

**Huawei CH242 V3 Compute Node
V100R001**

White Paper

Issue **04**
Date **2014-09-15**

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About This Document

Product Positioning

This document describes the appearance, features, technical specifications, and configuration of the new-generation CH242 V3 compute node of the HUAWEI E9000 server.

Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Huawei enterprise presales engineers

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 04 (2014-09-15)

This issue is the fourth official release.

Mode	Change Description
Deleted	"Tecal" is deleted from the product document.
Modified	Maximum power consumption and Altitude in 1.8 Technical Specifications are updated.
	1.6 Hardware Structure (4HDD) is updated, USB 2.0 port is added to the component figure and description.

Issue 03 (2014-07-30)

This issue is the third official release.

Mode	Change Description
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Mode	Change Description
Modified	The 1.5 Hardware Structure (8HDD) and 1.6 Hardware Structure (4HDD) are updated.
	In 1.8 Technical Specifications , the key components of the CH242 V3 8HDD are added to 1.5 Hardware Structure (8HDD) , and the key components of the CH242 V3 4HDD are added to 1.6 Hardware Structure (4HDD) .
	Multiple sections in 3 Component Selection are combined as one section.

Issue 02 (2014-05-13)

This issue is the second official release.

Mode	Change Description
Modified	The content in 3 Component Selection is modified.

Issue 01 (2014-02-28)

This issue is the first official release.

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1 Introduction

About This Chapter

1.1 Functions

This topic describes the functions and components of the CH242 V3 compute node (CH242 V3 for short).

1.2 Appearance

This topic describes the appearance, front panel, installation position, and slot numbering of the CH242 V3.

1.3 Indicators

This topic describes the names, meanings, colors, and status of the indicators on the CH242 V3.

1.4 Ports

This topic describes the ports on the CH242 V3 and provides detailed information about the high-density port.

1.5 Hardware Structure (8HDD)

This topic describes the components of the CH242 V3 8HDD and provides detailed information about the layouts of the mainboard and hard disk backplane.

1.6 Hardware Structure (4HDD)

This topic describes the components of the CH242 V3 4HDD and provides detailed information about the layouts of the mainboard and hard disk backplane.

1.7 Logical Architecture

This topic describes the logical structure of the CH242 V3 CPUs, dual in-line memory modules (DIMMs), and platform controller hub (PCH) and ports on the CH242 V3.

1.8 Technical Specifications

This topic describes specifications of the CH242 V3.

1.1 Functions

This topic describes the functions and components of the CH242 V3 compute node (CH242 V3 for short).

The CH242 V3 is a large-memory, full-width compute node that uses the new-generation Intel® Xeon® E7-4800 V2 (IVY Bridge-EX) processors. It provides strong computing capabilities and flexible scalability.

The CH242 V3 has two types of specifications:

- **CH242 V3 8HDD**
Supports SAS HDDs, SATA HDDs, SSDs, and PCIe SSD disks, and provides two customized PCIe cards.
- **CH242 V3 4HDD**
Supports SAS HDDs, SATA HDDs, and SSDs, and provides one standard PCIe card of full-height, half-length and two customized PCIe cards.

The CH242 V3 is installed in a E9000 chassis and managed by the MM910 management module in a centralized manner.

The CH242 V3 features high density, large-capacity memory and storage, high network I/O capability, and high reliability, suiting enterprise applications such as virtualization and high-performance computing (HPC).

1.2 Appearance

This topic describes the appearance, front panel, installation position, and slot numbering of the CH242 V3.

Appearance

[Figure 1-1](#) shows the CH242 V3 8HDD appearance.

Figure 1-1 CH242 V3 8HDD appearance



Figure 1-2 shows the CH242 V3 4HDD appearance.

Figure 1-2 CH242 V3 4HDD appearance

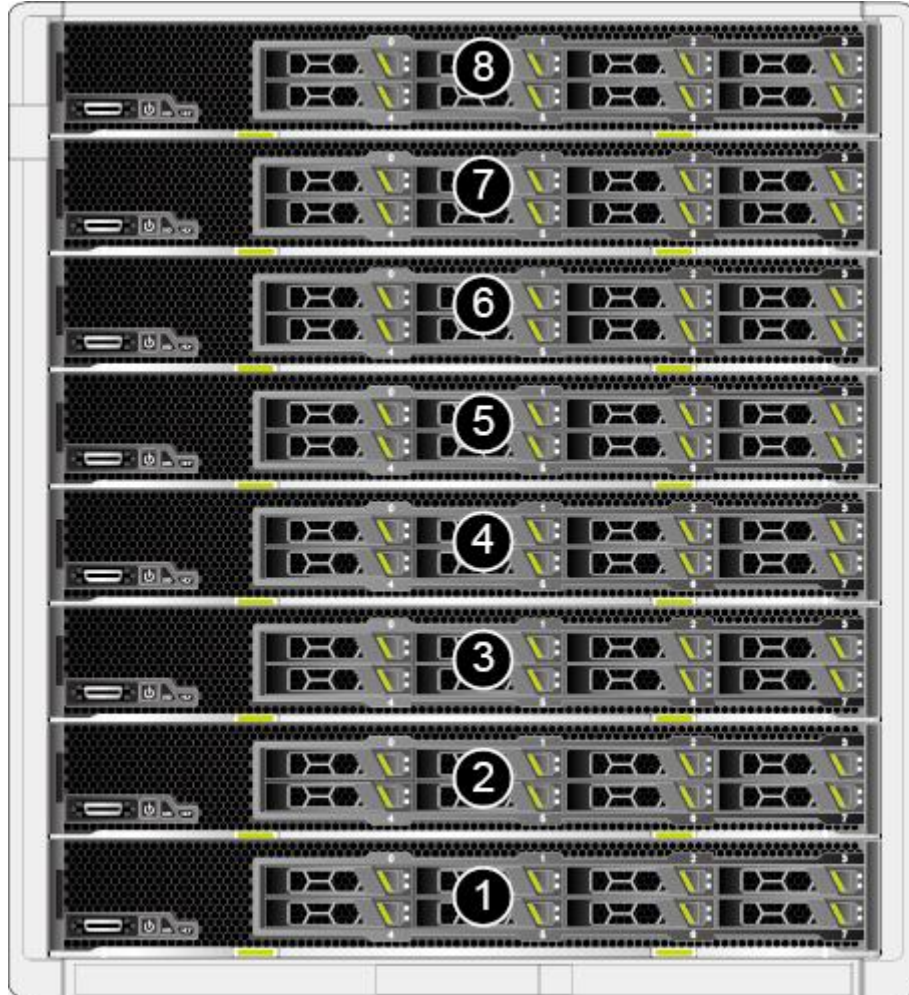


Installation Position

The CH242 V3s are installed in the front full-width slots of the E9000 chassis. A chassis houses a maximum of eight CH242 V3. The installation positions and slots for the CH242 V3 8HDD are the same as those for the CH242 V3 4HDD. The following uses the CH242 V3

8HDD as an example. Figure 1-3 shows the installation positions of the CH242 V3 and their slot numbers in the chassis.

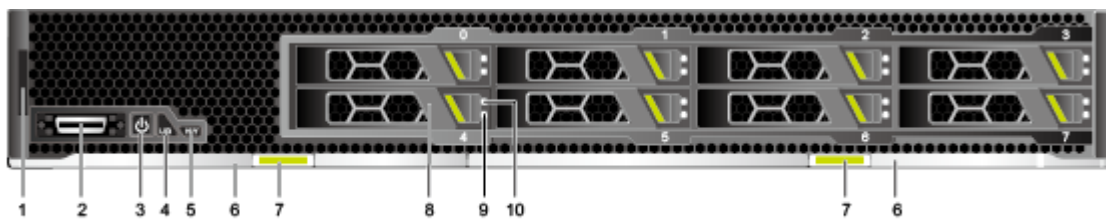
Figure 1-3 Installation positions and slot numbering



Front panel

Figure 1-4 shows the front panel of a CH242 V3 8HDD.

Figure 1-4 CH242 V3 8HDD front panel



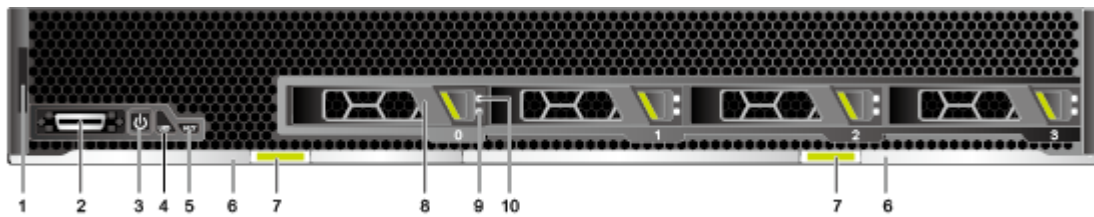
1 Customization label

2 High-density port

3	Power button/indicator	4	UID button/indicator
5	HLY indicator	6	Ejector lever
7	Spring	8	Hard disk
9	Hard disk active indicator	10	Hard disk fault indicator

Figure 1-5 shows the front panel of a CH242 V3 4HDD.

