Pillar Axiom® 500

Service Guide

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CHAPTER 1

About Pillar Axiom Service Procedures

Important! Contact Technical Support for any time-sensitive information that may be related to the service procedures outlined in this guide.

Audience

This guide addresses Service Technicians, Field Engineers, and others who maintain, troubleshoot, and replace system components and field replaceable units (FRUs). We assume that you have the necessary skills and experience in using:

- Computer hardware and its operation.
- Required tools.
- ESD procedures.
- Computers and computer parts.
- A graphical user interface (GUI) in a Web browser.
- An operating system command line interface.

Important! If you have a Support Services contract, authorized Pillar Data Systems personnel perform all repairs. Refer to your service agreement to determine your service coverage. See Contact Information for the Sales phone number if you would like to get a Support Services contract.

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Warnings and Cautions

Hazard signal words conform to the American National Standards Institute (ANSI) Z535.4-1998 meanings.

Safety Notice Conventions

Hazard signal words conform to the American National Standards Institute (ANSI) Z535.4-1998 meanings.

CAUTION	Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.
Warning	Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.
DANGER	Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

Important! To emphasize a point, to remind you of something, or to indicate potential problems in the outcome of the in-process task.

Hazard Signal Words

Important! A set of important Warning and Caution notices apply throughout this guide. Read them before servicing Pillar Axiom FRUs.

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Pillar Axiom Series Components

This guide explains how to replace the field-replaceable units (FRUs) contained in the following Pillar Axiom 500 Series components:

Table 1 Pillar Axiom 500 series components

Product name	Model and description
Brick storage enclosures	• BRX 500-160A7—160 GB SATA disk drives, 1920 raw GB • BRX 500-250A7—250 GB SATA disk drives, 3000 raw GB • BRX 500-400A7—400 GB SATA disk drives, 4800 raw GB • BRX 500-500A7—500 GB SATA disk drives, 6000 raw GB • BRX 500-750A7—750 GB SATA disk drives, 9000 raw GB • BRX 500-1000A7—1 TB SATA disk drives, 12000 raw GB • BRX 500-73F15R—73 GB FC disk drives (RAID) • BRX 500-73F15E—73 GB FC disk drives (Expansion) • BRX 500-146F15R—146 GB FC disk drives (RAID) • BRX 500-146F15E—146 GB FC disk drives (Expansion) • BRX 500-300F15R—300 GB FC disk drives (RAID) • BRX 500-300F15E—300 GB FC disk drives (Expansion)
Slammer storage controller	• SLM 500-GEC—NAS, copper interface • SLM 500-GEO—NAS, optical interface • SLM 500-SAN—SAN, 2 Gb optical interface • SLM 500-SAN-4G—SAN, 4 Gb optical interface
PCB card	• PCI 500-STAPE—Ultra SCSI PCI interface • PCI 500-FTAPE—2 GB FC/PCI-X host bus adaptor • PCI 500-iSCSI—1 GB iSCSI/PCI-X host bus adaptor
Pilot management controller	• Pillar Axiom Pilot
Power distribution unit (PDU)	• PDU 500-1P20A—115/230 V, 20 A, 1 ϕ • PDU 500-1P30A—f 115/230 V, 30 A, 1 ϕ • PDU 500-3P30A—f 208 V, 30 A, 3 ϕ • PDU 500-3P16A—230/400 V, 16 A, 3 ϕ WYE
Filler panel	• 1 U • 2 U

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Table 1 Pillar Axiom 500 series components (continued)

Product name	Model and description
Rack	• RACK500-42U—42 U cabinet assembly with doors

Note: These drives are no longer available for new systems:

- BRX 500-160A7
- BRX 500-250A7
- BRX 500-73F15R
- BRX 500-73F15E

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About Supported Hardware Components

Pillar Data Systems supports only Pillar-supplied parts on a Pillar Axiom storage system.

