NETAŞ NCS6721A N6

Rack Server

Hardware Description

Version: R1.0

NETAŞ TELEKOMÜNİKASYON A.Ş
Yenişehir Mahallesi Osmanlı Bulvarı Aeropark Sitesi
B Blok No:11B İç Kapı No:40
Postcode: 34912
Tel: +90 (216) 522 20 00
URL: https://destek.netas.com.tr
E-mail: info@netas.com.tr

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Revision History

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Contents

About This Manual

Purpose

This manual describes the hardware configurations of the NCS6721A N6 rack server so that you can learn about detailed information about the server's components including the CPUs, DIMMs, storage, network, I/O expansion, PSUs, fan units, and boards.

Intended Audience

This manual is intended for:

- Network planning engineers
- Hardware installation engineers
- Maintenance engineers

What Is in This Manual

This manual contains the following chapters.

Chapter 1, Product Structure	Describes the physical structure and logical structure of the NCS6721A N6.
Chapter 2, CPU	Describes the positions of CPUs in the NCS6721A N6 server and the recommended CPU configurations.
Chapter 3, Memory	Describes the memory slots in the NCS6721A N6 server and the supported memory configurations.
Chapter 4, Storage	Describes the hard disk slots in the NCS6721A N6 server and the supported hard disk configurations.
Chapter 5, Network	Describes the OCP NIC and PCIe NIC configurations for the NCS6721A N6 server.
Chapter 6, I/O Expansion	Describes the PCIe slots in the NCS6721A N6 server and the supported PCIe card configurations.
Chapter 7, PSU	Describes the positions of PSUs in the NCS6721A N6 server and the supported PSU configurations.
Chapter 8, Fan Unit	Describes the positions of fan units in the NCS6721A N6 server and the supported fan unit configurations.
Chapter 9, Board	Describes the I/O card, mainboard, and disk backplane configurations for the NCS6721A N6 server.

Chapter 10, Cables	Describes the functions, structures, and usage of cables used by the NCS6721A N6 server.
Chapter 11, Anti-Intrusion Sensor	Describes the functions and position of the anti-intrusion sensor in the NCS6721A N6 server.

Conventions

This manual uses the following conventions.

	Notice: indicates equipment or environment safety information. Failure to comply can result in equipment damage, data loss, equipment performance degradation, environmental contamination, or other unpredictable results. Failure to comply will not result in personal injury.
	Note: provides additional information about a topic.

Chapter 1
Product Structure

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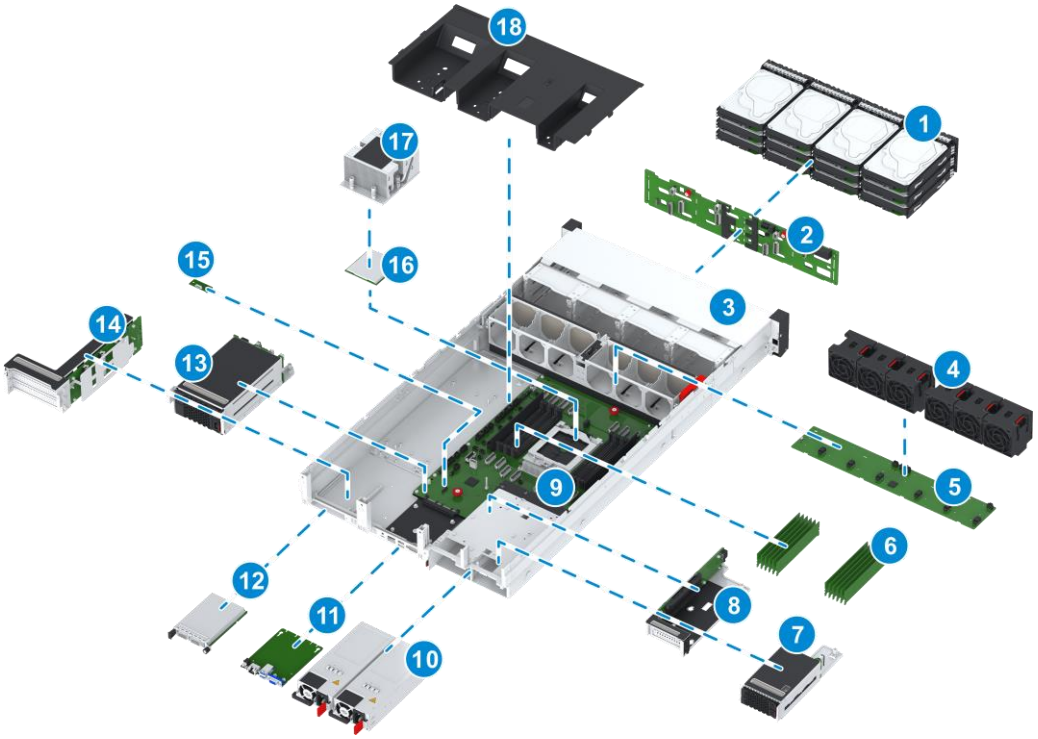
1.1 Physical Structure

1.1.1 Physical Structure of the General Model

Figure 1-1 shows the internal components of the NCS6721A N6 server (horizontal 12-disk standard model).

Figure 1-1 Physical Structure



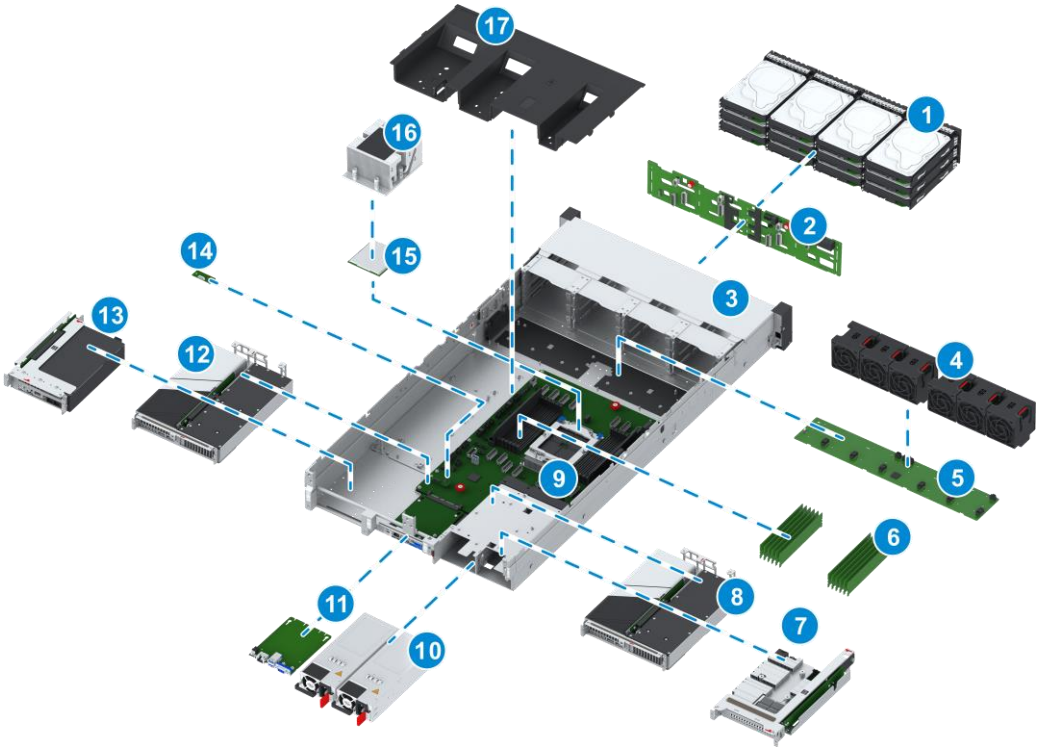
No.	Component	No.	Component
1	Front hard disk	2	Front-disk backplane

No.	Component	No.	Component
3	Chassis	4	Fan unit
5	Fan backplane	6	Memory
7	I/O module 4	8	I/O module 3
9	Mainboard	10	PSU
11	BMC card	12	OCP card 1
13	I/O module2	14	I/O module 1
15	TPCM card	16	CPU
17	CPU heat sink	18	Air baffle

1.1.2 Physical Structure of the 4-GPU Model

Figure 1-2 shows the internal components of the NCS6721A N6 4-GPU server.

Figure 1-2 Physical Structure



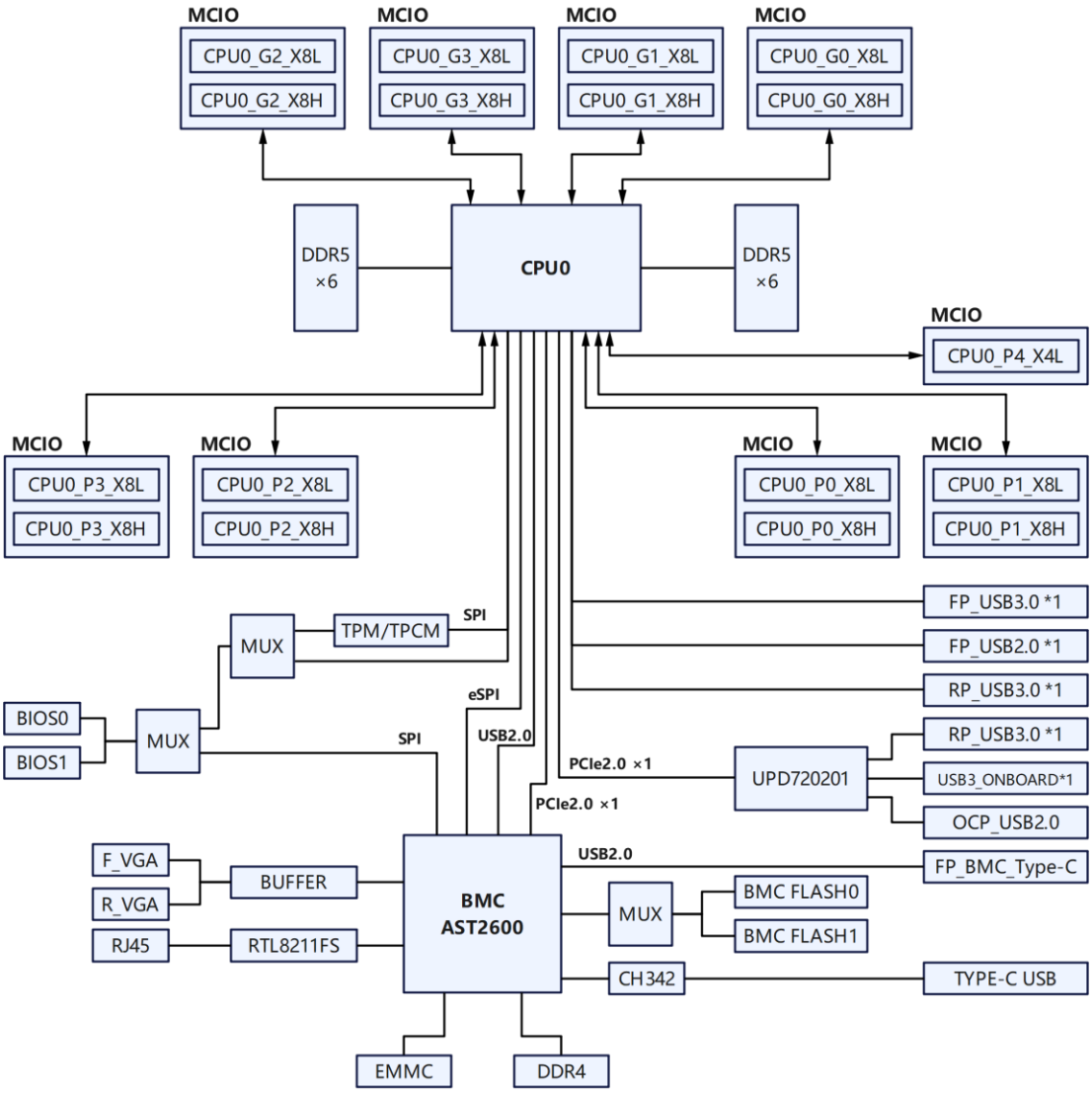
No.	Component	No.	Component
1	Front hard disk	2	Front-disk backplane
3	Chassis	4	Fan unit
5	Fan backplane	6	Memory
7	I/O module 3	8	I/O module 4

No.	Component	No.	Component
9	Mainboard	10	PSU
11	BMC card	12	I/O module 1
13	I/O module 2	14	TPCM card
15	CPU	16	CPU heat sink
17	Air baffle	-	-

1.2 Logical Structure

Figure 1-3 shows the system modules of the NCS6721A N6 server and the logical relationships among these modules.

