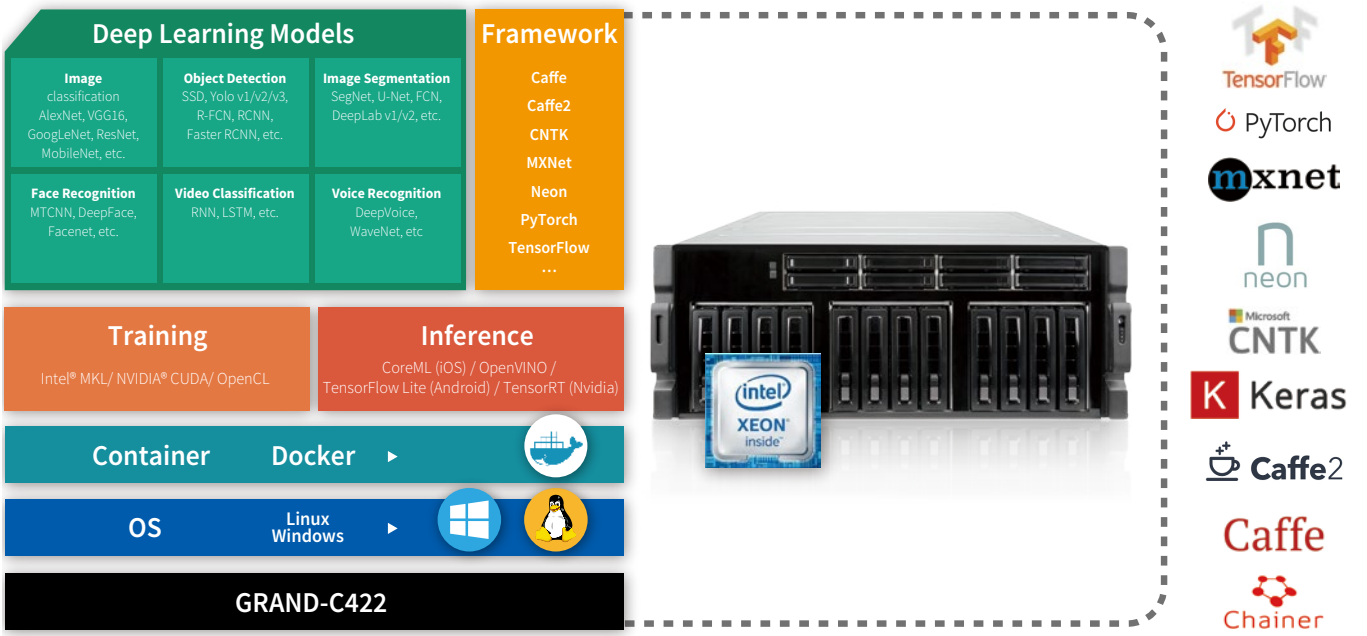
IEI GRAND AI Training Server System

AI Training System

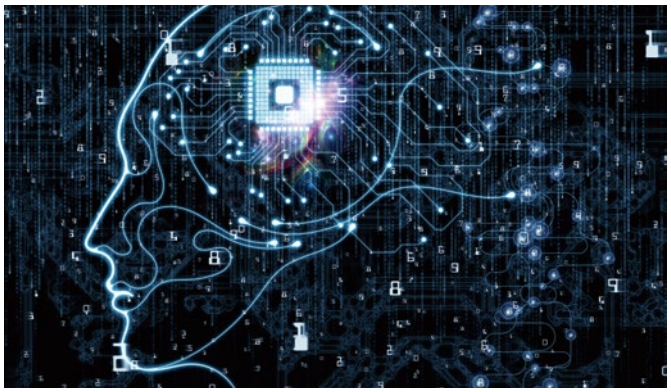
The AI training system GRAND-C442 is dedicated for these tasks because it offers a wide range of slots for storage expansion, acceleration cards and video capture, Thunderbolt™ or PoE add-on cards for unlimited data ac-quisition possibilities. In order to develop a useful training model, existing and widely used deep learning training frameworks such as Caffe, Tensor-Flow or Apache MXNet are recommended. These facilitate the definition of the apt architecture and algorithms for a distinct AI application.

