

NETAŞ NCS6721 N6

Rack Server

Hardware Description

Version: R1.0

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About This Manual

Purpose

This manual describes the hardware configurations of the NCS6721 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 NCS6721 N6.
Chapter 2, CPU	Describes the positions of CPUs in the NCS6721 N6 server and the recommended CPU configurations.
Chapter 3, Memory	Describes the memory slots in the NCS6721 N6 server and the supported memory configurations.
Chapter 4, Storage	Describes the hard disk slots in the NCS6721 N6 server and the supported hard disk configurations.
Chapter 5, Network	Describes the OCP NIC and PCIe NIC configurations for the NCS6721 N6 server.
Chapter 6, I/O Expansion	Describes the PCIe slots in the NCS6721 N6 server and the supported PCIe card configurations.
Chapter 7, PSU	Describes the positions of PSUs in the NCS6721 N6 server and the supported PSU configurations.
Chapter 8, Fan Unit	Describes the positions of fan units in the NCS6721 N6 server and the supported fan unit configurations.
Chapter 9, Board	Describes the I/O card, mainboard, and disk backplane configurations for the NCS6721 N6 server.

Chapter 10, Cables	Describes the functions, structures, and usage of cables used by the NCS6721 N6 server.
Chapter 11, Anti-Intrusion Sensor	Describes the functions and position of the anti-intrusion sensor in the NCS6721 N6 server.

Conventions

This manual uses the following conventions.

1	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.	
111	Note: provides additional information about a topic.	

Chapter 1 Product Structure

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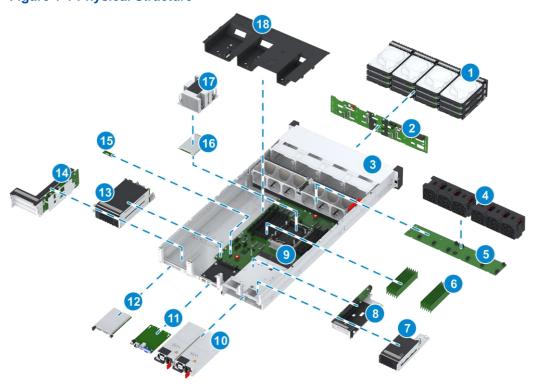
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1.1 Physical Structure

1.1.1 Physical Structure of the General Model

Figure 1-1 shows the internal components of the NCS6721 N6 server (horizontal 12-disk standard model).

Figure 1-1 Physical Structure



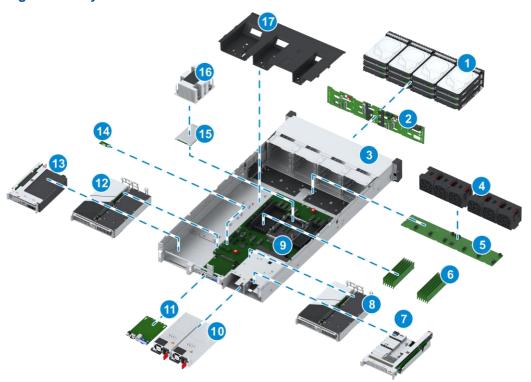
No.	Component	No.	Component
1	Front hard disk	2	Front-disk backplane

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 NCS6721 N6 4-GPU server.

Figure 1-2 Physical Structure



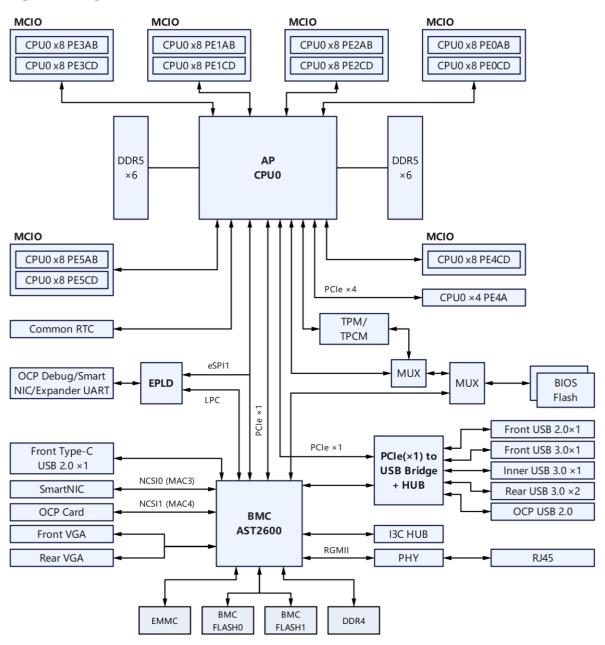
No.	Component	No.	Component
1	Front hard disk	2	Front-disk backplane
3	Chassis	4	Fan unit
5	Fan backplane	6	Memory
7	I/O module 3	8	I/O module 4

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 NCS6721 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	Descriptions	
CPU	Central processing unit, as the calculation and control core of the server, used for processing information and running programs. The NCS6721 N6 server supports one CPU.	
DDR5	Used for storing computational data in the CPUs and the data exchanged with externatorage devices such as hard disks. The NCS6721 N6 server provides 12 DDR memory slots.	

