



AssuredSAN 3000 Series FRU Installation and Replacement Guide

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Adobe PostScript

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About this guide

This guide identifies 3000 Series FRUs (field-replaceable units), and describes how to remove or install them within the AssuredSAN™ 3000 Series products listed below:

Hybrid FC/iSCSI Controller Enclosures:

- 3920
- 3930

Fibre Channel Controller Enclosures:

- 3723
- 3733
- 3720
- 3730

Serial Attached SCSI Controller Enclosures:

- 3523
- 3533
- 3520
- 3530

Internet SCSI (10GbE) Controller Enclosures:

- 3420
- 3430

Internet SCSI (1Gb) Controller Enclosures:

- 3320
- 3330

Intended audience

This guide is intended for storage system administrators.

Prerequisites

Prerequisites for installing and using this product include knowledge of:

- Servers and computer networks
- Network administration
- Storage system installation and configuration
- Storage area network (SAN) management and direct attach storage (DAS)
- Fibre Channel (FC), Serial Attached SCSI (SAS), Internet SCSI (iSCSI), and Ethernet protocols

Related documentation

For information about	See
Enhancements, known issues, and late-breaking information not included in product documentation	Release Notes
Overview of product shipkit contents and setup tasks	Getting Started*
Regulatory compliance and safety and disposal information	AssuredSAN Product Regulatory Compliance and Safety*
Installing and using optional host-based software components (CAPI Proxy, MPIO DSM, VDS Provider, VSS Provider, SES Driver)	AssuredSAN Installing Optional Software for Microsoft Windows® Server

For information about	See
Recommendations for using optional data-protection features (AssuredSnap, AssuredCopy, AssuredRemote)	AssuredSAN 3000 Series Using Data Protection Software
Using a rackmount bracket kit to install an enclosure into a rack	AssuredSAN Rackmount Bracket Kit Installation* <i>or</i> AssuredSAN 2-Post Rackmount Bracket Kit Installation*
Product hardware setup and related troubleshooting	AssuredSAN 3000 Series Setup Guide
Obtaining and installing a license to use licensed features	AssuredSAN 3000 Series Obtaining and Installing a License Certificate File
Using the web interface to configure and manage the product	AssuredSAN 3000 Series RAIDar User Guide
Using the command-line interface (CLI) to configure and manage the product	AssuredSAN 3000 Series CLI Reference Guide
Event codes and recommended actions	AssuredSAN Event Descriptions Reference Guide


* Printed document included in product shipkit.

For additional information, see Dot Hill's Customer Resource Center web site: <http://crc.dothill.com>.


Document conventions and symbols


Table 1 Document conventions

Convention	Element
Blue text	Cross-reference links and e-mail addresses
Blue, underlined text	Web site addresses
Bold font	<ul style="list-style-type: none"> Key names Text typed into a GUI element, such as into a box GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
<i>Italics font</i>	Text emphasis
Monospace font	<ul style="list-style-type: none"> File and directory names System output Code Text typed at the command-line
<i>Monospace, italic font</i>	<ul style="list-style-type: none"> Code variables Command-line variables
Monospace, bold font	Emphasis of file and directory names, system output, code, and text typed at the command-line

 **WARNING!** Indicates that failure to follow directions could result in bodily harm or death.

 **CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.

 **IMPORTANT:** Provides clarifying information or specific instructions.

 **NOTE:** Provides additional information.

 **TIP:** Provides helpful hints and shortcuts.

1 FRUs

Available FRUs

You can determine which FRUs pertain to your controller enclosure using the Command-line Interface (CLI). Access the controller via a telnet client; log into the controller over the network (default user name `manage` and password `!manage`). If the default user or password — or both — have been changed for security reasons, enter the secure login credentials instead of the defaults shown above.

Enter a `show frus query`.

Execution of the `show frus` CLI command displays controller metadata, followed by the FRU information pertaining to chassis (with midplane), controller module(s), and power supplies.

 **NOTE:** See AssuredSAN 3000 Series CLI Reference Guide for more information.

You can also determine which FRUs pertain to your controller enclosure by visual inspection of the component, noting *serial number* and *part number*. This method applies to disk drives. FRUs and FRU make-up are subject to change independent of documentation versions.

See Dot Hill's products: <http://www.dothill.com/products> page for the latest product information. See the customer resource center (CRC) site for interoperability information: <http://crc.dothill.com>.

Select **Interoperability Matrix > AssuredSAN 3000 Series** article for the latest compatibility data.

Product overview

 **NOTE:** Tables and companion illustrations show field-replaceable units for 3000 Series products.

[Table 2](#) (below) provides summary descriptions of the individual product models comprising the 3000 Series product line.

Table 2 Individual product models comprising 3000 Series

AssuredSAN 3000 Series Controller enclosures					
2.5" 24-drive Controller enclosures (SFF)			3.5" 12-drive Controller enclosures (LFF)		
Model	Description	Form	Model	Description	Form
3920	FC/iSCSI hybrid host ports	2U24	3930	FC/iSCSI hybrid host ports	2U12
3723	Fibre Channel host ports	2U24	3733	Fibre Channel host ports	2U12
3720	Fibre Channel host ports	2U24	3730	Fibre Channel host ports	2U12
3523	Serial Attached SCSI host ports	2U24	3533	Serial Attached SCSI host ports	2U12
3520	Serial Attached SCSI host ports	2U24	3530	Serial Attached SCSI host ports	2U12
3420	Internet SCSI (10GbE) host ports	2U24	3430	Internet SCSI (10GbE) host ports	2U12
3320	Internet SCSI (1 Gb) host ports	2U24	3330	Internet SCSI (1 Gb) host ports	2U12

[Table 3](#) (below) shows components for 2.5" 24-drive standard-depth enclosure models (2U24). [Table 4](#) on page 17 shows components for the 2.5" 24-drive reduced-depth enclosure models (also 2U24). [Table 5](#) on page 20 shows components for 3.5" 12-drive enclosure models (2U12). [Table 6](#) on page 23 shows components for the 3.5" 12-drive reduced-depth enclosure models (also 2U12).

Tables and supporting illustrations (following tables) show components for the 3000 Series product line that can be ordered for replacement in the field. **Contact your account manager for packaged FRU**

numbers and ordering information. Data addressing 3000 Series 24-drive and 12-drive enclosure products is provided to supplement the illustrated replacement procedures described in Chapter 2 — [Procedures](#).

The illustrations following herein show various 2U24 and 2U12 chassis used in 24-drive and 12-drive enclosures, respectively. These chassis support controller enclosure and drive (expansion) enclosure configurations.


FRUs addressing 24-drive enclosures

Table 3 3000 Series product components for standard-depth 24-drive enclosures

Item	Enclosure component descriptions
1	Disk drive (SFF)
	a) 2.5" disk drive module (various models of differing storage capacities: SAS, SSD)
	b) Air management module (disk drive blank to maintain optimum air flow within enclosure)
2	Ear kit
	a) Left ear assembly (including ear cap)
	b) Right ear assembly (including ear cap)
	Also see Enclosure bezel for 24-drive models on page 19
3	Chassis
4	HDD midplane (included with chassis)
5	Controller midplane (included with chassis)
6	Power supplies (one shown)
	a) AC power supply for enclosure (newer power supplies do not have a power switch)
	b) DC power supply for enclosure
7	Controller module for enclosure (one shown)
	a) 3920, 1RM, FC/iSCSI hybrid, 4-port [2 ports each: 2/4/8Gb FC; 1Gb iSCSI]
	b) 3723, 1RM, FC, 4-port [2/4/8Gb]*
	c) 3720, 1RM, FC, 2-port [2/4/8Gb]
	d) 3523, 1RM, 6Gb SAS, 4-port*
	e) 3520, 1RM, 6Gb SAS, 4-port
	f) 3420, 1RM, 10Gb iSCSI, 2-port [10GbE]
	g) 3320, 1RM, 1Gb iSCSI, 4-port
8	Small form-pluggable (SFP) connectors (one FC SFP shown)
	a) Fibre Channel SFP transceiver (applies to 3720/3730, 3723/3733, 3920/3930 models)
	b) 10GbE SFP+ transceiver (applies to 3420/3430 models only — not shown)
9	Enclosure cover (included with chassis)
Not shown	Expansion module (I/O modules and drive (expansion) enclosures are ordered separately)
	a) 3120, 1JM, mini-SAS (SFF-8088) connection [6Gb] 2.5"
	b) 3130, 1JM, mini-SAS (SFF-8088) connection [6Gb] 3.5"
	c) 2122, 1JM, mini-SAS (SFF-8088) connection [3Gb] 2.5"
	d) 2130, 1JM, SAS (8470) connection [3Gb] 3.5"
	e) I/O module blank (used in controller enclosures equipped with a single controller)

Table 3 3000 Series product components for standard-depth 24-drive enclosures

Item	Enclosure component descriptions
Not shown	Rail kits (variable options)
	a) Rack mount kit, shelf, short, All HW 22.5" - 31"
	b) Rack mount kit, shelf, long, All HW 25" - 36"
	c) Rack mount bracket kit, 2-Post adjustable, All HW
Not shown	Cable kit (Cable package: SAS-8470 to mini-SAS-8088 4 x 0.6m)
Not shown	Cable kit (Cable package: USB Type B; CLI (USB))
Not shown	AC power cord compatible with AC power supply unit; or DC power cable compatible with DC power supply unit
*The 3X23 controller modules are compatible with 3000 Series reduced-depth 2U24 controller enclosures. To realize performance improvements, the chassis must have a PCIe Gen 2 capable midplane.	

 **NOTE:** The following illustrations visually describe [Table 3](#) components for the *standard-depth* chassis:

- Exploded view — [Figure 1](#) on page 16
- Assembly — [Figure 2](#) on page 16
- Internal components sub-assembly — [Figure 3](#) on page 17

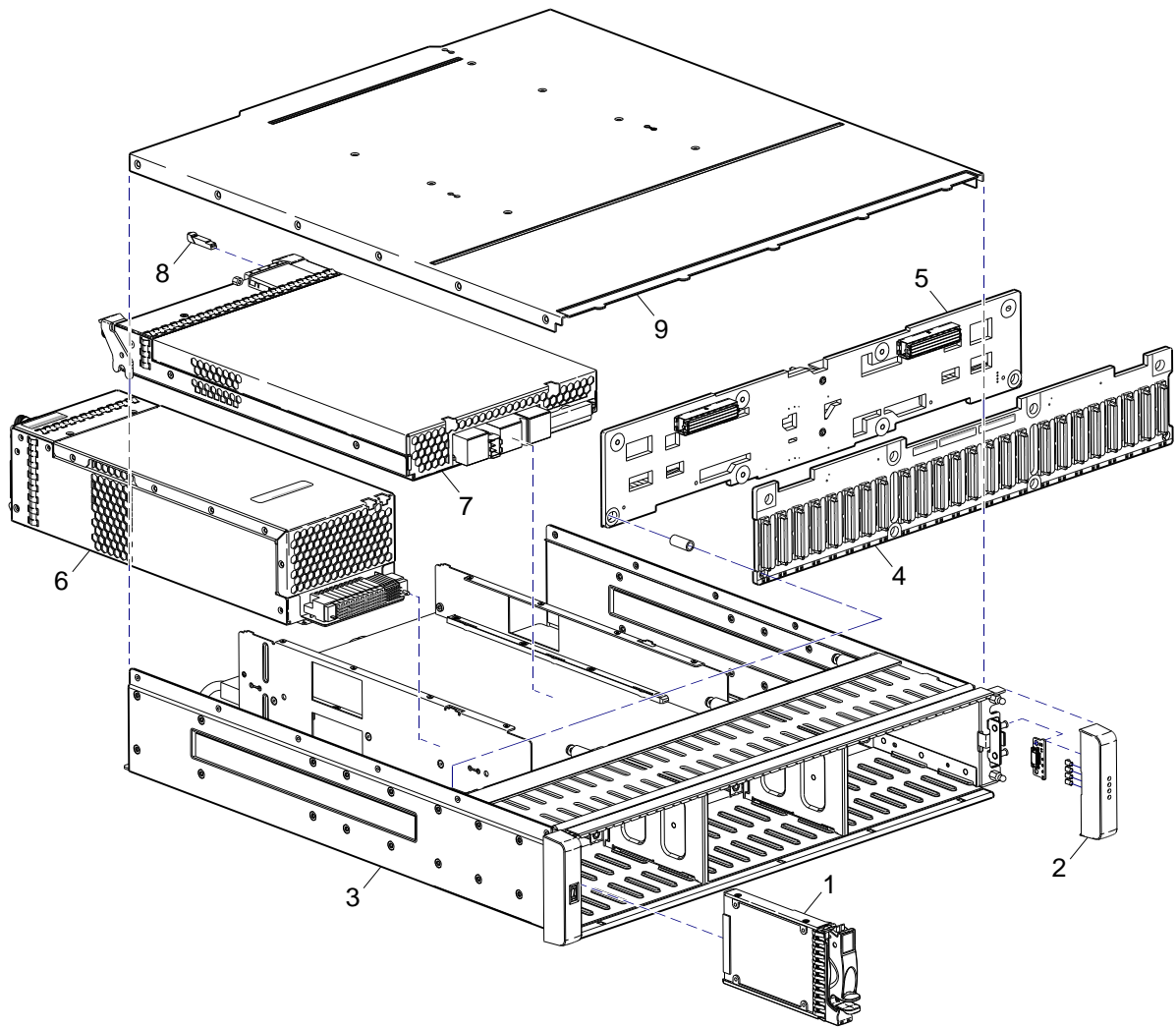


Figure 1 Controller enclosure exploded view (standard-depth 2U24)

The illustration above shows ear covers (item No.2). An enclosure bezel is sometimes used instead of ear covers. See [Figure 7](#) on page 19 for an illustration showing how the bezel aligns for attachment to the front panel of SFF 24-drive models via press-fit onto four mounting ball studs located on chassis ears.

Figure 1 (above) and Figures 2 and 3 (below) illustrate standard-depth 24-drive enclosure models.

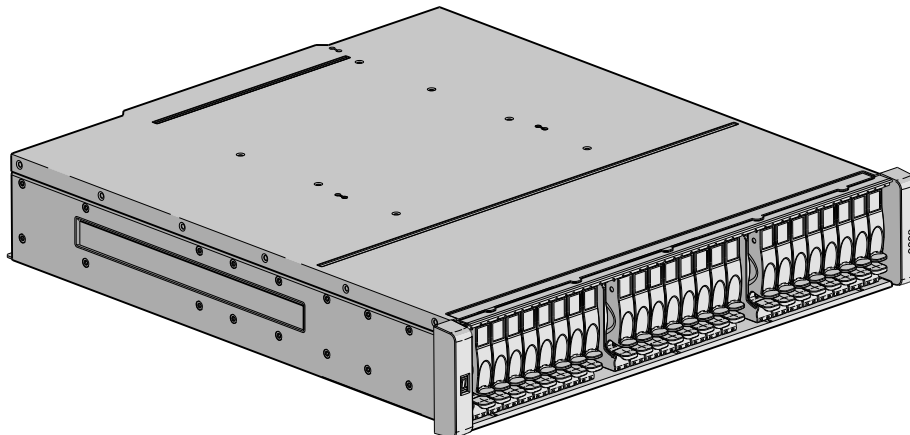


Figure 2 Controller enclosure assembly (standard-depth 2U24)

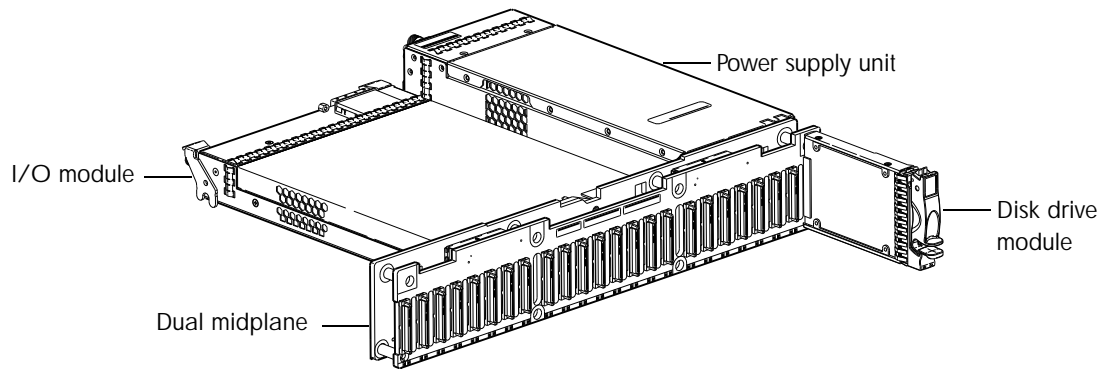


Figure 3 Controller enclosure architecture — internal components sub-assembly (standard-depth 2U24)

[Table 4](#) supplements [Table 3](#) on page 14, showing items specific to the 24-drive reduced-depth chassis.