Figure 1-5 CH242 V3 4HDD front panel



1	Customization label	2	High-density port
3	Power button/indicator	4	UID button/indicator
5	HLY indicator	6	Ejector lever
7	Spring	8	Hard disk
9	Hard disk active indicator	10	Hard disk fault indicator


1.3 Indicators


This topic describes the names, meanings, colors, and status of the indicators on the CH242 V3.

You can learn about the status of the CH242 V3 by observing the indicators. [Table 1-1](#) describes the indicators on the CH242 V3.

Table 1-1 Indicators on the front panel

Indicator	Meaning	Color	State Description
PWR	Power button/indicator	Yellow and green	<ul style="list-style-type: none"> Off: The compute node is not powered on. Blinking yellow: The power supply is locked, and the compute node cannot be powered on. The power button that locked of reason: <ul style="list-style-type: none"> When a compute node is being powered on, iMana 200 does

Indicator	Meaning	Color	State Description
			<p>not start, and the power button on the panel is locked.</p> <ul style="list-style-type: none"> – Shield the power button in iMana 200. <ul style="list-style-type: none"> • Steady yellow: The compute node is to be powered on. • Steady green: The compute node is properly powered on. <p>NOTE</p> <p>If a compute node is powered on, you can hold down the power button for 6 seconds to forcibly power off the compute node.</p>
UID	UID button/indicator	Blue	<p>The Unit Identification (UID) indicator helps locate a compute node in a rack. You can control the UID indicator status (off or on) by remotely using the MM910 or by manually pressing the UID indicator.</p> <ul style="list-style-type: none"> • Off: The compute node is not located or is not powered on. • On: The compute node is located. <p>NOTE</p> <p>If a compute node is powered on, you can hold down the button for 6 seconds to reset iMana 200.</p>
HLY	Health status indicator	Red and green	<ul style="list-style-type: none"> • Off: The compute node is not powered on. • Steady green: The compute node hardware is operating properly. • Blinking red (at 1 Hz): A major alarm is generated for the compute node. • Blinking red (at 4 Hz): A critical alarm is generated for the compute node. • Blinking red (at 5 Hz): The compute node is not properly installed. <p>NOTE</p> <p>It is difficult to distinguish a blinking frequency of 4 Hz from a blinking frequency of 5 Hz. When the HLY indicator is quickly blinking red, you are advised to check whether the device is securely inserted and then check whether a critical alarm is generated.</p>
	Hard disk active indicator	Green	<ul style="list-style-type: none"> • Off: The hard disk is not detected or is faulty.

Indicator	Meaning	Color	State Description
			<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.

1.4 Ports

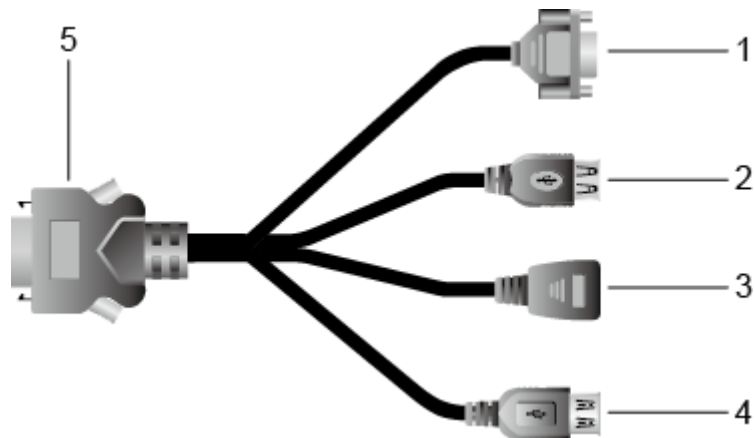
This topic describes the ports on the CH242 V3 and provides detailed information about the high-density port.

[Table 1-2](#) describes the ports on the CH242 V3.

Table 1-2 Port description

Port	Category	Quantity	Description
High-density port	-	1	The High-density port on the front panel connects to a high-density cable, which provides a DB15 video graphics array (VGA) video port, three USB 2.0 ports, and a RJ45 serial port.

Figure 1-6 High-density cable



1	VGA port	2	Two USB ports
3	Serial port	4	One USB port
5	High-density port	-	-

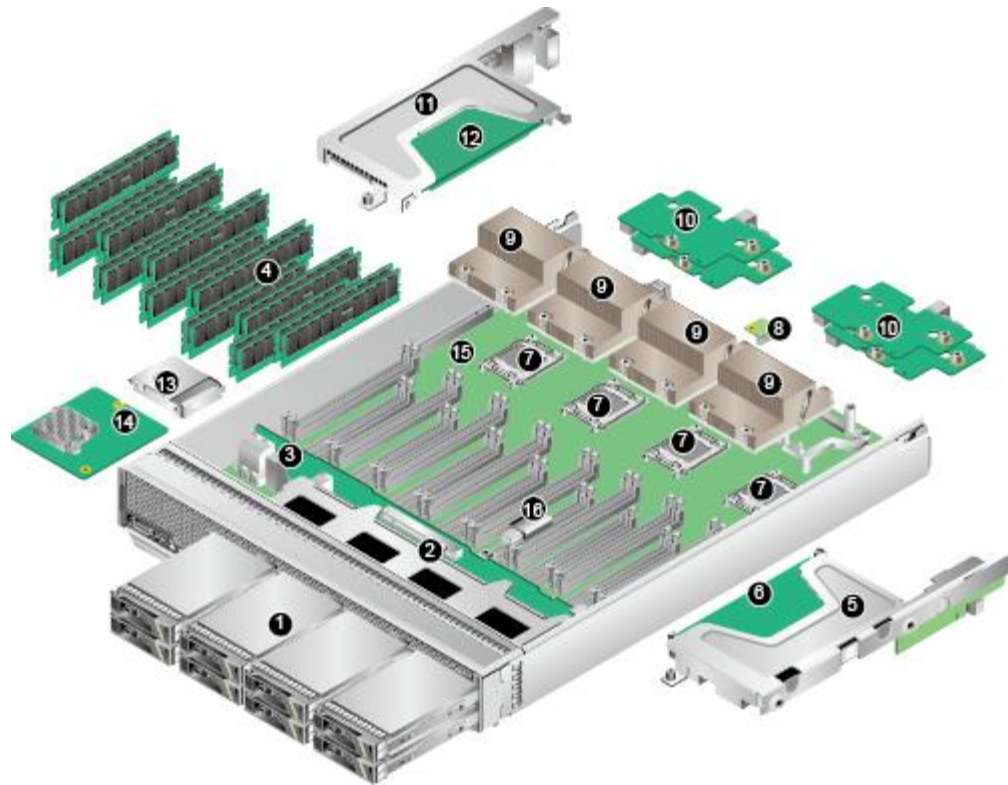
1.5 Hardware Structure (8HDD)

This topic describes the components of the CH242 V3 8HDD and provides detailed information about the layouts of the mainboard and hard disk backplane.

Components

[Figure 1-7](#) shows the components of the CH242 V3 8HDD.

Figure 1-7 Components



1	Hard disk	2	Hard disk tray
3	Hard disk backplane	4	DIMM
5	(Optional) PCIe card tray 2	6	(Optional) PCIe card 2
7	CPU	8	(Optional) TPM
9	Heat sink	10	Mezz module
11	(Optional) PCIe card tray 1	12	(Optional) PCIe card 1
13	iBBU	14	RAID controller card
15	Main board	16	(Optional) USB 2.0

[Table 1-3](#) describes the components of the CH242 V3 8HDD.

Table 1-3 Component description

No.	Item	Description
1	Hard disk	The compute node supports a maximum of eight 2.5-inch hard disk drives (HDDs), or SSDs. Slots 0 to 3 support PCIe SSDs. Mixed configuration of SAS and SATA hard disks is supported. Each hard disk is hot-swappable and can be installed and removed separately. PCIe SSDs do not support hot swap. The hard disk backplane provides eight Serial Attached SCSI (SAS) and Serial Advanced Technology Attachment (SATA) ports for

No.	Item	Description
		connecting SAS and SATA hard disks. <ul style="list-style-type: none"> • Up to 9.6 TB with fully configured 1.2 TB SAS hard disks • Up to 8 TB with fully configured 1 TB SATA hard disks • Up to 6.4 TB with fully configured 800 GB SSDs
2	Hard disk tray	Supports hard disks
3	Hard disk backplane	The hard disk backplane helps expand the storage capacity and control hard disks in real time.
4	DIMM	Up to 32 dual in-line memory module (DIMM) slots for installing DIMMs (8 DIMMs for each CPU). <ul style="list-style-type: none"> • Maximum memory speed: 1600 MHz • Memory protection: error-correcting code (ECC), mirroring, and sparing. • DIMM type: registered DIMM (RDIMM) and load-reduced DIMM (LRDIMM) • Mixing different types of DIMMs is not supported. <ul style="list-style-type: none"> – RDIMM: up to 512 GB for 32 x 16 GB RDIMMs and four CPUs – LRDIMM: up to 1024 GB for 32 x 32 GB LRDIMMs and four CPUs
5	(Optional) PCIe card tray 2	The PCIe card tray is placed above the DIMMs. Each PCIe card tray provides one PCIe x16 slot by using a riser card.
6	(Optional) PCIe card 2	The mainboard provides two customized PCIe cards on the left and right sides. If a standard PCIe card of full-height, half-length is installed, no DIMMs can be inserted into the 10 DIMM slots below the PCIe card due to space limitations. NOTE You can configure either PCIe card tray 1 and PCIe card 1 or PCIe card tray 2 and PCIe card 2.
7	CPU	The mainboard supports two or four Intel® Xeon® E7-4800 V2 (Ivy Bridge-EX) CPUs of 105 W, 130 W, and 155 W, with a maximum of 15 cores per CPU. <ul style="list-style-type: none"> • Each CPU integrates two memory controllers for supporting eight memory channels. Each channel supports one DIMM and DDR3 1333 MHz, or 1600 MHz. • Each CPU integrates a PCIe controller for supporting PCIe 3.0, and provides 32 lanes. • The CPUs are interconnected through one QuickPath bus at 8.0 GT/s. • The maximum dominant frequency supported by the CPUs reaches 2.8 GHz.