Module	Descriptions	
Riser	Extended PCIe module, used for installing standard PCIe cards.	
USB	Used for exchanging data between the server and external devices. The NCS6721 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.	
ВМС	Used for upgrading server firmware and viewing device information when the server is not powered on.	
BMC GE	Provides a GE electrical 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.	
OCP	Supports various OCP NIC 3.0 cards.	

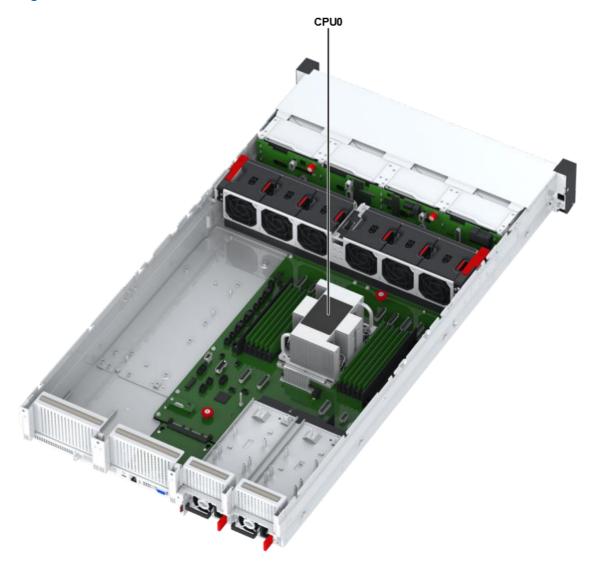
Chapter 2 CPU

The NCS6721 N6 server uses a single-CPU design, supporting Xeon Scalable processors (

Granite Rapids-AP 6900P/ Sierra Forest-AP 6900E).

Figure 2-1 shows the position and ID of the CPU in the NCS6721 N6 server.

Figure 2-1 CPU Position and ID



Chapter 3 Memory

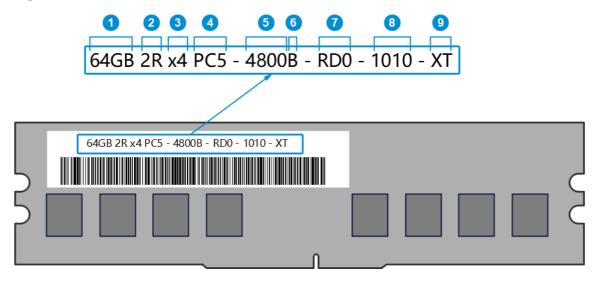
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3.1 DIMM Label

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 GB128 GB256 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°C NT (Normal Temperature grade): 0#–85°C

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
Туре	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 NCS6721 N6 server provides twelve memory channels, and each memory channel consists of one DIMM slot.

The NCS6721 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 NCS6721 N6 server.

Rear

CPU0_L0
CPU0_K0
CPU0_J0
CPU0_I0
CPU0_H0
CPU0_G0

Front

CPU0_A0
CPU0_B0
CPU0_C0
CPU0_D0
CPU0_E0
CPU0_E0
CPU0_F0

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



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 NCS6721 N6 server.

Figure 3-3 Recommended Memory Configuration

DDDE	T0	_K0	J0	01	ЭН.	0.5		A 0	_B0	_C0	D0_	E0	F0
DDR5 Qty	CPU0_	CPU0_	CPU0_	CPU0_	CPU0_	CPU0_		CPU0_	CPU0_	CPU0_	CPU0_	CPU0_	CPU0_
1	-	-	-	-	-	-		√	-	-	-	-	-
	√	√	√	√	-	-	C	-	-	√	√	√	√
8	-	√	√	-	√	√	P U	√	√	-	√	√	-
	√	-	-	√	√	√	0	√	√	√	-	-	√
12	√	√	√	√	√	√		√	√	√	√	√	√

- " $\sqrt{}$ " indicates that a DIMM needs to be installed.
- "-" indicates that no DIMM needs to be installed.



