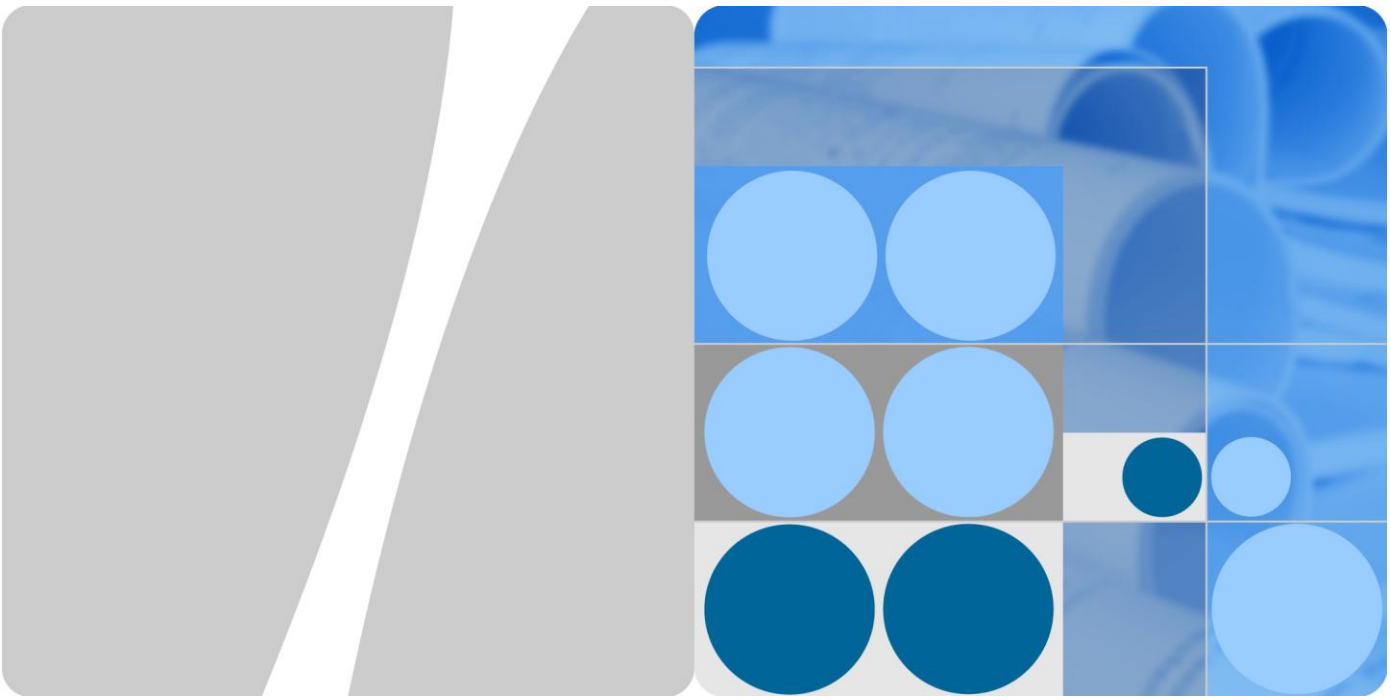

HUAWEI FusionServer RH5885H V3

Technical White Paper

Issue 01

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Contents

1 Overview

1.1 Functions

This topic describes the HUAWEI FusionServer RH5885H V3 (RH5885H V3 for short) functions.

As technology and applications develop rapidly, customers have higher requirements on the reliability, performance, maintainability, and cost of servers. Building on Huawei's extensive experience in servers, the RH5885H V3 is a high-performance enterprise-level server that uses the latest Intel processors.

The RH5885H V3 provides higher reliability, flexibility, scalability, and performance than previous servers. To address a wide range of applications such as databases, virtualization, and memory computing, the RH5885H V3 provides various processing capabilities, memory capacity, and I/O capabilities.

1.2 Appearance

This topic describes the RH5885H V3 in terms of its appearance and panel.

Appearance

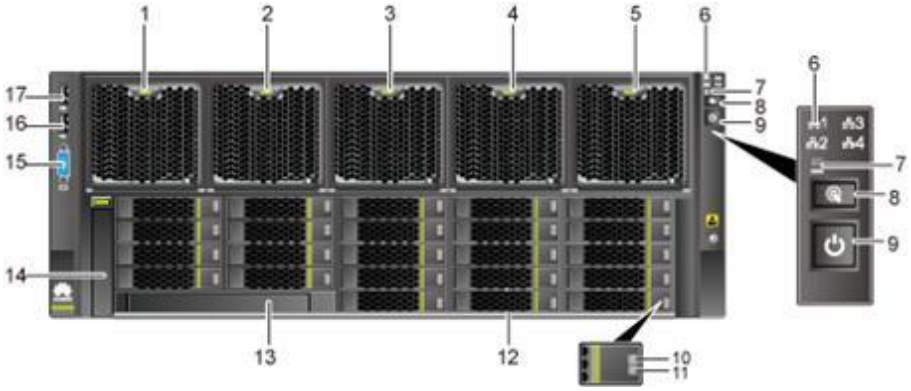
Figure 1-1 shows the RH5885H V3.

Figure 1-1 RH5885H V3

Front panel

Figure 1-2 shows the RH5885H V3 front panel after the front bezel is removed.

Figure 1-2 RH5885H V3 front panel



1	Fan module 1	2	Fan module 2
3	Fan module 3	4	Fan module 4
5	Fan module 5	6	Network port link status indicator
7	Health indicator	8	UID button/indicator
9	Power button/indicator	10	Hard disk fault indicator
11	Hard disk active indicator	12	Hard disk
13	DVD	14	LCD
15	VGA port	16	USB port 2
17	USB port 1	-	-

Table 1-1 Hard disk layout for the RH5885H V3 (8 hard disks)

HDD0	HDD4	-	-	-
HDD1	HDD5	-	-	-
HDD2	HDD6	-	-	-
HDD3	HDD7	-	-	-
-	-	-	-	-

Table 1-2 Hard disk layout for the RH5885H V3 (23 hard disks)

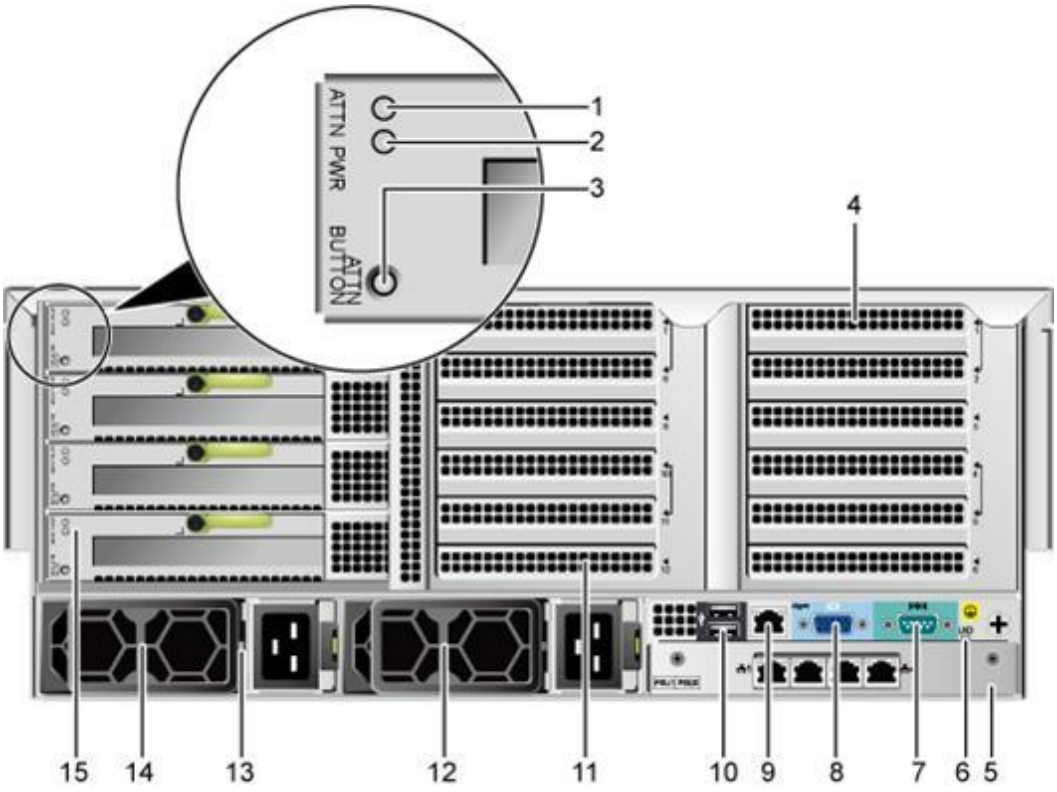
HDD0	HDD4	HDD8	HDD13	HDD18
HDD1	HDD5	HDD9	HDD14	HDD19

HDD2	HDD6	HDD10	HDD15	HDD20
HDD3	HDD7	HDD11	HDD16	HDD21
-	-	HDD12	HDD17	HDD22

Rear panel

Figure 1-3 shows the RH5885H V3 rear panel.

Figure 1-3 RH5885H V3 rear panel

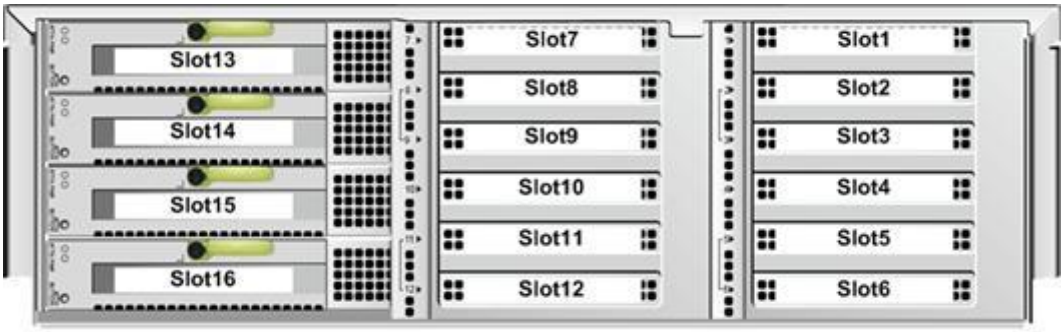


1	PCIe card status indicator (hot-swappable PCIe card)	2	PCIe card power indicator (hot-swappable PCIe card)
3	PCIe card hot swap button (hot-swappable PCIe card)	4	Standard PCIe riser card 1
5	NIC	6	UID indicator
7	Serial port	8	VGA port
9	BMC management network port	10	USB port

11	Standard PCIe riser card 2	12	PSU 2
13	PSU indicator	14	PSU 1
15	Hot-swappable PCIe riser card	-	-

PCIe slot layout for the RH5885H V3 as shown in Figure 1-4.