CAUTION Hardware that does not conform to Pillar specifications or is not a Pillar-supplied part voids the warranty and may compromise data integrity. For Pillar hardware specifications, refer to the *Service Guide* for your system.

Note: When an internal component within a Pilot control unit (CU) fails, the entire CU must be replaced.

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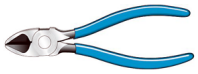
Required Tools

Use the following tools to service Pillar Axiom hardware.

Table 2 Required tools

Tool	Purpose	Illustration
1/4-in (7-mm) flat-tip screwdriver	Adjust leveling feet.	
Adjustable wrench, 6 in (15 cm)	Adjust leveling feet.	
#1 and #2 Phillips-head screwdrivers	Remove and secure Pillar Axiom hardware components.	
Socket wrench with a 1/2-in (13 mm) socket	Connect two racks.	
Offset box wrench, 13/32 in (10 mm)	Work with adjustable mounting rail assemblies.	
Torx® T20 screwdriver	Attach rail assemblies to the vertical channels and secure hardware components to the rails.	
Torx T30 screwdriver	Connect two racks.	
Diagonal cutters	Cut tie wraps.	

Note: Pillar Data Systems does not provide these tools for a service operation that is performed by non-Pillar employees.

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About Electrostatic Discharge (ESD) Precautions

CAUTION Before you handle a component, make sure that you have taken electrostatic discharge precautions:

- The minimum requirement is an anti-static wrist strap connected to a hard ground. We recommend that you remove components from their packaging and place them on an ESD-qualified table equipped with ground points for wrist straps.
- Static charges can build up rapidly on rolling carts. If you transport a hardware component by cart, ground the cart with a drag chain on an ESD floor. If there is no ESD cart available or ESD floor, ground yourself before you touch a component that has been transported on a cart.

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Contact Information

Table 3 Contacts at Pillar Data Systems

For help with...	Contact...
Error messages, usage questions, and other support issues	US and Canada: 877-4PILLAR (1-877-474-5527) Europe: +800 PILLAR FS (+800 74 44 27 37) Asia Pacific: +1-408-518-4515 South Africa: +0 800 980 400 Have your system serial number ready. Email support@pillardata.com Support portal: support.pillardata.com
Sales and general contact information	www.pillardata.com/company/contact/
Documentation improvements and resources	docs@pillardata.com www.pillardata.com/techdocs/ (log in with your username and password)

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CHAPTER 2

Service the Pillar Axiom System

About Guided Maintenance Initiation

You manage a Pillar Axiom storage system by means of the Guided Maintenance module of the AxiomONE Storage Services Manager (GUI).

⚠ CAUTION Access by any other means is not supported and voids the warranty for your Pillar Axiom storage system. Remote access (ssh, telnet, ftp, and others) may also compromise data integrity.

To maintain or restore reliability to a Pillar Axiom system, you sometimes need to replace a hardware component. To replace a hardware component, you must use Guided Maintenance (unless Technical Support gives you explicit instructions not to do so). You access Guided Maintenance through the AxiomONE Storage Services Manager, the graphical user interface (GUI), in one of three ways:

- In the Health section, click the type of hardware of interest and locate a particular FRU. To enter Guided Maintenance for that FRU, select the link.
- Click the system status icon on the far left side of the status bar, which takes you to the above Health section.
- In the Support section, click the Slammer or Brick link in the navigation pane and locate a particular FRU. To enter Guided Maintenance for that FRU, select the link.

Although you can enter Guided Maintenance in any of those ways, procedures in this guide assume that you are using the Health page.

System Health screens in the GUI display the status of hardware and firmware components of the Pillar Axiom system. The overall system status icon on the bottom of the screen is a summary of the hardware status and does not reflect the status of LUNs or filesystems.

A hardware problem will typically cause filesystems and LUNs to go offline or to a degraded state. Because this is not always the case, you should check the state of the filesystems and LUNs or any associated Administrator Actions that may be listed.