If there are eight DIMMs, there are three recommended configurations.

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)

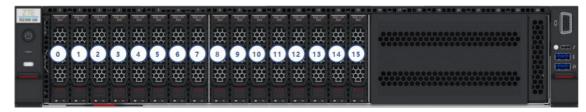


All slots support SAS/SATA/NVMe SSDs.

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)

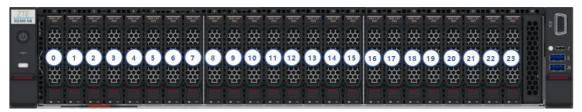


All slots support SAS/SATA/NVMe SSDs.

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)

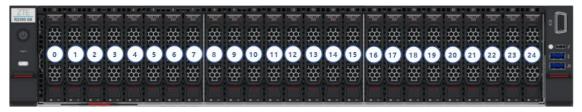


All slots support SAS/SATA/NVMe SSDs.

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 (22 E1.S hard disks)

Figure 4-7 shows the hard disk slots arranged when 22 E1.S hard disks are installed vertically.

Figure 4-7 Vertical Layout (22 E1.S Hard Disks)



Vertical layout (22 E3.S hard disks)

Figure 4-8 shows the hard disk slots arranged when 22 E1.S hard disks are installed vertically.

Figure 4-8 Vertical Layout (22 E3.S Hard Disks)



•



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 NCS6721 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.



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 NCS6721 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 (Intel BirchStream)*.

Chapter 5 Network

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5.1 OCP NIC

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

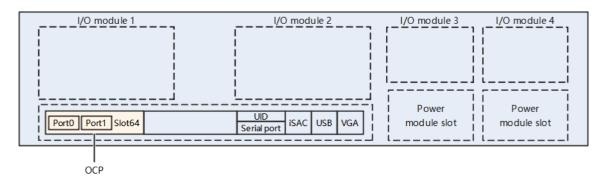
The NCS6721 N6 server supports OCP NICs to provide more network capabilities. The OCP NIC slots support various standard OCP NIC 3.0 cards, which provide the following port rates: GE, 10 GE, 25 GE, and 100 GE. Figure 5-1 shows the OCP NIC position.

Figure 5-1 OCP NIC Positions

The port names of a OCP NIC configured for the NCS6721 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 NCS6721 N6 server is ensxfy. 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 NCS6721 N6 server is configured with OCP NIC that has two optical interfaces each.

Figure 5-2 Typical OCP NIC Configuration





In Figure 5-2, the ports of the OCP NIC located in slot 64 are named ens64f0 and ens64f1.

For the OCP NIC models that the NCS6721 N6 server supports, refer to Table 5-1.

Table 5-1 Supported OCP NIC Models

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



The number of OCP NIC models supported by the NCS6721 N6 server is growing. For more information, contact technical support.

5.2 PCIe NIC

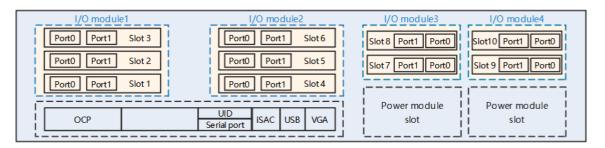
A PCIe NIC is a network adapter that provides PCIe ports. It is connected to the mainboard through a PCIe port.

The NCS6721 N6 server supports PCIe NICs to provide more network capabilities.

The port names of a PCIe NIC configured for the NCS6721 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 NCS6721 N6 server is ensxfy. 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 NCS6721 N6 server is configured with PCIe NICs that have two optical interfaces each.

Figure 5-3 Typical PCIe NIC Configuration





In Figure 5-3, the ports of the PCIe NIC located in slot 3 are named ens3f0 and ens3f1.

Chapter 6 I/O Expansion

6.1 PCle Card

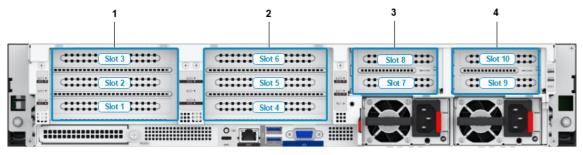
You can install PCle cards as required to expand system capabilities.

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 NCS6721 N6 server model.

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



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 NCS6721 N6 server model, 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
		Х8	2
	RC5306N2C	X16	2
	RC5306N2C1	X16	2
I/O module 2	RC5306N3B	X16	1
		Х8	2
	RC5306N2C	X16	2
	RC5306N2C1	X16	2
I/O module 3	RC5306N2B	X8	2
	RC5306N2E	X16	2
I/O module 4	RC5306N2B	X8	2
	RC5306N2E	X16	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



Figure 6-3 shows an RC5306N2C riser card installed in I/O module 1.