Table 4 3000 Series product components for reduced-depth 24-drive enclosures

Item	Enclosure component descriptions
1	Disk drive (SFF)
	a) 2.5" disk drive module (various models of differing storage capacities: SAS, SSD)
	b) Air management module (disk drive blank to maintain optimum air flow within enclosure)
2	Ear kit
	a) Left ear assembly (including ear cap)
	b) Right ear assembly (including ear cap)
	Also see Enclosure bezel for 24-drive models on page 19
3	Chassis
4	Midplane (included with chassis)
5	Power supplies (one shown)
	a) AC power supply for enclosure (newer power supplies do not have a power switch)
	b) DC power supply for enclosure
6	Controller module for enclosure (one shown) [see Table 3 — Item 7 for details]
7	Enclosure cover (included with chassis)

 **NOTE:** The following illustrations visually describe [Table 4](#) components for the *reduced-depth* chassis:

- Exploded view — [Figure 4](#) on page 18
- Assembly — [Figure 5](#) on page 18
- Internal components sub-assembly — [Figure 6](#) on page 19

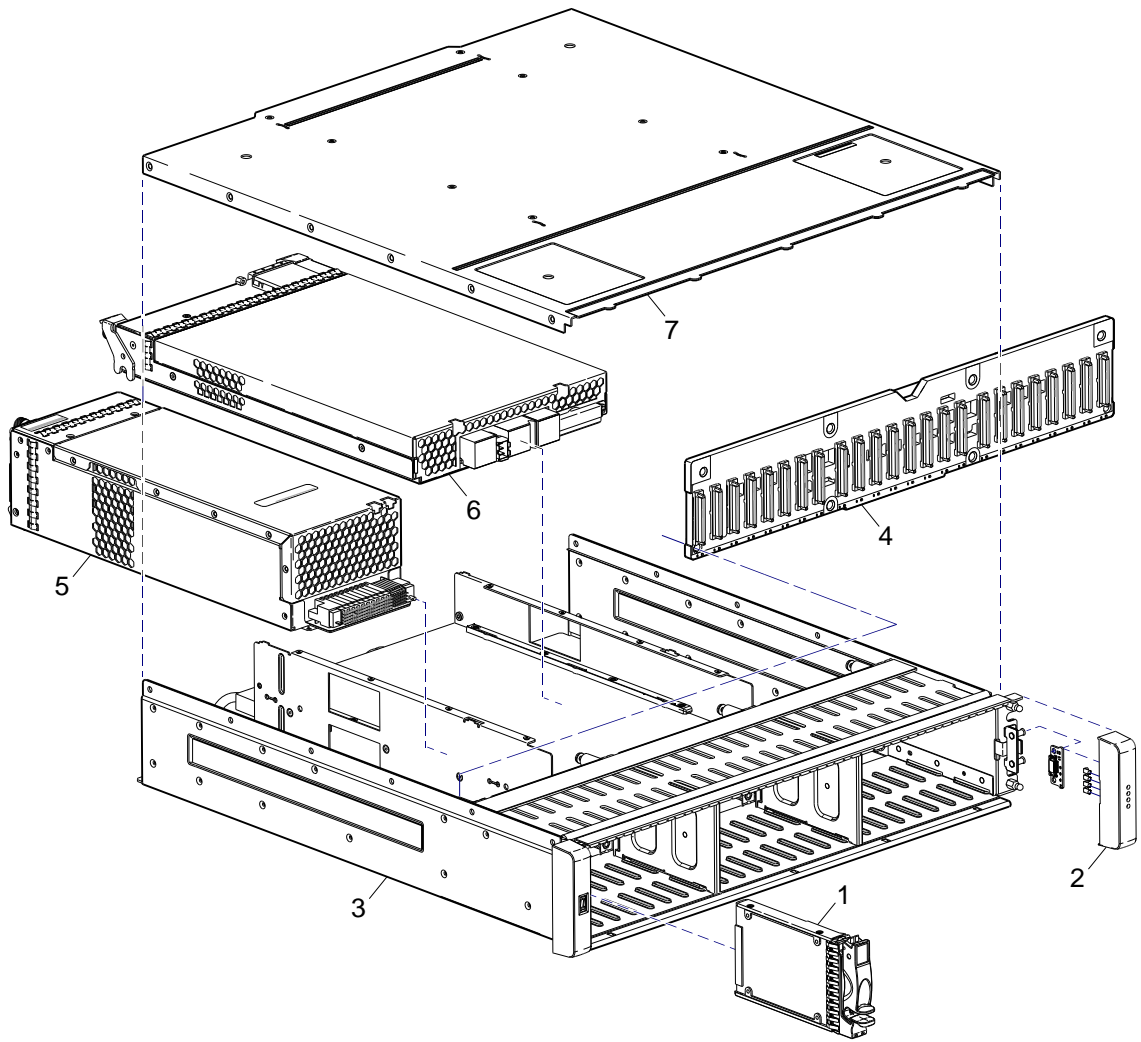


Figure 4 Controller enclosure exploded view (reduced-depth 2U24)

Figure 4 (above) and Figures 5 and 6 (below) illustrate reduced-depth 24-drive enclosure models.

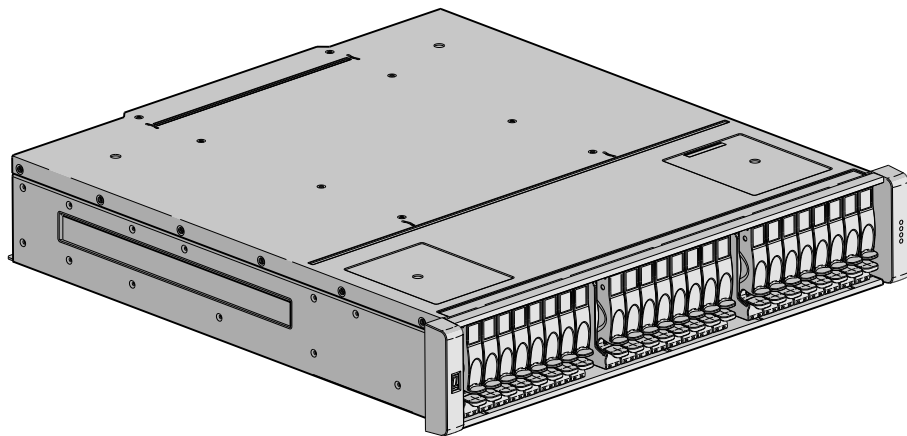


Figure 5 Controller enclosure assembly (reduced-depth 2U24)

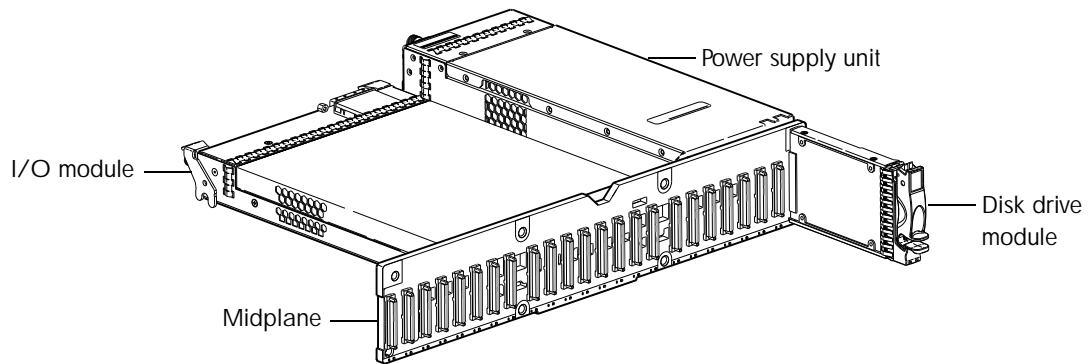


Figure 6 Controller enclosure architecture — internal components sub-assembly (reduced-depth 2U24)

Enclosure bezel for 24-drive models

As an alternative to using ear covers, SFF 24-drive enclosures support a bezel sub-assembly that attaches to the front of the chassis (see [Figure 7](#) on page 19). The bezel — comprised of a vented sheet metal cover secured to an ear cover on each end — is pre-assembled and packed with foam into a box. The bezel includes a removable air filter that can be serviced or replaced. Hard copy instructions for attaching or removing the bezel, and for servicing or replacing the air filter, are provided in the shipping container of a new enclosure configured with a bezel.

Alternatively, you can access the document online. See Dot Hill's customer resource center (CRC) web site for additional information: <http://crc.dothill.com>.

Select **AssuredSAN & R/Evolution Products > 3000 Series** to download the R/Evolution 24-drive Enclosure Bezel Kit Installation document.

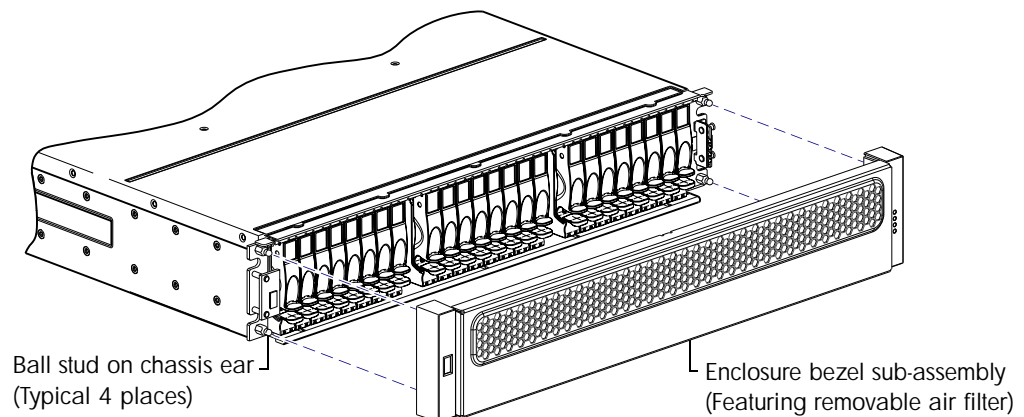


Figure 7 Partial controller enclosure assembly showing alignment for 24-drive enclosure bezel

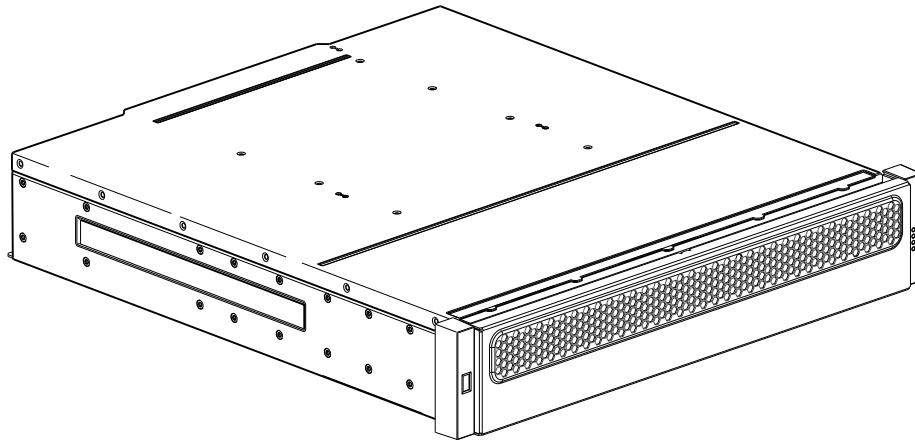


Figure 8 Controller enclosure assembly with 24-drive enclosure bezel installed


FRUs addressing 12-drive enclosures

Table 5 3000 Series product components for 12-drive enclosures

Item	Enclosure component descriptions
1	Disk drive (LFF)
	a) 3.5" disk drive module (various models of differing storage capacities: SAS, SATA)
	b) Air management module (disk drive blank to maintain optimum air flow within enclosure)
2	Ear kit
	a) Left ear assembly (including ear cap)
	b) Right ear assembly (including ear cap)
3	Chassis
4	Midplane (included with chassis)
5	Power supplies (one shown)
	a) AC power supply for enclosure (newer power supplies do not have a power switch)
	b) DC power supply for enclosure
6	Controller module for enclosure (one shown)
	a) 3930, 1RM, FC/iSCSI hybrid, 4-port [2 ports each: 2/4/8Gb FC; 1Gb iSCSI]
	b) 3733, 1RM, FC, 4-port [2/4/8Gb]*
	c) 3730, 1RM, FC, 2-port [2/4/8Gb]
	d) 3533, 1RM, 6Gb SAS, 4-port*
	e) 3530, 1RM, 6Gb SAS, 4-port
	f) 3430, 1RM, 10Gb iSCSI, 2-port [10GbE]
	g) 3330, 1RM, 1Gb iSCSI, 4-port
7	Small form-pluggable (SFP) connectors (one FC SFP shown)
	a) Fibre Channel SFP transceiver (applies to 3720/3730, 3723/3723, 3920/3930 models)
	b) 10GbE SFP+ transceiver (applies to 3420/3430 models only — not shown)
8	Enclosure cover (included with chassis)

Table 5 3000 Series product components for 12-drive enclosures

Item	Enclosure component descriptions
Not shown	Expansion module (I/O modules and drive (expansion) enclosures are ordered separately)
	a) 3120, 1JM, mini-SAS (SFF-8088) connection [6Gb] 2.5"
	b) 3130, 1JM, mini-SAS (SFF-8088) connection [6Gb] 3.5"
	c) 2122, 1JM, mini-SAS (SFF-8088) connection [3Gb] 2.5"
	d) 2130, 1JM, SAS (8470) connection [3Gb] 3.5"
	e) I/O module blank (used in controller enclosures equipped with a single controller)
Not shown	Rail kits (variable options)
	a) Rack mount kit, shelf, short, All HW 22.5" - 31"
	b) Rack mount kit, shelf, long, All HW 25" - 36"
	c) Rack mount bracket kit, 2-Post adjustable, All HW
Not shown	Cable kit (Cable package: SAS-8470 to mini-SAS-8088 4 x 0.6m)
Not shown	Cable kit (Cable package: USB Type B; CLI (USB))
Not shown	AC power cord compatible with AC power supply unit; or DC power cable compatible with DC power supply unit
*The 3X33 controller modules are compatible with 3000 Series reduced-depth 2U12 controller enclosures. To realize performance improvements, the chassis must have a PCIe Gen 2 capable midplane.	