Figure 1-4 PCIe slot layout



Hot-swappable PCIe riser card

A hot-swapping PCIe riser card provides PCIe slots 13 to 16. Table 1-3 describes the mapping between PCIe slots and processors and the compliant PCIe standards.

Table 1-3 PCIe slot description

PCIe Slot	Processor Socket	PCIe Standard
Slot13	CPU4 When no processor is installed in socket CPU4, PCIe slots 13 to 16 are unavailable.	PCIe 3.0 x8
Slot14		
Slot15		
Slot16		

Standard PCIe riser card

Standard PCIe riser card 1 provides slots 1 to 6, and standard PCIe riser card 2 provides slots 7 to 12.

The RH5885H V3 supports standard PCIe riser cards that provide four or six PCIe slots, both of which are displayed as six PCIe slots. The two types of PCIe riser cards can be installed on one server.

- If standard PCIe riser card 1 provides four PCIe slots, slots 2 and 5 are unavailable.
- If standard PCIe riser card 2 provides four PCIe slots, slots 8 and 11 are unavailable.

Table 1-4 describes the mapping between PCIe slots and processors and the compliant PCIe standards of the RH5885H V3.

NOTE
The PCIe slots mapping to a vacant processor socket are unavailable.

Table 1-4 PCIe slot description

PCIe Slot	Processor	PCIe Standard
Slot1	Processor 1	PCIe 3.0 x4
Slot2	Processor 2	PCIe 3.0 x8
Slot3	Processor 2	• If the riser card is a 6-slot riser card, this slot is a PCIe 3.0 x8 slot. • If the riser card is a 4-slot riser card, this slot is a PCIe 3.0 x16 slot.
Slot4	Processor 2	PCIe 2.0 x4
Slot5	Processor 2	PCIe 3.0 x8
Slot6	Processor 2	• If the riser card is a 6-slot riser card, this slot is a PCIe 3.0 x8 slot. • If the riser card is a 4-slot riser card, this slot is a PCIe 3.0 x16 slot.
Slot7	Processor 1	PCIe 3.0 x4
Slot8	Processor 3	PCIe 3.0 x8
Slot9	Processor 3	• If the riser card is a 6-slot riser card, this slot is a PCIe 3.0 x8 slot. • If the riser card is a 4-slot riser card, this slot is a PCIe 3.0 x16 slot.
Slot10	PCH	PCIe 2.0 x4
Slot11	Processor 3	PCIe 3.0 x8
Slot12	Processor 3	• If the riser card is a 6-slot riser card, this slot is a PCIe 3.0 x8 slot. • If the riser card is a 4-slot riser card, this slot is a PCIe 3.0 x16 slot.

Some PCIe cards occupy I/O resources. Observe the following points:

- When a PCIe card requiring no I/O resources is configured, the PCIe card can be installed in any PCIe slot.
- When a PCIe card requiring I/O resources is configured, the PCIe card cannot be installed in a restricted PCIe slot that provides no I/O resources because the system has insufficient I/O resources. Restricted slots support only PCIe cards that do not require I/O resources. Table 1-5 shows the restricted PCIe slots.

Table 1-5 I/O resource limitation

Standard PCIe Riser Card 1	Standard PCIe Riser Card 2	Hot-Swappable PCIe Riser Card	Restricted Slot
Riser card with six PCIe slots	Riser card with six PCIe slots	Not detected	Slot 4
Riser card with six PCIe slots	Riser card with four PCIe slots	Not detected	None
Riser card with four PCIe slots	Riser card with six PCIe slots	Not detected	None
Riser card with four PCIe slots	Riser card with four PCIe slots	Not detected	None
Riser card with six PCIe slots	Riser card with six PCIe slots	Detected	Slots 1, 4, 7, and 10
Riser card with six PCIe slots	Riser card with four PCIe slots	Detected	Slots 1 and 4
Riser card with four PCIe slots	Riser card with four PCIe slots	Detected	Slot 4
Riser card with four PCIe slots	Riser card with six PCIe slots	Detected	Slots 1 and 4

NOTE
For details about the PCIe card requirements on I/O resources, see the *Compatibility List*.

1.3 Ports

This topic describes the ports on the RH5885H V3 and provides detailed information about the high-density keyboard, video, and mouse (KVM) cable.

Table 1-6 and Table 1-7 describe the external ports on the RH5885H V3.

Table 1-6 Ports on the front panel

Port	Type	Quantity	Description
Video graphics array (VGA) port	DB15	1	The port is connected to a terminal, such as a

Port	Type	Quantity	Description
			monitor or KVM.
USB port	USB2.0	2	The USB port is connected to a USB device.

Table 1-7 Ports on the rear panel

Port	Type	Quantity	Description
VGA port	DB15	1	The port is connected to a terminal, such as a monitor or KVM.
USB port	USB2.0	2	The USB port is connected to a USB device.
iMana management network port	Ethernet port	1	The 100M Ethernet port is used to manage the server.
Serial port	DB9	1	The port is used as the system serial port by default. You can set it to the serial port by using the command. The port is used for debugging.
Network port	-	-	The port types and quantity vary according to the configured NIC.

1.4 Indicators&Button

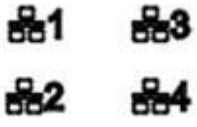
This topic describes the indicators on the RH5885H V3.

You can observe the indicators to determine the current status of the RH5885H V3.

Table 1-8 describes the indicators on the RH5885H V3 front panel.

Table 1-8 Indicators on the front panel

Indicator Symbol	Meaning	Color	State Description

Indicator Symbol	Meaning	Color	State Description
	Power button/indicator	Yellow and green	• Off: The server is not powered on. • Blinking yellow: The iMana is being started. • Steady yellow: The system is in the standby state. • Steady green: The system is properly powered on. **NOTE** You can hold down the power button for 6 seconds to power off the server.
	UID button/indicator	Blue	• Off: The server is not being located. • On: The server is being located. **NOTE** You can hold down the UID button for 6 seconds to reset the iMana.
	Health indicator	Red and green	• Steady green: The server is operating properly. • Blinking red (at 1 Hz): A major alarm is generated. • Blinking red (at 2 Hz): A critical alarm is generated.
	Hard disk active indicator	Green	• Off: The hard disk is not detected or is faulty. • Blinking green: Data is being read from, written to the hard disk, or synchronized between hard disks. • Steady green: The hard disk is inactive.
	Hard disk fault indicator	Yellow	• Off: The hard disk is operating properly or hard disks cannot be detected in the RAID. • Blinking yellow: The hard disk is being located, or the RAID is being reconstructed. • Steady yellow: The hard disk is not detected or is faulty.
	Network port link status indicator	Green	The indicator shows the status of the Ethernet port on the NIC. • Steady green: The port is properly connected.

Indicator Symbol	Meaning	Color	State Description
			• Off: The port is not in use. **NOTE** If the NIC provides two network ports, they correspond to network port indicators 1 and 2 on the front panel.

Table 1-9 describes the indicators on the RH5885H V3 rear panel.

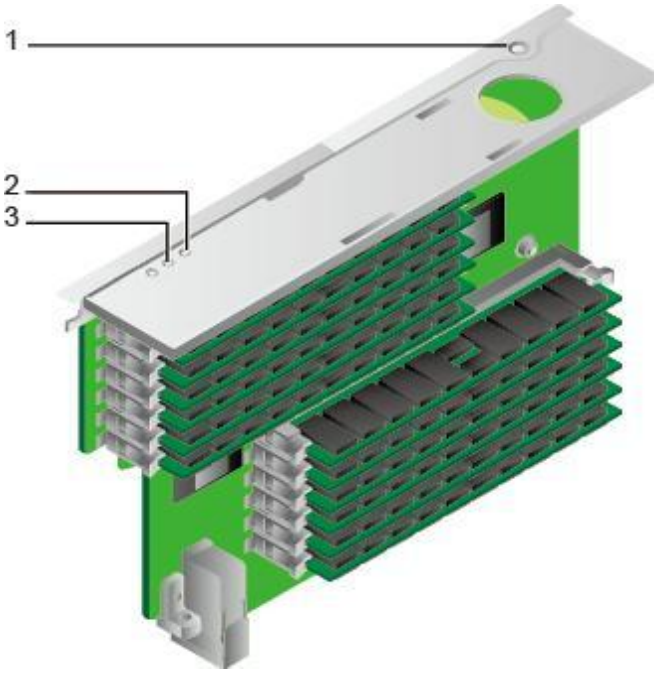
Table 1-9 Indicators on the rear panel

Indicator Symbol	Meaning	Color	State Description
UID	UID indicator	Blue	• Steady on: The UID button is pressed down. • Off: The UID button is not pressed.
-	Network port active status indicator	Orange	• Off: No data is being transmitted. • Blinking: Data is being transmitted.
-	Network port link status indicator	Green	• Steady green: The port is properly connected. • Off: The port is not in use.
-	PSU indicator	Red and green	• Steady green: The PSU is operating properly. • Blinking green (at 0.5 Hz): The PSU is in the hibernation state and supplies no power. • Steady red: The PSU is not operating properly. • Off: No power is supplied. **NOTE** The causes are as follows: • The PSU is in the input overvoltage or undervoltage state. • The PSU is in the output overvoltage or undervoltage state. • The PSU supplies no power. • An alarm is generated for fan modules, or a fan module fails.
ATTN	PCIe card status indicator	Yellow	• On: The PCIe card is error, or the device is in POST state. • Off: The PCIe card is operating properly.
PWR	PCIe card power indicator	Green	• Steady green: The power of the PCIe card is operating properly.

Indicator Symbol	Meaning	Color	State Description
			• Blinking green: The PCIe card is in the power-on or power-off process. • Off: The PCIe card is powered off.
ATTN BUTTON	PCIe card hot swap button	-	You can hot-swap the PCIe card when the system is operating properly. • Press this button when the PCIe card is operating properly. If the PWR indicator is off 10 seconds later, remove the PCIe card. • Press this button after installing the PCIe card. If the PWR indicator is steady green 10 seconds later, the PCIe card is operating properly.

Table 1-10 shows the indicators on an RH5885H V3 memory riser. Table 1-10 describes the indicators.