Figure 6-3 RC5306N2C Riser Card Installed in I/O Module 1



Figure 6-4 shows an RC5306N2C1 riser card installed in I/O module 1.

Figure 6-4 RC5306N2C1 Riser Card Installed in I/O Module 1

• I/O module 2

Figure 6-5 shows an RC5306N3B riser card installed in I/O module 2.

Figure 6-5 RC5306N3B Riser Card Installed in I/O Module 2



Figure 6-6 shows an RC5306N2C riser card installed in I/O module 2.

Figure 6-6 RC5306N2C Riser Card Installed in I/O Module 2



Figure 6-7 shows an RC5306N2C1 riser card installed in I/O module 2.

Figure 6-7 RC5306N2C1 Riser Card Installed in I/O Module 2



I/O module 3

Figure 6-8 shows an RC5306N2B riser card installed in I/O module 3.

Figure 6-8 RC5306N2B Riser Card Installed in I/O Module 3

Figure 6-9 shows an RC5306N2E riser card installed in I/O module 3.

Figure 6-9 RC5306N2E Riser Card Installed in I/O Module 3





I/O module 3 supports both full-height and half-height PCle cards. For the two types of PCle cards, their PCle slot IDs are the same. A half-height PCle card is used as an example in Figure 6-8 and Figure 6-9.

• I/O module 4

Figure 6-10 shows an RC5306N2B riser card installed in I/O module 4.

Figure 6-10 RC5306N2B Riser Card Installed in I/O Module 4



Figure 6-11 shows an RC5306N2E riser card installed in I/O module 4.

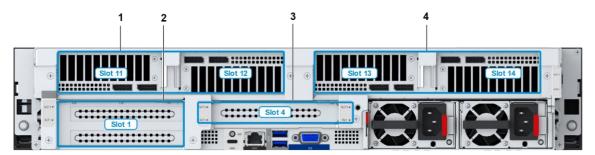
Figure 6-11 RC5306N2E Riser Card Installed in I/O Module 4



6.2.2 PCIe Card Slot Positions of a 4-GPU Server

Figure 6-12 shows the positions of the PCIe slots of a 4-GPU NCS6721 N6 server.

Figure 6-12 PCle 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 NCS6721 N6 server model, refer to Table 6-2.

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

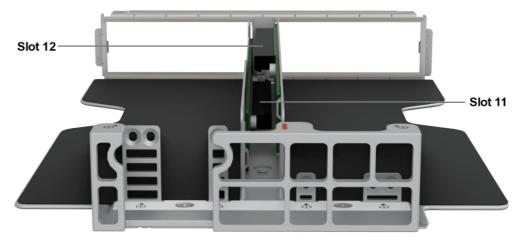
I/O Module	Riser card	PCIe Interface	Quantity
I/O module 1	RC5305N1B	X16	2
I/O module 2	RC5306N1C	X16	1
I/O module 3	RC5306N1C	X16	1
I/O module 4	RC5305N1B	X16	2

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

• I/O module 1

Figure 6-13 shows an RC5305N1B riser card installed in I/O module 1.

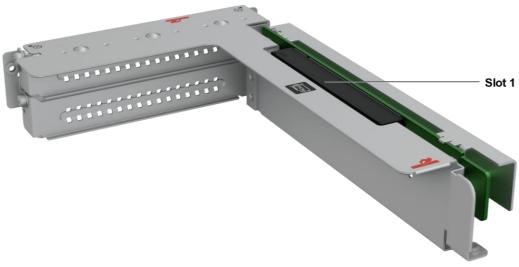
Figure 6-13 RC5305N1B Riser Card Installed in I/O Module 1



• I/O module 2

Figure 6-14 shows an RC5306N1C riser card installed in I/O module 2.

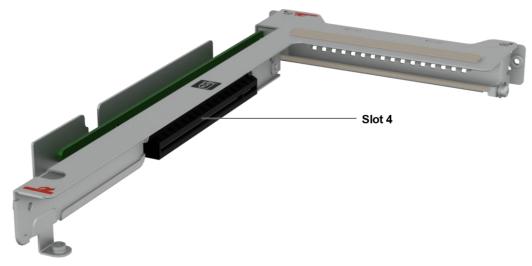
Figure 6-14 RC5306N1C Riser Card Installed in I/O Module 2



• I/O module 3

Figure 6-15 shows an RC5306N1C riser card installed in I/O module 3.

