MODEL:
GRAND-C422-20D-H

Storage Server Supports Hardware RAID, with Intel® Xeon® W CPU, Up to 256 GB DDR4, 10GbE Port, PCIe 3.0 x16/x8/x4 Slots, Up to 20 SAS/SATA Drives, 4U Rack Mount, 1200 W Redundant PSU, RoHS

User Manual

Rev. 1.00 – November 11, 2019

RoHS Lead Free

Revision

Date	Version	Changes
November 11, 2019	1.00	Initial release

Copyright

COPYRIGHT NOTICE

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

TRADEMARKS

All registered trademarks and product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective owners.

Manual Conventions

WARNING

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.

CAUTION

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.

NOTE

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

Table of Contents

List of Figures

List of Tables

Chapter

1

Introduction

1.1 Overview

Figure 1-1: GRAND-C422-20D-H Storage Server

Powered by an advanced 14nm Intel® Xeon® W processor with an integrated Intel® C422 PCH, and up to 256 GB DDR4 ECC RDIMM/LRDIMM RAM, the GRAND-C422-20D-H storage server delivers outstanding performance for data transmission and applications.

The GRAND-C422-20D-H supports up to twenty 2.5"/3.5" SAS 12Gb/s or SATA 6Gb/s drives, allowing for hard drives and SSDs. Businesses can create the most cost-effective storage by implementing suitable drives based on their needs.

1.2 Model Variations

The model variations of the GRAND-C422-20D-H are listed below.

Model No.	PCIe 3.0 Expansion Slots
GRAND-C422-20D-H1A1	Two PCIe x16 slots (x16 mode)
	One PCIe x16 slots (x8 mode)
	Three PCIe x4 slots (x4 mode)
GRAND-C422-20D-H2A1	Five PCIe x16 slots (x8 mode)
	Two PCIe x4 slots (x4 mode)

Table 1-1: GRAND-C422-20D-H Model Variations

1.3 Features

The GRAND-C422-20D-H has the following features

- Intel® Xeon® W processor family supported
- Supports four DDR4 RAM modules for ECC RDIMM/LRDIMM (up to 256 GB, pre-installed 32 GB)
- PEMUX single board computer supports up to 56-lane PCIe signal
- Water cooling system on CPU
- Supports SAS 12Gb/s or SATA 6Gb/s hard drives and SSDs for fast data transfer and highly-reliable storage.
- Support hardware RAID
- Support one M.2 SSD M-key slot (NVMe PCIe 3.0 x4)
- Support 10GbE network
- IPMI remote management

1.4 Front Panel

1	LCM
2	LCM control buttons
3	Eight 2.5" SAS 12Gb/s or SATA 6Gb/s drive bays
4	Power button
5	LED Indicator: 10GbE System status LAN Storage expansion port status
6	Twelve 2.5"/3.5" SAS 12Gb/s or SATA 6Gb/s drive bays

1.4.1 LED Indicator Specifications

The LED indicators of the GRAND-C422-20D-H indicate the system status and information. The following table lists the front LED indicator behavior. Note that the following information is applicable only when users have properly installed the hard drive, and connected the system to the power supply.

	LED	Color	LED Status	Description
1	10GbE	Green	Green	The 10GbE port functions normally.
2	System Status	Red/Green	Red	1. The hard drive is invalid. 2. The disk volume has reached its full capacity. 3. The disk volume is going to be full. 4. The system fan is out of function. 5. An error occurs when accessing (read/write) the disk data. 6. A bad sector is detected on the hard drive.
			Green	The system is ready.
			Deep flashes of orange	The system is in sleep mode.
			Off	All the hard drives are in standby mode.
3	LAN	Orange	Orange	The disk data is being accessed from the network and a read/write error occurs during the process.
			Flashes orange	The system is connected to the network.
4	Storage Expansion Port Status	Orange	Off	No expansion enclosures are detected.
			Orange	Expansion enclosures are detected.
5	HDD	Red/ Green	Flashes red	The NAS is being accessed from the network.
			Red	A hard drive read/write error occurs.
			Flashes green	The disk data is being accessed.
			Green	The hard drive can be accessed.

Front LED indicator locations:

The following table lists the LED indicator behavior of the two LAN ports on the rear panel.