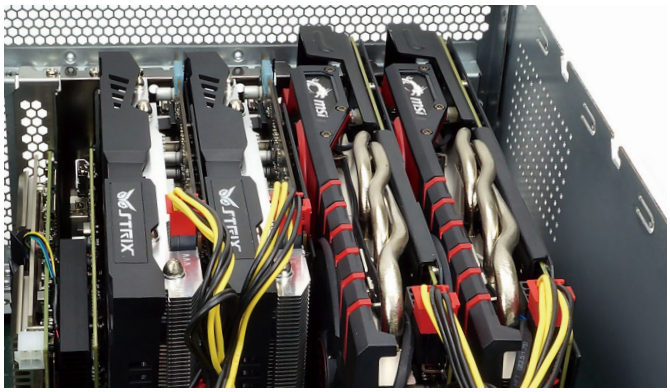
Supported Software



Demand for AI computing is booming

The application of AI computing is absolutely not enough through the CPU computing. With the decentralized architecture, the huge data is calculated to obtain the computing result. Therefore, we have developed a water-cooled chassis system with high expansion capability by adding multiple GPUs, FPGA or VPU acceleration cards for AI deep learning and inference.

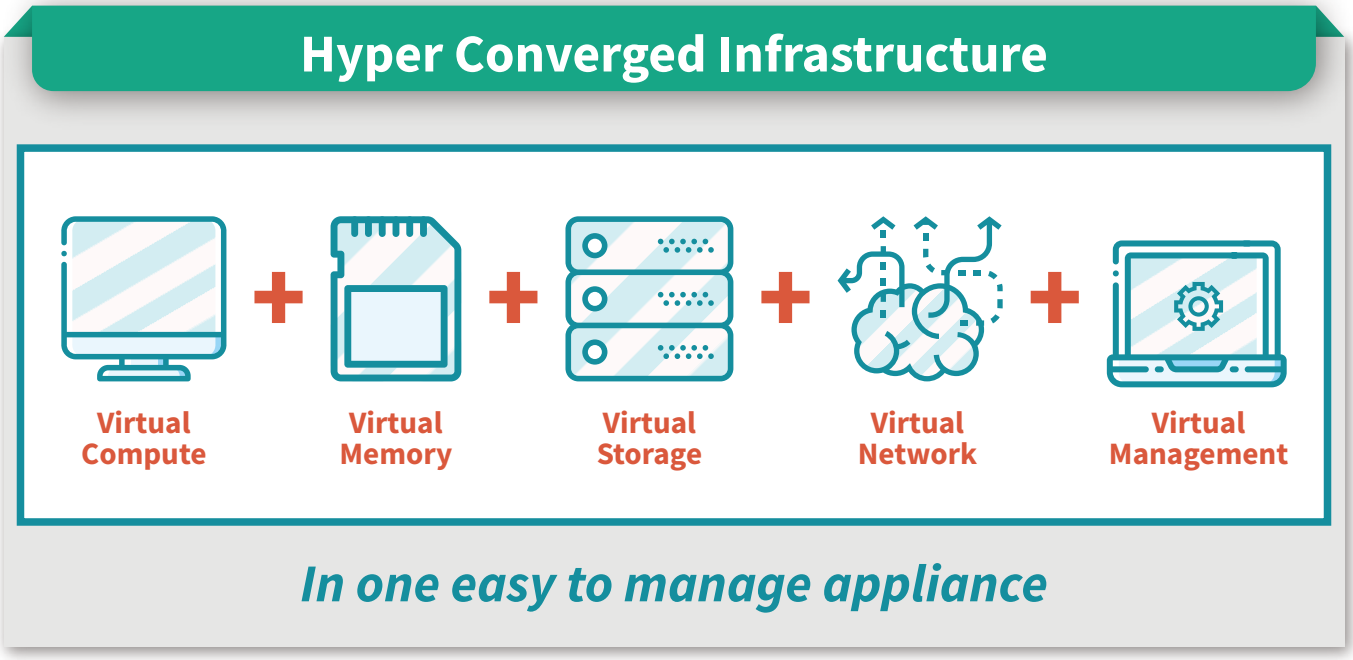




Hyper converged infrastructure

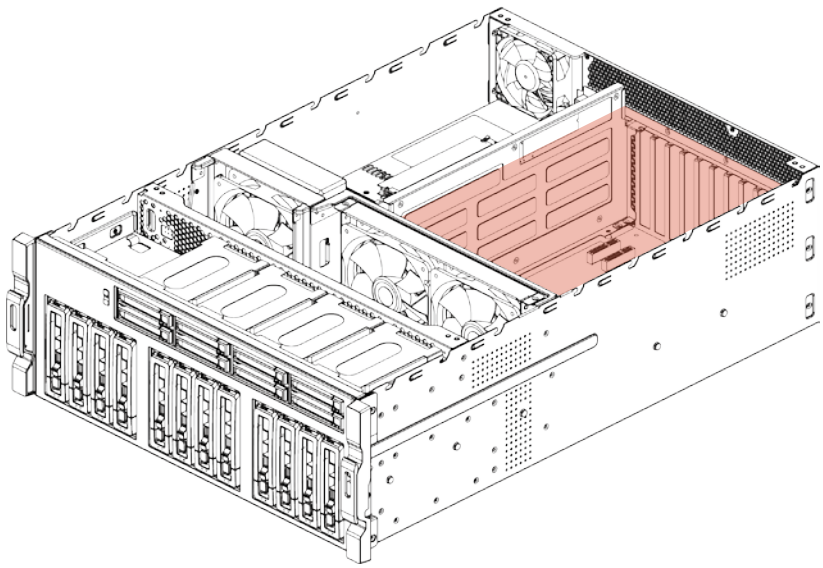
Hyper converged infrastructure (HCI) is scale-out software-defined infrastructure that converges core data services on flash-accelerated, industry-standard servers, delivering flexible and powerful building blocks under unified management.

Efficient, agile, flexible, and integrated, these systems allow for easy scale-out storage, cost-savings, and simplicity to manage your systems. To find out if hyperconverged is the best solution for your Data Center, consider the following.



Expandable to suit your needs