Figure 1-3 Logical Structure



For a description of these modules, refer to Table 1-1.

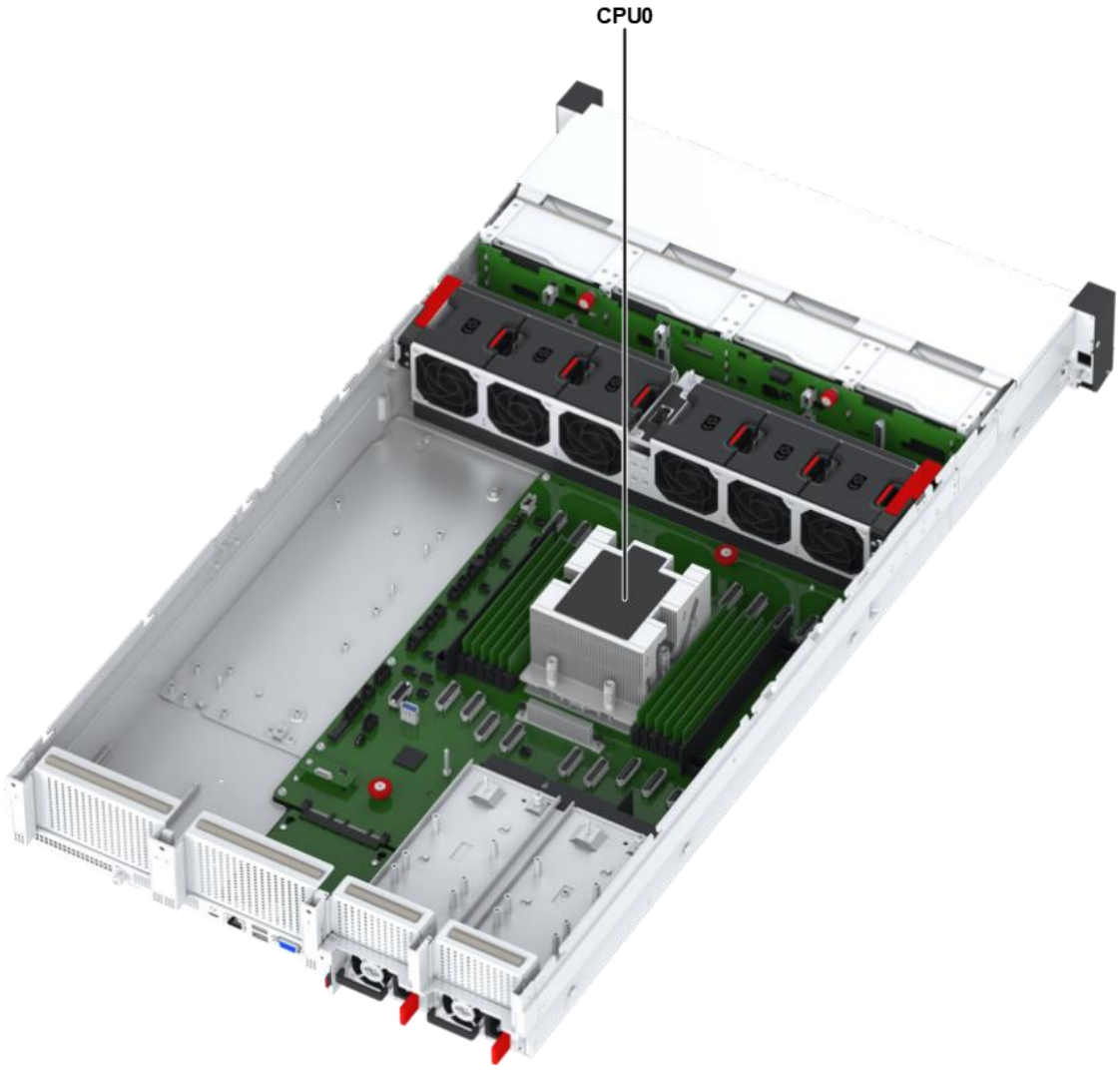
Table 1-1 Module Descriptions

Module	Description
CPU	Central processing unit, as the calculation and control core of the server, used for processing information and running programs. The NCS6721A N6 server supports one CPU.
DDR5	Used for storing computational data in the CPUs and the data exchanged with external storage devices such as hard disks. The NCS6721A N6 server provides 12 DDR5 memory slots.
Riser	Extended PCIe module, used for installing standard PCIe cards.
USB	Used for exchanging data between the server and external devices. The NCS6721A N6 server provides one USB 2.0 interface and four USB 3.0 interfaces.
BIOS	Most basic input/output system of the server, providing the most basic and direct hardware configuration and control for the server.
BMC	Used for upgrading server firmware and viewing device information when the server is not powered on.
RTL8211FS	Onboard NIC, which provides a GE electrical interface.
CH342	Serial interface controller, which provides a CH342 serial interface.
VGA	VGA interface, which is used for connecting to an external display.
Type-C USB	Serial interface module of the server, providing a serial interface for debugging the server.

Chapter 2
CPU

The NCS6721A N6 server uses a single-CPU design, supporting AMD Turin series processors. Figure 2-1 shows the position and ID of the CPU in the NCS6721A N6 server.

Figure 2-1 CPU Position and ID



Chapter 3
Memory

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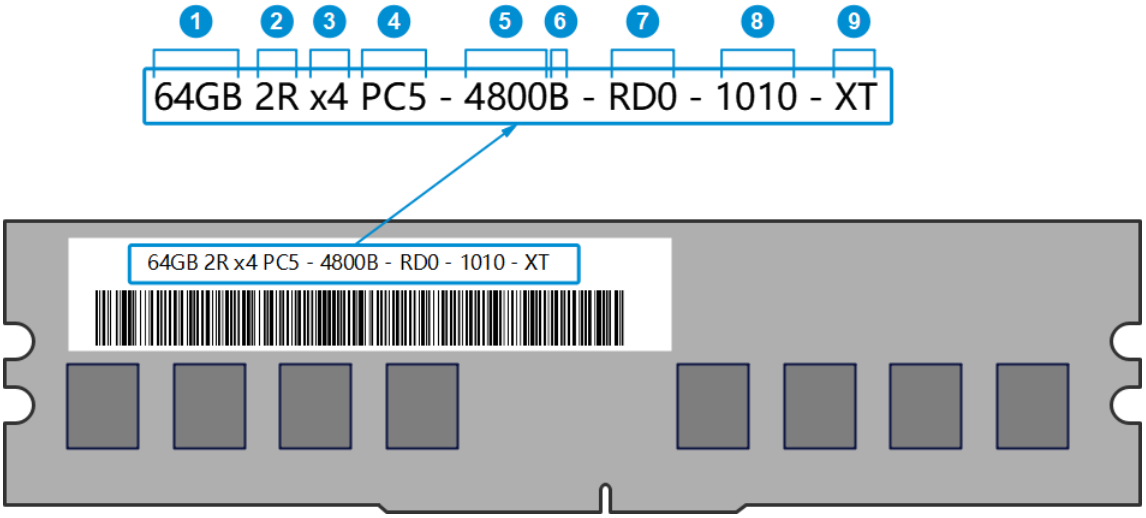
3.1 DIMM Label

A DIMM label specifies the attributes of a DIMM. Figure 3-1 shows a typical DIMM label.

Figure 3-1 DIMM Label



For a description of the DIMM label, refer to Table 3-1.

Table 3-1 DIMM Label Descriptions

No.	Attribute	Description
1	Capacity	• 16 GB • 32 GB

No.	Attribute	Description
		● 64 GB ● 128 GB ● 256 GB
2	Rank	● 1R = single-ranked ● 2R = dual-ranked ● 4R = quad-ranked ● 8R = octo-ranked
3	DRAM data-bus width	● x4 = 4 bits ● x8 = 8 bits
4	DIMM connector type	PC5 = DDR5
5	Maximum memory speed	4800 MT/s
6	CAS latency (CL-nRCD-nRP)	● AN = 34-34-34 ● B = 40-39-39 ● BN = 40-40-40 ● C = 42-42-42
7	DIMM type	RD0: RDIMM D0
8	SPD version	● First 10: SPD revision level (basic section) ● Last 10: SPD revision level (specific section, namely bytes 192–447)
9	Temperature grade	● XT (Extended Temperature grade): 0#–95℃ ● NT (Normal Temperature grade): 0#–85℃

3.2 Memory Compatibility Rules

DDR5 is a computer memory specification. Compared to DDR4, DDR5 supports higher speed and bandwidth, lower power consumption, and greater stability and reliability.

The following compatibility rules apply when you install DDR5 DIMMs:

- A server must use DDR5 DIMMs of the same model. All the DDR5 DIMMs of the server operate at the lower speed of the following:
  - ➔ Maximum memory speed supported by the specific CPU.
  - ➔ Maximum operating speed of the DIMMs.
- Different types (RDIMM and RDIMM-3DS) and specifications (capacity, data-bus width, rank, and height) of DDR5 DIMMs cannot be mixed for use.
- The total memory capacity equals the sum of all DDR5 DIMM capacities.
- The maximum number of DIMMs depends on the memory type and the number of ranks.

For a description of the DDR5 DIMM parameters, refer to Table 3-2.

Table 3-2 Descriptions of the DDR5 DIMM Parameters

Item	Value					
Capacity (GB) of one DDR5 DIMM	16	32	48	64	128	256
Type	RDIMM	RDIMM	RDIMM	RDIMM	RDIMM	RDIMM-3DS
Rated memory speed (MT/s)	6400	6400	6400	6400	6400	6400
Operating voltage (V)	1.1	1.1	1.1	1.1	1.1	1.1
Maximum number of DDR5 DIMMs supported by a server	12	12	12	12	12	12
Maximum DDR5 DIMM capacity (GB) supported by a server[1]	192	384	576	768	1536	3072
Maximum operating speed (MT/s)	6400	6400	6400	6400	6400	6400

1. The maximum DDR5 DIMM capacity supported is the value in full memory configuration.

3.3 DIMM Installation Guidelines

The general guidelines on installing DDR5 DIMMs are as follows:

- All configured memory modules must be of the same type, either DDR5 RDIMM or MCR DIMM.
- All the configured memory modules must have the same number of ranks.
- X8 DIMMs and x4 DIMMs cannot be used in the same channel or in the memory slots for the same processor.
- All the DDR5 DIMMs must have the same rate.

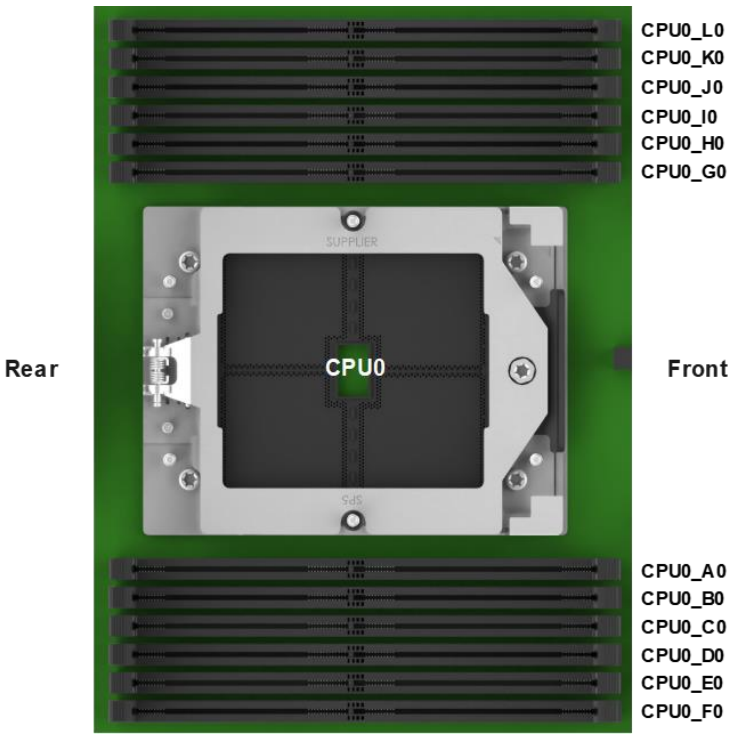
3.4 DIMM Slot Positions

The NCS6721A N6 server provides twelve memory channels, and each memory channel consists of one DIMM slot.

The NCS6721A N6 server provides a maximum of 12 DDR5 DIMMs, with the maximum speed up to 6400 MT/s per module.

Figure 3-2 shows the memory channels and DIMM slots in the NCS6721A N6 server.

Figure 3-2 Memory Channels and DIMM Sots



- Front indicates the server front view.
- Rear indicates the server rear view.