 **NOTE:** The following illustrations visually describe [Table 5](#) components:

- Exploded view — [Figure 9](#) on page 22
- Assembly views — [Figure 10](#) on page 22 and [Figure 11](#) on page 23
- Internal components sub-assembly — [Figure 12](#) on page 23

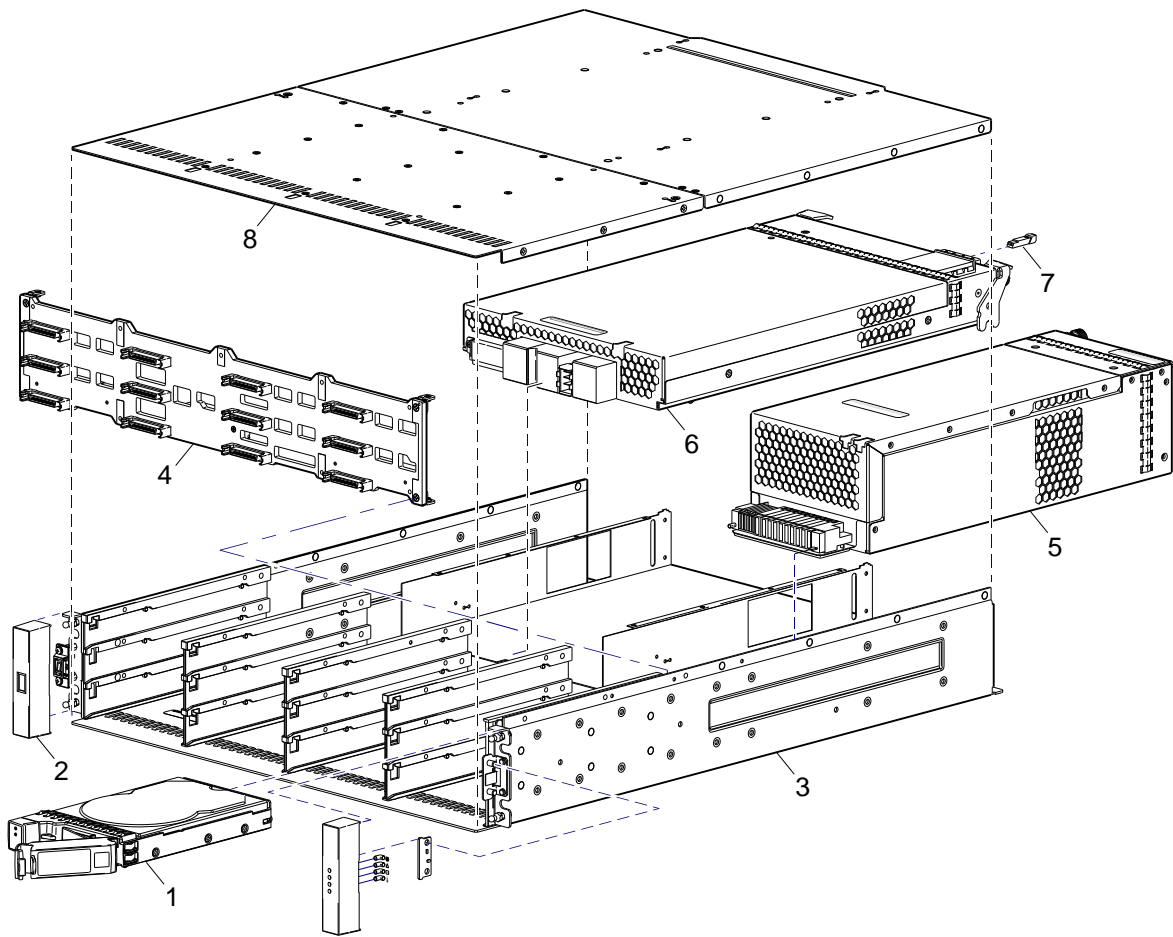


Figure 9 Controller enclosure exploded view (standard-depth 2U12)

Figure 9 (above) and Figures 10 through 12 (below) illustrate 12-drive enclosure models. Figure 10 is an assembled view of Figure 9, whereas Figure 11 shows a newer 2U12 chassis assembly. Figure 12 shows assembly of component FRUs within the enclosure.

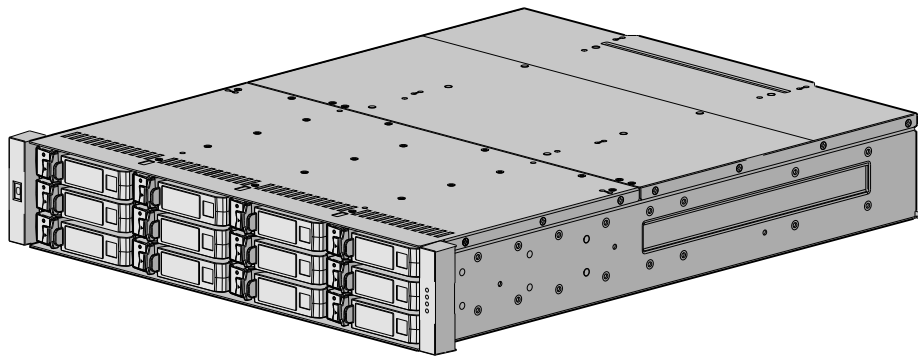


Figure 10 Controller enclosure assembly (legacy standard-depth 2U12)

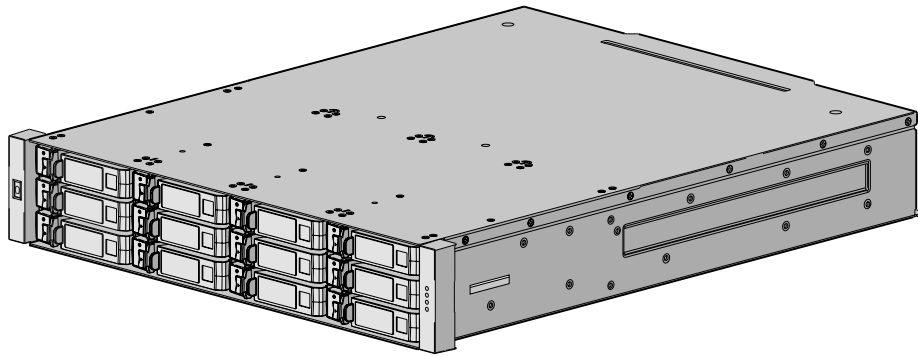


Figure 11 Controller enclosure assembly (standard-depth 2U12)

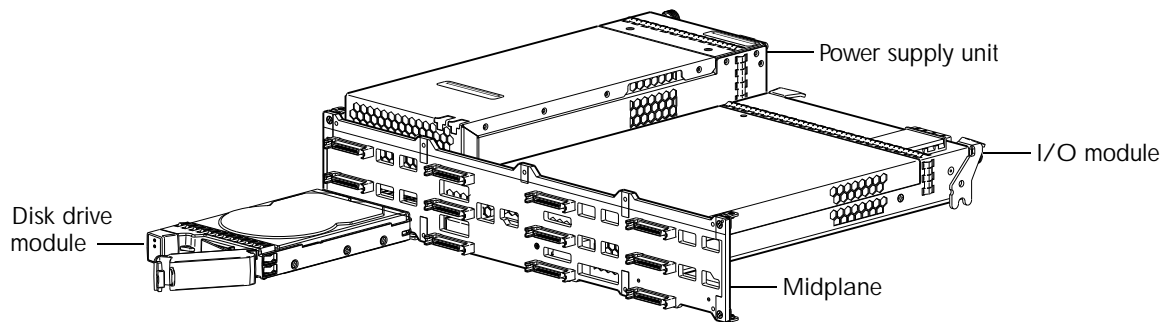



Figure 12 Controller enclosure architecture — internal components sub-assembly (standard-depth 2U12)

[Table 6](#) supplements [Table 5](#) on page 20, showing items specific to the 12-drive reduced-depth chassis.

Table 6 3000 Series product components for reduced-depth 12-drive enclosures

Item	Enclosure component descriptions
1	Disk drive (LFF without dongle)
	a) 3.5" disk drive module (various models of differing storage capacities: SAS, SATA)
	b) Air management module (disk drive blank to maintain optimum air flow within enclosure)
2	Chassis
3	Midplane (included with chassis)
4	Power supplies (one shown)
	a) AC power supply for enclosure (newer power supplies do not have a power switch)
	b) DC power supply for enclosure
5	Controller module for enclosure (one shown) [see Table 5 — Item 6 for details]
6	Enclosure cover (included with chassis)
Not Shown	Enclosure bezel sub-assembly featuring EMI shield and removable air filter (see Enclosure bezel for 12-drive reduced-depth model on page 24)

 **NOTE:** The following illustrations visually describe Table 6 components for the *reduced-depth* chassis:

- Exploded view — Figure 13 on page 24
- Assembly (partial) — Figure 14 on page 25 (shows bezel alignment)
- Assembly — Figure 15 on page 25 (shows bezel installed)
- Internal components sub-assembly — Figure 16 on page 25

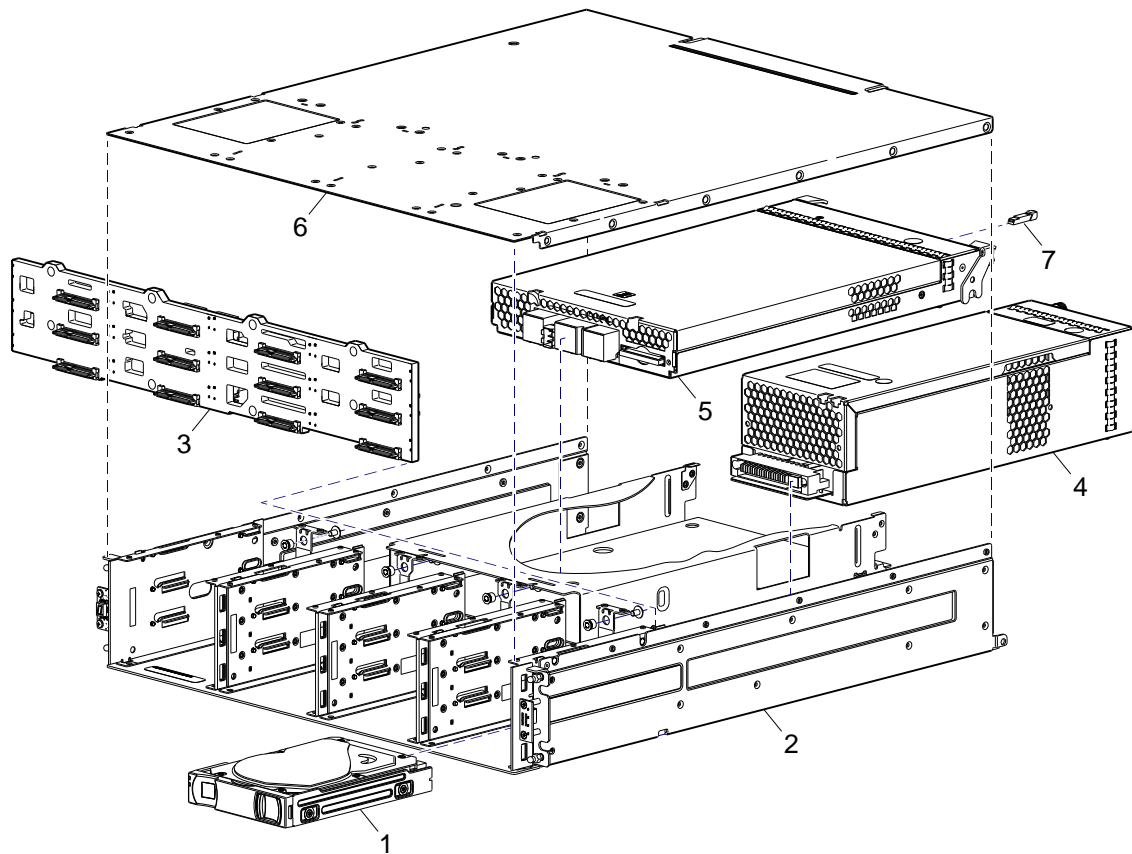


Figure 13 Controller enclosure exploded view (reduced-depth 2U12)

The enclosure illustration above intentionally does not show exploded ear covers. See Figure 14 on page 25 for an illustration showing how the bezel aligns for attachment to the enclosure front panel, via press-fit onto four mounting ball studs located on chassis ears.

Enclosure bezel for 12-drive reduced-depth model

The reduced-depth 12-drive enclosure includes a bezel sub-assembly that attaches to the front of the chassis (see Figure 14 on page 25). The bezel — comprised of a vented cover attached to an EMI (Electromagnetic Interface) shield — is pre-assembled and foam-packed within a box contained in the enclosure master shipping container. The bezel might optionally include a removable air filter that can be serviced or replaced. Hard copy instructions for attaching/removing the bezel, and for servicing or replacing the air filter, are provided in the shipping container of a new enclosure.

Alternatively, you can access the document online. See Dot Hill's customer resource center (CRC) web site for additional information: <http://crc.dothill.com>.

Select **AssuredSAN & R/Evolution Products > 3000 Series** to download the AssuredSAN 12-drive Enclosure Bezel Kit Installation document.

△ **CAUTION:** Whether configured with or without an air filter, to ensure adequate EMI protection for the disk drives, the bezel should be properly installed while the enclosure is in operation.

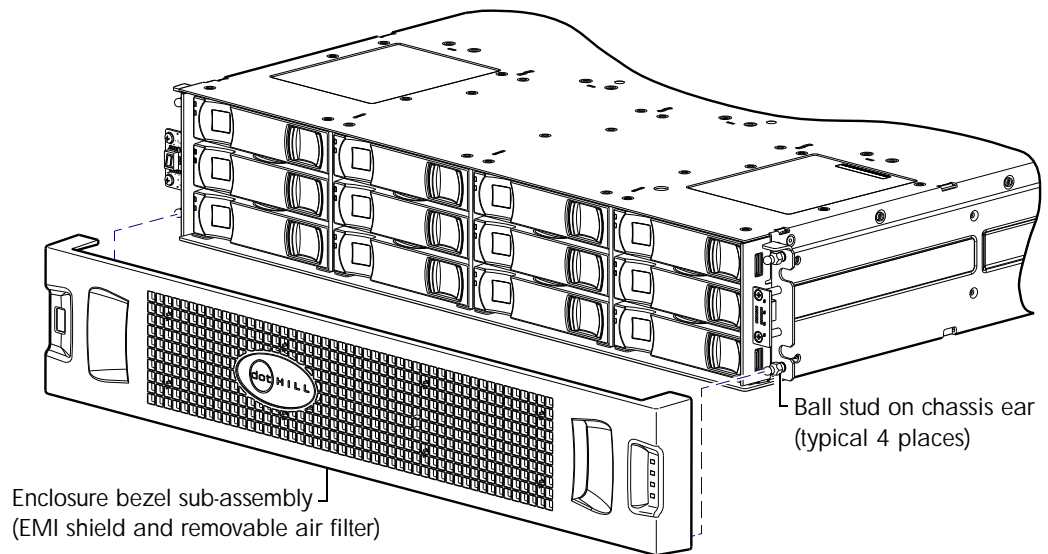


Figure 14 Partial controller enclosure assembly showing bezel alignment (reduced-depth 2U12)

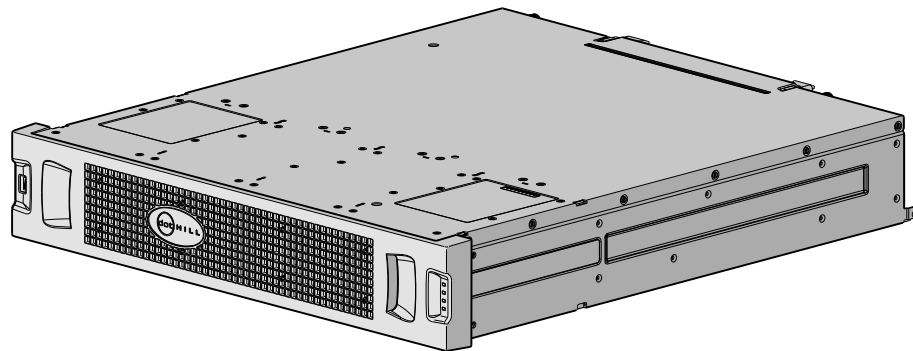


Figure 15 Controller enclosure assembly with bezel installed (reduced-depth 2U12)

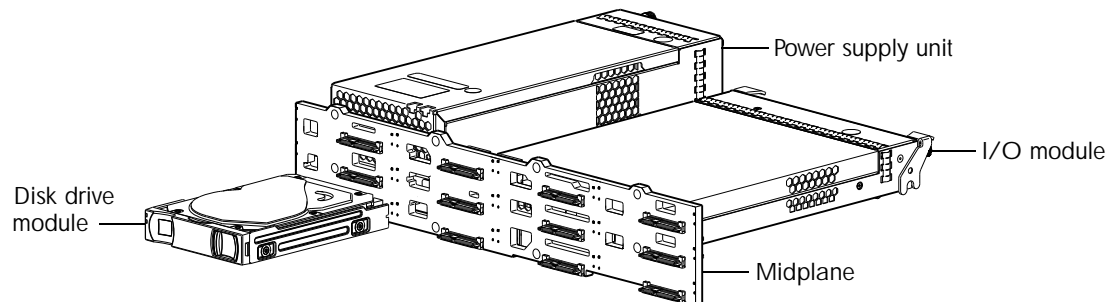


Figure 16 Enclosure architecture — internal components sub-assembly (reduced-depth 2U12)

2 Procedures

This chapter provides procedures for replacing FRUs (field-replaceable units), including precautions, removal instructions, installation instructions, and verification of successful installation. Each procedure addresses a specific task. Certain procedures refer to related documentation. See [Related documentation](#) on page 9 for a list of these documents and where to find them online.

Electrostatic discharge

Before you begin *any* of the procedures, consider the following precautions and preventive measures.

Preventing electrostatic discharge

To prevent electrostatic discharge (ESD) from damaging the system, be aware of the precautions to consider when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

△ **CAUTION:** Parts can be damaged by electrostatic discharge. Follow these precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
 - Keep electrostatic-sensitive parts in their containers until they arrive at static-protected workstations.
 - Place parts in a static-protected area before removing them from their containers.
 - Avoid touching pins, leads, or circuitry.
 - Always be properly grounded when touching a static-sensitive component or assembly.
 - Remove clutter (plastic, vinyl, foam) from the static-protected workstation.
-

Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Adhere to the following precautions when handling or installing electrostatic-sensitive parts.

