

Infortrend EonStor GSe Pro 1000 Series Hardware Manual

Version 1.0

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Contact Information

Worldwide offices

To contact one of our world wide offices visit the following web site:

[Contact Infortrend](#)

Customer Support

Contact your system vendor or visit the following support site:

[EonStor GSe Pro Support](#)

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Safety Precautions

Read these instructions carefully before you install, operate, or transport the system and expansion enclosures.

Energy Hazards Precaution

This equipment is intended to be used in Restrict Access Location, like computer room. The access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the metal chassis of the equipment is have energy hazards that service persons have to pay special attention or take special protection before touching it. Further, the access is through the use of key or security identity system. Only authorized by well trained professional person can access the restrict access location.

Installation and Operation

- Install the rack cabinet and the associated equipment at a site where the ambient temperature (special room cooling equipment may be required) stays lower than 40°C.
- Install the power source socket outlet near the enclosure where it is easily accessible and ground the rack cabinet.
- Secure airflow clearance inside and around the rack cabinet.
 - Secure an 18 to 20cm clearance on the rear side.
 - Do not cover the enclosure openings.
 - Route the cables inside the rack cabinet.
 - Do not leave drive bays empty as it will affect airflow efficiency.
- Secure each enclosure module using its retaining screws.
- Place power cords and other cables away from foot traffic. Do not place items on top of power cords and make sure they do not rest against data cables.
- Install all modules to the enclosure before powering-on systems.
- Ensure that the correct power range is being used before powering-on.
- DO NOT remove covers or replaceable modules if they are not faulty.

- If the system is not going to be used for a long period of time, disconnect it from the power mains to avoid transient over-voltage.
- For power source redundancy, please make sure that the two PSUs are plugged into two different power sources (i.e. Different circuit breakers).

Service and Maintenance

- Keep the faulty module in place until you have a replacement unit; an empty module greatly affects the airflow efficiency within the enclosure.
- During service operation, place the enclosure on soft and clean surface to prevent exterior damage. Do not place tools or other items on top.
- When transporting the enclosure, repackage all disk drives separately in the original package foam blocks. Replaceable modules can stay in the enclosure if you are using the original package; if not, repackage them separately as well.
- Disconnect the power cords before servicing or cleaning the enclosure.
- Use a slightly moistened paper sheet or cloth for cleaning. Avoid using liquid or sprayed detergent.
- When replacing components, insert them as gently as possible while assuring full engagement. Vibration and shock can easily damage hard drives.
- Only qualified service personnel should open the enclosure.
- Contact service personnel if any of the following situations occurs:
 - The power cord or plug is damaged.
 - The enclosure has been exposed to moisture.
 - The system has not been working properly.
 - The enclosure was dropped against a hard surface.
 - The enclosure shows obvious signs of breakage.
- To move the enclosure, it is recommended to remove the drives from the enclosure beforehand.

Important Notice

The use of Infortrend certified components is strongly recommended to ensure compatibility, quality and normal operation with your Infortrend products. Please contact your distributor for a list of Infortrend certified components (e.g. SFP, SFP+, HBA card, iSCSI cable, FC cable, memory module, etc.).

ESD Precautions

- Handle the modules by their retention screws, ejector levers, or the module's metal frame/faceplate only. Avoid touching the PCB boards or connector pins.
- Use a grounded wrist strap and an anti-static work pad to discharge static electricity when installing or operating the enclosure.
- Avoid dust, debris, carpets, plastic, vinyl, and Styrofoam in your work area.
- Do not remove any module or component from its anti-static bag before installation takes place.
- Drives must not be stacked on top of each other without their protective drive trays. Even when drives are fixed in the drive trays, contacting the exposed PCB or rear-side interface may damage the drives.

About This Manual

The manual introduces hardware components of the GSe Pro 1000 series systems. It also describes how to install, monitor, and maintain them.

For non-serviceable components, please contact our [support sites](#).

Firmware operation: Consult the Firmware User Manual on the CD-ROM.

EonOne: Consult the respective User Manual on the CD-ROM.

Revision History

Version	Date	Description
1.0	Sep. 2017	Initial release



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Introduction

Product Overview

This manual introduces Infortrend GSe Pro 1000 series systems that support 3Gbps / 6Gbps SATA hard drives. The enclosure is designed to utilize 2.5" or 3.5" hard drives.

Model Naming Conventions

The naming rules for systems are explained in the example below:

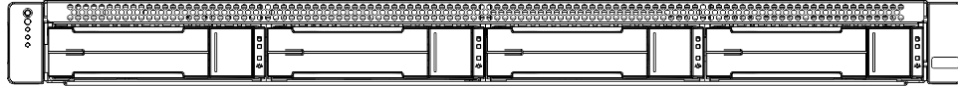
GSe Pro 1004RP → GSe Pro^(A) + 1^(B) + 0^(C) + 04^(D) + RP^(E) + B^(F)

Designation	Description
(A)	GSe Pro = EonStor GSe Pro systems
(B)	<u>The number that</u> indicates family series 1 = entry-level SMB
(C)	<u>The number that</u> indicates generation 0 = first generation
(D)	<u>The number that</u> indicates bay count 04 = 1U system, 4-bay 08 = 2U system, 8-bay
(E)	Indicates PSU type. SP: single PSU RP: redundant PSU
(F)	Indicates DDR type.

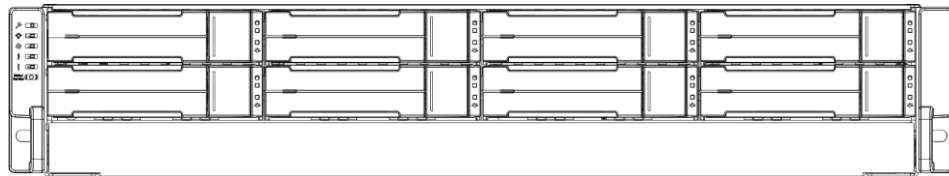


Model Variations

The systems can store hard drives and control the entire storage array. Hard drive limitation(s) may vary by model.



EonStor GSe Pro 1004



EonStor GSe Pro 1008



Major Components



NOTE

Upon receiving your system, check the package contents against the included **Unpacking List**. If module(s) are missing, please contact your system vendor immediately.

Controller and Interface

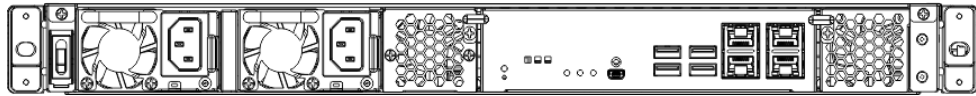
Each controller comes with pre-installed DIMM module(s).

The embedded firmware features intelligent algorithms, such as power-saving modes, variable fan speeds, and exiled drive handling, making this model a greener choice.

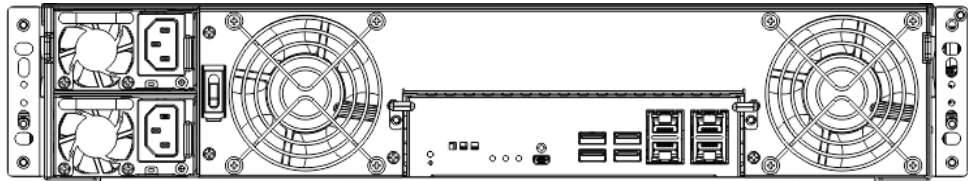
Power supply unit with built-in cooling module

Cooling module is built into the power supply unit (PSU) to protect the system from overheating. The two hot-swappable PSUs provide constant power to the system. The modular nature of the system and the easy accessibility to all major components ensure ease of maintenance.