3.5 Recommended Memory Configuration

Notice

This section recommends the number and layout of DIMMs in different scenarios, which help to maximize memory performance.

Figure 3-3 shows the memory configuration recommended for the NCS6721A N6 server.

Figure 3-3 Recommended Memory Configuration

DDR5 Qty	CPU0_L0	CPU0_K0	CPU0_J0	CPU0_I0	CPU0_H0	CPU0_G0		CPU0_A0	CPU0_B0	CPU0_C0	CPU0_D0	CPU0_E0	CPU0_F0
1	–	–	–	–	–	–	CPU0	√	–	–	–	–	–
2	–	–	–	–	–	√		√	–	–	–	–	–
4	–	–	–	√	–	√		√	–	√	–	–	–
6	–	–	–	√	√	√		√	√	√	–	–	–
8	–	√	–	√	√	√		√	√	√	–	√	–
10	–	√	√	√	√	√		√	√	√	√	√	–
12	√	√	√	√	√	√		√	√	√	√	√	√

- "√" indicates that a DIMM needs to be installed.
- "-" indicates that no DIMM needs to be installed.

3.6 Memory Protection Technologies

DDR5 DIMMs support the following memory protection technologies:

- Error Check and Correction (ECC)
- On-die ECC
- Error Check and Scrub (ECS)
- Memory Mirroring
- Memory Single Device Data Correction (SDDC)
- Failed DIMM Isolation
- Memory Thermal Throttling
- Command/Address Parity Check and Retry
- Memory Demand/Patrol Scrubbing
- Memory Data Scrambling
- Post Package Repair (PPR)
- Write Data CRC Protection
- Adaptive Data Correction - Single Region (ADC-SR)
- Adaptive Double Device Data Correction - Multiple Region (ADDDC-MR)
- Partial Cache Line Sparing (PCLS, HBM CPU only)

Chapter 4
Storage

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4.1 Hard Disk Slots

Front Hard Disk

In accordance with the layout (horizontal and vertical) and number of hard disks, the server supports the following hard disk configuration modes:

- Horizontal layout (8 hard disks)

  Figure 4-1 shows the hard disk slots arranged when 8 hard disks are installed horizontally.

  Figure 4-1 Horizontal Layout (8 Hard Disk Slots)

  All slots support SAS/SATA/NVMe SSDs.

- Horizontal layout (12 hard disks)

  Figure 4-2 shows the hard disk slots arranged when 12 hard disks are installed horizontally.

  Figure 4-2 Horizontal Layout (12 Hard Disk Slots)

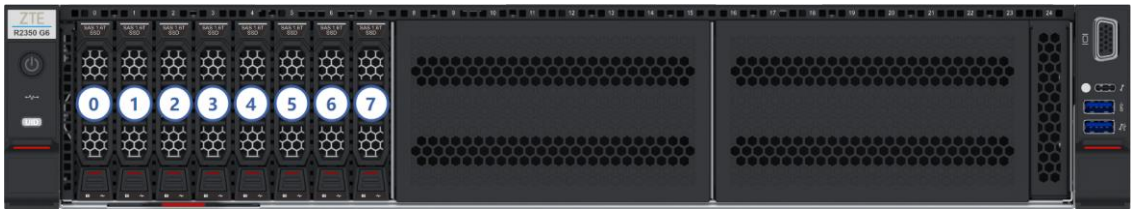
  

  All slots support SAS/SATA/NVMe SSDs.

- Vertical layout (8 hard disks)

Figure 4-3 shows the hard disk slots arranged when 8 hard disks are installed vertically.

Figure 4-3 Vertical Layout (8 Hard Disk Slots)



All slots support SAS/SATA/NVMe SSDs.

- Vertical layout (16 hard disks)

  Figure 4-4 shows the hard disk slots arranged when 16 hard disks are installed vertically.

Figure 4-4 Vertical Layout (16 Hard Disk Slots)

All slots support SAS/SATA/NVMe SSDs.

- Vertical layout (24 hard disks)

  Figure 4-5 shows the hard disk slots arranged when 24 hard disks are installed vertically.

Figure 4-5 Vertical Layout (24 Hard Disk Slots)

All slots support SAS/SATA/NVMe SSDs.

- Vertical layout (25 hard disks)

  Figure 4-6 shows the hard disk slots arranged when 25 hard disks are installed vertically.

Figure 4-6 Vertical Layout (25 Hard Disk Slots)

All slots support SAS/SATA/NVMe SSDs.

- Vertical layout (24 E1.S hard disks)

  Figure 4-7 shows the hard disk slots arranged when 24 E1.S hard disks are installed vertically.

Figure 4-7 Vertical Layout (24 E1.S Hard Disks)

- Vertical layout (24 E3.S hard disks)

  Figure 4-8 shows the hard disk slots arranged when 24 E3.S hard disks are installed vertically.

Figure 4-8 Vertical Layout (24 E3.S Hard Disks)

Note

To ensure drive availability, the storage duration of a hard disk drive cannot exceed six months before use.

Rear Hard Disk

When the I/O modules on the rear panel of the NCS6721A N6 server are configured as hard disk slots, the rear hard disk slots are distributed as shown in Figure 4-9.

Figure 4-9 Rear Hard Disk Slots

All slots support SAS/SATA/NVMe SSDs.

Note

To ensure drive availability, the storage duration of a hard disk drive cannot exceed six months before use.

4.2 Hard Disk Indicators

Figure 4-10 shows the hard disk indicators on the NCS6721A N6 server.

Figure 4-10 Hard Disk Indicators

1. Hard disk status indicator
2. Hard disk activity indicator

For a description of the hard disk indicators, refer to Table 4-1.

Table 4-1 Hard Disk Indicator Descriptions

Indicator	Status
Hard disk status indicator	For a SAS/SATA/NVMe SSD, the possible states of this indicator are as follows: ● Off: The hard disk is operating properly. ● Flashing blue at 1 Hz: The RAID group that the hard disk belongs to is being rebuilt. ● Flashing blue at 4 Hz: The hard disk is being positioned. ● Steady red: The hard disk is faulty. For an E1.S/E3.S SSD, the possible states of this indicator are as follows: ● Off: The hard disk is operating properly. ● Flashing amber at 1 Hz: The RAID group that the hard disk belongs to is being rebuilt. ● Flashing amber at 4 Hz: The hard disk is being positioned. ● Steady amber: The hard disk is faulty.
Hard disk activity indicator	The possible states of this indicator are as follows: ● Off: The hard disk is not present or is faulty. ● Flashing green: Data is being read from or written to the hard disk, or synchronized between hard disks. (The indicator flashes green at 4 Hz on a SAS/SATA SSD and flashes green at an undefined frequency on an NVMe SSD.) ● Steady green: The hard disk is present but inactive.

4.3 RAID Controller Card

Through a RAID controller card of the corresponding model, the RAID technology combines multiple independent hard disks to form an array with the redundancy capability. Compared with a single hard disk, the RAID array provides higher storage performance, I/O performance, and reliability.

The RAID controller card provides the functions such as RAID support, RAID level migration, and disk roaming.

For detailed information about RAID controller cards, refer to the *NETAŞ Server RAID User Guide (AMD Turin)*.

Chapter 5
Network

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5.1 OCP NIC

OCP NICs are new-generation multi-function and high-performance NICs for servers.

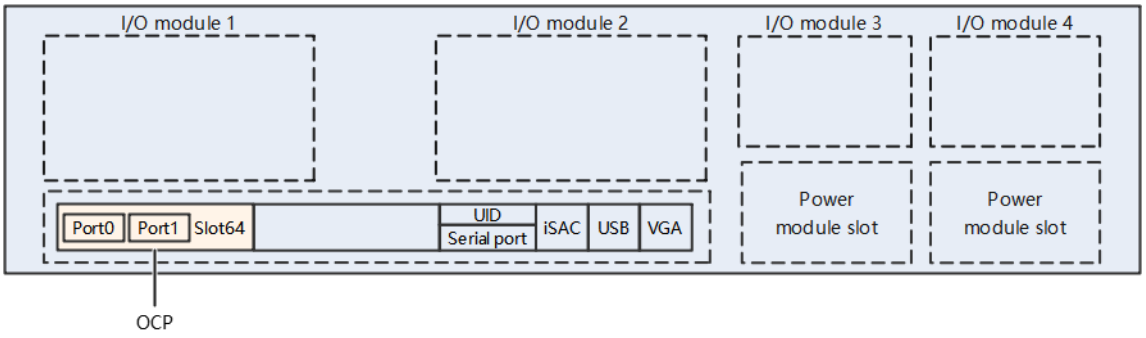
The NCS6721A N6 server supports OCP NICs to provide more network capabilities. The OCP NIC slots support various standard OCP NIC 3.0 cards, which provide the following port rates: GE, 10 GE, 25 GE, and 100 GE. Figure 5-1 shows the OCP NIC position.

Figure 5-1 OCP NIC Positions

The port names of a OCP NIC configured for the NCS6721A N6 server are usually determined by the BIOS. Some OSs support customization of the port names. By default, a port name of a OCP NIC configured for the NCS6721A N6 server is ens**x**f**y**. In the port name, **x** indicates the slot ID of the OCP NIC and **y** indicates the port ID. (The port on the left is numbered 0, which is incremented by one on the right.)

Figure 5-2 shows the IDs of the ports provided by OCP NIC when the NCS6721A N6 server is configured with OCP NIC that has two optical interfaces each.

Figure 5-2 Typical OCP NIC Configuration



Note

In Figure 5-2, the ports of the OCP NIC located in slot 64 are named ens**64**f**0** and ens**64**f**1**.

For the OCP NIC models that the NCS6721A N6 server supports, refer to Table 5-1.

Table 5-1 Supported OCP NIC Models

OCP NIC Model	Network Port Type	Number of Network Ports	Rate
MCX623436AN-CDAB	Optical port	2	250 Gbps
NO127D/NO127	Electrical port	2/4	1 Gbps
NO315	Optical port	2	25 Gbps

Note

The number of OCP NIC models supported by the NCS6721A N6 server is growing. For more information, contact NETAŞ technical support.

5.2 PCIe NIC

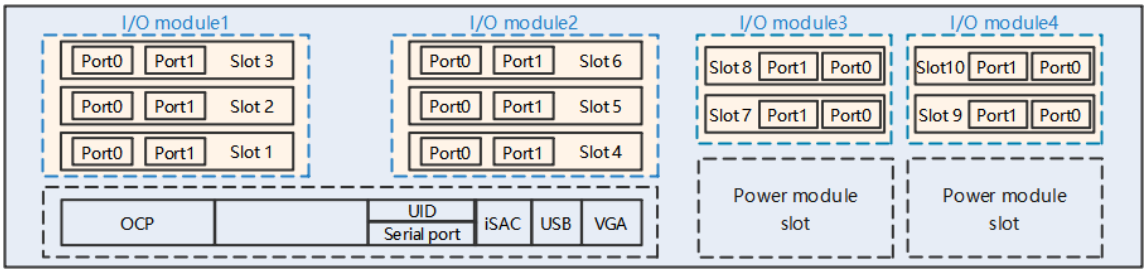
A PCIe NIC is a network adapter that provides PCIe ports. It is connected to the mainboard through a PCIe port.

The NCS6721A N6 server supports PCIe NICs to provide more network capabilities.

The port names of a PCIe NIC configured for the NCS6721A N6 server are usually determined by the BIOS. Some OSs support customization of the port names. By default, a port name of a PCIe NIC configured for the NCS6721A N6 server is ens**x**f**y**. In the port name, **x** indicates the slot ID of the PCIe NIC and **y** indicates the port ID. (The port far away from the gold finger of the PCIe NIC is numbered 0, which is incremented by one as the distance shortens.)

Figure 5-3 shows the IDs of the ports provided by each PCIe NIC when the NCS6721A N6 server is configured with PCIe NICs that have two optical interfaces each.

Figure 5-3 Typical PCIe NIC Configuration



Note

In Figure 5-3, the ports of the PCIe NIC located in slot 3 are named ens**3f0** and ens**3f1**.