AI computing requires huge computing power, so our system can support up to 4 dual-width expansion slots (PCIe x8) and 2 single-width expansion slots (PCIe x4) for maximum expansion ability to meet computing needs.
All six of the backplane slots connect directly to the system host board. This is perfect for applications that require minimal latency.



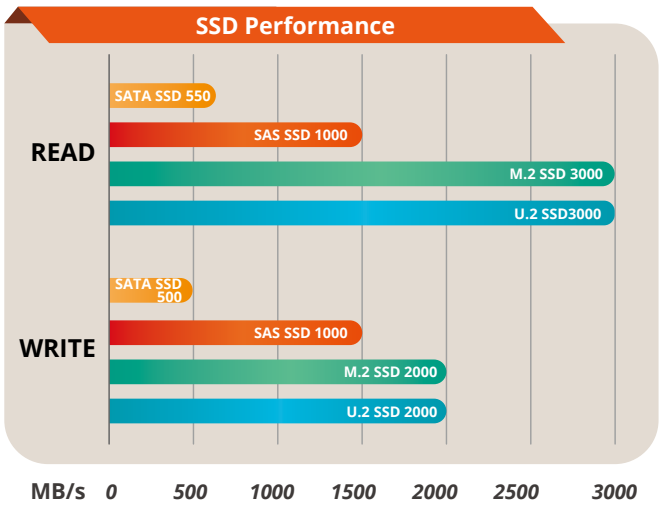
Model Name	PCIe	
GRAND-C422-20D-S1	6 Slots	4 PCIe Gen 3 x8
		2 PCIe Gen 3 x4
GRAND-C422-20D-H1	6 Slots	2 PCIe Gen 3 x16
		1 PCIe Gen 3 x8
		3 PCIe Gen 3 x4
GRAND-C422-20D-H2	7 Slots	5 PCIe Gen 3 x8
		2 PCIe Gen 3 x4

U.2 SSD (GRAND-C422-20D-S supported)

U.2 uses the same concept as a general hard disk. With a connection cable, a hard disk can be installed in the case without occupying the space of the motherboard. Therefore, M.2 and U.2 interfaces can be coexistence because they have different application environment. M.2 is more suitable for laptops or microcomputers, and U.2 is more suitable on a desktop or server. The U.2 interface features high-speed, low-latency, low-power, NVMe standard protocol, and PCIe 3.0 x4 channel. The theoretical transmission speed is up to 32Gbps, while SATA is only 6Gbps, which is 5 times faster than SATA.