Figure 1-5 Indicators on a memory riser



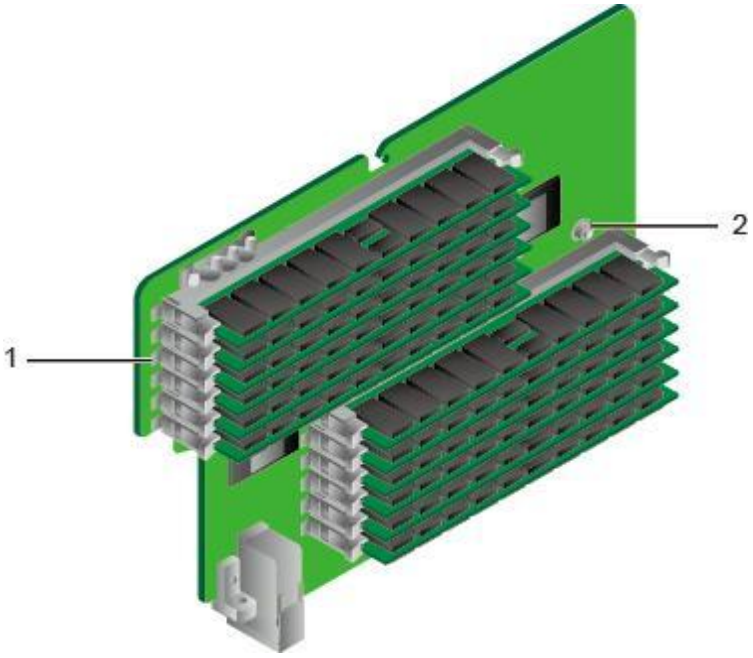
1	Memory riser power indicator	2	Memory riser removal status indicator
3	Memory riser mirror indicator	-	-

Table 1-10 Indicators on a memory riser

Silkscreen	Meaning	Color	State Description
POWER BUTTON	Memory riser power indicator	Green	• On: the memory riser is properly powered on. • Off: the memory riser is powered off.
ERR	Memory riser fault indicator	Red	• On: A fault occurs on one DIMM installed on the memory riser. • Off: The DIMMs on the memory riser are operating properly.
MIRR	Memory riser mirror indicator	Green	Enable some memory and in-use memory to be the mirror of each other to avoid system crash when an uncorrectable error occurs in the memory. When one mirror fails, the system can use the other mirror to ensure proper operating. • On: Mirror is configured for the two channels of the memory riser. • Off: Mirror is not configured for the two channels of the memory riser.

Figure 1-6 shows the indicator and button on the printed circuit board (PCB) of the memory riser for the RH5885H V3. Table 1-11 describes the indicator and button.

Figure 1-6 Indicator and button on the PCB of the memory riser



1	DIMM fault indicator	2	DIMM fault locating button

Table 1-11 Indicator and button on the PCB of the memory riser

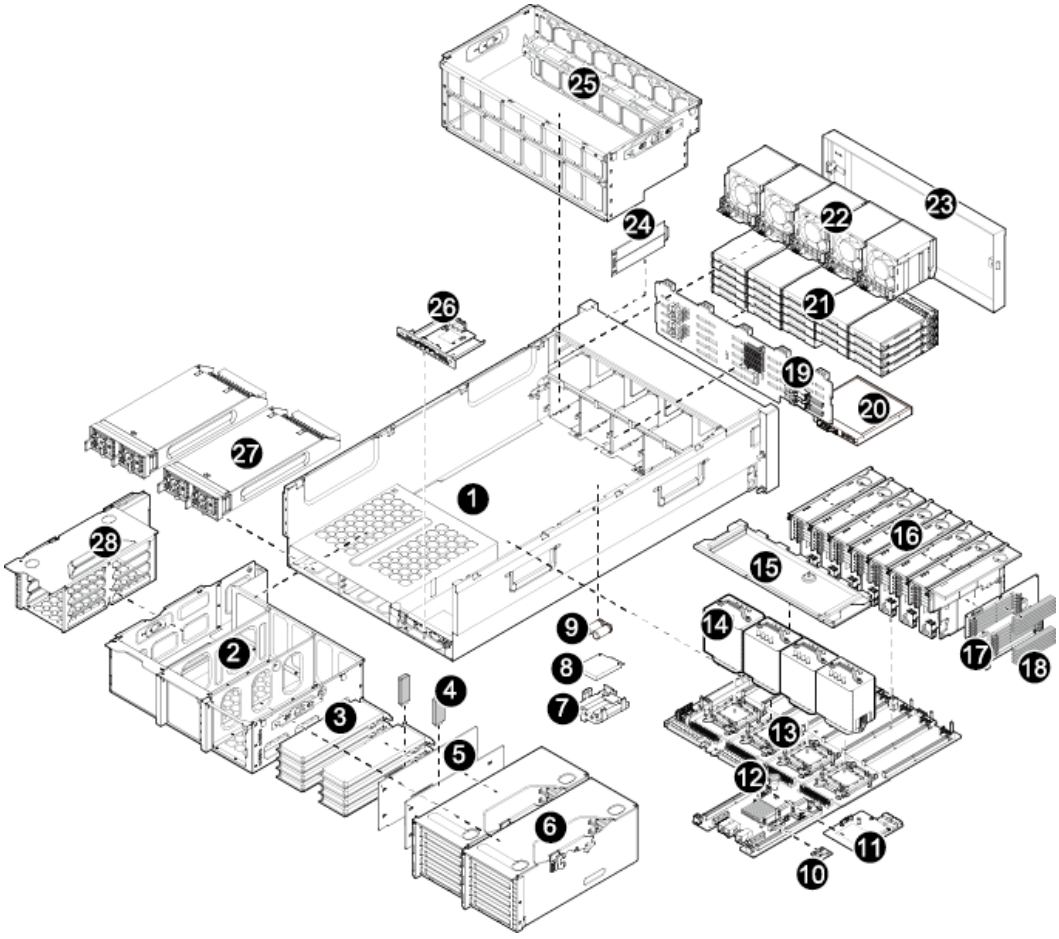
Name	Color	State Description
DIMM fault indicator	Red	• On: The DIMM is faulty. • Off: The DIMM is operating properly.
DIMM fault locating button	—	This button helps locate a faulty DIMM. If a fault occurs in the memory riser in the power-on state, the fault indicator on the panel of the memory riser turns on. After you remove the memory riser and hold down this button, the indicator for the faulty DIMM turns on. You can easily locate the faulty DIMM and replace or repair the DIMM.

1.5 Physical Structure

This topic describes the RH5885H V3 in terms of its components, mainboard layout and connectors.

Figure 1-7 shows the components of the RH5885H V3-23S.

Figure 1-7 Components of the RH5885H V3-23S



1	Chassis	2	PCIe riser card fixing frame
3	PCIe card	4	USB flash drive (optional)
5	Standard PCIe riser card	6	PCIe riser card tray
7	Battery tray	8	iBBU (optional)
9	Supercapacitor (optional)	10	TPM (optional)
11	RAID controller card	12	Mainboard
13	Processor	14	Heat sink
15	Chassis cover support	16	Memory riser tray
17	Memory riser	18	DIMM
19	Hard disk backplane	20	DVD-ROM drive
21	Hard disk	22	Fan module
23	Front bezel	24	Customer information label
25	Memory riser fixing frame	26	NIC

27	PSU	28	Hot-swappable PCIe riser card

Table 1-12 describes the components of the RH5885H V3.

Table 1-12 Component description

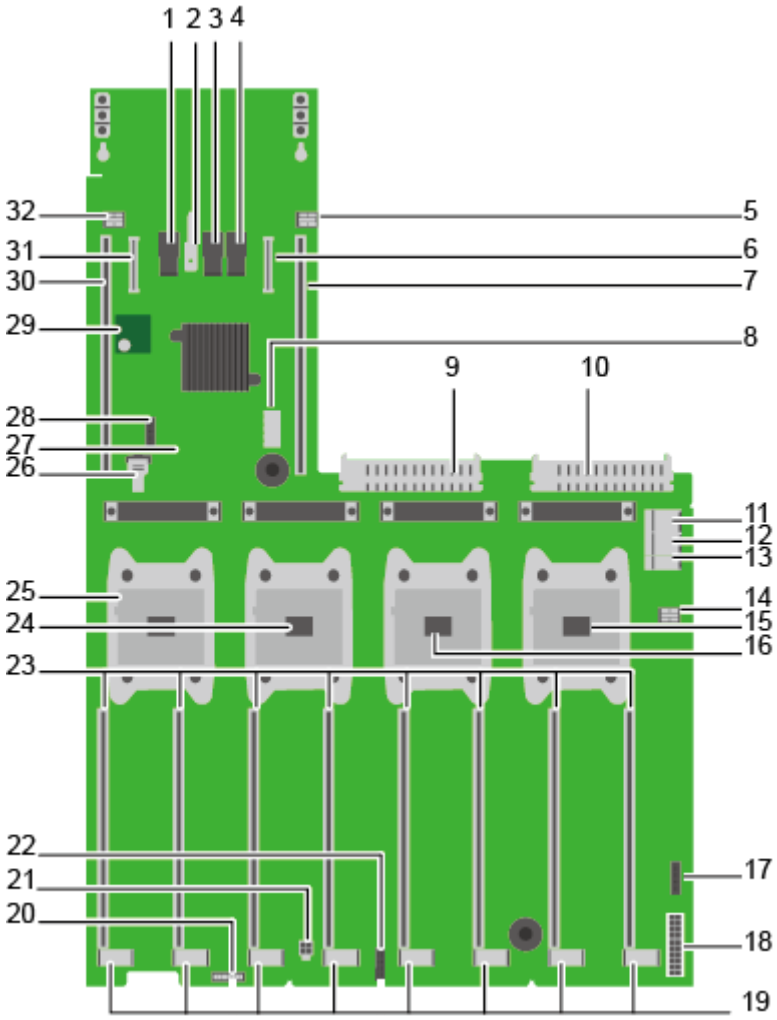
No.	Component	Description
1	Chassis	A chassis houses and protects all components.
2	PCIe riser card fixing frame	A fixing frame secures and supports three PCIe riser card trays.
3	PCIe card	The RH5885H V3 supports four types of PCIe cards on a PCIe riser card: PCIe 2.0 x4, PCIe 3.0 x4, PCIe 3.0 x8, and PCIe 3.0 x16.
4	USB flash driver (optional)	USB 2.0 flash driver.used as the extended storage device,hypervisor boot device and so on.
5	Standard PCIe riser card	The RH5885H V3 supports two standard PCIe riser cards of two types: • PCIe x8 riser card: four standard PCIe 3.0 x8 slots, one standard PCIe 3.0 x4 slot, and one standard PCIe 2.0 x4 slot. • PCIe x16 riser card: two standard PCIe 3.0 x16 slots, one standard PCIe 3.0 x4 slot, and one standard PCIe 2.0 x4 slot.
6	PCIe riser card tray	A riser card tray secures the PCIe riser card.
7	Battery tray	A battery tray secures and supports an integrated battery backup unit (iBBU) or a supercapacitor.
8	iBBU	An iBBU is required for power-off protection when the server uses the LSISAS2208 controller card. **NOTE** You can use either an iBBU or a supercapacitor to provide power-off protection for the data in the RAID controller card cache.
9	Supercapacitor	A supercapacitor is required for power-off protection when the server uses the LSISAS2208 or LSISAS3108 controller card.
10	TPM (optional)	A trusted platform module (TPM) is a security solution that complies with the Trusted Computing Group (TCG) standard. It prevents viruses and unauthorized operations, enhancing platform security.
11	RAID controller card	The RH5885H V3 supports four types of RAID controller cards on the mainboard: • LSISAS2308 – Supports RAID 0, 1, 1E, and 10. – Does not provide cache data protection upon power