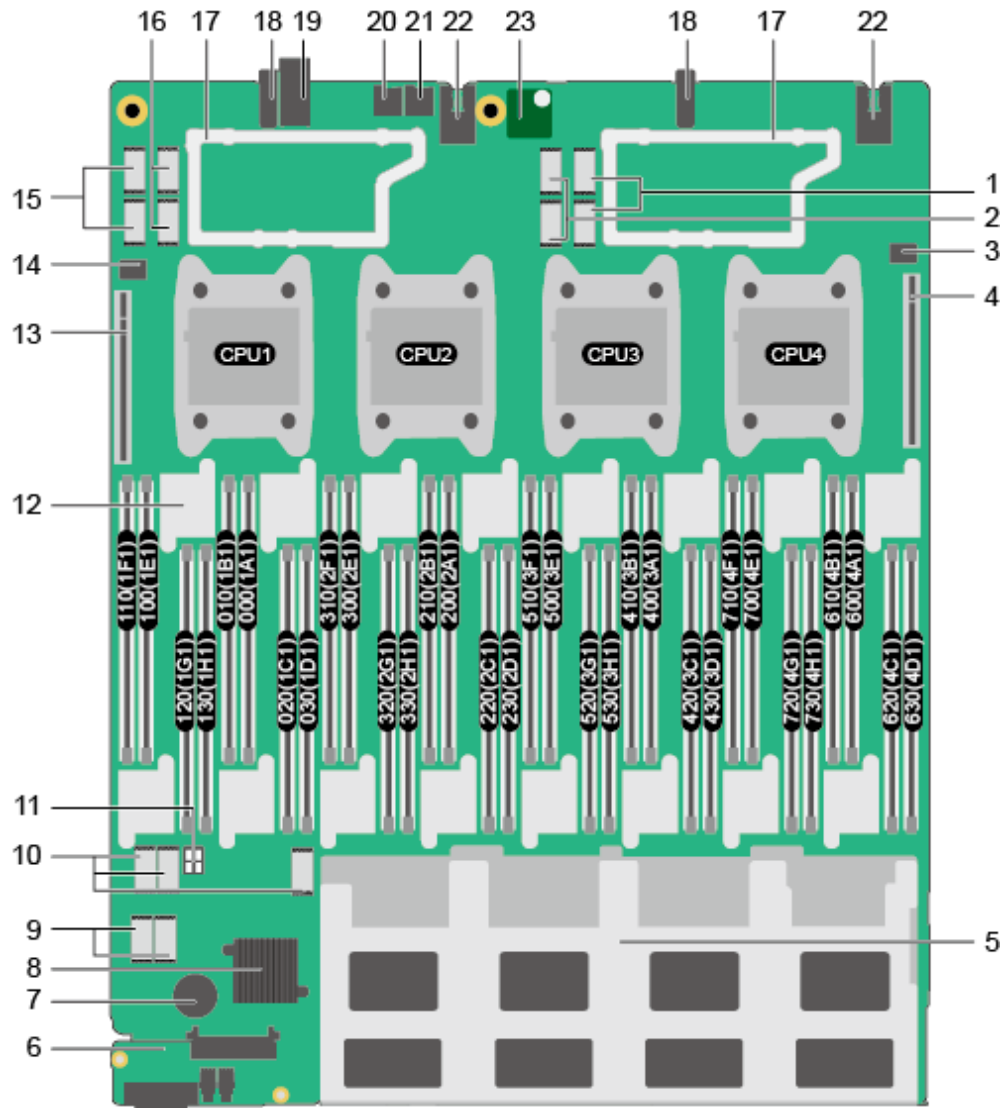
No.	Item	Description
8	(Optional) TPM	The Trusted Platform Module (TPM) is a security solution that complies with the Trusted Computing Group (TCG) standards. It enhances platform security by preventing viruses or unauthorized operations.
9	Heat sink	The heat sink is used to cool CPUs. Each CPU is configured with one heat sink.
10	Mezz module	The mainboard provides four mezzanine card connectors to connecting to the slots of switch modules or pass through modules through the backplane. <ul style="list-style-type: none"> The upper mezz module is Mezz 1 and Mezz 3, and the lower one is Mezz 2 and Mezz 4. Mezz 1 and Mezz3 connects to slots 2X and 3X. Mezz 2 and Mezz4 connects to slots 1E and 4E.
11	(Optional) PCIe card tray 1	The PCIe card tray is placed above the DIMMs. Each PCIe card tray provides one PCIe x16 slot by using a riser card.
12	(Optional) PCIe card 1	The mainboard provides two customized PCIe cards on the left and right sides. If a standard PCIe card of full-height, half-length is installed, no DIMMs can be inserted into the 10 DIMM slots below the PCIe card due to space limitations. NOTE You can configure either PCIe card tray 1 and PCIe card 1 or PCIe card tray 2 and PCIe card 2.
13	iBBU	When the LSISAS2208 or LSISAS2308 controller card is installed, you can install an iBBU to provide power-off protection at power failures.
14	RAID controller card	The RAID controller card connects to external hard disks to expand the storage capacity of the compute node. The hard disk backplane provides eight 6 Gbit/s Serial Attached SCSI (SAS) or Serial Advanced Technology Attachment (SATA) ports for connecting SAS disks, SATA disks. The mainboard supports RAID controller cards with the LSISAS2208 and LSISAS2308 chips. CH242 V3 8HDD: <ul style="list-style-type: none"> The LSISAS2208 RAID controller card supports RAID 0, 1, 5, 6, 10, 50, and 60. The LSISAS2308 RAID controller card supports RAID 0 and 1.
15	Main board	The mainboard holds the CPUs, DIMMs, hard disk interface modules, power control module, iBMC (integrated baseboard management controller), logic module, chipset and display adapter. The server chipset is the Platform Controller Hub (PCH) using

No.	Item	Description
		the Intel® C602J chip. A video chip with 64 MB display memory integrated into the FPGA. The maximum resolution is 1280 x 1024 at 60 Hz with 16 M colors.
16	(Optional) USB 2.0	The mainboard provides a built-in USB port for connecting to a USB 2.0 device with the dimensions of 66.1 mm x 16.60 mm x 7.02 mm.

Mainboard Layout

[Figure 1-8](#) shows the positions of connectors and other components on the CH242 V3 8HDD mainboard.

Figure 1-8 Positions of the connectors and other components



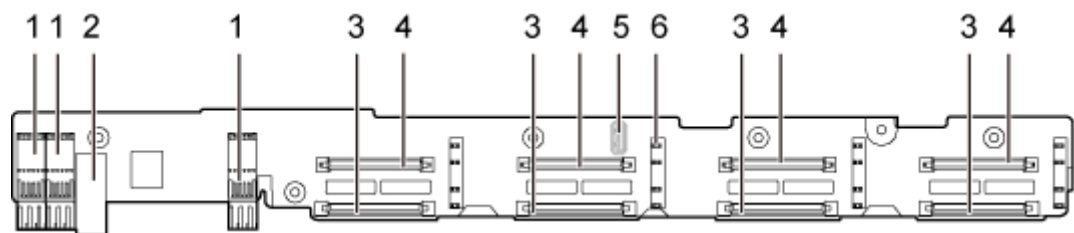
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|----|--------------------------------|----|------------------------------|
| 1 | Mezz module connector 4 | 2 | Mezz module connector 3 |
| 3 | Riser card power connector 2 | 4 | Riser card connector 2 |
| 5 | HDD tray | 6 | Customer interface board |
| 7 | BIOS battery | 8 | PCH(Platform Controller Hub) |
| 9 | RAID controller card connector | 10 | HDD backplane connector |
| 11 | HDD backplane power connector | 12 | Jordan Creek |
| 13 | Riser card connector 1 | 14 | Riser card power connector 1 |
| 15 | Mezz card connector 1 | 16 | Mezz card connector 2 |
| 17 | Mezz card tray | 18 | Positioning pin |

19	Midplane signal connector	20	Micro SD card connector 2
21	Micro SD card connector 1	22	Midplane power connector
23	TPM card connector	-	-

Hard Disk Backplane Layout

Figure 1-9 shows the positions of connectors and other components on the CH242 V3 8HDD hard disk backplane.

