

Gateway E-842R SAS RAID

USERGUIDE



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Contents

CHAPTER 1

Introduction

- Overview
- The enclosure
- The plug-in modules

Overview



Important

Mixing of SAS and SATA drives in the same enclosure is only supported in columns, for example, column 1 is all SAS and column 2 is all SATA. Also, mixing of drives of different capacities in the same column is not supported.

The Gateway E-842R SAS Enclosure Platform is a 2U (rack space) disk drive enclosure, housing twelve low profile (1-inch high), 3.5-inch form factor hard drives, which can be either:

- 3 GB direct dock SAS disk drives,
- 3 GB direct dock SATA disk drives, or
- 3 GB dual path SATA disk drives through an active/active SATA mux transition card.

The system provides as much as 6 TB of data storage per enclosure when 500 GB drives are installed.



Expansion enclosure

RAID enclosure expansion is achieved by connecting expansion enclosures. Multiple enclosures are connected together using SAS patch cables. You can connect as many as five enclosures. For more information, see [“Enclosure cabling - multiple enclosures” on page 25](#).

The enclosure

The Gateway E-842R design concept is based on an enclosure subsystem together with a set of plug-in modules. The enclosure platform, as equipped, includes:

- Chassis and backplane with integrated (front panel mounted) operator’s panel.
- As many as 12 drive carrier modules, containing either:
 - 3 GB direct dock SAS disk drives,
 - 3 GB direct dock SATA disk drives, or
 - 3 GB dual path SATA disk drives through an active/passive SATA mux transition card.



Important

Dummy carrier modules must be fitted in all unused drive bays to maintain airflow. See [“Dummy carrier modules” on page 13](#).

- Two plug-in power supply modules, 100-240 V AC, 350 W.
- One plug-in cooling fan module.
- Two plug-in controller modules, each incorporating a RAID controller and a StorView Management Module.



Important

If only one controller module is installed, a blank module must be installed in the unused slot.

Enclosure chassis

The chassis consists of a sheet metal enclosure assembly containing a backplane printed circuit board (PCB) and module runner system.

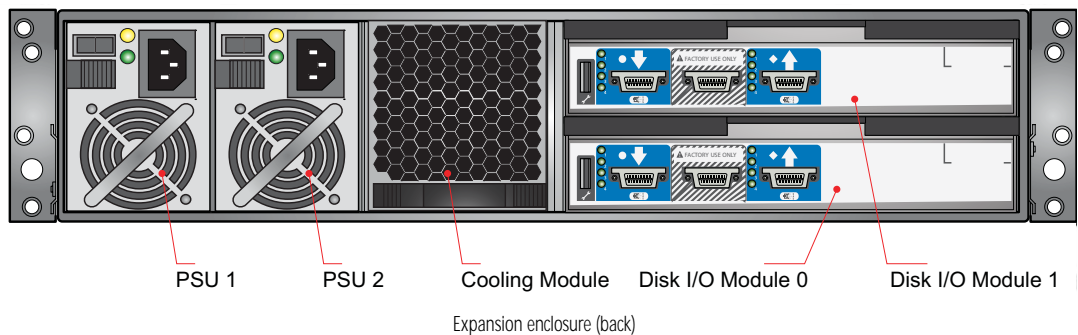
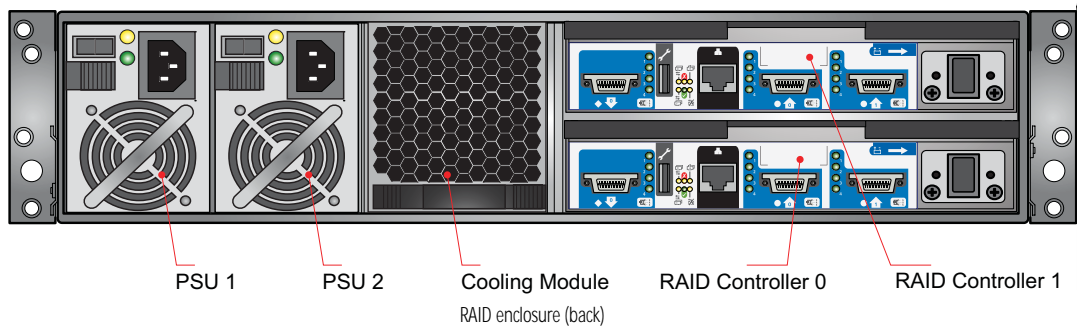
- The chassis front panel incorporates an integrated operator's (Ops) panel.
- The backplane PCB provides logic level signal and low voltage power distribution paths.
- The chassis has 19-inch rack mounting features so it fits into a standard 19-inch rack and uses 2 EIA units of rack space (3.5" high).



Important

A drive bay is defined as the space required to house a single 1.0" high, 3.5-inch disk drive in its carrier module.

The chassis assembly contains 12 drive bays at the front, each of which accommodates the appropriate plug-in drive carrier module. The 12 drive bays are arranged in 3 rows of 4 drives per row. In the back, the chassis assembly contains five plug-in module bays to house two power supply modules (PSUs), a cooling fan module, and two controller modules, which are installed horizontally (one above the other) in the right bay.



Operator's panel

The enclosure's front panel has an integrated operator's (Ops) panel with four LEDs. The Ops panel provides you with a high level indication of the operation of the enclosure. See ["Ops panel LEDs" on page 8](#) for details of the LED status conditions.



Caution

The Ops panel is an integral part of the enclosure assembly and cannot be replaced separately. To replace the Ops panel, you must replace the entire enclosure.

Enclosure replacement should only be performed by trained personnel.

Alarms

Visible alarms

The functional modules have associated status LEDs. The Ops panel shows a consolidated status for all modules. LEDs show constant green or blue to indicate good or positive status. Constant or flashing orange LEDs indicate the presence of a fault within that module.

LED	State	Description
Power On	Constant green	Good or positive status
System Fault	Constant orange: fault present	Indicates a problem with a power supply, cooling, or controller module. For more information, see the tables in "Power supply module LEDs" on page 13 , "Cooling Module LED" on page 13 , and "Controller module LEDs" on page 15 .
Logical Fault	Constant orange: fault present	Indicates failure of a drive module. The failing module is indicated by the Fault LED. For more information, see the table in "Drive carrier module faults" on page 16 .
Box Identity	Constant blue: enclosure identity	You can light this LED through the management interfaces to indicate which enclosure requires service actions.

See ["Ops panel LEDs" on page 8](#) for a description of the Ops panel LED states.

Audible alarms

The Gateway E-842R enclosure includes an audible alarm which indicates when a fault state is present. The following conditions activate the audible alarm:

- Fan fault
- Voltage out of range
- Over temperature
- Thermal overrun
- System fault
- Logical Fault
- Power supply module fault

When the audible alarm sounds, you can mute it by pressing the **Alarm Mute** button on the front panel. For more information, see [“Audible alarm mute”](#) on page 16.

The plug-in modules

A Gateway E-842R enclosure requires the following modules for normal operation:

- Two 350 W AC power supply modules.
- One cooling module.
- One or two controller modules.
- As many as 12 drive carrier modules.
- Dummy drive carrier modules, as required.



Important

No drive bays should be left completely empty. Dummy carriers or blank modules must be installed in all unused bays.

AC power supply module

Two, 100V-260 VAC 350 W power supply modules are supplied and mounted in the back of the enclosure as part of the enclosure's core product.



Power supply module input voltage operating ranges are nominally 115V or 230V AC, selected automatically.

Two LEDs mounted on the rear panel of the power supply module indicate the status of the module:

Power On & OK (Green)	Module Fault (Orange)	Status
Off	Off	No AC power (either power supply module)
Off	On	No AC power (this power supply module only)
On	On	Power supply module fault (over temperature, over voltage, over current, or power supply module fan fail)
On	Off	AC present, power supply module on and OK
On	On	Power supply module fan fault

Multiple power supply modules

In order to maintain the appropriate airflow, you must always operate the Gateway E-842R with two power supply modules installed. The two power supply modules operate together so if one fails, the other maintains the power supply and cooling while you replace the faulty module.

Module replacement should only take a few minutes to perform but must be completed within 10 minutes from removal of the failed module.

Cooling module

The cooling module provides system cooling, thermal monitoring, and control functions.

System airflow is from the front to the back of the enclosure:

- Cooling air passes over drives and through the midplane to a central air passage.
- The cooling module pulls air from the air passage and from the controller modules.



Important

The system must be operated with a low pressure rear exhaust installation (back pressure created by rack doors and obstacles not to exceed 5 pascals (0.5 mm water gauge)).

- The power supply modules pull cooling air from the air passage at the back of the enclosure.



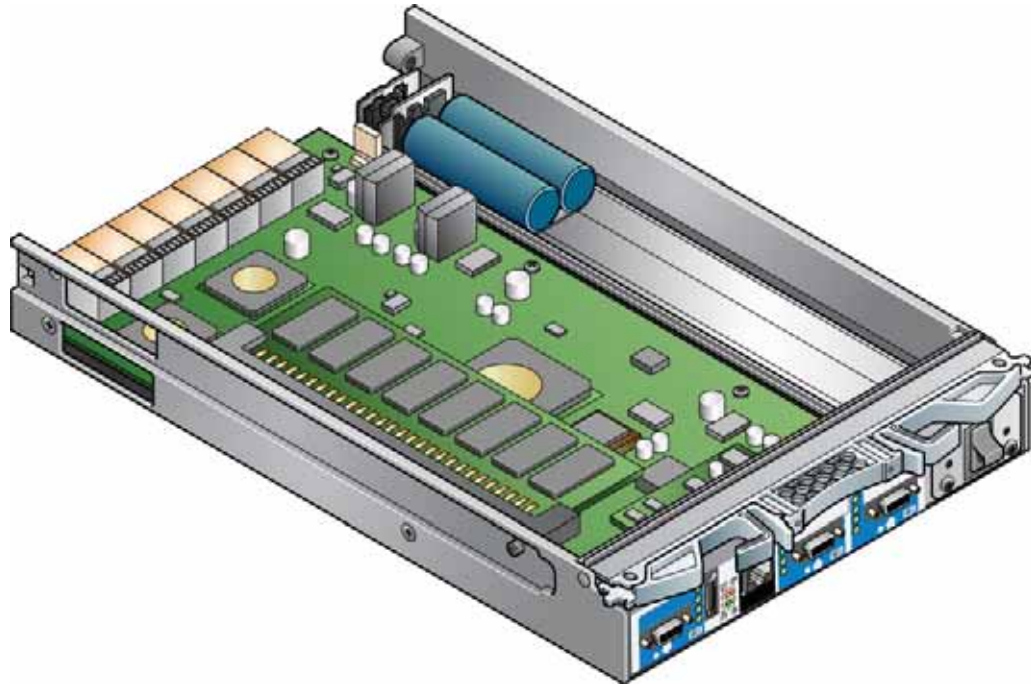
The module has an orange Cooling Module Fault LED.



LED status is described in the following table:

Module Fault (Orange)	Status
Off	Enclosure Off - Indicated by power supply module and controller module OK lights
Off	Enclosure On - Fan OK
On	Cooling module fan failure

Controller module



Caution

Operation of the enclosure with any modules missing disrupts the airflow and the drives do not receive sufficient cooling. All openings must be filled before operating the enclosure. When only one controller module is installed, a blank module must be installed in the vacant controller module slot at the rear of the enclosure to maintain airflow and ensure correct operation.



Important

Do not mix Disk I/O modules and RAID Controller modules in the same enclosure. Disk I/O modules are only installed in the expansion enclosure and RAID Controllers are only installed in the RAID enclosure.

One or two controller modules (depending on your configuration) are supplied and mounted in the back of the enclosure as part of the Gateway E-842R enclosure core product.

The plug-in controller modules have been designed for integration into the enclosure, providing external FC cable interfacing with the host computer system.

The backplane incorporates a connection to each of the SAS ports within the controller modules.

The controller module's internal processor monitors error conditions on each disk drive port. Processors housed on the controller modules provide enclosure management interfacing to devices on the backplane, power supply module, controller module, and Ops panel to monitor internal functions. These processors operate in a dual active configuration to allow failover.

The module incorporates LED indicators. For the location of the LED indicators, see ["Controller module LEDs" on page 8](#).

External ports

The RAID controller module has the following external ports:

- Two external (host) SAS ports that allow for fitting of Small Form-Factor Pluggable (SFP) modules, with auto-bypass at the output. Either or both of these SFP ports can be used to provide connection to the host controllers. Each host port operates at 3 Gb/s, giving an effective speed of 6 Gb/s. These ports are also backwards compatible with 2 Gb/s hosts.
- An SAS expansion port supports as many as four expansion enclosures through an SFF-8470 connector.

- An RJ45 10/100BaseT Ethernet port lets you connect the controller to a network to enable out-of-band management and monitoring using the embedded StorView GUI software.

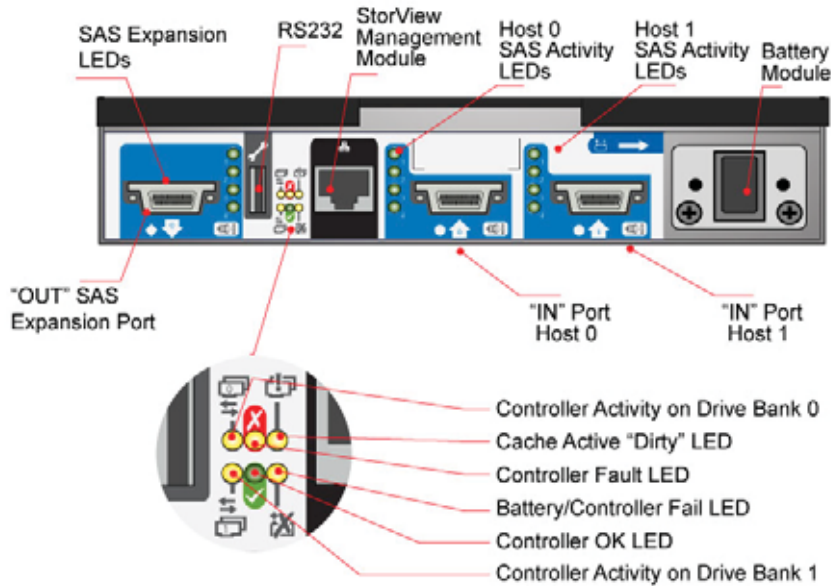
Important

Only shielded, Cat 5 (or better) cables should be used for connection to the Ethernet port for EMC performance.