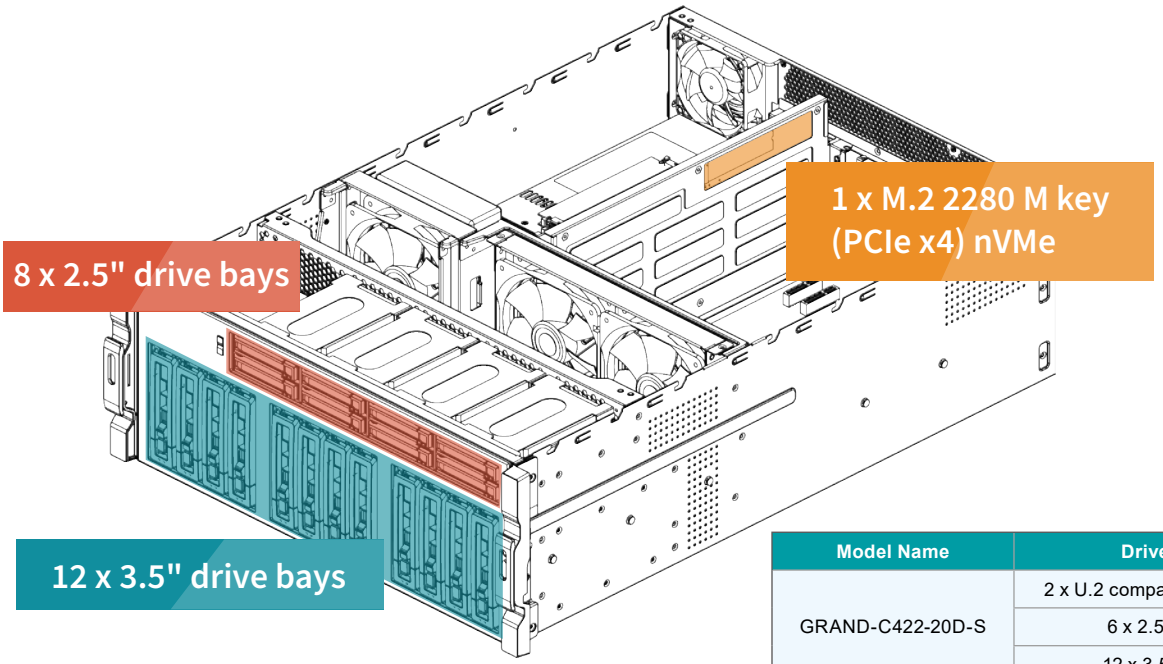
SAS HDD

15K SAS 12Gb HDD Compared to the conventional 7200 rpm speeds of SATA HDD, SAS HDD have disk speeds of up to 15,000 rpm, providing much higher read/write performance of up to 300MB/s. Although SAS 12Gb HDD cannot match the IOPS performance of SSD, its cost-per-gigabyte is more favorable. Enterprise-level SAS HDD also offers up to 2 million hours MTBF, providing dependable reliability. If an HDD failure occurs, the stored data may be recoverable, whereas if an SSD fails it can be harder (if not impossible) to recover data. With these considerations, SAS HDD remains the best choice for an enterprise to build a stable, efficient, and affordable storage medium.



Storage (M.2, SATA, SAS & U.2 by SKU)

The GRAND-C422-20D support M.2 2280 M key (PCIe x4) nVMe, SATA HDD/SSD, SAS HDD & U.2 SSD (by SKU). It has a built-in M.2 2280 M key (PCIe x4) nVMe port and 20 bays of HDD/SSD slots including two U.2 SDD slots. The GRAND-C422-20D supports M.2 solid-state disk which is the next-generation small-sized form factor introduced by Intel after mSATA. It has better performance than general SATA SSD but it is lighter and more power-saving.



Model Name	Drive Bay
GRAND-C422-20D-S	2 x U.2 compatiable to SATA
	6 x 2.5” SATA
	12 x 3.5” SATA
GRAND-C422-20D-H	8 x 2.5” SAS/SATA
	12 x 3.5” SAS/SATA

Water Cooling System for CPU

IEI uses the latest 14nm Intel Xeon Processor W family which uses the LGA2066 interface and Skylake-SP architecture with 4, 6, 8, 10, 14 and 18 core versions.
High performance means higher power consumption, therefore IEI designed water cooling system for CPU with smaller size, higher efficiency cooling system makes CPU cooler and keep the high performance, and it can support up to 250W TDP.

	Water Cooling	Air Cooling
Cooler Size	Small	Large
Working Noise	Small	Large
Cooling Efficiency	Better	Worse

GRAND-C422-20D-S

The GRAND-C422-20D is an AI training system which has maximum expansion ability to add in AI computing accelerator cards for AI model training or inference.