Figure 1-9 Hard disk backplane



1	Signal connector, connecting to the mainboard	2	Power connector, connecting to the mainboard
3	SAS connector, supporting SAS and SATA	4	SAS connector, supporting SAS, SATA, and PCIe
5	USB port at the back of the hard disk backplane	6	Hard disk indicator

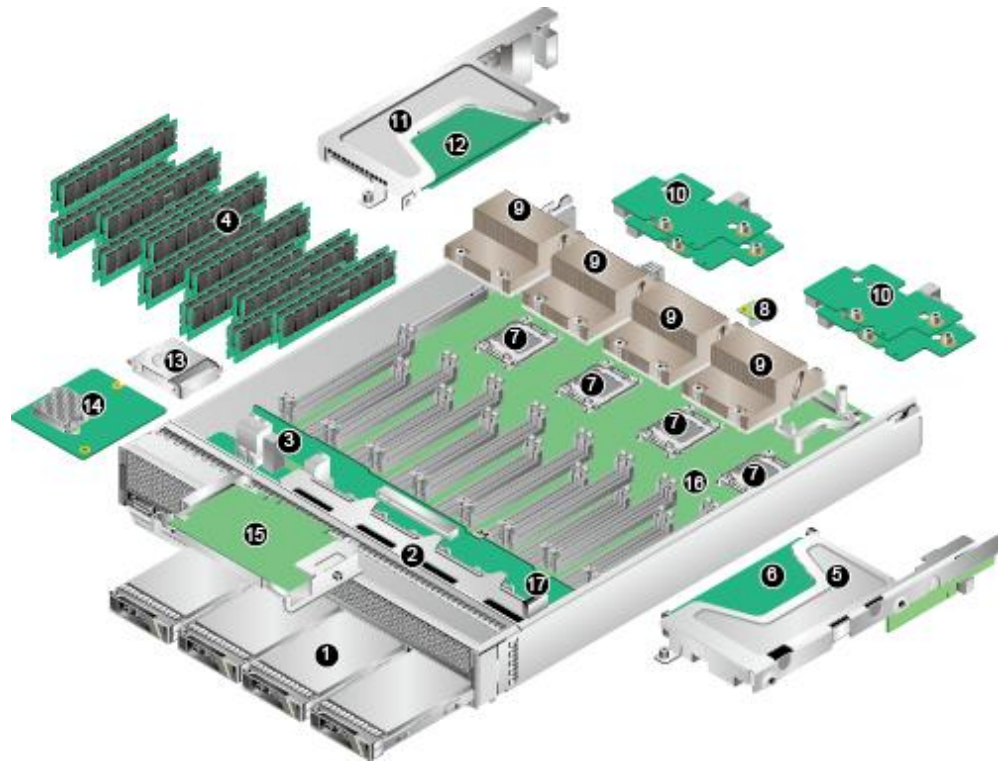
1.6 Hardware Structure (4HDD)

This topic describes the components of the CH242 V3 4HDD and provides detailed information about the layouts of the mainboard and hard disk backplane.

Components

Figure 1-10 shows the components of the CH242 V3 4HDD.

Figure 1-10 Components



1	Hard disk	2	Hard disk tray
3	Hard disk backplane	4	Dual in-line memory module (DIMM)
5	(Optional) PCIe card tray 2	6	(Optional) PCIe card 2
7	CPU	8	(Optional) TPM
9	Heat sink	10	Mezz module
11	(Optional) PCIe card tray 1	12	(Optional) PCIe card 1
13	iBBU	14	RAID controller card
15	PCIe card	16	Main board
17	(Optional) USB 2.0	—	—

[Table 1-4](#) describes the components of the CH242 V3 4HDD.

Table 1-4 Component description

No.	Item	Description
1	Hard disk	The compute node supports a maximum of four 2.5-inch hard disk drives (HDDs) or SSDs. Mixed configuration of SAS and SATA hard disks is supported. The hard disk backplane provides four Serial Attached SCSI (SAS) and Serial Advanced Technology Attachment (SATA) ports for connecting SAS and

No.	Item	Description
		<p>SATA hard disks. Each hard disk is hot-swappable and can be installed and removed separately.</p> <ul style="list-style-type: none"> Up to 4.8 TB with fully configured 1.2 TB SAS hard disks Up to 4 TB with fully configured 1 TB SATA hard disks Up to 1.2 TB with fully configured 300 GB SSDs
2	Hard disk tray	Supports hard disks
3	Hard disk backplane	The hard disk backplane helps expand the storage capacity and control hard disks in real time.
4	DIMM	<p>Up to 32 dual in-line memory module (DIMM) slots for installing DIMMs (8 DIMMs for each CPU).</p> <ul style="list-style-type: none"> Maximum memory speed: 1600 MHz Memory protection: error-correcting code (ECC), mirroring, and sparing. DIMM type: registered DIMM (RDIMM) and load-reduced DIMM (LRDIMM) Mixing different types of DIMMs is not supported. <ul style="list-style-type: none"> RDIMM: up to 512 GB for 32 x 16 GB RDIMMs and four CPUs LRDIMM: up to 1024 GB for 32 x 32 GB LRDIMMs and four CPUs
5	(Optional) PCIe card tray 2	The PCIe card tray is placed above the DIMMs. Each PCIe card tray provides one PCIe x16 slot by using a riser card.
6	(Optional) PCIe card 2	<p>Customized PCIe card.</p> <ul style="list-style-type: none"> The mainboard provides two customized PCIe cards on the left and right sides. The backplane provides one standard PCIe card of full-height, half-length. <p>If a standard PCIe card of full-height, half-length is installed, no DIMMs can be inserted into the 10 DIMM slots below the PCIe card due to space limitations.</p> <p>NOTE</p> <p>You can configure either PCIe card tray 1 and PCIe card 1 or PCIe card tray 2 and PCIe card 2.</p>
7	CPU	<p>The mainboard supports two or four Intel® Xeon® E7-4800 V2 (Ivy Bridge-EX) CPUs of 105 W, 130 W, and 155 W, with a maximum of 15 cores per CPU.</p> <ul style="list-style-type: none"> Each CPU integrates two memory controllers for supporting eight memory channels. Each channel supports one DIMM and DDR3 1333 MHz, or 1600 MHz. Each CPU integrates a PCIe controller for supporting PCIe 3.0, and provides 32 lanes. The CPUs are interconnected through one QuickPath bus at