No.	Component	Description
		failures. • LSISAS3008 – Supports RAID 0, 1, 1E, and 10. – Does not provide cache data protection upon power failures. • LSISAS2208 – Supports RAID 0, 1, 10, 5, 50, 6, and 60. – Provides an iBBU or a supercapacitor to protect cache data from power failures. • LSISAS3108 – Supports RAID 0, 1, 10, 5, 50, 6, and 60. – Provides a supercapacitor to protect cache data from power failures. These RAID controller cards support RAID level migration, and RAID configuration memory.
12	Mainboard	The mainboard integrates and interconnects components.
13	Processor	The RH5885H V3 supports Intel® Ivy Bridge-EX® E7-4800 or E7-8800 v2 (E7 v2) or Haswell-EX® E7-4800 or E7-8800 v3 (E7 v3) full-series processors. Each processor connects to the other three processors through two-way 20-lane QuickPath Interconnects (QPIs).
14	Heat sink	It cools a processor and is designed with fool-proofing. Each processor is configured with one heat sink.
15	Chassis cover support	It supports the chassis cover.
16	Memory riser tray	A tray secures a memory riser.
17	Memory riser	The RH5885H V3 supports a maximum of eight memory risers on the mainboard, with 12 DIMM slots per memory riser. The server supports a maximum of 96 DDR3 or DDR4 DIMMs.
18	DIMM	• Each DDR3 DIMM provides a maximum capacity of 32 GB. The server provides a maximum capacity of 3 TB and supports DIMMs of 1066 MHz, 1333 MHz, or 1600 MHz. • Each DDR4 DIMM provides a maximum capacity of 32 GB. The server provides a maximum capacity of 3 TB and supports DIMMs of 1333 MHz, 1600 MHz, or 1866 MHz.
19	Hard disk backplane	The backplane provides power and data transmission channels for hard disks. The server supports two types of hard disk backplanes for connecting to 8 or 23 hard disks respectively.

No.	Component	Description
20	DVD-ROM drive	The DVD-ROM drive is used to install operating systems (OSs).
21	Hard disk	Hard disks are hot-swappable and store data for the RH5885H V3. The RH5885H V3 supports the following hard disk configurations: • RH5885H V3 (8 hard disks): supports eight 2.5-inch SAS HDDs, SATA HDDs, or SSDs. • RH5885H V3 (23 hard disks): supports twenty-three 2.5-inch SAS HDDs, SATA HDDs, or SSDs.
22	Fan module	Fan modules dissipate heat for the RH5885H V3, and support hot swap. When one fan fails, the adjacent fans run at full speed to ensure optimal heat dissipation.
23	Front bezel	The front bezel protects the server front panel.
24	Customer information label	The label records customized device information.
25	Memory riser fixing frame	A fixing frame secures and supports eight memory riser trays.
26	NIC	The RH5885H V3 supports a GE NIC with four GE ports or a 10GE NIC with two 10GE ports. Both NICs support network controller sideband interface (NC-SI).
27	PSU	The RH5885H V3 supports two PSUs in 1+1 redundancy mode or four PSUs in 2+2 redundancy mode. The PSUs supply power to the entire server. **NOTE** The PSUs support double-pole/neutral fusing.
28	Hot-swappable PCIe riser card	The RH5885H V3 supports one hot-swappable PCIe riser card to provide four standard PCIe 3.0 x8 slots. You can maintain PCIe devices without powering off the system or opening the chassis cover.

Figure 1-8 shows the positions of connectors and other components on the RH5885H V3 mainboard.

Figure 1-8 Positions of the connectors and other components



1	NIC connector (J59)	2	NIC guide pin (J34)
3	NIC connector (J58)	4	NIC connector (J57)
5	Standard PCIe riser card power connector (J140)	6	Mezz module connector (J74)
7	Standard PCIe riser card connector (J11)	8	RAID controller card connector (J27)
9	Power connector (J30)	10	Power connector (J45)
11	Hot-swappable PCIe riser card connector (J13)	12	Hot-swappable PCIe riser card connector (J6)
13	Hot-swappable PCIe riser card connector (J122)	14	Hot-swappable PCIe riser card power connector (J125)
15	Processor 4 (J4)	16	Processor 3 (J3)
17	Right mounting ear connector (J52)	18	Hard disk backplane power

			connector (J50)
19	Memory riser connectors (from left to right: J21, J20, J133, J132, J135, J134, J137, J136)	20	LCD connector (J61)
21	DVD-ROM drive power connector (J127)	22	Hard disk backplane connector (J53)
23	Memory riser connectors (numbered 1 to 8 from left to right, with the silkscreen of J26, J23, J33, J28, J43, J40, J46, J44)	24	Processor 2 (J2)
25	Processor 1 (J1)	26	SATA DVD-ROM drive connector (J51)
27	Mainboard battery	28	Left mounting ear connector (J54)
29	TPM connector (J49)	30	Standard PCIe riser card connector (J8)
31	Mezz module connector (J62)	32	Standard PCIe riser card power connector (J141)

NOTE

Observe the following rules when configuring processors and memory risers :

- Processor 1 corresponds to memory risers 1 and 2, processor 2 corresponds to memory risers 3 and 4, processor 3 corresponds to memory risers 5 and 6, and processor 4 corresponds to memory risers 7 and 8.
- If only one processor is to be configured, the processor must be installed in socket CPU1.
- Install DIMMs only on memory risers that correspond to a detected processor.

1.6 Logical Structure

This topic describes the RH5885H V3 logical structure.

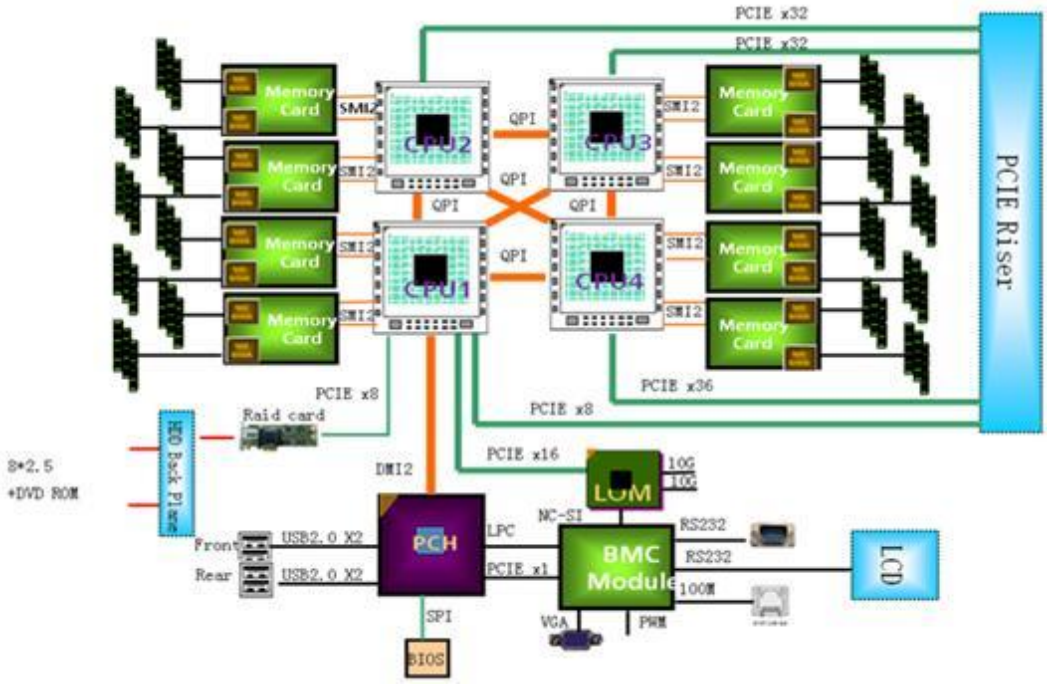
The RH5885H V3 is a high-performance rack server that uses new-generation Intel® Xeon® processors. It provides excellent performance and reliability by increasing the number of processor cores and improving the memory capacity, I/O expandability, and RAS features.

The RH5885H V3 provides the following features to offer tailored, flexible configurations, which helps maximize customers' return on investment (ROI):

- Supports the next three generations of Intel processors: IVB-EX (E7 v2), HSW-EX (E7 v3), and BDW-EX (E7 v4).
- Uses memory risers, and supports various memory riser configurations with different capacity and bandwidth, and memory riser upgrades.
- Uses an onboard NIC to provide GE or 10GE ports, meeting diverse configuration and upgrade requirements.
- Adopts an independent PCIe box, meeting diverse requirements for PCIe expansion and upgrades.

Figure 1-9 shows the RH5885H V3 logical structure.

Figure 1-9 RH5885H V3 logical structure



1.7 RAS Features

This topic describes the Reliability, Availability, and Serviceability (RAS) features supported by the RH5885H V3.

Table 1-13 describes the typical RAS features supported by the RH5885H V3. You can configure these features to improve server RAS.

NOTE
For details about how to configure the RAS features, see the *HUAWEI Server Brickland Platform BIOS Parameter Reference*.

Table 1-13 RAS features

Num.	Module Name	Feature Name	Description
1	Processor	Corrected Machine Check Interrupt (CMCI)	This feature corrects error-triggered interrupts.
2	Dual in-line memory module (DIMM)	Failed DIMM Isolation	This feature identifies the faulty DIMM, which helps isolate the faulty DIMM from others and replace it.
3		Memory Thermal Throttling	This feature automatically adjusts DIMM temperature to avoid DIMM damage due to overheat.