- There is also an RS232 socket which provides an alternative user interface to the RJ45 connector.

Caution

Although the RS232 port is similar in appearance to a USB port, it requires a special cable and you should not attach a USB cable to it.



The recommended configurations are shown in ["Ethernet connection"](#) on page 24 and ["Enclosure cabling - multiple enclosures"](#) on page 25.

StorView Management software

The StorView Storage Management software which is embedded in the controller module is a full-featured, graphical, HTML-based software suite designed to configure, manage, and monitor the controller module storage solution. The module is configured with a base IP address to let you connect to it. See ["StorView Storage Management software"](#) on page 29 or the *Gateway E-842R StorView Storage Management Software User Guide* for further information.

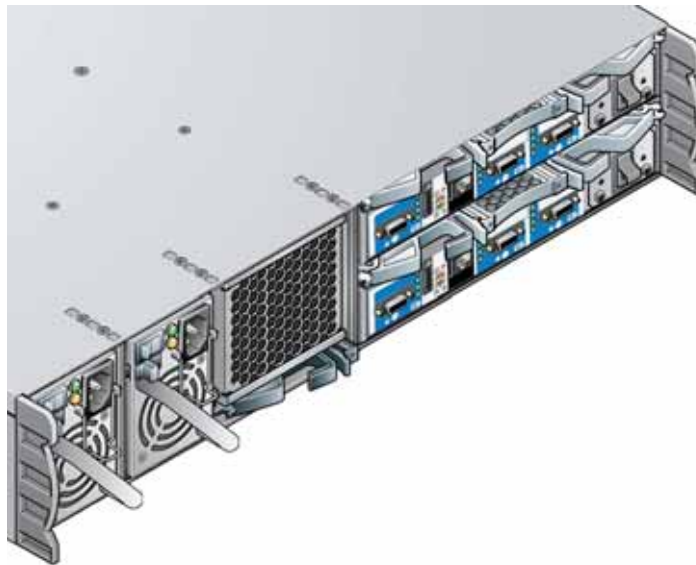
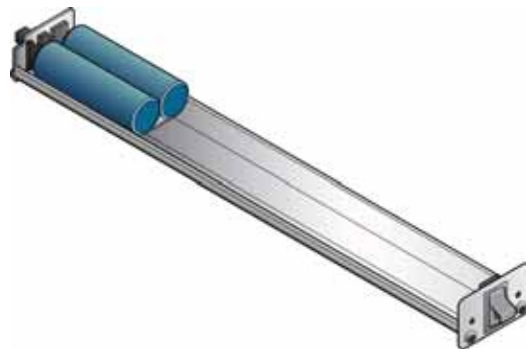
LED functions	LED state	Definition
Battery fault	Orange	When lit, this LED indicates that the backup battery unit is missing, has low voltage, has experienced a time-out on charge indicating a faulty battery, or has experienced a fault in the charging circuitry.
Cache active	Orange	When lit, this LED indicates that the RAID controller cache has data saved in memory but not written to the disk array.
Controller activity on drive bank 0	Orange	When lit, this LED indicates activity on the Bank 0 disk drives.
Controller activity on drive bank 1	Orange	When lit, this LED indicates activity on the Bank 1 disk drives.

Controller OK	Green	When lit, this LED indicates that RAID controller activity is normal.
Controller fault	Orange	When lit, this LED indicates that a RAID controller fault has occurred.
Ethernet status	Green	When lit, this LED indicates that the Ethernet port has a valid connection.
	Orange	When lit, this LED indicates that the Ethernet port has activity.
SAS activity	Green	When lit, these LEDs show I/O activity on the specific port lane indicated.

Battery module

Each controller module assembly includes a removable battery module (for the location, see ["Controller module" on page 8](#)). The battery module contains a replaceable Li-Ion battery pack, as shown in the following illustration. The battery pack protects the cache contents if the AC power fails. You can check the amount of battery time available through the Management Interface. The amount of time available is dependent on the amount of cache in the system.

See ["Battery module" on page 24](#) for removal and replacement procedures.



Disk I/O module

The expansion enclosure houses one or two Disk I/O modules. They provide the drive expansion for the RAID enclosure. When expanding the system, you may add up to four expansion enclosures. This will give you a total of five enclosures including the RAID enclosure. A fully loaded system will provide a total of 60 disk drives.

✓ Important

Do not mix Disk I/O modules and RAID Controller modules in the same enclosure. Disk I/O modules are only installed in the expansion enclosure and RAID Controllers are only installed in the RAID enclosure.

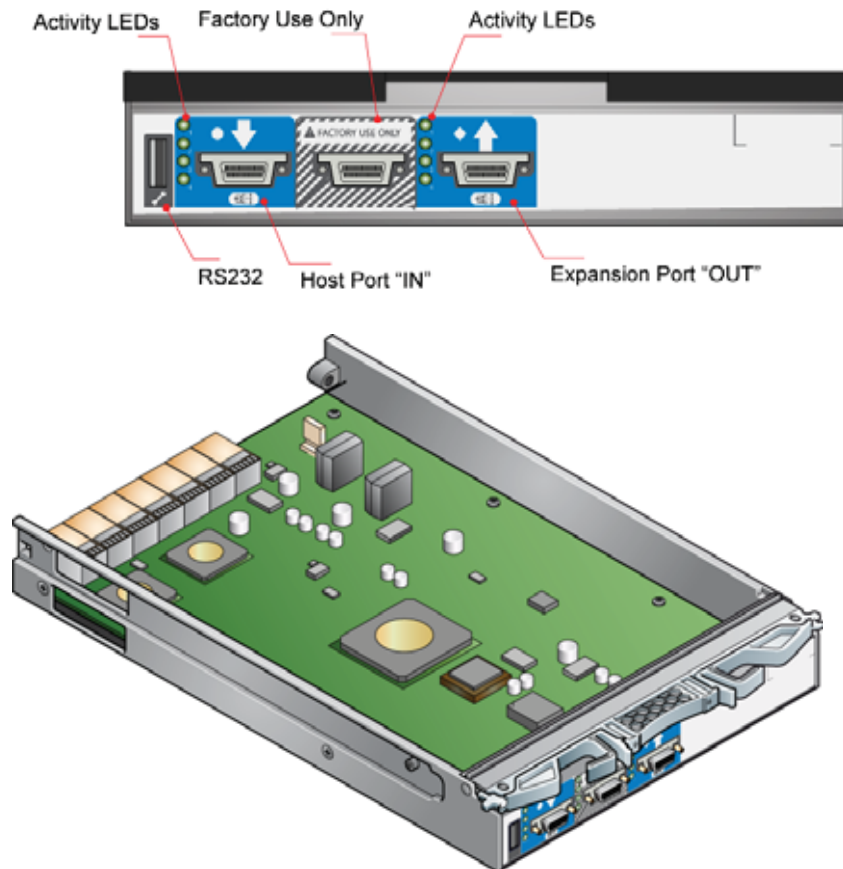
Processors housed on the Disk I/O modules provide enclosure management and an interface to the devices on the backplane, PSU, Disk I/O module and Ops panel, which monitor internal functions. These Disk I/O module processors operate in a master-slave configuration to allow for failover.

The enclosure may be configured with either one or two modules. If only one Disk I/O module is installed, a blank module must be installed in the unused bay.

Each SAS connector has four LEDs adjacent to the connector. The LEDs indicate I/O activity on that specific SAS port lane where each port has four lanes.

✓ Important

The OUT port on the RAID Controller or Disk I/O module connects to the IN port on the Disk I/O module in the next E-842R enclosure in a multiple enclosure configuration. See ["Enclosure cabling - multiple enclosures"](#) on page 25 for further information on enclosure expansion.



Drive carrier module

The drive carrier module comprises a hard disk mounted in a carrier. Each drive bay houses a single, low profile, 1.0-inch high, 3.5-inch form-factor disk drive in its carrier. The carrier has mounting locations for SAS or SATA drives.

The front cap also supports an ergonomic handle which provides the following functions:

- Inserting the carriers into the drive bays
- Removing the carriers from drive bays
- Positive “spring loading” of the drive/backplane connector
- An anti-tamper lock operated by a torx-socket type key



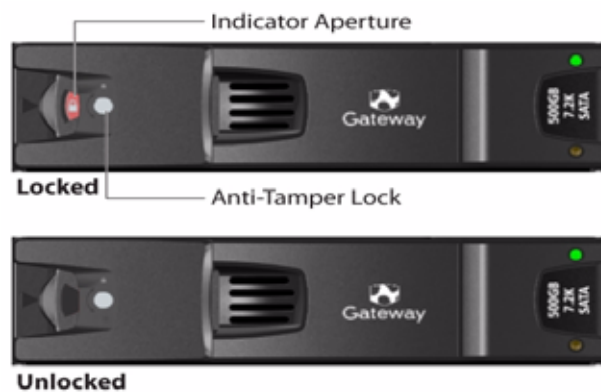
Drive status indicators

Each drive carrier has two LEDs, an upper (green) and lower (orange). In normal operation the green indicator is ON and flickers as the drive operates. The orange indicator is only ON if there is a drive fault. If the green LED is OFF when the orange LED is ON, a power control circuit failure is indicated.

Power On & OK (Green)	Module Fault (Orange)	Status
On	Off	Normal operation
On	On	Drive fault
Off	On	A power control circuit failure

Anti-tamper locks

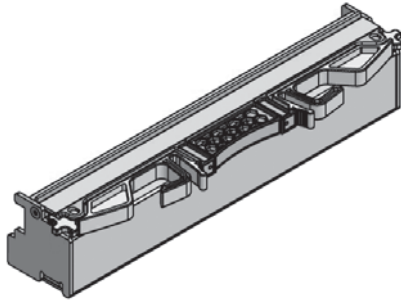
Anti-tamper locks are installed in the drive carrier handles and are accessed through the small cutout in the latch section of the handle. These locks are provided to disable the normal “pinch” latch action of the carrier handle.



Dummy carrier modules

Dummy carrier modules are provided for fitting in all unused drive bays. They are designed as integral drive module front caps and must be installed in all unused drive bays to maintain a balanced airflow.

Blank modules



Caution

Operation of the enclosure with any modules missing disrupts the airflow and the drives do not receive sufficient cooling. All openings must be filled before operating the enclosure.
When only one controller module is installed, a blank module must be installed in the vacant controller module slot at the rear of the enclosure to maintain airflow and ensure correct operation.



Important

Do not mix Disk I/O modules and RAID Controller modules in the same enclosure. Disk I/O modules are only installed in the expansion enclosure and RAID Controllers are only installed in the RAID enclosure.

CHAPTER 2

Getting Started

- Introduction
- Planning your installation
- Enclosure installation procedures
- Module installation
- Enclosure configuration
- Enclosure cabling - single enclosure
- Ethernet connection
- Enclosure cabling - multiple enclosures
- Drive slot arrangement
- Power cord connection
- Grounding checks
- Management interfaces

Introduction



Caution

When connecting the enclosure, use only the power cords supplied or cords which match the specification quoted in ["Specifications" on page 29](#).

This chapter explains how to install your enclosure into an industry-standard, 19-inch rack cabinet and configure the enclosure sub-system.

Planning your installation

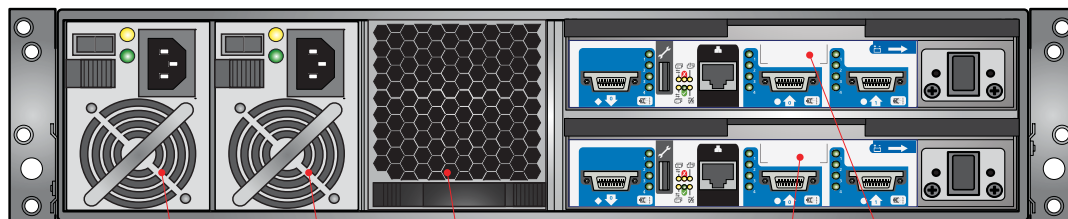


Caution

Blank modules or dummy carrier modules **MUST** be installed in ALL unused bays or the enclosure may overheat.

Before you begin installation, you should become familiar with the configuration requirements of your enclosure, detailed in the following table. The correct positions of each of the optional plug-in modules are shown in the illustration. See ["Ethernet connection" on page 24](#) and ["Enclosure cabling - multiple enclosures" on page 25](#) for details of controller module configurations.

Module	Location
Drive bays	All drive bays must have a drive carrier module or dummy drive carrier module installed. No bays should be left empty.
Power supply (PSU) modules	Two power supply modules must be installed. Full power redundancy is provided while a faulty module is replaced. Install the power supply modules in the left rear bays, as shown in the following illustration.
Cooling module	Install the cooling module in the rear bay, as shown in the following illustration.
Controller module	Two RAID controller modules (or one controller module and one blank module) can be installed, depending on the configuration you require. The modules are installed horizontally (one above the other) in the right rear bay.
Disk I/O module	Two Disk I/O modules (or one Disk I/O module and one blank module) can be installed, depending on the configuration you require. The modules are installed horizontally (one above the other) in the right rear bay.



PSU 1

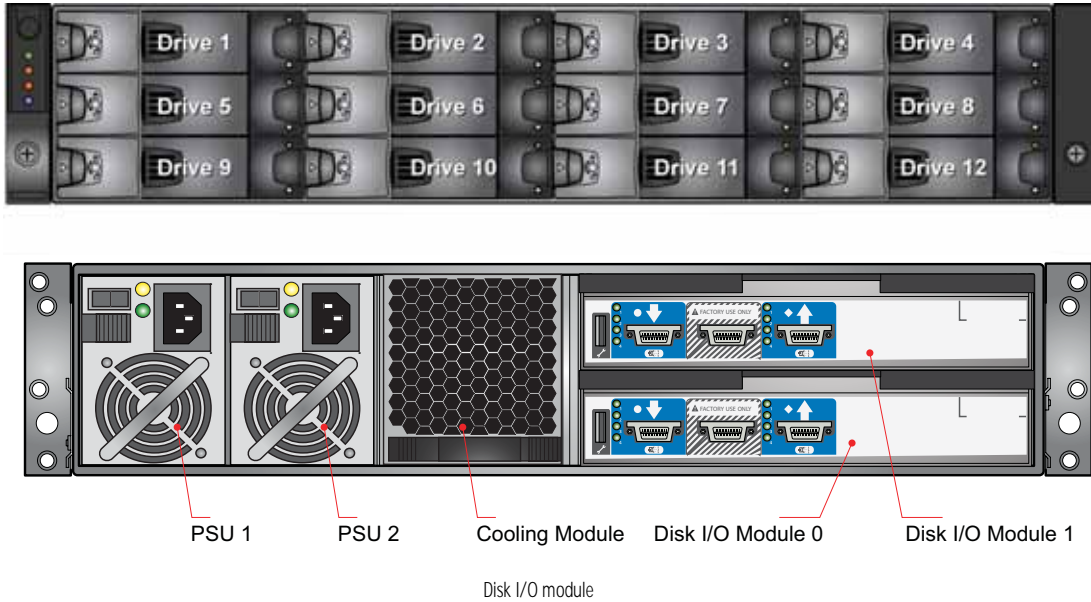
PSU 2

Cooling Module

RAID Controller 0

RAID Controller 1

Enclosure module



Enclosure drive bay numbering convention



Important

Drive carrier modules must always be installed in drive locations 1 and 12. This is the minimum configuration required for the system to operate and provide SES Management Services.