Chapter 6
I/O Expansion

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6.1 PCIe Card

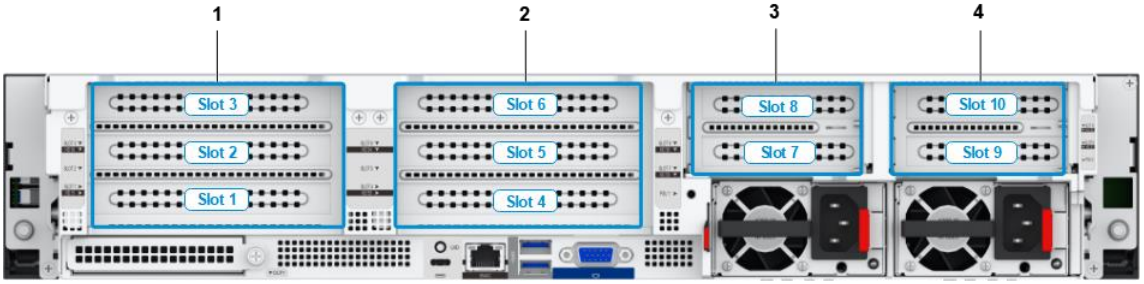
You can install PCIe cards as required to expand system capabilities.

6.2 PCIe Slot Positions

6.2.1 PCIe Card Slot Positions of a General-Purpose Server

Figure 6-1 shows the positions of the PCIe slots of a general-purpose NCS6721A N6 server.

Figure 6-1 PCIe Slots of a General-Purpose Server



1. I/O module 1
2. I/O module 2
3. I/O module 3
4. I/O module 4

Note

I/O module 3 supports both full-height and half-height PCIe cards. For the two types of PCIe cards, their PCIe slot IDs are the same. A half-height PCIe card is used as an example in Figure 6-1.

I/O modules can provide more PCIe slots through riser cards. For a description of the riser cards supported by the I/O modules of a general-purpose NCS6721A N6 server, refer to Table 6-1.

Table 6-1 Riser Cards Supported by a General-Purpose Server

I/O Module	Riser Card	PCIe Interface	Quantity
I/O module 1	RC5306N3B	X16	1
		X8	2
I/O module 2	RC5306N3B	X16	1
		X8	2
I/O module 3	RC5306N2B	X8	2
I/O module 4	RC5306N2B	X8	2

The riser cards supported by I/O modules of a general-purpose server are as follows:

- I/O module 1

  Figure 6-2 shows an RC5306N3B riser card installed in I/O module 1.

Figure 6-2 RC5306N3B Riser Card Installed in I/O Module 1

- I/O module 2

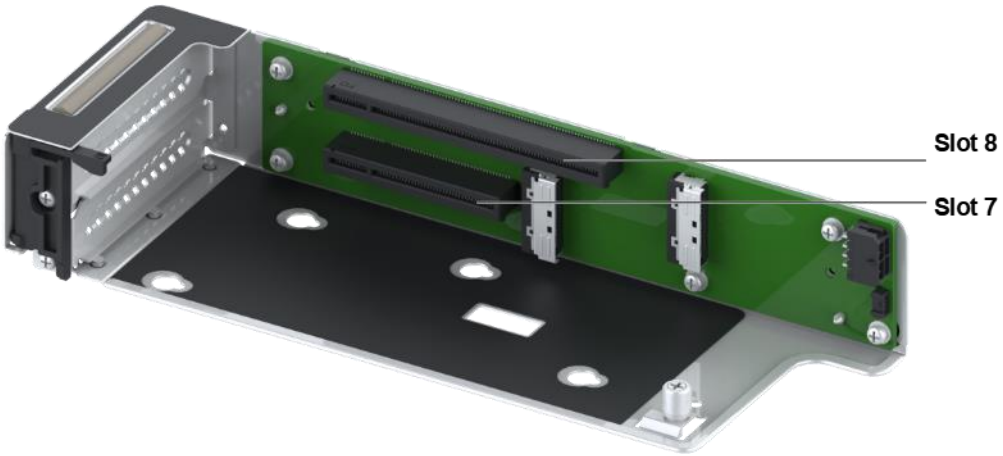
  Figure 6-3 shows an RC5306N3B riser card installed in I/O module 2.

Figure 6-3 RC5306N3B Riser Card Installed in I/O Module 2

- I/O module 3

  Figure 6-4 shows an RC5306N2B riser card installed in I/O module 3.

Figure 6-4 RC5306N2B Riser Card Installed in I/O Module 3



Note

I/O module 3 supports both full-height and half-height PCIe cards. For the two types of PCIe cards, their PCIe slot IDs are the same. A half-height PCIe card is used as an example in Figure 6-4.

- I/O module 4

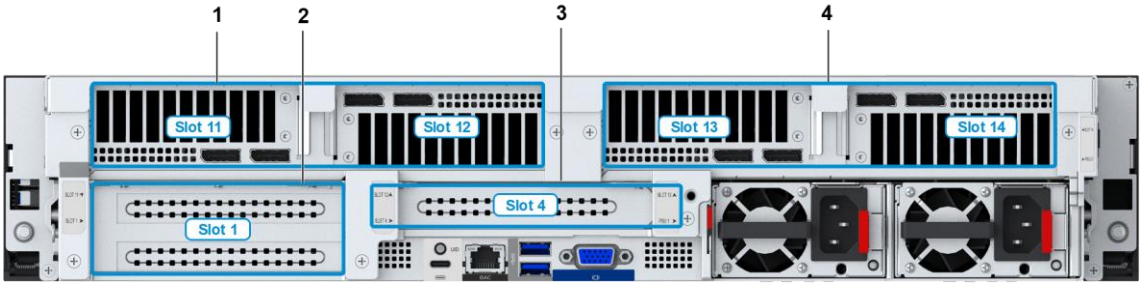
  Figure 6-5 shows an RC5306N2B riser card installed in I/O module 4.

Figure 6-5 RC5306N2B Riser Card Installed in I/O Module 4

6.2.2 PCIe Card Slot Positions of a 4-GPU Server

Figure 6-6 shows the positions of the PCIe slots of a 4-GPU NCS6721A N6 server.

Figure 6-6 PCIe Slots of a 4-GPU Server



1. I/O module 1
2. I/O module 2
3. I/O module 3
4. I/O module 4

I/O modules can provide more PCIe slots through riser cards. For a description of the riser cards supported by the I/O modules of a 4-GPU NCS6721A N6 server, refer to Table 6-2.

Table 6-2 Riser Cards Supported by a 4-GPU Server

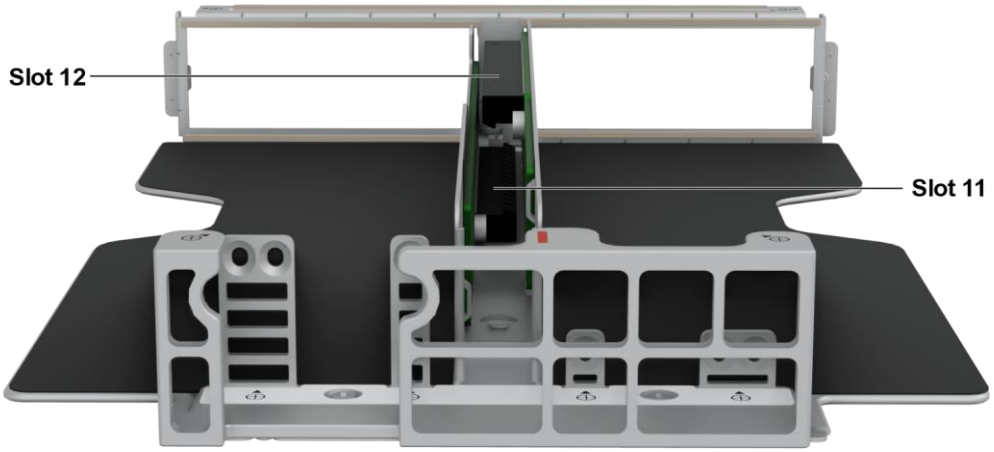
I/O Module	Riser Card	PCIe Interface	Quantity
I/O module 1	RC5305N1B	X16	2
I/O module 2	RC5306N1C	X16	1
I/O module 3	RC5306N1C	X16	1
	RC5306N1C1	X8/X16	1
I/O module 4	RC5305N1B	X16	2

The riser cards supported by I/O modules of a 4-GPU server are as follows:

- I/O module 1

  Figure 6-7 shows an RC5305N1B riser card installed in I/O module 1.

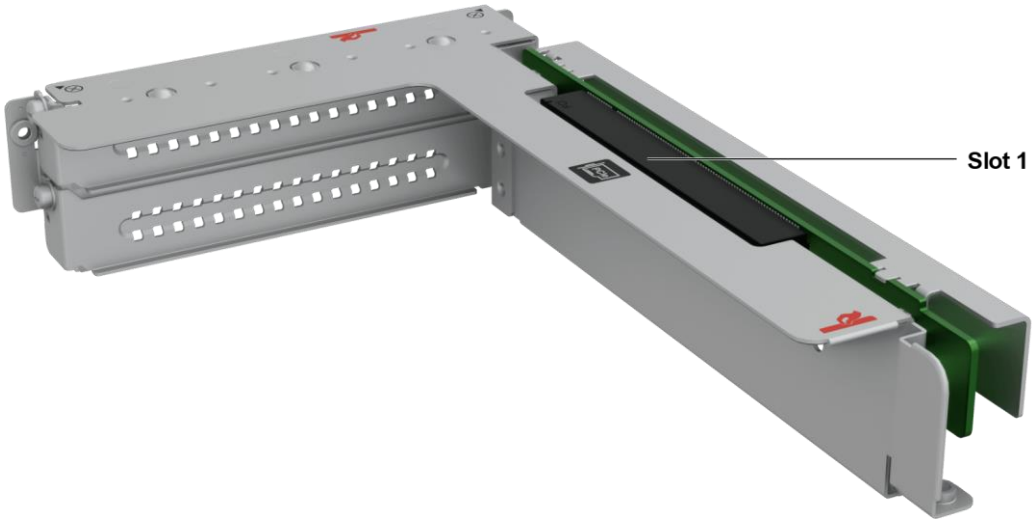
Figure 6-7 RC5305N1B Riser Card Installed in I/O Module 1



- I/O module 2

Figure 6-8 shows an RC5306N1C riser card installed in I/O module 2.

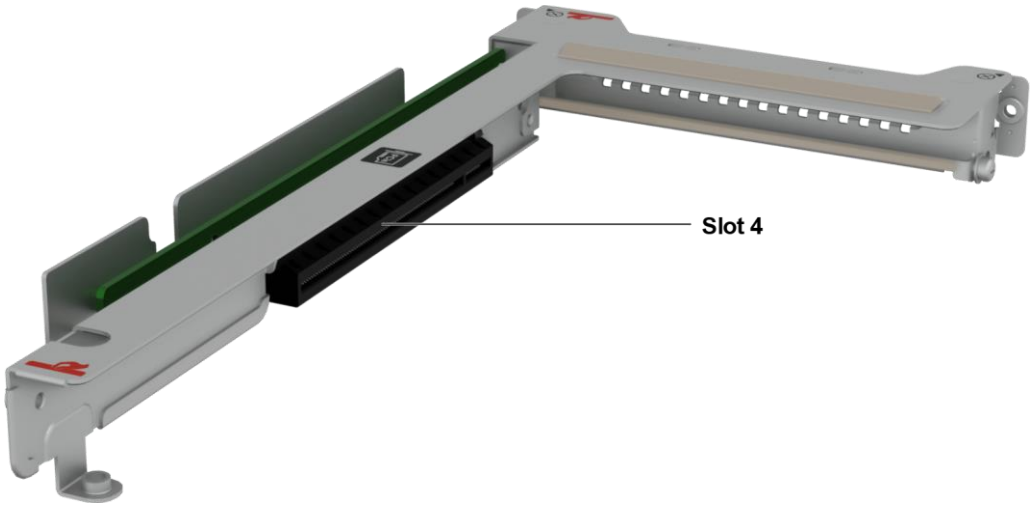
Figure 6-8 RC5306N1C Riser Card Installed in I/O Module 2



- I/O module 3

  Figure 6-9 shows an RC5306N1C or RC5306N1C1 riser card installed in I/O module 3.

