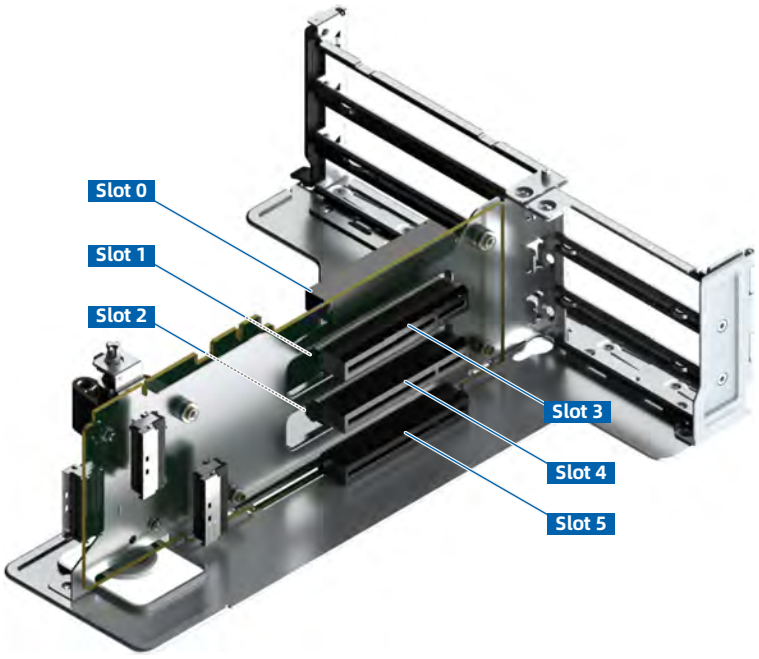

- PCIe Riser Module 4 (with 2 PCIe x8 slots)

Figure 5-40 PCIe Riser Module 4



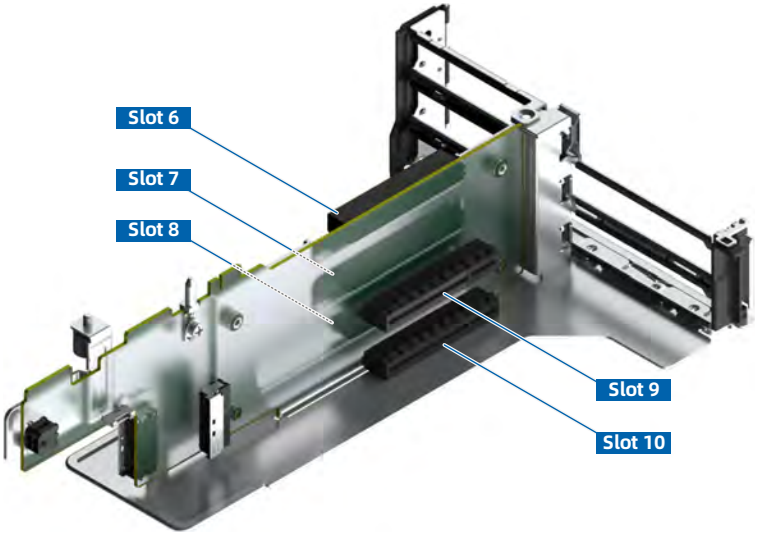

- PCIe Riser Module 5 (with 6 PCIe x8 slots)

Figure 5-41 PCIe Riser Module 5



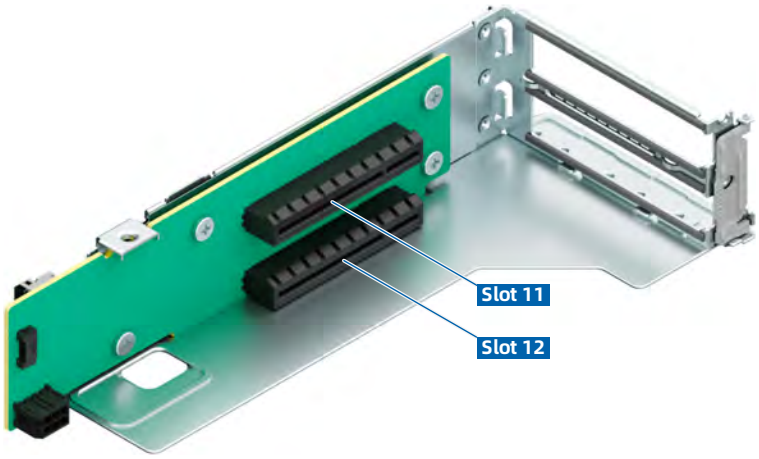

- PCIe Riser Module 6 (with 5 PCIe x8 slots)

Figure 5-42 PCIe Riser Module 6



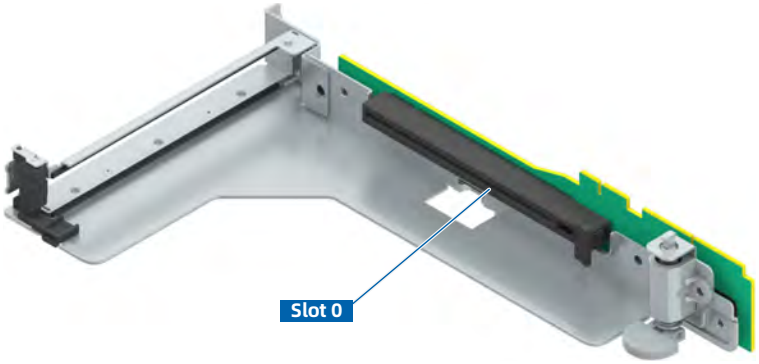

- PCIe Riser Module 7 (with 2 PCIe x8 slots)

Figure 5-43 PCIe Riser Module 7



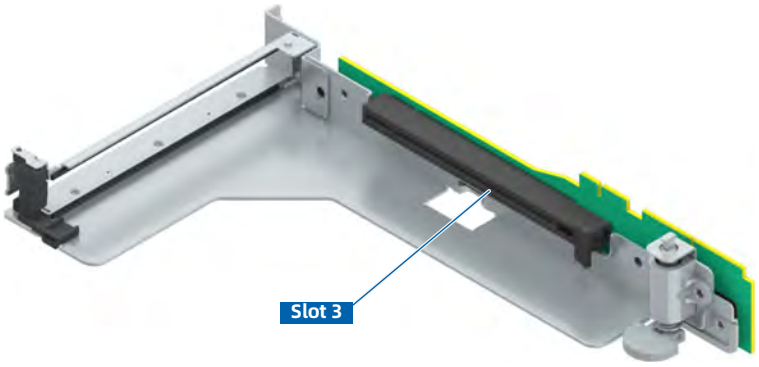

- PCIe Riser Module 8 (with 1 PCIe x16 slot)

Figure 5-44 PCIe Riser Module 8



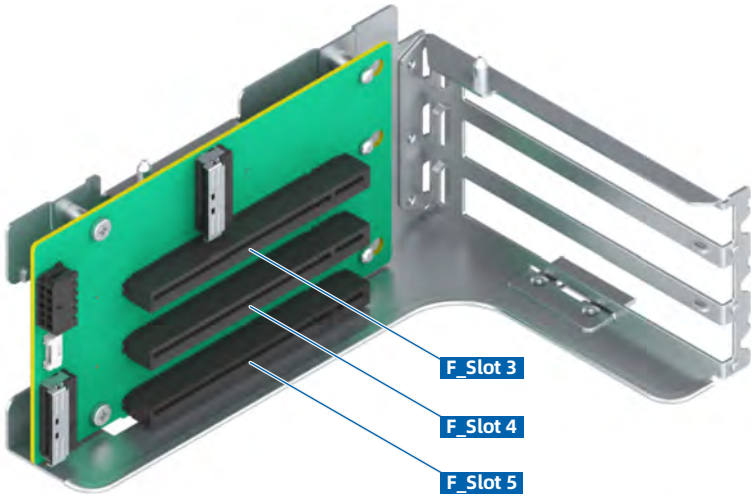

- PCIe Riser Module 9 (with 1 PCIe x16 slot)

Figure 5-45 PCIe Riser Module 9



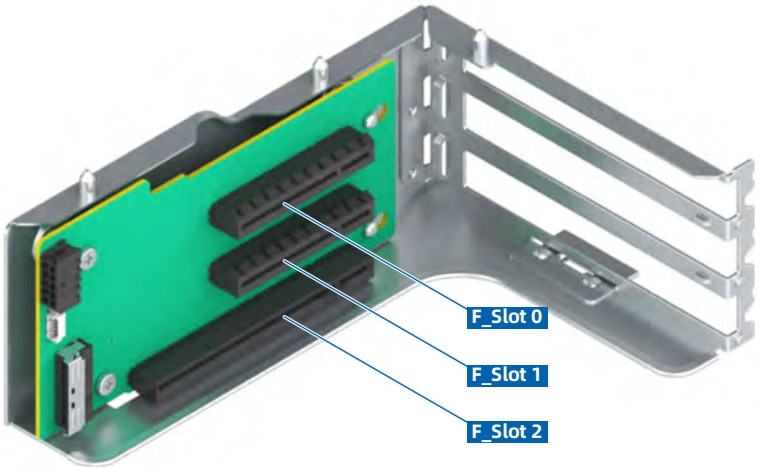

- PCIe Riser Module 10 (with 3 PCIe x16 slots)

Figure 5-46 PCIe Riser Module 10



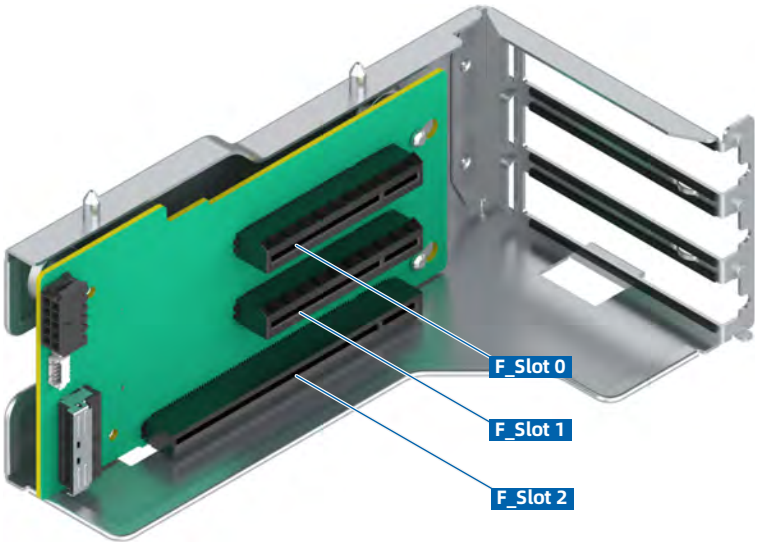

- PCIe Riser Module 11 (with 2 PCIe x8 slots and 1 PCIe x16 slot)

Figure 5-47 PCIe Riser Module 11




- PCIe Riser Module 12 (with 2 PCIe x8 slots and 1PCIe x16 slot)

Figure 5-48 PCIe Riser Module 12




## 5.9.4 PCIe Slot Description

NOTE

When a CPU is absent, its corresponding PCIe slots are not available.

- Models with rear PCIe riser modules

Table 5-16 PCIe Slot Description - 8 × Rear PCIe Slot (1)

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 0 | CPU0 | PCIe 5.0 | x16 | x16 | PE2 | FHHL |
| Slot 1 | CPU0 | PCIe 5.0 | x16 | x16 | PE1 | Full-height 3/4-length |
| Slot 2 | CPU0 | PCIe 5.0 | x16 | x16 | PE3 | Full-height 3/4-length |
| Slot 3[Note 1] | CPU1 | PCIe 5.0 | x16 | x16 | PE1 | FHHL |
| Slot 4 | CPU1 | PCIe 5.0 | x16 | x16 | PE2 | Full-height 3/4-length |
| Slot 5 | CPU0 | PCIe 5.0 | x16 | x16 | PE4 | Full-height 3/4-length |
| Slot 6 | CPU1 | PCIe 5.0 | x16 | x16 | PE3 | Full-height 3/4-length |
| Slot 7 | CPU1 | PCIe 5.0 | x16 | x16 | PE4 | Full-height 3/4-length |

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x16 | x16 | PE0 | Standard OCP 3.0 |
| OCP 3.0 Slot | CPU1 | PCIe 5.0 | x8/x16 | x8/x16 | PE0 | Standard OCP 3.0 |

Table 5-17 PCIe Slot Description - 8 × Rear PCIe Slot (2)

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 0 | CPU0 | PCIe 5.0 | x8 | x8 | PE2 | FHHL |
| Slot 1 | CPU0 | PCIe 5.0 | x8 | x8 | PE2 | Full-height 3/4-length |
| Slot 2 | CPU0 | PCIe 5.0 | x16 | x16 | PE1 | Full-height 3/4-length |
| Slot 3[Note 1] | CPU1 | PCIe 5.0 | x8 | x8 | PE1 | FHHL |
| Slot 4 | CPU1 | PCIe 5.0 | x8 | x8 | PE1 | Full-height 3/4-length |
| Slot 5 | CPU1 | PCIe 5.0 | x16 | x16 | PE2 | Full-height 3/4-length |
| Slot 6 | CPU1 | PCIe 5.0 | x8 | x8 | PE3 | Full-height 3/4-length |
| Slot 7 | CPU0 | PCIe 5.0 | x8 | x8 | PE3 | Full-height 3/4-length |
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x16 | x16 | PE0 | Standard OCP 3.0 |
| OCP 3.0 Slot | CPU1 | PCIe 5.0 | x8/x16 | x8/x16 | PE0 | Standard OCP 3.0 |

Table 5-18 PCIe Slot Description - 13 × Rear PCIe Slot

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 0 | CPU0 | PCIe 5.0 | x8 | x8 | PE2 | FHHL |
| Slot 1 | CPU0 | PCIe 5.0 | x8 | x8 | PE2 | Full-height 3/4-length |
| Slot 2 | CPU0 | PCIe 5.0 | x8 | x8 | PE1 | Full-height 3/4-length |
| Slot 3 | CPU0 | PCIe 5.0 | x8 | x8 | PE1 | HHHL |