The enclosure drive bay numbering convention is shown in the illustration on [page 16](#). A drive bay is defined as the space required to house a single 1.0-inch high, 3.5-inch disk drive in its carrier module.

Drive carrier configuration



Important

Before you begin installation, you should become familiar with the configuration requirements of your enclosure. There must be a drive present in drive locations 1 and 12 to enable SES communications to operate. Installing drives in both of these bays provides redundant SES communication paths.

When planning your system configuration, remember that all enclosure drive bays must be filled with either a drive carrier or dummy drive carrier module. No bays should be left empty.

Enclosure installation procedures



Warning

An enclosure with all component parts installed is too heavy for a single person to safely install alone into a rack cabinet.

The following procedures describe the installation of an enclosure and highlight any critical requirements and good handling practices you should follow to ensure a successful installation.



Caution

Make sure that you wear a suitable anti-static wrist or ankle strap and observe all conventional ESD precautions when handling modules and components. Avoid contact with such things as backplane components and module connectors.

Preparing the site and host server



Important

The E-842R system supports most of the widely used operating systems. However, deployment on Microsoft Windows requires the .inf driver file which is found on the Gateway External Storage CD (ESCD). (For Windows Servers, insert the ESCD and install the .inf file.)

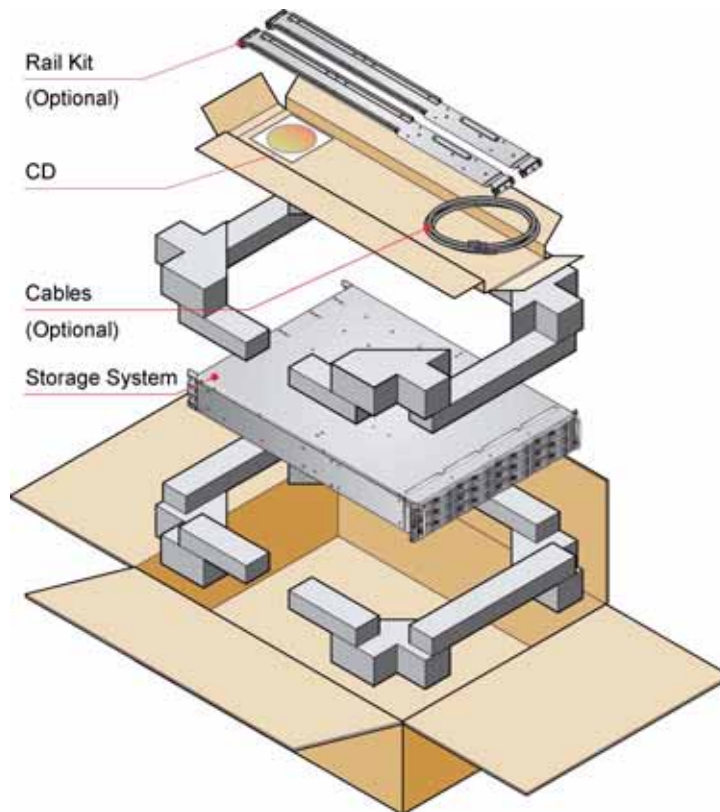
Before you begin, make sure that the site where you intend to set up and use your storage system has the following:

- Standard AC power from an independent source or a rack power distribution unit with a UPS (universal power supply).
- A host computer with a standard Fibre Channel HBA (host bus adapter) with the latest BIOS and drivers. Follow the instructions provided with your HBA and install the HBA and its driver software, if necessary.

Unpacking the enclosure system

The package contents and unpacking procedure are outlined in the following illustration.

The accessory box contains the AC power cord(s), a serial communication cord, and the software and the Gateway External Storage CD (ESCD). The accessory box insert contains the adjustable rail slides and hardware parts to rack mount the enclosure.



Rack installation prerequisites

The enclosure is designed for installation into an industry standard, 19-inch cabinet, capable of holding the unit.

- A minimum depth of 28 inches (700 mm) from the front flange to the back metalwork (excludes back cabling).
- Up to 70.5 lbs (32 kg) per enclosure, depending on configuration.
- A minimum gap of 1 inch (25 mm) of clearance between the rack cover and the front of the drawer, and 2 inches (50 mm) of rear clearance between the back of the drawer and the back of the rack is recommended, in order to maintain the correct airflow around the enclosure.
- The rack should have a maximum back pressure of 5 pascals (0.5 mm water gauge).

Rack mounting rail kit

A set of mounting rails is available for use in 19-inch rack cabinets. These rails have been designed and tested to handle the maximum enclosure weight and to ensure that multiple enclosures may be installed without loss of space within the rack. Use of other mounting hardware may cause some loss of rack space.

The rack mounting rail kit also incorporates a rear hold down mechanism to ensure shock and vibration immunity.

Contact Gateway Customer Care to make sure that suitable mount rails are available for the rack you are using.

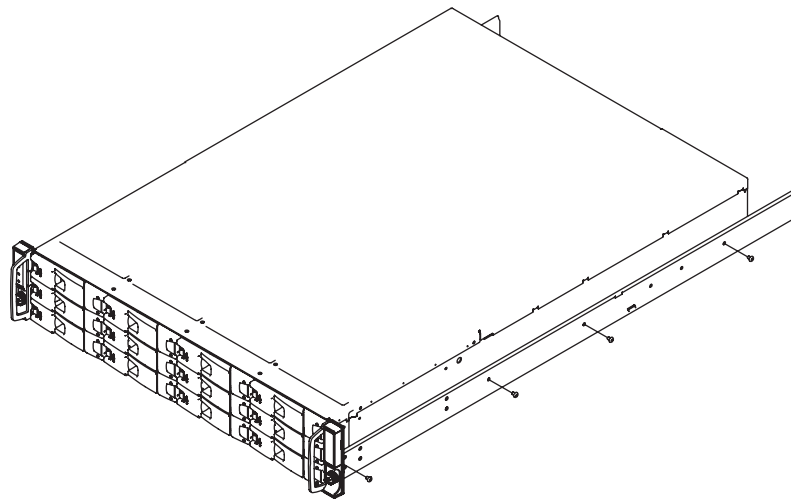
Rack installation procedure

See the detail drawings supplied with the rack mounting rail kit for additional information.

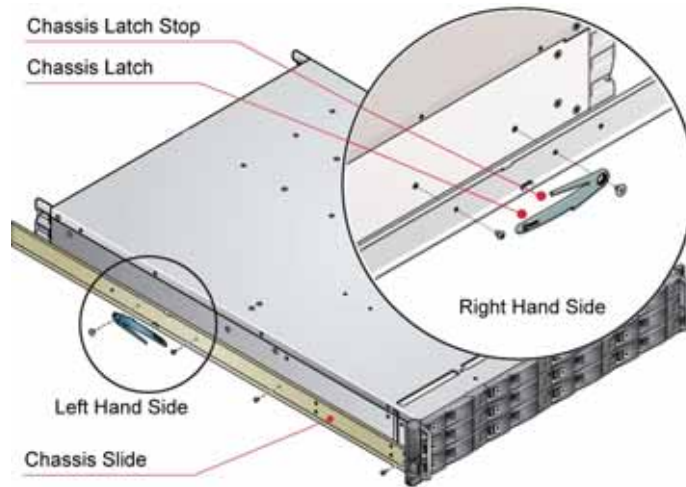
Installation procedure

► To install the rack mounting rail kit:

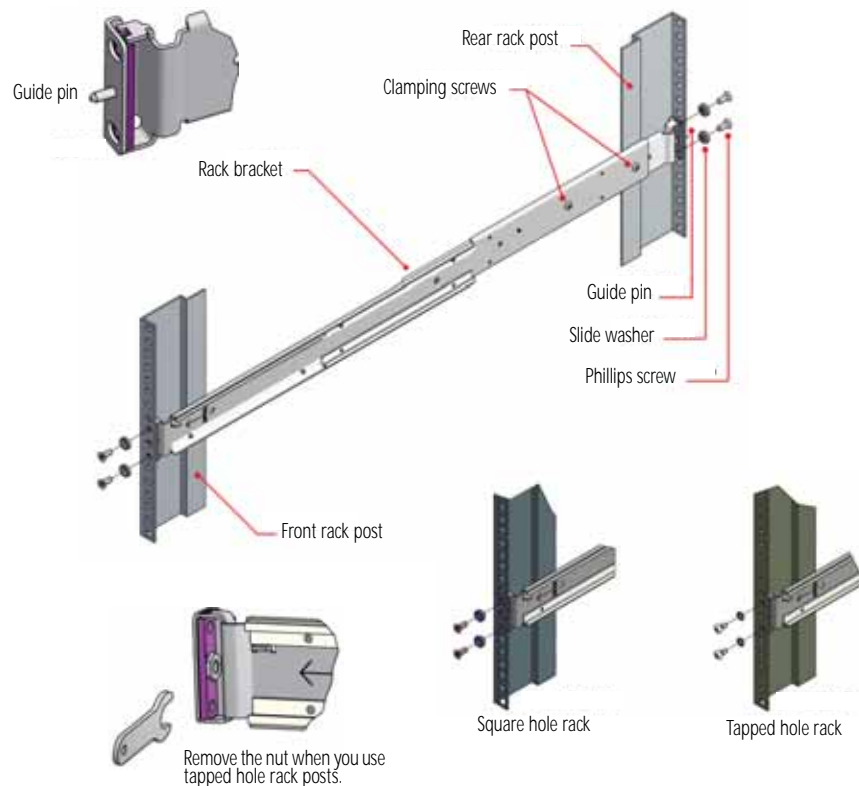
- 1 Attach left and right chassis slides to the enclosure sides using 8 M3x4 button head screws.



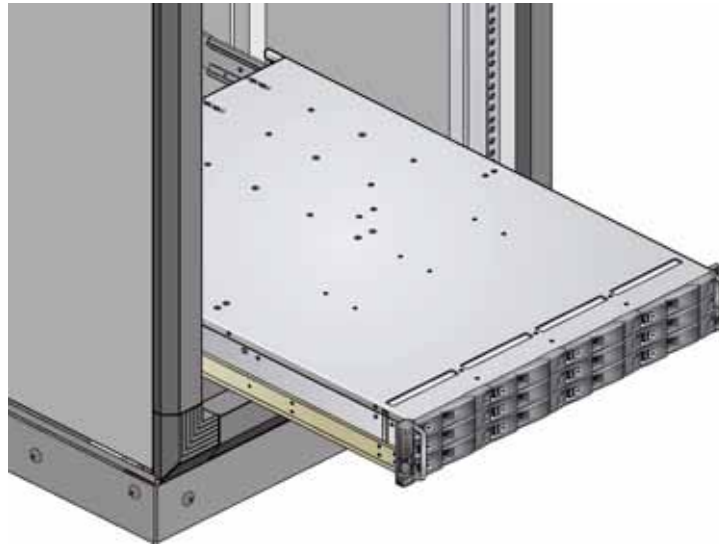
- 2 Assemble the left and right chassis latches using the special chassis latch screws. Make sure that the latch is orientated as shown in the following illustration, with the spring arm located against its stop (on the right side at the top, on the left side at the bottom).



- 3 Assemble the rack brackets to the rack posts as follows:
 - a Fit the location pin at the back of the rail into the rear rail post.
 - b Extend the rail to fit between the front and rear rack posts.
 - c Attach the rail to both the front and rear of the rack using the washers and screws supplied. The screws should be left loose enough to allow for sideways movement of the rail.
 - d Tighten the two clamping screws located on the inside of the rear section of the rack bracket.



- 4 Mount the enclosure in the rack as follows:
 - a Lift the enclosure and align it with the rack rails.
 - b Carefully insert the chassis slides into the rack rails and push it fully into the cabinet.
 - c Tighten the rear screws.
 - d Withdraw the enclosure until it reaches the hard stops (approximately 15.75 inches (400 mm)).
 - e Return the enclosure to the fully installed position and attach to the rack using the captive thumbscrews on the front flanges.



Module installation

The enclosure comes fully populated with all plug-in modules installed. For information on removal or replacement of plug-in modules, see [“Troubleshooting” on page 11](#).

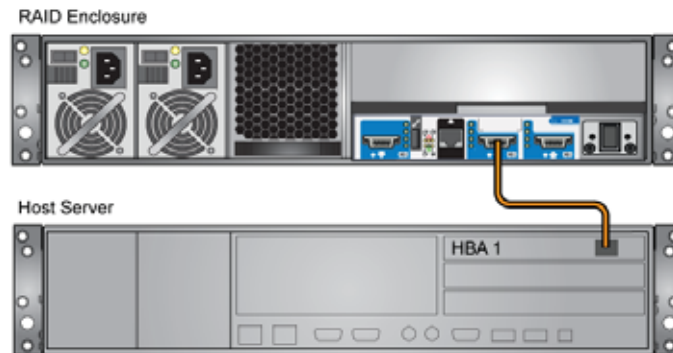
Enclosure configuration

Enclosures are configured with one internal domain of 12 drives per controller module.