Num.	Module Name	Feature Name	Description
4		Rank Sparing	This feature uses some memory ranks as backup ranks to prevent the system from crashing due to uncorrectable errors. (Uncorrectable errors are often generated due to accumulation of numerous correctable errors.)
5		Memory Address Parity Protection	This feature detects memory command and address errors.
6		Memory Demand and Patrol Scrubbing	This feature provides the memory patrol function to promptly correct correctable errors upon detection. If these errors are not corrected promptly, uncorrectable errors may occur.
7		Memory Mirroring	This feature improves system reliability.
8		Memory Board Hot swap	This feature enables hot-swappable memory risers to be supported by the HSW-EX platform.
9		Intel SMI Lane Failover	This feature provides an SMI2 interface self-recovery capability to improve system availability.
10		Intel SMI Packet Retry	This feature provides an SMI2 interface retry mechanism upon errors to improve system reliability and availability.
11		Single Device Data Correction (SDDC)	This feature provides a single-device, multi-bit error correction capability to improve memory reliability.
12		Double Device Data Correction (DDDC)	This feature enables the memory to still have the SDDC function after one faulty device is replaced with a backup device to improve memory reliability and the self-recovery capability.
13		SDDC+1	This feature enables the memory to correct 1-bit errors after one SDDC to improve memory reliability and availability.
14		DDDC+1	This feature enables the memory to correct 1-bit errors after one DDDC to improve memory

Num.	Module Name	Feature Name	Description
			reliability and availability.
15		Device Tagging	This feature replaces DIMM device faults to improve DIMM availability.
16		Data Scrambling	This feature optimizes data stream distribution and reduces the error possibility to improve the reliability of data streams in the memory and the capability to detect address errors.
17	PCIe	PCIe Advanced Error Reporting	This feature improves server serviceability.
18		Live Error Recovery (LER)	This feature provides a PCIe device self-recovery capability to improve server reliability.
19		PCI Express Hot Plug	This feature improves PCIe device flexibility and server usability.
20	QPI	Intel QPI Clock Failover	This feature provides a QuickPath Interconnect (QPI) clock link self-recovery mechanism to improve system reliability.
21		Intel QPI Dynamic Link Retraining and Recovery on Link Failure	This feature improves QPI link reliability.
22		Intel QPI Link Level Retry	This feature provides a retry mechanism upon errors to improve QPI reliability.
23		Intel QPI Self-Healing	This feature provides a QPI data link self-recovery mechanism to improve system reliability.
24		Intel QPI Protocol Protection via CRC	This feature provides cyclic redundancy check (CRC) protection for QPI packets to improve system reliability.
25		Intel QPI Viral Mode	This feature provides a QPI viral mode to prevent the spreading of error data and improve system security.
26	System	Core Disable for Fault Resilient Boot (FRB)	This feature isolates the faulty processor during startup to improve system reliability and availability.

Num.	Module Name	Feature Name	Description
27		Corrupt Data Containment Mode	This feature identifies the memory storage unit that contains corrupted data to minimize the impact on the running programs and improve system reliability.
28		Socket Disable for FRB	This feature isolates the faulty socket during startup to improve system reliability.
29		Architected Error Records	With the Enhanced Machine Check Architecture (eMCA) feature, the basic input/output system (BIOS) collects error information recorded in hardware registers in compliance with Unified Extensible Firmware Interface (UEFI) specifications, sends the error information to the OS over the APEI of the advanced configuration and power interface (ACPI), and locates the error unit, which improves system availability.
30		Error Injection Support	This feature injects errors to verify various RAS features.
31		Machine Check Architecture (MCA)	This feature provides software recovery for uncorrectable errors, which improves system availability.
32		eMCA:Gen1	This feature improves system availability.
33		MCA Recovery-IO	This feature integrates input/output (I/O) error reports into the MCA to allow users to process I/O device errors in a unified manner and improve system serviceability.
34		OOB Access to MCA Registers	The out-of-band system accesses MCA registers by using the Platform Environment Control Interface (PECI). If a fatal error occurs in the system, the out-of-band system collects onsite data to facilitate fault analysis and locating and improve system serviceability.
35		BIOS Abstraction Layer	The BIOS processes errors and

Num.	Module Name	Feature Name	Description
		for Error Handling	reports the error information to the OS and iMana in compliance with specifications to improve system serviceability.
36		BIOS-based Predictive Failure Analysis (PFA)	The BIOS provides physical unit information for DIMM errors, and the OS traces and predicts errors, and isolates error memory pages.
37		Touched Diagnostic LCD	The touched diagnostic LCD simplifies onsite maintenance operations and improves onsite maintenance efficiency.
38		Redundant Fans	The fan modules work in N+1 redundancy mode.
39		Hot-swap Fans	The fan modules are hot-swappable and support maintenance without the need for opening the chassis cover.
40		Redundant PSUs	The PSUs work in 1+1 redundancy mode.
41		Hot-swap PSUs	The PSUs are hot-swappable.
42		Failed DIMM Identification	Memory risers, no matter they are in online or offline state, support failed DIMM identification by using indicators.
43		Failed Fan Identification	This feature enables faulty fan identification.
44		Failed HDD Identification	This feature enables faulty hard disk identification.
45		Failed PSU Identification	This feature enables faulty PSU identification.
46		HDD Hot Swap	The hard disks are hot-swappable.
47		Memory PFA	This feature enables precaution for memory faults.
48		HDD PFA	This feature enables precaution for hard disk faults.
49		40 ℃ Ambiance Temperature	The RH5885H V3 supports long-term stable operation at 40 ℃ (104 ℉) when no graphics processing unit (GPU) is configured. When a GPU is configured, the server supports

Num.	Module Name	Feature Name	Description
			long-term stable operation at 35 ℃ (95 ℉).
50	Software	Black Box	Server Device Management (SDM) provides the black box function, facilitating cause analysis for OS breakdowns.
51		KVM Recording	SDM provides the KVM video recording function, facilitating cause analysis for system breakdowns.
52		The Last Screen	SDM provides the last screen function, facilitating cause analysis for system breakdowns.
53		Backup Image for iMana	The integrated management (iMana) software supports dual-image backup. If one image fails, the other image can be started to ensure normal software operation.

1.8 Compatibility

This topic describes the software and hardware supported by the RH5885H V3.

Table 1-14 lists the OSs supported by the RH5885H V3, and Table 1-15 lists the hardware supported by the RH5885H V3.

Table 1-14 Supported OSs

OS	Version
OS	• SUSE Linux Enterprise Server 11 SP3 for Intel EM64T • Red Hat Enterprise Linux 6 Update 4 Server for Intel EM64T • Windows Server 2008 R2 SP1 64-bit • Windows Server 2012 R2 64-bit

Table 1-15 Supported hardware

Component	Description	Quantity
Onboard NIC	The following NICs are supported:	1

Component	Description	Quantity
	• NIC that provides four GE ports • NIC that provides two 10GE ports • NIC that provides two GE ports	
PCIe card	The following PCIe cards are supported: • Standard PCIe 2.0 x4 card • Standard PCIe 3.0 x4 card • Standard PCIe 3.0 x8 card • Standard PCIe 3.0 x16 card	16
RAID controller card	• LSISAS2308 controller card (SR120) • LSISAS2208 controller card (SR320BC, SR420BC, and SR520C)	1

NOTE
For details about compatibility, see the Compatibility List.

1.9 Technical Specifications

This topic describes the technical specifications for the RH5885H V3.

Table 1-16 describes the technical specifications for the RH5885H V3.

Table 1-16 Technical specifications

Category	Item	Specifications
Mechanical specifications	Chassis dimensions (H x W x D)	175 mm x 447 mm x 790 mm (6.89 in. x 17.60 in. x 31.10 in.)
	Weight	Net weight: 62 kg (136.69 lb)
		Packaging material: 3.6 kg (7.94 lb)
Environmental specifications	Temperature	• Operating temperature: 5 ℃ to 40 ℃ (41 ℉ to 104 ℉) • Storage temperature: -40 ℃ to +65 ℃ (-40 ℉ to +149 ℉) **NOTE** The maximum operating temperature is 35 ℃ (95 ℉) if a PCIe SSD or a GPU is configured.
	Humidity	• Operating humidity: 10% to 90% RH (non-condensing) • Storage humidity: 5% to 95% RH (non-condensing)

Category	Item	Specifications
	Altitude	≤ 3000 m (9842.4 ft) When the altitude is higher than 900 m (2952.72 ft), the operating temperature decreases by 1 ℃ (1.8 ℉) per 300 m (984.24 ft).
PSU input specifications	Input voltage	• 2500 W DC PSU: –48 V DC to –60 V DC • 2000 W AC PSU: 90 V AC to 264 V AC • 3000 W AC PSU: – 90 V AC to 264 V AC, 50 Hz/60 Hz 192 V DC to 288 V DC
	Input current	• DC PSU: 63 A • AC PSU: 16 A **NOTE** The 2000 W PSU uses the internal fuse of 20 A.
PSU output specifications	Rated input voltage	12 V DC
	Rated input current	60 A
Power specifications	Rated power	The RH5885H V3 supports two PSUs. The following lists the rated power for each type of PSU: • 2500 W DC PSU: 2500 W (input voltage: –48 V DC to –60 V DC) • 2000 W AC PSU: – 800 W (input voltage: 90 V AC to 179 V AC) – 1800 W (input voltage: 180 V AC to 197 V AC) – 2000 W (input voltage: 198 V AC to 264 V AC) • 3000 W AC PSU: – 1200 W (input voltage: 90 V AC to 175 V AC) – 2500 W (input voltage: 176 V AC to 199 V AC or 192 V DC to 204 V DC) – 3000 W (input voltage: 200 V AC to 264 V AC or 205 V DC to 288 V DC)

1.10 Advantages

The RH5885H V3 provides the following advantages:

High RAS to Improve Stability and Enable Quick Recovery

- The RH5885H V3 transplants advanced RAS features from Intel Itanium (midrange computers) and implements up to 53 hardware RAS features. For details, see 1.7 RAS.
- The fan modules of the RH5885H V3 are hot-swappable and can be maintained without opening the chassis cover.
- Some PCIe devices used by the RH5885H V3 are hot-swappable and can be maintained without opening the chassis cover.
- The RH5885H V3 comes with a touched diagnostic LCD, which offers quicker fault location and better user experience than the traditional LED panels.
- The RH5885H V3 supports long-term stable operating at 40 ℃, while most servers support operating only at 35 ℃.
- SDM provides the black box and KVM video recording functions, facilitating fault location for OS breakdowns.

Leading Computing Performance

- The RH5885H V3 uses the latest Intel® Xeon® Brickland-EX® (E7 v2 and E7 v3) processors with high performance. Compared with a Westmere-EX (E7 v1) processor, which provides a maximum of 10 cores and 30 MB L3 cache, a Brickland-EX processor provides a maximum of 18 cores and 45 MB L3 cache.
- A Brickland-EX processor supports a maximum of 96 DIMMs. Both the number of DIMMs and the memory capacity increase by 50% compared with the Westmere-EX processor, enabling the RH5885H V3 to support large databases and more VMs.
- Compared with a Westmere-EX processor, a Brickland-EX processor increases the overall performance by 200% and offers 340% higher performance for certain applications.