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 4 | CPU0 | PCIe 5.0 | x8 | x8 | PE3 | Half-height 3/4-length |
| Slot 5 | CPU0 | PCIe 5.0 | x8 | x8 | PE3 | Half-height 3/4-length |
| Slot 6 | CPU1 | PCIe 5.0 | x8 | x8 | PE0 | HHHL |
| Slot 7 | CPU1 | PCIe 5.0 | x8 | x8 | PE2 | Half-height 3/4-length |
| Slot 8 | CPU1 | PCIe 5.0 | x8 | x8 | PE2 | Half-height 3/4-length |
| Slot 9 | CPU1 | PCIe 5.0 | x8 | x8 | PE4 | Half-height 3/4-length |
| Slot 10 | CPU1 | PCIe 5.0 | x8 | x8 | PE4 | Half-height 3/4-length |
| Slot 11 | CPU1 | PCIe 5.0 | x8 | x8 | PE3 | Half-height 3/4-length |
| Slot 12 | CPU1 | PCIe 5.0 | x8 | x8 | PE3 | Half-height 3/4-length |
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x16 | x16 | PE0 | Standard OCP 3.0 |
| OCP 3.0 Slot | CPU1 | PCIe 5.0 | x8 | x8 | PE0 | Standard OCP 3.0 |

Table 5-19 PCIe Slot Description - 10 × Rear PCIe Slot

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 0 | CPU0 | PCIe 5.0 | x16 | x16 | PE2 | FHHL |
| Slot 1 | CPU0 | PCIe 5.0 | x16 | x16 | PE1 | Full-height 3/4-length |
| Slot 2 | CPU0 | PCIe 5.0 | x16 | x16 | PE3 | Full-height 3/4-length |
| Slot 3[Note 1] | CPU1 | PCIe 5.0 | x16 | x16 | PE1 | FHHL |
| Slot 4 | CPU1 | PCIe 5.0 | x16 | x16 | PE2 | Full-height 3/4-length |
| Slot 5 | CPU0 | PCIe 5.0 | x16 | x16 | PE4 | Full-height 3/4-length |
| Slot 6 | CPU1 | PCIe 5.0 | x8 | x8 | PE3 | Half-height 3/4-length |

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 7 | CPU1 | PCIe 5.0 | x8 | x8 | PE3 | Half-height 3/4-length |
| Slot 8 | CPU1 | PCIe 5.0 | x8 | x8 | PE4 | Half-height 3/4-length |
| Slot 9 | CPU1 | PCIe 5.0 | x8 | x8 | PE4 | Half-height 3/4-length |
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x16 | x16 | PE0 | Standard OCP 3.0 |
| OCP 3.0 Slot | CPU1 | PCIe 5.0 | x8/x16 | x8/x16 | PE0 | Standard OCP 3.0 |

Table 5-20 PCIe Slot Description - with Rear GPU Configured

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 0 | CPU0 | PCIe 5.0 | x16 | x16 | PE2 | FHHL |
| Slot 3[Note 1] | CPU1 | PCIe 5.0 | x16 | x16 | PE1 | FHHL |
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x16 | x16 | PE0 | Standard OCP 3.0 |
| OCP 3.0 Slot | CPU1 | PCIe 5.0 | x8/x16 | x8/x16 | PE0 | Standard OCP 3.0 |

Note 1: This slot is unavailable for KR2280-X2-C0-R0-00.

- Model with front PCIe riser modules

Table 5-21 PCIe Slot Description - Front I/O

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| F_Slot 0 | CPU0 | PCIe 5.0 | x8 | x8 | PE3 | FHHL |
| F_Slot 1 | CPU0 | PCIe 5.0 | x8 | x8 | PE3 | FHHL |
| F_Slot 2 | CPU0 | PCIe 5.0 | x16 | x16 | PE1 | FHHL |
| F_Slot 3 | CPU1 | PCIe 5.0 | x16 | x16 | PE4 | FHHL |
| F_Slot 4 | CPU1 | PCIe 5.0 | x16 | x16 | PE3 | FHHL |
| F_Slot 5 | CPU1 | PCIe 5.0 | x16 | x16 | PE2 | FHHL |
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x16 | x16 | PE4 | Standard OCP 3.0 |

## 5.10 PSUs

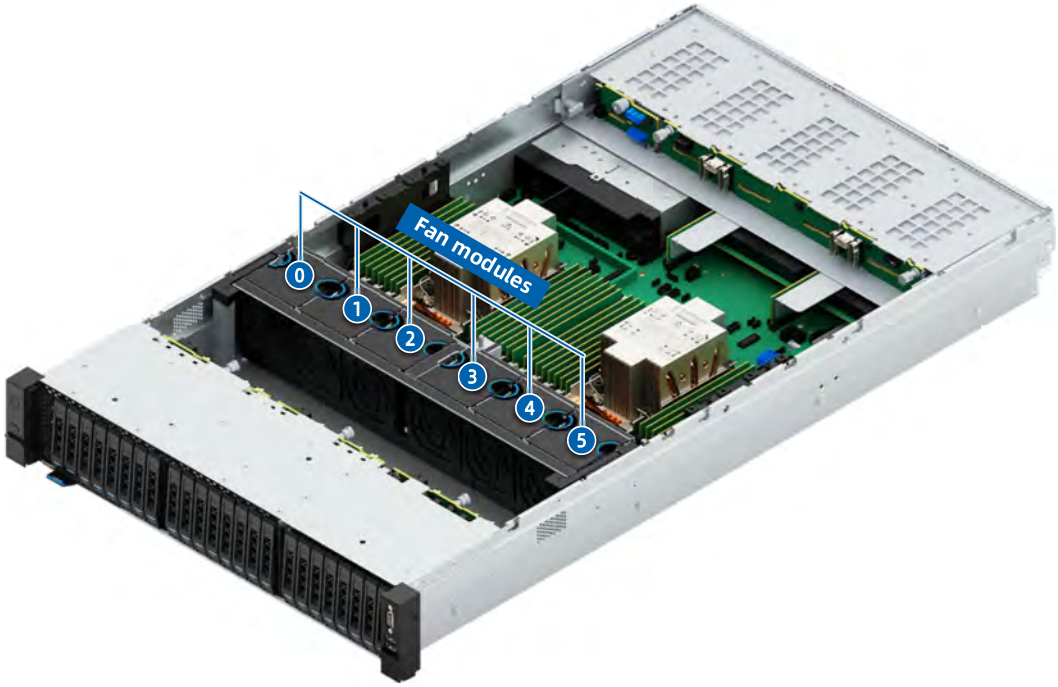
- The server supports 1 or 2 PSUs.
- The server supports AC or DC power input.
- The PSUs are hot-swappable.
- The server supports 2 PSUs in 1+1 redundancy.
- The server must use PSUs with the same part number (P/N code).
- The PSUs provide short circuit protection.

Figure 5-49 PSU Locations


## 5.11 Fan Modules

- The server supports 6 fan modules. Users can select 6038 or 6056 fans based on the configuration.
  - The 6056 fans support N+1 redundancy, which means that the server can continue working properly when a single fan fails.
  - The 6038 fans does not support redundancy.
- The fan modules are hot-swappable.
- The server supports intelligent fan speed control.
- The server must use fan modules with the same part number (P/N code).

Figure 5-50 Fan Module Locations




# 5.12 LCD Module

## 5.12.1 Function

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

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

## 5.12.2 Mobile Management Software ISMM

As mobile management software, ISMM reads server-related information from the BMC via the LCD module, including the operating status of processors and memories, network status, logs, and alerts, and transmits the information to client mobile terminals via Bluetooth. ISMM facilitates the O&M personnel to inspect and maintain the server and delivers more comprehensive server management capabilities.

Table 5-22 Basic Features of ISMM

| Feature | Item |
|---|---|
| Basic Information | Host name |
| | IP address |
| | Asset label |
| | Product serial number |
| | Product model |
| | All CPU models |
| | Total memory capacity (GB) |
| | Firmware version<br>Note:<br>BMC/BIOS/ME/CPLD version |
| | Status<br>(Power-on/power-off/processor/memory/hard disk/fan/power, etc.) |
| Hardware Device | Processor |
| | Memory |
| | Device list |
| | Power |
| Health | Processor |
| | Memory |
| | Hard disk |
| | Network |
| | Power consumption |
| | Power |
| | Fan |
| | Temperature |
| | Voltage |
| | GPU |
| Warning | No. |
| | Item |
| | Status |
| | Time |
| Network Conditions | LAN interface type |
| | MAC address |

| Feature | Item | |
|---|---|---|
| | IPv4 configuration | IPv4 address |
| | | Subnet mask |
| | | IPv4 default gateway |
| | IPv6 configuration | IPv6 address |
| | | Subnet mask |
| | | IPv6 default gateway |
| Log | Logs | |
| Service Support | Service support (hotline and official website) | |

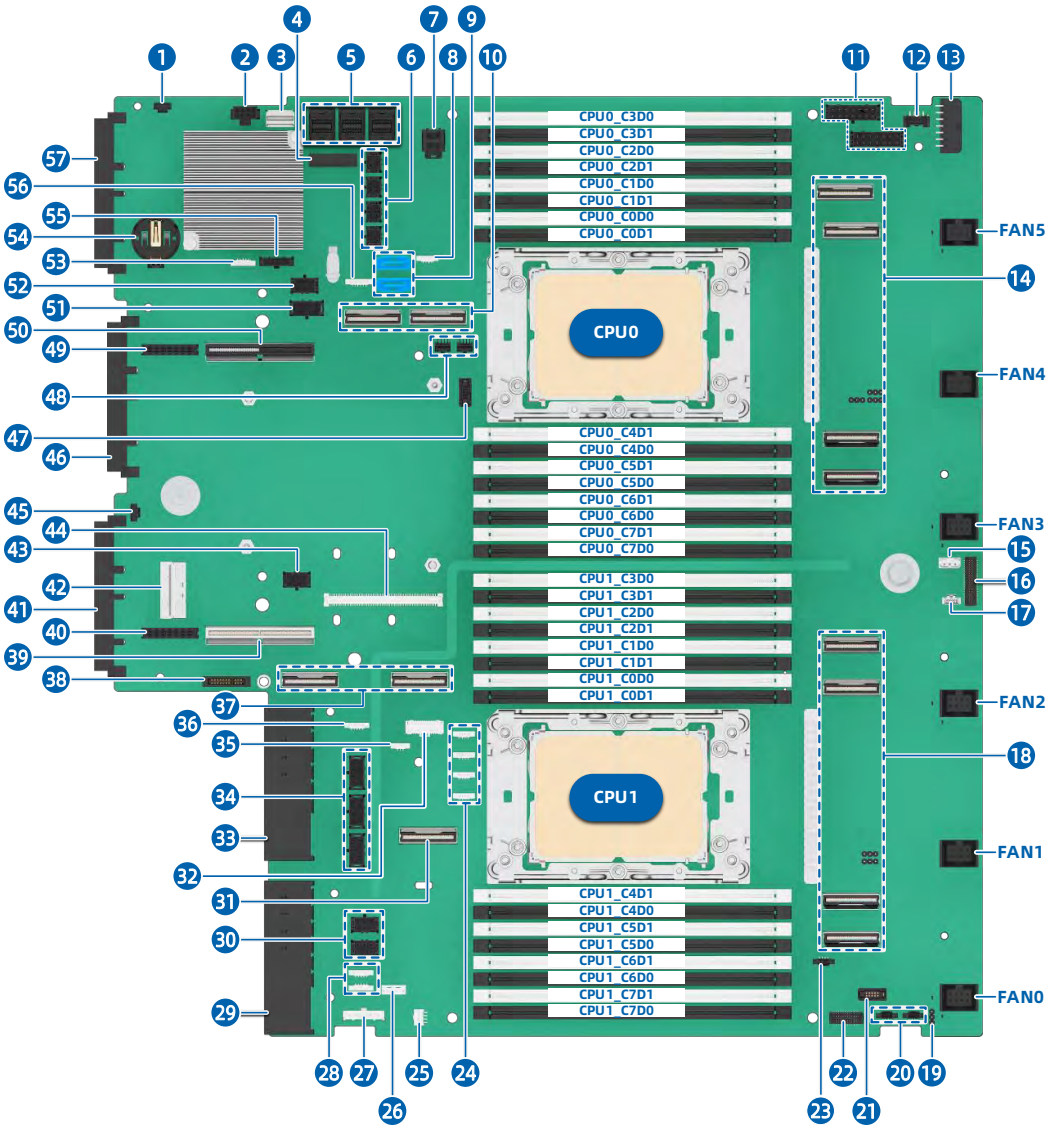
# 5.13 Boards

## 5.13.1 Motherboard

NOTE

- Motherboard 1 (with 1 RAID mezz connector) applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-A0-F0-00.
- Motherboard 2 (with 2 M.2 connectors) applicable model: KR2280-X2-A0-R0-00, KR2280-X2-C0-R0-00, and KR2280-X2-A0-F0-00.