The Rear Panel



1U model

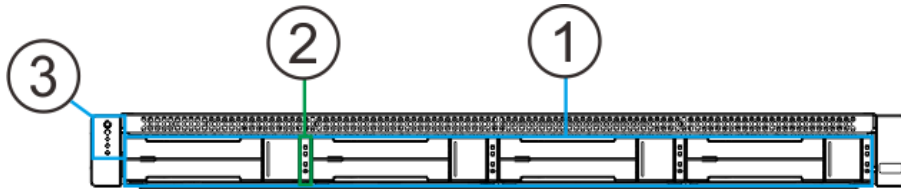


2U model

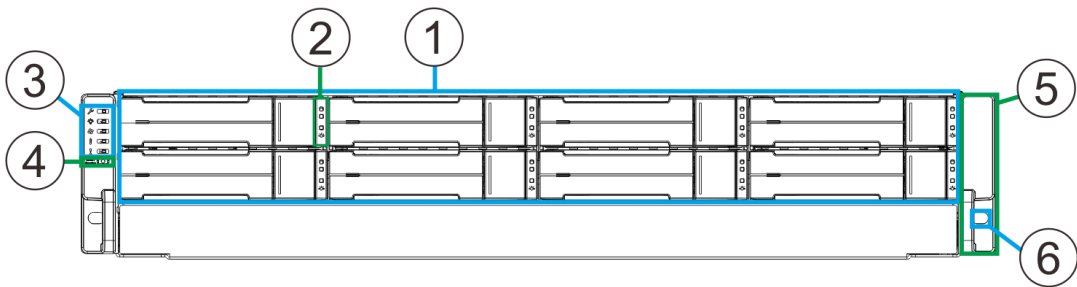
Chassis

The chassis is rugged constructed and divided into front and rear sections. The chassis is designed to be installed into a rack or cabinet.

Front Panel



1U model

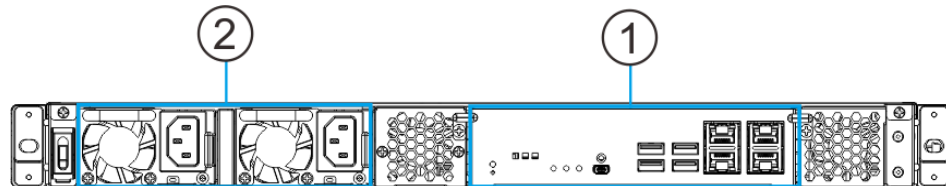


2U model

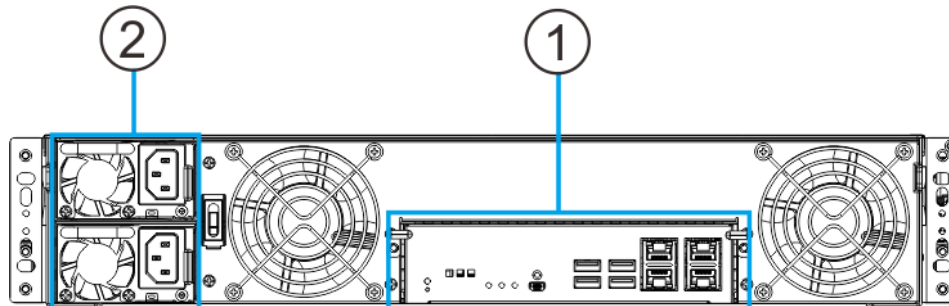
- **Hard drive trays (1):** Each drive tray is hot-swappable and holds a 2.5 / 3.5-inch hard drive.
- **Hard drive status LED (2):** There is a set of hard drive status LEDs on each hard drive tray on the right hand side to indicate operation status.
- **LED Panel (3):** It contains Service / Power / Cooling Fan / Thermal / System LED
- **Mute button / service LED (4):** The mute button is to mute an alarm when sound or to indicate that the system requires service.
- **Handles (5):** There are handles on both sides of the enclosure for users to pull / push the enclosure out and into the cabinet when the enclosure is installed on a slide rail rackmount system.
- **Rackmount holes (6):** There are two rackmount holes (one on each side of the enclosure) for users to secure the enclosure onto the cabinet.

Rear Panel

#	Description	#	Description
1	Controller	2	PSU + cooling module



1U model



2U model

- **Controllers (1):** The controller module contains a main circuit board and a pre-installed DIMM module. For details, see [Rear Panel Components](#).
- **PSU (2):** The hot-swappable PSUs provide power to the system. There is a cooling module within each PSU. Please refer to your specific system for details shown in the [later sections](#) of this chapter.



WARNING

Do NOT remove the dummy cage for this model. Doing so will disrupt the internal airflow.



Internal Backplane

An integrated backplane separates the front and rear sections of the chassis. This circuit board provides logic level signals and low voltage power paths. Thermal sensors and I²C devices are embedded to detect system temperatures and PSU/cooling module operating status. This board contains no user-serviceable components.



WARNING

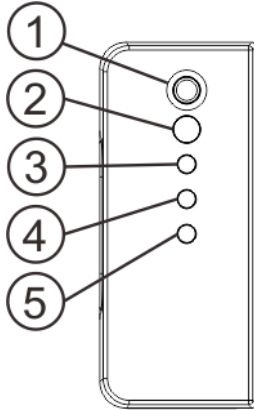
Accessing the backplane board may lead to fatal damage of the system. Also, physical contact with the backplane board may cause electrical hazards.



Front Panel Components

LED Panel

1004 model:



Designation	Description
1	Mute Service button
2	Power supply status LED
3	Cooling module status LED
4	Temperature sensor status LED
5	System fault LED

1008 model:



Designation	Description
1	Service LED
2	Power supply status LED
3	Cooling module status LED
4	Temperature sensor status LED
5	System fault LED
6	Mute Service button

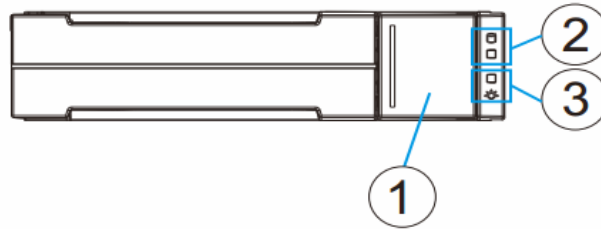
For details of the LEDs, please refer to [LED Panel](#).



WARNING

If critical faults are indicated on the LED panel, verify the cause of the problem as soon as possible and contact your system vendor to arrange for replacement.

Drive Tray Bezel



The drive tray is designed to accommodate separately purchased SATA interface hard disk drives. There is a release button **(1)** that has to be used to retrieve disk drives from the chassis. To the right of the bezel plate, there is a drive busy LED **(2)** and a power status LED **(3)**.



WARNING

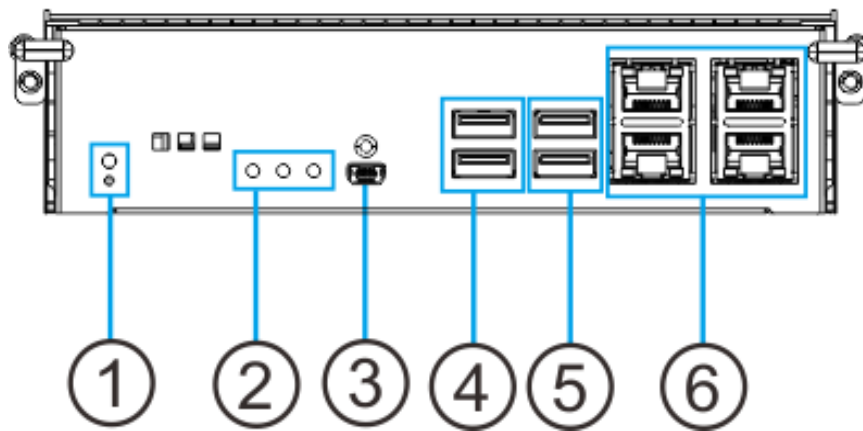
Be careful not to warp, twist, or contort the drive tray in any way (e.g., by dropping it or resting heavy objects on it). If the drive bay structure is deformed or altered, the drive trays may not fit into the drive bay.