	LED	Description	LED	Description
10GbE Port	Speed	Green: 10G Yellow: 5G/2.5G/1G/100M	ACT/LINK	Blinking: data is being sent/received Green: no activity
1GbE Port	Speed	On: linked Blinking: data is being sent/received	ACT/LINK	Off: 10 Mb/s Green: 100 Mb/s Orange: 1000 Mb/s
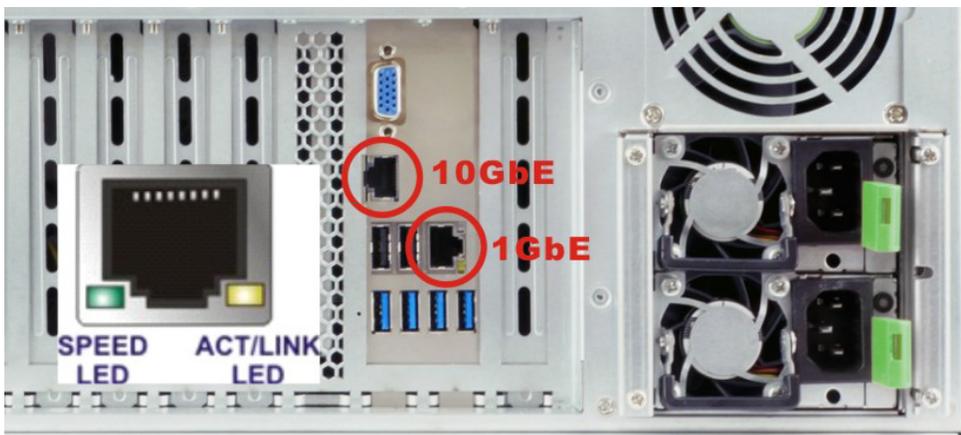
1.5 Rear Panel
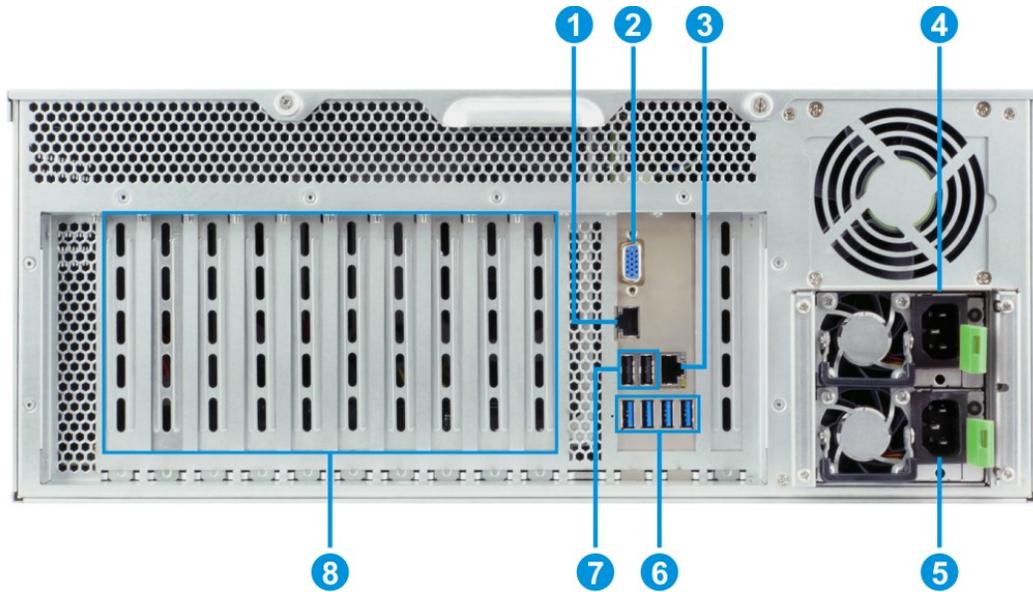
1	10 Gigabit Ethernet port	**5**	Power supply unit 2
2	IPMI VGA port	**6**	Four USB 3.2 Gen 1 ports
3	Gigabit Ethernet port with NCSI support	**7**	Two USB 2.0 ports
4	Power supply unit 1	**8**	PCIe expansion slots

1.6 Specifications

The specifications for the GRAND-C422-20D-H are listed below.

	GRAND-C422-20D-H
Form Factor	4U rack mount
CPU	Intel® Xeon® W processors: Intel® Xeon® W-2123 processor (4-core, 3.60 GHz, 8.25M cache) Intel® Xeon® W-2133 processor (6-core, 3.60 GHz, 8.25M cache) Intel® Xeon® W-2145 processor (8-core, 3.70 GHz, 11M cache) Intel® Xeon® W-2155 processor (10-core, 3.30 GHz, 13.75M cache) Intel® Xeon® W-2195 processor (18-core, 2.30 GHz, 24.75M cache)
PCH	Intel® C422
Memory	Four DDR4 ECC RDIMM/LRDIMM slots support up to 265 GB Pre-installed 32 GB
Processor Cooling	Water cooling system
TPM	1 x TPM 2.0 pin header
IPMI	IPMI LAN port (LAN2), IPMI VGA port
Ethernet	10GbE (LAN1): Aquantia AQC107 10GbE IC 1GbE (LAN2): Intel® I210-AT Ethernet controller with NCSI support
Storage	12 x 2.5"/3.5" SAS 12Gb/s or SATA 6Gb/s drive bays 8 x 2.5" SAS 12Gb/s or SATA 6Gb/s drive bays 1 x M.2 M-key 22110 slot (PCIe 3.0 x4 signal)
External I/O	4 x USB 3.2 Gen 1 (5Gb/s) port 2 x USB 2.0 port 1 x RJ-45 1GbE port 1 x RJ-45 10GbE port 1 x IPMI VGA display port (up to 1920 x 1200 @60 Hz)