2 Features

RAS Features

The RH5885H V3 provides the following RAS features to ensure stable system operation, simplify serviceability, and prolong the system operation time:

- The eMCA mechanism automatically rectifies correctable errors to ensure normal system operation. For uncorrectable errors, you can isolate or replace the faulty component online, and configure the new component without a system restart. BIOS preferentially deals with correctable memory errors and locates the faulty DIMM.
- The RH5885H V3 provides chip-level fault tolerance (such as automatic recovery from processor, chip, and link hardware faults), minimizing system breakdown caused by hardware faults.
- The RH5885H V3 supports single device data correction (SDDC) and double device data correction (DDDC) to rectify memory soft errors.
- The RH5885H V3 provides memory mirroring and memory sparing functions to eliminate system downtime caused by uncorrectable memory hardware errors.
- The RH5885H V3 supports faulty DIMM indication on an offline memory riser, which allows faulty DIMMs to be identified on a removed memory riser.
- The RH5885H V3 supports full redundancy and hot-swap maintenance without opening the chassis cover for key components, such as PSUs, fan modules, and hard disks. These features enable quick replacement of faulty components without interrupting normal system operation.
- The RH5885H V3 supports hot swap of some PCIe cards without opening the chassis cover, which implements PCIe upgrades and replacement without interrupting system operating.
- The RH5885H V3 supports automatic disconnection from a faulty I/O device. When a fatal I/O device fault is detected, the system enters virus mode and disconnects the link to the faulty I/O device to prevent other devices from being affected.
- The RH5885H V3 supports hot-swappable drives to protect data and prolong normal system running time using RAID.
- The Huawei iMana software monitors system operating, triggers alarms, and performs recovery actions. This helps minimize system downtime.
- Inband and out-of-band fault management software implements PFA and fault management. The software traces components, sends a precaution before a system breakdown caused by a faulty component, runs self-diagnosis, self-correction, self-recovery, and provides maintenance tips about faulty components for maintenance personnel, including offline and online operations and component replacement. PFA can

be performed on components, such as processors, DIMMs, fan modules, PSUs, and hard disks.

- The RH5885H V3 provides a touched diagnostic LCD diagnosis panel to facilitate fault location, which greatly shortens the system recovery time.
- The optimized heat dissipation system supports long-term stable operation at 40 ℃ (104 ℉) when no GPU is configured and 35 ℃ (95 ℉) when a GPU is configured.
- The advanced fault tolerance, fault recovery, and key component redundancy enable system availability of 99.999%.
- Huawei provides a three-year warranty for parts replacement and onsite limited repair for the RH5885H V3 used in China. Huawei provides 9 x 5 (a 9-hour-a-day, 5-day-a-week) next business day (NBD) support. Optional service upgrades are available.

Performance and Scalability

The RH5885H V3 supports the following features to ensure high performance and scalability while reducing the total cost of ownership (TCO):

- An Intel® Xeon® E7 v2 processor used by the RH5885H V3 supports a maximum of 15 cores, 37.5 MB L3 cache, and three QPI links. An Intel® Xeon® E7 v3 processor supports a maximum of 18 cores, 45 MB L3 cache, and three QPI links. These features provide outstanding system performance.
- The RH5885H V3 supports a maximum of four processors and 60 cores (E7 v2 processors) or 72 cores (E7 v3 processors), which maximizes concurrent execution of multithreaded applications.
- Intel® Turbo Boost Technology allows processor cores to run faster than the Thermal Design Power (TDP) configuration specified frequency if the processor cores are operating below power, current, and temperature specification limits.
- Intel Hyper-Threading Technology enables each processor core to run up to two threads, improving parallel computation capability.
- The hardware-assisted Intel®Virtualization Technology (Intel® VT) allows operating system (OS) vendors to better use hardware to address virtualization workloads.
- The RH5885H V3 can be configured with a maximum of 96 DDR3 or DDR4 DIMMs, providing 3 TB memory capacity (with 32 GB DIMMs) and thirty-two 1866 MHz memory channels. These features offer high memory bandwidth, addressing in-memory computing.
- The RH5885H V3 provides 16 standard PCIe slots for installing four dual-slot, full-height, full-length GPUs. The RH5885H V3 provides one plug-in NIC without occupying a standard PCIe slot, allowing flexible configurations of four GE ports or two 10GE ports.
- The RH5885H V3 supports four dual-slot GPUs, meeting demands for graphics processing, high-performance computing, and virtual desktop.
- The RH5885H V3 supports PCIe 3.0, which increases the maximum I/O bandwidth by 60% (8 GT/s per link) compared with PCIe 2.0.

Manageability and Security

The RH5885H V3 provides the following features to simplify local and remote server management:

- The RH5885H V3 supports Intelligent Platform Management Interface (IPMI) 2.0. The built-in iMana monitors server operating status and implements remote management.

- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) increases setup, configuration, and update efficiency, and simplifies fault handling.
- The Intel Advanced Encryption Standard New Instructions (AES NI) implement faster and stronger encryption.
- The Intel Execute Disable Bit (EDB) function works with the supported OS to prevent certain types of malicious buffer overflow attacks.
- The Intel Trusted Execution technology provides enhanced security by using hardware-based defense against malicious software attacks, allowing an application to run in an isolated space from all other applications running on the OS.

Energy Efficiency

The RH5885H V3 provides the following features to reduce energy consumption and operating expense (OPEX) and increase energy efficiency:

- The latest Intel® Xeon® E7-4800 or E7-8800 processors provide better performance than the previous-generation processors while fitting into the same TDP limits.
- The Intel Intelligent Power Capability allows a processor to be powered on or off based on site requirements to reduce power consumption.
- Low-voltage Intel® Xeon® processors consume less energy and apply to data centers and telecommunication environments that have power and thermal limitations.
- The latest E7 v3 processors support 1.2 V DDR4 DIMMs, which consume approximately 20% less power with the same memory capacity and improve the operating frequency of the memory bus by around 15%.
- Solid state drives (SSDs) consume 80% less power than traditional 2.5-inch HDDs.
- AC and 240 V high-voltage DC power supplies are supported.
- Platinum PSUs are used, achieving power conversion efficiency of 94%.

3 Technical Specifications

Table 3-1 lists the RH5885H V3 technical specifications.

Table 3-1 RH5885H V3 technical specifications

Item	Specifications
Form factor/height	4U rack server, supporting hold rails and cable management assemblies
Processor	• A maximum of four Intel® Xeon® E7-4800 or E7-8800 v2 (Ivy Bridge-EX) processors, with up to 15 cores and 37.5 MB L3 cache per processor • A maximum of four Intel® Xeon® E7-4800 or E7-8800 v3 (Haswell-EX) processors, with up to 18 cores and 45 MB L3 cache per processor
Chipset	Intel Patsburg PCH
Number of DIMMs	96 slots for installing DDR3 or DDR4 DIMMs There are 8 memory risers in total. Each processor supports two memory risers, and each memory riser supports 8 or 12 DIMMs.
Maximum memory capacity	3 TB (32 GB DIMMs)
Number of hard disks	Eight or twenty-three 2.5-inch hot-swappable SAS/SATA HDDs or SSDs
Maximum local storage capacity	• Eight hard disks: 8 x 1.2 TB = 9.6 TB • 23 hard disks: 23 x 1.2 TB = 27.6 TB **NOTE** The RH5885H V3 supports eight or twenty-three hard disks.
RAID support	A RAID controller card supports either of the following: • RAID 0, 1, 10, and 1E • RAID 0, 1, 10, 5, 50, 6, and 60, a maximum cache capacity of 2 GB, and a supercapacitor for power-off protection
Network port	The onboard NIC can be flexibly configured to provide either of the following ports:

Item	Specifications
	• Four integrated GE 1000BASE-T ports • Two 10GE optical ports • Two GE BASE-T ports
Expansion slot	The RH5885H V3 supports a non-standard PCIe slot dedicated for a RAID controller card. The RH5885H V3 also supports various PCIe risers with different PCIe specifications: 16 standard PCIe slots • Four PCIe 3.0 x8 slots for installing full-height full-length cards, supporting hot swap without opening the chassis cover • Eight PCIe 3.0 x8 slots for installing full-height full-length cards • Two PCIe 3.0 x4 slots for installing full-height full-length cards • Two PCIe 2.0 x4 slots for installing full-height full-length cards 12 standard PCIe slots • Four PCIe 3.0 x8 slots for installing full-height full-length cards, supporting hot swap without opening the chassis cover • Four PCIe 3.0 x16 slots for installing full-height full-length cards • Two PCIe 3.0 x4 slots for installing full-height full-length cards • Two PCIe 2.0 x4 slots for installing full-height full-length cards 14 standard PCIe slots • Four PCIe 3.0 x8 slots for installing full-height full-length cards, supporting hot swap without opening the chassis cover • Four PCIe 3.0 x8 slots for installing full-height full-length cards • Two PCIe 3.0 x16 slots for installing full-height full-length cards • Two PCIe 3.0 x4 slots for installing full-height full-length cards • Two PCIe 2.0 x4 slots for installing full-height full-length cards
External port	• Front panel: two USB 2.0 ports, one power button, one UID button, one video graphics array (VGA) port, and one touched diagnostic LCD • Rear panel: two USB 2.0 ports, one VGA port, one serial port, one 100M management port, one UID indicator, and one plug-in NIC
DVD-ROM drive	One

Item	Specifications
PSU	The PSUs can be configured as follows: • Two 3000 W AC PSUs in 1+1 redundancy mode • Two 2000 W AC PSUs in 1+1 redundancy mode • Two 2500 W DC PSUs in 1+1 redundancy mode • Four 800 W AC PSUs in 2+2 redundancy mode
System management	IPMI 2.0
Security feature	Power-on password and administrator password Front bezel
Video card	The system mainboard integrates the display chip and provides 16 MB display memory. The maximum resolution is 1024 x 768.
Operating systems supported	Check the latest compatibility list.
Warranty	Three-year customer replaceable unit and onsite limited warranty, 9 x 5 NBD, and optional service upgrades
Dimensions (H x W x D)	175 mm x 447 mm x 790 mm (6.89 in. x 17.60 in. x 31.10 in.)
Maximum weight	• Packaging materials: 7 kg (15.44 lb) • Server with 23 disks (excluding the package): 56 kg (123.48 lb) • Server with 8 disks (excluding the package): 52 kg (114.66 lb) **NOTE** When four CPUs are installed and DIMMs and hard disks are fully configured, the server is highest in weight. The weight of PCIe cards is not included and can be calculated as follows: • HHHL PCIe card: 0.3 kg (0.66 lb) • FHHL PCIe card: 0.4 kg (0.88 lb) • FHFL dual-slot PCIe card (GPU): 1 kg (2.205 lb).
Physical environment	• Operating environment – Ambient temperature: 5 ℃ to 40 ℃ (41 ℉ to 104 ℉) **NOTE** The maximum operating temperature is 35 ℃ (95 ℉) if an PCIe SSD or a GPU is configured. – Ambient humidity: 10% RH to 90% RH (twmax = 29 ℃) • Storage environment – Ambient temperature: –40 ℃ to 65 ℃ (–40 ℉ to +149 ℉) – Ambient humidity: 5% RH to 95% RH (twmax = 38 ℃) • Altitude: ≤ 3000 m (9842.4 ft) **NOTE** When the altitude is higher than 900 m (2952.72 ft), the operating temperature decreases by 1 ℃ (1.8 ℉) per 300 m (984.24 ft).