Rear Panel Components

System Controller Module

Designation	Description	Designation	Description
1	Restore default button and LED	4	USB2.0 service ports
2	Controller status LEDs	5	USB3.0 service ports
3	Mini USB port (console port)	6	iSCSI 1Gb ports

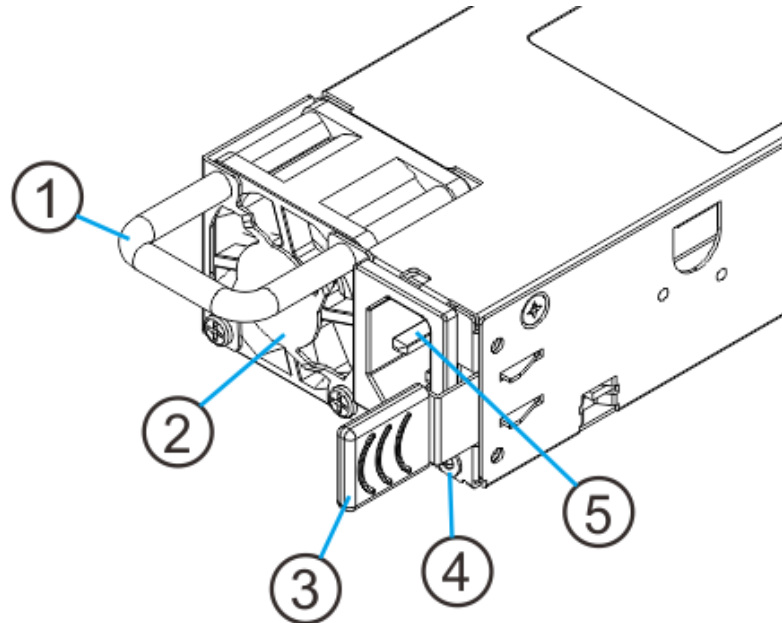


WARNING

The only time you should remove the controller is to install / replace the failed controller. The controller is built of sensitive components and unnecessary tampering may cause damage to it.

PSU & Cooling Module

The two redundant, hot-swappable PSUs have an extraction handle (1), cooling module (2), latch (3), PSU status LED (4) and a power socket (5).



The cooling modules can operate at three rotation speed settings. Under normal operating conditions, the cooling fans run at the low speed. Under the following conditions, cooling fans raise their rotation speed to increase the airflow:

- Component failure: if a cooling module, PSU, or a temperature sensor fails.
- Elevated temperature: if the temperature breaches the upper threshold set for any of the interior temperature sensors.
- During the system initialization stage, the cooling fans operate at high speed and return to low speed once the initialization process has completed and no erroneous condition detected.



NOTE

There are two upper temperature thresholds: one for event notification and the other for triggering higher fan rotation speed. The preset-value for event notification can be changed using the firmware-embedded configuration utility, while the fan speed trigger cannot be changed. Refer to the Firmware Operation Manual for details.



System Monitoring Features

There are a number of monitoring approaches that provide the operating status of individual components.

Main System Monitoring

The system is aware of the status of components including those of:

- Controller (presence, voltage and thermal readings)
- PSU
- Cooling module
- Service (the Service signal to specify a specific enclosure)
- Disk drives

Cooling Module Speed Adjustment:

If any of the detected temperature readings breaches the temperature threshold, the firmware running on the managing system automatically raises the rotation speed of all cooling fans.

Firmware (FW) and Management Software Suite

The firmware (FW) is preloaded and is used to configure the system. The FW can be accessed through the management software, a browser-based graphical user interface (GUI) software that can be installed on a local/remote computer and accessed via the network. The manager communicates with the array via the connection of the existing host links or the Ethernet link to the array's Ethernet port.

Audible Alarms

The system comes with audible alarms that are triggered when certain active components fail or when certain controller or system thresholds are exceeded. Whenever you hear an audible alarm, it is imperative that you determine the cause and rectify the problem immediately.

Event notification messages indicate the completion or status of array configuration tasks and are always accompanied by two or three successive and prolonged beeps. The alarm can be turned off using the [mute button](#) on the front panel.



WARNING

Failing to respond when an audible alarm is heard can lead to permanent damage(s) to the system. When an audible alarm is heard, rectify the problem as soon as possible.



Hot-swapping

The system comes with a number of hot-swappable components that can be exchanged while the system is still online without affecting the operational integrity. These components should only be removed from the system when they have to be replaced.

The following components can be user-maintained and hot-swappable:

- Controller module
- PSU (including cooling modules)
- Hard drive



NOTE

Normalized airflow ensures sufficient cooling of the system and is only attained when all components are properly installed. Therefore, a failed component should only be removed when a replacement is available. For instructions on how to replace these hot-swappable components, please refer to [System Maintenance](#).



Hardware Installation

This chapter describes how to install modular components, such as hard drives into the enclosure.



NOTE

Installation into a rack or cabinet should occur **BEFORE** hard drives are installed into the system.

Installation Prerequisites

Static-free installation environment: The system must be installed in a static-free environment to minimize the possibility of electrostatic discharge (ESD) damage.

Component check: Before installing the system, check to see that you have received all the required components using the **Unpacking List** included in the package. If there are item(s) missing or appear damaged, contact your vendor for a replacement.

Hard drives: SATA hard drives must be purchased separately and be available prior to installing the system.

Cabling: All the cables that connect the system to the hosts must be purchased separately. Please refer to [System Connection](#) for sample topologies and configuration options. Contact your vendor for the list of compatible cables.

Memory modules: If you wish to change the pre-installed DIMM module, you can find DIMM replacement procedures in [Replacing Memory Module\(s\)](#).

Make sure you are aware of the related positions of each plug-in module and interface connector.

Cables must be handled with care and must not be bent. To prevent emission interference within a rack system and accidental cable disconnection, the routing paths must be carefully planned.



Installation Procedures Overview

Following all the instructions provided below can minimize system installation time. Detailed, illustrated instructions for each component are given in the following sections.

1. **Unpack:** Unpack the system and confirm all components have been received against the Unpacking List.
2. **Install hard drives:** Separately purchased SATA hard drives must be individually installed into the drive trays.
3. **Install drive trays:** After the hard drives have been installed into the drive trays, you can install the drive trays into the enclosure (install trays **AFTER** the enclosure has been placed well).
4. **Cable connection:** Use the supplied power cords to connect the system to main power. It is recommended to connect power cords to separate and independent power sources (different circuit breakers for redundancy).
5. **Power up:** Once the components have been properly installed and all cables are properly connected, you can power up the system and configure it.



Unpacking the System

Compare the **Unpacking List** included in the shipping package against the actual package contents to confirm that all required materials have arrived.

Box contents

For detail content(s), please refer to the unpacking list that came with the system.

The accessory items include a serial port cable, screws, **Quick Installation Guide**, a CD containing the Management Software and its manual and **Firmware Operation Manual**, and a product utility CD containing the **Installation and Hardware Reference Manual** (this document).