Internal I/O	2 x RS-232 pin header 2 x USB 3.2 Gen 1 (5Gb/s) pin header 1 x USB DOM pin header	
PCIe 3.0 Slots	**H1A1 SKU:** Two PCIe x16 slots (x16 mode) One PCIe x16 slots (x8 mode) Three PCIe x4 slots (x4 mode)	**H2A1 SKU:** Five PCIe x16 slots (x8 mode) Two PCIe x4 slots (x4 mode)
LEDs	10GbE network, system status, network, drive LED	
Button	Power button	
LCM	LCM with two control buttons	
Dimensions (HxWxD)	176.15 mm x 480.94 mm x 644.00 mm / 6.94" x 18.93" x 25.35"	
Power Consumption	In operation: 285 W	
Power Supply	Redundant power: input 100V to 240V AC; 2 x 1200W	
Operating Temperature	0~40°C	
Relative Humidity	5% to 95% non-condensing, wet bulb: 27°C	
System Fan	2 x 12-cm high-efficiency smart cooling fan (12 V DC)	
Net Weight	23.59 kg	
Certification	CE/FCC	
Supported OS	Windows Server 2016 Linux	

Table 1-2: Specifications

1.7 Dimensions

The dimensions of the GRAND-C422-20D-H are listed below.
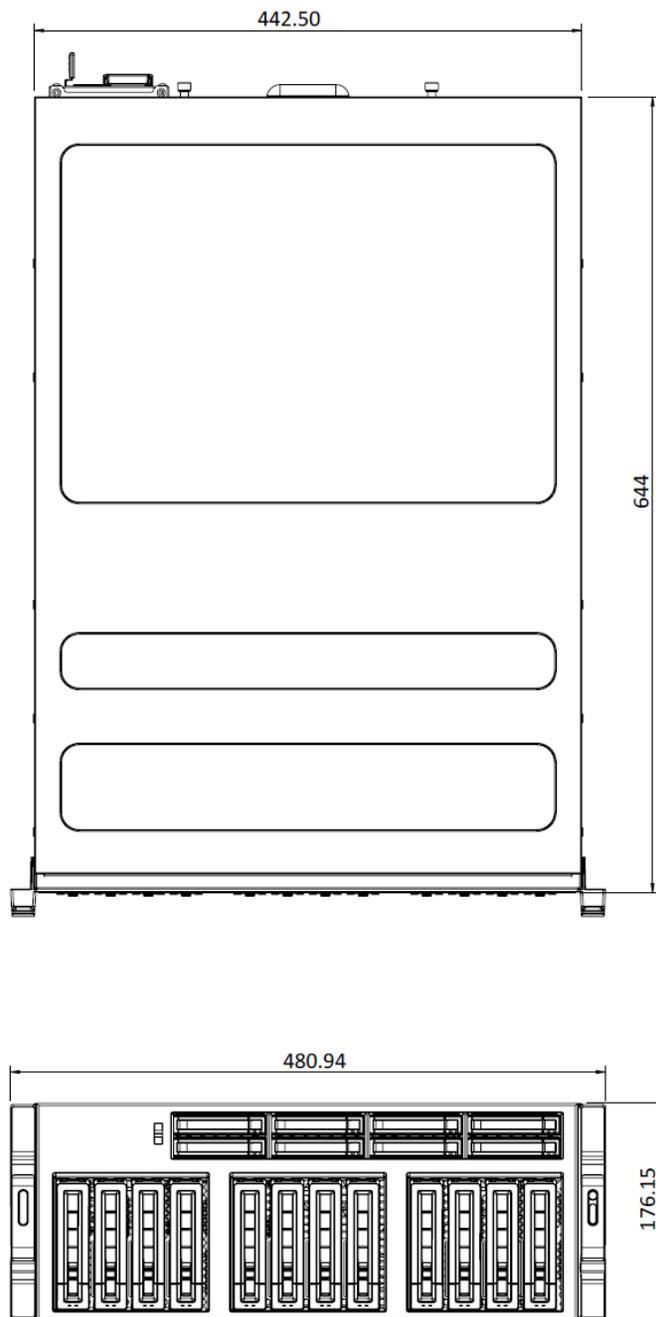
Figure 1-2: Dimensions (Unit: mm)

Chapter

2

Unpacking

2.1 Packing List

![NOTE icon] **NOTE:**

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the GRAND-C422-20D-H was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The GRAND-C422-20D-H is shipped with the following components:

Quantity	Item	Image
1	GRAND-C422-20D-H	
1	Cat5e LAN cable	
1	Cat6A LAN cable	
2	Power cord	
1	Screw pack for 2.5" HDD installation	

| 1 | Screw pack for 3.5" HDD installation | |

Table 2-1: Package List

2.2 Optional Item

The following are optional component(s) which may be separately purchased:

| Microsemi Adaptec SmartRAID 3154-24i RAID adapter (**P/N**: 7F200-SMARTRAID315424I-RS) | |

Table 2-2: Optional Item

Chapter

3

Installation

3.1 Anti-static Precautions

⚠️ **WARNING:**

Failure to take ESD precautions during the maintenance of the GRAND-C422-20D-H may result in permanent damage to the GRAND-C422-20D-H and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the motherboard and the power module. (Dry climates are especially susceptible to ESD.) It is therefore critical that whenever the GRAND-C422-20D-H is opened and any electrical component handled, the following anti-static precautions are strictly adhered to.

- *Wear an anti-static wristband*: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- *Self-grounding*: Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- *Use an anti-static pad*: When configuring the GRAND-C422-20D-H, place it on an anti-static pad. This reduces the possibility of ESD damaging the GRAND-C422-20D-H.

3.2 Installation Precautions

During installation, be aware of the precautions below:

- **Read the user manual**: The user manual provides a complete description of the GRAND-C422-20D-H, installation instructions and configuration options.
- **DANGER! Disconnect Power**: Power to the GRAND-C422-20D-H must be disconnected during the installation process. Failing to disconnect the power may cause severe injury to the body and/or damage to the system.
- **Qualified Personnel**: The GRAND-C422-20D-H must be installed and operated only by trained and qualified personnel. Maintenance, upgrades, or

repairs may only be carried out by qualified personnel who are familiar with the associated dangers.

▪ **Air Circulation**: Make sure there is sufficient air circulation when installing the GRAND-C422-20D-H. The GRAND-C422-20D-H's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the GRAND-C422-20D-H. Leave at least 5 cm of clearance around the GRAND-C422-20D-H to prevent overheating.

▪ **Grounding**: The GRAND-C422-20D-H should be properly grounded. The voltage feeds must not be overloaded. Adjust the cabling and provide external overcharge protection per the electrical values indicated on the label attached to the back of the GRAND-C422-20D-H.

3.3 Expansion Card Installation

![Warning icon] **WARNING!**

The following instructions should only be performed by an authorized and trained technician.

Strictly adhere to the instructions to install an expansion card on the system. Failure to do so could result in injury to human body or death.

The GRAND-C422-20D-H provides multiple PCIe 3.0 slots so that users can add functionality to their system.

To install expansion card, follow the steps below.

Step 1: Turn off the GRAND-C422-20D-H. Disconnect the power adaptor, network cable(s), and any other connectors or cables from the GRAND-C422-20D-H.

Step 2: Before installing the network expansion card, put on an antistatic wrist strap to prevent electrostatic discharge. The crocodile clip should be connected to the ground.

Step 3: Loosen the two captive screws on the rear of the GRAND-C422-20D-H. Slide the top cover towards rear panel. Grab the handle to lift the top cover off the system.

Step 4: Remove the screw(s) from the expansion slot cover(s) and detach cover(s).

Step 5: Line up the notch on the expansion card to the break in the PCIe slot. Fully

insert the expansion card to the expansion slot. Fasten screw(s) to lock in card.

i
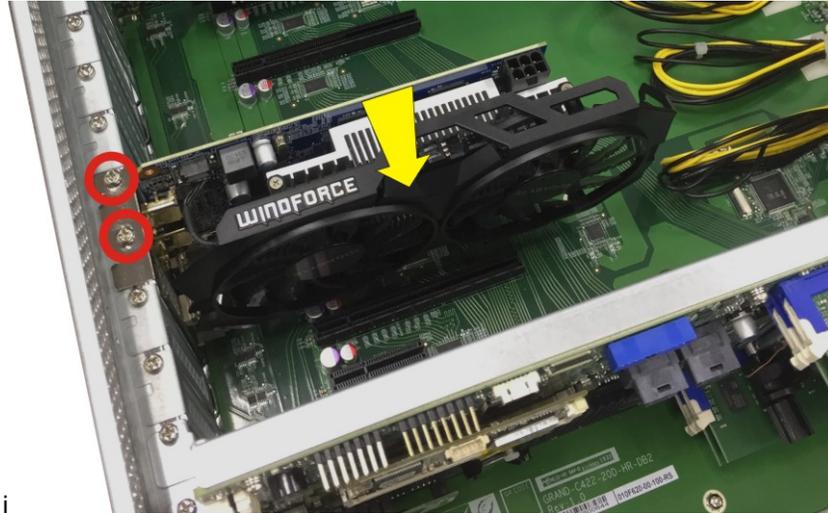
Step 6: Re-install the top cover.