Item	Specifications
Acoustic noise	The data listed in the following is the declared A-weighted sound power levels (LWAd) and declared average bystander position A-weighted sound pressure levels (LpAm) when the server is operating in a 23 ℃ (73.4 ℉) ambient environment. Noise emissions are measured in accordance with ISO 7999 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). • Idle: – LWAd: 7.1 Bels – LpAm: 58.8 dBA • Operating: – LWAd: 7.1 Bels – LpAm: 58.8 dBA **NOTE** The actual sound levels generated during server operating vary depending on the server configuration, load, and ambient temperature.

4 System Components

4.1 Processors

The RH5885H V3 supports Intel® Xeon® E7-4800 or E7-8800 processors.

The processor configuration rules are as follows:

- The RH5885H V3 supports two or four processors. If only two processors are configured, install them in sockets CPU1 and CPU2.
- A server must use processors of the same model.

For details about the processor models supported by the RH5885H V3, see the compatibility list, which is available at the following URL:

http://e.huawei.com/en/marketing-material/download_success?MaterialID={51DD876B-6B1F-4BAA-9FE0-52613548BB31}

4.2 Memory

Memory Configuration Rules

The maximum number of DIMMs configured for the RH5885H V3 varies depending on the number of processors used in the RH5885H V3:

- Two processors: 48 DIMMs on four memory risers

- Four processors: 96 DIMMs on eight memory risers

The 96 DIMMs are distributed to eight memory risers. Each processor supports two memory risers.

The following rules apply when selecting the memory configurations:

- The server supports RDIMMs and LRDIMMs.
- Mixing different types of memory (RDIMMs and LRDIMMs) is not supported.
- In RAS (lockstep) mode, DIMMs must be installed in a pair.
- If RDIMMs are used, each channel supports a maximum of eight ranks. If LRDIMMs are used, each channel supports a maximum of 24 ranks.

NOTE
A memory channel supports more than eight ranks for LRDIMMs because a quad-rank LRDIMM generates the same electrical load on a memory bus as a single-rank RDIMM.

- The maximum quantity of DIMMs that can be installed in the server depends on the number of processors, DIMM type, rank, and operating voltage, as shown in "Maximum quantity supported" in Table 4-1 and Table 4-2.

NOTE
Maximum number of DIMMs supported by each channel ≤ Number of ranks supported by each channel/Number of ranks supported by each DIMM

- All DIMMs in the server operate at the same speed, which is determined as the lowest value of one of the following options:
  - Memory speed that is supported by the specific processor.
  - Lowest of maximum operating speeds for selected memory configuration that depends on rated speed, operating voltage, and quantity of DIMMs per channel, as shown in "Maximum operating speed" in Table 4-1 and Table 4-2.

Table 4-1 and Table 4-2 list the specifications of the supported DIMMs. Tables cells that are highlighted with a gray background indicate that the server supports higher memory frequencies or larger memory capacity (or both) than the Intel processor specification defines.

Memory speed: In performance mode, memory channels operate independently, and the SMI2 link operates at twice the DDR3 speed. In RAS mode, two channels operate synchronously, and the SMI2 link operates at the DDR3 speed.

Table 4-1 DDR3 DIMM configuration rules

Item	RDIMM				LRDIMM			
Rank	Single-rank		Dual-rank		Quad-rank		8-rank	
Rated speed (MHz)	1600		1600		1600		1333	
Rated voltage (V)	1.35		1.35		1.35		1.35	
Operating voltage (V)	1.35	1.5	1.35	1.5	1.35	1.5	1.35	1.5
Maximum number of DIMMs	96	96	96	96	96	96	96	96

Item	RDIMM				LRDIMM			
Maximum capacity per DIMM (GB)	8	8	16	16	32	32	64	64
Maximum memory capacity (TB)	0.75	0.75	1.5	1.5	3	3	6	6
Maximum operating speed: Performance mode (2:1 mode - SMI2 bus operates at twice the DDR3 speed)								
1 DIMM per channel	1333	1333	1333	1333	1333	1333	1333	1333
2 DIMMs per channel	1333	1333	1333	1333	1333	1333	1333	1333
3 DIMMs per channel	1066	1333	1066	1333	1333	1333	1333	1333
Maximum operating speed: RAS mode (1:1 mode - SMI2 bus operates at the DDR3 speed)								
1 DIMM per channel	1333	1600	1333	1600	1333	1600	1333	1333
2 DIMMs per channel	1333	1600	1333	1600	1333	1600	1333	1333
3 DIMMs per channel	1066	1333	1066	1333	1333	1333	1333	1333

Table 4-2 DDR4 DIMM configuration rules

Item	RDIMM			LRDIMM			
Rank	Single Rank	Dual Rank		Quad Rank		4H[a] (4 die stacked)	
Rated speed (MHz)	1866	1866		1866		1866	
Rated voltage (V)	1.2	1.2		1.2		1.2	
Operating voltage (V)	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Maximum number of DIMMs	96	96	96	96	96	96	96
Maximum capacity per DIMM (GB)	8	16	32	32	64[a]	64[a]	128[a]

Item	RDIMM			LRDIMM			
Maximum memory capacity (TB)	0.75	1.5 TB	3	3	6	6	12
Maximum operating speed: Performance mode (2:1 mode - SMI2 bus operates at twice the DDR4 speed)							
1 DIMM per channel	1600	1600	1600	1600	1600	TBD	TBD
2 DIMMs per channel	1600	1600	1600	1600	1600	TBD	TBD
3 DIMMs per channel	1600	1333	1333	1600	1600	TBD	TBD
Maximum operating speed: RAS mode (1:1 mode - SMI2 bus operates at the DDR4 speed)							
1 DIMM per channel	1866	1866	1866	1866	1866	TBD	TBD
2 DIMMs per channel	1866	1866	1866	1866	1866	TBD	TBD
3 DIMMs per channel	1600	1333	1333	1600	1600	TBD	TBD
NOTE a. The server currently does not support the specifications.							

Memory Slot Configuration Rules

The RH5885H V3 supports DIMMs of 4 GB, 8 GB, 16 GB, or 32 GB. A fully configured RH5885H V3 provides a maximum of 3 TB memory capacity.

The RH5885H V3 provides 96 DIMM slots distributed on eight memory risers. Table 4-3 lists the memory channels on each memory riser. Figure 4-1 shows the DIMM positions.

NOTE
For details about the mapping between memory risers and processors, see 1.5 Physical Structure.

Table 4-3 Memory channels

Memory Channel	Composition	Primary Channel
Channel A	DIMMA1	A1
	DIMMA2	
	DIMMA3	
Channel B	DIMMB1	B1
	DIMMB2	

Memory Channel	Composition	Primary Channel
	DIMMB3	
Channel C	DIMMC1	C1
	DIMMC2	
	DIMMC3	
Channel D	DIMMD1	D1
	DIMMD2	
	DIMMD3	

Figure 4-1 DIMM positions

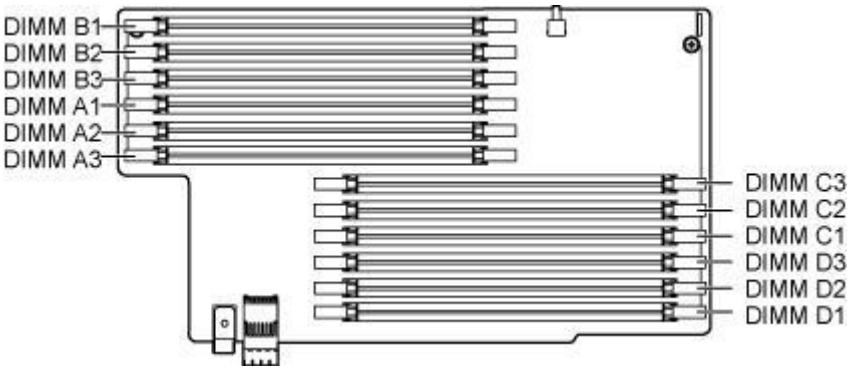


Table 4-4 describes the sequence in which the DIMMs are installed.

Table 4-4 DIMM installation sequence

Processor Socket	DIMM Installation Sequence
CPU1, CPU2, CPU3, and CPU4	DIMM must be installed in slot DIMM A1. All DIMMs are installed in the sequence of DIMM A1, DIMM B1, DIMM C1, DIMM D1, DIMM A2, DIMM B2, DIMM C2, DIMM D2, DIMM A3, DIMM B3, DIMM C3, and DIMM D3.

Memory Protection

The RH5885H V3 employs the following memory protection technologies:

- Error checking and correcting (ECC)
- Memory mirroring
- Memory sparing

Supported DIMM Models

For details about the DIMM models supported by the RH5885H V3, see the compatibility list, which is available at the following URL:

http://e.huawei.com/en/marketing-material/download_success?MaterialID={51DD876B-6B1F-4BAA-9FE0-52613548BB31}

4.3 Storage

The RH5885H V3 supports two types of hard disks:

- Eight 2.5-inch SAS/SATA HDDs or SSDs
- Twenty-three 2.5-inch SAS/SATA HDDs or SSDs

For details about the hard disk models and RAID controller card models supported by the RH5885H V3, see the compatibility list, which is available at the following URL:

http://e.huawei.com/en/marketing-material/download_success?MaterialID={51DD876B-6B1F-4BAA-9FE0-52613548BB31}

Table 4-5 lists the performance of different RAID levels, the minimum number of disks required, and disk utilization.

Table 4-5 RAID level comparison

RAID Level	Reliability	Read Performance	Write Performance	Minimum Number of Hard Disks	Hard Disk Utilization
RAID 0	Low	High	High	2	100%
RAID 1	High	Low	Low	2	1/N
RAID 5	Better than medium	High	Medium	3	(N – 1)/N
RAID 6	Better than medium	High	Medium	3	(N – 2)/N
RAID 1E	High	Medium	Medium	3	M/N
RAID 10	High	Medium	Medium	4	M/N
RAID 50	High	High	Better than medium	6	(N – M)/N
RAID 60	High	High	Better than medium	6	(N – M x 2)/N

NOTE
N indicates the number of member hard disks in a RAID. *M* indicates the number of subgroups of a RAID.