Figure 6-15 RC5306N1C Riser Card Installed in I/O Module 3



• I/O module 4

Figure 6-16 shows an RC5305N1B riser card installed in I/O module 4.

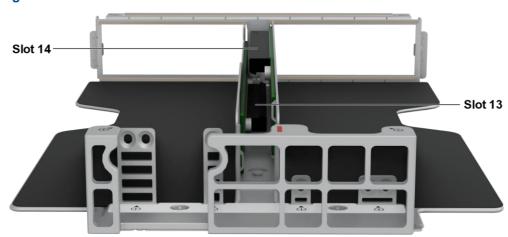


Figure 6-16 RC5305N1B Riser Card Installed in I/O Module 4

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 NCS6721 N6 server, refer to Table 6-3.

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

PCIe Slot	CPU	PCIe Stan	Supported Bandwidth	Slot Size
		dard		
Slot1	CPU0	PCle 5.0	 2-slot RC5306N2C and RC5306N2C1 riser cards: X16 3-slot RC5306N3B riser card: X8 	Full height and full length
Slot2	CPU0	PCIe 5.0	X16	Full height and full length
Slot3	CPU0	PCle 5.0	 2-slot RC5306N2C and RC5306N2C1 riser cards: not applicable 3-slot RC5306N3B riser card: X8 	Full height and full length
Slot4	CPU0	PCIe 5.0	 2-slot RC5306N2C and RC5306N2C1 riser cards: X16 3-slot RC5306N3B riser card: X8 	Full height and full length
Slot5	CPU0	PCle 5.0	X16	Full height and full length
Slot6	CPU0	PCle 5.0	 2-slot RC5306N2C and RC5306N2C1 riser cards: not applicable 3-slot RC5306N3B riser card: X8 	Full height and full length
Slot7	CPU0	PCle 5.0	2-slot RC5306N2B riser card: X82-slot RC5306N3E Riser card: X16	Full height and full length or

PCIe Slot	CPU	PCIe Stan	Supported Bandwidth	Slot Size
		dard		
				half height and full length
Slot8	CPU0	PCIe 5.0	2-slot RC5306N2B riser card: X82-slot RC5306N3E Riser card: X16	Full height and full length or half height and full length
Slot9	CPU0	PCIe 5.0	2-slot RC5306N2B riser card: X82-slot RC5306N3E Riser card: X16	Half height and full length
Slot10	CPU0	PCIe 5.0	2-slot RC5306N2B riser card: X82-slot RC5306N3E Riser card: X16	Half height and full length



The dimensions of full height, half height, full length, and half length are as follows:

- Full height: no more than 111.15 mm
- Half height: no more than 68.9 mm
- Full length: 254.00 mm through 312.00 mm
- Half length: no more than 167.65 mm

6.3.2 PCle Card Slot Descriptions for a 4-GPU Server

For a description of the PCle slots supported by a 4-GPU NCS6721 N6 server, refer to Table 6-4.

Table 6-4 PCIe Card Slot Descriptions for a 4-GPU 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	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



The dimensions of full height, half height, full length, and half length are as follows:

- Full height: no more than 111.15 mm
- Half height: no more than 68.9 mm
- Full length: 254.00 mm through 312.00 mm
- Half length: no more than 167.65 mm

Chapter 7 PSU

Figure 7-1 shows the positions of the PSUs in the NCS6721 N6 server.

Figure 7-1 PSU Positions



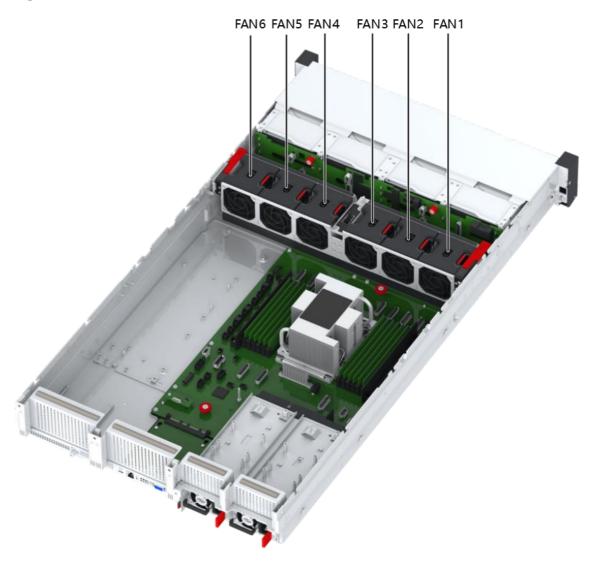
The PSU configurations of the NCS6721 N6 server are described as follows:

- 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.