△ **CAUTION:** Parts can be damaged by electrostatic discharge. Use proper anti-static protection:


- Keep the replacement FRU in the ESD bag until needed; and when removing a FRU from the enclosure, immediately place it in the ESD bag and anti-static packaging.
 - Wear an ESD wrist strap connected by a ground cord to a grounded workstation or unpainted surface of the computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm (\pm 10 percent) resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
 - If an ESD wrist strap is unavailable, touch an unpainted surface of the chassis before handling the component.
 - Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
 - Use conductive field service tools.
 - Use a portable field service kit with a folding static-dissipating work mat.
-

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part. For more information on static electricity or assistance with product installation, contact an authorized reseller.

Replacing chassis FRU components

Chassis FRUs replace a damaged chassis or chassis components. A fully functional chassis requires successful installation of the following components:

- One or two controller modules of the same model (for a given controller enclosure)*
See [Replacing a controller module or expansion module](#) on page 29 for more information.
- All disk drives and air management modules
See [Replacing a disk drive module](#) on page 36 for more information.
- Two power supply units of the same type (AC or DC)
See [Replacing a power supply module](#) on page 40 for more information.
- Two ear bezels (complementary left and right ear kits)
See [Replacing ear bezels](#) on page 46 for more information.

 **NOTE:** Some product models use an enclosure bezel instead of ear covers. If your model is equipped with a bezel instead of ear covers, see the enclosure bezel kit installation document provided in your product ship kit:

- See [Figure 7](#) on page 19 for 2U24 enclosure bezel alignment.
- See [Figure 14](#) on page 25 for reduced-depth 2U12 enclosure bezel alignment.


-
- One or two expansion modules of the same model (per optional drive enclosure)*
[Replacing a controller enclosure chassis](#) on page 51 for more information.


*For enclosures equipped with a single I/O module (IOM), the lower IOM slot within the chassis is empty, and must be covered with an IOM blank to allow optimum airflow through the enclosure during operation.


In addition to the FRUs identified above, replacement procedures are provided to address specific interface protocols and replacement of the enclosure chassis:

- Removal and installation of a Fibre Channel transceiver
See [Replacing a Fibre Channel transceiver](#) on page 49 for more information.
- Removal and installation of a 10GbE SFP+ module
See [Replacing a 10GbE SFP+ transceiver](#) on page 51 for more information.
- Removal and installation of a controller enclosure chassis
See [Replacing a controller enclosure chassis](#) on page 51 for more information.


Replacement of chassis FRU components are described within this chapter.

 **NOTE:** AssuredSAN 3000 Series controller enclosures support hot-plug replacement of redundant controller modules, fans, power supplies, and I/O modules. Hot-add of drive enclosures is also supported.

 **TIP:** Many procedures refer to component LEDs and LED status. See the AssuredSAN 3000 Series Setup Guide for descriptions of model-specific front panel and rear panel LEDs.

 **TIP:** Within the AssuredSAN 3000 Series Setup Guide, see “Troubleshooting > Fault isolation methodology” for information about using health icons/values — in addition to using LEDs — for verifying component failure before actually replacing the FRU.

Replacing a controller module or expansion module


 **IMPORTANT:** The replacement controller is pre-loaded with TS200 or later firmware. This requires that a second controller — in a dual-controller configuration — be upgraded to the same code version in order to operate properly. It is required that the system be upgraded to TS200 or later firmware prior to installing the replacement controller.


For more information, contact Dot Hill support at 1-877-368-7924 (U.S.); 1-760-931-5500, option 2 (outside U.S.); e-mail: support@dothill.com.


In a dual-controller configuration, controller and expansion modules are hot-swappable, which means you can replace one module without halting I/O to virtual disks (vdisk), or powering off the enclosure. In this case, the second module takes over operation of the storage system until you install the new module.

In a single-controller configuration, you must halt I/O to vdisks, and power off the enclosure. You may need to replace a controller or expansion module when:

- The Fault/Service Required LED is illuminated
 - Events in RAIDar indicate a problem with the module
 - Troubleshooting indicates a problem with the module
-

 **NOTE:** With TS230 or later firmware, 3920/3930, 3723/3733, 3720/3730, 3420/3430, and 3320/3330 models support AssuredRemote replication; whereas 3523/3533 and 3520/3530 models do not.

 **IMPORTANT:** Replication is not supported on 3723/3733 controller enclosures equipped with a single controller module.

 **CAUTION:** When replacing a 3000 Series controller set supporting AssuredRemote with a 3000 Series controller set that does not support this licensed feature (e.g., 3520/3530), you must first delete all replication sets before swapping the controller modules. Not doing so will lead to unexpected results, and there is no way to delete replication sets after the installation. See the following for additional information:

- Upgrade document supporting your product
 - AssuredSAN 3000 Series Using Data Protection Software
 - AssuredSAN 3000 Series RAIDar User Guide
 - AssuredSAN 3000 Series CLI Reference Guide
-

Before you begin

Removing a controller or expansion module from an operational enclosure significantly changes air flow within the enclosure. Openings must be populated for the enclosure to cool properly. Leave modules in the enclosure until ready to install a replacement. For controller enclosures configured with a single controller module, a companion IOM blank must be properly installed in the bottom controller module slot. Single-controller enclosures can be upgraded to dual-controller status. If replacing the controller module in a single-controller enclosure, or if replacing both controllers in a dual-control enclosure, use RAIDar to record configuration settings before installing the new controller modules. See [Removing a controller module](#) on page 33, and [Installing a controller module or expansion module](#) on page 34 for instructions on installing an additional controller module.

-
- △ **CAUTION:** When replacing a controller module, ensure that less than 10 seconds elapse between inserting it into a slot and fully latching it in place. Failing to do so might cause the controller to fail. If it is not latched within 10 seconds, remove the controller module from the slot, and repeat the process.
-

Configuring partner firmware update

In a dual-controller system in which Partner Firmware Update (PFU) is enabled, when you update firmware on one controller, the system automatically updates the partner controller. Disable partner firmware update *only* if requested by a service technician.

Use RAIDar or the CLI to change the partner firmware update setting.

Using RAIDar

1. Sign-in to RAIDar using default user `manage` and password `!manage`.
If the default user or password — or both — have been changed for security reasons, enter the secure login credentials instead of the system defaults shown above.
2. In the Configuration View panel, right-click the system and select **Configuration > Advanced Settings > Firmware**.
3. Either select (enable) or clear (disable) the **Partner Firmware Update** option.
4. Click **Apply**.

 **NOTE:** See AssuredSAN 3000 Series RAIDar User Guide for additional information.

Using the CLI

1. Log-in to the command-line interface (CLI) using default user `manage` and password `!manage`.
If the default user or password — or both — have been changed for security reasons, enter the secure login credentials instead of the system defaults shown above.
2. To verify that partner firmware upgrade is enabled, run the following command:

```
show advanced-settings
```
3. If partner firmware upgrade is disabled, enable it by running the following command:

```
set advanced-settings partner-firmware-upgrade enabled
```

 **NOTE:** See AssuredSAN 3000 Series CLI Reference Guide for additional information.


Verifying component failure

Select from the following methods to verify component failure:

- Use RAIDar to check the health icons/values of the system and its components to either ensure that everything is okay, or to drill down to a problem component. RAIDar uses health icons to show OK, Degraded, Fault, or Unknown status for the system and its components. If you discover a problem component, follow the actions in its Health Recommendations field to resolve the problem.
- As an alternative to using RAIDar, you can run the `show system` command in the CLI to view the health of the system and its components. If any component has a problem, the system health will be Degraded, Fault, or Unknown. If you discover a problem component, follow the actions in its Health Recommendations field to resolve the problem.
- Monitor event notification — With event notification configured and enabled, use RAIDar to view the event log, or use the CLI to run the `show events detail` command to see details for events.
- Check Fault/Service Required LED (back of enclosure): Amber = Fault condition
- Check that the FRU OK LED (back of enclosure) is off

Stopping I/O

When troubleshooting drive and connectivity faults, ensure you have a current full backup. As an additional data protection precaution, stop all I/O to the affected vdisks.

 **IMPORTANT:** Stopping I/O to a vdisk is a host-side task, and falls outside the scope of this document.


When on-site, you can verify that there is no I/O activity by briefly monitoring the system LEDs; however, when accessing the storage system remotely, this is not possible. Remotely, you can use the `show vdisk-statistics` command to determine if input and output has stopped. Perform the steps below:

1. Using the CLI, run the `show vdisk-statistics` command.
The `Number of Reads` and `Number of Writes` outputs show the number of these operations that have occurred since the statistic was last requested.
2. Run the `show vdisk-statistics` command a second time.
This provides you a specific window of time (the interval between requesting the statistics) to determine if data is being written to or read from the disk.
3. If any reads or writes occur during this interval, a host is still reading from or writing to this vdisk. Continue to stop IOPS from hosts, and repeat step 1 until the `Number of Reads` and `Number of Writes` statistic are zero.

 **NOTE:** See AssuredSAN 3000 Series CLI Reference Guide for additional information.

Shutting down a controller module

Shutting down the Storage Controller in a controller module ensures that a proper failover sequence is used, which includes stopping all I/O operations and writing any data in write cache to disk. If the Storage Controller in both controller modules is shut down, hosts cannot access the system's data. Perform a shut down before removing a controller module or powering down the system.

 **CAUTION:** You can continue to use the CLI when either or both Storage Controllers are shut down, but information shown might be invalid.

Use RAIDar or the CLI to perform a shut down.

Using RAIDar

1. Sign-in to RAIDar using default user `manage` and password `!manage`.
If the default user or password — or both — have been changed for security reasons, enter the secure login credentials instead of the system defaults shown above.
2. In the Configuration View panel, right-click the system and select **Tools > Shut Down or Restart Controller**.
3. In the main panel, set the options:
 - Select the **Shut down** operation.
 - Select whether to restart the processor in controller A, B, or both.
4. Click **Shut down now**. A confirmation dialog appears.
5. Click **Yes** to continue; otherwise click **No**. If you clicked Yes, a second confirmation dialog appears.
6. Click **Yes** to continue; otherwise click **No**. If you clicked Yes, a message describes shutdown activity.

 **NOTE:** If an iSCSI port is connected to a Microsoft Windows host, the following event is recorded in the Windows event log: `Initiator failed to connect to the target`.

 **NOTE:** See AssuredSAN 3000 Series RAIDar User Guide for additional information.

Using the CLI

1. Log-in to the CLI using default user `manage` and password `!manage`.
If the default user or password — or both — have been changed for security reasons, enter the secure login credentials instead of the system defaults shown above.
2. In a dual-controller system, verify that the partner controller is online by running the command:

```
show redundancy-mode
```
3. Shut down the failed controller — A or B — by running the command:

```
shutdown a or shutdown b
```


The blue OK to Remove LED (back of enclosure) illuminates to indicate that the controller module can be safely removed.
4. Illuminate the identification LED of the enclosure that contains the controller module to remove by running the command:

```
set led enclosure 0 on
```


 **NOTE:** See AssuredSAN 3000 Series CLI Reference Guide for additional information.

Removing a controller module or expansion module

IMPORTANT:

- In a single-controller configuration, if you desire to transport CompactFlash to a replacement controller, remove the controller module only after the cache is copied to CompactFlash, which is indicated by the Cache Status LED being off. Transporting of cache **must** be performed by a qualified service technician.
- In a single-controller environment, you must stop I/O and power off the enclosure before replacing the controller module.
- In a dual-controller environment, you may hot-replace a controller module in an operational enclosure, provided you first shut down the faulty controller using either RAIDar or the CLI.

See CAUTION bullets regarding “electrostatic discharge” and “anti-static protection” on [page 27](#).

 **NOTE:** Within these procedures, illustrations featuring controller module face plates are generic. They do not show host ports, and they pertain to all 3000 Series controller module models. For illustrations of model-specific controller face plates, see the AssuredSAN 3000 Series Setup Guide.

1. Verify that you have successfully shut down the controller module using RAIDar or the CLI.
2. Locate the enclosure whose Unit Locator LED (front right ear) is illuminated, and within the enclosure, locate the controller module whose OK to Remove LED is blue (rear panel).
3. Disconnect any cables connected to the controller.
Label each cable to facilitate re-connection.
4. Turn the thumbscrews counterclockwise until they disengage from the controller (see [Figure 17](#) on page 33).

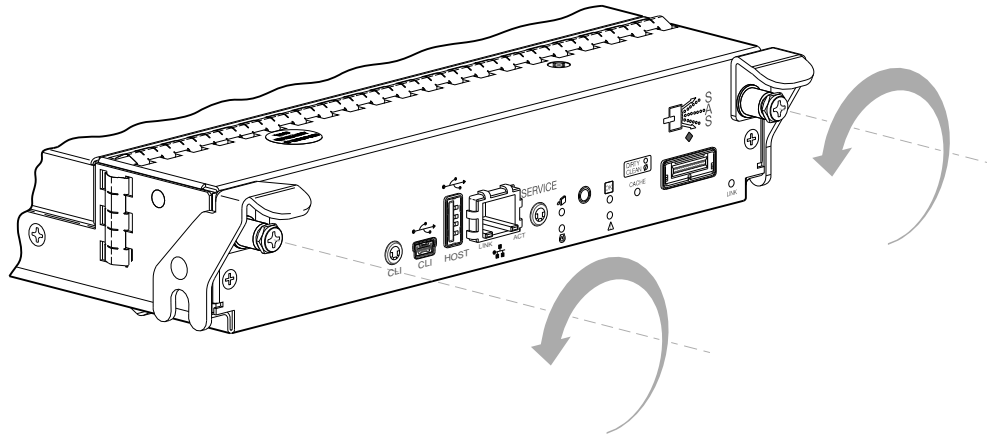


Figure 17 Disengaging a controller module

5. Press both latches downward to disconnect the controller module from the midplane (see [Figure 18](#)).

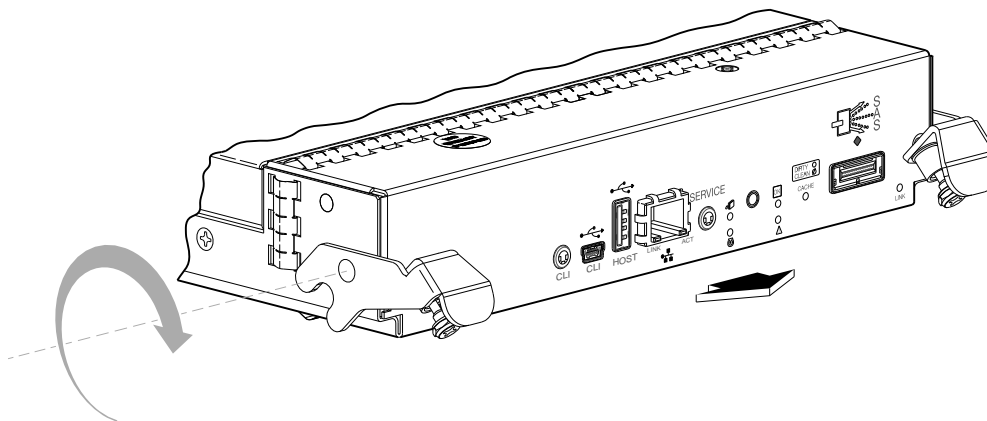


Figure 18 Extracting a controller module

6. Pull the controller module straight out of the enclosure (see [Figure 19](#)).

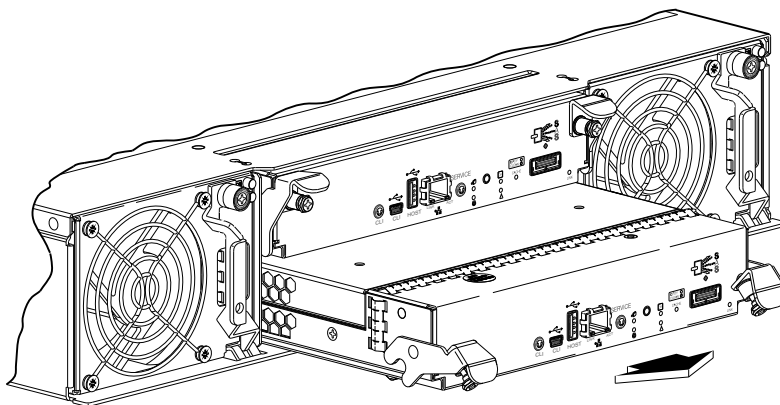


Figure 19 Removing a controller module

Installing a controller module or expansion module

TIP: You can install a controller module into an enclosure that is powered on, provided you wait 60 seconds after removing the old controller module. Check controller and midplane power connectors before inserting the new controller module into the enclosure.