Feature

- Intel® Xeon® W family processor supported
- 6 x PCIe Slot, up to 4 dual width GPU cards
- Water cooling system on CPU
- Support two U.2 SSD
- Support one M.2 SSD M-key slot (NVMe PCIe 3.0 x4)
- Support 10GbE network
- IPMI remote management

Specifications

Model		GRAND-C422-20D-S
Chassis	Dimensions (H x W x D)	176.15 x 480.94 x 644 mm
	System Fan	2 x 120 mm, 12V DC
	Chassis Construction	4U, Rackmount
Motherboard	CPU	Intel® LGA-2066 Xeon® W Family processor
	Processor Cooling	Water cooling system
	Chipset	C422
	Memory	Total slot: 4 x DDR4 ECC RDIMM / LRDIMM Memory expandable up to:256GB (4 x 64GB)
Security	TPM	1 x TPM 2.0 Pin header
IPMI	IPMI Solution	IPMI LAN port, IPMI VGA display
Storage	Hard Drive	12 x 2.5" / 3.5" drive bay 8 x 2.5" drive bay
	M.2	1 x 2280 M key (PCIe x4) built in on SBC
	U.2	2 x U.2 SSD drive bay compatible to SATA
Networking	Ethernet IC	1 GbE NIC: Intel® i210-AT with NCSI support 10 GbE NIC: Aquantia AQC107
I/O Interface	USB 3.2 Gen 1	4
	USB 2.0	2
	Ethernet	1 x 1GbE RJ-45 combo LAN ports / IPMI 1 x 10GbE RJ-45 LAN port
	Display	1 x IPMI VGA display
	Buttons	Power button
Internal I/O	COM port	2 x RS-232 pin header
	USB 3.2 Gen 1	2 x USB 3.2 Gen 1 (5Gb/s) pin header
	USB 2.0	2 x USB 2.0 pin header, 1 x USB 2.0 type A
Indicator	LEDs	10 GbE, Status, LAN, Storage Expansion Port Status
	LCM	LCM, 2 buttons
Expansion	PCIe	4 x PCIe Gen 3 x8 2 x PCIe Gen 3 x4
Power	Power Input	100-240V AC, 47-63Hz
	Power Consumption	In Operation: 285W
	Type/Watt	Redundant Power 1200W
Reliability	Operating Temperature	0~40˚C
	Relative Humidity	5 to 95% non-condensing, wet bulb: 27˚C
	Weight	23.59 kg
	Certification	CE/FCC
OS	Support OS	Windows server 2016 Linux

Packing List

Flat head screws (for 2.5” HDD)	Flat head screws (for 3.5” HDD)
1 x Cat5e LAN cable	2 x Power cord
1 x Cat6A LAN cable	1 x QIG

Options

Item	Part No.	Description
Slide Rail	RAIL-A02-90	Kingslide Rail kit, maximum load 90 kg

Model Naming Convention

GRAND-C422-20D-S1A1

RAID type
- S : Software RAID
- H : Hardware RAID

Serial number

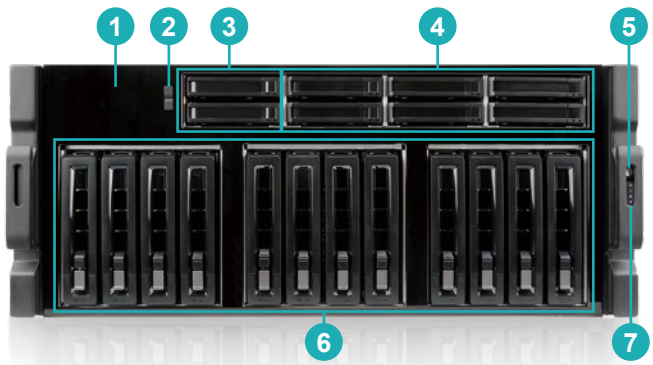
CPU
- A : W-2123
- B : W-2133
- C : W-2145
- D : W-2155
- E : W-2195

RAM
- 1 : 32GB (8GB x 4 = 32GB)
- 2 : 64GB (16GB x 4 = 64GB)
- 3 : 128GB (32GB x 4 = 128GB)
- 4 : 256GB (64GB x 4 = 256GB)