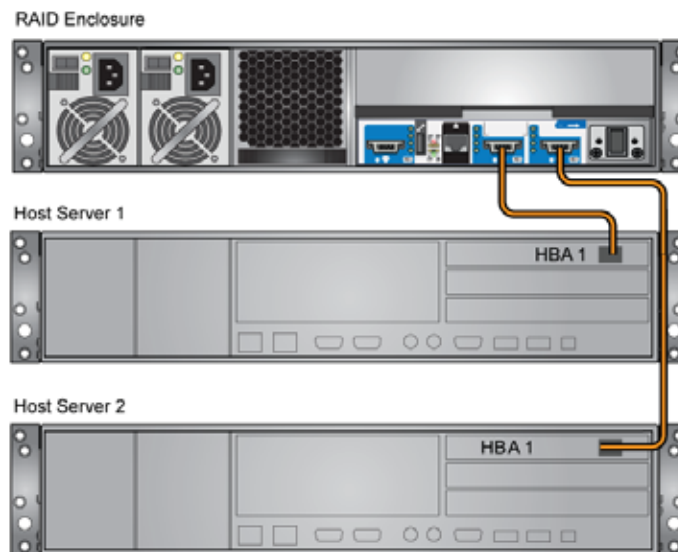
Enclosure cabling - single enclosure

The RAID controller module provides bi-directional connection between the host-side interface and the drives. The drives will not be presented to the Host until they are configured and mapped by the controller.

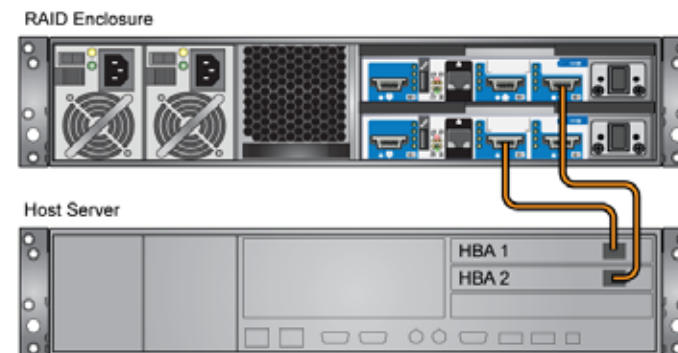
Each E-842R RAID controller module can be connected to up to two independent Host Bus Adaptors. Some typical configurations utilizing one or two RAID controller modules and either one or two HBAs are shown in the following.



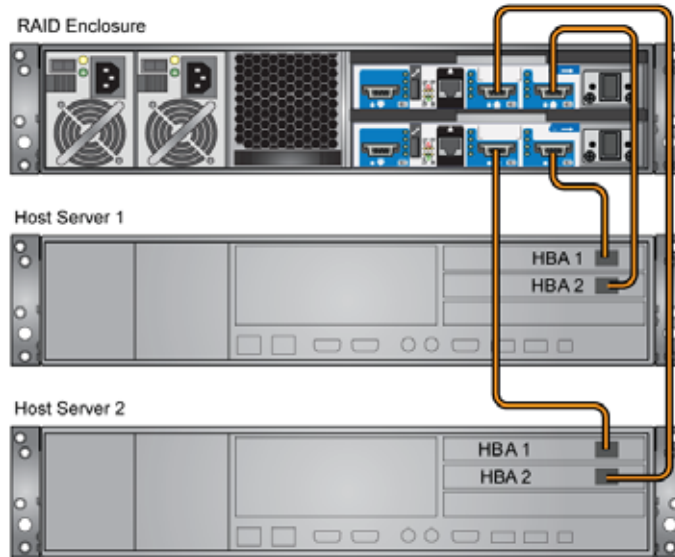
Single host, single HBA, and single controller connection



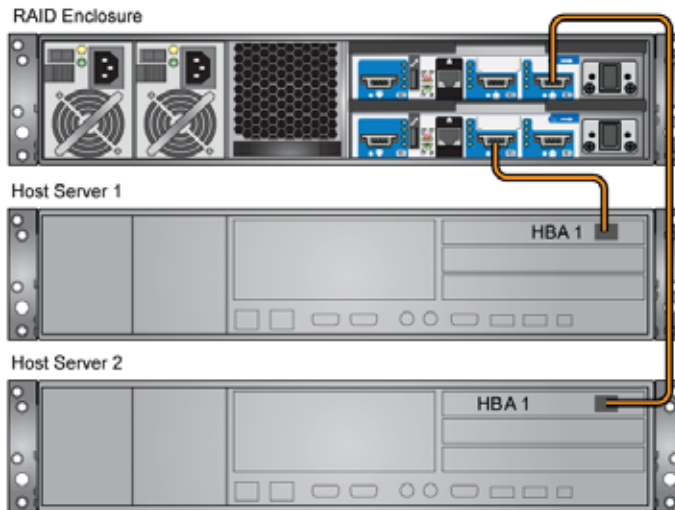
Dual host, single HBA, and single controller connections



Single host, dual HBAs, and dual controller connections



Dual hosts, dual HBAs, and dual controller connections



Dual host, single HBA, and dual controller connections

Ethernet connection



Important

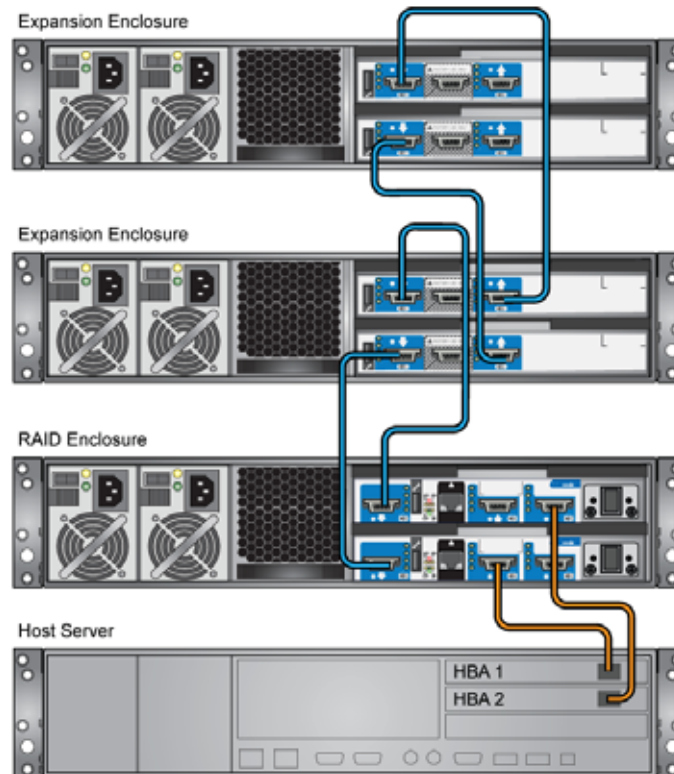
Only shielded Cat 5 (or better) cables should be used for connection to the Ethernet port for EMC conformance.

An RJ-45 10/100BaseT Ethernet port lets you connect the controller to a network to enable out-of-band management and monitoring using the Embedded StorView GUI software.

Make sure that the PC is connected either directly or through a switched LAN to the Ethernet.

Enclosure cabling - multiple enclosures

You can connect additional expansion enclosures to an E-842R RAID enclosure. Multiple enclosures are connected together using SAS patch cables, up to a maximum of five enclosures, including the RAID enclosure. A typical two-expansion enclosure configuration is shown below. To fully populate your installation to the maximum number of enclosures, follow the example below connecting the enclosures in the same fashion for each additional expansion enclosure.



Drive slot arrangement

Each enclosure has 12 drives which are referenced by their locations as shown in the following table. Drives are numbered column/row. For information on installing drive carrier modules, see ["Installing a drive carrier module" on page 27](#).

Column/row	1	2	3	4
1	Drive 1	Drive 2	Drive 3	Drive 4
2	Drive 5	Drive 6	Drive 7	Drive 8
3	Drive 9	Drive 10	Drive 11	Drive 12

Drive location rules

The E-842R storage enclosure supports two different types of disk drives, SAS and SATA. In order to allow optimal configurations to be built, the following rules should be observed:

Different drive types cannot be mixed in the same column.

- Slots 1, 5, 9 = column 1
- Slots 2, 6, 10 = column 2
- Slots 3, 7, 11 = column 3
- Slots 4, 8, 12 = column 4

To achieve optimum performance, drives should be populated in the following sequence:

- Initially—Slots 2, 6, and 10
- Then—Slots 3, 7, and 11
- Then—Slots 1, 5, and 9
- Then—Slots 4, 8, and 12

Drive Location Sequence (1)

Column/row	1/#	2/#	3/#	4/#
#/1	-	2	-	-
#/2	-	6	-	-
#/3	-	10	-	-

Drive Location Sequence (2)

Column/row	1/#	2/#	3/#	4/#
#/1	-	2	3	-
#/2	-	6	7	-
#/3	-	10	11	-

Drive Location Sequence (3)

Column/row	1/#	2/#	3/#	4/#
#/1	1	2	3	-
#/2	5	6	7	-
#/3	9	10	11	-

Drive Location Sequence (4)

Column/row	1/#	2/#	3/#	4/#
#/1	1	2	3	4
#/2	5	6	7	8
#/3	9	10	11	12

If you need to change drive technology, a new column of drives should be populated.

Column/row	1/#	2/#	3/#	4/#
#/1	-	SAS 2	SATA 3	-
#/2	-	SAS 6	SATA 7	-
#/3	-	-	SATA 11	-

All members of the column should have the same drive type.

Drive start

With two active power supply modules installed (required), all drives start immediately.

Activating the anti-tamper locks

The anti-tamper locks are installed in the drive carrier handles and are accessed through the small cutout in the latch section of the handle.

Drives are supplied with the locks set in the locked position.



Important

You cannot install a drive carrier if its anti-tamper lock is activated before installing it into the enclosure.

► To activate the locks:

- 1 Carefully insert the provided lock key into the cutout in the handle.
- 2 Rotate the key clockwise until the indicator is visible in the opening beside the key.



- 3 Remove the key.
- 4 To deactivate the lock, rotate the key counter-clockwise until the indicator is no longer visible in the opening beside the key.

■

Power cord connection

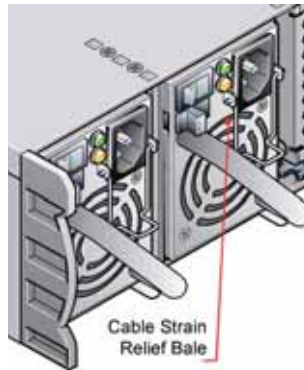


Caution

Before turning on the enclosure, carry out the grounding checks detailed in "Grounding checks" on page 28.

► To attach the power cord:

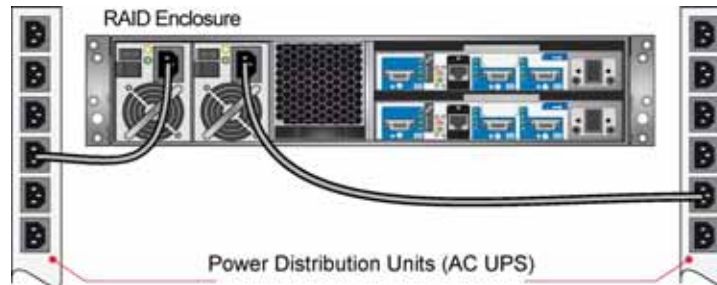
- 1 Attach the power cords to the power supply modules. The cable strain relief bale fits over and onto the power cord. Lift the bale up first, insert the cable, and secure the bale onto the power cord.



Caution

The power connections must always be disconnected prior to removal of the power supply module from the enclosure.

- 2 Attach the power cord to the power distribution unit in the rack or other power source.



- 3 A Power On LED on the Ops panel indicates whether AC power is present.

Grounding checks

Perform these checks to make sure that a safe grounding system is provided.

- If a rack distribution system is being used.
 - Make sure that power is removed from the rack.
 - Connect the power cord to the rack distribution system and the enclosure.
- If a direct connection is made with the power cord, make sure that it is connected to the enclosure.



Caution

Some electrical circuits could be damaged if external signal cables or power control cables are present during the grounding checks.

- Check for continuity between the earth pin on the IEC 320 connector on one of the power supply modules and any exposed metal surface of the enclosure.

Management interfaces

The following management interfaces are used to configure, manage, and monitor the controller module storage solution.

StorView Storage Management software

StorView Storage Management software is a full-featured, graphical, HTML-based, software suite designed to configure, manage, and monitor the controller module storage solution.

StorView provides a centralized local and remote management tool to control primary storage assets vital to ensuring maximum data reliability, network up-time, and system serviceability. This tool also lets you manage and monitor the storage system from a host running StorView locally and from a Web browser across the intranet or Internet.

StorView includes the StorView Server which runs as a background service and is responsible for managing the installed modules.

The StorView Server discovers system storage devices, manages and distributes message logs, and communicates with other StorView Servers installed on the same local and external subnet networks.

A GUI provides the interface in an HTML-based front end which is accessed using a Web browser.

The software incorporates a Web server, Apache 2.0, that provides the interface between the StorView Server and GUI. During installation, the Web server is automatically configured.

For more information, see the *Gateway E-842R StorView Storage Management Application User Guide*.

RAID controller configuration utility

The controller module firmware-based programs are accessed through a VT-100 terminal or emulation.

VDS

Introduction

VDS (Virtual Disk Service) is a feature of Microsoft Windows Server 2003. It provides a consistent interface for managing storage devices and creating volumes.

The Gateway Hardware Provider for VDS enables Virtual Disk Service to be used with the E-842R RAID controller.

System requirements

Use of the Gateway Hardware Provider for VDS requires the following:

Hardware:

- An enclosure with an E-842R controller.

Operating System:

- Windows Server 2003 R2 only.

Software:

- A VDS client (optional)
- The Microsoft utility programs Storage Manager for SANs (optional) and DiskRAID (optional).

Installation

If the VDS service is running, it is stopped automatically while the provider is installed.



Important

The Gateway Hardware Provider for VDS can be installed on a system that already has VDS providers from other vendors. Likewise, other VDS providers can be installed after Gateway's without any conflict.

► To install the hardware provider for VDS:

- 1 Double-click the installer executable.
- 2 Read the license agreement, then click **I Agree** to accept to the terms and conditions.
- 3 Choose a destination folder for the application (or accept the default), then click **Install**.
- 4 When you are prompted that the installation is finished, click **Close** to close the installation window.



Starting the VDS service

The VDS service starts automatically when a client attempts to access it. However, under some circumstances, you may need to manually start the VDS service.