See CAUTION bullets regarding “electrostatic discharge” and “anti-static protection” on [page 27](#).

1. Loosen the thumbscrews; press the latches downward (see [Figure 20](#)).
2. Slide the controller module into the enclosure as far as it will go (1).
A controller module that is only partially-seated will prevent optimal performance of the controller enclosure. Verify that the controller module is fully-seated before continuing.
3. Press the latches upward to engage the controller module (2); turn the thumbscrews clockwise until finger-tight.
4. Reconnect the cables.

NOTE: See the web-posted 3000 Series Setup Guide for cabling information.

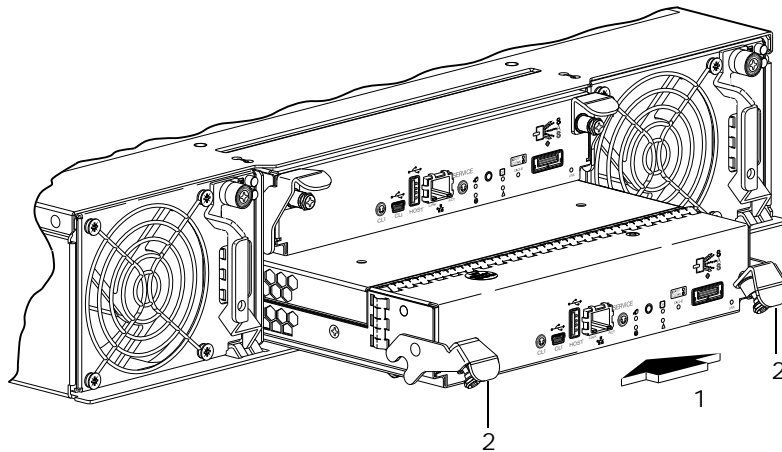


Figure 20 Inserting a controller module

IMPORTANT: In a dual-controller system in which partner firmware update is enabled, when you update firmware on one controller, the system automatically updates the partner controller.

Verifying component operation

After replacing the controller module, verify that the FRU OK LED (rear panel) illuminates green, indicating that the controller has completed initializing, and is online/operating normally. It may take two to five minutes for the replacement controller to become ready. If you are replacing either controller module, and partner firmware update is enabled, you may need to wait 30 minutes to ensure that the two controllers — with their respective ownership of the vdisks — have enough time to fully stabilize.


Use RAIDar or the CLI to perform a restart *only* if necessary.

Using RAIDar

1. Sign-in to RAIDar using default user `manage` and password `!manage`.

If the default user or password — or both — have been changed for security reasons, enter the secure login credentials instead of the system defaults shown above.

2. In the Configuration View panel, right-click the system and select **Tools > Shut Down or Restart Controller**.
3. In the main panel, set the options:
 - Select the **Restart** operation.
 - Select whether to restart the processor in controller A, B, or both.
4. Click **Restart now**. A confirmation dialog appears.
5. Click **Yes** to continue; otherwise click **No**. If you clicked Yes, a second confirmation dialog appears.
6. Click **Yes** to continue; otherwise click **No**. If you clicked Yes, a message describes restart activity.

 **NOTE:** If an iSCSI port is connected to a Microsoft Windows host, the following event is recorded in the Windows event log: A connection to the target was lost, but Initiator successfully reconnected to the target.

Using the CLI

If the enclosure's Unit Locator LED is on, run the following command to turn it off:

```
set led enclosure 0 off
```


If the Fault/Service Required LED is amber, the controller module has not gone online, and likely failed its self-test. Put the module online by restarting the controller, or by checking the event log for errors. To restart the controller (A or B), run the following command:

```
restart sc a or restart sc b
```

 **TIP:** See the AssuredSAN 3000 Series Setup Guide for descriptions of model-specific LEDs.


Updating firmware

You can view the current versions of firmware in controller modules, expansion modules (in drive enclosures), and disks, and you can also install new firmware versions.

 **TIP:** To ensure success of an online update, select a period of low I/O activity. This helps the update complete as quickly as possible and avoids disruptions to hosts and applications due to timeouts. Attempting to update a storage system that is processing a large, I/O-intensive batch job will likely cause hosts to lose connectivity with the storage system.

A controller enclosure can contain one or two controller modules. In a dual-controller system, both controllers should run the same firmware version. Storage systems in a replication set must run the same firmware version. You can update the firmware in each controller module by loading a firmware file obtained from the enclosure vendor.

If you have a dual-controller system and the PFU option is enabled, when you update one controller, the system automatically updates the partner controller. If PFU is disabled, after updating firmware on one controller, you must log into the partner controller's IP address and perform this firmware update on that controller also.

 **NOTE:** If a vdisk is quarantined, firmware update is not permitted due to the risk of losing unwritten data that remains in cache for the vdisk volumes. Before you can update firmware, you must resolve the problem that is causing the vdisk to be quarantined, as described in the "Removing a vdisk from quarantine" topic in the RAIDar user guide or online help.

For best results, the storage system should be in a healthy state before starting firmware update.

You can update firmware using RAIDar or using FTP (File Transfer Protocol). See the AssuredSAN 3000 Series RAIDar User Guide for more information.

Replacing a disk drive module

A disk drive module consists of a disk in a sled. Disk drive modules are hot-swappable, which means they can be replaced without halting I/O to the vdisks, or powering off the enclosure. The new disk drive module must be of the same type, and possess capacity equal to or greater than the one being replaced. Otherwise, the storage system cannot use the new disk to reconstruct the vdisk (see “About vdisks” and “About disk failure and vdisk reconstruction” topics in the RAIDar user guide).

Air management modules

An air management module looks like a disk drive module; however, it is an empty box — also known as a *blank* — used to maintain optimum air flow for proper cooling within an enclosure. Air management modules are installed in slots missing disk drive modules. If you must remove a disk drive module, but cannot immediately replace it, you must either leave the faulty module in place, or insert an air management module in its place.

The blank is installed using the same procedure as [Installing a disk drive module](#) on page 38. Similarly, the blank is removed using the same procedures as [Removing a disk drive module](#) on page 36.

Before you begin

△ **CAUTION:** Removing either a disk drive module or blank impacts the airflow and cooling ability of the enclosure. If the internal temperature exceeds acceptable limits, the enclosure may overheat, and automatically shut down or restart. To avoid potential overheating, wait 20 seconds to allow the internal disks to stop spinning, then insert the new disk drive module or blank.

See CAUTION bullets regarding “electrostatic discharge” and “anti-static protection” on [page 27](#).

Verifying component failure

Before replacing a disk, perform the following steps to ensure that you have correctly identified the module requiring removal and replacement.

△ **CAUTION:** Failure to identify the correct disk drive module could result in data loss if the wrong disk is removed from the enclosure.

When a disk drive fault occurs, the failed disk’s fault indicator LED, located on the enclosure’s front panel, illuminates solid amber (see the AssuredSAN 3000 Series Setup Guide for a description of LEDs and disk drive slot numbering for your enclosure). You can determine from visual inspection which disk in the enclosure is experiencing a fault/failure using the fault LED for your disk type.

📋 **NOTE:** For enclosures equipped with a dust filtration bezel, you must remove the bezel to view the disk drive LEDs. Enclosure status LEDs are visible on the labeled bezel.

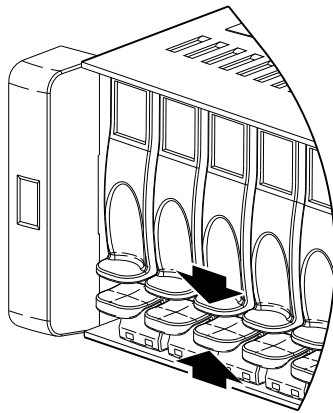
See the enclosure bezel kit installation document in your product ship kit for information about removing and installing the bezel, or for instructions about servicing or replacing the bezel air filter. Alternatively, you can observe disk component health using management interfaces to verify component failure or component operation (see [Using management interfaces](#) on page 55 for more information).

Removing a disk drive module

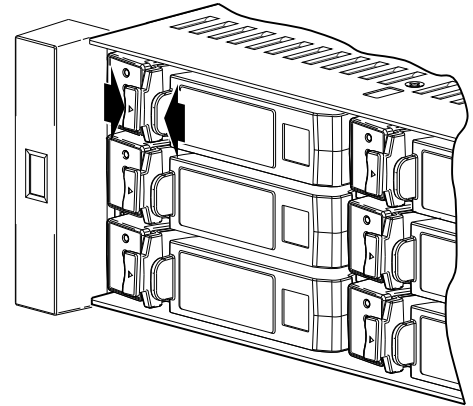
1. Follow *one* of the three sub-steps below, according to your product disk drive type (see [Figure 21](#) on page 37):

- a. SFF disk — Squeeze the latch release flanges together to disengage the disk drive module.
- b. LFF disk (standard-depth enclosure) — Squeeze the latch release flanges inward to disengage the disk drive module.
- c. LFF disk (reduced-depth enclosure) — Slide the release latch to the left to disengage the disk drive module.

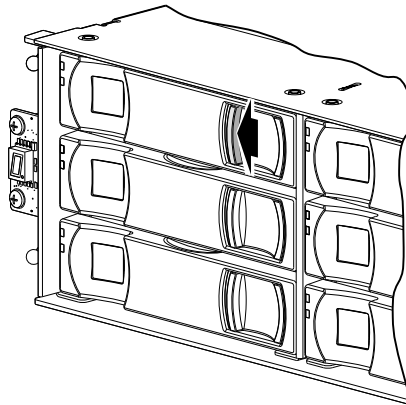
Moving the latch to the left will provide a clicking sound and cause the spring to move its position inside the chassis, partially ejecting the the disk from its installed position within the disk drive slot.



SFF 2.5" disk or blank



LFF 3.5" disk or blank
(standard-depth enclosure)

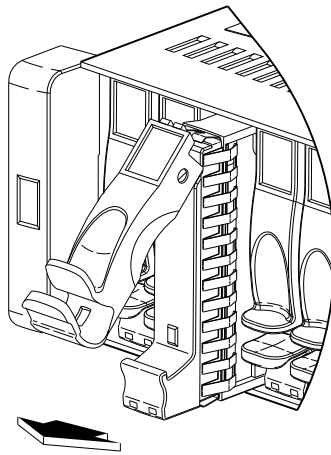


LFF 3.5" disk or blank
(reduced-depth enclosure)

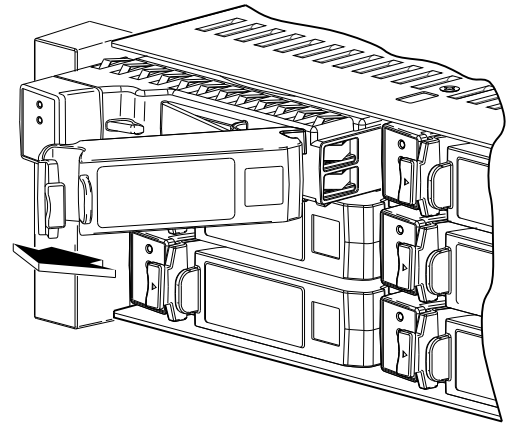
The enclosure bezel is removed in the illustration at left to show disks.

Figure 21 Disengaging a disk drive module or blank

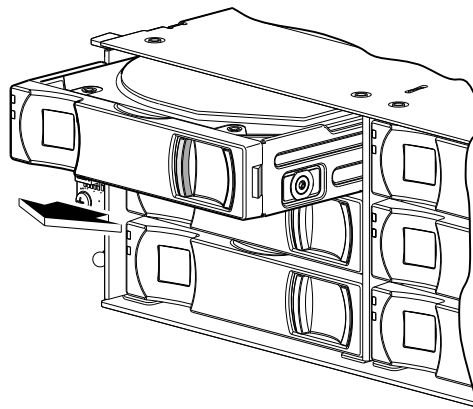
2. Wait 20 seconds for the internal disks to stop spinning.
3. Follow *one* of the three sub-steps below, according to your product disk drive type (see [Figure 22](#) on page 38):
 - a. SFF disk — Pull the disk drive module straight out of the chassis, taking care not to drop the module.
 - b. LFF disk (standard-depth enclosure) — Pull the disk drive module straight out of the chassis, taking care not to drop the module.
 - c. LFF disk (reduced-depth enclosure) — Once the disk drive module partially ejects from the slot, grasp the module firmly, and carefully pull it straight out of the chassis slot.



Extract SFF disk or blank



Extract LFF disk or blank
(standard-depth enclosure)



Eject and extract LFF disk or blank
(reduced-depth enclosure)

The enclosure bezel is removed in the illustration at left to show disks.

Figure 22 Removing a disk drive module or blank

Installing a disk drive module

1. Follow *one* of the three sub-steps below, according to your product disk drive type:
 - a. SFF disk — Squeeze the latch release flanges together, and then pull the latch, rotating it upward until it is fully open (see [Figure 21](#) on page 37).
 - b. LFF disk (standard-depth enclosure) — Squeeze the latch release flanges inward, and then pull the latch, rotating it outward until it is fully open (see [Figure 21](#) on page 37).
 - c. LFF disk (reduced-depth enclosure) — No action required.
Proceed to step 2 below.
2. Follow *one* of the three sub-steps below, according to your product disk drive type:
 - a. SFF disk — with the LEDs oriented to the bottom, slide the disk drive module into the drive slot as far as it will go (see upper left illustration in [Figure 23](#) on page 39).
 - b. LFF disk (standard-depth enclosure) — with the LEDs oriented to the left, slide the disk drive module into the drive slot as far as it will go (see upper right illustration in [Figure 23](#) on page 39).
 - c. LFF disk (reduced-depth enclosure) — with the LEDs oriented to the left, slide the disk drive module into the drive slot as far as it will go (see bottom illustration in [Figure 23](#) on page 39).

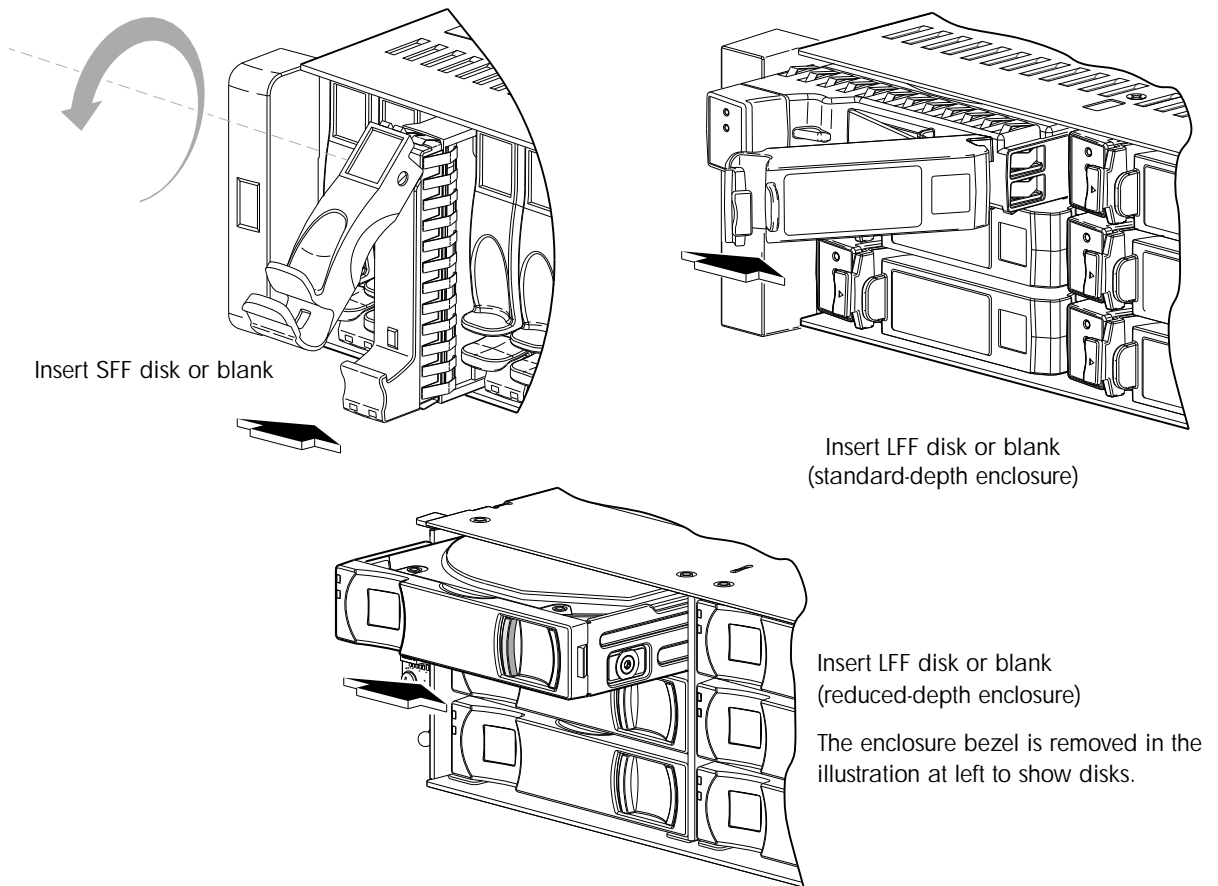



Figure 23 Installing a disk drive module or blank

3. Follow *one* of the three sub-steps below, according to your product's disk drive type:
 - a. SFF disk — Rotate the latch downward until it clicks closed to firmly seat the disk drive module in the enclosure midplane.
 - b. LFF disk (standard-depth enclosure) — Rotate the latch inward until it clicks closed to firmly seat the disk drive module in the enclosure midplane.
 - c. LFF disk (reduced-depth enclosure) — Verify that you have inserted the disk drive module into the slot as far as it will go, to ensure that the module is firmly seated in the enclosure midplane.