Step 7: Reconnect all cables back into the GRAND-C422-20D-H.

3.4 Hard Drive Installation

The GRAND-C422-20D-H is compatible with 2.5-inch/3.5-inch SAS/SATA hard drives.

 NOTE:

Before installing hard drives, ensure the disk drives (HDDs/SSDs) that you use
are compatible with the GRAND-C422-20D-H.

WARNING:

Users are strongly recommended to turn OFF the GRAND-C422-20D-H before replacing the hard drive to reduce the risk of electric shock.

CAUTION:

IEI disclaims any responsibility for product damage/malfunction or data loss/recovery due to misuse or improper installation of hard disks in any occasions for any reasons.

3.4.1 Hard Drive Bay Numbering

GRAND-C422-20D-H drive bay numbering:

Number	Supported HDD/SSD
1~8, 17~20	3.5-inch or 2.5-inch SAS/SATA hard drives
9~16	2.5-inch SAS/SATA hard drives

3.4.2 Hard Drive Installation - 2.5"/3.5" Bays

The front panel of the GRAND-C422-20D-H has 12 drive slots for installing 2.5"/3.5" SAS/SATA HDD/SSD. To install the hard drive into the system, please follow the steps below.

Step 1: Press the button to release the HDD tray as shown in **Figure 3-1**.

Figure 3-1: Release HDD Tray (2.5"/3.5")

Step 2: Remove the hard drive tray (**Figure 3-2**).

Figure 3-2: HDD Tray Removal (2.5"/3.5")

Step 3: Attach the drive to the tray and secure the four screws in the bottom/sides of the drive tray (**Figure 3-3**).
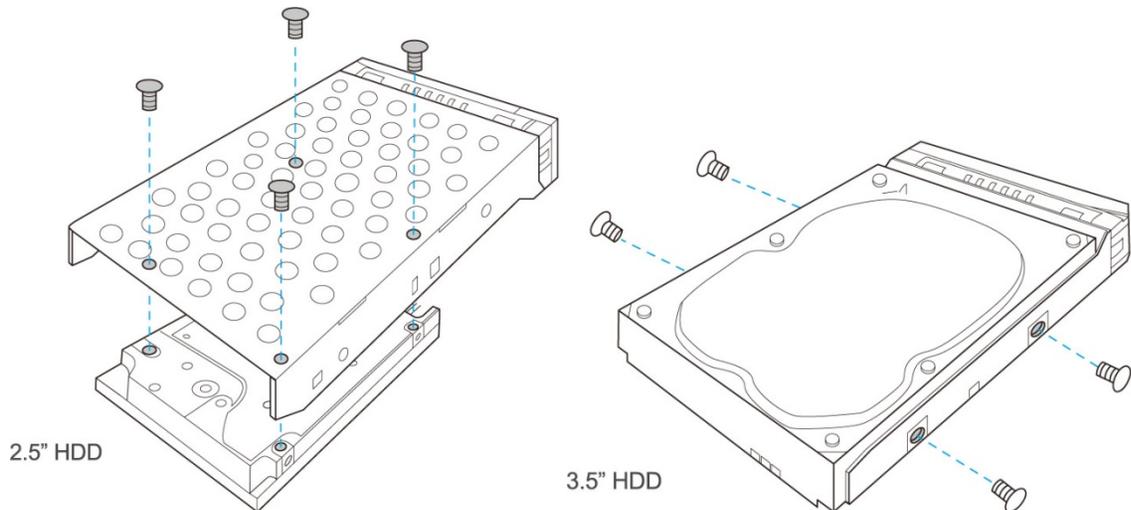
Figure 3-3: HDD Tray Installation (2.5"/3.5")

Step 4: Insert the drive tray into the GRAND-C422-20D-H all the way to the end. Close and lock the latch to secure the drive tray. See **Figure 3-4**.

Figure 3-4: HDD Installation (2.5"/3.5")

Step 5: Repeat **Step 1** to **Step 4** to install the remaining drives. Please follow the HDD Sequence shown above.

3.4.3 Hard Drive Installation - 2.5" Bays

The front panel of the GRAND-C422-20D-H also has 8 drive slots for installing 2.5" SAS/SATA SSD. To install the hard drive into the system, please follow the steps below.

Step 1: Press the button to release the HDD tray as shown in **Figure 3-5**.


Figure 3-5: Release Drive Tray (2.5")

Step 2: Pull to remove the drive tray.