► To start the VDS service:

- 1 Click **Start, Control Panel, Administrative Tools**, then click **Services**.
- 2 Select **Virtual Disk Services** from the list, then click **Start**.



Using VDS

VDS is a Microsoft standard method for managing storage devices. Therefore, you should refer to the official Microsoft documentation at:

<http://www.microsoft.com/windowserversystem/storage/storservices.mspx>

The VDS Technical Reference is also available from Microsoft at:

<http://technet2.microsoft.com/WindowsServer/en/Library/1dbc6c24-1477-4f73-a0ae-57b4e90808d81033.mspx>

Additional documentation is available from the SDK.

Two helpful tools exist for making use of VDS:

- *DiskRAID* is a test tool that can be used to interface with VDS. It is included with the VDS SDK and can also be downloaded from Microsoft or found in the Resource Kit Tools.
- *Storage Manager for SANs* is a program for managing storage area networks that comes as part of Windows Server 2003.

► To install Storage Manager for SANs:

- 1 In the *Windows Control Panel*, click **Add or Remove Programs**, then click **Add/Remove Windows Components**.
- 2 Select **Management and Monitoring Tools** from the list, then click **Details**.
- 3 Click the **Storage Manager for SANs** box, then click **OK**. Follow the on-screen instructions.



Supported VDS functions

The following VDS functions are supported by the Gateway Hardware Provider for VDS:

Object	Method name
IEnumVdsObject	Clone Next Reset Skip

Object	Method name
IVdsAsync	QueryStatus Wait
IVdsController	GetPortProperties GetProperties GetSubSystem Reset SetStatus QueryAssociatedLuns Initialize (internal)
IVdsControllerControllerPort	QueryControllerPorts
IVdsControllerPort	Initialize (internal) GetController GetProperties
IVdsDrive	GetProperties GetSubsystem ClearFlags SetFlags SetStatus Initialize (internal)
IVdsHwProvider	QuerySubSystems Reenumerate Refresh
IVdsHwProviderPrivate	QueryIfCreatedLun
IVdsHwProviderType	GetProviderType
IVdsLun	GetProperties GetSubsystem Initialize (internal) QueryHints QueryMaxLunExtendSize QueryPlexes Delete Extend SetStatus ("offline" and "online" only) SetMask GetIdentificationData
IVdsLunControllerPorts	AssociateControllerPorts QueryActiveControllerPorts
IVdsLunNaming	SetFriendlyName
IVdsLunPlex	GetLun GetProperties QueryExtents QueryHints
IVdsMaintenance (controller)	PulseMaintenance StartMaintenance StopMaintenance
IVdsMaintenance (c-port)	PulseMaintenance StartMaintenance StopMaintenance
IVdsMaintenance (drive)	PulseMaintenance StartMaintenance StopMaintenance

Object	Method name
IVdsMaintenance (lun)	PulseMaintenance StartMaintenance StopMaintenance
IVdsMaintenance (subsystem)	PulseMaintenance StartMaintenance StopMaintenance
IVdsProvider	GetProperties
IVdsProviderPrivate	GetObject OnLoad OnUnload
IVdsProviderSupport	GetVersionSupport
IVdsSubSystem	GetDrive GetProperties GetProvider QueryControllers QueryDrives QueryLuns QueryMaxLunCreateSize Reenumerate SetControllerStatus Initialize (internal) CreateLun
IVdsSubSystemNaming	SetFriendlyName

Known issues and limitations

The following issues and limitations are present in the current release of the Gateway Hardware Provider for VDS:

- Flashing of drive LEDs cannot be turned off - they can only be set to flash for a specific time period.
- The following limitations relate to the *SetFriendlyName* method in the "IVdsSubSystemNaming" object:
 - The subsystem cannot be given a friendly name until at least one LUN has been created.
 - If the subsystem is renamed without any other configuration being present, the subsystem will retain the default name.
 - If the subsystem has been renamed, then all LUNs are deleted, the subsystem name will revert back to the default name.
- When using the *Extend* method in the "IVdsLun" object, if there is insufficient space on the existing array, a whole new array will be created in the background on which to expand the LUN.

Existing arrays cannot, in themselves, be extended. This has the following implications:

- RAID 5 arrays have to be extended by a minimum of 3 drives.
- RAID 1 arrays have to be extended by an even number of drives.

If there are an insufficient number of drives or if an incorrect number of drives is explicitly specified, an invalid argument error occurs.

- There are minimum allowable chunk sizes for RAID 0 and RAID 1 arrays (RAID 5 arrays have no restrictions):

RAID 0:			
Number of Drives	1 or 2	3	4 or more
Minimum Chunk Size	256K	128K	64K
RAID 1:			
Number of Drives	2 or 4	6	8 or more
Minimum Chunk Size	256K	128K	64K

Stripe size = (chunk size) x (number of non-parity drives in the array).

CHAPTER 3

Operation

- Before you begin
- Power on
- Starting the drives
- Starting StorView
- Power down

Before you begin

Before turning on the enclosure, make sure that all the modules are firmly seated in their correct bays.

Power on



Caution

Do not operate this equipment until the ambient temperature is within the specified operating range. If the drives have been recently installed, make sure that they have time to acclimatize before operating them.



Important

See [“Ops panel LEDs” on page 8](#) for details of the Ops panel LEDs and related fault conditions.

► To turn on the enclosure:



Important

The Power On LED on the Ops panel should be lit green at power up to indicate that the system is functioning correctly. All other Ops panel LEDs are off. If any LEDs show orange, a problem exists and the procedures in [“Troubleshooting” on page 11](#) should be followed.

- 1 Connect AC power cables to the power distribution units (*PDU*s).
- 2 Connect AC power cables from the PDUs to the power supply modules.

When the enclosure is turned on, the Power On LED on the Ops panel lights green and the disk drives start.



Important

If AC power is lost for any reason, the enclosure re-starts automatically on restoration of power.

Power supply module LEDs

The power supply modules have 2 LEDs.

- Under normal conditions, the green Power On LED stays on continuously.
- If a problem occurs, the orange Module Fault LED turns on.

The LED states are detailed in [“Power supply module LEDs” on page 13](#).

Ops panel LEDs

The Ops panel LEDs are shown in [“Ops panel LEDs” on page 14](#).

Controller module LEDs

The controller module LEDs status conditions are defined in [“Controller module LEDs” on page 15](#).

Cooling module LEDs

The cooling module LEDs status conditions are defined in [“Cooling Module LED” on page 13](#).

Disk I/O module LEDs

The disk I/O module LEDs status conditions are defined in [“Disk I/O module LEDs” on page 15](#).

Starting the drives

Unless otherwise selected during installation, all drives in the enclosure should start automatically. If they do not start, there may be a power problem (an alarm and power fault indication would normally be active).

Disk drive LEDs

Each drive carrier incorporates two indicators, an upper (green) and lower (orange).

- In normal operation, the green LED is ON and flickers as the drive operates.
- The orange LED is OFF in normal operation. It is only ON if there is a drive fault.
- If the green LED is OFF when the orange LED is ON, a power control circuit failure is indicated.

Starting StorView

At start-up, embedded StorView looks at the user preferences settings to determine if an IP address exists. If one is defined, StorView initializes the network interface using that IP address. In the event an IP address is not defined, StorView attempts to get a DHCP IP address. You need to contact your network administrator for the IP address assigned by the DHCP server. To identify the new IP address, you can look for *esv0* or *esv1* in your DHCP manager software. If an IP address cannot be determined, StorView uses a default IP address of *10.1.1.5* for controller 0 and *10.1.1.6* for controller 1. If an error is encountered, it assigns the embedded StorView server the IP address *10.1.1.7*.

The first time you start StorView, you need to configure the network settings. On the first startup, you are prompted for a user name and password. The default user name is *admin* and the default password is *password*. You should change your password to protect your array. See the *Gateway E-842R StorView Storage Management Software User Guide* for additional information.

Power down

You can turn off the enclosure at any time. If cached contents are present (look at the Cache Active LED on the controller module), they are saved by the internal battery. If the enclosure is left in this state for extended periods, the batteries discharge and the cached data is lost. Therefore, we recommend that you shut down the controller prior to powering off the enclosure, especially if the unit is to be powered down for an extended period. This ensures that the cache is flushed to disc and prevents the battery from being discharged. Discharged batteries may also result in reduced performance when the array is again powered up, because the write-back cache is disabled until the batteries are fully charged.

► To power down the enclosure:

- 1 Shut down the controller through the GUI interface. For more information, see the *Gateway E-842R StorView Storage Management Software User Guide*.
- 2 Disconnect AC power at the power source.
 -

CHAPTER 4

Troubleshooting

- Overview
- Status indicator LEDs
- Audible alarm
- Drive carrier module faults
- Troubleshooting
- Hardware faults
- Continuous operation during replacement
- Replacing a module
- Power supply modules
- Drive carrier module
- Telephone support

Overview

The Gateway E-842R enclosure includes a processor and associated monitoring and control logic to enable it to diagnose problems within the enclosure's power, cooling, and drive systems.

The sensors for power and cooling conditions are housed within the power supply modules. There is independent monitoring for each unit.

If a fault is indicated on the Ops panel, see the table in ["Ops panel LEDs" on page 14](#).

Initial start-up problems

Faulty cords

First make sure that you have wired up the subsystem correctly. Then, call Gateway Customer Care for a replacement if:

- Cords are missing or damaged
- Plugs are incorrect
- Cords are too short

Alarm sounds on power up

See ["Audible alarm" on page 15](#).

Green "Signal Good" LED on controller module is not lit

- Make sure that the SAS cables are properly connected.
- Try removing and re-inserting the suspect RAID controller.
- If the Fault LED is lit there are a few steps you can take to attempt to diagnose the problem:
 - Connect the cable to the RS232 port and to your COM port or terminal. In your terminal window, access the RAID Configuration Utility (RCU) and examine the event log to determine if an event occurred. If an event is listed, refer to the *VT-100 RAID Configuration Utility User Guide* for an explanation of the event. Perform the necessary troubleshooting from known information.
 - Try power cycling the enclosure while monitoring the boot process from the terminal. Refer to the *VT-100 RAID Configuration Utility User Guide - Monitor Mode*.
 - If you are still unable to capture and examine the boot process to determine the cause, contact Gateway Customer Support. Refer to the *VT-100 RAID Configuration Utility User Guide*.

Your computer does not recognize the enclosure

- Make sure that the interface cables from the enclosure to the host computer are connected correctly.
- Make sure that all drive carrier modules are correctly installed and that the LEDs on all installed drive carrier modules are lit green. Note that the drive LEDs are not be lit during drive spinup.
- Make sure that there is activity on the SAS connector activity LEDs. Also check for Controller OK LEDs on both the upper and lower RAID controllers.

- Check the controller module setup as follows:



Important

For details on how to remove and replace a plug-in module, see ["Replacing a module" on page 19](#).

- Make sure that the controller module has been correctly installed and all external links and cables are connected securely.
- Make sure that the maximum cable length has not been exceeded.
- Make sure that the RAID controller module is correctly set up at the Management Interface.

Status indicator LEDs

- Green LEDs are always used for good or positive indication.
- LEDs flashing green or orange indicate that non-critical conditions exist.
- Solid orange LEDs indicate there is a critical fault present within the module.

Power supply module LEDs

The Power Supply LED states are detailed in the following table.

- Under normal conditions, the Power On LED should be lit constant green.
- If a problem is detected, the Module Fault LED lights constant orange.

Power On & OK (Green)	Module Fault (Orange)	Status
Off	Off	No AC power (either power supply module)
Off	On	No AC power (this power supply module only)
		Power supply module fault (over temperature, over voltage, over current) Power supply module fan fail
On	Off	AC present, power supply module on and OK
On	On	Fan fault

Cooling Module LED

The Cooling module has a Module Fault LED (orange), defined in the following table:

Status	Module Fault (orange)
Enclosure On - Fan OK	Off
Fan fail	On

Ops panel LEDs

**Important**

The Ops panel is supplied as an integral part of the enclosure core product and is not user replaceable.

The Ops panel displays the overall status of all the modules. The Ops panel LEDs are described in the following table.



Ops panel LEDs				Other associated LEDs or alarms	State description
Power On (Green)	System Fault (Orange)	Logical Fault (Orange)	Box Identify (Blue)		
On	On	On	On	Single beep, two double beeps	Power On Self Test
On	Off	Off	X		Power On, all functions good
On	On	X	X	Power supply module Fault LED or Cooling Module Fault LED	Any power supply module fault or fan fault Over or under temperature
On	On	X	X	RAID Controller Fault LED	A RAID controller fault
On	X	On	X	Drive Fault LED	A drive failure has occurred, causing loss of availability or redundancy.
On	X	On	X		Array is performing a background function, such as parity check, initialization, or expansion.
X	X	X	On		Enclosure identification mode. When lit, it identifies a specific enclosure.

"X" = no bearing on these states

Controller module LEDs

For details on how to remove and replace a controller module see [“Controller module” on page 22](#).
The controller module incorporates the following LED indicators:

LED functions	LED state	Definition
Battery fault	Orange	When lit, this LED indicates that the backup battery unit is missing, has low voltage, has experienced a time-out on charge, indicated a faulty battery, or has experienced a fault in the charging circuitry.
Cache active	Orange	When lit, this LED indicates that the RAID controller cache has data saved in memory but not written to the disk array.
Controller activity on drive bank 0	Orange	When lit, this LED indicates activity on the Bank 0 disk drives.
Controller activity on drive bank 1	Orange	When lit, this LED indicates activity on the Bank 1 disk drives.
Controller OK	Green	When lit, this LED indicates that RAID controller activity is normal.
Controller fault	Orange	When lit, this LED indicates that a RAID controller fault has occurred.
Ethernet status	Green	When lit, this LED indicates that the Ethernet port has a valid connection.
	Orange	When lit, this LED indicates that the Ethernet port has activity.
SAS activity*	Green	When lit, these LEDs show I/O activity on the specific port lane indicated.

* These LEDs blink on and off when there is module activity.

Disk I/O module LEDs

LED Functions	Description
SAS Activity	These LEDs are adjacent to the SAS connectors. When lit, they indicate I/O activity on a specific port lane (4 lanes).

Drive carrier LEDs

See [“Drive carrier module faults” on page 16](#).