Chapter 8 Fan Unit

Figure 8-1 shows the positions of fan units on the NCS6721 N6 server.

Figure 8-1 Fan Unit Positions



The fan unit configurations of the NCS6721 N6 server are described as follows:

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



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

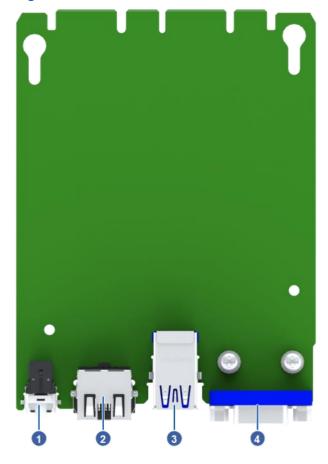
Hard Disk Backplanes 37 Fan Backplane 43

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 NCS6721 N6 server.





For a description of the ports on the BMC card of the NCS6721 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	СОМ	X4
2	BMC management network interface	BMC_ETH	X2
3	USB 3.0 interface x 2	USB1/USB2	X5
4	VGA interface	VGA	ХЗ

9.2 Mainboard

Figure 9-2 shows the mainboard layout of the NCS6721 N6 server.

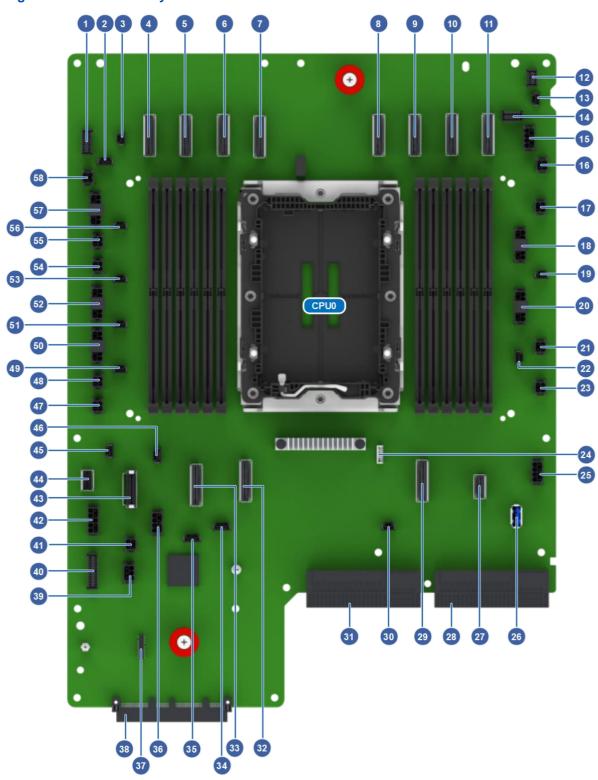


Figure 9-2 Mainboard Layout

For a description of the interfaces on the mainboard of the NCS6721 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	X26
2	Intrusion detection switch interface	INTRUDER	X55
3	Front-disk backplane I2C interface	F I2C 2	X28
4	PCle x8 interface 8	HSIO8	X4
5	PCle x8 interface 7	HSIO7	X6
6	PCIe x8 interface 6	HSIO6	X5
7	PCle x8 interface 5	HSIO5	X1
8	PCle x8 interface 4	HSIO4	X251
9	PCle x8 interface 3	HSIO3	X252
10	PCle x8 interface 2	HSIO2	X2
11	PCle x8 interface 1	HSIO1	Х3
12	Fan data line interface	FAN MISC	X66
13	Front-disk backplane I2C interface	F I2C 1	X55
14	Left flange interface	BTN/LED	X56
15	Front-disk backplane power interface	PWR1	X249
16	Riser or disk-backplane power interface	PWR21	X16
17	Riser or disk-backplane power interface	PWR20	X10
18	Rear-disk backplane or GPU power interface	PWR19	X37
19	I2C interface for I/O module 4	R I2C 10	X31
20	Rear-disk backplane or GPU power interface	PWR18	X48
21	Riser or disk-backplane power interface	PWR17	X45
22	I2C interface for I/O module 3	R I2C 9	X30
23	Riser or disk-backplane power interface	PWR16	X19
24	AbbrMacro KEY interface	RAID KEY	X36
25	Riser or disk-backplane power interface	PWR15	X248
26	Built-in AbbrMacro3.0 interface	USB 3	X34
27	PCIe x4 interface	HSIO12	X63
28	AbbrMacro power interface 2	PSU 2	X2A4