The installed disk drive module should now appear as shown in [Figure 21](#) on page 37.

 **NOTE:** Allow at least 30 seconds to elapse when jointly completing the “Removing a disk drive module” and “Installing a disk drive module” procedures.

If using RAIDar, execute steps 4 and 5 to complete this procedure. If using the CLI, execute steps 6 and 7 to complete this procedure.

Using RAIDar:

4. Sign in to RAIDar (use default user `manage` and password `!manage`, or the appropriate username and password if they have been changed).
5. View the System Overview panel to determine whether the health of the new disk is OK. If the health is OK, then the disk drive module installation process is complete. If the health is not OK, then in the Configuration View panel, select the enclosure that the new disk is in to display the Enclosure Overview panel, then select the disk and view details about it, such as Status and Health Recommendations.

Using the CLI:

6. Log in to the CLI (use default user `manage` and password `!manage`, or the appropriate username and password if they have been changed).
7. To view information about disks, run the following command:

```
show disks <disk-ID>
```

Disks are specified by enclosure ID and slot number. Enclosure IDs increment from 1. Disk IDs increment from 1 in each enclosure (e.g., `show disks 1.7`). Entering the command shown above will display the disk health. If health is not OK, the command output will also display recommended actions.

Determine if a disk is missing

You can determine whether a disk is missing by using management interfaces.

Using RAIDar

1. Sign-in to RAIDar using default user `manage` and password `!manage`.
If the default user or password — or both — have been changed for security reasons, enter the secure login credentials instead of the system defaults shown above.
2. In the Configuration View panel, right-click on the appropriate enclosure under **Physical**.
 - Select the **Front Graphical** tab to display a pictorial representation of disks within slots and the supporting enclosure table showing properties and values.
 - Select the **Front Tabular** tab to display the Enclosure's Front View data table and supporting enclosure table showing properties and values.
3. Using the graphical and tabular views, look for gaps in the disk location sequence to determine if a disk is missing.

Using the CLI


1. Log-in to the command-line interface (CLI) using default user `manage` and password `!manage`.
If the default user or password — or both — have been changed for security reasons, enter the secure login credentials instead of the system defaults shown above.
2. To determine location of a missing or faulty drive, run the following command:

```
show disks
```

The command outputs a listing of detected disks' properties by location. Review the information, and look for gaps in the disk location sequence to determine whether any disks are missing.

Verifying component operation


Check that the Power/Activity/Fault LED (LFF disks) or Power/Activity LED (SFF disks) — located on the front face of the disk drive's escutcheon — is illuminated green. On LFF disks, this is the bottom LED. On SFF disks, this is the left LED. Both sets of LEDs are shown in [Figure 23](#) on page 39.

 **TIP:** See the AssuredSAN 3000 Series Setup Guide for descriptions of disk drive LEDs and other front panel LEDs pertaining to 2U12 and 2U24 controller enclosures.

Also see [Using management interfaces](#) on page 55 as an alternative to physically observing LEDs to verify component operation.

Replacing a power supply module

This section provides procedures for replacing a failed AC or DC power supply module, also referred to as a power supply unit (PSU).


 **CAUTION:** Power supply FRU replacement activities can cause enclosure cables to disconnect and disks to go offline.

When replacing a power supply FRU, you might accidentally disconnect cables, causing disks to go offline. As a precaution — before installing or replacing a FRU — you should stop I/O to all vdisks. If stopping I/O is not possible, the next best action is to defer FRU replacement until such time as it is possible to stop all I/O. If immediate replacement is necessary during I/O, ensure that all cables are securely fastened, and *proceed with great caution* as you replace the power supply FRU within the controller enclosure. Be very careful if moving a cabled/operational enclosure during the FRU replacement process.

A single PSU is sufficient to maintain operation of the enclosure. You need not halt operations and completely power-off the enclosure when replacing only one PSU; however, a complete shutdown is required if replacing both power supply units.

 **TIP:** [Power supply faults and recommended actions](#) on page 41 provides additional information.

Before you begin

 **CAUTION:** Removing a power supply unit significantly disrupts the enclosure's airflow. Do not remove the PSU until you have received the replacement module.

See CAUTION bullets regarding “electrostatic discharge” and “anti-static protection” on [page 27](#).

Verifying component failure

When either a fan or power supply component fails, RAIDar provides notification; faults are recorded in the event log; and the PSU's status LED color changes to amber to indicate a fault condition.

Table 7 Power supply faults and recommended actions

Problem	Recommended action
Power supply fan warning or failure, or power supply warning or failure Event code 168	<ul style="list-style-type: none">• Verify that all fans are working using RAIDar. In the Configuration View, expand Physical, right-click the enclosure and select View > Overview. Select either Rear Graphical or Rear Tabular to view health attributes.• Ensure that the power supply modules are properly seated and secured within their slots.• Ensure that no slots are left open for more than 2 minutes. If you must replace the FRU, leave the old module in place until the replacement arrives to maintain optimal airflow and avoid overheating.
Power supply module failure status, or voltage event notification Event code 168	<ul style="list-style-type: none">• Verify that the power supply module is powered on. If your power supply module has a power switch, verify that it is switched on.• Verify that the power cables are securely attached to the power supply module and the appropriate power source.• Replace the FRU if necessary.
AC Power Good LED is off	Same as above.
DC Voltage/Fan Fault/Service Required LED is illuminated	Replace the power supply module FRU.

Alternatively, you can observe power supply component health (PSUs, fans) using management interfaces to verify component failure or component operation (see [Using management interfaces](#) on page 55 for more information).

Power supply units

IMPORTANT: Newer AC power supply units do not have power switches. These PSUs power on when connected to a power source, and power off when disconnected.

Power cycling procedures vary according to the type of power supply included within the enclosure. For controller and expansion enclosures configured with AC PSUs that do not have power switches, refer to the procedure described under [AC PSU](#) below. For procedures pertaining to a) controller enclosures configured with DC PSUs, or b) previously installed drive enclosures featuring power switches, see [DC and AC PSUs with power switch](#) on page 43.

NOTE: AC PSUs — with or without a power switch — are compatible with one another in that the two different models can coexist in the same enclosure, and are interchangeable.

AC PSU

Enclosures configured with AC PSUs that do not have a power switch rely on the power cord for power cycling. Connecting the cord from the PSU power cord connector to the appropriate power source facilitates power on; whereas disconnecting the cord from the power source facilitates power off.

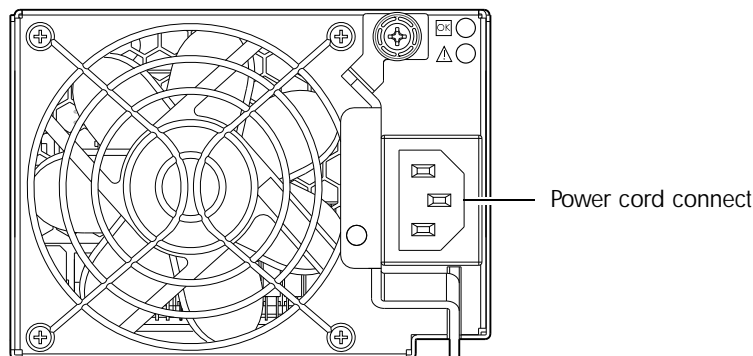


Figure 24 AC PSU

Powering off the PSU

1. Stop all I/O from hosts to the enclosure (see [Stopping I/O](#) on page 31).
2. Use management software to shut down any other system components necessary.
Given that power switch shut-off does not apply to this particular power supply model, proceed to disconnecting the AC power cord.

Disconnecting an AC power cord

1. Disconnect the power cord's male plug from the power source.
2. Disconnect the power cord's female plug from the power cord connector on the PSU.

NOTE: See [Connecting a power cable](#) on page 45 for an illustration showing AC power cord connection/disconnection.

DC and AC PSUs with power switch

DC and legacy AC power supplies — each equipped with a power switch — are shown below.

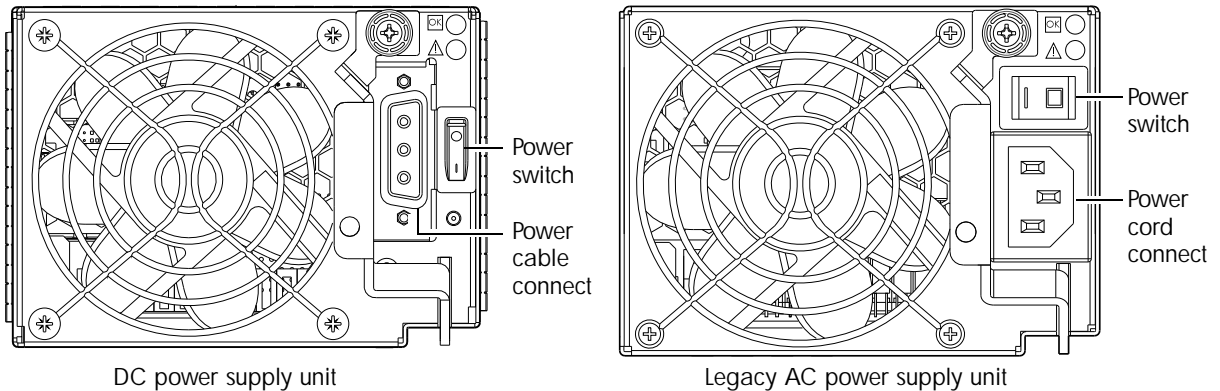



Figure 25 DC and AC PSUs with power switch

Powering off the PSU

1. Stop all I/O from hosts to the system (see [Stopping I/O](#) on page 31).
2. Use management software to shut down any other system components necessary.
3. If applicable, turn off the power switch on the PSU being replaced and on the replacement PSU.

Disconnecting an AC power cord

1. If applicable, verify that the power switch on the PSU being replaced is in the **Off** position.
2. Disconnect the power cord's male plug from the power source.
3. Disconnect the power cord's female plug from the power cord connector on the PSU.

 **NOTE:** See [Connecting a power cable](#) on page 45 for illustrations showing *both* AC and DC power cord connection/disconnection.

Disconnecting a DC power cable

1. Verify that the power switch on the PSU being replaced is in the **Off** position.
2. Loosen the cable-locking screws that attach each D-shell connector to its power supply, and carefully disconnect the lugs on each cable wire component of the DC power cable from the DC power source ([Figure 28](#) on page 45 shows cable wire lugs and D-shell connector).
3. Loosen the cable-locking screws attaching the D-shell connector to the PSU, and disconnect the power cable from the PSU.

Removing a power supply unit

1. If replacing a single power supply module via hot-swap, proceed to step3.
2. If replacing both power supply modules, verify that the enclosure is powered off.
If the PSU model has a power switch, verify that the switch is set to the **Off** position.
3. Verify that the power cord is disconnected.
4. Turn the thumbscrew at the top of the latch counterclockwise to loosen and disengage it from the module; however, do not remove the thumbscrew from the latch.
5. Rotate the latch downward by approximately 45° supplying leverage to disconnect the module from the internal connector.

See [Figure 26](#) on page 44.

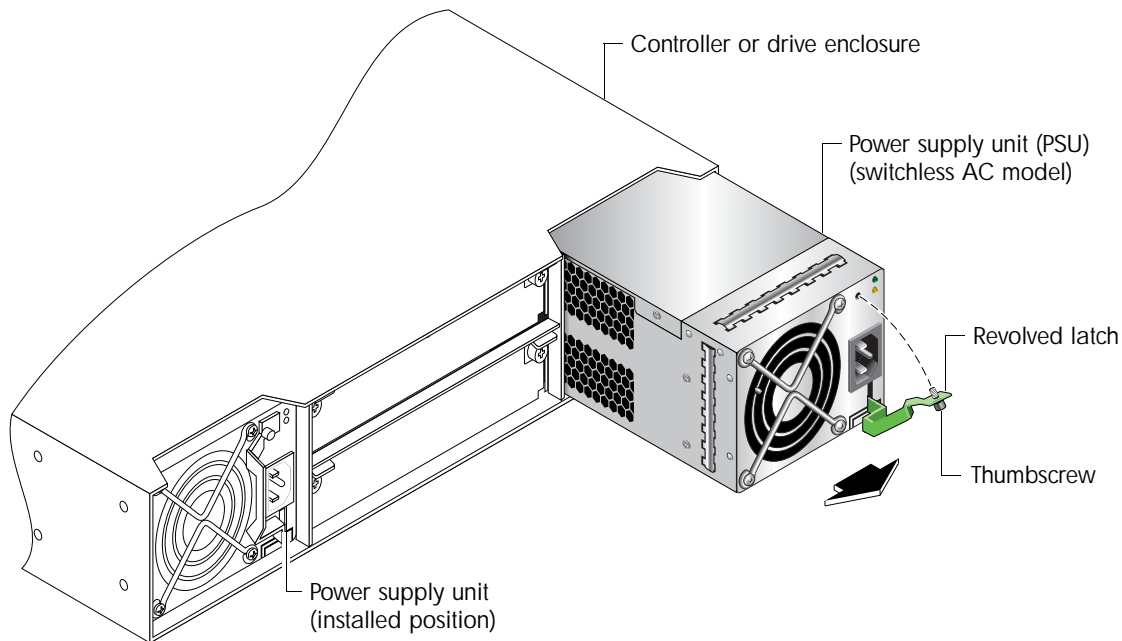
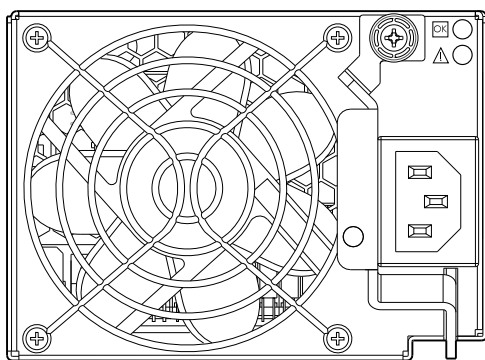


Figure 26 Removing a power supply unit

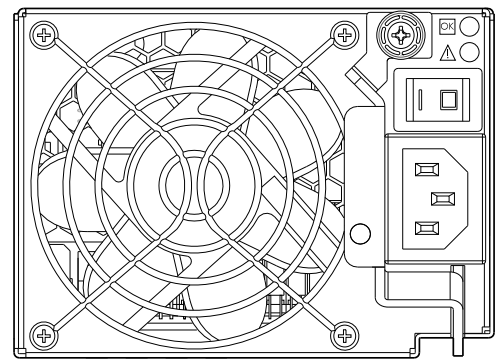
6. Use the latch to pull the module straight out of the chassis.
7. If replacing two power supply modules, repeat step 3 through step 6.

CAUTION: Do not lift the module by its latch; doing so could damage the latch. Lift and carry the module using its metal casing.