Audible alarm

The enclosure subsystem includes an audible alarm which indicates when a fault state is present. The following conditions activate the audible alarm:

- Fan fault
- Voltage out of range
- Over temperature
- Thermal overrun
- System fault
- Logical fault
- Power supply module fault

Audible alarm mute

When the audible alarm sounds, you can mute it by pressing the alarm mute button, located on the enclosure's front panel. Automatic muting takes place after two minutes if you do not press the alarm mute button.

When the alarm is muted, it continues to sound with short intermittent beeps to indicate that a problem still exists. The alarm turns off when all problems are cleared. (See ["Thermal warnings" on page 18](#)).

LED test mode

You can also use the alarm mute button to activate the self- test feature for the LEDs on the Ops panel. The test is activated when you press the mute button while no faults are present. While the test is running, all LEDs flash.

Drive carrier module faults

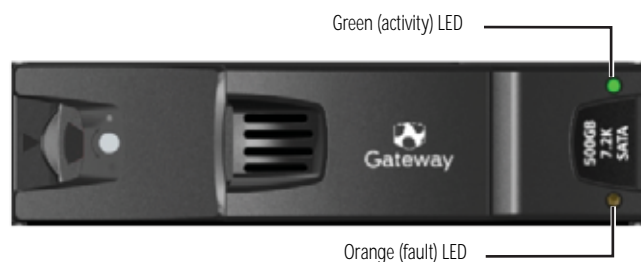
Use the green LED and orange LED mounted on the front of each drive carrier module to monitor disk drive status. The LEDs indicate the following:

State	Green	Orange
No drive installed	Off	Off
Drive power ON	On	Off
Drive activity	On/Blink off	Off
Drive impacted	On	Blink
Drive fault	On	On
Power control circuit failure	Off	On



Important

The LED may be off for a length of time during power up.



Auto start failure

Unless otherwise selected at installation, all drives in the enclosure should automatically start after you turn on the enclosure. If this does not occur, there is a power problem (an alarm and power fault indication would normally be active).

Troubleshooting

The following sections describe problems, with possible solutions, which can occur with your Gateway E-842R Storage Area Network.

System faults

Symptom	Cause	Action
1. The CONTROLLER FAULT LED lights orange on the module. 2. The audible alarm sounds.	The ESI processor has detected an internal fault on one of the following modules: <ul style="list-style-type: none"> ▪ Power supply ▪ Cooling ▪ RAID 	Replace the faulty module as appropriate.

Also see ["Thermal warnings"](#) on page 18.

Power supply faults

Symptoms	Causes	Actions
<ul style="list-style-type: none"> ▪ Ops panel SYSTEM FAULT LED is orange. ▪ An orange LED on one or more power supply modules. ▪ Audible alarm sounding. 	<ul style="list-style-type: none"> ▪ Any power fault. ▪ A fan failure. ▪ A thermal condition which could cause power supply module overheating. ▪ Fault on one of the following modules: <ul style="list-style-type: none"> ▪ Power supply ▪ Cooling ▪ RAID ▪ Removal of 1 power supply module. 	<ul style="list-style-type: none"> ▪ Make sure that the AC power connections to power supply module are live. ▪ Disconnect the power supply module from AC power and remove the module from the system, then re-install. If the problem persists, replace the power supply module. ▪ Reduce the ambient temperature. ▪ Replace the faulty module, as appropriate: <ul style="list-style-type: none"> ▪ Power supply ▪ Cooling ▪ RAID

Thermal control

The Gateway E-842R storage enclosure uses extensive thermal monitoring and takes a number of actions to make sure that component temperatures are kept low and that acoustic noise is minimized. Airflow is from front to rear of the enclosure.

Symptom	Cause	Action
If the ambient air is cool (below 77°F (25°C)) and the fans are observed to increase in speed, some airflow restriction may be causing the internal temperature rise. Note: This is not a fault condition.	The first stage in the thermal control process is for the fans to automatically increase in speed when a thermal threshold is reached. This may be caused by higher ambient temperatures in the local environment and may be perfectly normal. Note: This threshold changes according to the number of drives and power supplies installed.	<ul style="list-style-type: none"> ▪ Check the installation for any airflow restrictions at either the front or rear of the enclosure. A minimum gap of 1 inch (25 mm) at the front and 2 inches (50 mm) at the rear is recommended. ▪ Check for restrictions caused by dust build-up and clean as appropriate. ▪ Check for excessive re-circulation of heated air from the rear to the front. Installing in a fully enclosed rack installation is not recommended. ▪ Make sure that all blank modules are installed. ▪ Reduce the ambient temperature.

Thermal alarm

Symptom	Cause	Action
<ul style="list-style-type: none"> ▪ Ops panel SYSTEM FAULT LED is orange. ▪ An orange LED on one or more power supply module. ▪ An audible alarm is sounding. ▪ Air temperature in the exiting power supply module is above 131°F (55°C). 	<ul style="list-style-type: none"> ▪ If the internal temperature measured in the airflow through the enclosure exceeds a pre-set threshold, a thermal alarm sounds. ▪ Cooling module failure. 	<ul style="list-style-type: none"> ▪ Make sure that the local ambient environment temperature is below the upper 104°F (40°C) specification. ▪ Check the installation for any airflow restrictions at either the front or rear of the enclosure. A minimum gap of .98 inch (25 mm) at the front and 1.97 inches (50 mm) at the rear is recommended. ▪ Check for restrictions caused by dust build-up and clean as appropriate. ▪ Check for excessive re-circulation of heated air from the rear to the front. Installing in a fully enclosed rack installation is not recommended. ▪ If possible, shutdown the enclosure and investigate the problem before continuing. ▪ Replace the cooling module.

Thermal warnings

Symptom	Cause	Action
<ul style="list-style-type: none"> ▪ All orange LEDs on the Ops panel and on all drive bays are flashing. ▪ The audible alarm sounds almost continuously and cannot be muted. 	<p>The temperature is higher than the thermal alarm threshold (this should already have been activated).</p> <p>OR - All fans have failed.</p> <p>OR - Only 1 fan is operating and the internal temperature is 104°F (40°C) or above.</p>	<ul style="list-style-type: none"> ▪ Power off immediately. ▪ Check for airflow restrictions. ▪ Check for power supply module faults. ▪ Check for excessive local temperatures.

Hardware faults

Make sure that you have obtained a replacement module of the same type *before* removing any faulty module.



Caution

If your Gateway E-842R enclosure is turned on and you remove any module, replace it immediately. If the enclosure is used with plug-in modules, dummy carriers, or blank modules missing for more than a few minutes, the enclosure can overheat, causing power failure and data loss. Such use invalidates the warranty.

- Replace a faulty drive with a drive of the same type and equal or greater capacity.
- All drive bays must have a drive carrier or dummy carrier module installed in order to maintain a balanced airflow.
- All of the supplied plug-in power supply units, electronics modules, dummy carriers, and blank modules must be installed for the air to flow correctly around the cabinet.

Continuous operation during replacement



Important

The power supply module replacement time must be as short as possible because the Gateway E-842R enclosure is designed to operate with two power supply modules installed.



Important

The fans within the cooling module are not user replaceable. In the event of a cooling fan failure, the complete cooling module must be replaced.

Depending on how your Gateway E-842R enclosure is set up, you can normally replace a failed disk unit without interrupting the use of the system.

In addition, each enclosure contains two power supply modules, either of which can maintain power and cooling to the subsystem while the other is replaced.

Ops panel



Important

The Ops panel is an integral part of the enclosure assembly and can only be replaced with a replacement enclosure. The enclosure should only be replaced by trained personnel.

Replacing a module



Caution

When replacing a module, never leave an empty space in the rear of the enclosure. Obtain a replacement before removing the problem module.



Caution

Observe all conventional ESD precautions when handling modules and components. Avoid contact with such things as backplane components and module connectors.

See [“Getting Started” on page 15](#) for information on the initial installation of the plug-in modules in your Gateway E-842R enclosure.

Power supply modules



Caution

The Gateway E-842R enclosure must only be operated with two power supply modules installed.

AC Power supply module



Caution

Do not remove the faulty power supply module unless you have a replacement unit of the correct type ready for insertion. The system must not be operated without both power supply modules in place.

Removing a power supply module

You can continue working while replacing the faulty module because there should always be two power supply modules in place.

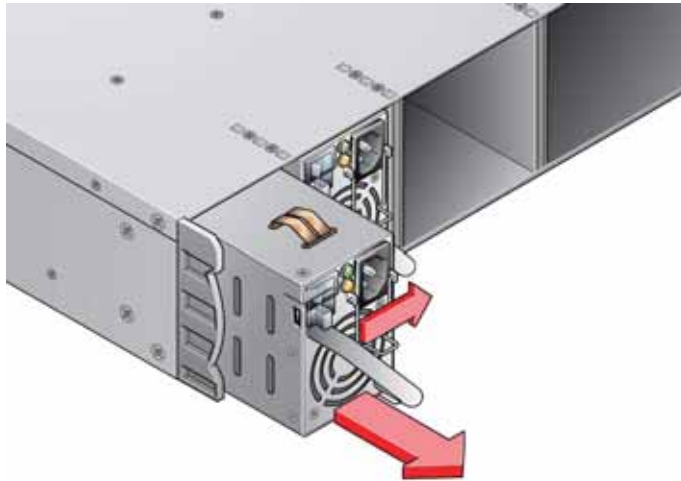


Warning

Do not remove covers from the power supply modules. There is a danger of electric shock inside.

► **To remove a power supply module:**

- 1 Make sure that you identify the faulty power supply module correctly. The Module Fault LED on the faulty power supply module lights orange.
- 2 Disconnect the power supply cord.
- 3 Push the latch on the power supply module handle to the right, then grip the handle and pull the power supply module out of the enclosure.



■

Installing a power supply module



Caution

Do not mix power supply modules of different types or makes.

► **To install a power supply module:**

- 1 Check for damage, especially to the rear connector on the power supply module.



Caution

Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

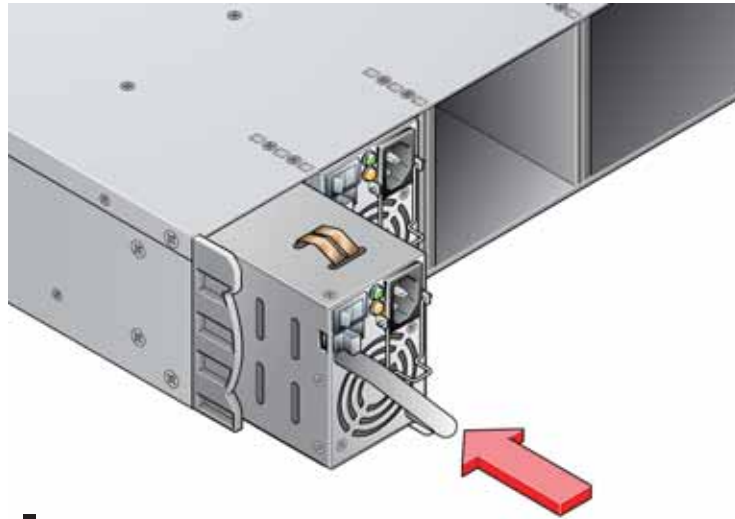
- 2 Slide the module into the enclosure (see [“To install a power supply module:”](#) on page 20).
- 3 Push the module until you hear a click as the handle latch engages.

- 4 Connect the power supply cord to the power source.



Important

The alarm sounds until the new power supply module is operating correctly.

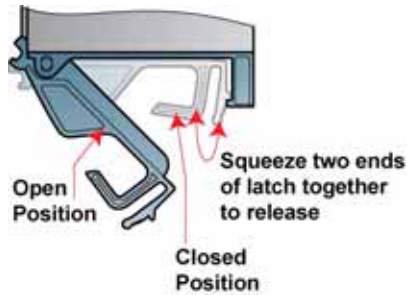


Cooling module

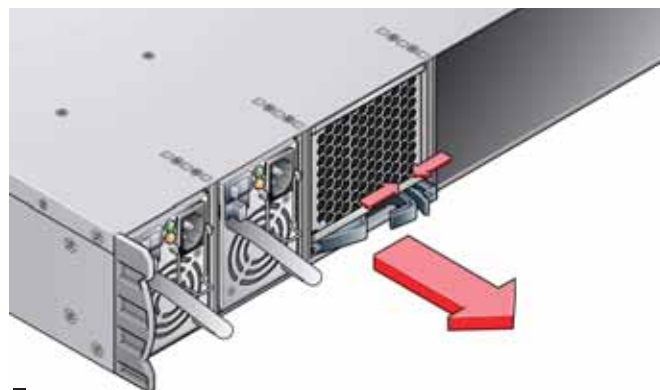
Removing the cooling module

► To remove the cooling module:

- 1 Grasp the latch between your thumb and forefinger. Squeeze your thumb and forefinger together to release the latch.



- 2 Pull the latch outward to pull the module out of the enclosure.
- 3 Remove the module.



Installing the cooling module

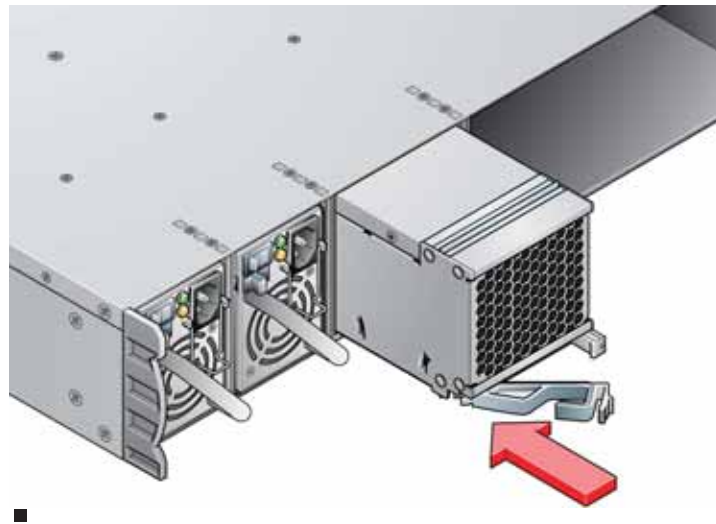


Caution

Handle the module carefully and avoid damaging the connector pins. Do not install the module if any pins appear to be bent.

► To install the cooling module:

- 1 Check for damage, especially to the rear connector on the supply.
- 2 With the latch in the open position, slide the module into the enclosure until the latch engages automatically.
- 3 Secure the module by manually closing the latch. You should hear a click when the module latch engages.