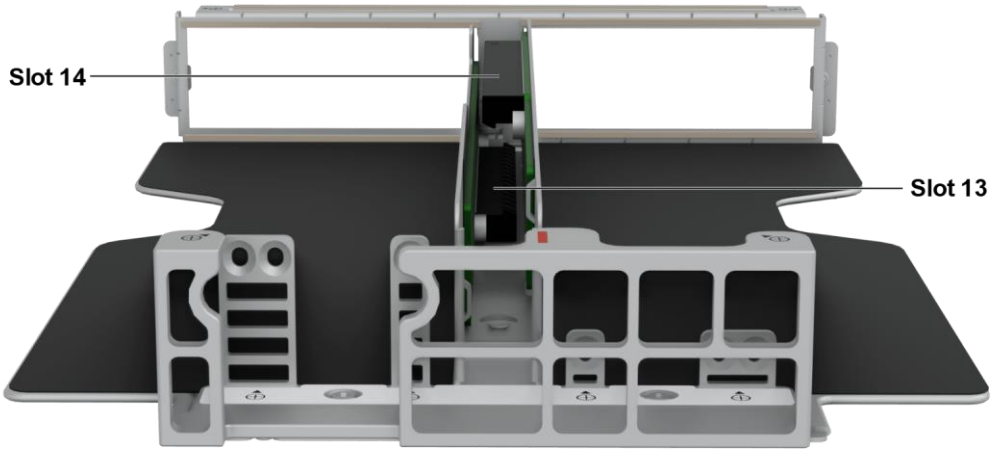
Figure 6-9 RC5306N1C or RC5306N1C1 Riser Card Installed in I/O Module 3



- I/O module 4

  Figure 6-10 shows an RC5305N1B riser card installed in I/O module 4.

Figure 6-10 RC5305N1B Riser Card Installed in I/O Module 4



6.3 PCIe Slot Descriptions

6.3.1 PCIe Card Slot Descriptions for a General-Purpose Server

For a description of the PCIe slots supported by a general-purpose NCS6721A N6 server, refer to Table 6-3.

Table 6-3 PCIe Card Slot Descriptions for a General-Purpose NCS6721A N6 Server

PCIe Slot	CPU	PCIe Standard	Supported Bandwidth	Slot Size
Slot1	CPU0	PCIe 5.0	X8	Full height and half length
Slot2	CPU0	PCIe 5.0	X16	Full height and half length
Slot3	CPU0	PCIe 5.0	X8	Full height and half length
Slot4	CPU0	PCIe 5.0	X8	Full height and half length
Slot5	CPU0	PCIe 5.0	X16	Full height and half length
Slot6	CPU0	PCIe 5.0	X8	Full height and half length
Slot7	CPU0	PCIe 5.0	X8	Full height and half length or half height and half length
Slot8	CPU0	PCIe 5.0	X8	Full height and half length or half height and half length
Slot9	CPU0	PCIe 5.0	X8	Half height and half length
Slot10	CPU0	PCIe 5.0	X8	Half height and half length

Note

Full height, half height, full length, and half length are described as follows:

- Full height: not higher than 111.15 mm.

- Half height: not higher than 68.9 mm.
- Full length: between 254.00 mm and 312.00 mm.
- Half length: not longer than 167.65 mm.

6.3.2 PCIe Card Slot Descriptions for a 4-GPU Server

For a description of the PCIe slots supported by a 4-GPU NCS6721A N6 server, refer to Table 6-4.

Table 6-4 PCIe Card Slot Descriptions for a 4-GPU NCS6721A N6 Server

PCIe Slot	CPU	PCIe Standard	Supported Bandwidth	Slot Size
Slot1	CPU0	PCIe 5.0	X16	Full height and half length
Slot4	CPU0	PCIe 5.0	X8/X16	Full height and half length
Slot11	CPU0	PCIe 5.0	X16	Full height and full length
Slot12	CPU0	PCIe 5.0	X16	Full height and full length
Slot13	CPU0	PCIe 5.0	X16	Full height and full length
Slot14	CPU0	PCIe 5.0	X16	Full height and full length

Note

Full height, half height, full length, and half length are described as follows:
- Full height: not higher than 111.15 mm.
- Half height: not higher than 68.9 mm.
- Full length: between 254.00 mm and 312.00 mm.
- Half length: not longer than 167.65 mm.

Chapter 7
PSU

Figure 7-1 shows the positions of the PSUs in the NCS6721A N6 server.

Figure 7-1 PSU Positions

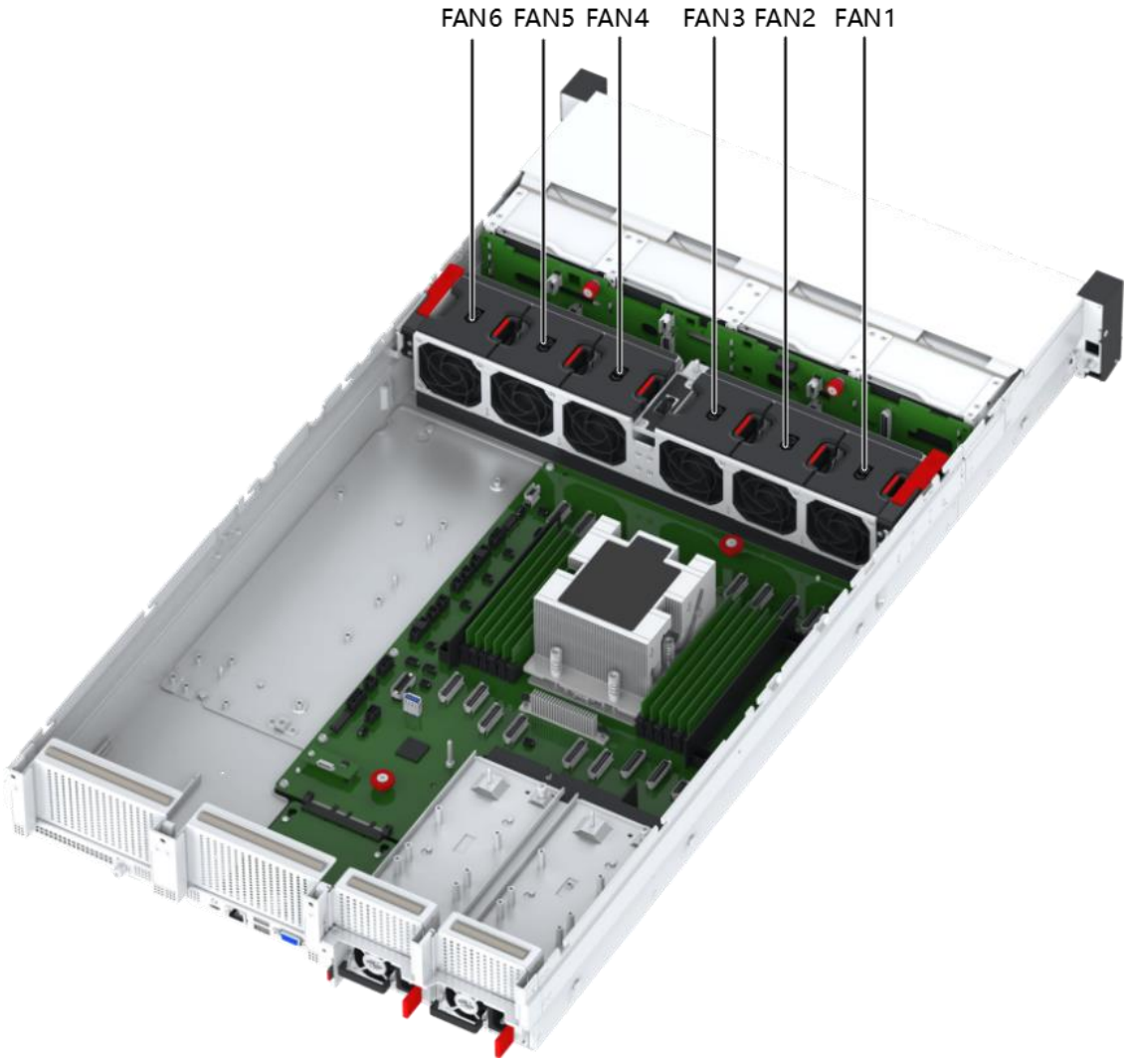
The PSU configurations of the NCS6721A N6 server are described as follows:

- The server supports one or two PSUs.
- The server supports AC or DC PSUs and also supports the mix of them.
- Hot swapping is supported.
- If two PSUs are configured, 1+1 redundancy is supported.
- The PSUs installed on a server must be of the same model.
- The PSUs are protected against short circuits. The double-pole fuse is provided for a PSU with dual input live wires.

Chapter 8
Fan Unit

Figure 8-1 shows the positions of fan units on the NCS6721A N6 server.

Figure 8-1 Fan Unit Positions



The fan unit configurations of the NCS6721A N6 server are described as follows:

- The server supports six fan units: FAN1–FAN6.
- The server supports one fan specification: 6056.

Note

The fans installed in the same server must be of the same model and specification.

- Hot swapping is supported.
- If a fan unit fails, other fan units can still operate properly.
- The fan speed is adjustable.

Chapter 9
Board

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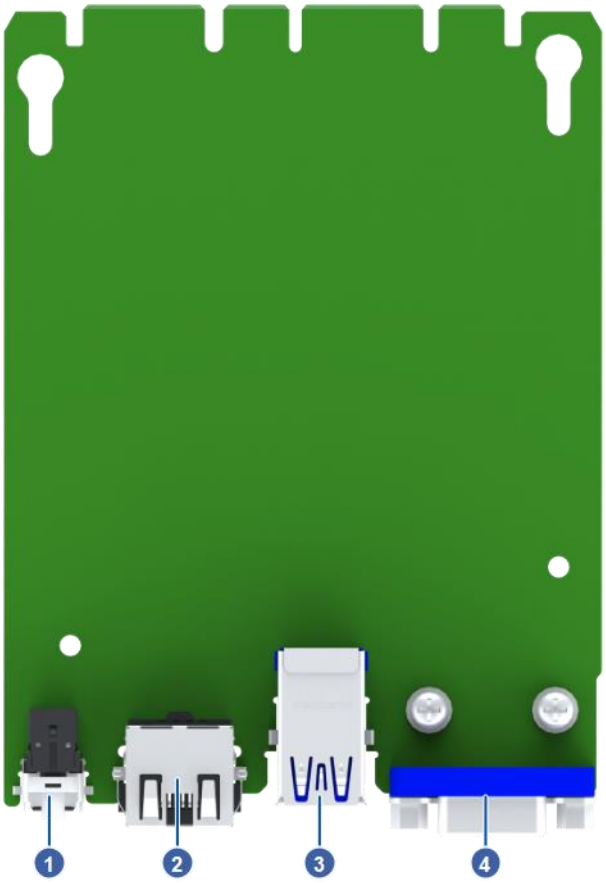
9.1 BMC Card

The BMC card is an I/O interface card connected to the mainboard. It manages the server, and provides a UID button, a serial port, a network port, two USB ports, and a VGA port.

Figure 9-1 shows the BMC card of the NCS6721A N6 server.

Figure 9-1 BMC Card



For a description of the ports on the BMC card of the NCS6721A N6 server, refer to Table 9-1.