Figure 3-6: HDD Tray Removal (2.5")
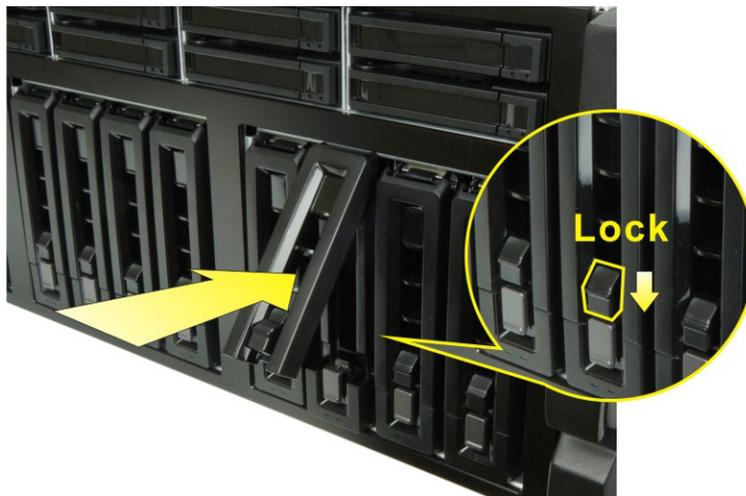
Step 3: Attach the drive to the tray and secure the four screws in the bottom of the drive tray (**Figure 3-7**).
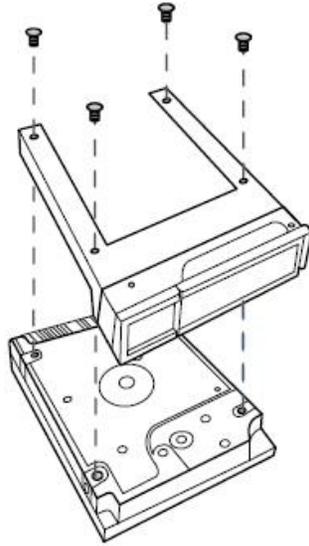
Figure 3-7: Drive Tray Installation (2.5")

Step 4: Insert the drive tray into the GRAND-C422-20D-H all the way to the end. Close the latch to secure the drive tray. See **Figure 3-8**.

Figure 3-8: HDD Installation (2.5")

Step 5: Repeat **Step 1** to **Step 4** to install the remaining drives. Please follow the HDD Sequence shown **Figure 3-5**.

3.5 Power-On Procedure

3.5.1 Installation Checklist

![WARNING icon] **WARNING:**

> Make sure a power supply with the correct input voltage is being fed into the system. Incorrect voltages applied to the system may cause damage to the internal electronic components and may also cause injury to the user.

To power on the GRAND-C422-20D-H, please make sure of the following:

- The HDD/SSD is installed
- The LAN cable is connected
- The power cables are plugged in
- The system is securely mounted

3.5.2 Power-on Procedure

To power-on the GRAND-C422-20D-H please follow the steps below:

Step 1: Connect the power source to the power input jacks.

Figure 3-9: Power Connection

Step 2: Push the power button (**Figure 3-10**).

Figure 3-10: Power Button

Step 3: To turn off the GRAND-C422-20D-H, press the power button for 1.5 seconds.

To force turn off, press the power button for 5 seconds.

Chapter

4

Maintenance

 WARNING:

The following instructions should only be performed by an authorized and trained technician.

Before starting, please ensure that you turn off the GRAND-C422-20D-H, disconnect the power adaptor, network cable(s), and also remove any other device/cable that is attached to the server.

Take Anti-Static precautions whenever maintenance is being carried out on the system components. Failure to take anti-static precautions can cause permanent system damage. For more details on anti-static precautions, please refer to **Section 3.1**.

4.1 Component Replacement Procedure

 WARNING!

Users are not advised to attempt to repair or replace any internal or external components of the GRAND-C422-20D-H storage server other than those listed below. If any other components fail or need replacement, contact the IEI reseller or vendor you purchased the GRAND-C422-20D-H from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@ieiworld.com.

The industrial server components listed below can all be replaced if they fail:

- Expansion cards (see **Section 3.3**)
- Hard disk drives (see **Section 3.4**)
- DIMM modules
- Power supply units

4.2 Memory Module Replacement

To replace memory modules, follow the steps below:

Step 1: Turn off the GRAND-C422-20D-H. Disconnect the power adaptor, network cable(s), and any other connectors or cables from the GRAND-C422-20D-H.

Step 2: Put on an antistatic wrist strap to prevent electrostatic discharge. The crocodile clip should be connected to the ground.

Step 3: Loosen the two captive screws on the rear of the GRAND-C422-20D-H. Slide the top cover towards rear panel. Grab the handle to lift the top cover off the system.

Step 4: Locate the memory module on the main board. Release the memory module by pulling the ejector clips gently out of the sides of the RAM slot.

Step 5: Grip the new RAM on the edges to avoid touching contacts or circuitry on the module.

Step 6: Line up the notch on the RAM to the break in the slot. Note that the first RAM slot must install with a memory module.