No.	Interface	Silk Screen	Position ID
29	PCIe x8 interface 11	HSIO11	X8
30	I2C interface for I/O module 2	R I2C 8	X47
31	AbbrMacro power interface 1	PSU 1	X1A4
32	PCIe x8 interface 10	HSIO10	X9
33	PCIe x8 interface 9	HSIO9	X7
34	Leakage detection interface 2	WEEP WIRE 2	X53
35	Leakage detection interface 1	WEEP WIRE 1	X54
36	Riser or disk-backplane power interface	PWR14	X247
37	AbbrMacro card interface	TPM/TPCM	X65
38	AbbrMacro management card interface	BMC CARD	X35
39	Smart NIC power interface	PWR12	X14
40	Smart NIC data cable interface	SMART NIC NCSI	X52
41	OCP NIC power interface	PWR11	X51
42	Smart NIC power interface	PWR10	X15
43	OCP NIC data cable interface	OCP NCSI	X58
44	Right lug interface	VGA/USB/OCP DEBUG	X6
45	Central I2C interface	M I2C 7	X20
46	Smart NIC power interface	PWR13	X57
47	Riser or disk-backplane power interface	PWR9	X18
48	Built-in M.2 backplane power interface	PWR8	X38
49	I2C interface for I/O module 1	R I2C 6	X46
50	Rear-disk backplane or GPU power interface	PWR7	X39
51	Built-in M.2 backplane I2C interface	M I2C 5	X49
52	Rear-disk backplane or GPU power interface	PWR6	X43
53	Front-disk backplane I2C interface	F I2C 4	X61
54	Riser or disk-backplane power interface	PWR5	X11
55	Riser or disk-backplane power interface	PWR4	X17
56	Front-disk backplane I2C interface	F I2C 3	X29
57	Fan backplane power interface	PWR3	X41

No.	Interface	Silk Screen	Position ID
58	Fan backplane power interface	PWR2	X12

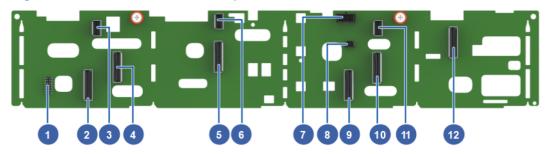
9.3 Hard Disk Backplanes

Front-Disk Backplane

The NCS6721 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.

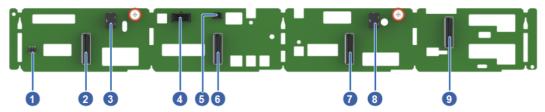
Table 9-3 Interfaces on the 12 x 3.5" Hard Disk Backplane

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
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	Х3

• 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	Х3
4	Power cable interface	PWR	X13
5	Out-of-band communication interface	12C	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 NCS6721 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.

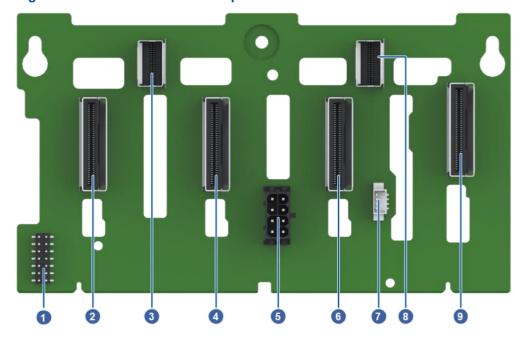


Figure 9-5 8 x 2.5" Hard Disk Backplane

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.

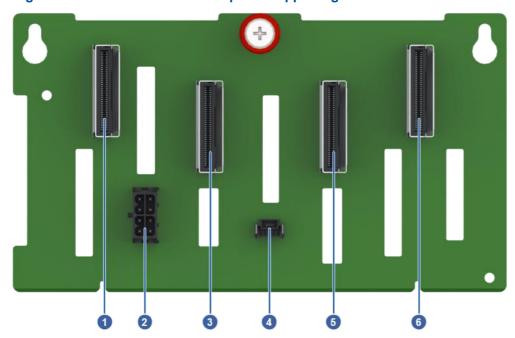


Figure 9-6 8 x 2.5" Hard Disk Backplane Supporting E1.S/E3.S SSDs

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.