Preinstalled Components

Shown below are the components pre-installed in the system:

- Controllers
- LED front panels
- DIMM module for the systems
- PSUs including cooling modules

Components to be installed

You must install the following components:

- Hard drives
- Cabling



Installing Hard Drives

Installation of hard drives should only occur after the enclosure has been placed well.

Hard Drive Installation Prerequisites

Hard drives are separately purchased and when purchasing hard drives, the following factors should be considered:

Capacity (MB/GB): Use drives with the same capacity. RAID arrays use a “least-common-denominator” approach, meaning the maximum capacity used in each drive for composing a RAID array is the maximum capacity of the smallest drive. Therefore it is recommended to use large storage capacity hard drives.



WARNING

Even hard drives by the same manufacturer, of the same model, and claiming the same rated capacity may actually carry different block numbers meaning that their capacity may not be exactly the same.

When configuring hard drives into a RAID array, you may use a slightly smaller capacity as the “**Maximum Disk Capacity**” in each individual hard drive. The configuration option can be found in the interface-specific firmware manual that came with your enclosure.

Profile: The drive trays and bays of the system are designed for 2.5” or 3.5” hard drives, depending on the system model.

Drive type: The system uses SATA 2.5” or 3.5” hard drives. Please ensure that you purchase the correct hard drives.



Hard Drive Designation

Illustrations shown below are system hard drive slot number designations. Please familiarize yourself with the designations to avoid withdrawing the hard drive(s) out of the enclosure.

1	2	3	4
---	---	---	---

1U systems

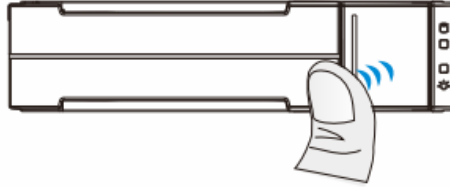
1	2	3	4
5	6	7	8

2U systems

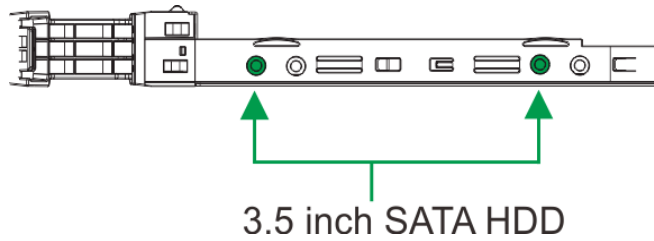


Installing the Hard Drive into Drive Tray

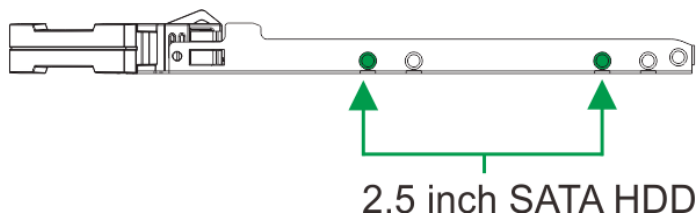
Open the bezel by pressing the release button and gently pull out the tray.



Place the hard drive into the drive tray, making sure that the interface connector is facing the open side of the drive tray and its label side facing up.



Installing a 3.5" SATA drive



Installing a 2.5" SATA drive

Adjust the drive location until the mounting holes in the drive tray are aligned with those on the hard drive. Secure the drive with four of the supplied flat-head screws.

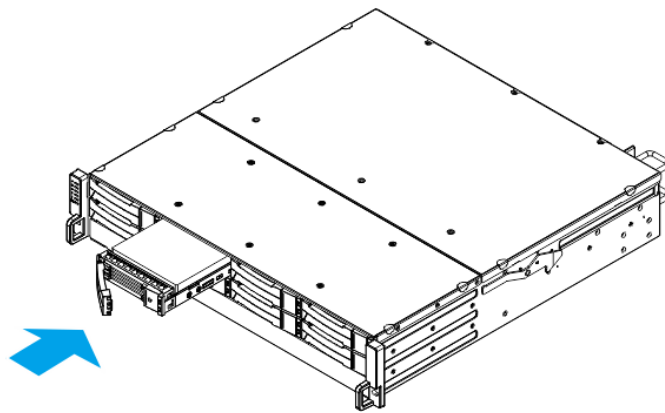
Installing the Hard Drive Tray into the Enclosure

Once the hard drives have been installed in the drive trays, install the drive trays into the system.



WARNING

Each drive bay must be populated with a tray even if it does not contain a hard drive. An empty bay will disrupt ventilation and the system might overheat.



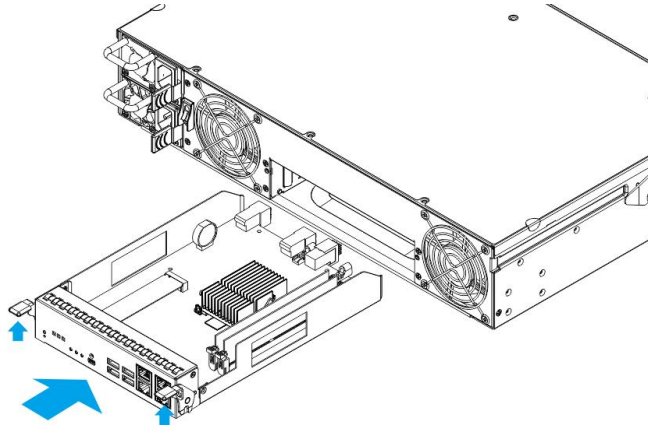
With the hard drive tray bezel opened, align and insert the tray into the enclosure. Once fully inserted, close the tray. You will hear a click sound if the tray is placed correctly.



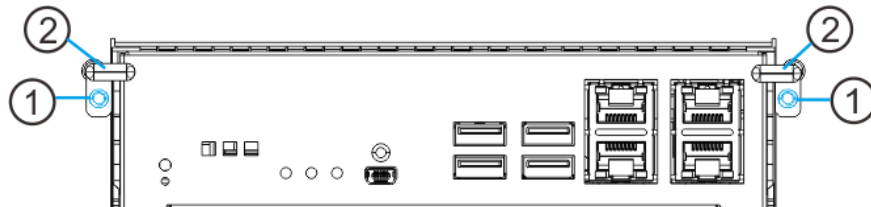
Installing the Controller

After completing the battery backup unit and flash backup module installation, the controller can be re-inserted into the enclosure:

1. Insert the controller slowly into the module slot. When you feel the contact resistance, use slightly more force and then push both of the ejector levers upwards (indicated by the **blue arrows**) to secure the controller into chassis.



2. Secure the controller by fastening the two retention screws **(1)** under the ejector levers **(2)**.





System Connection

This chapter outlines the general configuration rules you should follow when cabling a storage system. A complete description of the power-on and power-off procedures is also given in this chapter.

General Considerations on Making Connections

When selecting the number of hard drives to be included in a logical drive, the host channel bandwidth and the mechanical performance of individual disk drives should be considered.

It is a good practice to calculate performance against the host port bandwidth when designing an application topology. As an example, if eight members are included in a logical drive and this logical drive is associated with a host ID (LUN mapping), the combined performance of this logical drive should approximate the channel bandwidth. If, for example, two 6-drive logical arrays are associated with two IDs residing on a single host channel, there may be a trade-off with performance.