Controller module



Caution

If only one controller module is installed, a blank module must be installed in the unused slot. If the slot is left open, the drive may overheat.

The following procedures apply to both the controller module and the blank module.

Removing a controller module



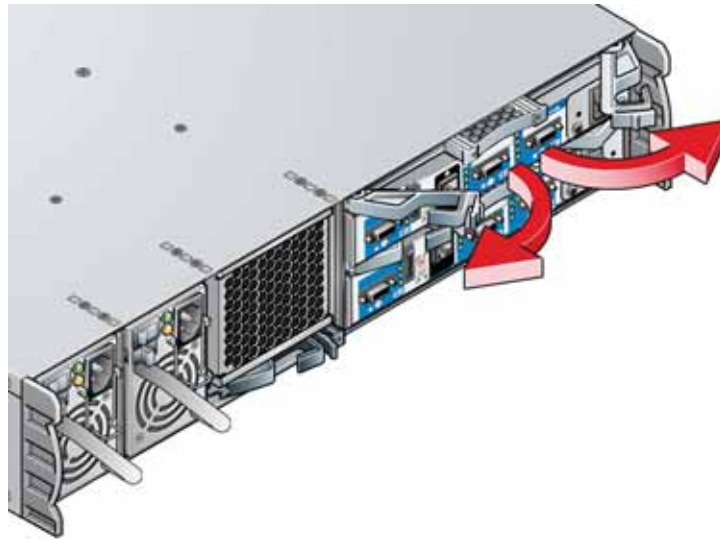
Caution

Do not remove this module unless a replacement can be installed immediately. The system must not be run without all modules in place.

► To remove a controller module:

- 1 Using two hands, grasp each latch between the thumb and forefinger of each hand. Squeeze your thumb and forefinger together to release the latches.
- 2 Pull the latches outward to pull the module out of the enclosure.

- 3 Grip the latch handles and remove the module.

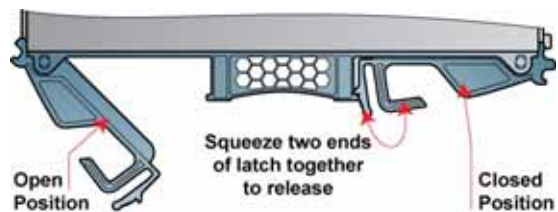
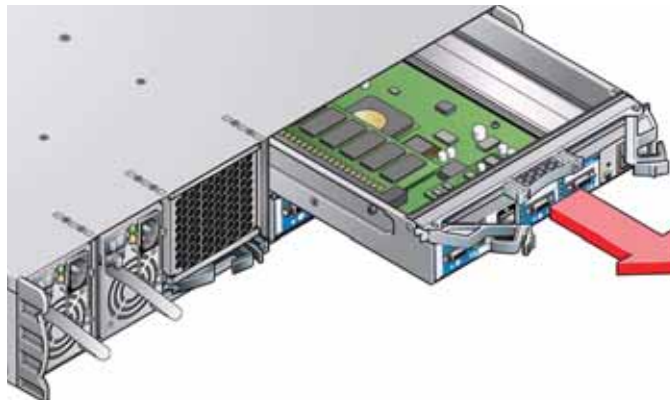


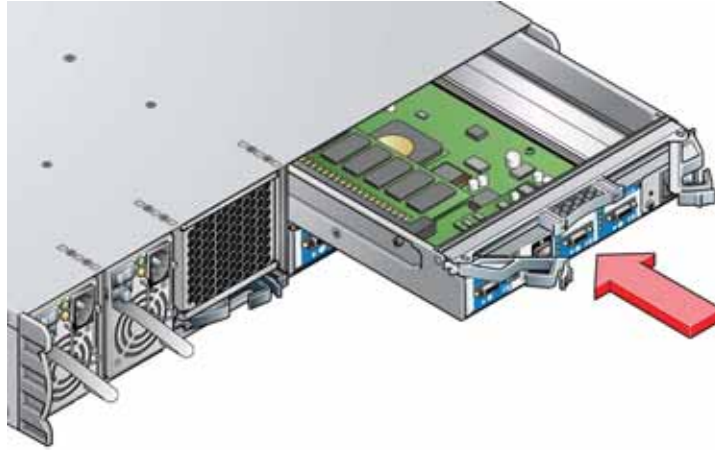
■

Installing a RAID controller module

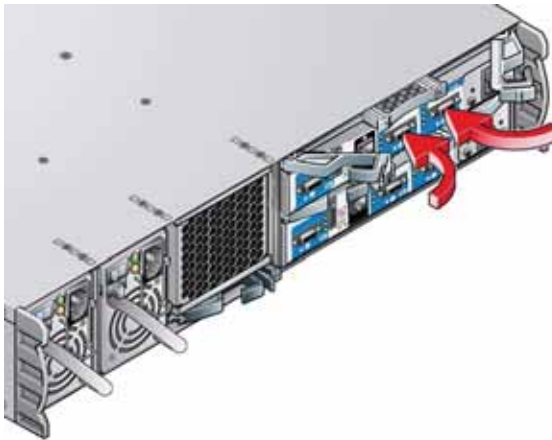
► To install a RAID controller module:

- 1 Check for damage, especially to the interface connector. Do not install if the pins are bent.
- 2 With the latches in the open position, slide the RAID controller module into the enclosure until the latches engage automatically.





- 3 Secure the module by manually closing the latches. You should hear a click when the latches engage.



The controller module takes up to one minute to re-initialize onto the loop after re-cabling.



Battery module



Warning

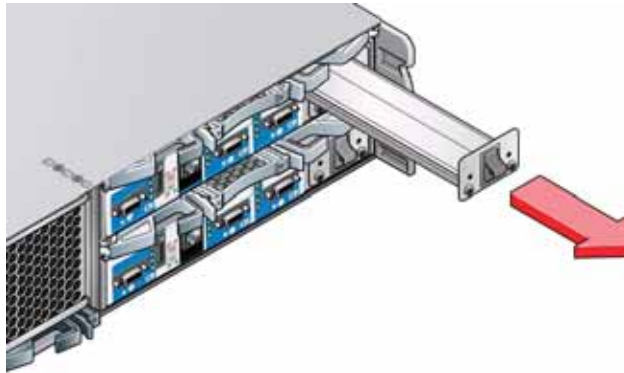
There is a danger of explosion if the battery is incorrectly replaced.

Dispose of used batteries in accordance with the manufacturer's instructions and national regulations.

Removing a battery module

► **To remove a battery module:**

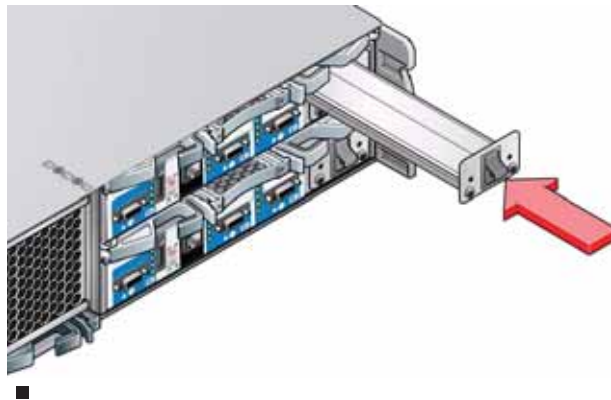
- Operate the release latch and slide the battery module out of the controller module.



Installing a battery module

► **To install a battery module:**

- 1 Check for damage. Do not install if there are any outer signs of damage.
- 2 Slide the battery module into the vacant slot on the right side of the controller module until it clicks into place.



Removing and replacing a disk I/O module

To remove and replace a disk I/O module in an expansion enclosure, follow the procedures for removing and replacing a controller module (see ["Controller module" on page 22](#)).

Drive carrier module



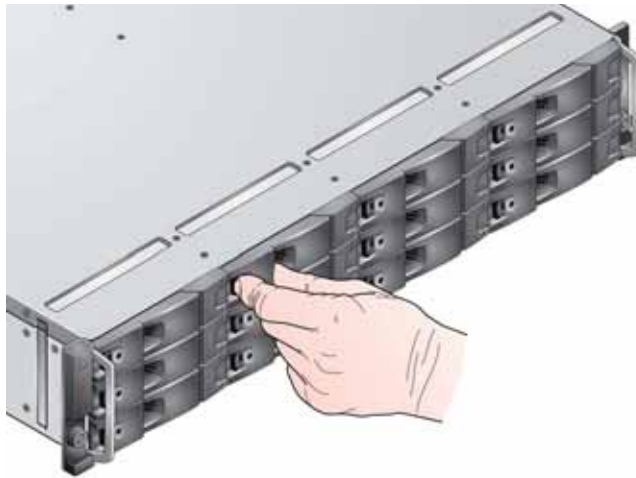
Caution

Observe all conventional ESD precautions when handling modules and components. Avoid contact with such things as backplane components and module connectors.

Removing a drive carrier module

► To remove a drive carrier module:

- 1 Release the carrier handle by pressing the latch in the handle towards the right. The anti-tamper lock must be off.



Caution

Damage can occur to a drive if it is removed while still spinning. We recommend that you perform all steps in the following procedure to ensure that the drive has stopped prior to removal.

- 2 Gently withdraw the drive carrier module approximately 1 inch (25 mm) and wait 30 seconds to let the drive spin down.
- 3 Withdraw the module from the drive bay.



■

Installing a drive carrier module



Caution

All drive bays must have drive carrier modules or dummy carrier modules installed to maintain a balanced airflow. Dummy carrier modules are provided for fitting in all unused drive bays. They are designed as integral drive module front caps and must be installed in all unused drive bays to maintain a balanced airflow. If you plan to remove a drive for more than a few minutes, we recommend that you temporarily install a dummy carrier module in its place.

Drive carrier configuration

Before you install the drive carrier modules in your E-842R enclosure, see [“Planning your installation” on page 16](#) for system configuration information.

Installation procedure



Important

Make sure that the carrier is orientated so that the drive is uppermost and the handle opens from the left.

► To install a drive carrier module:

- 1 Release the carrier handle by pressing the latch in the handle towards the right, then insert the carrier into the enclosure.



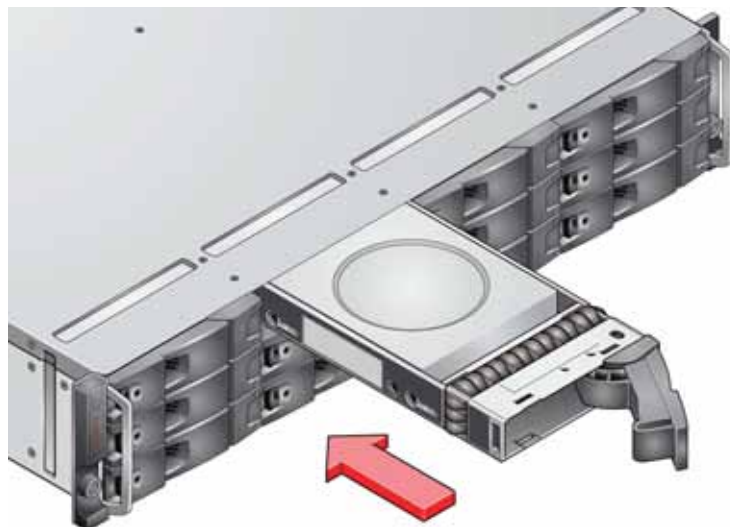
If the anti-tamper locks have been activated, see [“Activating the anti-tamper locks” on page 27](#).

- 2 Gently slide the carrier all the way into the enclosure until it is stopped by the lever on the right of the carrier.

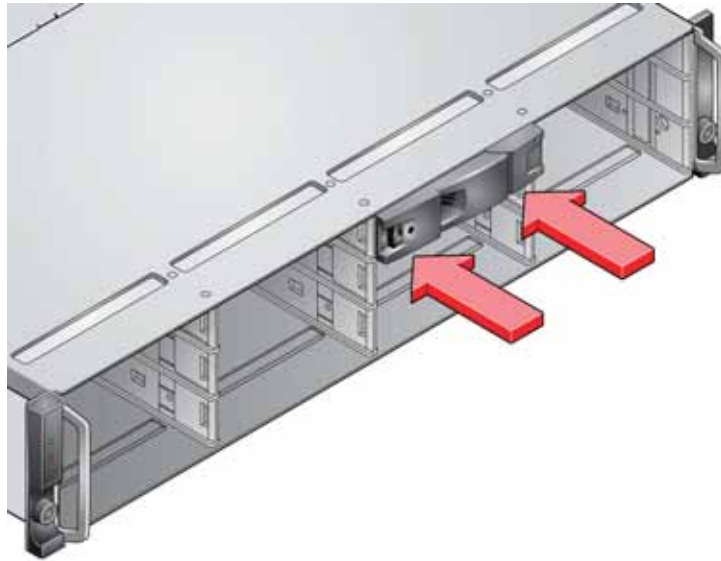


Caution

Make sure that the carriers are fully engaged in the enclosure.



- 3 Secure the carrier into the slot (the latch on the base of the carrier engages a slot in the enclosure). Continue to push firmly until the handle fully engages. You should hear a click when the latch engages and holds the handle closed.



■

Dummy drive carrier module removal and replacement

Dummy drive carrier modules are removed and replaced in the enclosure by pulling the dummy module out of the enclosure or pushing it into place.

Telephone support

Gateway offers a wide range of customer service, technical support, and information services.

Telephone numbers

You can access the following services through your telephone to get answers to your questions:

Resource	Service description NEW	How to reach
Gateway Customer Care	Talk to a Gateway Customer Care representative about a non-tutorial technical support question.	877-485-1464 (US)(option #6) 800-846-3609 (Canada and Puerto Rico) 605-232-2191 (all other countries)
Sales, accounting, and warranty	Get information about available systems, pricing, orders, billing statements, warranty service, or other non-technical issues.	800-846-2000 (US) 888-888-2037 (Canada)

APPENDIX A

Specifications

- Dimensions
- Weight
- AC power (350 W power supply module)
- Power supply module safety and EMC compliance
- Environment
- Interfaces
- Controller module specification
- Disk I/O module specification
- Drive carrier module specification

Dimensions

Enclosure	inches	mm
Height	3.46	87.9
Width across the mounting flange	19	483
Width across the body of the enclosure	17.6	447
Depth from the flange to the rear of the enclosure body	21.65	550
Depth from the flange to the maximum extremity of enclosure (rear hold down)	22.72	577
Depth from the flange to the furthest extremity at the front of the enclosure	1.44	36.5

We recommend that a rack with a depth of no less than 27.55 inches (700 mm) be used with this product.