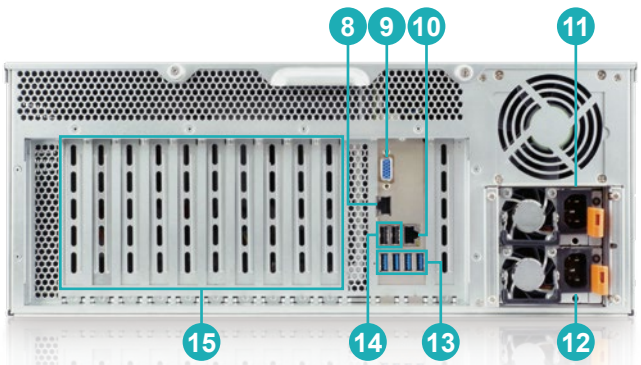
Ordering Information

Part No.	Description
GRAND-C422-20D-S1A1-R10	20-bay (12 x 3.5", 8 x 2.5") 4U Rackmount, Intel® Xeon® W-2123 with C422 chipset, 32G DDR4 w/ECC, 6 x PCIe expansion slot, and 1200W redundant PSU, RoHS
GRAND-C422-20D-S1B2-R10	20-bay (12 x 3.5", 8 x 2.5") 4U Rackmount, Intel® Xeon® W-2133 with C422 chipset, 64G DDR4 w/ECC, 6 x PCIe expansion slot, and 1200W redundant PSU, RoHS
GRAND-C422-20D-S1C3-R10	20-bay (12 x 3.5", 8 x 2.5") 4U Rackmount, Intel® Xeon® W-2145 with C422 chipset, 128G DDR4 w/ECC, 6 x PCIe expansion slot, and 1200W redundant PSU, RoHS
GRAND-C422-20D-S1D3-R10	20-bay (12 x 3.5", 8 x 2.5") 4U Rackmount, Intel® Xeon® W-2155 with C422 chipset, 128G DDR4 w/ECC, 6 x PCIe expansion slot, and 1200W redundant PSU, RoHS
GRAND-C422-20D-S1E4-R10	20-bay (12 x 3.5", 8 x 2.5") 4U Rackmount, Intel® Xeon® W-2195 with C422 chipset, 256G DDR4 w/ECC, 6 x PCIe expansion slot, and 1200W redundant PSU, RoHS

I/O Interface

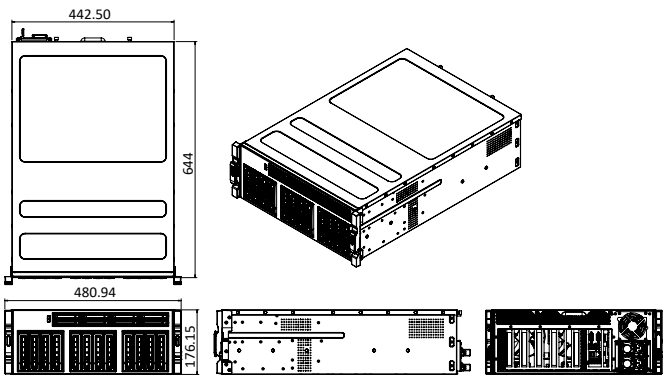


1. LCM
2. LCM control buttons
3. Two U.2 SSD drive bays compatible with SATA
4. Six 2.5" SATA 6Gb/s drive bays
5. Power button
6. Twelve 2.5"/3.5" SATA 6Gb/s drive bays
7. LED Indicator:
   - 10 10GbE
   - i System status
   - LAN
   - Storage expansion port status



8. 10 Gigabit Ethernet port
9. IPMI VGA port
10. Gigabit Ethernet port with NCSI support
11. Power supply unit 1
12. Power supply unit 2
13. Four USB 3.1 Gen 1 ports
14. Two USB 2.0 ports
15. PCIe expansion slots

GRAND-C422-20D Series Dimensions (Unit: mm)



GRAND-C422-20D-H

NEW

The GRAND-C422-20D is an AI training system which has maximum expansion ability to add in AI computing accelerator cards for AI model training or inference.