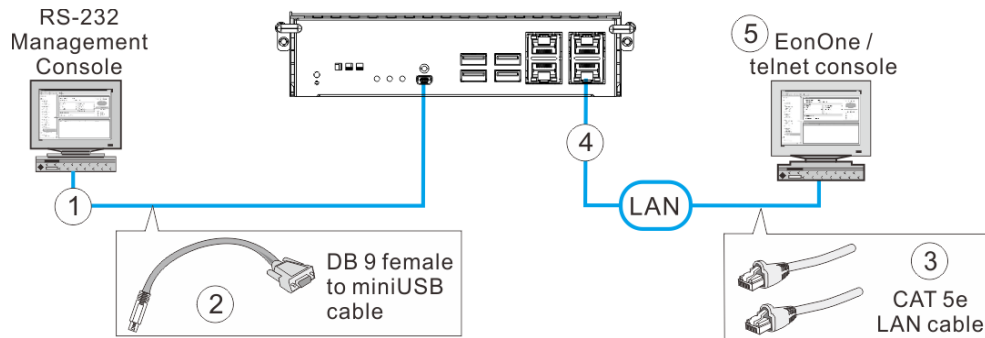
There are other considerations:

- For example, a spare drive carries no data stripes and will not contribute to disk-level performance. Refer to the documentation for your hard drives for performance data.
- The disk drives in the same logical drive / array should have the same capacity, but it is preferred that all the drives within a chassis have the same capacity.
- A spare drive should have a minimum capacity that is equivalent to the largest drive that it is expected to replace. If the capacity of the spare is less than the capacity of the drive it is expected to replace, the controller will not proceed with the failed drive rebuild.
- When cabling, pay attention to signal quality and avoid electronic noise from adjacent interfaces, e.g., do not lay power cords on optical cables.
- Route the cables away from places where it can be damaged by other devices, e.g., foot traffic or fan exhaust.
- Do not over-tighten or bend the cables.



Management Console Connections

Designation	Description	Designation	Description
1	Serial port (for Telnet access)	4	Local area network
2	DB9 to mini USB	5	EonOne / telnet console
3	CAT5e LAN cable		



Connecting the system to external consoles

Serial port (mini USB): Use the cable supplied with the system to connect to mini USB port.

Ethernet port: An Ethernet cable should be supplied by the user.



NOTE

A null modem may be required if you are using a 3rd party cable.

The serial port's defaults are:

Baud Rate	38400
Data Bit	8
Parity	None
Stop Bit	1
Flow Control	Hardware

For TCP/IP connection and firewall configuration please refer to Management Software online help or User's Manual. If your network environment is not running DHCP server protocols, a default IP, <10.10.1.1> can be used if you are accessing for the first time.

Power Connections

Once all hard drives have been properly installed and the I/O ports or management interfaces have been connected, the system can be powered on.

Checklist

BEFORE powering on the system, please check the following:

- **Hard drives:** Hard drives are correctly installed in the drive trays.
- **Drive trays:** All the drive trays, whether or not they contain a hard drive, have been installed into the system.
- **Cable connections:** The system has been correctly connected to host computer(s), management computers, or external networking devices.
- **Ambient temperature:** Make sure the surrounding environment temperature is not higher than 40 degrees Celsius.

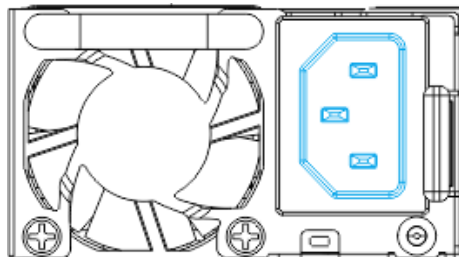


NOTE

Make sure you use the power cables provided that are at least 1.2 meters in length. **DO NOT** use extension cables as the power cables are designed to connect **ONLY and DIRECTLY** to relocatable power taps (RPTs) on server cabinets.

Power Cords Connections

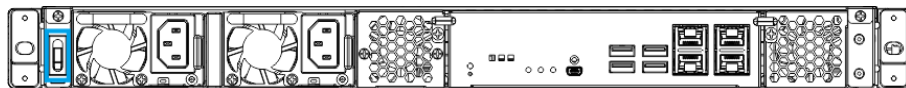
Use the included cables. Connect them to the power sockets (in blue) for all PSUs.



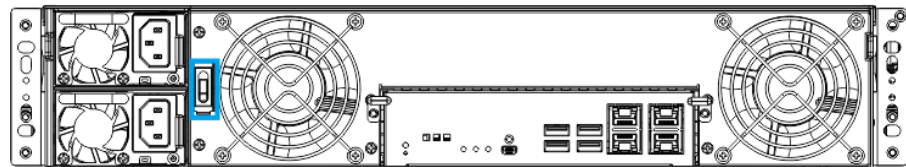
Power on Procedure

To power on the system please follow the procedures below.

1. Turn on the power switches to the “on” position for every PSU (shown in blue).
2. Power on the networking devices, e.g. switches.
3. Power on the host computers. They should be the last devices to be turned on.



1U model



2U model



NOTE

Make sure all power supply modules' switches are turned on!



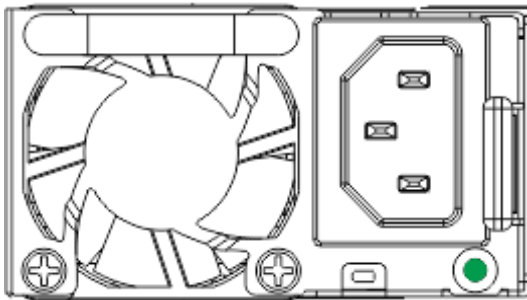
Power on Status Check

As a general rule, once the system has been powered on, there should be **NO** LED(s) that light up **red** / **amber** nor should you hear an audible alarm from the system. You may verify system status via the following monitoring interfaces: LEDs on rear chassis, including controller module, PSUs, and cooling modules (refer to [System Monitoring](#)).

PSU & Cooling Module LEDs:

PSU LED:

On	Green
Failure	Amber





Power off Procedure

If you wish to power down the system, please follow these steps:



NOTE

If you wish to power down the system, please ensure that no time-consuming processes, like “Regenerate Logical Drive Parity” or a “Media Scan,” are taking place.

1. Stop I/O access to the system

Close your applications running on the host computers to stop all I/O access to the system.

2. Flush the cache

Locate the C_Dirty LED (refer to [Controller LEDs](#)) on the controller module to check if there is still cached data in the DRAM (if the LED is lit up in **amber**).

3. Use the Shutdown Controller function to flush all cached data (please refer to the Management Software manual)

4. Once the cache has been flushed, you may proceed to power down the system.



System Monitoring

This system is equipped with a variety of self-monitoring features that help keep system managers aware of system operation statuses.

Monitoring Features

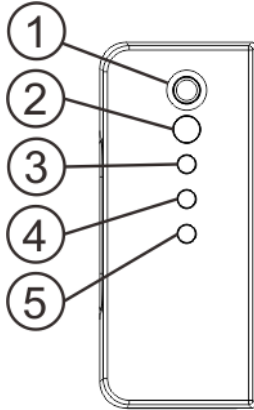
You may monitor the system through the following features:

- **Firmware:** The controller in the system is managed by a pre-installed firmware, which is accessible in a terminal program via the serial port. For more details, see the Firmware manual in the CD-ROM.
- **EonOne:** EonOne is a browser-based Graphical User Interface (GUI) that can to monitor and manage the system locally or remotely over TCP/IP network. For more details, see the EonOne manual in the CD-ROM.
- **LEDs:** LED indicators notify users of system status, events, and failures. LEDs are located on both the front and rear panel of the chassis. For details, see and subsequent sections.
- **Audible alarm:** Audible alarm will be triggered in case of system failures.