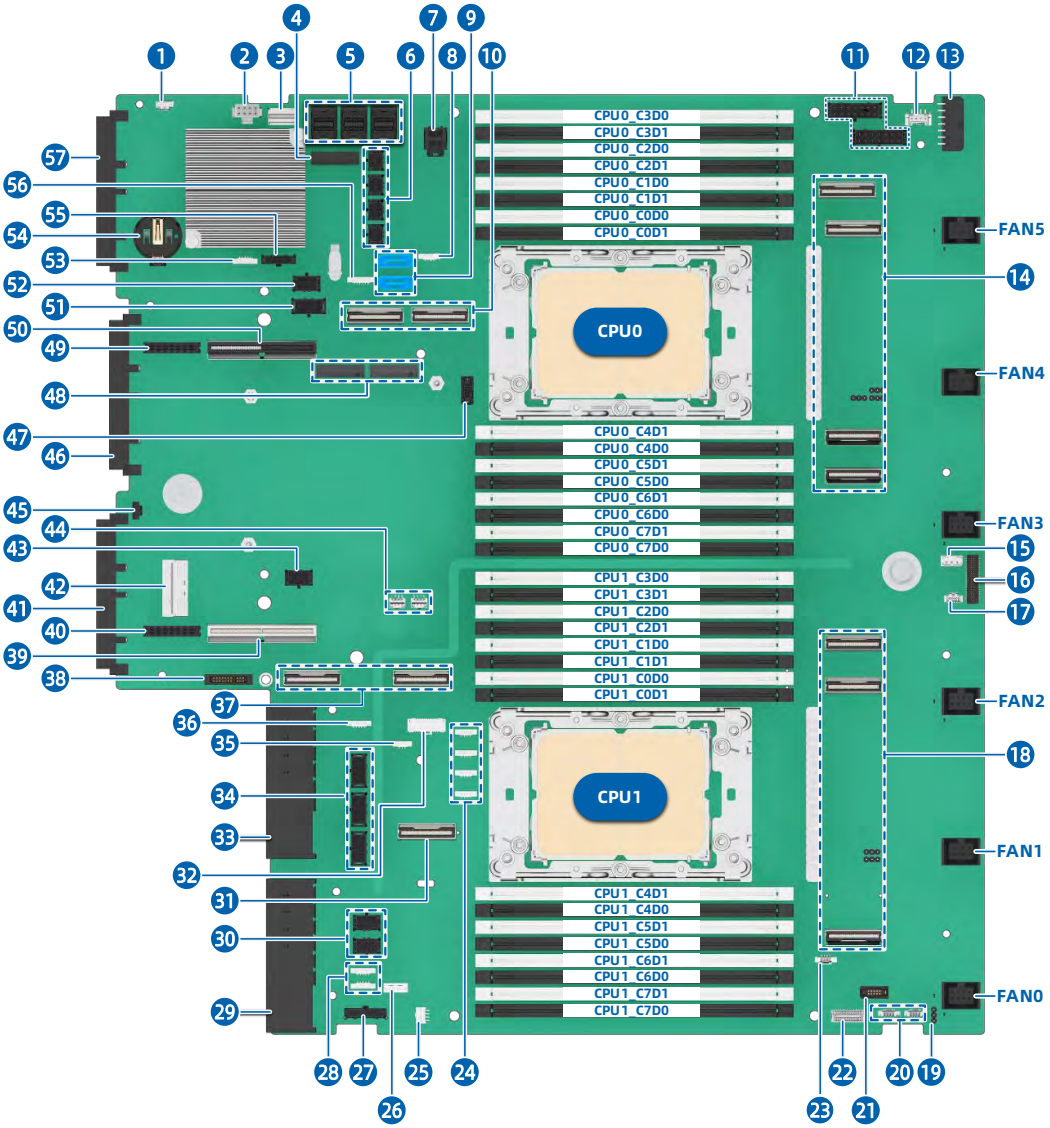
Figure 5-51 Motherboard 1




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | OCP 3.0_0 Button & LED Connector | 2 | Mid-Drive Power Connector |
| 3 | Right Control Panel Connector | 4 | SYS_TF Connector |
| 5 | Mini SAS Connector × 3 | 6 | Rear Drive Backplane Power Connector × 4 |
| 7 | Front OCP Power Connector | 8 | $I^2C$ Connector |
| 9 | SATA Connector × 2 | 10 | MCIO x8 Connector (CPU0) × 2 |
| 11 | Front Drive Backplane Power Connector × 2 | 12 | Sensor Connector |
| 13 | Front Drive Backplane Power Connector | 14 | MCIO x8 Connector (CPU0) × 4 |

| Item | Feature | Item | Feature |
|---|---|---|---|
| 15 | Intrusion Detection Connector | 16 | OCP2 Sideband Connector |
| 17 | OCP 3.0_2 Button & LED Connector | 18 | MCIO x8 Connector (CPU1) × 4 |
| 19 | CMOS Jumper | 20 | Backplane $I^2C$ Connector × 2 |
| 21 | VPP Connector | 22 | Left Control Panel Connector |
| 23 | Backplane $I^2C$ Connector | 24 | Backplane $I^2C$ Connector × 4 |
| 25 | IPMB Connector | 26 | RAID Key Connector |
| 27 | Capacitor Board Power Connector | 28 | $I^2C$ Connector × 2 |
| 29 | PSU1 Connector | 30 | GPU_Riser Power Connector × 2 |
| 31 | MCIO x8 Connector (CPU1) | 32 | NC-SI Connector |
| 33 | PSU0 Connector | 34 | GPU Power Connector × 3 |
| 35 | Smart NIC UART Connector | 36 | $I^2C$ Connector |
| 37 | MCIO x8 Connector (CPU1) × 2 | 38 | Riser Power Connector |
| 39 | MCIO x16 Connector (CPU1) | 40 | Riser Power Connector |
| 41 | OCP 3.0 Connector | 42 | OCP 3.0 MCIO Connector (CPU1) |
| 43 | GPU_Riser Power Connector | 44 | OCPA Connector (CPU0) |
| 45 | OCP 3.0_1 Button & LED Connector | 46 | DC-SCM Board Connector |
| 47 | VPP Connector | 48 | Leak Detection Connector × 2 |
| 49 | Riser Power Connector | 50 | MCIO x16 Connector (CPU0) |
| 51 | GPU0 Power Connector | 52 | GPU_Riser Power Connector |
| 53 | $I^2C$ Connector | 54 | Button Cell Battery Socket |
| 55 | Smart NIC Power Connector | 56 | SGPIO Connector |
| 57 | OCP 3.0 Connector | - | - |

Figure 5-52 Motherboard 2




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | OCP 3.0_0 Button & LED Connector | 2 | Mid-Drive Power Connector |
| 3 | Right Control Panel Connector | 4 | SYS_TF Connector |
| 5 | Mini SAS Connector × 3 | 6 | Rear Drive BP Power Connector × 4 |
| 7 | Front OCP Power Connector | 8 | $I^2C$ Connector |
| 9 | SATA Connector × 2 | 10 | MCIO x8 Connector (CPU0) × 2 |
| 11 | Front Drive Backplane Power Connector × 2 | 12 | Sensor Connector |
| 13 | Front Drive Backplane Power Connector | 14 | MCIO x8 Connector (CPU0) × 4 |

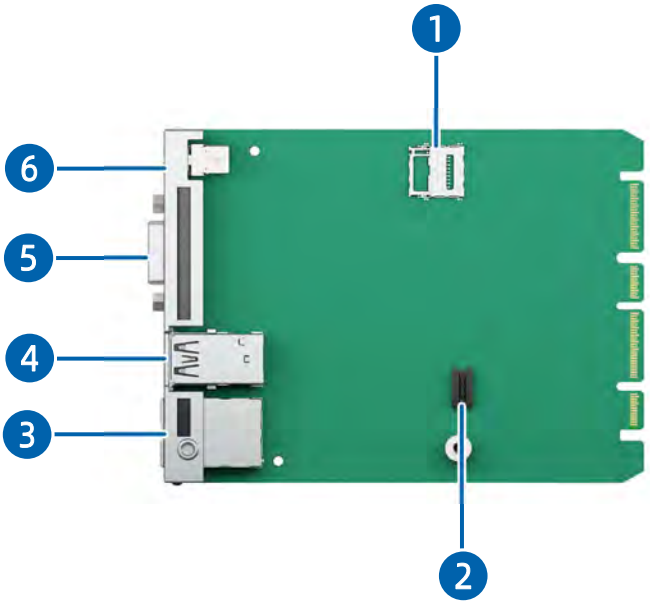
| Item | Feature | Item | Feature |
|---|---|---|---|
| 15 | Intrusion Detection Connector | 16 | OCP2 Sideband Connector |
| 17 | OCP 3.0_2 Button & LED Connector | 18 | MCIO x8 Connector (CPU1) × 4 |
| 19 | CMOS Jumper | 20 | Backplane I²C Connector × 2 |
| 21 | VPP Connector | 22 | Left Control Panel Connector |
| 23 | Backplane I²C Connector | 24 | Backplane I²C Connector × 4 |
| 25 | IPMB Connector | 26 | RAID Key Connector |
| 27 | Capacitor Board Power Connector | 28 | I²C Connector × 2 |
| 29 | PSU1 Connector | 30 | GPU_Riser Power Connector × 2 |
| 31 | MCIO x8 Connector (CPU1) | 32 | NC-SI Connector |
| 33 | PSU0 Connector | 34 | GPU Power Connector × 3 |
| 35 | Smart NIC UART Connector | 36 | I²C Connector |
| 37 | MCIO x8 Connector (CPU1) × 2 | 38 | Riser Power Connector |
| 39 | MCIO x16 Connector (CPU1) | 40 | Riser Power Connector |
| 41 | OCP 3.0 Connector | 42 | OCP 3.0 MCIO Connector (CPU1) |
| 43 | GPU_Riser Power Connector | 44 | Leak Detection Connector × 2 |
| 45 | OCP 3.0_1 Button & LED Connector | 46 | DC-SCM Board Connector |
| 47 | VPP Connector | 48 | M.2 Connector × 2 |
| 49 | Riser Power Connector | 50 | MCIO x16 Connector (CPU0) |
| 51 | GPU0 Power Connector | 52 | GPU_Riser Power Connector |
| 53 | I²C Connector | 54 | Button Cell Battery Socket |
| 55 | Smart NIC Power Connector | 56 | SGPIO Connector |
| 57 | OCP 3.0 Connector | - | - |

### 5.13.2 DC-SCM Board

NOTE

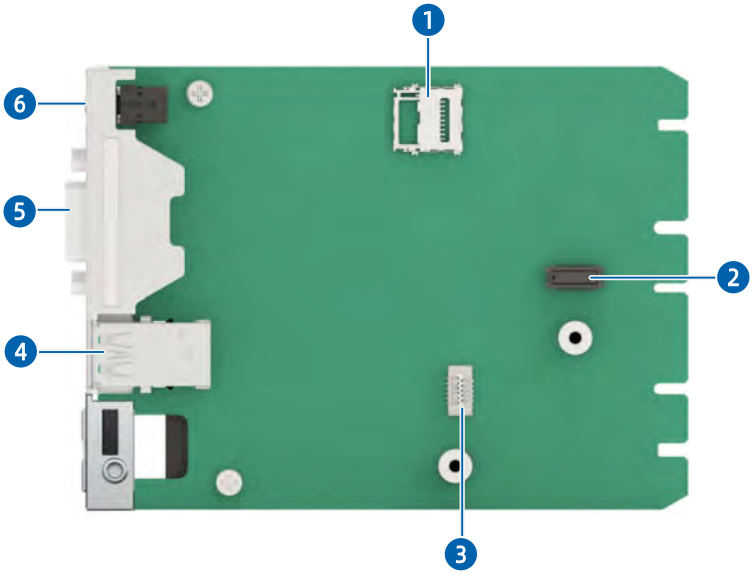
- DC-SCM Board 1 applicable model: KR2280-X2-A0-R0-00 and KR2280-X2-C0-R0-00.
- DC-SCM Board 2 applicable model: KR2280-X2-A0-F0-00.

Figure 5-53 DC-SCM Board 1




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

Figure 5-54 DC-SCM Board 2



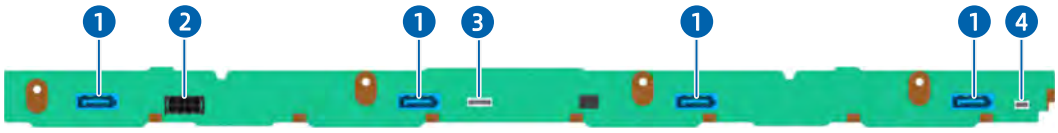

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | BMC TF Card Connector | 4 | USB 3.0 Port × 2 |

| Item | Feature | Item | Feature |
|---|---|---|---|
| 2 | BTB_PHY Connector | 5 | VGA Port |
| 3 | TPM/TCM Connector | 6 | UID/BMC RST Button and LED |

## 5.13.3 Drive Backplanes

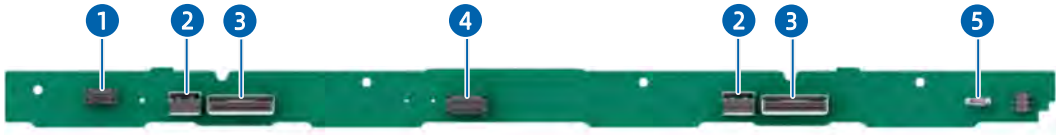
### 1. Front Drive Backplanes

Figure 5-55 4 × 3.5-Inch SAS/SATA Drive Backplane



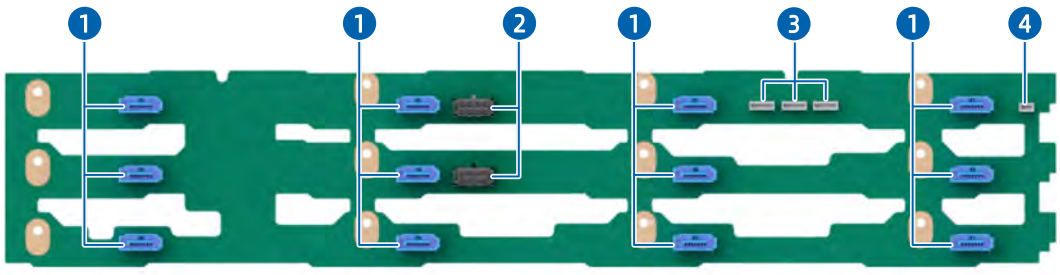

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | SATA Connector | 3 | SGPIO Connector |
| 2 | Power Connector | 4 | BMC_I²C Connector |