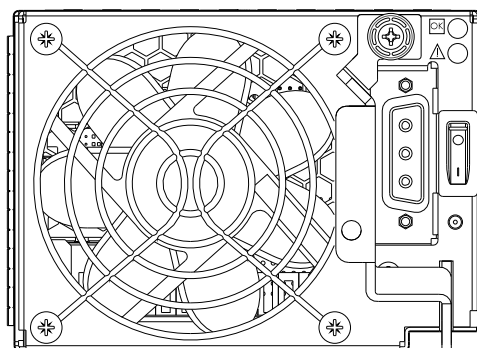
Installing a power supply unit



AC model without power switch



AC model with power switch




DC model with power switch

Figure 27 Orienting a power supply unit

To install a power supply module, perform the following steps:

1. Orient the PSU with the AC or DC connector toward the right as shown in [Figure 26](#) on page 44 and [Figure 27](#) on page 44, respectively.
2. With the latch in the open position, slide the module into the appropriate power supply slot as far as it will go.
3. Rotate the PSU latch upward until it is flush against the PSU face, ensuring that the connector on the PSU engages the connector inside the chassis.
4. Turn the thumbscrew located at the top of the power supply latch clockwise, until it is finger-tight, to secure the latch to the power supply unit within the enclosure.
5. If replacing two power supply modules, repeat step 1 through step 4.

 **NOTE:** AC PSUs — with or without a power switch — are compatible with one another in that the two different models can coexist in the same enclosure, and are interchangeable.

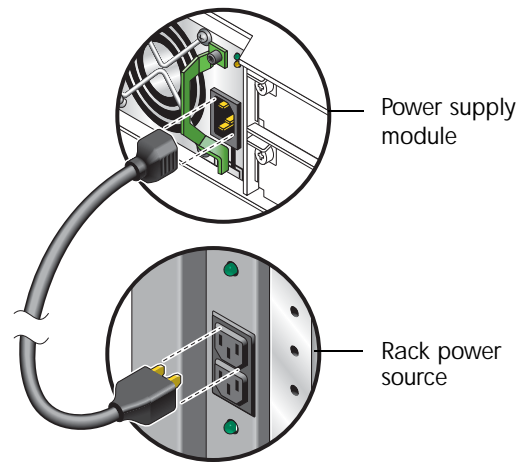
Connecting a power cable

This section addresses power cable connection for enclosures configured with either AC or DC power supply modules.

Connecting an AC power cord

The diagram at right pertains to AC PSU models (a switchless unit is shown).

1. Install the power cord:
 - a. Connect the female plug to the AC PSU cord inlet.
 - b. Connect the male plug to the rack power source.Verify connection of the primary power cord(s) from the rack to separate external power sources.
2. Power-on the newly-installed PSU:
 - Connecting the power cord effectively powers a switchless AC PSU on. Wait several seconds for the disks to spin up.
 - For AC PSUs equipped with a power switch, press the power switch to the **On** position. Wait several seconds for the disks to spin up.
3. If replacing two power supply modules, repeat step 1 through step 2.



Connecting a DC power cable

Locate the DC power cable that applies to the DC PSU being installed in the enclosure.

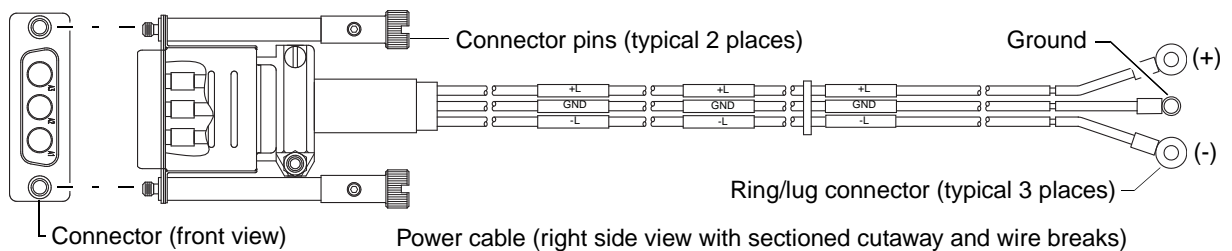
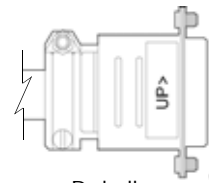


Figure 28 DC power cable featuring D-shell and lug connectors

1. Install the appropriate DC power cable:

- a. Connect a DC power cable to each DC power supply using the D-shell connector. Use the **UP>** arrow on the connector shell to ensure proper positioning (see adjacent left side view of D-shell connector).
- b. Tighten the screws at the top and bottom of the shell, applying a torque between 1.7 N-m (15 in-lb) and 2.3 N-m (20 in-lb), to securely attach the cable to the DC PSU.
- c. To complete the DC connection, secure the other end of each cable wire component of the DC power cable to the target DC power source.



D-shell
(left side view)

Check the three individual DC cable wire labels before connecting each cable wire lug to its power source. One cable wire is labeled *ground* (GND), and the other two are labeled *positive* (+L) and *negative* (-L), respectively (shown in [Figure 28](#) above).

△ **CAUTION:** Connecting to a DC power source outside the designated -48VDC nominal range (-36VDC to -72VDC) may damage the enclosure.

2. If you did not perform a hot-swap, power-on storage system components in the order indicated:
Drive enclosures *first*; controller enclosures *next*; data host *last* (if powered down for maintenance).

Verifying component operation

Examine PSU module status as indicated in the table below.

Table 8 Power supply unit LED descriptions

LED No./Description	Color	State	Definition
1 — Input Source Power Good	Green	On	Power is on and input voltage is normal.
		Off	Power is off, or input voltage is below the minimum threshold.
2 — Voltage/Fan Fault/Service Required	Amber	On	Output voltage is out of range, or a fan is operating below the minimum required RPM.
		Off	Output voltage is normal.

LEDs for a PSU are located in the top right corner of the module, as shown in [Figure 27](#) on page 44.

The top LED corresponds to LED number (1) above, and the bottom LED corresponds to number (2) above. If the Voltage/Fan Fault/Service Required LED is illuminated amber, the PSU module has not gone online, and likely failed its self-test. Remove and reinstall the PSU module. In addition to viewing the PSU LEDs, verify that the cooling fans are spinning. Also see [Using management interfaces](#) on page 55 as an alternative to physically observing LEDs to verify component operation.

Replacing ear bezels

Before you begin

△ **CAUTION:** Verify that you have the proper FRU kit (left or right) for the ear bezel that is being replaced.

See CAUTION bullets regarding “electrostatic discharge” and “anti-static protection” on [page 27](#).

Enclosure ear bezel FRUs are available for the left and right ears of the chassis front panel. The following ear bezel replacement procedure applies to ear kits provided with the 2U24 and 2U12 enclosure models, respectively. Refer to the following illustration(s) pertaining to your product ear kit.

2U24 Ear bezels

[Figure 29](#) illustrates ear bezel replacement relative to 2U24 models. See [Removing ear bezel components](#) on page 48, and [Installing ear bezel components](#) on page 48.

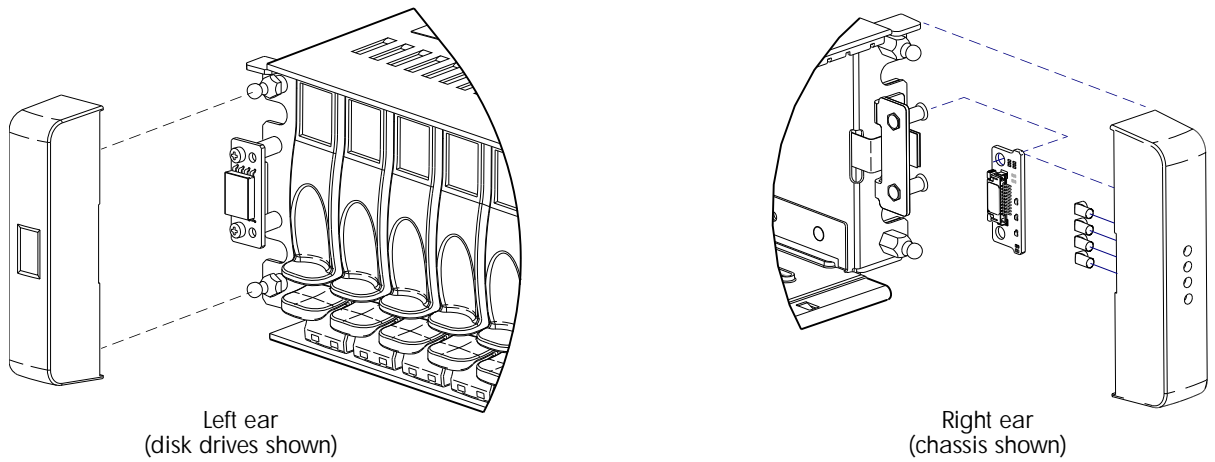


Figure 29 Replacing ear bezels — 2U24 models

2U12 Ear bezels

[Figure 30](#), and [Figure 31](#) on page 47 illustrate ear bezel replacement relative to 2U12 models. See [Removing ear bezel components](#) on page 48, and [Installing ear bezel components](#) on page 48.

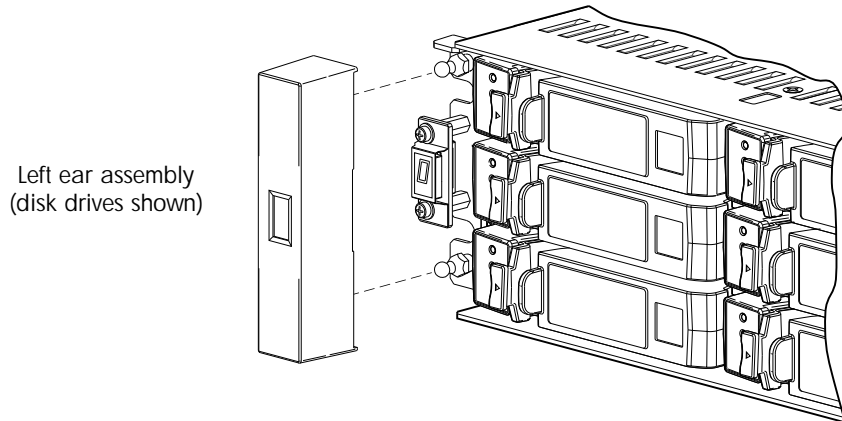


Figure 30 Replacing left ear bezels — 2U12 models

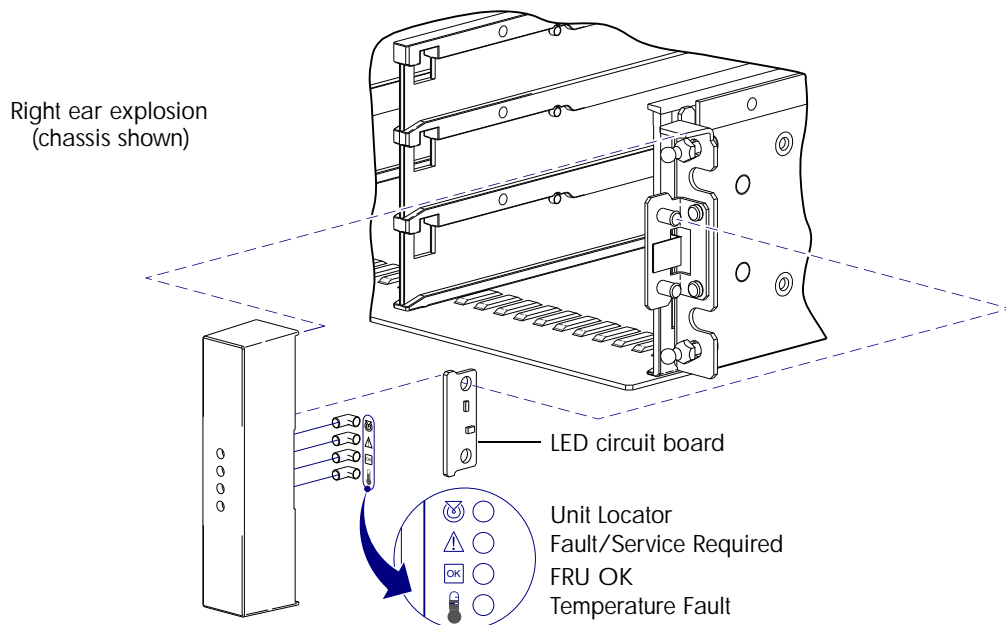


Figure 31 Replacing right ear bezels — 2U12 models

Removing ear bezel components

See [Figure 29](#) on page 47, [Figure 30](#) on page 47, and [Figure 31](#) when removing the ear bezel sub-assemblies.

1. Stop all I/O from hosts to the system.
2. Use management software to shut down any other components necessary.
3. Power off the enclosure.
4. Gently squeeze the sides of the ear cover, and pull it straight forward to remove the ear from the push-fit mounting ball studs.



NOTE: Some product models use an enclosure bezel instead of ear covers. If your model is equipped with an enclosure bezel instead of ear covers, see the enclosure bezel kit installation document provided in your product ship kit:

- See [Figure 7](#) on page 19 for 2U24 enclosure bezel alignment.
 - See [Figure 14](#) on page 25 for reduced-depth 2U12 enclosure bezel alignment.
-

5. Loosen the hexagonal nuts that secure the LED circuit board to the mounting pins on the flange.
6. Remove the LED circuit board.

[Figure 31](#) on page 47 lists LEDs common to the right ear of both 2U24 and 2U12 enclosures.

Installing ear bezel components

See [Figure 29](#) on page 47, [Figure 30](#) on page 47, and [Figure 31](#) when installing the ear bezel sub-assemblies.

1. Verify that the enclosure is powered off.
2. Install the LED circuit board:
 - a. Insert the mounting pins into the through holes in the LED circuit board and mounting flange.
 - b. Thread the hexagonal nuts onto the inserted pins, and turn the nuts clockwise to tighten.
3. Gently slip the ear cover over onto the push-fit mounting ball studs, taking care to guide the LED indicators through the cover's through holes.



NOTE: Some product models use an enclosure bezel instead of ear covers. If your model is equipped with an enclosure bezel instead of ear covers, see the enclosure bezel kit installation document provided in your product ship kit:

- See [Figure 7](#) on page 19 for 2U24 enclosure bezel alignment.
 - See [Figure 14](#) on page 25 for reduced-depth 2U12 enclosure bezel alignment.
-

4. Power on the enclosure.



TIP: See the AssuredSAN 3000 Series Setup Guide for descriptions of front panel LEDs.

Verifying component operation

Enclosure status LEDs are located on the front of the controller enclosure. During normal operation, the FRU OK and Temperature Fault LEDs are green, and the other status LEDs located on the right ear are off.

Replacing a Fibre Channel transceiver

This section provides steps for replacing a small form-factor pluggable (SFP transceiver) connector used in a Fibre Channel (FC) controller host port. An example SFP connector is shown below.

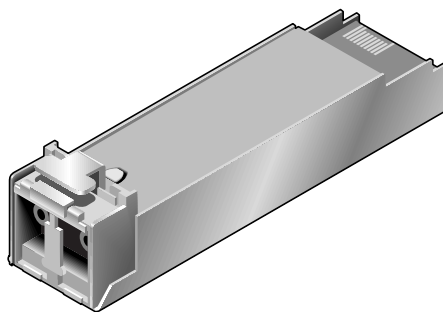


Figure 32 Sample SFP connector

Before you begin

-
- △ **CAUTION:** Mishandling fibre-optic cables can degrade performance. Do not twist, fold, pinch, or step on fibre-optic cables. Do not bend them tighter than a 2-inch radius.
-

See CAUTION bullets regarding “electrostatic discharge” and “anti-static protection” on [page 27](#).

- △ **CAUTION:** To prevent potential loss of access to data, be sure to identify the *correct* cable and SFP connector for subsequent removal.
-

Verifying component failure

Transceivers are part of a data path that includes multiple components, such as the transceiver, a cable, another SFP, and an HBA (host bus adapter). A reported fault can be caused by any component in the data path. To identify the location of the fault, check the Link Status and Activity LEDs on the controller enclosure and server. Also, check the cable for kinks, crimping or other possible damage.

- 💡 **TIP:** See the AssuredSAN 3000 Series Setup Guide for descriptions of rear panel LEDs.
-

Removing an SFP module

Perform the following procedure to remove an SFP connector. When removing an FC SFP that has previously limited the port speed — and replacing it with a higher-rated SFP — it is possible, though rare, that auto-negotiation will not enable the higher port speed. Rebooting the array or the host resolves the problem.

1. Disconnect the fibre-optic interface cable by squeezing the end of the cable connector.
If the SFP does not have a cable, it should have a plug (retained from installation).