LED Panel

When lid **amber** to indicate failure, please check the corresponding module(s). For example, if the Thermal LED lights up amber, please check if there are faults on the system cooling modules (built within the PSU).

1004 model:



Name	Color	Status
1. Mute Service button	N/A	Pressing less than one second mutes the audible alarm. Pressing more than two seconds sends a service notification to the host computer.
2. Power	Green/ Amber	Green indicates that the system is powered properly. Amber indicates that there is a power failure in the system.
3. Cooling module	Green/ Amber	Green indicates that the cooling fan is operating properly. Amber indicates that there is a cooling fan failure in the system.
4. Thermal	Green/ Amber	Green indicates that the internal temperature is within the safety threshold. Amber indicates that the internal temperature has gone over the safety threshold.
5. System fault	Green/ Amber	Green indicates that the system is operating normally. Amber indicates that the system has encountered abnormal conditions.

1008 model:



Name	Color	Status
1. Service	White	<p>White indicates that the system is being serviced or is requiring services.</p> <p>OFF indicates that the system is not being serviced nor is requiring services.</p>
2. Power	Green/ Amber	<p>Green indicates that the system is powered properly.</p> <p>Amber indicates that there is a power failure in the system.</p>
3. Cooling fan	Green/ Amber	<p>Green indicates that the cooling fan is operating properly.</p> <p>Amber indicates that there is a cooling fan failure in the system.</p>
4. Thermal	Green/ Amber	<p>Green indicates that the internal temperature is within the safety threshold.</p> <p>Amber indicates that the internal temperature has gone over the safety threshold.</p>
5. System fault	Green/ Amber	<p>Green indicates that the system is operating normally.</p> <p>Amber indicates that the system has encountered abnormal conditions.</p>
6. Mute/ service button	N/A	<p>Pressing less than one second mutes the audible alarm.</p> <p>Pressing more than two seconds sends a service notification to the host computer.</p>



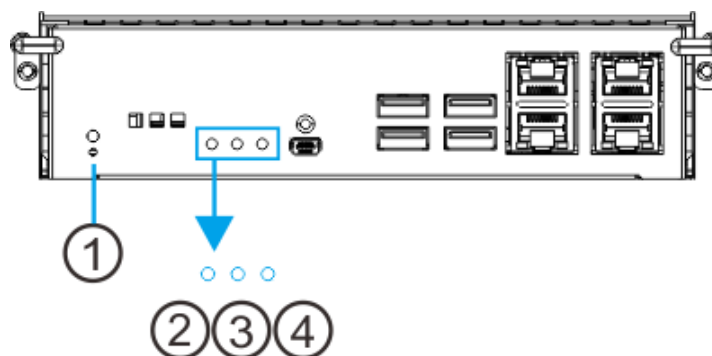
Drive Tray LED

Two LED indicators are located on the right side of each drive tray. When notified by a drive failure message, you should check the drive tray indicators to find the correct location of the failed drive.



Name	Color	Status
1. Drive Busy	Blue	Flashing blue indicates data is being written to or read from the drive. The drive is busy. Steady blue indicates that a hard drive is plugged-in but there is no activity on the disk drive.
2. Power Status	Green / Red	Green indicates that the drive bay is populated and is working normally. Red indicates that the disk drive has failed, or a connection problem occurred.

Controller LEDs

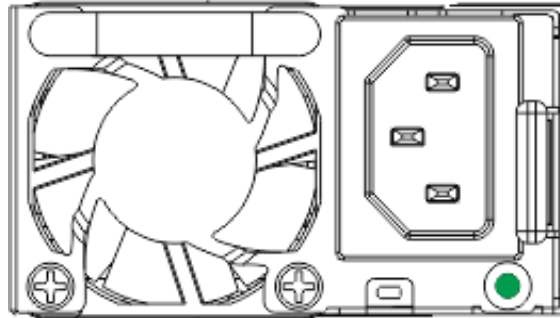


Name	Color	Status
1. Restore default	Green	Lights up green after pressing and holding restore default button to indicate a successful reset.
2. Ctrl Status	Green/ Amber	Green indicates that a controller is operating healthily. Amber indicates that a component failure has occurred, or inappropriate RAID configurations have caused system faults. It is also lit during the initialization process.
3. Cache Dirty	Amber	Amber indicates the following: <ul style="list-style-type: none"> - Cache memory is dirty. - Data is being flushed from flash backup module to cache. - Data is being flushed from flash backup module to drive (when power is restored). - Errors occurred with cache memory (ECC errors). Blinking amber indicates cached data is being transferred to the flash module after the occurrence of a power outage. Once the transfer is done, all LEDs will turn off. This signal is local to each controller. OFF indicates that the cache is clean.
4. Host Busy	Green	Blinking green to indicate traffic on the host bus.



PSU & Built-in Cooling Module LEDs

The PSU (Power Supply Unit) contains the LEDs for the PSU and the cooling module statuses. When either of the unit fails, you need to replace the PSU as soon as possible. For details, please refer to [Replacing the Power Supply Module](#).



PSU & Cooling Module Status LED (1)

Status	Description
Flashing (Green)	The system is connected to power supply but the power switch has not turned on.
On (Green)	The PSU / cooling module is operating normally.
On (Amber)	The PSU / cooling module is faulty.



WARNING

HAZARDOUS MOVING PARTS!

KEEP FINGERS AND OTHER BODY PARTS AWAY!



Alarms and I²C Bus

Other monitoring schemes include audible alarms and I²C bus.

Audible Alarms

If any of the following components fails, the audible alarm will be triggered:

- Cooling fan modules
- PSU modules
- Hard disk drives
- Sensors or presence detection circuitries

If an alarm rings out, the administrator must read the error message on the terminal or Management Software screen to determine what has triggered the alarm, and then take appropriate actions to rectify the problem. The alarm can be turned off using the [mute button](#) on the front panel and the alarm beep pattern is described in the Troubleshooting Guide included in the CD-ROM.



NOTE

When temperature exceeds a preset threshold, the controller's charger circuits will stop charging. You will then receive a message that reads "Thermal Shutdown/Enter Sleep Mode." When the temperature falls back within normal range, the super capacitor will resume charging.

I²C

The operating status of PSU and cooling fan modules are collected through an I²C serial bus. If either of those modules fails, the failure will be detected and you will be notified through the same methods as in the audible alarms.



System Maintenance



WARNING

Do not remove a failed component from the system until you have a replacement on hand. If you remove a failed component without immediate replacement, it will disrupt the internal airflow.

Qualified engineers who are familiar with the system should be the only ones who make component replacements.

When inserting a removable module, do not use excessive force. Forcing or slamming a module can damage the connector pins either on the module itself or on the backplane.

The following components can be replaced:

- Controller module (please refer to [Replacing the Controller Module](#))
- Memory module (please refer to [Replacing Memory Module\(s\)](#))
- PSU module (please refer to [Replacing the Power Supply](#))
- Hard drive (please refer to [Replacing the Hard Disk Drive](#))

Restoring Default System Settings



NOTE

Restoring default settings is a last-resort function. All configurations, such as parameters and host LUN mappings, will be erased.

You may need to restore default settings in the following cases:

- When the firmware update procedure requires it.
- When you need to reset the password to access the system.

Restoring Default Settings

To restore default settings, follow these steps.