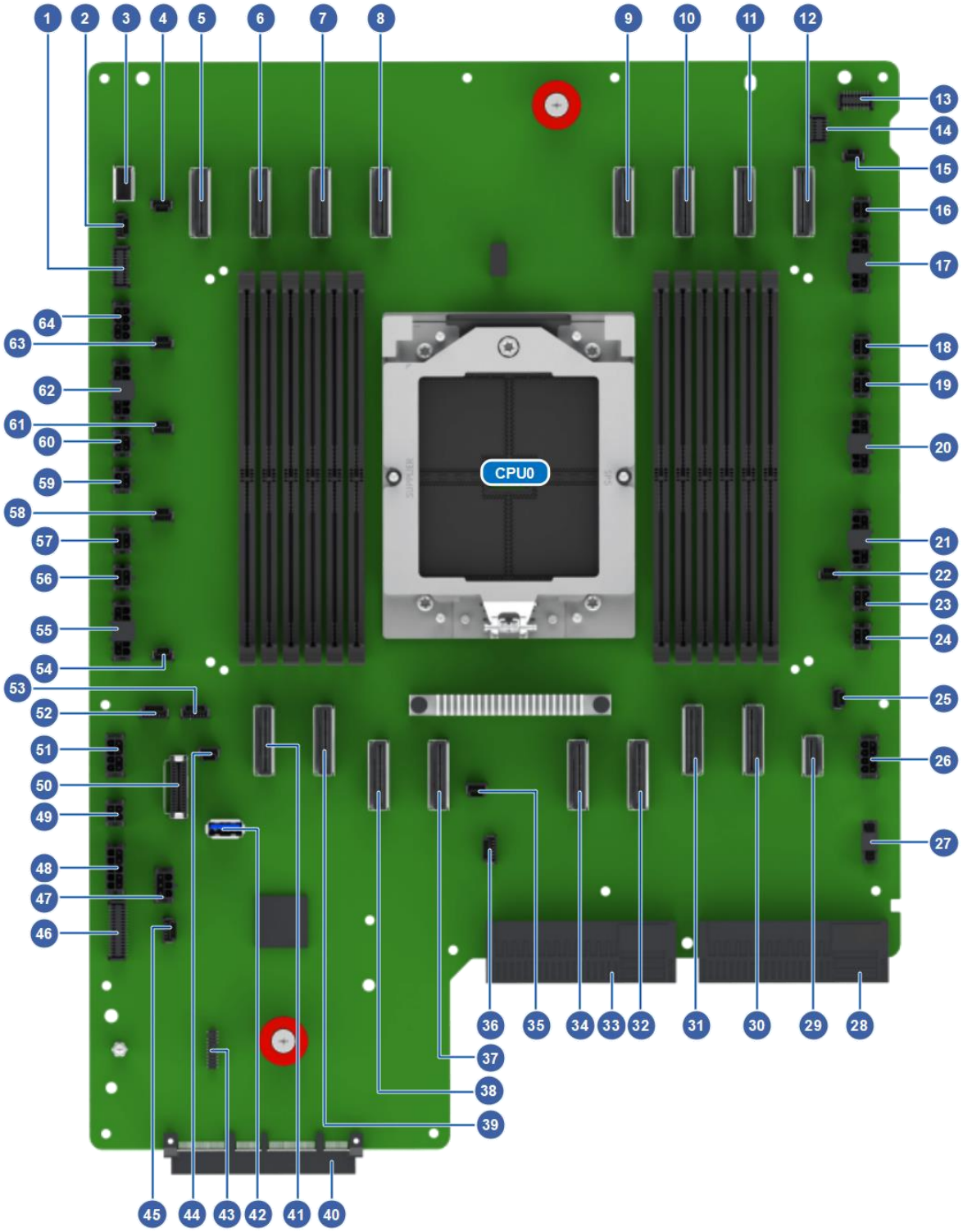
Table 9-1 Interfaces on the BMC Card

No.	Interface Name	Silk Screen	Position ID
1	Type-C serial port	COM	X4
2	BMC management network interface	BMC_ETH	X2
3	USB 3.0 interface x 2	USB1/USB2	X5
4	VGA interface	VGA	X3

9.2 Mainboard

Figure 9-2 shows the mainboard layout of the NCS6721A N6 server.

Figure 9-2 Mainboard Layout



For a description of the interfaces on the mainboard of the NCS6721A N6 server, refer to Table 9-2.

Table 9-2 Interfaces on the Mainboard

No.	Interface	Silk Screen	Position ID
1	Front-disk backplane expansion interface	EXPANDER	X149
2	Intrusion detection switch interface	INTRUDER	X153
3	Right lug interface	VGA/USB/OCP_DEBUG	X51
4	Front-disk backplane I2C interface 2	F_I2C_2	X47
5	PCIe x8 interface (G2_X8L)	HSIO8	X126
6	PCIe x8 interface (G2_X8H)	HSIO7	X128
7	PCIe x8 interface (G3_X8L/SATA)	HSIO6	X127
8	PCIe x8 interface (G3_X8H/SATA)	HSIO5	X129
9	PCIe x8 interface (G1_X8L)	HSIO4	X122
10	PCIe x8 interface (G1_X8H)	HSIO3	X124
11	PCIe x8 interface (G0_X8L)	HSIO2	X121
12	PCIe x8 interface (G0_X8H)	HSIO1	X123
13	Left lug interface	BIN/LED	X157
14	Fan board data line interface	FAN_MSIC	X47
15	Front-disk backplane I2C interface 1	F_I2C_1	X139
16	Fan board power interface (4-pin)	PWR5	X251
17	Fan board power interface (12-pin)	PWR4	X48
18	GPU4 power interface 2 (4-pin)	PWR3	X161
19	GPU4 power interface 1 (4-pin)	PWR2	X162
20	GPU4 power interface (12-pin)	PWR1	X134
21	GPU3 power interface (12-pin)	PWR20	X145
22	I2C interface for I/O module 4	R_I2C_10	X131
23	GPU3 power interface 2 (4-pin)	PWR19	X163
24	GPU3 power interface 1 (4-pin)	PWR18	X164
25	I2C interface for I/O module 3	R_I2C_9	X142
26	Power interface for I/O module 3 (8-pin)	PWR17	X147
27	CPU DEBUG HDT interface	CPU_HDT	X114
28	PSU interface 2	PSU2	X2A2

No.	Interface	Silk Screen	Position ID
29	PCIe x4 interface (P4_X4L)	HSIO17	X125
30	PCIe x8 interface (P1_X8L)	HSIO16	X117
31	PCIe x8 interface (P1_X8H)	HSIO15	X120
32	PCIe x8 interface (P0_X8L/SATA)	HSIO14	X118
33	PSU interface 1	PSU1	X1A2
34	PCIe x8 interface (P0_X8H/SATA)	HSIO13	X119
35	Southbound I2C interface (reserved)	M_I2C_8	X168
36	MISC interface for smart NIC	SMART_NIC_2_MISC	X160
37	PCIe x8 interface (P2_X8L)	HSIO12	X110
38	PCIe x8 interface (P2_X8H)	HSIO11	X112
39	PCIe x8 interface (P3_X8L)	HSIO10	X111
40	BMC card interface	BMC_CARD	X151
41	PCIe x8 interface (P3_X8H)	HSIO9	X113
42	Built-in USB3.0/USB2.0 interface	USB3.0	X158
43	TPM/TPCM card interface	TPM/TPCM	X116
44	I2C interface for I/O module 3	R_I2C_7	X138
45	Auxiliary power interface for smart NIC	SMART_NIC_PWR3V3	X159
46	Smart NIC NCSI	SMART_NIC_NCSI	X148
47	Smart NIC power interface (6-pin)	PWR16	X222
48	Smart NIC power interface (10-pin)	PWR15	X22
49	OCP NIC power interface (4-pin)	PWR14	X108
50	Low-speed signal interface for OCP NIC	OCP_MISC	X109
51	Power interface for I/O module 2 (8-pin)	PWR13	X137
52	Leakage detection cable interface 1	WEEP_WIRE_1	X154
53	Leakage detection cable interface 2	WEEP_WIRE_2	X152
54	I2C interface for IO module 1	R_I2C_6	X130
55	GPU2 power interface (12-pin)	PWR12	X133
56	GPU2 power interface 2 (4-pin)	PWR11	X146
57	GPU2 power interface 1 (4-pin)	PWR10	X136

No.	Interface	Silk Screen	Position ID
58	Rear I2C interface (reserved)	M_I2C_5	X141
59	GPU1 power interface 2 (4-pin)	PWR9	X167
60	GPU1 power interface 1 (4-pin)	PWR8	X166
61	Front I2C interface (reserved)	M_I2C_4	X143
62	GPU1 power interface (12-pin)	PWR7	X132
63	Front-disk backplane I2C interface 3	F_I2C_3	X144
64	Front-disk backplane power interface (8-pin)	PWR6	X135

9.3 Hard Disk Backplanes

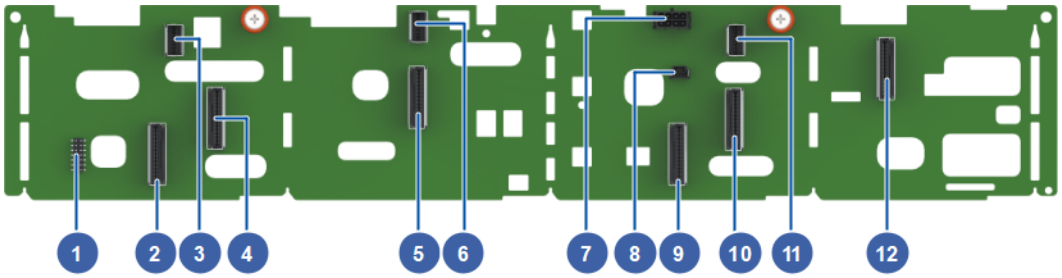
Front-Disk Backplane

The NCS6721A N6 server supports the following types of front-disk backplanes:

- 12 x 3.5" hard disk backplane

  Figure 9-3 shows a 12 x 3.5" hard disk backplane.

Figure 9-3 12 x 3.5" Hard Disk Backplane



For a description of the interfaces on the 12 x 3.5" hard disk backplane, refer to Table 9-3.

Table 9-3 Interfaces on the 12 x 3.5" Hard Disk Backplane

No.	Interface Name	Silk Screen	Position ID
1	JTAG programming interface of the EPLD chip	EPLD_JTAG	X200A6
2	PCIe x8 interface 6	HSIO 6	X12
3	PCIe x4 interface 3	SAS3	X2
4	PCIe x8 interface 5	HSIO 5	X11
5	PCIe x8 interface 4	HSIO 4	X10
6	PCIe x4 interface 2	SAS2	X7

No.	Interface Name	Silk Screen	Position ID
7	Power cable interface	PWR	X4
8	Out-of-band communication interface	I2C	X1
9	PCIe x8 interface 3	HSIO 3	X8
10	PCIe x8 interface 2	HSIO 2	X9
11	PCIe x4 interface 1	SAS1	X6
12	PCIe x8 interface 1	HSIO 1	X3

- 8 x 3.5" disk backplane

  Figure 9-4 shows an 8 x 3.5" hard disk backplane.

Figure 9-4 8 x 3.5" Hard Disk Backplane

For a description of the interfaces on the 8 x 3.5" hard disk backplane, refer to Table 9-4.

Table 9-4 Interfaces on the 8 x 3.5" Hard Disk Backplane

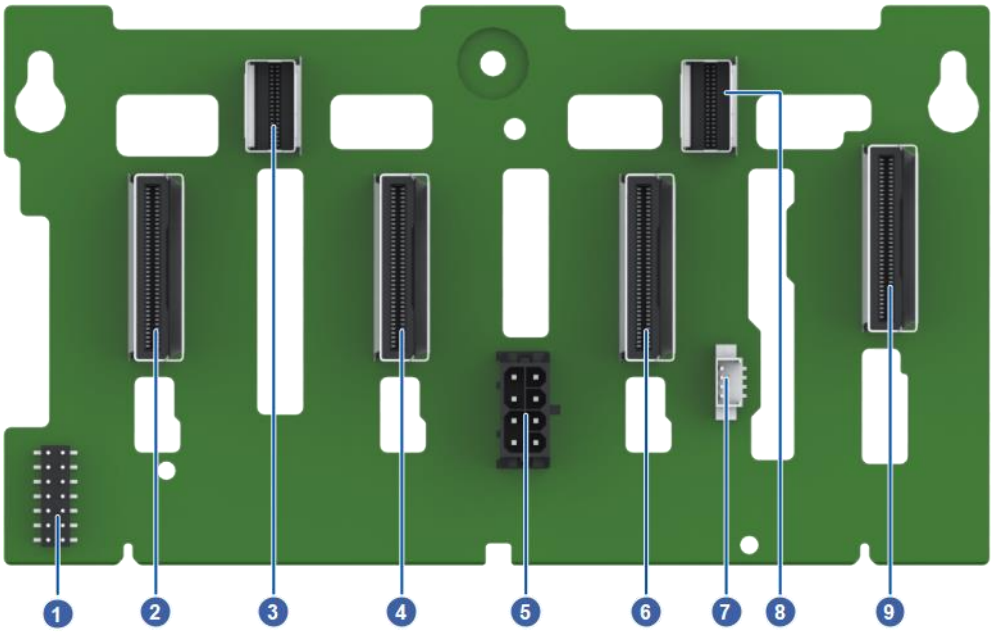
No.	Interface Name	Silk Screen	Position ID
1	JTAG programming interface of the EPLD chip	EPLD_JTAG	X1
2	PCIe x8 interface 4	HSIO 4	X12
3	PCIe x4 interface 2	SAS2	X3
4	Power cable interface	PWR	X13
5	Out-of-band communication interface	I2C	X10
6	PCIe x8 interface 3	HSIO 3	X11
7	PCIe x8 interface 2	HSIO 2	X5
8	PCIe x4 interface 1	SAS1	X2
9	PCIe x8 interface 1	HSIO 1	X4

- 8 x 2.5" hard disk backplane

  The NCS6721A N6 server supports two types of 8 x 2.5" hard disk backplanes:

  ➔ Figure 9-5 shows the 8 x 2.5" hard disk backplane that supports SAS/SATA/NVMe SSDs.