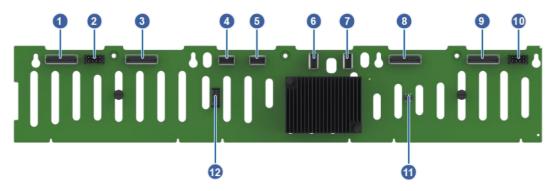
Table 9-6 Interfaces on the 8 x 2.5" Hard Disk Backplane Supporting E1.S/E3.S SSDs

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	Х3
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

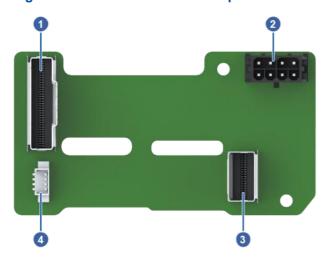
No.	Interface Name	Silk Screen	Position ID
1	PCIe x8 interface 4	HSIO 4	X34
2	Power cable interface	PWR_2	X5
3	PCIe x8 interface 3	HSIO 3	X33
4	PCIe x4 interface 1	SLIMSAS_1	X37
5	PCIe x4 interface 2	SLIMSAS_2	X39
6	PCIe x4 interface 3	SLIMSAS_3	X35
7	PCIe x4 interface 4	SLIMSAS_4	X36
8	PCIe x8 interface 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 NCS6721 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.

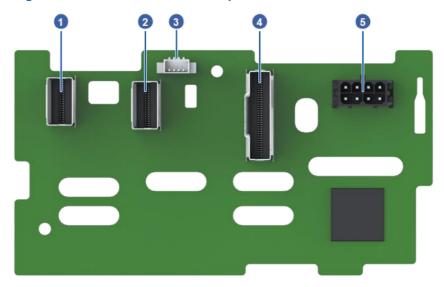
Table 9-8 Interfaces on a 2 x 2.5" Hard Disk Backplane

No.	Interface Name	Silk Screen	Position ID
1	PCIe x8 interface	HSIO	Х3
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

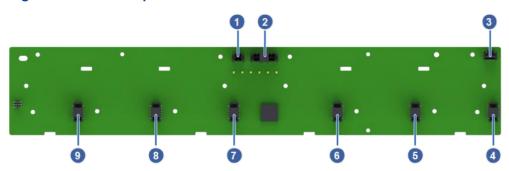
No.	Interface Name	Silk Screen	Position ID
1	PCIe x4 interface 1	SAS1	X2
2	PCIe x4 interface 2	SAS2	X1
3	Out-of-band communication interface	I2C	X7
4	PCIe x8 interface	HSIO	Х3
5	Power cable interface	PWR	X4

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 NCS6721 N6 server.

Figure 9-10 Fan Backplane



For a description of the interfaces on the fan backplane of the NCS6721 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	-	Х9
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	Х3
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 NCS6721 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 NCS6721 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.

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	Connected to a power strip in the cabinet.
the chassis.	

Technical Specifications

- Rated current: 10 A.
- Internal wires: three wires, each with a cross-sectional area of 1 mm².

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 NCS6721 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
Е	Yellow-green	В3

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	Connected to the AC PDU.
the chassis.	

Technical Specifications

- Rated current: 10 A.
- Internal wires: three wires, each with a cross-sectional area of 1 mm².

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 NCS6721 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	В3

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	Connected to the DC PDU in the equipment room.
chassis.	

Technical Specifications

- Rated current: 10 A.
- Internal wires: three wires, each with a cross-sectional area of 1 mm².

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 NCS6721 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 preinsulated 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)

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	Connected to the DC PDU in the equipment room.
chassis.	

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.

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



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 NCS6721 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 NCS6721 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



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 NCS6721 N6 server.

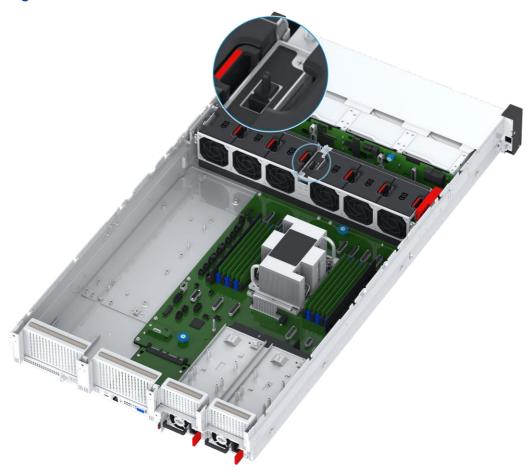


Figure 11-1 Position of the Anti-Intrusion Sensor

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

NIC

- Network Interface Card

NVMe

- Non-Volatile Memory Express

OCP

- Open Computer Project

os

- Operating System

PC

- Personal Computer

PCle

- 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

UID

- Unit Identification Light

USB

- Universal Serial Bus

VGA

- Video Graphic Adapter