4.4 I/O Expansion

Standard PCIe Cards

The RH5885H V3 supports the following standard PCIe cards:

- GE expansion card
- 10GE expansion card
- FC expansion card
- InfiniBand expansion card
- SSD expansion card
- GPU expansion card

Observe the following rules when configuring PCIe cards for the RH5885H V3:

- The RH5885H V3 supports mixed use of a riser card with four PCIe slots and a riser card with six PCIe slots.
- The PCIe slots mapping to a vacant processor socket cannot be used.
- When a PCIe card requiring no I/O resources is configured, the PCIe card can be installed in any PCIe slot.
- When a PCIe card requiring I/O resources is configured, the PCIe card cannot be installed in the limited PCIe slot due to insufficient I/O resources. Table 4-6 describes the limited PCIe slots.

Table 4-6 I/O resource limitation

Standard PCIe Riser Card 1 Configuration	Standard PCIe Riser Card 2 Configuration	Hot-Swappable PCIe Riser Card Configuration	Limited PCIe Slot (Unavailable for a PCIe Card Requiring I/O Resources)
Riser card with six PCIe slots	Riser card with six PCIe slots	Not detected	Slot 4
Riser card with six PCIe slots	Riser card with four PCIe slots	Not detected	–
Riser card with four PCIe slots	Riser card with six PCIe slots	Not detected	–
Riser card with four PCIe slots	Riser card with four PCIe slots	Absent	–
Riser card with six PCIe slots	Riser card with six PCIe slots	Detected	Slots 1, 4, 7, and 10
Riser card with six PCIe slots	Riser card with four PCIe slots	Detected	Slots 1 and 4
Riser card with four PCIe slots	Riser card with four PCIe slots	Detected	Slot 4
Riser card with four PCIe slots	Riser card with six PCIe slots	Detected	Slots 1 and 4

For details about the standard PCIe card models supported by the RH5885H V3, see the compatibility list, which is available at the following URL:

http://e.huawei.com/en/marketing-material/download_success?MaterialID={51DD876B-6B1F-4BAA-9FE0-52613548BB31}

4.5 Mezz Card

For details about the network mezz card models supported by the RH5885H V3, see the compatibility list, which is available at the following URL:

http://e.huawei.com/en/marketing-material/download_success?MaterialID={51DD876B-6B1F-4BAA-9FE0-52613548BB31}

4.6 PSU

The PSU configuration rules are as follows:

- Input voltage range:
  - AC: 90 V AC to 264 V AC with an input frequency of 50 Hz or 60 Hz
  - DC: –48 V DC to –60 V DC or 192 V DC to 288 V DC
- A server must use PSUs of the same model.

For details about the PSU models supported by the RH5885H V3, see the compatibility list, which is available at the following URL:

http://e.huawei.com/en/marketing-material/download_success?MaterialID={51DD876B-6B1F-4BAA-9FE0-52613548BB31}

4.7 OSs, Virtualization Software and Databases

For details about the OSs, virtualization software, and databases supported by the RH5885H V3, see the compatibility list, which is available at the following URL:

http://e.huawei.com/en/marketing-material/download_success?MaterialID={51DD876B-6B1F-4BAA-9FE0-52613548BB31}

5 Management

The RH5885H V3 uses Huawei proprietary iMana 200 integrated management system to implement remote server management. iMana 200 complies with IPMI 2.0 specifications and provides reliable hardware monitoring and management. iMana 200 seamlessly communicates with management modules in a chassis and manages the compute nodes in the chassis through the management modules.

iMana 200 supports the following features:

- Keyboard, video, and mouse (KVM) and text console redirection
- Remote virtual media
- IPMI V2.0
- Simple Network Management Protocol Version 3 (SNMPv3)
- Common information model (CIM)
- Web-based logins

Table 5-1 REF describes iMana 200 specifications.

Table 5-1 iMana 200 specifications

Item	Specifications
Management interface	iMana 200 supports a variety of management interfaces to implement system integration. iMana 200 can integrate with any standard management system over the following interfaces: • IPMI V2.0 • CLI • HTTPS • SNMPv3
Fault detection	Detects faults and accurately locates hardware faults.
System watchdog	Supports BIOS power on self-test (POST), OS watchdog, and automatic system reset for timeout. You can enable or disable these functions on iMana 200.

Item	Specifications
Boot device configuration	Supports out-of-band configuration for boot devices.
Alarm management	Supports alarm management and reports alarms in various ways, such as the SNMP trap, Simple Mail Transfer Protocol (SMTP), and syslog service, to ensure uninterrupted system operation.
Integrated KVM	Provides remote maintenance measures, such as KVM and KVM over IP, for troubleshooting. Support a maximum resolution of 1280 x 1024.
Integrated virtual media	Virtualizes local media devices or images to the media devices for remote compute nodes, which simplifies OS installation. The virtual DVD-ROM drive supports a transmission rate of up to 8 MB/s.
Web-based user interface (UI)	Provides a visual WebUI for quick configuration and information queries. Supports the following web browsers: • Internet Explorer 8.0 • Firefox 9.0 • Chrome 13.0 • Safari 5.1
Fault reproduction	Reproduces faults to facilitate fault diagnosis.
Screenshots and videos	Allows you to view screenshots and videos without login, which facilitates preventive maintenance inspection (PMI).
DNS/LDAP	Supports domain management and directory services, which significantly simplifies network configuration and management.
Dual-image backup	Starts software from an image backup if the software fails.
Asset management	Provides intelligent asset management.
Intelligent power management	Uses the power capping technology to increase deployment density and the dynamic energy saving technology to lower the OPEX.
IPv6	Supports IPv6 to ensure sufficient IP addresses.
Network Controller Sideband Interface (NC-SI)	Supports NC-SI, which allows you to access iMana 200 over a service network port.

6 Warranty

According to the *Huawei Warranty Policy for Servers & Storage Products*, the RH5885H V3 has a three-year warranty, the DVD-ROM drives and BBUs have a one-year warranty, and the software media has a three-month warranty. The *Warranty Policy* is a series of warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, terms of service, and service agreement terms and conditions.

The *Warranty Policy* is country-specific. The service types, service levels, response time, and terms and conditions may vary by country, and some service and/or parts may not be available in all countries. For more information about warranty services in your country, contact Huawei technical support or your local representative office.

Table 6-1 describes the warranty service response time.

Table 6-1 Response time

Service	Response Time	Description	Remarks
Help Desk	24/7	Available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None
Remote troubleshooting	Available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	The response time starts from the time when Huawei technical support accepts a customer's service request to the time when the technical support contacts the customer the first time to provide remote troubleshooting services.	
Online technical support	Huawei enterprise support website: available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to	None	

Service	Response Time		Description	Remarks
	Sunday)			
Licensing of software updates	Huawei enterprise support website: available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None		
Return for repair	Outside China	9/5 hours, 45 calendar days shipment	Available 9 hours a day, 5 days a week (09:00 to 18:00, Monday to Friday), excluding official holidays	The repaired or replacement parts will be shipped within 45 calendar days after Huawei receives the defective parts.
	In China	10/5 hours, next business day	Available 10 hours a day, 5 days a week (08:00 to 18:00, Monday to Friday), excluding official holidays	Service requests submitted after 15:30 will be handled the next business day.

Table 6-2 describes the warranty services provided by Huawei.

Table 6-2 Warranty services

No.	Description
Help Desk	Huawei provides 24-hour after-sales technical support (such as handling requests for troubleshooting and hardware repair), receives and handles customer inquiries, complaints, and suggestions through a dedicated hotline.
Remote troubleshooting	After receiving a service request for rectifying a network or system fault, Huawei engineers will first analyze and handle the fault remotely and rectify it in the shortest possible time. There are two methods for remote troubleshooting: telephone support and remote access.

No.	Description
Online technical support	Huawei enterprise support website (http://enterprise.huawei.com) provides product and technical materials, such as product manuals, configuration guides, networking case study, and maintenance experience collections. Registered users can access the website and download required documents.
Licensing of software updates	To ensure that the devices operate stably, Huawei provides software patches whenever necessary.
Return for repair	Huawei provides repair or replacement services for customers within the promised time to meet customer needs for spare parts. You can return defective parts to the designated Huawei site after submitting a service request. Huawei provides a three-year warranty for parts replacement and onsite repair for the RH1288 V2 used in China. Huawei provides a 10-hour-a-day, 5-day-a-week support program. Service requests will be handled the next business day. Huawei provides a three-year warranty for parts replacement and repair for the RH1288 V2 used outside China. Huawei provides a 9-hour-a-day, 5-day-a-week support program. Service requests will be handled the next business day. Huawei delivers the repaired or new parts within 45 calendar days after receiving the defective parts.

7 Certifications

Table 7-1 lists the certifications passed by the RH5885H V3 and the standards that the RH5885H V3 complies with.

Table 7-1 Certifications and standards

No.	Country/Region	Certification	Standard
1	China	RoHS	SJ/T-11363-2006 SJ/T-11364-2006 GB/T 26572-2011
2	China	China Environmental Labeling	GB/T24024:2001 idt ISO14024:1999 HJ 2507-2011
3	China	CCC	GB4943.1-2011;GB9254-2008(A);GB17625.1-2012
4	Europe	WEEE	2002/96/EC
5	Europe	CE	Safety: IEC 60950-1:2005 (2nd Edition) + A1:2009 and/or EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 EMC: EN 55022:2010 CISPR 22:2008 EN 55024:2010 CISPR 24:2010 ETSI EN300386 V1.5.1:2010 ETSI ES 201 468 V1.3.1:2005 IEC61000-3-2:2005+A1:2008+A2:2009/EN 61000-3-2:2006+A1:2009+A2:2009 IEC 61000-3-3:2008/EN 61000-3-3:2008 RoHS 2002/95/EC

No.	Country/Region	Certification	Standard
			REACH EC 1907/2006
6	Turkey	CE	Safety: IEC 60950-1:2005 (2nd Edition) + A1:2009 and/or EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 EMC: EN 55022:2010 CISPR 22:2008 EN 55024:2010 CISPR 24:2010 ETSI EN 300 386 V1.5.1:2010 ETSI ES 201 468 V1.3.1:2005 IEC61000-3-2:2005+A1:2008+A2:2009/EN 61000-3-2:2006+A1:2009+A2:2009 IEC 61000-3-3:2008/EN 61000-3-3:2008
7	America	FCC	FCC CFR47 Part 15 Class A
8	Canada	IC	ICES-003 Class A
9	Australia	C-Tick	AS/NZS CISPR 22:2009+A1:2010
10	Japan	VCCI	VCCI V-3:2012
11	America	NRTL-UL	UL 60950-1,2nd Edition,2011-12-19 (Information Technology Equipment-Safety-Part 1:General Requirement) CSA C22.2 No.60950-1-07,2nd Edition,2011-12 (Information Technology Equipment-Safety-Part 1:General Requirement)
12	Canada	NRTL-UL	UL 60950-1,2nd Edition,2011-12-19 (Information Technology Equipment-Safety-Part 1:General Requirement) CSA C22.2 No.60950-1-07,2nd Edition,2011-12 (Information Technology Equipment-Safety-Part 1:General Requirement)