Step 7: Set the stick into the slot and apply equal pressure onto both ends of the stick until the clamps on the side click and fully lock the RAM in.

Step 8: Re-install the top cover.

Step 9: Reconnect all cables back into the GRAND-C422-20D-H.

⚠️ **CAUTION**:

For four-channel configuration, always install four identical memory modules that feature the same capacity, timings, voltage, number of ranks and the same brand.

4.3 Power Supply Unit Replacement

To replace a failed power supply unit, please follow the steps below.

Step 1: Turn off the GRAND-C422-20D-H. Disconnect the power adaptor, network

cable(s), and any other connectors or cables from the GRAND-C422-20D-H.

Step 2: Firmly press and hold the green button on back of PSU towards the black handle.

Pull out power supply by pulling black handle.
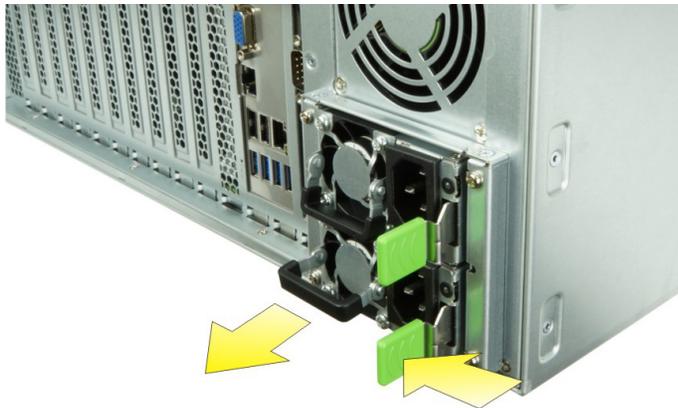
Step 3: Insert new power supply into the GRAND-C422-20D-H.

Step 4: Connect the power adaptor and cables to the GRAND-C422-20D-H.

Step 5: Power on the system.

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY $C \in$

This equipment is in conformity with the following EU directives:

- EMC Directive 2014/30/EU
- Low-Voltage Directive 2014/35/EU
- RoHS II Directive 2015/863/EU

If the user modifies and/or install other devices in the equipment, the CE conformity declaration may no longer apply.

If this equipment has telecommunications functionality, it also complies with the requirements of the R&TTE Directive 1999/5/EC.

English
IEI Integration Corp declares that this equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Български [Bulgarian]
IEI Integration Corp. декларира, че този оборудване е в съответствие със съществените изисквания и другите приложими правила на Директива 1999/5/EC.
Česky [Czech]
IEI Integration Corp tímto prohlašuje, že tento zařízení je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Dansk [Danish]
IEI Integration Corp erklærer herved, at følgende udstyr overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch [German]
IEI Integration Corp, erklärt dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 1999/5/EU.
Eesti [Estonian]
IEI Integration Corp deklareerib seadme seadme vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

Español [Spanish]

IEI Integration Corp declara que el equipo cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

Ελληνική [Greek]

IEI Integration Corp ΔΗΛΩΝΕΙ ΟΤΙ ΕΞΟΠΛΙΣΜΟΣ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/EK.

Français [French]

IEI Integration Corp déclare que l'appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.

Italiano [Italian]

IEI Integration Corp dichiara che questo apparecchio è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.

Latviski [Latvian]

IEI Integration Corp deklarē, ka iekārta atbilst būtiskajām prasībām un citiem ar to saistītajiem noteikumiem Direktīvas 1999/5/EK.

Lietuvių [Lithuanian]

IEI Integration Corp deklaruoja, kad šis įranga atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.

Nederlands [Dutch]

IEI Integration Corp dat het toestel toestel in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.

Malti [Maltese]

IEI Integration Corp jiddikjara li dan prodott jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.

Magyar [Hungarian]

IEI Integration Corp nyilatkozom, hogy a berendezés megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.

Polski [Polish]

IEI Integration Corp oświadcza, że wyrobu jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.

Português [Portuguese]

IEI Integration Corp declara que este equipamento está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

Româna [Romanian]
IEI Integration Corp declară că acest echipament este in conformitate cu cerinţele esenţiale şi cu celelalte prevederi relevante ale Directivei 1999/5/CE.
Slovensko [Slovenian]
IEI Integration Corp izjavlja, da je ta opreme v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovensky [Slovak]
IEI Integration Corp týmto vyhlasuje, že zariadenia spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi [Finnish]
IEI Integration Corp vakuuttaa täten että laitteet on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Svenska [Swedish]
IEI Integration Corp förklarar att denna utrustningstyp står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

FCC WARNING

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Federal Communication Commission Interference Statement

This equipment has been assembled with components that comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Appendix

B

Safety Precautions

WARNING:

The precautions outlined in this chapter should be strictly followed. Failure to follow these precautions may result in permanent damage to the GRAND-C422-20D-H.