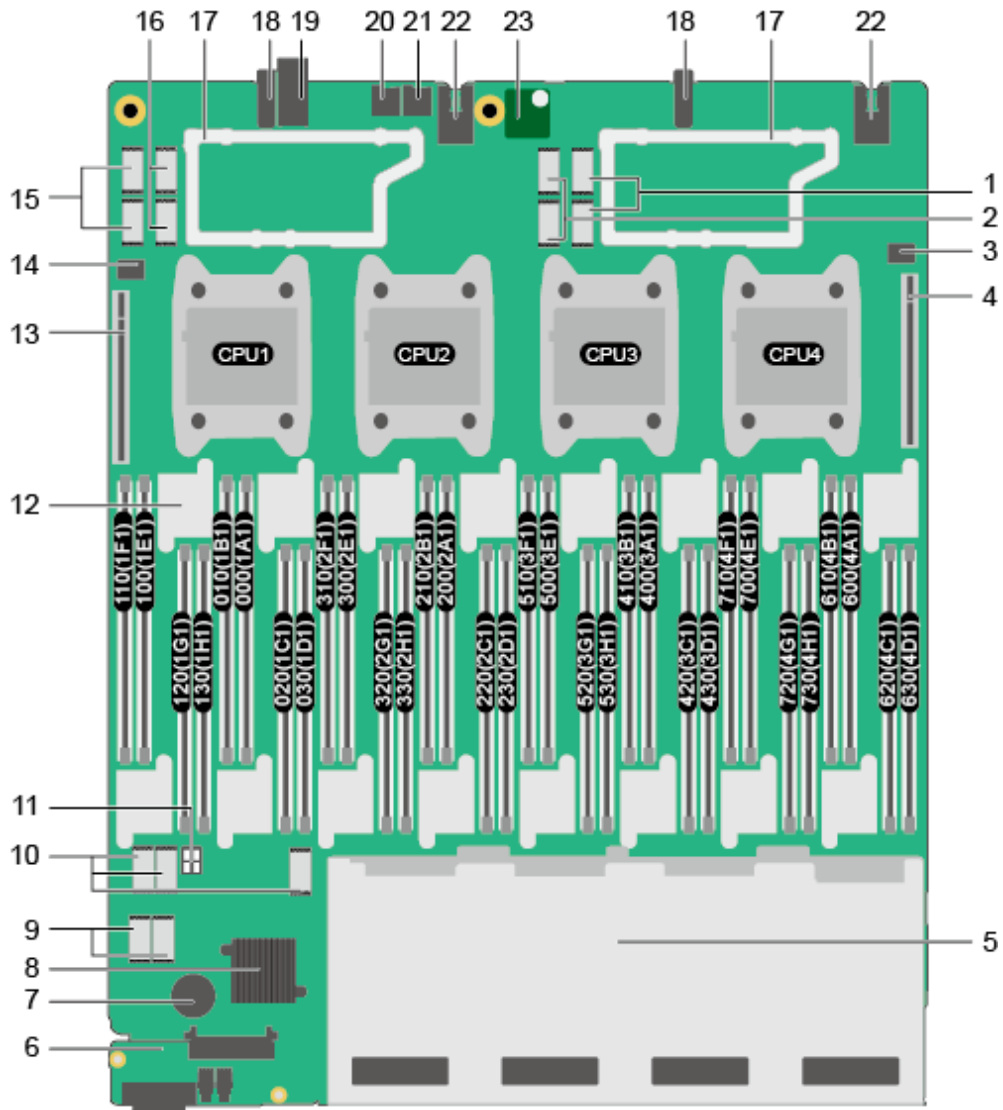
No.	Item	Description
		<p>8.0 GT/s.</p> <ul style="list-style-type: none"> The maximum dominant frequency supported by the CPUs reaches 2.8 GHz.
8	(Optional) TPM	The Trusted Platform Module (TPM) is a security solution that complies with the Trusted Computing Group (TCG) standards. It enhances platform security by preventing viruses or unauthorized operations.
9	Heat sink	The heat sink is used to cool CPUs. Each CPU is configured with one heat sink.
10	Mezz module	<p>The mainboard provides four mezzanine card connectors to connecting to the slots of switch modules or pass through modules through the backplane.</p> <ul style="list-style-type: none"> The upper mezz module is Mezz 1 and Mezz 3, and the lower one is Mezz 2 and Mezz 4. Mezz 1 and Mezz3 connects to slots 2X and 3X. Mezz 2 and Mezz4 connects to slots 1E and 4E.
11	(Optional) PCIe card tray 1	The PCIe card tray is placed above the DIMMs. Each PCIe card tray provides one PCIe x16 slot by using a riser card.
12	(Optional) PCIe card 1	<p>Customized PCIe card.</p> <ul style="list-style-type: none"> The mainboard provides two customized PCIe cards on the left and right sides. The backplane provides one standard PCIe card of full-height, half-length. <p>If a standard PCIe card of full-height, half-length is installed, no DIMMs can be inserted into the 10 DIMM slots below the PCIe card due to space limitations.</p> <p>NOTE You can configure either PCIe card tray 1 and PCIe card 1 or PCIe card tray 2 and PCIe card 2.</p>
13	iBBU	When the LSISAS2208 or LSISAS2308 controller card is installed, you can install an iBBU to provide power-off protection at power failures.
14	RAID controller card	<p>The RAID controller card connects to external hard disks to expand the storage capacity of the compute node. The hard disk backplane provides four 6 Gbit/s Serial Attached SCSI (SAS) or Serial Advanced Technology Attachment (SATA) ports for connecting SAS disks, SATA disks.</p> <p>The mainboard supports RAID controller cards with the LSISAS2208 and LSISAS2308 chips.</p> <p>CH242 V3 4HDD:</p> <ul style="list-style-type: none"> The LSISAS2208 RAID controller card supports RAID 0, 1, 5, 6, 10, 50, and 60. The LSISAS2308 RAID controller card supports RAID 0

No.	Item	Description
		and 1.
15	PCIe card	The hard disk backplane provides one PCIe x16 slot for installing the standard PCIe card of full height, half length.
16	Main board	<p>The mainboard holds the CPUs, DIMMs, hard disk interface modules, power control module, iBMC (integrated baseboard management controller), logic module, chipset and display adapter.</p> <p>The server chipset is the Platform Controller Hub (PCH) using the Intel® C602J chip.</p> <p>A video chip with 64 MB display memory integrated into the FPGA. The maximum resolution is 1280 x 1024 at 60 Hz with 16 M colors.</p>
17	(Optional) USB 2.0	The mainboard provides a built-in USB port for connecting to a USB 2.0 device with the dimensions of 66.1 mm x 16.60 mm x 7.02 mm.

Mainboard Layout

[Figure 1-11](#) shows the positions of connectors and other components on the CH242 V3 4HDD mainboard.

Figure 1-11 Positions of the connectors and other components



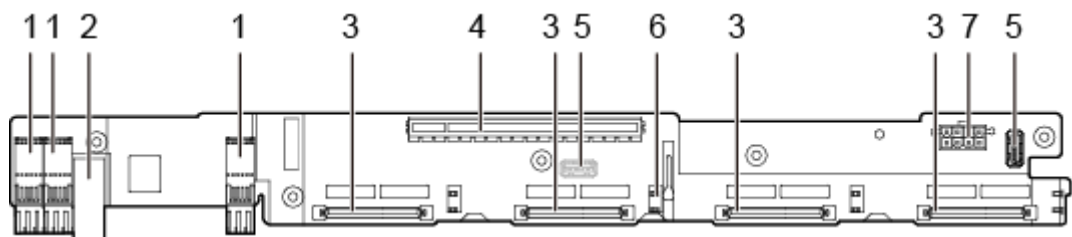
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|----|--------------------------------|----|------------------------------|
| 1 | Mezz module connector 4 | 2 | Mezz module connector 3 |
| 3 | Riser card power connector 2 | 4 | Riser card connector 2 |
| 5 | HDD tray | 6 | Customer interface board |
| 7 | BIOS battery | 8 | PCH(Platform Controller Hub) |
| 9 | RAID controller card connector | 10 | HDD backplane connector |
| 11 | HDD backplane power connector | 12 | Jordan Creek |
| 13 | Riser card connector 1 | 14 | Riser card power connector 1 |
| 15 | Mezz card connector 1 | 16 | Mezz card connector 2 |
| 17 | Mezz card tray | 18 | Positioning pin |

19	Midplane signal connector	20	Micro SD card connector 2
21	Micro SD card connector 1	22	Midplane power connector
23	TPM card connector	-	-

Hard Disk Backplane Layout

Figure 1-12 shows the positions of connectors and other components on the CH242 V3 4HDD hard disk backplane.

Figure 1-12 Hard disk backplane



1	Signal connector, connecting to the mainboard	2	Power connector, connecting to the mainboard
3	SAS connector, supporting SAS and SATA	4	PCIe 3.0 x16 connector
5	USB ports, one each at the front and back of the hard disk backplane	6	Hard disk indicator
7	Auxiliary PCIe card power connector	-	-

1.7 Logical Architecture

This topic describes the logical structure of the CH242 V3 CPUs, dual in-line memory modules (DIMMs), and platform controller hub (PCH) and ports on the CH242 V3.

- CPU: The CH242 V3 supports a maximum of four Intel® Ivy bridge-EX CPUs.
 - Each CPU has two memory controllers. Each memory controller supports two Intel® Serial Management Interfaces (SMIs). Each SMI supports one Jordan Creek, and each Jordan Creek supports two memory channels.
 - A CPU integrates three QuickPath Interconnect (QPI) 1.1 interfaces. CPUs are interconnected over the QPI bus with a transmission rate of 8.0 GT/s.
 - The CPUs are interconnected with the PCH over the DMI2 bus with a transmission rate of 5 GT/s.

- DIMM: The CH242 V3 can be configured with a maximum of 32 DIMMs. Each DIMM provides a maximum capacity of 32 GB.
- As the PCH, the Patsburg-J chip is an Intel southbridge for server platforms to provide external I/O ports and bus expandability. The PCH connects to the () to provide management and service ports.
- I/O ports: The CH242 V3 connects to switch modules and pass through modules by using four mezz modules.
- Hard disk interface module:
 - CH242 V3 8HDD: Hard disk interface module: The hard disk interface module consists of the hard disk backplane and a RAID controller card. The hard disk backplane for eight hard disks provides eight Serial Attached SCSI (SAS) or Serial Advanced Technology Attachment (SATA) ports. Ports in slots 0 to 3 support PCIe and can connect to PCIe SSDs.
 - CH242 V3 4HDD: Hard disk interface module: The hard disk interface module consists of the hard disk backplane and a RAID controller card. The hard disk backplane for four hard disks provides four SAS or SATA ports and one PCIe x16 port.
- The provides device management functions, such as compute node power control, slot ID obtaining, power detection, and KVM over IP. The connects to a high-density port of the panel.

Figure 1-13 shows the CH242 V3 8HDD logical structure.