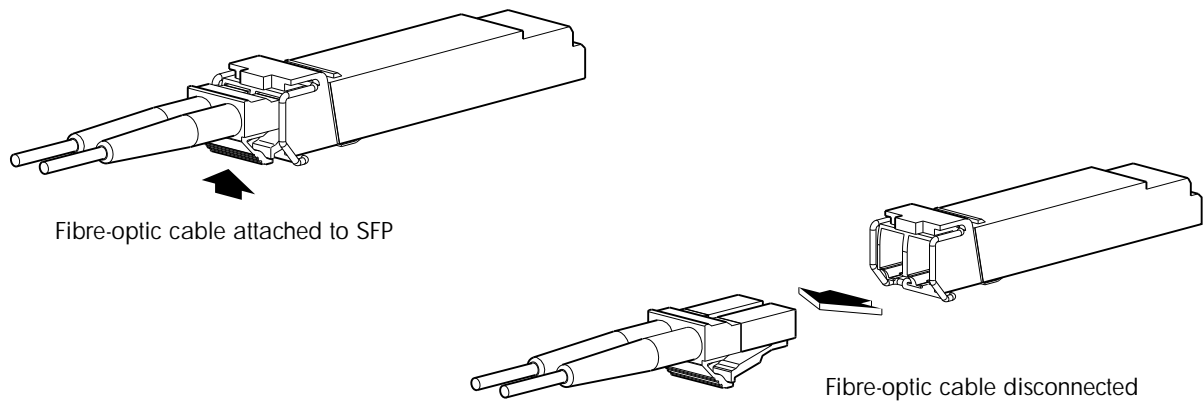


Figure 33 Disconnect fibre-optic interface cable from SFP

2. SFPs are commonly held in place by a small wire bail actuator. Flip the actuator up.

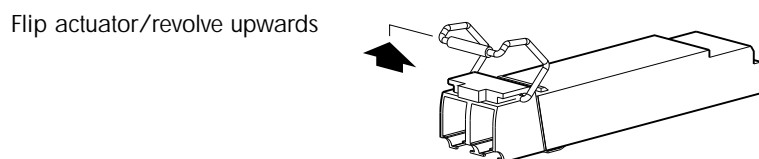


Figure 34 Flip SFP actuator upwards

3. Grasp the SFP between your thumb and index finger, and carefully remove it from the controller module.

Installing an SFP module

Perform the following procedure to install an SFP connector.

1. To connect to an empty port, slide the SFP connector into the port until it locks into place.
If the SFP has a plug, remove it before sliding the connector into the FC port. Retain the plug.
2. Flip the actuator down.

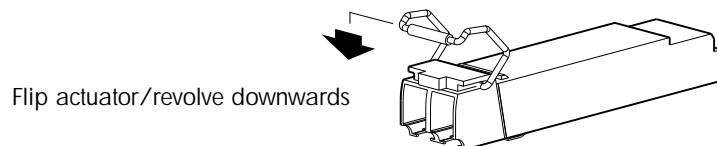


Figure 35 Flip SFP actuator downwards

3. Connect the fibre-optic interface cable into the duplex jack at the end of the SFP connector.

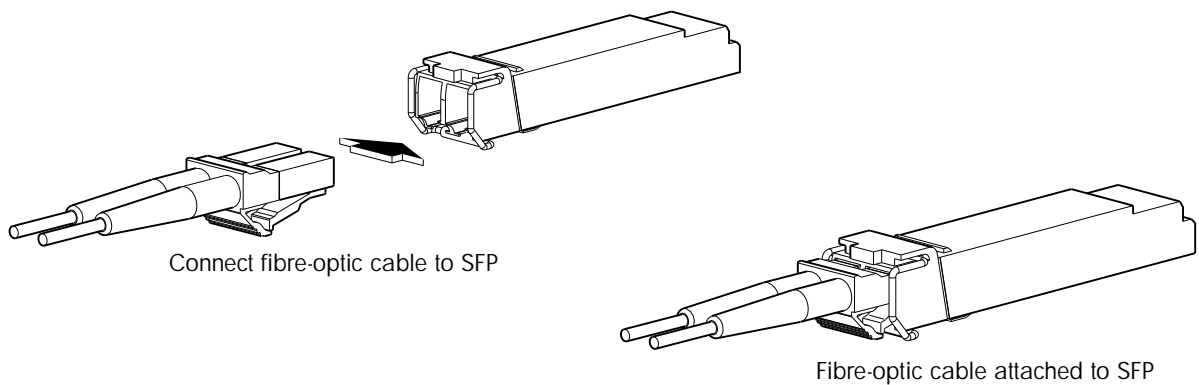


Figure 36 Connect fibre-optic interface cable to SFP

Verifying component operation

View the Link Status and Link Activity LEDs on the controller module face plate. A blinking LED indicates that no link is detected. Also check the link status and link activity LEDs on the host.

Replacing a 10GbE SFP+ transceiver

This section provides steps for removing and replacing a small form-factor pluggable plus (SFP+ transceiver) connector used in an Internet SCSI (iSCSI) controller host port. SFP+ connectors are similar in appearance to SFP connectors. These transceivers enable 10GbE equipment designs with high port density, based on electrical and mechanical enhancements to SFP specifications developed by the Small Form Factor (SFF) Committee.

Removing and replacing an SFP+ consists of the same basic steps described for removing and replacing an SFP in the preceding section. This procedure refers to the preceding Replacing a Fibre Channel transceiver procedure. When reviewing the procedure as it pertains to the 10Gb iSCSI host ports, note that your particular cables may be either copper or fibre-optic for the SFP+, depending upon how your system was initially configured, and the SFP+ option used.

Table 9 Removing and replacing a 10GbE SFP+ transceiver

To accomplish this sequential process	See the following procedures
1. Remove SFP+ connector.	<ul style="list-style-type: none"> a. Before you begin on page 49. b. Verifying component failure on page 49. c. Removing an SFP module on page 49.
2. Install the replacement SFP+ connector.	Installing an SFP module on page 50.
3. Verify proper operation for the removed and installed FRU component.	Verifying component operation on page 51.

Replacing a controller enclosure chassis

The controller enclosure chassis replacement procedure replaces a damaged chassis FRU, which consists of the structural support metal, the exterior sheet metal housing, and the assembled/installed midplane. The procedure includes removing all FRU components from a damaged chassis and installing them in a replacement chassis.

NOTE: AssuredSAN 2U24 and 2U12 controller enclosure chassis models are described in [FRUs addressing 24-drive enclosures](#) on page 14 and [FRUs addressing 12-drive enclosures](#) on page 20.

Whether your controller enclosure product is a 2U24 or 2U12 model, a fully functional replacement chassis requires the successful removal and installation of the following components:

- All disk drive modules and air management modules
- Two ear bezels (for left and right ears)
Some models use an enclosure bezel instead of left and right ear covers
- Two power supply units of the same type (both AC or both DC)
- One or two controller modules (of the same model type) and possibly an I/O module blank (for single-controller enclosures)

Certain models also require the successful removal and installation of the following components:

- Fibre Channel transceiver (SFP for 3920/3930, 3723/3733, and 3720/3730 models)
- 10GbE SFP+ transceiver (SFP+ option for 3420/3430 models)

This procedure makes extensive use of the FRU component procedures described elsewhere in Chapter 2. Perform this procedure by following the step-by-step process described below.

Before you begin

△ **CAUTION:** Do not remove the enclosure until you have received the replacement enclosure.

See CAUTION bullets regarding “electrostatic discharge” and “anti-static protection” on [page 27](#).

1. Schedule down time that will allow for shutdown; sixty minutes of replacement work; and restart.
2. Verify the existence of a known/good backup of the system.
3. Record system settings for future use.
4. Label all cables.
5. Prepare a suitable work environment to accommodate chassis replacement.

Verifying component failure

The controller enclosure FRU includes the enclosure’s metal housing and the midplane that connects controller modules, disk drive modules, and power supply modules. This FRU replaces an enclosure that has been damaged, or whose midplane has been damaged.

Often times, a damaged midplane will appear as though a controller module has failed. If you replace a controller module, and it does not remedy the fault, you may need to replace the enclosure.

Alternatively, you can observe enclosure health (front panel and rear panel) using management interfaces to verify enclosure/component failure or enclosure/component operation (see [Using management interfaces](#) on page 55 for more information).

Preparing to remove a damaged storage enclosure chassis

Since you are removing and replacing an entire controller enclosure, neither the hot-swap capability that applies to replacing individual redundant FRUs in an operational controller enclosure, nor the hot-add of a drive enclosure to an operational storage system, apply to this procedure.

1. Stop all I/O from hosts to the system. See [Stopping I/O](#) on page 31.
2. Shut down the controller(s). See [Shutting down a controller module](#) on page 31.
3. Power off the system (controller enclosure *first*; drive enclosure(s) *next*). See [Power supply units](#) on page 42, and refer to the power cycling procedures pertaining to your enclosure’s power supply modules.

Table 10 Removing and replacing a controller enclosure chassis and its FRUs

To accomplish this sequential process	See the following procedures
1. Remove disk drive modules and air management modules from the damaged chassis. ¹	<ul style="list-style-type: none"> a. Air management modules on page 36. b. Before you begin on page 36. c. Removing a disk drive module on page 36.
2. Remove the ear bezel components from the damaged chassis.	<ul style="list-style-type: none"> a. Before you begin on page 46. b. Removing ear bezel components on page 48.
3. Remove the damaged storage enclosure chassis from the rack.	Removing a damaged storage enclosure chassis from the rack on page 54.
4. Remove the power supply units from the damaged chassis, and install them in the replacement chassis.	<ul style="list-style-type: none"> a. Before you begin on page 41. b. Power supply units on page 42. c. Removing a power supply unit on page 43. d. Installing a power supply unit on page 44.
5. Remove each IOM from the damaged chassis, and install it in the replacement chassis. ²	<ul style="list-style-type: none"> a. Before you begin on page 29. b. Removing a controller module or expansion module on page 32. c. Installing a controller module or expansion module on page 34.
6. Remove each Fibre Channel transceiver from the damaged chassis, and install it in the replacement chassis (Fibre Channel models only). ³	<ul style="list-style-type: none"> a. Before you begin on page 49. b. Removing an SFP module on page 49. c. Installing an SFP module on page 50.
7. Remove each 10GbE SFP+ module from the damaged chassis, and install it in the replacement chassis (10GbE iSCSI models only). ³	Replacing a 10GbE SFP+ transceiver on page 51. Also see Steps 6a - 6c immediately above.
8. Install ear bezel components on the replacement chassis.	Installing ear bezel components on page 48.
9. Install the replacement storage enclosure chassis in the rack.	Installing the replacement storage enclosure chassis in the rack on page 54.
10. Install disk drive modules and air management module in the replacement chassis. ¹	Installing a disk drive module on page 38.
11. Complete the installation process.	<ul style="list-style-type: none"> a. Connecting a power cable on page 45. b. Completing the process on page 54.
12. Verify proper operation for all removed and installed FRU components.	<ul style="list-style-type: none"> a. Disks—Verifying component operation on page 40. b. Controller module(s)—Verifying component operation on page 34. c. PSUs—Verifying component operation on page 46. d. SFPs (if applicable)—Verifying component operation on page 51. e. SFP+ (if applicable)—Verifying component operation on page 51. f. Verify PFU enabled (if applicable)—Configuring partner firmware update on page 30.

¹Within the replacement enclosure, reinstall each disk drive or disk drive blank into the same disk slot from which it was removed from the damaged enclosure.

²Within the replacement enclosure, the IOM(s) and IOM blank — if applicable — must be reinstalled into the same IOM slots from which they were extracted from the damaged enclosure.

³If your enclosure model does not support SFP or SFP+ connectors, ignore this step.

Removing a damaged storage enclosure chassis from the rack

This section provides a procedure for removing a damaged controller enclosure chassis from its rack location.

△ **CAUTION:** It is recommended that all disk drive modules and air management modules be removed before removing the enclosure. If this is not possible, two people are required to move the enclosure. See [Removing a disk drive module](#) on page 36.

1. Make sure that the ear bezels are removed. See [Removing ear bezel components](#) on page 48.
2. Remove the retaining screws that secure the front and rear of the controller enclosure chassis to the rack and rails.
3. Carefully slide the controller enclosure chassis from the rack.
4. Place the chassis on a work surface near the replacement controller enclosure chassis, the removed disk drive modules, ear bezel components, and screws.
5. Remove the side bracket from each side of the damaged controller enclosure chassis.
6. Attach the side bracket to each side of the replacement controller enclosure chassis.

Installing the replacement storage enclosure chassis in the rack

This section provides a procedure for installing the replacement controller enclosure chassis in its rack location.

△ **CAUTION:** It is recommended that all disk drive modules and air management modules be removed before lifting the enclosure. If this is not possible, two people are required to move the enclosure. See [Removing a disk drive module](#) on page 36.


📋 **NOTE:** Refer to Rackmount Bracket Kit Installation or 2-Post Rackmount Bracket Kit Installation for the correct installation procedure and mounting hardware.

1. Attach side brackets (standard rackmount installation) or main brackets (2-post rackmount installation) on the replacement controller enclosure chassis.
2. Support the bottom of the controller enclosure chassis. Carefully lift/align the chassis and slide it into the rack.
3. Using the appropriate mounting hardware, secure the controller enclosure chassis to the rack.
4. Install the ear bezels. See [Installing ear bezel components](#) on page 48.
5. Using the applicable retaining screws, secure the front and rear of the controller enclosure chassis to the rack and rails.

Completing the process

This section provides a procedure for ensuring that the FRU components installed in the replacement controller enclosure chassis function properly.

1. Reconnect data cables between devices, as needed, to return to the original cabling configuration:
 - Between cascaded enclosures.
 - Between the controller and peripheral or SAN devices.
 - Between the controller enclosure and the host.
2. Reconnect power cables to the controller enclosure. See [Connecting a power cable](#) on page 45.
3. Turn on the power switch to power supply modules if they are equipped with power switches.

 **NOTE:** For powering-on AC PSUs with or without a power switch, and DC and AC PSUs with a power switch, see [Power supply units](#) on page 42.

Verifying component operation

Restart system devices in the following sequence. Allow time for each device to complete its Power On Self Tests (POST) before proceeding:

1. Disk drive enclosures
2. Controller enclosure
3. Host (if powered down for maintenance)

Using LEDs

View LEDs on the front and rear of the enclosure (see “LED descriptions” within the AssuredSAN 3000 Series Setup Guide for more information).

Verify front panel LEDs:

- Verify that the Enclosure ID LED (located on the left ear) is illuminated green.
- Verify that the FRU OK and Temperature Fault LEDs are illuminated green, and that the Fault/Service Required LED is off (all three LEDs are located on the right ear).
- For LFF disks, verify that the Power/Activity/Fault LED (bottom LED on front of disk) is illuminated green or blinking green (If your product model has an enclosure bezel, remove it to view disk LEDs).
- For SFF disks, verify that the Power/Activity LED (left LED on front of disk) is illuminated green or blinking green (If your product model has an enclosure bezel, remove it to view disk LEDs).

Verify rear panel LEDs:

- Verify that the each power supply module’s Input Source Power Good LED (top LED on PSU) is illuminated green.
- Verify that the FRU OK LED on each IOM face plate is illuminated green, indicating that the module has completed initializing, and is online.

Using management interfaces

In addition to viewing LEDs as described above, you can use management interfaces to monitor the health status of the system and its components, provided you have configured and provisioned the system (see “Getting Started” within the AssuredSAN 3000 Series RAIDar User Guide for more information).

Select from the following methods to verify component operation:

- Use RAIDar to check the health icons/values of the system and its components to either ensure that everything is okay, or to drill down to a problem component. RAIDar uses health icons to show OK, Degraded, Fault, or Unknown status for the system and its components. If you discover a problem component, follow the actions in its Health Recommendations field to resolve the problem.
- As an alternative to using RAIDar, you can run the `show system` command in the CLI to view the health of the system and its components. If any component has a problem, the system health will be Degraded, Fault, or Unknown. If you discover a problem component, follow the actions in its Health Recommendations field to resolve the problem.
- Monitor event notification — With event notification configured and enabled, you can view event logs to monitor the health of the system and its components. If a message tells you to check whether an event has been logged, or to view information about an event in the log, you can do so using either RAIDar or the CLI. Using RAIDar, you would view the event log and then click on the event message to see detail about that event. Using the CLI, you would run the `show events detail` command (with additional parameters to filter the output) to see the detail for an event (see “Alphabetical list of commands > show events” within the AssuredSAN 3000 Series CLI Reference Guide for more information about command syntax and parameters).

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