Weight

Maximum configuration	70.4 lb. (32 kg)
Empty enclosure	19.8 lb. (9 kg)

AC power (350 W power supply module)

Voltage range	100~240 VAC Rated
Frequency	50/60 Hz
Inrush current	<30 A @ 230 VAC
Power factor	>0.98
Harmonics	Meets EN61000-3-2

Power consumption

Power consumption of enclosure with 12x SAS drives running I/O, powered by a single power supply module (Power One power supply module) with extended power lead between the power supply module and the I/O backplane and with two controllers installed at IDLE and ACTIVE operation.



Caution

The enclosure must be operated with two power supplies in place.

Voltage Rail	IDLE		ACTIVE	
	Average	Peak	Average	Peak
5V	11.51A	13.2A	13.53A	15.7A
12V	12.29A	15.1A	13.17A	20.1A

Power supply module safety and EMC compliance

Safety compliance	UL 60950-1
	IEC 60950-1
	EN 60950-1
EMC compliance	CFR47 Part 15B Class A
	EN55022
	EN55024

Environment

	Temperature Range	Relative Humidity	Max. Wet Bulb
Operational	41°F to 104°F (5°C to 40°C)	8% to 80% non-condensing	73.4°F (23°C)
Non-Operational	33.8°F to 122°F (1°C to 50°C)	8% to 80% non-condensing	80.6°F (27°C)
Storage	33.8°F to 140°F (1°C to 60°C)	8% to 80% non-condensing	84.2°F (29°C)
Shipping	-40°F to 140°F (-40°C to 60°C)	5% to 100% non-precipitating	84.2°F (29°C)

Airflow	The system must be operated with a low pressure rear exhaust installation (the back pressure created by the rack doors and obstacles not to exceed 5 pascals [0.5mm Water gauge])
Altitude, Operational	0 to 10,000 ft. (0 to 3045 m)
Altitude, Non-Operational	-1000 to 40,000 ft. (-305 to 12,192 m)

Shock, Operational	Vertical axis 5 g peak 1/2 sine, 10 ms
Shock, Non-Operational	30 g 10 ms 1/2 sine
Vibration, Operational	0.21 grms 5-500 Hz Random
Vibration, Non-Operational	1.04 grms 2-200 Hz Random
Vibration, Relocation	0.3 g 2-200 Hz sine
Acoustics	Sound Power Operating: Less than 58 dB LwA measured at 73.4°F (23°C). Sound Pressure Operating: Less than 6.8 Bels LwA measured at 73.4°F (23°C).
Orientation & Mounting	19" rack mount (2 EIA units)
▪ Rack Rails	To fit 31.5 inches (800 mm) depth racks, compliant with IEC 297
▪ Rack Characteristics	Back pressure not exceeding 5 pascals (0.5mm water gauge)
Safety & Approvals	CE, UL, cUL
▪ EMC	EN55022 (CISPR - A), FCC A

Interfaces

Drive support	See drive carrier specification
Attachment	<ul style="list-style-type: none"> ▪ 1 domain of 12 drives per controller module ▪ (2) SAS Host Ports (IN) - 2 x SFF8470 connector (4 lane) ▪ (1) SAS expansion port (OUT) - 1 x SFF8470 connector (4 lane)

Controller module specification

Dimensions (internal)	4 inches x 10.5 inches (103 mm x 267 mm) Component board - 4 inches x 9.5 inches (103 mm x 240 mm)
Speed	<ul style="list-style-type: none"> ▪ Host ports: two 3 Gb/sec SAS ▪ Drive ports: 3 GB SAS, creates connections to a single domain of 12 drives
Mounting	Back, horizontal in Bay 4 (see "Enclosure chassis" on page 3)
Connectors	<ul style="list-style-type: none"> ▪ (2) 4 Lane SAS SFF connectors for IN 0 (Port 0) and IN 1 (Port 1) ports ▪ (1) 4 Lane SAS Expansion SFF connector OUT ports ▪ (1) RJ45, 10/100BaseT Ethernet port ▪ (1) RS232 port
Power consumption	40 W

LED functions

LED functions	LED state	Definition
Battery fault	Orange	When lit, this LED indicates that the backup battery unit is missing, has low voltage, has experienced a time-out on charge, indicated a faulty battery, or has experienced a fault in the charging circuitry.
Cache active	Orange	When lit, this LED indicates that the RAID controller cache has data saved in memory but not written to the disk array.
Controller activity on drive bank 0	Orange	When lit, this LED indicates activity on the Bank 0 disk drives.
Controller activity on drive bank 1	Orange	When lit, this LED indicates activity on the Bank 1 disk drives.
Controller OK	Green	When lit, this LED indicates that RAID controller activity is normal.
Controller fault	Orange	When lit, this LED indicates that a RAID controller fault has occurred.
Ethernet status	Green	When lit, this LED indicates that the Ethernet port has a valid connection.
	Orange	When lit, this LED indicates that the Ethernet port has activity.
SAS activity*	Green	When lit, these LEDs show I/O activity on the specific port lane indicated.

* These LEDs blink on and off when there is module activity.

Disk I/O module specification

Dimensions (internal)	4 inches x 10.5 inches (103 mm x 267 mm) Component board - 4 inches x 9.5 inches (103 mm x 240 mm)
Speed	<ul style="list-style-type: none"> ▪ Host ports: two 3 Gb/sec SAS ▪ Drive ports: 3 GB SAS, creates connections to a single domain of 12 drives
Connectors	<ul style="list-style-type: none"> ▪ (1) Host Port (IN) - SFF8470 connector (4 lane) ▪ (1) expansion port (OUT) - SFF8470 connector (4 lane) ▪
Attachment	<ul style="list-style-type: none"> ▪ (1) SAS 4 lane 3 Gbit/sec wide port Host connector ▪ (1) SAS 4 lane 3 Gbit/sec wide port Expansion connector

LED functions

LED	LED state	Definition
IN (1-4)	Green	When lit, this LED indicates I/O activity on the specified SAS port lane.
OUT (1-4)	Green	When lit, this LED indicates I/O activity on the specified SAS port lane.

* These LEDs blink on and off when there is module activity.

Drive carrier module specification



Important

Operating E-842R enclosures with non-approved drives may invalidate the warranty. Contact Gateway Customer Care for details of approved drives.

The drive carrier module is not available separately.

Module dimensions	Height 1.06" (27.05 mm) Width 4.19" (106.55 mm) Depth 8.25" (209.55 mm)
Weight	1.91 lbs (0.86 kg) (with 1.0" 750 GB drive)
Operating temperature	41°F to 104°F (5°C to 40°C) (when installed in an E-842R storage enclosure with dual power supply modules)
Power dissipation	18.5 Watts maximum

APPENDIX B

Legal Information

Regulatory compliance statements

United States of America

Federal Communications Commission (FCC) Unintentional emitter per FCC Part 15

FCC Part 15 Class A Statement

The server is designated as complying with Class A requirements if it bears the following text on the rating label:

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

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

This device 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 in a commercial 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 with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.



Caution

Changes or modifications not expressly approved by Gateway could void the FCC compliance and negate your authority to operate the product.

Telecommunications per FCC part 68 (applicable to products fitted with USA modems)

Your modem complies with Part 68 of the Federal Communications Commission (FCC) rules. On the computer or modem card is a label that contains the FCC registration number and Ringer Equivalence Number (REN) for this device. If requested, this information must be provided to the telephone company.

An FCC-compliant telephone line cord with a modular plug is required for use with this device. The modem is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68-compliant. See installation instructions for details.

The Ringer Equivalence Number (REN) is used to determine the number of devices which may be connected to the telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

If this device causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. The telephone company may request that you disconnect the equipment until the problem is resolved.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of this equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

This equipment cannot be used on telephone company-provided coin service. Connection to party line service is subject to state tariffs. Contact the state public utility commission or public service commission for information.

When programming or making test calls to emergency numbers:

- Remain on the line and briefly explain to the dispatcher the reason for the call.
- Perform such activities in the off-peak hours such as early morning or late evenings.

The United States Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device to send any message via a telephone fax machine unless such message clearly contains, in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent, an identification of the business, other entity, or other individual sending the message, and the telephone number of the sending machine or such business, other entity, or individual. Refer to your fax communication software documentation for details on how to comply with the fax-branding requirement.

FCC declaration of conformity

Responsible party:

Gateway Companies, Inc.
610 Gateway Drive, North Sioux City, SD 57049
(605) 232-2000 Fax: (605) 232-2023

Product:

- Gateway E-842R SAS RAID Storage Solution

For unique identification of the product configuration, please submit the 10-digit serial number found on the product to the responsible party.



Caution

Changes or modifications not expressly approved by Gateway could void the FCC compliance and negate your authority to operate the product.

This device complies with Part 15 of the FCC Rules. Operation of this product is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canada

Industry Canada (IC) Unintentional emitter per ICES-003

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par Industrie Canada.

Telecommunications per Industry Canada CS03 (for products fitted with an IC-compliant modem)

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operation, and safety requirements. The Department does not guarantee the equipment will operate to the users' satisfaction.

Before installing this equipment, users should make sure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.



Warning

To avoid electrical shock or equipment malfunction do not attempt to make electrical ground connections by yourself. Contact the appropriate inspection authority or an electrician, as appropriate.

Users should make sure, for their own protection, that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

Laser safety statement

All Gateway systems equipped with CD and DVD drives comply with the appropriate safety standards, including IEC 825. The laser devices in these components are classified as "Class 1 Laser Products" under a US Department of Health and Human Services (DHHS) Radiation Performance Standard. Should the unit ever need servicing, contact an authorized service location.



Warning

Use of controls or adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure. To prevent exposure to laser beams, do not try to open the enclosure of a CD or DVD drive.

California Proposition 65 Warning



Warning

This product contains chemicals, including lead, known to the State of California to cause cancer and/or birth defects or reproductive harm.

Environmental information

The product you have purchased contains extracted natural resources that have been used in the manufacturing process. This product may contain substances known to be hazardous to the environment or to human health.

To prevent releases of harmful substances into the environment and to maximize the use of our natural resources, Gateway provides the following information on how you can responsibly recycle or reuse most of the materials in your "end of life" product.

Waste Electrical and Electronic Equipment (commonly known as WEEE) should never be disposed of in the municipal waste stream (residential garbage collection). The "Crossed-Out Waste Bin" label affixed to this product is your reminder to dispose of your "end of life" product properly.



Substances such as glass, plastics, and certain chemical compounds are highly recoverable, recyclable, and reusable. You can do your part for the environment by following these simple steps:

- When your electrical or electronic equipment is no longer useful to you, "take it back" to your local or regional waste collection administration for recycling.
- In some cases, your "end of life" product may be "traded in" for credit towards the purchase of new Gateway equipment. Call Gateway to see if this program is available in your area.
- If you need further assistance in recycling, reusing, or trading in your "end of life" product, you may contact us at the Customer Care number listed in your product's user guide and we will be glad to help you with your effort.

Finally, we suggest that you practice other environmentally friendly actions by understanding and using the energy-saving features of this product (where applicable), recycling the inner and outer packaging (including shipping containers) this product was delivered in, and by disposing of or recycling used batteries properly.

With your help, we can reduce the amount of natural resources needed to produce electrical and electronic equipment, minimize the use of landfills for the disposal of "end of life" products, and generally improve our quality of life by ensuring that potentially hazardous substances are not released into the environment and are disposed of properly.

Notices

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Irvine, CA 92618-2930 USA

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APPENDIX C

Safety Information

Important safety information



Warning

Always follow these instructions to help guard against personal injury and damage to your Gateway system.

Your Gateway system is designed and tested to meet the latest standards for safety of information technology equipment. However, to ensure safe use of this product, it is important that the safety instructions marked on the product and in the documentation are followed.

Setting up your system

- Read and follow all instructions marked on the product and in the documentation before you operate your system. Retain all safety and operating instructions for future use.
- Do not use this product near water or a heat source such as a radiator.
- Set up the system on a stable work surface.
- The product should be operated only from the type of power source indicated on the rating label.
- If your computer has a voltage selector switch, make sure that the switch is in the proper position for your area. The voltage selector switch is set at the factory to the correct voltage.
- Openings in the computer case are provided for ventilation. Do not block or cover these openings. Make sure you provide adequate space, at least 6 inches (15 cm), around the system for ventilation when you set up your work area. Never insert objects of any kind into the computer ventilation openings.
- Some products are equipped with a three-wire power cord to make sure that the product is properly grounded when in use. The plug on this cord will fit only into a grounding-type outlet. This is a safety feature. If you are unable to insert the plug into an outlet, contact an electrician to install the appropriate outlet.
- If you use an extension cord with this system, make sure that the total ampere rating on the products plugged into the extension cord does not exceed the extension cord ampere rating.
- If your system is fitted with a TV Tuner, cable, or satellite receiver card, make sure that the antenna or cable system is electrically grounded to provide some protection against voltage surges and buildup of static charges.

Care during use

- Do not walk on the power cord or allow anything to rest on it.
- Do not spill anything on the system.
- Some products have a replaceable CMOS battery on the system board. There is a danger of explosion if the CMOS battery is replaced incorrectly. Replace the battery with the same or equivalent type recommended by the manufacturer. Dispose of batteries according to the manufacturer's instructions.
- When the computer is turned off, a small amount of electrical current still flows through the computer. To avoid electrical shock, always unplug all power cables and modem cables from the wall outlets before cleaning the system.



Warning

This unit has two power supplies. To remove power from all internal circuitry you must disconnect both power cords.

- Unplug the system from the wall outlet and refer servicing to qualified personnel if:
 - The power cord or plug is damaged.
 - Liquid has been spilled into the system.
 - The system does not operate properly when the operating instructions are followed.
 - The system was dropped or the cabinet is damaged.
 - The system performance changes.

Replacement parts and accessories

Use only replacement parts and accessories recommended by Gateway.



Warning

To reduce the risk of fire, use only No. 26 AWG or larger telecommunications line cord.



Important

Do not use Gateway products in areas classified as hazardous locations. Such areas include patient care areas of medical and dental facilities, oxygen-laden environments, or industrial facilities.

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