1. Stop all host I/Os.
2. Save the current configuration using the **“Export NVRAM”** function.
3. You may also want to make a list of the existing ID/LUN mapping information because the default restoration will erase the ID/LUN mapping associations (e.g., which logical drive is associated with which host ID/LUN)
4. Power off the system.
5. Press and hold the [Restore Default button](#) on Controller A. You may use a straightened paper clip to press the button. While pressing the Restore Default button down, power on the system.
6. Keep pressing the [Restore Default button](#) till the [Restore Default LED](#) lights up than release the Restore Default button.
7. System default has been restored when the Controller Status LED changes the color from **amber** to **green**.
8. Restore previous settings using the **“Import NVRAM from reserve space”** or **“Restore NVRAM from Files”** in the firmware. ID/LUN mapping will be restored.

The system’s restore default procedure is complete now.

Replacing the Controller Module



WARNING

Controller firmware **MUST** be identical for proper functionality.

DO NOT mix controller modules from different models. Each controller has a unique ID which is applied to host port names. As the result, you may encounter SAN problems with identical port names on multiple systems.

When removing a controller from this system, ensure that your applications have been shut down beforehand.

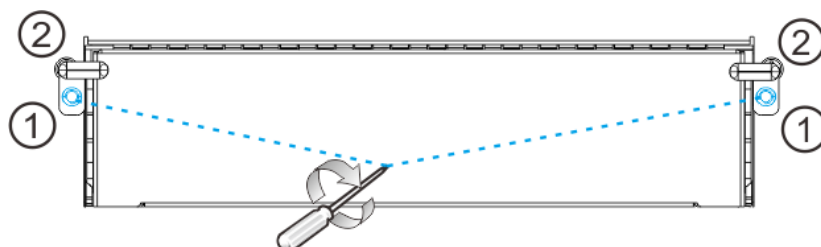
1. Prepare a clean, static-free work pad or container to place the controller.
2. **Replacing the controller model:**

First, shut down the system.

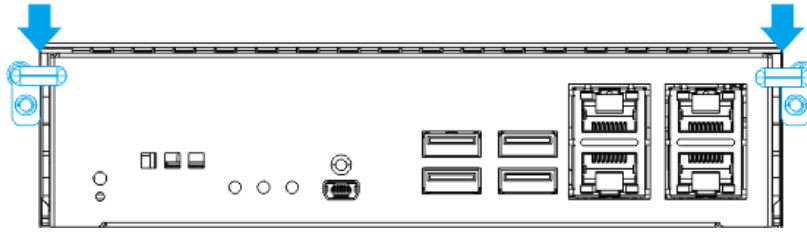
Stop all I/O access to the system and make sure all cached writes have been distributed to disk drives using firmware's Main Menu -> System Functions > Shutdown controller function.

[Power off the system](#) and turn off the power switches and unplug the power cords from PSUs.

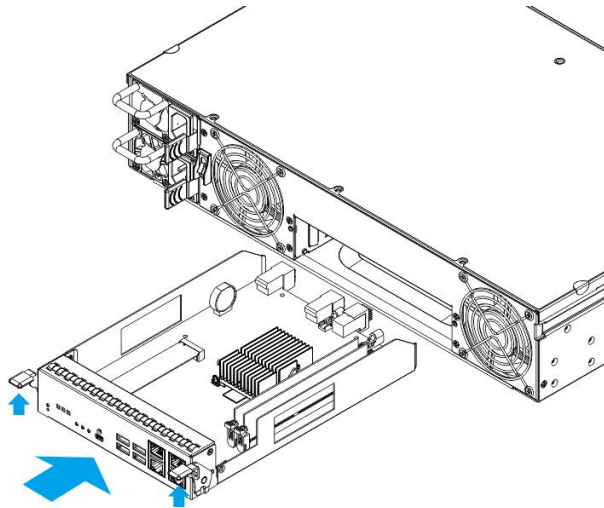
3. **Disconnect all cables** that are connected to the controller module.
4. **Loosen the screws** that secure the control module's ejection levers.



5. **Push the ejection levers downwards (indicated by the blue arrows).** The controller module will automatically ease out of the controller module bay.



6. **Insert the new controller module.** Carefully push the controller until you feel the contact resistance when the board edge connectors are engaging the backplane. Push the ejection levers upward (indicated by the **blue arrows**) and fasten the retention screw on the ejection levers.



7. Reattach all the cables.
8. **Power up the system.** Check system message on the LCD screen, the management software, or firmware menu-driven utility. When the replacement controller is successfully brought online, the [Power On Status LEDs](#) should turn on properly.
9. **Restoring NVRAM data.** To restore previous ID/LUN mapping settings, users may use the following options:
 - Use the “**Restore NVRAM from Disks**” or “**Restore NVRAM from Files**” functions in the firmware. ID/LUN mapping will be restored.

Replacing Memory Module(s)

The controller comes with pre-installed DRAM module(s). You may upgrade it or replace it when the original module malfunctions (shown as the “NVRAM failure” event in EonOne). If you have two modules installed, please identify correctly which one has failed before proceeding with the replacement procedure.

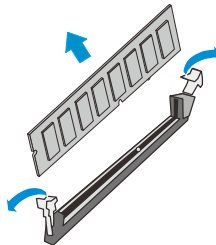


WARNING

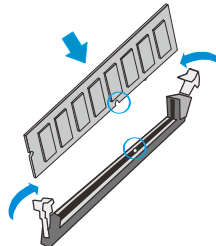
If you are installing only one or replacing just one DRAM module, with the I/O ports pointing at you, always install to the DRAM slot on the right (blue slot). Follow the ESD Precautions (refer to [ESD Precautions](#)). Contact your system vendor for selecting a compatible DRAM module. Reusing the DRAM module removed from a failed controller is not recommended unless you have a similar system to test its integrity.

Installing the DIMM Module

1. Remove the controller module (refer to [Replacing the Controller Module](#)).
2. **Wait for one minute** for the remaining electricity on the main board to disperse.
3. Push down the clips on the sides of the DIMM socket. The DIMM will eject automatically from the socket.



4. **Insert the replacement module.** Make sure the side clips are in the open positions. Align the DIMM module with the socket and firmly push the DIMM module into the socket. The side clips will close automatically and secure the DIMM module into the socket.



5. **(If applicable)** Reinstall the BBU module (refer to [Replacing the BBU](#)).
6. Reinstall the controller module into the chassis (refer to [Replacing the Controller Module](#)).

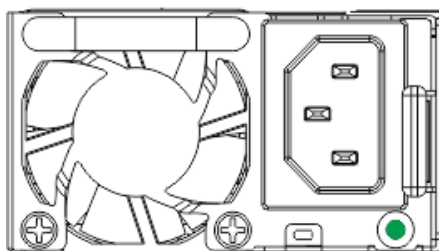
Replacing the Power Supply / Cooling Module

The power supply units (PSU) are configured in a redundant configuration with each PSU housed in a robust steel canister.

Detecting a Failed PSU

If a PSU module fails, the system notifies you through the following indicators:

- PSU LED:



- Audible alarm (refer to [Audible Alarms](#))
- Firmware utility (refer to Firmware User Manual in the CD-ROM for details)
- Management Software Suite (refer to the respective User Manual in the CD-ROM for details)

Replacing Power Supply Unit

A failed PSU should be replaced as soon as possible, but only when you have a replacement module in your hand. Contact your vendor for more details (refer to [Contact Information](#)).

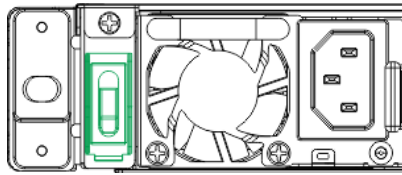


WARNING

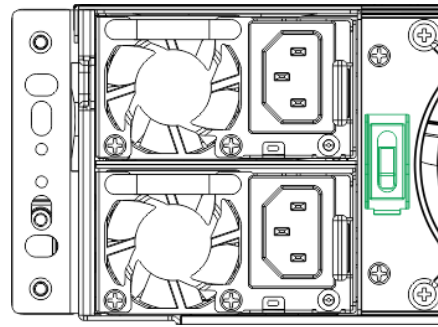
Although the system can operate with a failed PSU in a system, it is not recommended to run the system with a failed PSU for an extended period of time. The failed spare redundant PSU should be replaced as soon as possible!