Feature

- Intel® Xeon® W family processor supported
- Up to 7 x PCIe Slot, with dual width expansion card support
- Water cooling system on CPU
- Support SAS SSD
- Support one M.2 SSD M-key slot (NVMe PCIe 3.0 x4)
- Support 10GbE network
- Support Hardware RAID
- IPMI remote management

Specifications

Model		GRAND-C422-20D-H1	GRAND-C422-20D-H2
Chassis	Dimensions (H x W x D)	176.15 x 480.94 x 644 mm	
	System Fan	2 x 120 mm, 12V DC	
	Chassis Construction	4U, Rackmount	
Motherboard	CPU	Intel® LGA-2066 Xeon® W Family processor	
	Processor Cooling	Water cooling system	
	Chipset	C422	
	Memory	Total slot: 4 x DDR4 ECC RDIMM / LRDIMM Memory expandable up to:256GB (4 x 64GB)	
Security	TPM	1 x TPM 2.0 Pin header	
IPMI	IPMI Solution	IPMI LAN port, IPMI VGA display	
Storage	Hard Drive (need to install RAID card)	12 x 2.5” / 3.5” drive bay (support SAS /SATA) 8 x 2.5” drive bay (support SAS /SATA)	
	M.2	1 x M.2 (PCIe Gen 3 x4) built in on SBC	
	U.2	2 x U.2 SSD drive bay compatible to SATA	
Networking	Ethernet IC	1 GbE NIC: Intel® i210-AT with NCSI support 10 GbE NIC: Aquantia AQC107	
I/O Interface	USB 3.2 Gen 1	4	
	USB 2.0	2	
	Ethernet	1 x 1GbE RJ-45 combo LAN ports / IPMI 1 x 10GbE RJ-45 LAN port	
	Display	1 x IPMI VGA display	
	Buttons	Power button	
Internal I/O	COM port	2 x RS-232 pin header	
	USB 3.2 Gen 1	2 x USB 3.2 Gen 1 (5Gb/s) pin header	
	USB 2.0	2 x USB 2.0 pin header, 1 x USB 2.0 type A	
Indicator	LEDs	10 GbE, Status, LAN, Storage Expansion Port Status	
	LCM	LCM, 2 buttons	
Expansion	PCIe	2 PCIe Gen 3 x16 1 PCIe Gen 3 x8 3 PCIe Gen 3 x4	5 PCIe Gen 3 x8 2 PCIe Gen 3 x4
Power	Power Input	100-240V AC, 47-63Hz	
	Power Consumption	In Operation: 285W	
	Type/Watt	Redundant Power 1200W	
Reliability	Operating Temperature	0~40˚C	
	Relative Humidity	5 to 95% non-condensing, wet bulb: 27˚C	
	Weight	23.59 kg	
	Certification	CE/FCC	
OS	Support OS	Windows server 2016 / Linux	

Packing List

Flat head screws (for 2.5” HDD)	Flat head screws (for 3.5” HDD)
1 x Cat5e LAN cable	2 x Power cord
1 x Cat6A LAN cable	1 x QIG

Options

Item	Part No.	Description
Slide Rail	RAIL-A02-90	Kingslide Rail kit, maximum load 90 kg
RAID Controller	7F200-SMARTRAID315424I-RS	Microsemi Adaptec SmartRAID 3154-24i

Model Naming Convention

GRAND-C422-20D-**H** **1** **A** **1**

RAID type
- S : Software RAID
- H : Hardware RAID

Serial number

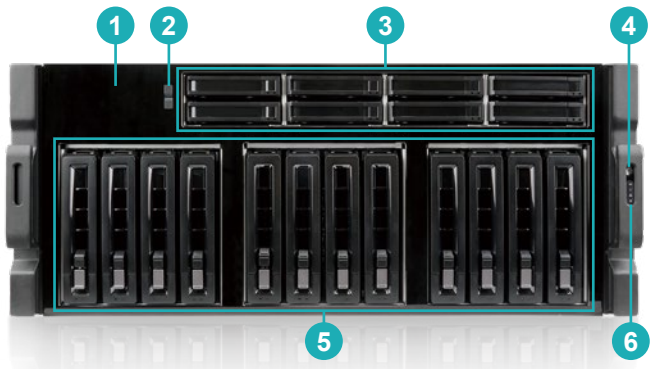
CPU
- A : W-2123
- B : W-2133
- C : W-2145
- D : W-2155
- E : W-2195

RAM
- 1 : 32GB (8GB x 4 = 32GB)
- 2 : 64GB (16GB x 4 = 64GB)
- 3 : 128GB (32GB x 4 = 128GB)
- 4 : 256GB (64GB x 4 = 256GB)