Figure 1-13 Logical CH242 V3 8HDD structure

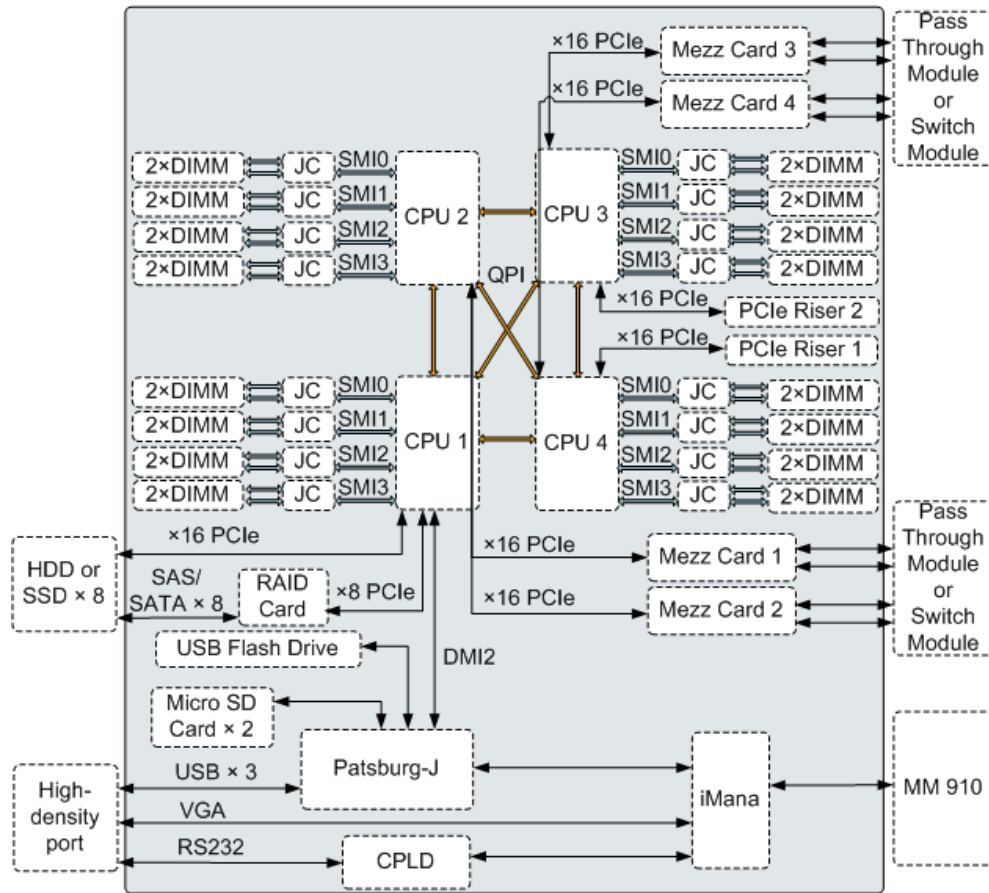
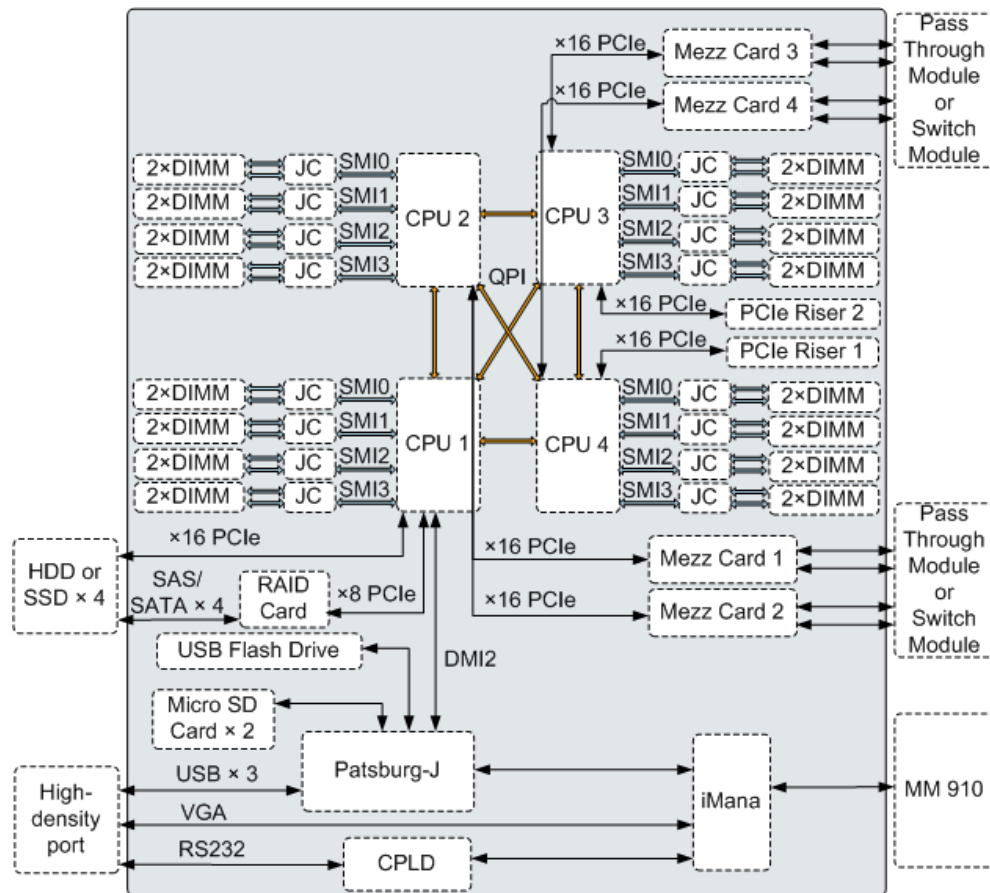


Figure 1-14 shows the CH242 V3 4HDD logical structure.

Figure 1-14 Logical CH242 V3 4HDD structure



1.8 Technical Specifications

This topic describes specifications of the CH242 V3.

[Table 1-5](#) describes the technical specifications of the CH242 V3.

Table 1-5 Technical Specifications

Category	Item	Specifications
Physical specifications	Dimensions (H x W x D)	60.46 mm x 423 mm x 537.2 mm (2.4 in. x 16.65 in. x 21.14 in.)
	Color	<ul style="list-style-type: none"> Front panel: black Cover: silver white
	Weight	Net weight: 16 kg to 17 kg (35.27 lb to 37.48 lb) Packing materials: 3.6 kg (7.94 lb)
Environmental specifications	Temperature	<ul style="list-style-type: none"> Operating temperature: 5 °C to 40 °C (41 °F to 104 °F)

Category	Item	Specifications
		<ul style="list-style-type: none"> Storage temperature: -40 °C to +65 °C (-40 °F to +149 °F)
	Temperature change rate	15 °C/h (27 °F/h)
	Humidity	<ul style="list-style-type: none"> Operating humidity: 5% RH to 85% RH (non-condensing) Storage humidity: 5% RH to 95% RH (non-condensing)
	Altitude	<p>900 m (2952.72 ft) at 40 °C (104 °F)</p> <p>When the device is used in an altitude of 900 m to 1800 m, the operating temperature decreases by 1 °C (1.8 °F) as the altitude increases by 300 m (984.24 ft).</p>
Input power supply	Rated input voltage	12 V DC
Power consumption	Maximum power consumption	<ul style="list-style-type: none"> CH242 V3 8HDD: 1259 W CH242 V3 4HDD: 1265 W

2 Features

Performance and Scalability

- The CH242 V3 uses the Intel® Xeon® E7-4800 V2 series processors. Each processor has up to fifteen cores and a L3 cache of 37.5 MB at a dominant frequency of 2.8 GHz, with three 8 GT/s QuickPath Interconnect (QPI) links between processors. This enables the CH242 V3 to provide optimal processing performance.
- Each CH242 V3 supports four processors, 60 cores, and 120 threads to maximize the concurrent execution of multithreaded applications.
- The intelligent autonegotiation function provided by Intel® Turbo Boost Technology 2.0 enables the processor cores to run at maximum speeds during peak workloads by temporarily going beyond the processor thermal design power (TDP).
- Intel® Hyper-Threading Technology boosts performance for multithreaded applications by enabling concurrent execution of multiple threads within each processor core (up to two threads per core).
- Intel® Virtualization Technology integrates hardware-level virtualization functions to allow operating system (OS) vendors to better use hardware for addressing virtualization workloads.
- Intel® Advanced Vector Extensions (Intel® AVX) improves floating-point computing performance for computing-intensive applications.
- A total of 32 load-reduced DIMMs (LRDIMMs) provides quick speed, high availability, and a maximum memory capacity of 1024 GB.
- Intel® Xeon® E7-4800 series processors provide a maximum memory bandwidth of 409.6 GB/s (64 bit/8*1600 MHz*32 channel) in theory.
- The use of solid-state drives (SSDs) provides better I/O performance than using hard disk drives (HDDs) or using SSDs and HDDs. An SSD supports up to 100 times more input/output operations per second (IOPS) than a typical HDD.
- The CH242 V3 provides two integrated Gigabit Ethernet (GE) ports and a variety of network ports.
- The CH242 V3 supports 128-lane Peripheral Component Interconnect Express (PCIe) 3.0, which increases the maximum I/O bandwidth by 60% (8 GT/s per lane) compared with PCIe 2.0.
- Intel® Integrated I/O enables the PCIe 3.0 controller to be integrated into the Intel® Xeon® E7 series processors. This shortens I/O latency and enhances overall system performance.
- The CH242 V3 supports flexible hard disk configurations and provides elastic and scalable storage capacity to satisfy various storage capacity and upgrade requirements.

The CH242 V3 8HHD supports a maximum of eight 2.5-inch hard disks. The CH242 V3 supports a maximum of four 2.5-inch hard disks.