Figure 9-5 8 x 2.5" Hard Disk Backplane



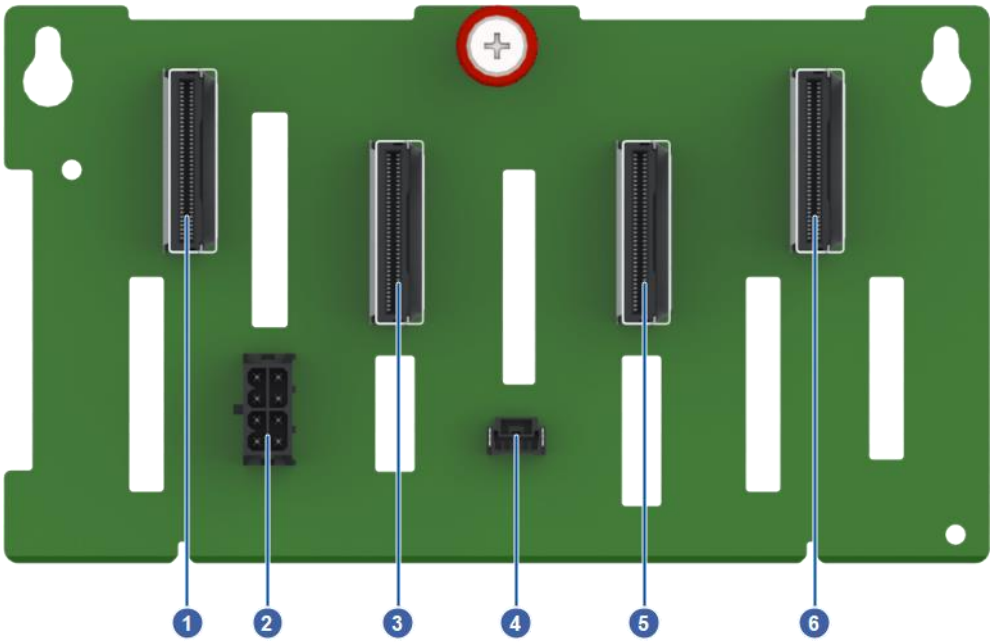
For a description of the interfaces on the 8 x 2.5" hard disk backplane that supports SAS/SATA/NVMe SSDs, refer to Table 9-5.

Table 9-5 Interfaces on the 8 x 2.5" Hard Disk Backplane Supporting SAS/SATA/NVMe SSDs

No.	Interface Name	Silk Screen	Position ID
1	JTAG programming interface of the EPLD chip	CPLD_JTAG	X305
2	PCIe x8 interface 4	HSIO_4	X13
3	PCIe x4 interface 2	SAS_2	X15
4	PCIe x8 interface 3	HSIO_3	X12
5	Power cable interface	PWR 1	X16
6	PCIe x8 interface 2	HSIO_2	X11
7	Out-of-band communication interface	I2C 1	X17
8	PCIe x4 interface 1	SAS_1	X14
9	PCIe x8 interface 1	HSIO_1	X10

➔ Figure 9-6 shows the 8 x 2.5" hard disk backplane that supports E1.S/E3.S SSDs.

Figure 9-6 8 x 2.5" Hard Disk Backplane Supporting E1.S/E3.S SSDs



For a description of the interfaces on the 8 x 2.5" hard disk backplane that supports E1.S/E3.S SSDs, refer to Table 9-6.

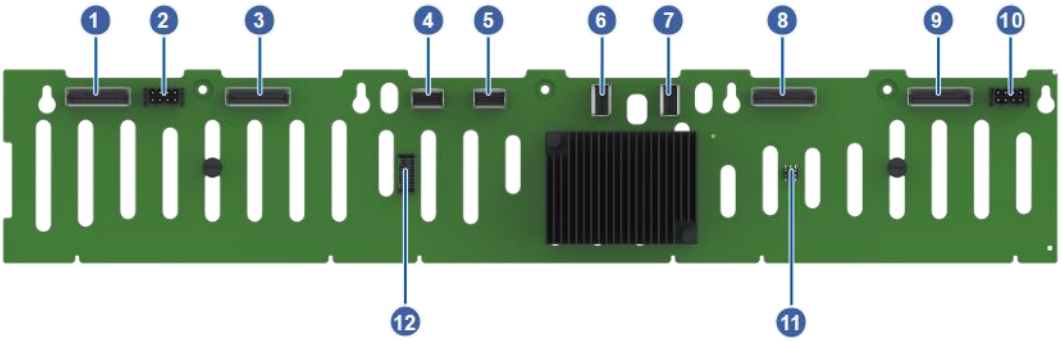
Table 9-6 Interfaces on the 8 x 2.5" Hard Disk Backplane Supporting E1.S/E3.S SSDs

No.	Interface Name	Silk Screen	Position ID
1	PCIe x8 interface 4	HSIO4	X5
2	Power cable interface	PWR	X1
3	PCIe x8 interface 3	HSIO3	X4
4	Out-of-band communication interface	I2C	X6
5	PCIe x8 interface 2	HSIO2	X3
6	PCIe x8 interface 1	HSIO1	X2

- 25 x 2.5" hard disk backplane

  Figure 9-7 shows a 25 x 2.5" hard disk backplane.

Figure 9-7 25 x 2.5" Hard Disk Backplane



For a description of the interfaces on the 25 x 2.5" hard disk backplane, refer to Table 9-7.

Table 9-7 Interfaces on the 25 x 2.5" Hard Disk Backplane

No.	Interface Name	Silk Screen	Position ID
1	PCIe x8 interface 4	HSIO 4	X34
2	Power cable interface	PWR_2	X5
3	PCIe x8 interface 3	HSIO 3	X33
4	PCIe x4 interface 1	SLIMSAS_1	X37
5	PCIe x4 interface 2	SLIMSAS_2	X39
6	PCIe x4 interface 3	SLIMSAS_3	X35
7	PCIe x4 interface 4	SLIMSAS_4	X36
8	PCIe x8 interface 2	HSIO 2	X32
9	PCIe x8 interface 1	HSIO 1	X31
10	Power cable interface	PWR_1	X4
11	JTAG programming interface of the EPLD chip	CPLD_JTAG	X45
12	Out-of-band communication interface	I2C/SPI/UART	X38

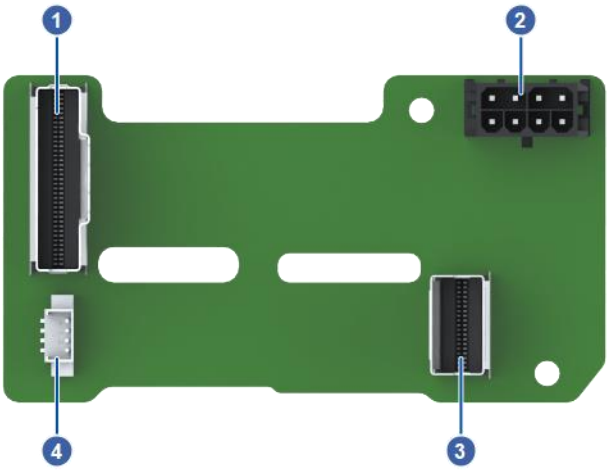
Rear-Disk Backplane

The NCS6721A N6 server provides the following types of rear-disk backplanes:

- 2 x 2.5" hard disk backplane

  This type of hard disk backplane can be installed in I/O module 3 or 4. Figure 9-8 shows a 2 x 2.5" hard disk backplane.

Figure 9-8 2 x 2.5" Hard Disk Backplane



For a description of the interfaces on a 2 x 2.5" hard disk backplane, refer to Table 9-8.

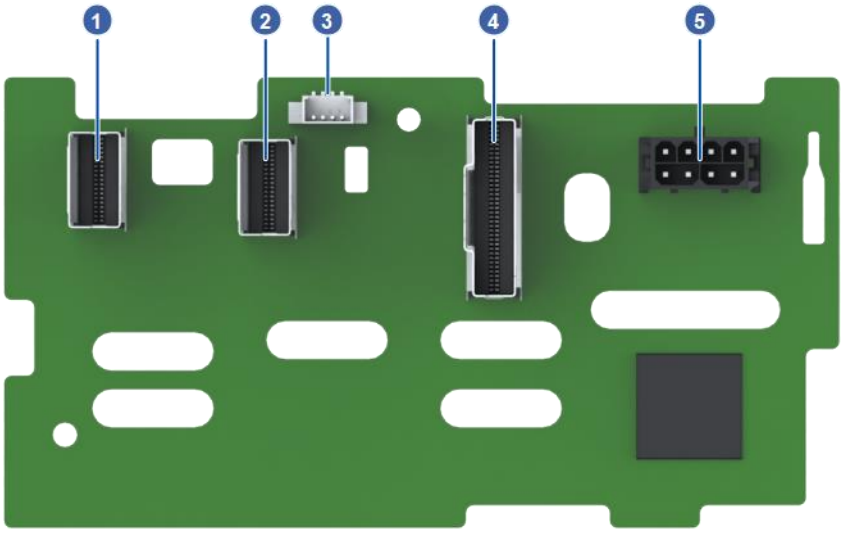
Table 9-8 Interfaces on a 2 x 2.5" Hard Disk Backplane

No.	Interface Name	Silk Screen	Position ID
1	PCIe x8 interface	HSIO	X3
2	Power cable interface	PWR	X4
3	PCIe x4 interface	SAS	X2
4	Out-of-band communication interface	I2C	X1

- 2 x 3.5" hard disk backplane

  This type of hard disk backplane can be installed in I/O module 1 or 2. Figure 9-9 shows a 2 x 3.5" hard disk backplane.

Figure 9-9 2 x 3.5" Hard Disk Backplane



For a description of the interfaces on the 2 x 3.5" disk backplane, refer to Table 9-9.

Table 9-9 Interfaces on the 2 x 3.5" Hard Disk Backplane

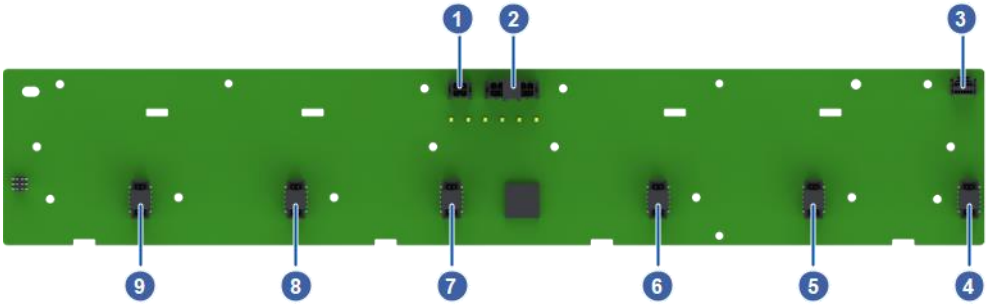
No.	Interface Name	Silk Screen	Position ID
1	PCIe x4 interface 1	SAS1	X2
2	PCIe x4 interface 2	SAS2	X1
3	Out-of-band communication interface	I2C	X7
4	PCIe x8 interface	HSIO	X3
5	Power cable interface	PWR	X4

9.4 Fan Backplane

The fan backplane is used to connect the mainboard and fan units.

Figure 9-10 shows the fan backplane of the NCS6721A N6 server.

Figure 9-10 Fan Backplane



For a description of the interfaces on the fan backplane of the NCS6721A N6 server, refer to Table 9-10.

Table 9-10 Fan Backplane Interface Descriptions

No.	Interface	Silk Screen	Position ID
1	Power interface for fan 6	-	X9
2	Power interface for fans 1–5	-	X12
3	Fan data line interface	-	X7
4	Interface for fan 1	FAN1	X1
5	Interface for fan 2	FAN2	X2
6	Interface for fan 3	FAN3	X3
7	Interface for fan 4	FAN4	X4
8	Interface for fan 5	FAN5	X5
9	Interface for fan 6	FAN6	X6

Chapter 10
Cables

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10.1 Power Cables

The NCS6721A N6 is configured with different power supply modules to provide AC or DC power supply. In accordance with the power distribution condition, an AC power supply module can use an AC power cable with a three-flat-pin male plug or with pre-insulated tubular terminals, and a DC power supply module can use a high-voltage DC power cable or -48 V DC power cable.

10.1.1 AC Power Cable with a Three-Flat-Pin Male Plug

Function

An AC power cable with a three-flat-pin male plug is connected to a power strip in the cabinet to supply power for the NCS6721A N6 server chassis.

External View

Figure 10-1 shows an external view of an AC power cable with a three-flat-pin male plug.

Figure 10-1 AC Power Cable with a Three-Flat-Pin Male Plug

End A of the power cable is a C13 female connector, and end B is a 10 A three-flat-pin male plug. The power cable is a black AC power cable.

Connections

For the connections of an AC power cable with a three-flat-pin male plug, refer to Table 10-1.

Table 10-1 Connections of an AC Power Cable with a Three-Flat-Pin Male Plug

End A	End B
Connected to the power input port of an AC PSU on the chassis.	Connected to a power strip in the cabinet.