Figure 5-56 4 × 3.5-Inch SAS/SATA/NVMe Drive Backplane



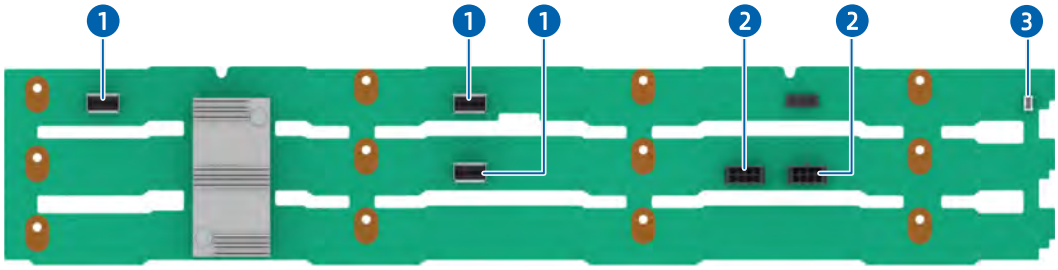

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | VPP Connector | 4 | Power Connector |
| 2 | Slimline x4 Connector | 5 | BMC_I²C Connector |
| 3 | MCIO x8 Connector | - | - |

Figure 5-57 12 × 3.5-Inch SAS/SATA Drive Backplane



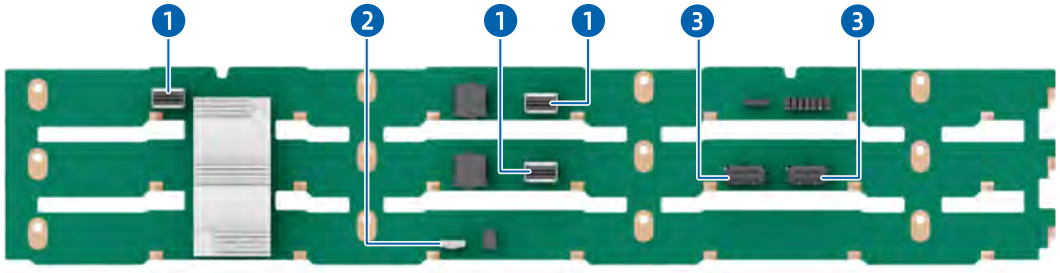
| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | SATA Connector | 3 | SGPIO Connector |
| 2 | Power Connector | 4 | BMC_I²C Connector |

Figure 5-58 12 × 3.5-Inch SAS/SATA Drive Backplane



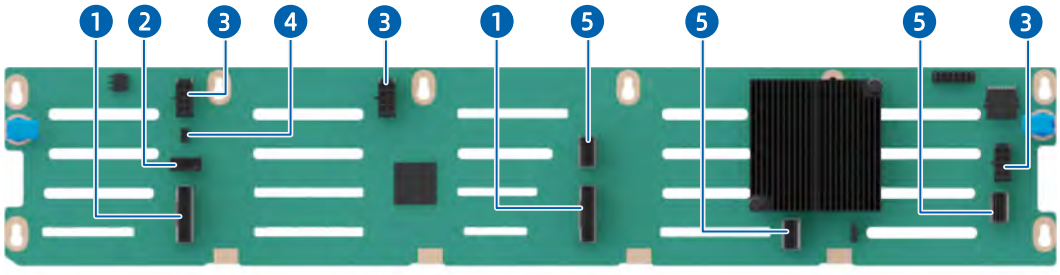

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Slimline x4 Connector | 3 | BMC_I²C Connector |
| 2 | Power Connector | - | - |

Figure 5-59 12 × 3.5-Inch SAS/SATA Drive Backplane



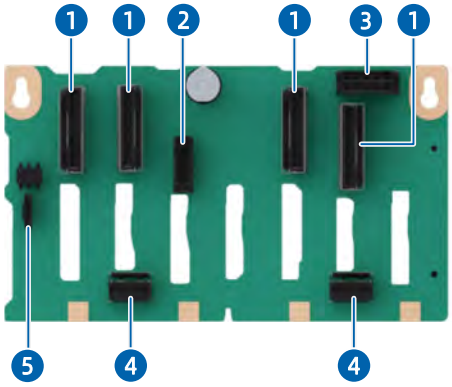

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Slimline x4 Connector | 3 | Power Connector |
| 2 | BMC_I²C Connector | - | - |

Figure 5-60 21 × 2.5-Inch SAS/SATA Drive + 4 × 2.5-Inch SAS/SATA/NVMe Drive Backplane



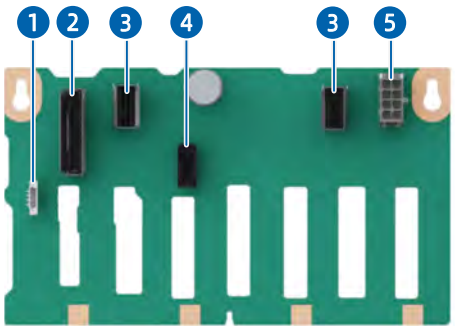
| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Slimline x8 Connector | 4 | BMC_I²C Connector |
| 2 | VPP Connector | 5 | Slimline x4 Connector |
| 3 | Power Connector | - | - |

Figure 5-61 8 × 2.5-Inch SAS/SATA/NVMe Drive Backplane



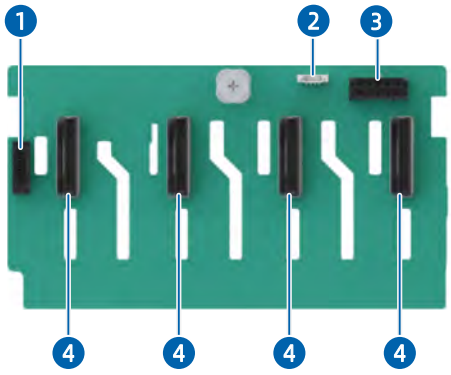

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | MCIO x8 Connector | 4 | Slimline x4 Connector |
| 2 | VPP Connector | 5 | BMC_I²C Connector |
| 3 | Power Connector | - | - |

Figure 5-62 6 × 2.5-Inch SAS/SATA Drive + 2 × 2.5-Inch SAS/SATA/NVMe Drive Backplane



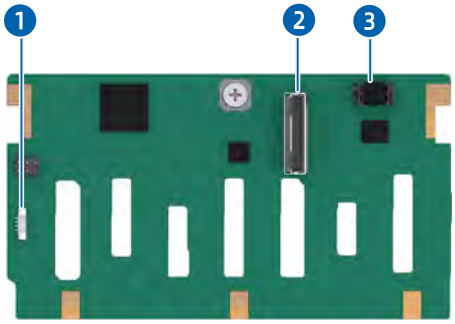

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | BMC_I²C Connector | 4 | VPP Connector |
| 2 | MCIO x8 Connector | 5 | Power Connector |
| 3 | Slimline x4 Connector | - | - |

Figure 5-63 8 × E3.S SSD Backplane



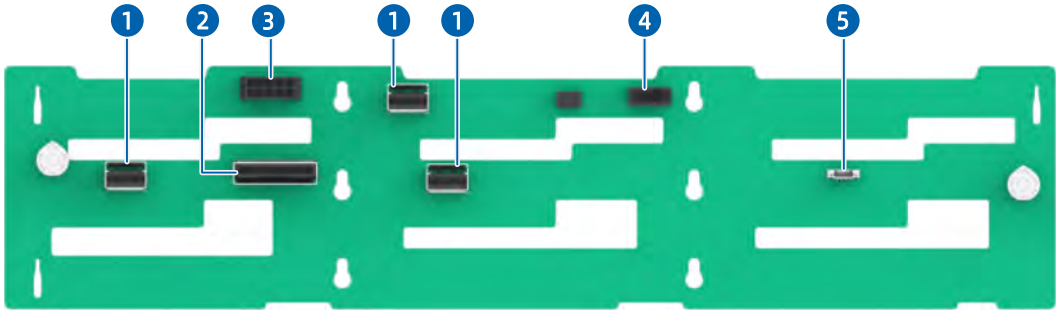

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | VPP Connector | 3 | Power Connector |
| 2 | BMC_I²C Connector | 4 | MCIO x8 Connector |

Figure 5-64 8 × NVMe Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | BMC_I²C Connector | 3 | Power Connector |
| 2 | MCIO x8 Connector | - | - |

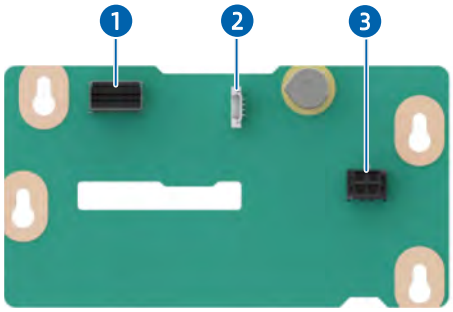
Figure 5-65 7 × 3.5-Inch SAS/SATA Drive + 2 × 3.5-Inch SAS/SATA/NVMe Drive Backplane



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

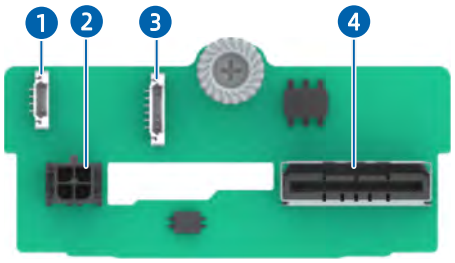
## 2. Rear Drive Backplanes

Figure 5-66 2 × 3.5-Inch SAS/SATA Drive Backplane



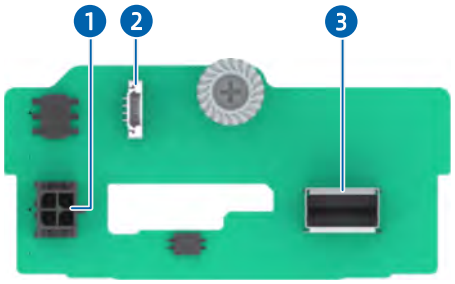

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Slimline x4 Connector | 3 | Power Connector |
| 2 | BMC_I²C Connector | - | - |

Figure 5-67 2 × 2.5-Inch NVMe Drive Backplane



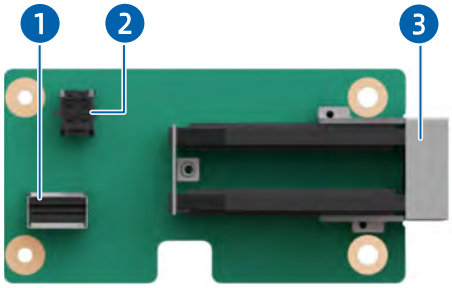

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | BMC_I²C Connector | 3 | VPP Connector |
| 2 | Power Connector | 4 | Slimline x8 Connector |

Figure 5-68 2 × 2.5-Inch SAS/SATA Drive Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Connector | 3 | Slimline x4 Connector |
| 2 | BMC_I²C Connector | - | - |

Figure 5-69 2 × M.2 SSD Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Slimline x4 Connector | 3 | M.2 Connector |
| 2 | Power Connector | - | - |

Figure 5-70 8 × 2.5-Inch SAS/SATA/NVMe Drive Backplane


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

# 6 Product Specifications

## 6.1 KR2280-X2-A0-R0-00

### 6.1.1 Technical Specifications

Table 6-1 Technical Specifications

| Item | Description |
| --- | --- |
| Form Factor | 2U rack server |
| Chipset | Intel C741 chipset |
| Processor | Supports 1 or 2 processors<br>• 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids)<br>• Integrated memory controllers and 8 memory channels per processor<br>• Integrated PCIe 5.0 controllers and 80 PCIe lanes per processor<br>• 4 UPI links per CPU at up to 20 GT/s per link<br>• Up to 64 cores per CPU<br>• Max. Turbo frequency up to 4.2 GHz<br>• L3 cache up to 5 MB per core<br>• TDP up to 385 W<br>Note:<br>The information above is for reference only. See 7.2 Hardware Compatibility for details. |
| Memory | Supports up to 32 DDR5 DIMMs<br>• RDIMMs supported<br>• Up to 5,600 MT/s (1 DPC)<br>• Up to 4,400 MT/s (2 DPC)<br>• Mixing DDR5 DIMMs of different specifications (capacity, bit width, rank, height, etc.) is not supported.<br>• A server must use DDR5 DIMMs with the same part number (P/N code).<br>Note:<br>The information above is for reference only. See 7.2 Hardware Compatibility for details. |

| Item | Description |
| --- | --- |
| Storage | • Front:<br>- 24 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 21 × 2.5-inch SAS/SATA drive (hot-swap) + 4 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 12 × 3.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 8 × 3.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 24 × E3.S SSD (hot-swap)<br>• Rear:<br>- 4 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 4 × 3.5-inch SAS/SATA drive (hot-swap) or<br>- 2 × SATA M.2 SSD or 2 × hot-swap E1.S SSD<br>• Internal:<br>- Up to 2 TF cards, one each for BIOS and BMC<br>- 4 × 3.5-inch SAS/SATA drive |
| Network | Provides multiple network expansion capabilities.<br>• OCP 3.0 cards:<br>- 2 dedicated slots for OCP 3.0 cards that can be selected as needed<br>- Balanced mode supported for the dual-CPU configuration<br>- NC-SI supported<br>- Hot-pluggable<br>- Multi-host supported (only by the OCP1 slot)<br>• 1/10/25/100/200 Gb PCIe NICs |
| I/O Expansion | Supports PCIe expansion slots.<br>• Up to 13 PCIe expansion slots and 2 dedicated slots for OCP 3.0 cards.<br>• For details, see 5.9.2 PCIe Slot Locations and 5.9.4 PCIe Slot Description. |
| Port | Supports multiple kinds of ports<br>• Front:<br>- 1 × USB 2.0/LCD port<br>- 1 × USB 3.0 port<br>- 1 × VGA port<br>- 1 × USB Type-C port (optional) |

| Item | Description |
| --- | --- |
| | • Rear:<br>- 2 × USB 3.0 port<br>- 1 × VGA port<br>- 1 × system/BMC serial port<br>- 1 × BMC management network port<br>Note:<br>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<br>Notes:<br>• 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.<br>• 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/Legacy<br>• BMC<br>• NC-SI<br>• KSManage<br>• KSManage Tools |
| Security | • Intel Platform Firmware Resilience (PFR)<br>• Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM)<br>• Intel Trusted Execution Technology<br>• Firmware update mechanism based on digital signatures<br>• UEFI Secure Boot<br>• Hierarchical BIOS password protection<br>• BIOS Secure Flash and BIOS Lock Enable (BLE)<br>• BMC and BIOS dual-image mechanism<br>• 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)<br>• Storage (packed): -40°C to 70°C (-40°F to 158°F)<br>• Storage (unpacked): -40°C to 55°C (-40°F to 131°F) |
| Relative Humidity (RH, non-condensing) | • Operating: 5% to 90% RH<br>• Storage (packed): 5% to 93% RH<br>• Storage (unpacked): 5% to 93% RH |
| Operating Altitude | ≤3,050 m (10,007 ft) |
| Corrosive Gaseous Contaminants | Maximum growth rate of corrosion film thickness:<br>• Copper coupon: 300 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)<br>• 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):<br>• Idle:<br>- LWAd: 6.7 Bels<br>- LpAm: 55 dBA<br>• Operating:<br>- LWAd: 7.2 Bels<br>- LpAm: 60 dBA |

Notes:

1. Not all configurations support an operating temperature range of 5°C to 45°C (41°F to 113°F). The GPU configuration supports an operating temperature range of 10°C to 30°C (50°F to 86°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 an altitude of 0 to 3,050 m (0 to 10,007 ft), derate the maximum allowable temperature by 1°C per 305 m (1°F per 556 ft). No direct sustained sunlight is permitted. The maximum

temperature gradient is 20°C/h (36°F/h). Both the altitude and the maximum temperature gradient vary by server configuration.

- Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

3. 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 by server configuration, workload, ambient temperature, 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 | • With mounting ears: 482.4 × 87 × 828.4 mm (18.99 × 3.43 × 32.61 in.) (W × H × D)<br>• Without mounting ears: 435 × 87 × 800 mm (17.13 × 3.43 × 31.50 in.) (W × H × D)<br>• Outer packaging dimensions: 600 × 295 × 1,090 mm (23.62 × 11.61 × 42.91 in.) (W × H × L) |
| Installation Dimension Requirements | • Installation requirements for the cabinet are as follows:<br>- General cabinet compliant with the International Electrotechnical Commission 297 (IEC 297) standard<br>- Width: 482.6 mm (19 in.)<br>- Depth: Above 1,000 mm (39.37 in.)<br>• Installation requirements for the server rails are as follows:<br>- L-bracket rails: only applicable to our cabinets |

| Item | Description |
| --- | --- |
| | - Static rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.).<br>- Ball-bearing slide rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.).<br>- When cable management arms (CMAs) are used, the cabinet depth should be no smaller than 1,200 mm (47.24 in.). |
| Weight | • 25 × 2.5-inch drive configuration (with all drives loaded)<br>- Net weight: 30 kg (66.14 lbs)<br>- Gross weight: 40 kg (88.18 lbs) (including server, packaging box, rails and accessory box)<br>• 24 × 2.5-inch drive configuration (with all drives loaded)<br>- Net weight: 27 kg (59.52 lbs)<br>- Gross weight: 37 kg (81.57 lbs) (including server, packaging box, rails and accessory box)<br>• 12 × 3.5-inch drive configuration (with all drives loaded)<br>- Net weight: 37 kg (81.57 lbs)<br>- Gross weight: 47 kg (103.62 lbs) (including server, packaging box, rails and accessory box)<br>Note:<br>The server weight varies by configuration. |

# 6.2 KR2280-X2-C0-R0-00

## 6.2.1 Technical Specifications

Table 6-4 Technical Specifications

| Item | Description |
| --- | --- |
| Form Factor | 2U rack server |
| Chipset | Intel C741 chipset |
| Processor | Supports 1 or 2 processors<br>• $4^{th}$/$5^{th}$ Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids) |

| Item | Description |
| --- | --- |
| | • Integrated memory controllers and 8 memory channels per processor<br>• Integrated PCIe 5.0 controllers and 80 PCIe lanes per processor<br>• 4 UPI links per CPU at up to 20 GT/s per link<br>• Up to 64 cores per CPU<br>• Max. Turbo frequency up to 4.2 GHz<br>• L3 cache up to 5 MB per core<br>• TDP up to 385 W<br>Note:<br>The information above is for reference only. See 7.2 Hardware Compatibility for details. |
| Memory | Supports up to 32 DDR5 DIMMs<br>• RDIMMs supported<br>• Up to 5,600 MT/s (1 DPC)<br>• Up to 4,400 MT/s (2 DPC)<br>• Mixing DDR5 DIMMs of different specifications (capacity, bit width, rank, height, etc.) is not supported.<br>• A server must use DDR5 DIMMs with the same part number (P/N code).<br>Note:<br>The information above is for reference only. See 7.2 Hardware Compatibility for details. |
| Storage | • Front:<br>- 24 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 21 × 2.5-inch SAS/SATA drive (hot-swap) + 4 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 12 × 3.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 8 × 3.5-inch SAS/SATA/NVMe drive (hot-swap)<br>• Rear: 2 × SATA M.2 SSD or 2 × hot-swap E1.S SSD<br>• Internal: Up to 2 TF cards, one each for BIOS and BMC |
| Network | Provides multiple network expansion capabilities.<br>• OCP 3.0 cards<br>- 2 dedicated slots for OCP 3.0 cards that can be selected as needed<br>- Balanced mode supported for the dual-CPU configuration |

| Item | Description |
| --- | --- |
| | - NC-SI supported<br>- Hot-pluggable<br>- Multi-host supported (only by the OCP1 slot)<br>• 1/10/25/100/200 Gb PCIe NICs |
| I/O Expansion | Supports PCIe expansion slots.<br>• Up to 9 standard PCIe expansion slots and 2 dedicated slots for OCP 3.0 cards.<br>• For details, see 5.9.2 PCIe Slot Locations and 5.9.4 PCIe Slot Description. |
| Cold Plate | • Material: copper<br>• Coolant: deionized water, PG25, etc.<br>• Coolant particle size (diameter): ≤50 μm<br>• Flow rate: 1 to 1.4 L/min per node, depending on the actual condition<br>• Inlet liquid temperature: <50°C (122°F)<br>Note:<br>Liquid temperature ≥ dew point temperature of the server room + 3°C (5.4°F), to ensure that no condensation occurs.<br>• Outlet liquid temperature: varying by the configuration<br>• Operating pressure: <50 psi<br>• Maximum transient pressure: 100 psi<br>• Quick disconnects: TSC/D-4Z02BSSJE |
| Port | Supports multiple kinds of ports<br>• Front:<br>- 1 × USB 2.0/LCD port<br>- 1 × USB 3.0 port<br>- 1 × VGA port<br>- 1 × USB Type-C port<br>• Rear:<br>- 2 × USB 3.0 port<br>- 1 × VGA port<br>- 1 × system/BMC serial port<br>- 1 × BMC management network port<br>- 1 × liquid inlet |

| Item | Description |
| --- | --- |
| | - 1 × liquid outlet<br>Note:<br>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<br>Notes:<br>• 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.<br>• 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/Legacy<br>• BMC<br>• NC-SI<br>• KSManage<br>• KSManage Tools |
| Security | • Intel Platform Firmware Resilience (PFR)<br>• Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM)<br>• Intel Trusted Execution Technology<br>• Firmware update mechanism based on digital signatures<br>• UEFI Secure Boot<br>• Hierarchical BIOS password protection<br>• BIOS Secure Flash and BIOS Lock Enable (BLE)<br>• BMC and BIOS dual-image mechanism<br>• 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)<br>• Storage (packed): -40°C to 70°C (-40°F to 158°F)<br>• Storage (unpacked): -40°C to 55°C (-40°F to 131°F) |

| Item | Description |
|---|---|
| Relative Humidity (RH, non-condensing) | • Operating: 5% to 90% RH<br>Note:<br>No condensation is allowed on any component.<br>• Storage (packed): 5% to 93% RH<br>• Storage (unpacked): 5% to 93% RH |
| Operating Altitude | ≤3,050 m (10,007 ft) |
| Corrosive Gaseous Contaminants | Maximum growth rate of corrosion film thickness:<br>• Copper coupon: 300 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)<br>• 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):<br>• Idle:<br>- LWAd: 6.7 Bels<br>- LpAm: 49.0 dBA<br>• Operating:<br>- LWAd: 7.2 Bels<br>- LpAm: 53 dBA |

Notes:

1. Not all configurations support an operating temperature range of 5°C to 45°C (41°F to 113°F). The GPU configuration supports an operating temperature range of 10°C to 30°C (50°F to 86°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 an altitude of 0 to 3,050 m (0 to 10,007 ft), derate the maximum allowable temperature by 1°C per 305 m (1°F per 556 ft). No direct sustained sunlight is permitted. The maximum temperature gradient is 20°C/h (36°F/h). Both the altitude and the maximum temperature gradient vary by server configuration.
   - Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.
3. 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 by server configuration, workload, ambient temperature, 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 | • With mounting ears: 482.4 × 87 × 828.4 mm (18.99 × 3.43 × 32.61 in.) (W × H × D)<br>• Without mounting ears: 435 × 87 × 800 mm (17.13 × 3.43 × 31.50 in.) (W × H × D)<br>• Outer packaging dimensions: 600 × 295 × 1,090 mm (23.62 × 11.61 × 42.91 in.) (W × H × L) |
| Installation Dimension Requirements | • Installation requirements for the cabinet are as follows:<br>- General cabinet compliant with the International Electrotechnical Commission 297 (IEC 297) standard<br>- Width: 482.6 mm (19 in.)<br>- Depth: Above 1,000 mm (39.37 in.)<br>• Installation requirements for the server rails are as follows:<br>- L-bracket rails: only applicable to our cabinets<br>- Static rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.).<br>- Ball-bearing slide rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.). |

| Item | Description |
| --- | --- |
| | - When cable management arms (CMAs) are used, the cabinet depth should be no smaller than 1,200 mm (47.24 in.). |
| Weight | • 25 × 2.5-inch drive configuration (with all drives loaded)<br>- Net weight: 30 kg (66.14 lbs)<br>- Gross weight: 40 kg (88.18 lbs) (including server, packaging box, rails and accessory box)<br>• 24 × 2.5-inch drive configuration (with all drives loaded)<br>- Net weight: 27 kg (59.52 lbs)<br>- Gross weight: 37 kg (81.57 lbs) (including server, packaging box, rails and accessory box)<br>• 12 × 3.5-inch drive configuration (with all drives loaded)<br>- Net weight: 37 kg (81.57 lbs)<br>- Gross weight: 47 kg (103.62 lbs) (including server, packaging box, rails and accessory box)<br>Note:<br>The server weight varies by configuration. |

# 6.3 KR2280-X2-A0-F0-00

## 6.3.1 Technical Specifications

Table 6-7 Technical Specifications

| Item | Description |
| --- | --- |
| Form Factor | 2U rack server |
| Chipset | Intel C741 chipset |
| Processor | Supports 1 or 2 processors<br>• 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids)<br>• Integrated memory controllers and 8 memory channels per processor<br>• Integrated PCIe 5.0 controllers and 80 PCIe lanes per processor<br>• 4 UPI links per CPU at up to 20 GT/s per link<br>• Up to 64 cores per CPU<br>• Max. Turbo frequency up to 4.2 GHz |

| Item | Description |
| --- | --- |
| | • L3 cache up to 5 MB per core<br>• TDP up to 385 W<br>Note:<br>The information above is for reference only. See 7.2 Hardware Compatibility for details. |
| Memory | Supports up to 32 DDR5 DIMMs<br>• RDIMMs supported<br>• Up to 5,600 MT/s (1 DPC)<br>• Up to 4,400 MT/s (2 DPC)<br>• Mixing DDR5 DIMMs of different specifications (capacity, bit width, rank, height, etc.) is not supported.<br>• A server must use DDR5 DIMMs with the same part number (P/N code).<br>Note:<br>The information above is for reference only. See 7.2 Hardware Compatibility for details. |
| Storage | • Front:<br>- 16 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 8 × 2.5-inch SAS/SATA/NVMe drive (hot-swap) or<br>- 7 × 3.5-inch SAS/SATA drive + 2 × 3.5-inch SAS/SATA/NVMe drive (hot-swap)<br>• Internal:<br>- Up to 2 TF cards, one each for BIOS and BMC<br>- 2 × SATA M.2 SSD |
| Network | Provides multiple network expansion capabilities.<br>• Up to 1 hot-plug OCP 3.0 card<br>• 1/10/25/100/200 Gb PCIe NICs |
| I/O Expansion | Supports PCIe expansion slots.<br>• Front: 6 FHHL PCIe 5.0 expansion slots and 1 dedicated slot for one OCP 3.0 card.<br>• For details, see 5.9.2 PCIe Slot Locations and 5.9.4 PCIe Slot Description. |
| Port | Supports multiple kinds of ports<br>• Front:<br>- 1 × USB 2.0/LCD port<br>- 1 × USB 3.0 port |

| Item | Description |
| --- | --- |
| | - 1 × VGA port<br>- 1 × BMC management network port<br>• Rear:<br>- 2 × USB 3.0 port<br>- 1 × VGA port<br>- 1 × system/BMC serial port<br>Note:<br>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<br>Notes:<br>• 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.<br>• 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/Legacy<br>• BMC<br>• NC-SI<br>• KSManage<br>• KSManage Tools |
| Security | • Intel Platform Firmware Resilience (PFR)<br>• Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM)<br>• Intel Trusted Execution Technology<br>• Firmware update mechanism based on digital signatures<br>• UEFI Secure Boot<br>• Hierarchical BIOS password protection<br>• BIOS Secure Flash and BIOS Lock Enable (BLE)<br>• BMC and BIOS dual-image mechanism<br>• Chassis intrusion detection |

## 6.3.2 Environmental Specifications

Table 6-8 Environmental Specifications

| Item | Description |
|---|---|
| Temperature[1,2,3] | • Operating: 5°C to 45°C (41°F to 113°F)<br>• Storage (packed): -40°C to 70°C (-40°F to 158°F)<br>• Storage (unpacked): -40°C to 55°C (-40°F to 131°F) |
| Relative Humidity (RH, non-condensing) | • Operating: 5% to 90% RH<br>• Storage (packed): 5% to 93% RH<br>• Storage (unpacked): 5% to 93% RH |
| Operating Altitude | ≤3,050 m (10,007 ft) |
| Corrosive Gaseous Contaminants | Maximum growth rate of corrosion film thickness:<br>• Copper coupon: 300 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)<br>• 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):<br>• Idle:<br>- LWAd: 6.7 Bels<br>- LpAm: 55 dBA<br>• Operating:<br>- LWAd: 7.2 Bels<br>- LpAm: 60 dBA |

Notes:

1. Not all configurations support an operating temperature range of 5°C to 45°C (41°F to 113°F). The GPU configuration supports an operating temperature range of 10°C to 30°C (50°F to 86°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 an altitude of 0 to 3,050 m (0 to 10,007 ft), derate the maximum allowable temperature by 1°C per 305 m (1°F per 556 ft). No direct sustained sunlight is permitted. The maximum

temperature gradient is 20°C/h (36°F/h). Both the altitude and the maximum temperature gradient vary by server configuration.

- Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

3. 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 by server configuration, workload, ambient temperature, 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.

## 6.3.3 Physical Specifications

Table 6-9 Physical Specifications

| Item | Description |
| --- | --- |
| Dimensions | • With mounting ears: 482.4 × 87 × 828.4 mm (18.99 × 3.43 × 32.61 in.) (W × H × D)<br>• Without mounting ears: 435 × 87 × 800 mm (17.13 × 3.43 × 31.50 in.) (W × H × D)<br>• Outer packaging dimensions: 600 × 295 × 1,090 mm (23.62 × 11.61 × 42.91 in.) (W × H × L) |
| Installation Dimension Requirements | • Installation requirements for the cabinet are as follows:<br>- General cabinet compliant with the International Electrotechnical Commission 297 (IEC 297) standard<br>- Width: 482.6 mm (19 in.)<br>- Depth: Above 1,000 mm (39.37 in.)<br>• Installation requirements for the server rails are as follows:<br>- L-bracket rails: only applicable to our cabinets |

| Item | Description |
| --- | --- |
| | - Static rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.).<br>- Ball-bearing slide rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.).<br>- When cable management arms (CMAs) are used, the cabinet depth should be no smaller than 1,200 mm (47.24 in.). |
| Weight | • 9 × 3.5-inch drive configuration (with all drives loaded)<br>- Net weight: 28 kg (61.73 lbs)<br>- Gross weight: 38 kg (83.78 lbs) (including server, packaging box, rails and accessory box)<br>• 8 × 2.5-inch drive configuration (with all drives loaded)<br>- Net weight: 25 kg (55.12 lbs)<br>- Gross weight: 35 kg (77.16 lbs) (including server, packaging box, rails and accessory box) |

# 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 by the model. Contact your sales representatives for detailed hardware configurations during the pre-sales phase.
- The server performance is strongly influenced by application software, middleware and hardware. The subtle differences in them may lead to performance variation in the application and test software.
  - For requirements on the performance of specific application software, contact your sales representatives to confirm the detailed hardware and software configurations during the pre-sales phase.
  - For requirements on hardware performance consistency, define specific configuration requirements (for example, specific drive models, RAID cards, or firmware versions) during the pre-sales phase.

## 7.1 Supported Operating Systems

Table 7-1 Supported Operating Systems

| OS Version |
| --- |
| Red Hat Enterprise Linux 9.3 |
| Red Hat Enterprise Linux 9.0 |
| Red Hat Enterprise Linux 8.6 |
| SUSE Linux Enterprise Server 15.4 |
| SUSE Linux Enterprise Server 12.5 |
| Windows Server 2022 |
| Windows Server 2019 |
| VMware ESXi 8.0 |
| VMware ESXi 7.0 |

| |
|---|
| Ubuntu 22.04.01 |
| Oracle Linux 8.9 |
| Oracle Linux 9.3 |
| KeyarchOS 5.8 (RHCK) |
| KeyarchOS 5.8 (ANCK) |
| KeyarchOS 5.8 SP1 (RHCK) |
| KeyarchOS 5.8 SP1 (ANCK) |
| KeyarchOS 5.8 SP1 U2 (RHCK) |
| KeyarchOS 5.8 SP1 U2 (ANCK) |

# 7.2 Hardware Compatibility

## 7.2.1 CPU Specifications

The server supports up to two Intel Xeon Scalable processors (Sapphire Rapids) built on the Intel Eagle Stream platform.

Table 7-2 CPU Specifications

| Model | Cores | Threads | Base Frequency (GHz) | Max. Turbo Frequency (GHz) | Cache (MB) | TDP (W) |
|---|---|---|---|---|---|---|
| 6454S | 32 | 64 | 2.2 | 3.4 | 60 | 270 |
| 8470 | 52 | 104 | 2.0 | 3.8 | 105 | 350 |
| 6416H | 18 | 36 | 2.2 | 4.2 | 45 | 165 |
| 6418H | 24 | 48 | 2.1 | 4.0 | 60 | 185 |
| 6430 | 32 | 64 | 2.1 | 3.4 | 60 | 270 |
| 8480+ | 56 | 112 | 2.0 | 3.8 | 105 | 350 |
| 8462Y+ | 32 | 64 | 2.8 | 4.1 | 60 | 300 |
| 5418Y | 24 | 48 | 2.0 | 3.8 | 45 | 185 |
| 6434H | 8 | 16 | 3.7 | 4.1 | 22.5 | 195 |
| 8468 | 48 | 96 | 2.1 | 3.8 | 105 | 350 |
| 8454H | 32 | 64 | 2.1 | 3.4 | 82.5 | 270 |
| 8452Y | 36 | 72 | 2.0 | 3.2 | 67.5 | 300 |
| 8468V | 48 | 96 | 2.4 | 3.8 | 97.5 | 330 |
| 6442Y | 24 | 48 | 2.6 | 4.0 | 60 | 225 |
| 6438M | 32 | 64 | 2.2 | 3.7 | 60 | 205 |
| 6426Y | 16 | 32 | 2.5 | 4.1 | 37.5 | 185 |
| 5420+ | 28 | 56 | 2.0 | 4.1 | 52.5 | 205 |

| Model | Cores | Threads | Base Frequency (GHz) | Max. Turbo Frequency (GHz) | Cache (MB) | TDP (W) |
|---|---|---|---|---|---|---|
| 4410Y | 12 | 24 | 2.0 | 3.9 | 30 | 150 |
| 5415+ | 8 | 16 | 2.9 | 4.1 | 22.5 | 150 |
| 6438Y+ | 32 | 64 | 2.0 | 4.0 | 60 | 205 |
| 5416S | 16 | 32 | 2.0 | 4.0 | 30 | 150 |
| 4416+ | 20 | 40 | 2.0 | 3.9 | 37.5 | 165 |
| 6434 | 8 | 16 | 3.7 | 4.1 | 22.5 | 195 |
| 8458P | 44 | 88 | 2.7 | 3.8 | 82.5 | 350 |
| 6444Y | 16 | 32 | 3.6 | 4.0 | 45 | 270 |
| 6434 | 8 | 16 | 3.7 | 4.1 | 22.5 | 195 |
| 6448H | 32 | 64 | 2.4 | 4.1 | 60 | 250 |
| 8458P | 44 | 88 | 2.7 | 3.8 | 82.5 | 350 |
| 9462 | 32 | 64 | 2.7 | 3.5 | 75 | 350 |
| 8558 | 48 | 96 | 2.1 | 4.0 | 260 | 330 |
| 6530 | 32 | 64 | 2.1 | 4.0 | 160 | 270 |
| 4510 | 12 | 24 | 2.4 | 4.1 | 30 | 150 |
| 4509Y | 8 | 16 | 2.6 | 4.1 | 22.5 | 125 |
| 6542Y | 24 | 48 | 2.9 | 4.1 | 60 | 250 |
| 5520+ | 28 | 56 | 2.2 | 4.0 | 52.5 | 205 |
| 4516Y+ | 24 | 48 | 2.2 | 3.7 | 45 | 185 |
| 4514Y | 16 | 32 | 2.0 | 3.4 | 30 | 150 |
| 8592+ | 64 | 128 | 1.9 | 3.9 | 320 | 350 |
| 8580 | 60 | 120 | 2.0 | 4.0 | 300 | 350 |
| 8570 | 56 | 112 | 2.1 | 4.0 | 300 | 350 |
| 8568Y+ | 48 | 96 | 2.3 | 4.0 | 300 | 350 |
| 8592V_ | 64 | 128 | 2.0 | 3.9 | 320 | 330 |
| 8558P | 48 | 96 | 2.7 | 4.0 | 260 | 350 |
| 8562Y+ | 32 | 64 | 2.8 | 4.1 | 60 | 300 |
| 6548Y+ | 32 | 64 | 2.5 | 4.1 | 60 | 250 |
| 6544Y | 16 | 32 | 3.6 | 4.1 | 45 | 270 |
| 6534 | 8 | 16 | 3.9 | 4.2 | 22.5 | 195 |
| 6526Y | 16 | 32 | 2.8 | 3.9 | 37.5 | 195 |
| 6538Y+ | 32 | 64 | 2.2 | 4.0 | 60 | 225 |
| 5515+ | 8 | 16 | 3.2 | 4.1 | 22.5 | 165 |
| 6548N | 32 | 64 | 2.8 | 4.1 | 60 | 250 |
| 4510T | 12 | 24 | 2.0 | 3.7 | 30 | 115 |

## 7.2.2 DIMM Specifications

The server supports up to 32 DDR5 DIMMs. Each processor supports 8 memory channels with up to 2 DIMMs per channel. RDIMMs are supported.

Table 7-3 DIMM Specifications

| Type | Capacity (GB) | Frequency (MT/s) | Data Width | Organization |
|---|---|---|---|---|
| RDIMM | 16 | 4,800 | x80 | 1R x8 |
| RDIMM | 32 | 4,800 | x80 | 1R x4/2R x8 |
| RDIMM | 64 | 4,800 | x80 | 2R x4 |
| RDIMM | 96 | 4,800 | x80 | 2R x4 |
| RDIMM | 128 | 4,800 | x80 | 2S2R x4 |
| RDIMM | 16 | 5,600 | x80 | 1R x8 |
| RDIMM | 32 | 5,600 | x80 | 2R x8 |
| RDIMM | 64 | 5,600 | x80 | 2R x4 |

## 7.2.3 Drive Specifications

Table 7-4 HDD Specifications

| Type | Speed in rpm | Capacity | Max. Qty. |
|---|---|---|---|
| 3.5-Inch SATA HDD | 7.2k | 2 TB/4 TB/6 TB/8 TB/10 TB/12 TB/14 TB/16 TB/18 TB/20 TB | 20 |
| 3.5-Inch SAS HDD | 7.2k | 2 TB/4 TB/6 TB/8 TB/10 TB/12 TB/14 TB/16 TB/18 TB | 20 |
| 2.5-Inch SAS HDD | 10k | 600 GB/1.2 TB/1.8 TB/2.4 TB | 39 |
| | 15k | 600 GB/900 GB | 39 |

Table 7-5 SAS/SATA SSD Specifications

| Type | Capacity | Max. Qty. |
|---|---|---|
| SATA SSD | 240 GB | 39 |
| SATA SSD | 480 GB | 39 |
| SATA SSD | 960 GB | 39 |
| SATA SSD | 1.9 TB | 39 |
| SATA SSD | 3.8 TB | 39 |
| SAS SSD | 960 GB | 39 |
| SAS SSD | 1.9 TB | 39 |
| SAS SSD | 3.8 TB | 39 |

Table 7-6 U.2 NVMe SSD Specifications

| Type | Capacity | Max. Qty. |
|---|---|---|
| U.2 NVMe SSD | 960 GB | 34 |
| U.2 NVMe SSD | 1.6 TB | 34 |
| U.2 NVMe SSD | 1.92 TB | 34 |
| U.2 NVMe SSD | 3.2 TB | 34 |
| U.2 NVMe SSD | 3.84 TB | 34 |
| U.2 NVMe SSD | 6.4 TB | 34 |
| U.2 NVMe SSD | 7.68 TB | 34 |
| U.2 NVMe SSD | 12.8 TB | 34 |
| U.2 NVMe SSD | 15.36 TB | 34 |

Table 7-7 M.2 SSD Specifications

| Type | Capacity | Max. Qty. |
|---|---|---|
| M.2 SATA SSD | 240 GB | 2 |
| M.2 SATA SSD | 480 GB | 2 |
| M.2 SATA SSD | 960 GB | 2 |
| M.2 PCIe SSD | 960 GB | 2 |
| M.2 PCIe SSD | 1.9 TB | 2 |
| M.2 PCIe SSD | 3.8 TB | 2 |

Table 7-8 E3.S SSD Specifications

| Type | Capacity | Max. Qty. |
|---|---|---|
| E3.S SSD | 15.36 TB | 24 |
| E3.S SSD | 7.68 TB | 24 |
| E3.S SSD | 3.84 TB | 24 |

## 7.2.4 SAS/RAID Card Specifications

Table 7-9 SAS/RAID Card Specifications

| Type | Description |
|---|---|
| SAS Card | SAS Card_PM8222_PM8222_8_SAS3_PCIE |
| | SAS Card_PM8222_SmartHBA_8_SAS3_PCIE3 |
| | SAS Card_BRCM_8R0_9500-8i_SMSAS3_PCIE4 |

| Type | Description |
|---|---|
| | SAS Card_BRCM_16R0_9500-16i_SMSAS3_PCIE4 |
| RAID Card | RAID Card_L_8R0_9560-8i_4G_HDM12G_PCIE4 |
| | RAID Card_L_16R0_9560-16i_8GB_SMSAS3_PCIE4 |
| | RAID Card_9540-8i_Non_12Gbps |
| | RAID Card_9230-2i_Non_6Gbps_VSAN |
| | RAID Card_PM8204_RA_8_2GB_SAS3_PCIE3 |
| | RAID Card_PM8204_RA_8_4GB_SAS3_PCIE3 |
| | RAID Card_PM8254-8i_4G_24Gbps_GEN4-Mezz |
| | RAID Card_PM8254-8i_8G_24Gbps_GEN4-Mezz |

NOTE

- Mixing SAS/RAID cards from different manufacturers may cause drives to be out of order.
- If the front drives are connected to SAS/RAID cards and are used with rear M.2 drives directly connected to the PCH, the drive letter may go out of order.
- When more than one drive controller (including storage controllers such as onboard controllers and RAID cards) is configured, the drive letters may go out of order under the OS.