Availability and Serviceability

- The CH242 V3 provides the memory mirroring and memory backup functions to avoid system downtime caused by uncorrectable memory errors.
- The CH242 V3 supports hot-swappable hard disks to protect data and prolong system running time using redundant array of independent disks (RAID) redundancy. The CH242 V3 supports RAID 0, 1, 1E, 10, 5, 50, and 60 with a RAID cache, and uses a backup battery unit (BBU) or supercapacitor for power-off protection.
- The UID and HLY indicators on the panel and the integrated baseboard management controller (iBMC) web user interface (WebUI) display the status of key components to quickly lead the technical support personnel to failed (or failing) components. This simplifies maintenance, accelerates troubleshooting, and improves system availability.
- The CH242 V3 supports SSDs which offer better reliability than HDDs, prolonging the system uptime.
- The integrated BMC module (iBMC) continuously monitors system parameters, triggers alarms, and performs recovery actions to minimize system downtime caused by failures.

Manageability and Security

- The built-in iBMC management module monitors the server running status and provides remote management functions.
- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) increases setting, configuring, and updating efficiencies, and simplifies error handling.
- The optional Trusted Platform Module (TPM) 1.2 provides advanced encryption functions, such as digital signatures and remote authentication.
- The industry-standard Advanced Encryption Standard–New Instruction (AES NI) implements faster and stronger encryption.
- The Intel® Execute Disable Bit (EDB) function in a supported OS prevents certain types of malicious buffer overflow attacks.
- Intel® Trusted Execution Technology provides enhanced security by using hardware-based resistance against malicious software attacks, allowing an application to run in an isolated space that is protected from all other applications running on the OS.

Energy Efficiency

- The Intel® Xeon® E7-4800 series processors provide better performance over the previous-generation processors while supporting the same TDP.
- Intel® Intelligent Power Capability powers on and off a processor based on the site requirements to reduce power consumption.
- Low-voltage Intel® Xeon® processors consume less energy to satisfy demands of power and thermally constrained data centers and telecommunication environments.
- Low-voltage 1.35 V DDR3 registered DIMMs (RDIMMs) consume 15% less energy than 1.5 V DDR3 RDIMMs.
- SSDs consume 80% less power than HDDs.
- The CH242 V3 uses hexagonal ventilation holes to enable higher ventilation density over round holes, remarkably increasing system cooling efficiency.
- The efficient voltage regulator down (VRD) power supply units (PSUs) reduce the loss in DC/DC power conversion.

- The CH242 V3 provides power capping and power control functions.

3 Component Selection

This topic describes the software and hardware supported by the CH242 V3.

For details about the software and hardware that are compatible with the CH242 V3, see [Compatibility](#).

CPU

The mainboard supports two or four Intel® Xeon® E7-4800 V2 (Ivy Bridge-EX) CPUs of 105 W, 130 W, and 155 W, with a maximum of 15 cores per CPU.

- Each CPU integrates two memory controllers for supporting eight memory channels. Each channel supports one DIMM and DDR3 1333 MHz, or 1600 MHz.
- Each CPU integrates a PCIe controller for supporting PCIe 3.0, and provides 32 lanes.
- The CPUs are interconnected through one QuickPath bus at 8.0 GT/s.
- The maximum dominant frequency supported by the CPUs reaches 2.8 GHz.

Memory

Up to 32 dual in-line memory module (DIMM) slots for installing DIMMs (8 DIMMs for each CPU).

Memory Configuration Rules

Observe the following rules to configure DIMMs:

1. The CH242 V3 supports 8 GB, 16 GB, and 32 GB DIMMs with a maximum memory capacity of 1,024 GB in full configuration.
2. The CH242 V3 can be configured with either registered DIMMs (RDIMMs) or load-reduced DIMMs (LRDIMMs).
3. 1.5 V and 1.35 V DIMMs cannot be used in the same compute node.
4. Each channel supports a maximum of eight ranks.(Only for RDIMMs)

NOTE

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

5. The maximum number of DIMMs that can be installed in a compute node depends on the processor type, DIMM type, number of ranks, and operating voltage. See "Maximum number of DIMMs" in [Table 3-1](#).



NOTE

Note the following rule:

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

6. All DIMMs in the compute node operate at the same speed, whichever of the following is the lowest:
 - Memory speed supported by a specific processor
 - For details about the lowest of the maximum operating speeds, see Maximum Operating Speed in [Table 3-1](#).

Table 3-1 DIMM configuration rules

Parameter		RDIMM			LRDIMM	
Rank		Dual rank			Quad rank	Quad rank
Rated speed (MHz)		1333	1600		1333	1333
Rated voltage (V)		1.35	1.35	1.5	1.35	1.35
Operating voltage (V)		1.35	1.35	1.5	1.35	1.35
Maximum number of DIMMs ^a		32 ^b	32 ^b	32 ^b	32 ^b	32 ^b
Maximum capacity per DIMM (GB)		16	16	16	32	32
Maximum memory capacity (GB)		512 ^b	512 ^b	512 ^b	1024 ^b	1024 ^b
Maximum memory capacity at the maximum operating speed (GB)		512 ^b	512 ^b	512 ^b	1024 ^b	1024 ^b
Maximum operating speed (MHz)	One DIMM per channel	1333 ^b	1333 ^b	1600 ^b	1066 ^b	1333 ^b
<p>a: The maximum number of DIMMs is given for four-processor configuration. If only one processor is installed, the maximum number of DIMMs is 1/4 of the values given in this table.</p> <p>b: The values with b indicate that all DIMM slots are occupied.</p> <p>The table is for reference only. For details about the components that can be purchased, consult the local Huawei sales representatives.</p>						

Memory Slot Configuration Rules

[Table 3-2](#) describes the DIMM slot installation sequence. For details about the DIMM slot numbers, see [Figure 1-8](#) and [Figure 1-11](#).

Table 3-2 Memory slot configuration rules

CPU	DIMM
CPU1, CPU2	1A1, 1B1, 2A1, 2B1, 1C1, 1D1, 2C1, 2D1, 1E1, 1F1, 2E1, 2F1, 1G1, 1H1, 2G1, 2H1
CPU1, CPU2, CPU3, and CPU4	1A1 ^a , 1B1 ^a , 2A1, 2B1, 3A1, 3B1, 4A1 ^b , 4B1 ^b , 1C1 ^a , 1D1 ^a , 2C1, 2D1, 3C1 ^b , 3D1 ^b , 4C1 ^b , 4D1 ^b , 1E1 ^a , 1F1 ^a , 2E1 ^a , 2F1 ^a , 3E1, 3F1, 4E1 ^b , 4F1 ^b , 1G1 ^a , 1H1 ^a , 2G1, 2H1, 3G1, 3H1, 4G1 ^b , 4H1 ^b
<p>Note:</p> <p>If a server is configured with four CPUs and full-height full-length PCIe cards, the DIMM slots under the PCIe cards cannot be used.</p> <ul style="list-style-type: none"> • If a full-height half-length PCIe card is installed next to CPU 1, you do not need to install DIMMs in the slots marked with a. • If a full-height half-length PCIe card is installed next to CPU 4, you do not need to install DIMMs in the slots marked with b. <p>If a server is configured with four CPUs and PCIe cards thinner than 10 mm, the DIMM slots under the PCIe cards are available.</p>	

The CH241 provides 32 double data rate 3 (DDR3) slots for installing DIMMs. Each processor integrates eight memory channels. The memory channels for processor 1 are 1A, 1B, 1C, 1D, 1E, 1F, 1G, and 1H, those for processor 2 are 2A, 2B, 2C, 2D, 2E, 2F, 2G, and 2H, those for processor 3 are 3A, 3B, 3C, 3D, 3E, 3F, 3G, and 3H, and those for processor 4 are 4A, 4B, 4C, 4D, 4E, 4F, 4G, and 4H. [Table 3-3](#) lists memory channels for each processor.

Table 3-3 Memory channels for each processor

Channel Location	Memory Channel	Composition
CPU1	1A	DIMM000(1A1)
	1B	DIMM010(1B1)
	1C	DIMM020(1C1)
	1D	DIMM030(1D1)
	1E	DIMM100(1E1)
	1F	DIMM110(1F1)
	1G	DIMM120(1G1)
	1H	DIMM130(1H1)
CPU2	2A	DIMM200(2A1)
	2B	DIMM210(2B1)
	2C	DIMM220(2C1)
	2D	DIMM230(2D1)

Channel Location	Memory Channel	Composition
	2E	DIMM300(2E1)
	2F	DIMM310(2F1)
	2G	DIMM320(2G1)
	2HD	DIMM330(2H1)
CPU3	3A	DIMM400(3A1)
	3B	DIMM410(3B1)
	3C	DIMM420(3C1)
	3D	DIMM430(3D1)
	3E	DIMM500(3E1)
	3F	DIMM510(3F1)
	3G	DIMM520(3G1)
	3H	DIMM530(3H1)
CPU4	4A	DIMM600(4A1)
	4B	DIMM610(4B1)
	4C	DIMM620(4C1)
	4D	DIMM630(4D1)
	4E	DIMM700(4E1)
	4F	DIMM710(4F1)
	4G	DIMM720(4G1)
	4H	DIMM730(4H1)

Storage

- CH242 V3 8HDD:**

The compute node supports a maximum of eight 2.5-inch hard disk drives (HDDs) or SSDs. Mixed configuration of hard disk drives (HDDs) and SSDs is supported. The hard disk backplane provides eight Serial Attached SCSI (SAS) and Serial Advanced Technology Attachment (SATA) ports for connecting SAS and SATA hard disks. Each hard disk is hot-swappable and can be installed and removed separately.