Technical Specifications

- Rated current: 10 A.
- Internal wires: three wires, each with a cross-sectional area of 1 mm^2.

10.1.2 AC Power Cable with Pre-Insulated Tubular Terminals

Function

An AC power cable with pre-insulated tubular terminals is connected to the AC PDU in the equipment room to supply power for the NCS6721A N6 server chassis.

External View

Figure 10-2 shows an external view of an AC power cable with pre-insulated tubular terminals.

Figure 10-2 AC Power Cable with Pre-Insulated Tubular Terminals

End A of the power cable is a C13 female connector, and end B consists of pre-insulated tubular terminals. The power cable is a black AC power cable.

For the correspondence between the wires and pins of an AC power cable with pre-insulated tubular terminals, refer to Table 10-2.

Table 10-2 Correspondence Between Wires and Pins of an AC Power Cable with Pre-Insulated Tubular Terminals

Pin of End A	Wire Color	Pin of End B
L	Brown	B1
N	Blue	B2
E	Yellow-green	B3

Connections

For the connections of an AC power cable with pre-insulated tubular terminals, refer to Table 10-3.

Table 10-3 Connections of an AC Power Cable with Pre-Insulated Tubular Terminals

End A	End B
Connected to the power input port of an AC PSU on the chassis.	Connected to the AC PDU.

Technical Specifications

- Rated current: 10 A.
- Internal wires: three wires, each with a cross-sectional area of 1 mm^2.

10.1.3 HVDC Power Cable

Function

An HVDC power cable is connected to the DC PDU in the equipment room to supply power for the NCS6721A N6 server chassis.

External View

Figure 10-3 shows an external view of an HVDC power cable.

Figure 10-3 HVDC Power Cable

End A of the power cable is an HVDC female connector, and end B consists of pre-insulated tubular terminals. The power cable is a black DC power cable.

For the correspondence between the wires and the pins of the HVDC power cable, refer to Table 10-4.

Table 10-4 Correspondence Between the Wires and Pins of an HVDC Power Cable

Pin of End A	Wire Color	Pin of End B
L (+)	Brown	B1
N (-)	Blue	B2
FG	Yellow-green	B3

Connections

For the connections of an HVDC power cable, refer to Table 10-5.

Table 10-5 Connections of an HVDC Power Cable

End A	End B
Connected to the power input port of a DC PSU of the chassis.	Connected to the DC PDU in the equipment room.

Technical Specifications

- Rated current: 10 A.
- Internal wires: three wires, each with a cross-sectional area of 1 mm^2.

10.1.4 -48 V DC Power Cable

Function

A –48 V DC power cable is connected to the DC PDU in the equipment room to supply power for the NCS6721A N6 server chassis.

External View

Figure 10-4 shows an external view of a –48V DC power cable.

Figure 10-4 –48V DC Power Cable

End A of the power cable is a dedicated –48 V DC power plug, and end B consists of pre-insulated terminals with copper lugs. The power cable has three wires: one red wire, one black wire, and one yellow-green wire.

For the correspondence between the wires and pins of the –48 V DC power cable, refer to Table 10-6.

Table 10-6 Correspondence Between the Wires and Pins of a –48V DC Power Cable

Pin of End A	Wire Color	Pin of End B
1	Yellow-green	B1 (label: PE)
2	Black	B2 (label: –48 V)
3	Red	B3 (label: –48 VRTN)

Connections

For the connections of a –48 V DC power cable, refer to Table 10-7.

Table 10-7 –48 V DC Power Cable Connections

End A	End B
Connected to the power input port of a DC PSU of the chassis.	Connected to the DC PDU in the equipment room.

Technical Specifications

Rated current: 26 A.

10.2 Straight-Through Cable

Function

A straight-through cable is used to connect two devices or terminals for data transmission.

External View

Figure 10-5 shows an external view of a straight-through cable.

Figure 10-5 Straight-Through Cable

End A and end B of a shielded straight-through cable are shielded 8P8C crimped plugs. End A and end B of a non-shielded straight-through cable are non-shielded 8P8C crimped plugs. The main differences between shielded and unshielded straight-through cables lie in the structures, resistance to interference, and application scenarios.

- Shielded straight-through cable: This type of cable contains a metal shielding layer to reduce electromagnetic interference and RF interference, thus increasing signal quality and transmission distance. Shielded straight-through cables are typically used in environments with high data transmission requirements, such as data centers or industrial automation settings.
- Unshielded straight-through cable: This type of cable lacks an additional metal shielding layer, resulting in lower resistance to interference. Due to its lower cost and ease of installation, unshielded straight-through cables are widely used in home and office environments.

Connections

The two ends of a straight-through cable are connected to the network interfaces (RJ45 interfaces) of the devices or terminals that require data transmission.

Technical Specifications

A shielded straight-through cable is an eight-core 100-ohm Cat5e shielded cable. An unshielded straight-through cable is an eight-core 100-ohm Cat5e unshielded cable. Table 10-8 describes the correspondence between cores.

Table 10-8 Correspondence Between Wires and Pins of a Straight-Through Cable

End A	Color	End B
1	White-orange	1
2	Orange	2
3	White-green	3
4	Blue	4
5	White-blue	5
6	Green	6
7	White-brown	7
8	Brown	8

Note

The metal shielding layer of a shielded cable must be securely connected to the metal shielding enclosures of connectors at both ends.

10.3 Serial Cable

Function

A serial cable is used to connect the type-C serial port on the NCS6721A N6 server chassis to a USB port on a debugging PC.

External View

Figure 10-6 shows an external view of a serial cable for the type-C port.

Figure 10-6 Serial Cable for the Type-C Port

End A of the serial cable is a type-C connector, and end B is a USB connector.

Connections

For the connections of the serial cable for the type-C port, refer to Table 10-9.

Table 10-9 Serial Cable Connections

End A	End B
Connected to the type-C serial port on the server.	Connected to a USB port on a debugging PC.

10.4 VGA Cable

Function

A VGA cable is used to connect the NCS6721A N6 and a media display.

External Overview

Figure 10-7 shows the external overview of a VGA cable.

Figure 10-7 VGA Cable

A VGA cable is a beige UL2919 cable with magnetic rings, and uses HD-SUB plugs at both ends.

Connections

For the connections of a VGA cable, refer to Table 10-10.

Table 10-10 VGA Cable Connections

End A	End B
Connected to the VGA interface on the chassis.	Connected to the VGA interface of a media display.

Technical Specifications

A VGA cable is a horizontal pair-twisted cable. For the correspondence between the wires and pins of a VGA cable, refer to Table 10-11.

Table 10-11 Correspondence Between the Wires and Cores of a VGA Cable

End A	Color	End B
1	Core of the red cord	1
2	Core of the gray cord	2
3	Core of the blue cord	3
4	(Blank)	4
5	External shielded wire	5
6	Core of the red cord	6
7	Core of the gray cord	7
8	Core of the blue cord	8
9	(Blank)	9
10	Shielded wire for the white cord	10
11	Shielded wire for the black cord	11
12	Black wire	12
13	Shielded wire for the white cord	13
14	Shielded wire for the black cord	14
15	Brown wire	15

Note

The external shielded wire for the entire VGA cable, shielded wire for the white cord, and shielded wire for the black cord are connected and grounded together through the VGA plug shell.

Chapter 11
Anti-Intrusion Sensor

The functions of the anti-intrusion sensor are as follows:

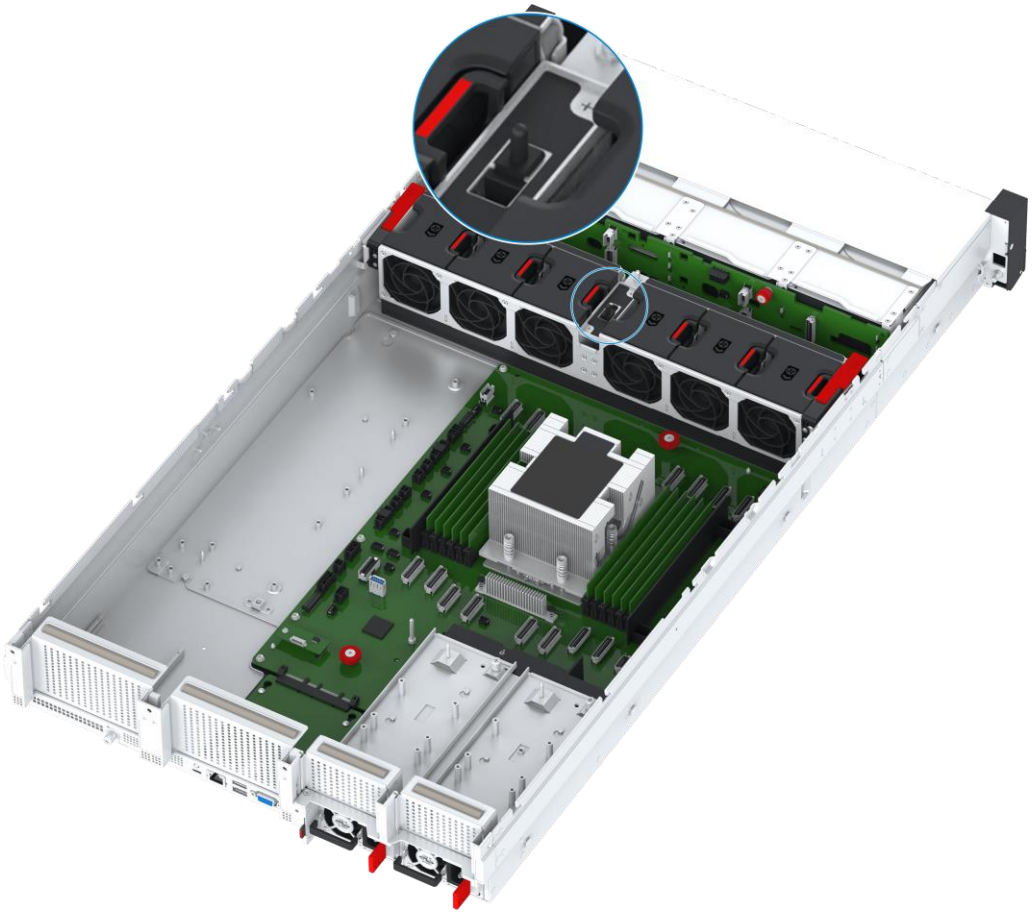
- Triggers an alarm to indicate that the cover of the server is not installed or is not installed properly.
- Ensures good heat dissipation of related components and proper operation of the server if the cover of the server is not installed or is not installed properly.

When the server is in power-on status, once the anti-intrusion sensor detects that the cover is open, it triggers the following actions:

- The BMC reports a system intrusion alarm, indicating that the cover of the server is not installed or is not installed properly.
- The fans of the server operate at the maximum speed to ensure good heat dissipation.

Figure 11-1 shows the position of the anti-intrusion sensor in the NCS6721A N6 server.

Figure 11-1 Position of the Anti-Intrusion Sensor



Glossary

AC

- Alternating Current

ADDDC

- Adaptive Double Device Data Correction

BIOS

- Basic Input/Output System

BMC

- Baseboard Management Controller

CAS

- Column Address Strobe

CPU

- Central Processing Unit

CRC

- Cyclic Redundancy Check

DC

- Direct Current

DDR

- Double Data Rate

DIMM

- Dual Inline Memory Module

DRAM

- Dynamic Random Access Memory

ECC

- Error Check and Correction

ECS

- Error Check and Scrub

EPLD

- Erasable Programmable Logic Device

GPU

- Graphics Processing Unit

HBM

- High Bandwidth Memory

HVDC

- High-Voltage Direct Current

I/O

- Input/Output

JTAG

- Joint Test Action Group

NCSI

- Network Controller Sideband Interface

NIC

- Network Interface Card

NVMe

- Non-Volatile Memory Express

OCP

- Open Computer Project

OS

- Operating System

PC

- Personal Computer

PCIe

- Peripheral Component Interconnect Express

PCLS

- Partial Cache Line Sparing

PDU

- Power Distribution Unit

PPR

- Post-Package Repair

PSU

- Power Supply Unit

RAID

- Redundant Array of Independent Disks

RDIMM

- Registered Dual Inline Memory Module

SAS

- Serial Attached SCSI

SATA

- Serial ATA

SDDC

- Single Device Data Correction

SPD

- Serial Presence Detect

SSD

- Solid State Drive

TPCM

- Trusted Platform Control Module

TPM

- Trusted Platform Module

UID

- Unit Identification Light

USB

- Universal Serial Bus

VGA

- Video Graphic Adapter