## 7.2.5 NIC Specifications

Table 7-10 OCP Card Specifications

| Type | Description | Speed (Gbps) | Port Qty. |
|---|---|---|---|
| OCP 3.0 Card | NIC_I_1G_I350T4_RJ_OCP3x4_4_XR | 1 | 4 |
| | NIC_IAG_Mozart_I350_1G_RJ_O3x4_4 | 1 | 4 |
| | NIC_IAG_A-M6_X710_10G_LC_O3x8_2_M7 | 10 | 2 |
| | NIC_I_25G_E810XXVDA2_LC_OCP3x8_2_XR | 25 | 2 |
| | NIC_Andes-M6_E810_25G_LC_OCP3x8_2 | 25 | 2 |
| | NIC_BRCM_25G_57414_LC_OCP3x8_2_XR | 25 | 2 |
| | NIC_IAG_Liszt_BCM_25G_LC_O3x8_2 | 25 | 2 |
| | NIC_M_100G_MCX623436AN_LC_OCP3x16_2_XR | 100 | 2 |
| | NIC_I_100G_E810CQDA2_LC_OCP3x16_2_XR_M7 | 100 | 2 |
| | NIC_M_200G_MCX623435AN_LC_OCP3x16_XR | 200 | 1 |

Table 7-11 PCIe NIC Specifications

| Type | Description | Speed (Gbps) | Port Qty. |
|---|---|---|---|
| PCIe NIC | NIC_Intel_W_I350-T2V2_RJ_PCI-E4X_1KM_Dual | 1 | 2 |
| | NIC_IAG_Vostok_I350_1G_RJ_P4-G2_4 | 1 | 4 |
| | NIC_I_10G_X710DA2_LC_PCIEx8_2_XR | 10 | 2 |
| | NIC_Vostok_X710_10G_LC_P8-G3_2_M7 | 10 | 2 |
| | NIC_I_10G_X710T2L_RJ_PCIEx8_2_XR_M7 | 10 | 2 |
| | NIC_SOLARFL_25G_9250_LC_PCIEx8_2_XR_PLUS | 25 | 2 |
| | NIC_M_25G_MCX631102AN_LC_PCIEx8_2_XR | 25 | 2 |
| | NIC_BROADCM_25G_57414_LC_PCIEx8_2_XR_42C | 25 | 2 |
| | NIC_M_25G_MCX512A-ACAT_LC_PCIEx8_2_XR | 25 | 2 |
| | NIC_IAG_A-M6_E810_25G_LC_P8-G4_2_M7 | 25 | 2 |
| | NIC_I_25G_E810XXVDA2_LC_PCIEx8_2_XR_M7 | 25 | 2 |
| | NIC_IAG_BCM57414_25G_LC_P8-G3_2 | 25 | 2 |
| | NIC_M_100G_MCX623106AN_LC_PCIEx16_2_XR | 100 | 2 |
| | NIC_I_100G_E810CQDA2_LC_PCIEx16_2_XR_M7 | 100 | 2 |
| | NIC_M_200G_MCX623105AN_LC_PCIEx16_XR | 200 | 1 |

## 7.2.6 GPU Specifications

Table 7-12 GPU Specifications

| Type | Description | Max. Qty. |
|---|---|---|
| GPU | GPU_NV_48G_NVIDIA-L40-PCIe4_384b_MP_S | 4 |
| | GPU_NV_80G_H100-PCIe5_5120b_MP | 4 |
| | GPU NV 24G NVIDIA-L4-PCIe4-LP 192b MP S | 8 |

## 7.2.7 PSU Specifications

The server supports up to 2 PSUs in 1+1 redundancy that follow the Intel Common Redundant Power Supply (CRPS) specification. The PSUs share a common electrical and structural design that allows for hot-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 to 230 Vac PSUs in 1+1 redundancy are supported:
  - 550 W Platinum PSU: 550 W (110 Vac ), 550 W (230 Vac)
  - 800 W Platinum PSU: 800 W (110 Vac), 800 W (230 Vac)
  - 1,300 W Platinum PSU: 1,000 W (110 Vac), 1,300 W (230 Vac)
  - 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)
  - 2,700 W Platinum PSU: 1,200 W (110 Vac), 2,700 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)
  - 2,700 W Titanium PSU: 1,200 W (110 Vac), 2,700 W (230 Vac)
  - 3,200 W Titanium PSU: 1,200 W (110 Vac), 3,200 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, and that of a 2,700/3,200 W PSU will be derated to 1,200 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

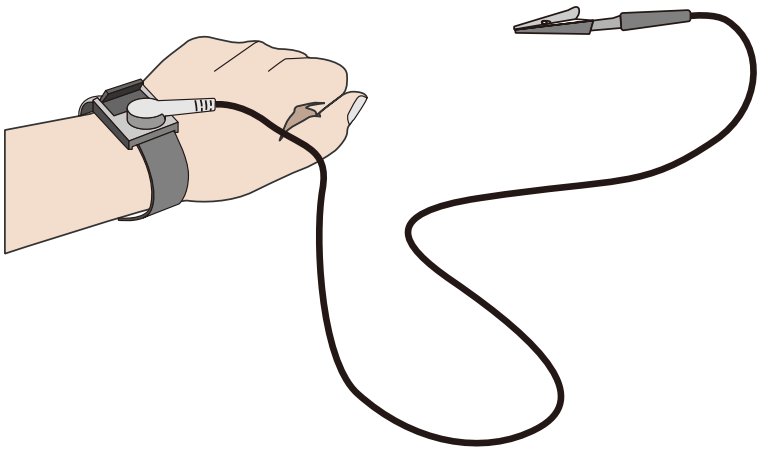
- Before touching the equipment, put on ESD clothes and ESD gloves or an ESD wrist strap, and remove any conductive objects such as wrist watches or metal jewelry, as shown in Figure 8-2, in order to avoid electric shock or burns.

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 |

| Organization | Weight Limit (kg/lbs) |
| --- | --- |
| General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) | • Male: 15/33.08<br>• 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:<br>• IPMI<br>• SMASH CLP<br>• SNMP<br>• HTTPS<br>• Web GUI<br>• Redfish<br>• RESTful<br>• 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 virtualizing local images, USB devices, and folders as media devices of remote servers, simplifying OS installation, file sharing, and other O&M tasks. |
| Virtual Network Console (VNC) | Supports mainstream third-party VNC clients without relying on Java, improving management flexibility. |
| Remote Virtual Media | Supports virtualizing images, USB devices, folders and local media devices 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.<br>• 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.<br>• 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.<br>• 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 and Remote Control of UID LED | • Supports remote lighting of the UID LED for locating the server in the server room.<br>• Supports remote control of UID LED. The UID LED blinks when a user remotely logs in via web, KVM, or SSH to inform the on-site personnel that an administrator is accessing the server. |
| 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<br>• 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. |

# 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 |

| Feature | Description |
| --- | --- |
| Assets | • Batch asset import, automatic asset discovery, and full lifecycle management of assets<br>• 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<br>• Management of our general-purpose disk arrays and distributed storage devices<br>• Management of network devices (switches, routers, etc.), security devices (firewalls, load balancers, etc.), cabinets and clouds<br>• Management of data centers<br>• 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<br>• Fault prediction of drives and memories<br>• Custom inspection plan and inspection result management<br>• Notification record viewing<br>• Intelligent fault diagnosis and analysis, automatic fault reporting and repair ticket viewing<br>• Trap management and Redfish management<br>• Management of monitoring rules, such as alert rules, notification rules, blocking rules, alert noise reduction rules, compression rules and fault reporting rules, and redefinition of above rules |
| Control | • Quick start of firmware update, OS installation, power management, drive data erasing and stress test<br>• Batch firmware update (BMC/BIOS/RAID Card/NIC/Drive/HBA Card/MB CPLD/BP CPLD/PSU)<br>• Batch firmware configuration (BMC/BIOS)<br>• Batch RAID configuration and OS deployment for servers<br>• Secure and quick drive data erasing<br>• CPU and memory stress test<br>• Automatic firmware baseline management<br>• BMC and BIOS snapshot management<br>• Repositories for update files |

| Feature | Description |
| --- | --- |
| Energy Efficiency | • Overview of data center power consumption trend chart and carbon emission trend chart<br>• Setting of server dynamic power consumption policies and minimum power consumption policies<br>• Carbon asset and carbon emission management |
| Log | • Fault log record management<br>• 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<br>• Network topologies |
| Reports | • Management of warranty information reports, alert reports, asset reports, hardware reports and performance reports<br>• Export of reports in .xlsx format |
| System | • Password management, alert forwarding and data dump<br>• 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 |

| Feature | Description |
| --- | --- |
| 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

## 11.1 KR2280-X2-A0-R0-00

Table 11-1 Certifications

| Country/Region | Certification | Mandatory/Voluntary |
|---|---|---|
| International | CB | Voluntary |
| EU | CE | Mandatory |
| US | FCC | Mandatory |
| | UL | Voluntary |
| | Energy Star | Voluntary |
| UK | CE | Mandatory |
| EAEU | EAC | Mandatory |
| | EAC RoHS | Mandatory |
| | FSS | Mandatory |
| India | BIS | Mandatory |
| Korea | E-Standby | Mandatory |
| | KC | Mandatory |
| Australia | RCM | Mandatory |
| Taiwan (China) | BSMI | Mandatory |
| Mexico | NOM | Mandatory |
| Egypt | NTRA | Mandatory |
| Saudi Arabia | SABER | Mandatory |
| Canada | IC | Mandatory |

## 11.2 KR2280-X2-C0-R0-00

Table 11-2 Certifications

| Country/Region | Certification | Mandatory/Voluntary |
|---|---|---|
| International | CB | Voluntary |
| EU | CE | Mandatory |
| US | FCC | Mandatory |
| | UL | Voluntary |
| | Energy Star | Voluntary |

| Country/Region | Certification | Mandatory/Voluntary |
|---|---|---|
| UK | CE | Mandatory |
| EAEU | EAC | Mandatory |
| | EAC RoHS | Mandatory |
| | FSS | Mandatory |
| India | BIS | Mandatory |
| Korea | E-Standby | Mandatory |
| | KC | Mandatory |
| Australia | RCM | Mandatory |
| Taiwan (China) | BSMI | Mandatory |
| Mexico | NOM | Mandatory |
| Egypt | NTRA | Mandatory |
| Saudi Arabia | SABER | Mandatory |
| Canada | IC | Mandatory |

## 11.3 KR2280-X2-A0-F0-00

Table 11-3 Certifications

| Country/Region | Certification | Mandatory/Voluntary |
|---|---|---|
| China | CCC | Mandatory |
| | CECP | Voluntary |
| | China Environmental Labelling | Voluntary |
| International | CB | Voluntary |
| EU | CE | Mandatory |
| US | FCC | Mandatory |
| | UL | Voluntary |
| | Energy Star | Voluntary |
| UK | CE | Mandatory |
| EAEU | EAC | Mandatory |
| | EAC RoHS | Mandatory |
| | FSS | Mandatory |
| India | BIS | Mandatory |
| Korea | E-Standby | Mandatory |
| | KC | Mandatory |
| Australia | RCM | Mandatory |
| Taiwan (China) | BSMI | Mandatory |

| Country/Region | Certification | Mandatory/Voluntary |
|---|---|---|
| Mexico | NOM | Mandatory |
| Egypt | NTRA | Mandatory |
| Saudi Arabia | SABER | Mandatory |
| Canada | IC | Mandatory |

# 12 Appendix A

## 12.1 Operating Temperature Specification Limits

### 12.1.1 KR2280-X2-A0-R0-00

Table 12-1 Operating Temperature Specification Limits

| 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) |
|---|---|---|---|---|
| 12 × 3.5-Inch Drive Config., Perforated Chassis | • 6056 fans<br>• CPU TDP ≤385 W<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• CPU TDP ≤385 W<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• 100 Gb OCP cards not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported |
| 12 × 3.5-Inch Drive Config., Non-perforated Chassis | • 6056 fans<br>• CPU TDP ≤385 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤330 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤270 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs 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) |
|---|---|---|---|---|
| 8 × 3.5-Inch Drive Config. | • 6056 fans<br>• CPU TDP ≤385 W<br>• GPUs supported | • 6056 fans<br>• CPU TDP ≤385 W<br>• GPUs supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤330 W<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤270 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported |
| 12 × 3.5-Inch Drive + Mid Drives Config. | • 6056 fans<br>• CPU TDP ≤270 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported<br>• Mid drives supported | • 6056 fans<br>• CPU TDP ≤270 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported<br>• Mid drives supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤270 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported<br>• Mid drives supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤270 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported<br>• Mid drives supported |
| 24 × 2.5-Inch Drive Config. | • 6056 fans<br>• CPU TDP ≤385 W<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• CPU TDP ≤385 W<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb 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) |
|---|---|---|---|---|
| | | | • PCIe NICs ≥100 Gb not supported<br>• GPUs not supported | • PCIe NICs ≥100 Gb not supported<br>• GPUs not supported |
| 16 × 2.5-Inch Drive Config. | • 6056 fans<br>• CPU TDP ≤385 W<br>• GPUs supported | • 6056 fans<br>• CPU TDP ≤385 W<br>• OCP cards ≥100 Gb not supported<br>• GPUs supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported<br>• GPUs supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs supported |
| 25 × 2.5-Inch Drive Config. | • 6056 fans<br>• CPU TDP ≤385 W<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• CPU TDP ≤385 W<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported |
| 4 × 3.5-Inch Drive (12-Drive Bay Chassis) Config. | • 6038 fans<br>• RDIMMs ≤32 GB<br>• CPU TDP ≤205 W<br>• OCP cards ≥25 Gb not supported<br>• PCIe NICs ≥25 Gb 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) |
|---|---|---|---|---|
| | • GPUs not supported | | | |
| 8 × 2.5-Inch Drive (24-Drive Bay Chassis) Config. | • 6038 fans<br>• RDIMMs ≤32 GB<br>• CPU TDP ≤205 W<br>• OCP cards ≥25 Gb not supported<br>• PCIe NICs ≥25 Gb not supported<br>• GPUs not supported | | | |