 - Up to 9.6 TB with fully configured 1.2 TB SAS hard disks
 - Up to 8 TB with fully configured 1 TB SATA hard disks
 - Up to 6.4 TB with fully configured 800 GB SSDs
- CH242 V3 4HDD:**

The compute node supports a maximum of four 2.5-inch hard disk drives (HDDs) or SSDs. Mixed configuration of SAS and SATA hard disks is supported. The hard disk

backplane provides four Serial Attached SCSI (SAS) and Serial Advanced Technology Attachment (SATA) ports for connecting SAS and SATA hard disks. Each hard disk is hot-swappable and can be installed and removed separately.

- Up to 4.8 TB with fully configured 1.2 TB SAS hard disks
- Up to 4 TB with fully configured 1 TB SATA hard disks
- Up to 1.2 TB with fully configured 300 GB SSDs

The mainboard supports RAID controller cards with the LSI SAS2208 and LSI SAS2308 chips.

CH242 V3 8HDD:

- The LSI SAS2208 RAID controller card supports RAID 0, 1, 5, 6, 10, 50, and 60.
- The LSI SAS2308 RAID controller card supports RAID 0 and 1.

CH242 V3 4HDD:

- The LSI SAS2208 RAID controller card supports RAID 0, 1, 5, 6, 10, 50, and 60.
- The LSI SAS2308 RAID controller card supports RAID 0 and 1.

Table 3-4 describes the performances of different RAID levels, the minimum number of hard disks required, and hard disk utilization.

Table 3-4 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	50%
RAID 5	Medium	High	Medium	3	(N-1)/N
RAID 6	Medium	High	Medium	4	(N-2)/N
RAID 1E	High	Medium	Medium	3	M/N
RAID 10	High	Medium	Medium	4	M/N
RAID 50	High	High	Medium	6	(N-M)/N
RAID 60	High	High	Medium	8	(N-M*2)/N

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

I/O Expansion

The CH242 V3 supports the following types of Peripheral Component Interconnect Express (PCIe) mezz modules for connecting to switch modules through the midplane. You can choose a mezz module based on the I/O card type and rate requirements.

- GE expansion card
- 10GE expansion card

- FC expansion card
- HCA expansion card
- IB expansion card

Power Supply

The CH242 V3 is powered by the power supply units (PSUs) in the E9000 chassis, without any independent power supply.

Peripherals

The CH242 V3 supports the peripherals such as USB DVD-ROM drive and KVM.

OSs and Softwares

For details about the operating systems (OSs) and virtualization softwares supported by the CH242 V3, see the [Compatibility](#).

4 Management

Huawei iBMC, a remote management system for servers, is integrated on the E9000 compute nodes. It complies with the IPMI V2.0 standards and provides reliable hardware monitoring and management functions. Huawei iBMC implements seamless communications with management modules. The management modules can also be used to manage compute nodes in a chassis.

The iBMC supports the followings:

- KVM and text console redirection
- Remote virtual media
- IPMI V2.0
- Common information model (CIM)
- Web-based browser login

Table 4-1 describes the iBMC specifications.

Table 4-1 iBMC specifications

Item	Description
Management interface	The iBMC supports various management interfaces to implement system integration. The iBMC can integrate with any standard management systems over the following interfaces: <ul style="list-style-type: none"> • IPMI V2.0 • CLI • HTTPS
Fault detection	The iBMC helps to detect faults and accurately locate hardware faults.
System watchdog	The iBMC supports BIOS POST, OS watchdog, and fault timeout automatic system reset. You enable or disable these functions in the iBMC.
Boot device configuration	The iBMC supports out-of-band configuration for boot devices.
Alarm management	The iBMC supports alarm management and reports alarms

Item	Description
	in various ways such as the (SMTP), and syslog service to ensure that the server runs properly without interruption.
Integrated KVM	The iBMC Provides remote maintenance measures, such as KVM and KVM over IP, for troubleshooting. The maximum resolution is 1280 x 1024.
Integrated virtual media	The iBMC virtualizes local media devices or images to the media devices for remote compute nodes, which simplifies operating system (OS) installation. The virtual DVD-ROM drive supports a transmission rate of up to 8 MB/s.
WebUI	<p>The iBMC provides visual WebUIs for quick configuration and information queries.</p> <p>The following web browsers are supported:</p> <ul style="list-style-type: none"> • Internet Explorer 8.0 • Firefox 9.0 • CHROME 13.0 • SAFARI
Fault reproduction	The iBMC reproduces faults to diagnose the faults quickly.
Screenshots and videos	The iBMC allows you to view screenshots and videos without login, which facilitates preventive maintenance inspection (PMI).
DNS/LDAP	The iBMC supports domain management and directory services, which significantly simplifies network and configuration management.
Dual-image backup	The iBMC starts the software from an image backup if the running software fails.
Asset management	The iBMC provides intelligent asset management to ease of assets stocktaking.
Intelligent power management	The iBMC supports power capping to increase deployment density and uses dynamic energy saving technology to lower the operating expense (OPEX).

5 Warranty

According to the *Huawei Enterprise Standard Onsite Warranty*, the hardware have a three-years warranty, and the software media has a three-months warranty. The *Huawei Enterprise Standard Onsite Warranty* 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 *Huawei Enterprise Standard Onsite Warranty* is country-specific. The service types, service levels, response time, and terms and conditions may vary with the countries where the product is used. Not all services described in the *Huawei Enterprise Standard Onsite Warranty* are provided to users in all countries. For more information about warranty services in your country, contact Huawei technical support or local representative office.

[Table 5-1](#) describes warranty services provided by Huawei.

Table 5-1 Huawei warranty services

Service	Description
Help Desk	Huawei provides a 24X7 Help Desk hotline for you to obtain after-sales service support. The customer care representative (CCR) is available 24X7 and 365 days/year.
Remote Trouble Shooting	After receiving a service request for rectifying a network or system fault, Huawei TAC engineers will first analyze and handle the fault remotely and then rectify it in the shortest possible time.
Online Technical Support	Huawei's website provides technical materials about the products, such as product manuals, configuration guides, networking cases, and maintenance experiences. After obtaining website access permissions, you can download documents, get up-to-date information about maintenance experiences and skills, and learn about the latest products.
Licensing of Software Updates	To ensure that the equipment purchased by you can run stably, Huawei provides software correction patches.
Advance Hardware Replacement	Huawei provides advance hardware replacement services to help you cope with your urgent needs of Spare Parts.
Onsite hardware replacement	If the problem cannot be resolved without replacing the hardware, Huawei will assign experienced technical support engineers to your site if necessary. The engineers will replace the hardware and rectify

Service	Description
	the fault to restore your system.

Table 5-2 describes the warranty service response time.

Table 5-2 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 Trouble Shooting		Available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	Huawei TAC responds to all calls in the shortest possible time.
Online Technical Support		Huawei support website: available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None
Licensing of software updates		Huawei support website: available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None
Advance Hardware Replacement	9×5	Available 9 hours a business day 5 days a week, excluding official holidays.	Huawei will use commercially reasonable efforts to deliver a replacement part within NBD after RMA issued. Service request accepted after 15:00 local time will be considered as received on the next Business Day.
Onsite hardware replacement		Available 9 hours a business day 5 days a week, excluding official holidays.	Huawei will use commercially reasonable efforts to deliver a replacement part within NBD after RMA issued. Service request accepted after 15:00 local time will be considered as received on the next Business Day.

6 Certifications

This topic describes the certifications that the E9000 has passed.

Table 6-1 lists the certifications.

Table 6-1 Certifications

Country /Region	Certification	Standard
China	RoHS	SJ/T-11363-20006 SJ/T-11364-20006 GB/T 26572-2011
China	China Environmental Labeling	GB/T24024:2001 idt ISO14024:1999 HJ 2507-2011
Europe	RoHS	2002/95/EC, 2011/65/EU, EN 50581: 2012
Europe	REACH	EC 1907/2006
Europe	WEEE	2002/96/EC, 2012/19/EU
Europe	CE	Safety: IEC 60950-1:2005 (2nd Edition) + A1:2009 and/or EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 EMC: <ul style="list-style-type: none"> • 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 • IEC 61000-6-2:2005/EN 61000-6-2:2005

Country /Region	Certification	Standard
		<ul style="list-style-type: none"> IEC 61000-6-4:2006+A1:2010/EN 61000-6-4:2007 +A1:2011
America	FCC	FCC CFR47 Part 15 Subpart B:2011
Japan	VCCI	VCCI V-4:2012
Canada	IC	ICES-003 Issue 5:2012
Australia	C-tick	AS/NZS CISPR 22:2009+A1:2010
America	NTRL-UL	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No.60950-1-07,2nd Edition,2011-12 (Information Technology Equipment-Safety-Part 1:General Requirements)
Global	CB	IEC 60950-1:2005(2 nd Edition); Am 1:2009