To replace a PSU, follow these steps:

1. Turn the switch to the off position and unplug the power cord.

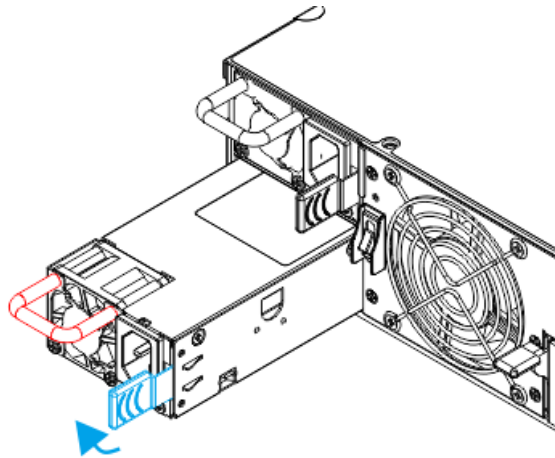


1U model



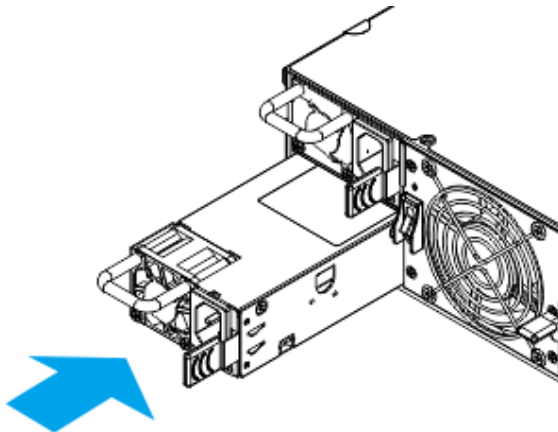
2U model

2. To remove the PSU module, flip the latch (shown in blue) and hold the handle (shown in red). Gently pull the PSU out from the system.



3. Insert the replacement module. Make sure the extraction handle is pointing outwards. Push the replacement PSU into the chassis, and when you feel the

contact resistance, push the PSU module and it should engage the back-end connectors.



4. Reconnect the power cord.
5. Power on the PSU module.



NOTE

If a cooling fan failed within a PSU, the whole PSU module will need to be replaced.

Replacing a Hard Drive



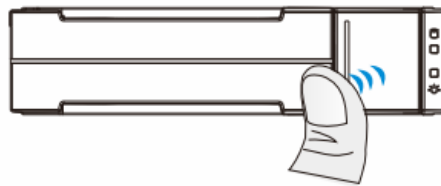
WARNING

Keep a replacement on hand before replacing the hard drive. Do not leave the drive tray open for an extended period of time or the internal airflow will be disrupted.

Handle the hard drives with extreme care. Carry them only by the edges and avoid touching their circuits part and interface connectors.

To replace a hard drive, follow these steps.

1. **Identify the drive tray.** Use the firmware utility, the management software, or the LED on the drive tray to identify faulty hard drive(s). The drive bays are numbered from left to right and from top to bottom.
2. **Open the drive tray.** Press the button. The spring handle will pop out.



3. **Remove the drive tray.** Pull the tray one inch away from the enclosure. Wait for at least 30 seconds for the disk drive to spin down, and then gently withdraw the drive tray from the chassis.
4. **Remove four retention screws** (two on each side). The screws secure the hard drive to the drive tray.

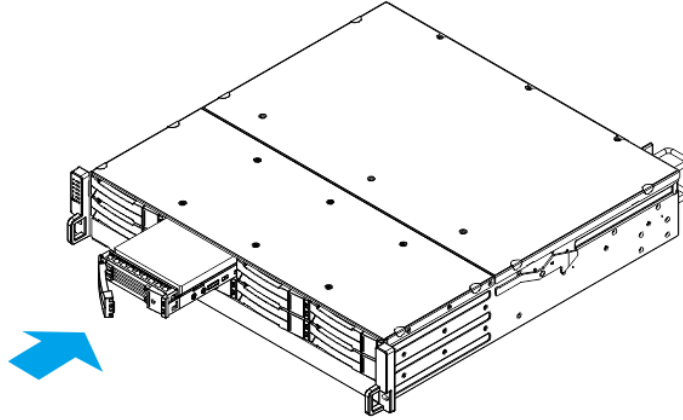


3.5 inch SATA HDD



2.5 inch SATA HDD

5. **Replace the drive.** After swapping the drive, fasten the retention screws back. Refer to screw locations in the previous step.
6. **Insert the drive tray back into the enclosure.** Install the drive tray with the front bezel open. When fully inserted, close the front bezel.



7. **Check for drive error.** Make sure that there is no more error reported.



Appendix

Technical Specifications

Power Supply

Input Voltage	Single-Controller model: 100VAC @ 10A 240VAC @ 5A with PFC (auto-switching)
Frequency	50 to 60Hz
Power rating	460W
DC Output	12.0V: 38A (Max.) 5.0VSB: 2A (Max.)
Input Frequency	50 to 60Hz
AC Input	100VAC @ 10A or 240VAC @ 5A with PFC
Power Factor Correction	Yes
Hold-up Time	At least 12ms at 115/230VAC full load after a loss of AC input
Over-temperature Protection	Auto shutdown when lost cooling or exceeded ambient temperature; over-voltage protection is also available.

*PSU specifications described above are general measurements and do not represent all models. For details, please refer to [specific model specifications](#).



Dimensions

1U series

Dimensions	Without chassis ears & protrusions
Height	43.5mm
Width	447mm
Length	450mm

2U series

Dimensions	Without chassis ears & protrusions
Height	159.3mm
Width	449mm
Length	450mm

Environment

Humidity	5 to 95% (non condensing – operating and non-operating)
Temperature	Operating: 5° to 40°C Non-operating: -40° to 60°C
Altitude	Operating: Sea level to 12,000ft Packaged: Sea level to 40,000ft
Shock (Half-sine)	Operating: 5G, half-sine, 11ms pulse width Non-operating: 15G, half-sine, 11ms pulse width
Vibration	(Random) Operating: 5~500Hz, 0.25Grms, X/Y/Z, 30mins Non-operating: 5~500Hz, 2.0Grms, X/Y/Z, 30mins (Sine) Operating: 5~500Hz, 0.2G, 0.5oct/min, X/Y/Z, 1sweep Non-operating: 5~500Hz, 1.0G, 0.5oct/min, X/Y/Z, 1sweep
Acoustic Noise	65dBA boundary, 60dBA normal

Certifications

Summary

Safety	UL 60950-1, 2nd Edition BSMI CNS 14336-1: 99 年版 CB IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013 EAC TP TC 004/2011, TP TC 020/2011
EMC	CE EN 55032:2012 +AC:2013 / EN61000-3-2:2014 / EN 61000-3-3: 2013 / EN 55024:2010+A1:2015 BSMI (CNS 13438) FCC (FCC Part 15,subpart B)
Environment	IEC 60068-2 MIL-STD-810E/883E ISTA ASTM-D3332 IPC-TM-650
Others	ISO7779/3744 RoHS Microsoft WHQL-Windows Server 2003

警告使用者：

這是甲類資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當對策

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