## 12.1.2 KR2280-X2-C0-R0-00

Table 12-2 Operating Temperature Specification Limits

| 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) |
|---|---|---|---|---|
| 12 × 3.5-Inch Drive Config. | • 6056 fans<br>• GPUs not supported | • 6056 fans<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported |
| 24 × 2.5-Inch Drive Config. | • 6056 fans<br>• GPUs not supported | • 6056 fans<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb 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) |
|---|---|---|---|---|
| | | | | • GPUs not supported |
| 25 × 2.5-Inch Drive Config. | • 6056 fans<br>• GPUs not supported | • 6056 fans<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported |
| 8 × 3.5-Inch Drive Config. | • 6056 fans<br>• GPUs supported | • 6056 fans<br>• GPUs supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported |
| 16 × 2.5-Inch Drive Config. | • 6056 fans<br>• GPUs supported | • 6056 fans<br>• GPUs supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• GPUs not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported<br>• GPUs not supported |

### 12.1.3 KR2280-X2-A0-F0-00

Table 12-3 Operating Temperature Specification Limits

| Config. | Max. Operating Temp. 35°C (95°F) | Max. Operating Temp. 40°C (104°F) | Max. Operating Temp. 45°C (113°F) |
|---|---|---|---|
| 3 × Front PCIe Expansion Card + 9 × Front 3.5-Inch Drive Config. | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤385 W | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported |
| 3 × Front PCIe Expansion Card + 16 × Front 2.5-Inch Drive Config. | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤385 W | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported |
| 6 × Front PCIe Expansion Card + 8 × Front 2.5-Inch Drive Config. | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤385 W | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported | • 6056 fans<br>• RDIMM ≤64 GB<br>• CPU TDP ≤350 W<br>• OCP cards ≥100 Gb not supported<br>• PCIe NICs ≥100 Gb not supported |

# 12.2 Models

Table 12-4 Models

| Certified Model | Description |
|---|---|
| KR2280-X2-A0-R0-00 | Global |
| KR2280-X2-C0-R0-00 | Global |
| KR2280-X2-A0-F0-00 | 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 12-5 Sensor List

| Sensor | Description | Sensor Location |
|---|---|---|
| Inlet_Temp | Air inlet temperature | Front control panel |
| Outlet_Temp | Air outlet temperature | Motherboard |
| PVCCIN_CPUx | CPUx core voltage | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| PVCCFA_FIVR_CPUx | UPI I/O voltage | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| PVCCINFAON_CPUx | CPUx boot voltage | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| PVCCFA_EHV_CPUx | Controller voltage | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| PVCCD_HV_CPUx | Memory controller voltage | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| CPUx_VR_Temp | CPUx VR chip temperature | CPUx<br>x indicates the CPU number with a value of 0 to 1 |

| Sensor | Description | Sensor Location |
|---|---|---|
| PSUx_VIN | PSUx input voltage | PSUx<br>x indicates the PSU number with a value of 0 to 1 |
| PSUx_VOUT | PSUx output voltage | PSUx<br>x indicates the PSU number with a value of 0 to 1 |
| SYS_12V | System 12 V voltage | Motherboard |
| SYS_5V | System 5 V voltage | Motherboard |
| SYS_3V3 | System 3.3 V voltage | Motherboard |
| RTC_Battery | Motherboard RTC battery voltage | Motherboard |
| PVNN_MAIN_CPUx | CPUx voltage | Motherboard<br>x indicates the CPU number with a value of 0 to 1 |
| P12V_CPUx_DIMM | CPUx DIMM voltage | Motherboard<br>x indicates the CPU number with a value of 0 to 1 |
| PVNN_PCH_STBY | PCH core voltage | Motherboard |
| P1V05_PCH_STBY | PCH logic voltage | Motherboard |
| CPUx_Temp | CPUx temperature | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| CPUx_DTS | CPUx margin temperature before it reaches the throttling frequency | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| CPUx_DIMM_T | The maximum temperature among DDR DIMMs of CPUx | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| PCH_Temp | PCH temperature | Motherboard |
| PSU_Inlet_Temp | PSU temperature | PSUs |
| Total_Power | Total power | Motherboard |
| FAN_Power | Total fan power | Fans |
| PSUx_PIN | PSUx input power | PSUx<br>x indicates the PSU number with a value of 0 to 1 |
| PSUx_POUT | PSUx output power | PSUx<br>x indicates the PSU number with a value of 0 to 1 |
| CPU_Power | Total CPU power | Motherboard |

| Sensor | Description | Sensor Location |
|---|---|---|
| Memory_Power | Total memory power | Motherboard |
| FANx_F_Speed, FANx_R_Speed | FANx speed | Fans<br>x indicates the fan number with a value of 0 to 5 |
| RAID_Temp | The maximum temperature among RAID cards (excluding the RAID mezz cards) | RAID Card |
| HDD_MAX_Temp | The maximum temperature among all drives | - |
| OCP_RAID_Temp | RAID mezz card temperature | RAID mezz card |
| NVME_Temp | The maximum temperature among all NVMe drives | Drives |
| OCP_NIC_SFP_Temp | OCP card SFP module temperature | Optical module |
| PCIe_NIC_SFP_T | PCIe NIC SFP module temperature | Optical module |
| OCP_NIC_Temp | OCP card temperature (Max. temp. will be taken in case of multiple OCP cards) | OCP NIC |
| PCIE_NIC_Temp | PCIe NIC temperature (Max. temp. will be taken in case of multiple PCIe NICs) | PCIe NIC |
| MEM_ResourceRate | Memory utilization rate | Memory |
| CPU_ResourceRate | CPU utilization rate | CPU |
| GPUx_Temp | GPUx temperature | GPUx<br>x indicates the GPU number with a value of 0 to 7 |
| CPUx_Status | CPUx status | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| SEL_Status | SEL status | - |
| PSU_Mismatch | PSU model mismatch | - |
| PSU_Redundant | PSU redundancy status | - |
| FANx_Status | FANx status | FANx |

| Sensor | Description | Sensor Location |
|---|---|---|
| | | x indicates the fan number with a value of 0 to 5 |
| FAN_Redundant | Fan redundancy status | - |
| PCIe_Status | The status of PCIe devices (including PCIe buses, slots and expansion cards) | - |
| POST_Status | System firmware and POST status | - |
| PWR_CAP_Fail | Power capping failure | - |
| CPUx_CnDm | DIMM | x indicates the CPU number with a value of 0 to 1<br>n indicates the channel number with a value of 0 to 7<br>m indicates the DIMM number with a value of 0 to 1 |
| CPU_Config | CPU configuration status (mixing of CPUs, or primary CPU not installed) | - |
| PSUx_Status | PSUx status | PSUx<br>x indicates the power supply number with a value of 0 to 1 |
| k_HDDx | Drive | HDDx<br>• k denotes front, internal and rear, with a value of F/I/R respectively<br>• x indicates the drive number |
| ACPI_PWR | ACPI power status | - |
| Sys_Health | System health status | - |
| BMC_Boot_Up | BMC boot up complete | - |
| BIOS_Boot_Up | BIOS boot up complete | - |
| Intrusion | Chassis-opening activity | Top cover |
| LeakageStatus | Leak detection | Leak detection cable |
| ME_FW_Status | ME health status | ME |

| Sensor | Description | Sensor Location |
|---|---|---|
| TPM_Verify | TPM verification status | - |
| HBA_Temp | PCIe HBA card temperature (Max. temp. will be taken in case of multiple PCIe HBA cards) | HBA card |
| PWR_On_TMOUT | Abnormal motherboard power failure | CPLD signal |
| System_Error | System error | CPLD signal |
| CPUx_PMEM_DIMM_T | NVDIMM temperature | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| PSUx_IOUT | PSUx output current | PSUx<br>x indicates the PSU number with a value of 0 to 1 |
| PSUx_Fan_Status | PSUx fan status | PSUx<br>x indicates the PSU number with a value of 0 to 1 |
| FANx_Present | FANx presence | FANx<br>x indicates the fan number with a value of 0 to 5 |
| PCIe_HCA_SFP_T | HCA card optical module temperature (Max. temp. will be taken in case of multiple HCA cards) | Optical module |
| PCIe_HCA_Temp | PCIe HCA card temperature (Max. temp. will be taken in case of multiple PCIe HCA cards) | HCA card |
| CPUx_Power | CPUx power | CPUx<br>x indicates the CPU number with a value of 0 to 1 |
| FPGA_Card_Temp | PCIe FPGA card temperature (Max. temp. will be taken in case of multiple PCIe FPGA cards) | FPGA card |
| BF2_SFP_Temp | BF2 optical module temperature | BF2 card |
| BF2_Temp | BF2 temperature (Max. temp. will be taken in case of multiple BF2 cards) | BF2 card |

| Sensor | Description | Sensor Location |
| --- | --- | --- |
| BMC_Status | BMC status | - |
| Retimer_Temp | Retimer card temperature | Retimer card |

# 13 Appendix B Acronyms and Abbreviations

## 13.1 A - E

**A**

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

**B**

| | |
|---|---|
| BIOS | Basic Input Output System |
| BIS | Bureau of Indian Standards |
| BLE | BIOS Lock Enable |
| BMC | Baseboard Management Controller |
| BP | Backplane |
| BSMI | Bureau of Standards, Metrology and Inspection in Taiwan |

**C**

| | |
|---|---|
| CAS | Column Address Strobe |
| CB | Certification Body |

| | |
|---|---|
| CCC | China Compulsory Certificate |
| CE | Conformite Europeenne |
| 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 |
| DC-SCM | Datacenter-ready Secure Control Module |
| DIMM | Dual In-line Memory Module |
| DL | Deep Learning |
| DOA | Dead on Arrival |
| DPC | DIMM Per Channel |
| DRAM | Dynamic Random-Access Memory |
| DTS | Digital Thermal Sensor |
| DWPD | Drive Writes Per Day |

**E**

| | |
|---|---|
| EAC | Eurasian Conformity |
| EBG | Emmitsburg |
| ECC | Error-Correcting Code |
| ECMA | European Computer Manufacturer Association |

| | |
|---|---|
| ESD | Electro-static Discharge |
| EU | European Union |
| EVAC | Extended Volume Air Cooling |

## 13.2 F - J

**F**

| | |
|---|---|
| FCC | Federal Communications Commission |
| FHHL | Full-Height Half-Length |
| FPGA | Field Programmable Gate Array |
| FW | Firmware |

**G**

| | |
|---|---|
| GPU | Graphics Processing Unit |
| GUI | Graphical User Interface |

**H**

| | |
|---|---|
| HBA | Host Bus Adapter |
| HBM | High Bandwidth Memory |
| HCA | Host Channel Adapter |
| HDD | Hard Disk Drive |
| HHHL | Half-Height Half-Length |
| HSE | Health and Safety Executive |
| HTTPS | HyperText Transfer Protocol Secure |

**I**

| | |
|---|---|
| IEC | International Electrotechnical Commission |
| IIPC | Intel Intelligent Power Capability |
| iMC | Integrated Memory Controller |
| I/O | Input/Output |
| IP | Internet Protocol |
| IPMB | Intelligent Platform Management Bus |
| IPMI | Intelligent Platform Management Interface |
| ISA | International Society of Automation |
| ISO | International Organization for Standardization |

## 13.3 K - O

**K**

| | |
|---|---|
| KC | Korean Certification |
| KVM | Keyboard, Video, Mouse |

**L**

| | |
|---|---|
| LC | Lucent Connector |
| LCD | Liquid Crystal Display |
| LDAP | Lightweight Directory Access Protocol |
| LED | Light Emitting Diode |
| LP | Low Profile |

**M**

| | |
|---|---|
| MCIO | Mini Cool Edge IO |
| ME | Management Engine |

**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 Mexicana |
| NTRA | National Telecom Regularity Authority |
| NVMe | Non-Volatile Memory Express |

**O**

| | |
|---|---|
| OCP | Open Compute Project |
| O&M | Operations and Maintenance |
| OpROM | Option ROM |
| OS | Operating System |

## 13.4 P - T

**P**

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

**R**

| | |
|---|---|
| RAID | Redundant Arrays of Independent Disks |
| RAS | Reliability, Availability, Serviceability |
| RCM | Regulatory Compliance Mark |
| RDIMM | Registered Dual In-line Memory Module |
| RH | Relative Humidity |
| 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 |
| SEL | System Event Log |
| SFF | Small Form Factor |
| SFP | Small Form-factor Pluggable |
| SGPIO | Serial General Purpose Input/Output |
| SGX | Software Guard Extensions |
| SLA | Service Level Agreements |
| SN | Serial Number |
| SNMP | Simple Network Management Protocol |
| SSD | Solid State Drive |
| SSH | Secure Shell |
| SSO | Single Sign-On |

**T**

| | |
|---|---|
| TCM | Trusted Cryptography Module |
| TDP | Thermal Design Power |
| TF | TransFlash |
| TPM | Trusted Platform Module |

## 13.5 U - Z

**U**

| | |
|---|---|
| UART | Universal Asynchronous Receiver Transmitter |
| UEFI | Unified Extensible Firmware Interface |
| UID | Unit Identification |
| UL | Underwriters Laboratories |
| UPI | Ultra Path Interconnect |
| USB | Universal Serial Bus |

**V**

| | |
|---|---|
| VGA | Video Graphics Array |
| VLAN | Virtual Local Area Network |
| VMD | Volume Management Device |
| VNC | Virtual Network Console |
| VNNI | Vector Neural Network Instructions |
| VPP | Virtual Pin Port |
| VR | Voltage Regulator |
| VRD | Voltage Regulator-Down |
| VROC | Virtual RAID on CPU |