B.1 Safety Precautions

Please follow the safety precautions outlined in the sections that follow:

B.1.1 General Safety Precautions

Please ensure the following safety precautions are adhered to at all times.

- **Follow the electrostatic precautions** outlined below whenever the GRAND-C422-20D-H is opened.
- **Make sure the power is turned off and the power cord is disconnected** whenever the GRAND-C422-20D-H is being installed, moved or modified.
- **Do not apply voltage levels that exceed the specified voltage range**. Doing so may cause fire and/or an electrical shock.
- **Electric shocks can occur** if the GRAND-C422-20D-H chassis is opened when the GRAND-C422-20D-H is running.
- **If considerable amounts of dust, water, or fluids enter the GRAND-C422-20D-H**, turn off the power supply immediately, unplug the power cord, and contact the GRAND-C422-20D-H vendor.
- **DO NOT**:
  - ○ Drop the GRAND-C422-20D-H against a hard surface.
  - ○ In a site where the ambient temperature exceeds the rated temperature

B.1.2 Anti-static Precautions

![WARNING icon] **WARNING:**

Failure to take ESD precautions during the installation of the GRAND-C422-20D-H may result in permanent damage to the GRAND-C422-20D-H and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the GRAND-C422-20D-H. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the GRAND-C422-20D-H is opened and any of the electrical components are handled, the following anti-static precautions are strictly adhered to.

- **Wear an anti-static wristband**: Wearing a simple anti-static wristband can help to prevent ESD from damaging any electrical component.
- **Self-grounding**: Before handling any electrical component, touch any grounded conducting material. During the time the electrical component is handled, frequently touch any conducting materials that are connected to the ground.
- **Use an anti-static pad**: When configuring or working with an electrical component, place it on an antic-static pad. This reduces the possibility of ESD damage.
- **Only handle the edges of the electrical component**: When handling the electrical component, hold the electrical component by its edges.

B.1.3 Product Disposal

⚠️ **CAUTION:**

Risk of explosion if battery is replaced by and incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

- Outside the European Union - If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union:
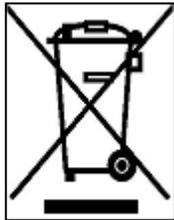
EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your display products, please follow the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

B.2 Maintenance and Cleaning Precautions

When maintaining or cleaning the GRAND-C422-20D-H, please follow the guidelines below.

B.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the GRAND-C422-20D-H, please read the details below.

- The interior of the GRAND-C422-20D-H does not require cleaning. Keep fluids away from the GRAND-C422-20D-H interior.
- Be cautious of all small removable components when vacuuming the GRAND-C422-20D-H.
- Turn the GRAND-C422-20D-H off before cleaning the GRAND-C422-20D-H.
- Never drop any objects or liquids through the openings of the GRAND-C422-20D-H.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the GRAND-C422-20D-H.
- Avoid eating, drinking and smoking within vicinity of the GRAND-C422-20D-H.

B.2.2 Cleaning Tools

Some components in the GRAND-C422-20D-H may only be cleaned using a product specifically designed for the purpose. In such case, the product will be explicitly mentioned in the cleaning tips. Below is a list of items to use when cleaning the GRAND-C422-20D-H.

- *Cloth* – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the GRAND-C422-20D-H.
- *Water or rubbing alcohol* – A cloth moistened with water or rubbing alcohol can be used to clean the GRAND-C422-20D-H.
- *Using solvents* – The use of solvents is not recommended when cleaning the GRAND-C422-20D-H as they may damage the plastic parts.
- *Vacuum cleaner* – Using a vacuum specifically designed for computers is one of the best methods of cleaning the GRAND-C422-20D-H. Dust and dirt can restrict the airflow in the GRAND-C422-20D-H and cause its circuitry to corrode.
- *Cotton swabs* - Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas.
- *Foam swabs* - Whenever possible, it is best to use lint free swabs such as foam swabs for cleaning.

Appendix

C

Hazardous Substances Disclosure

C.1 RoHS II Directive (2015/863/EU)

The details provided in this appendix are to ensure that the product is compliant with the RoHS II Directive (2015/863/EU). The table below acknowledges the presences of small quantities of certain substances in the product, and is applicable to RoHS II Directive (2015/863/EU).

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements								
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O
Display	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in Directive (EU) 2015/863.

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in Directive (EU) 2015/863.

C.2 China RoHS

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素								
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)	邻苯二甲酸二 (2-乙基己基)酯 (DEHP)	邻苯二甲酸甲 苯基丁酯 (BBP)	邻苯二甲酸二 丁酯 (DBP)	邻苯二甲酸二 异丁酯 (DIBP)
壳体	O	O	O	O	O	O	O	O	O	O
显示	O	O	O	O	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O	O	O	O	O
电池	O	O	O	O	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求。