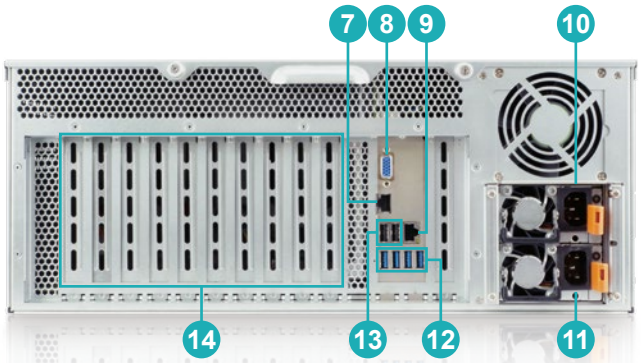
Ordering Information

Part No.	Description
GRAND-C422-20D-H1-R10	Barebone, 20-bay (12 x 3.5", 8 x 2.5") 4U Rackmount, support hardware RAID, Intel® Xeon W series with C422 chipset, 6 x PCIe expansion slot, and 1200W redundant PSU, RoHS
GRAND-C422-20D-H1A1-R10	20-bay (12 x 3.5", 8 x 2.5") 4U Rackmount, pre-install microsemi 3154-24i RAID controller, Intel® Xeon® W-2123 with C422 chipset, 32G DDR4 w/ECC, 6 x PCIe expansion slot, and 1200W redundant PSU, RoHS
GRAND-C422-20D-H2-R10	Barebone, 20-bay (12 x 3.5", 8 x 2.5") 4U Rackmount, support hardware RAID, Intel® Xeon W series with C422 chipset, 7 x PCIe expansion slot, and 1200W redundant PSU, RoHS
GRAND-C422-20D-H2A1-R10	20-bay (12 x 3.5", 8 x 2.5") 4U Rackmount, pre-install microsemi 3154-24i RAID controller, Intel® Xeon® W-2123 with C422 chipset, 32G DDR4 w/ECC, 6 x PCIe expansion slot, and 1200W redundant PSU, RoHS

I/O Interface

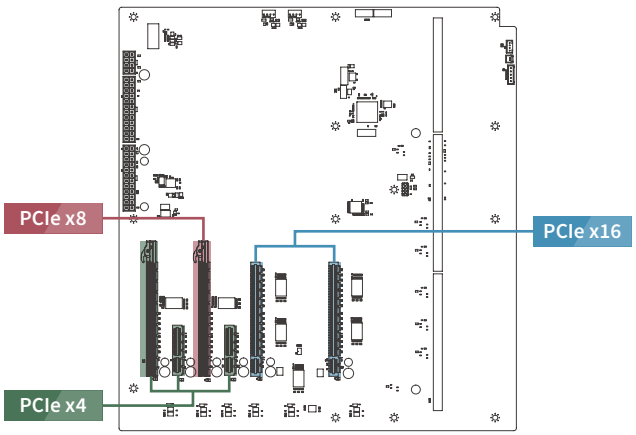
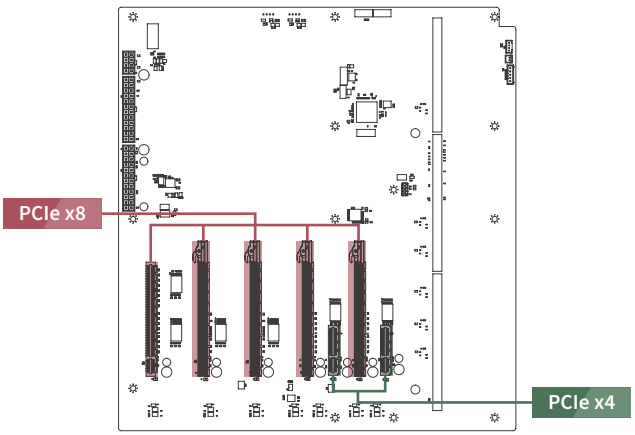


1. LCM
2. LCM control buttons
3. 2.5" SAS/SATA drive bays
4. Power button
5. Twelve 2.5"/3.5" SAS/SATA drive bays
6. LED Indicator:
   - 10 10GbE
   - i System status
   - LAN
   - Storage expansion port status



7. 10 Gigabit Ethernet port
8. IPMI VGA port
9. Gigabit Ethernet port with NCSI support
10. Power supply unit 1
11. Power supply unit 2
12. Four USB 3.1 Gen 1 ports
13. Two USB 2.0 ports
14. PCIe expansion slots

GRAND-C422-20D-H1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