To initiate Guided Maintenance:

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- Log in to the Graphical User Interface.
- Enter Guided Maintenance for the target FRU.

Once you initiate Guided Maintenance, you can:

- Identify the Target FRU (Optional) to find the FRU that is to be replaced.
- Prepare the System for FRU Replacement.
- Replace the Target FRU.
- Fail Back the Control Unit (Optional). Automatic failback of NAS Slammers is the default configuration beginning with Release 02.00.00. If this is not desired, automatic failback of NAS Slammer CUs can be disabled in the GUI Global Network settings menu (System>Global Settings>Networking>Notification). Automatic failback of SAN Slammer CUs is always enabled.
- Verify The Status of the Replacement FRU.

Log In to the Graphical User Interface (GUI)

1 Start the browser software on your workstation.

2 Specify the public IP address of the Pilot as the address to open.

Tip: If the IP has not been changed to a customer-specified address, use 10.0.0.2, which was set at the factory. If that IP address is not successful, try 10.0.0.3 and 10.0.0.4. If you still cannot log in, ping those addresses and contact Technical Support.

3 When prompted, enter the Primary System Administrator's login name and password.

Note: If this is the first time the Primary System Administrator account is accessed, use administrator for the login name and pillar for the password. When logged in, you will be prompted to change the password. Choose an appropriate password to protect the security of the server. Keep that password in a safe location.

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Tip: These tips can improve your experience using the GUI:

- Because the GUI uses popup windows, configure your browser to allow popups. Current versions of Internet Explorer block pop-ups by default.
- For Internet Explorer and Mozilla-based browsers, select the smallest text size you can view comfortably. Doing so help you to see all menu items.
- For Internet Explorer, disable Script Debugging in Tools>Internet Options>Advanced>Browsing.

About Guided Maintenance for the Target FRU

The Summary page in the Health section displays the status of the Pilot and all Slammers and Bricks. For any component of interest (for example, one that has a critical status), you can inspect all of its FRUs by selecting the component. You can then enter Guided Maintenance for any of its FRUs.

When you enter Guided Maintenance, if the Enable Automatic Failback of NAS Control Units option has been selected, Guided Maintenance warns you of that on the introductory page. This option is found in the Global Settings>Networking section under the System tab in the AxiomONE Storage Services Manager and is described in *Pillar Axiom Administrator's Guide*.

When automatic recovery is enabled, Guided Maintenance will automatically fail back the target control unit (CU) of a NAS Slammer after you replace the FRU.

Tip: If you want to fail back the CU manually, de-select the Enable Automatic Failback of NAS Control Units option before you continue with Guided Maintenance. However, be sure to re-select this option when you have completed maintenance.

Note: SAN Slammers always have automatic recovery enabled.

Enter Guided Maintenance

1 Click the Health icon in the top context pane.

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Figure 1 Pillar Axiom Health page

Important! Check the background tasks at the bottom of the screen. If any tasks are running, those tasks may interfere with Guided Maintenance. Wait for them to complete. If any of these tasks do not complete, before you enter Guided Maintenance, contact Technical Support.

2 Review the hardware summary information that is displayed in the content pane.

3 Under Hardware in the navigation pane, click the component type of interest.

4 In the content pane, click the name of the component of interest to open its status page. This page shows detailed information about the FRUs.

5 Click the link for the FRU of interest.

6 Choose one of:

- To enter Guided Maintenance for that FRU, click the Replace Component button.
- To close the window and return to the component status page, click the Close button.

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About Target FRU Identification

Using Guided Maintenance, you can identify which FRU in the system needs to be replaced, If you already know which FRU to replace, you may still want to perform this step to verify the identity of the target FRU. Though this step is not required, it is highly recommended.

Both the Identify and Reverse Identify buttons are available for Bricks and Slammers.

When identifying a target FRU, Guided Maintenance:

- Blinks the LEDs on that FRU and on the bezel of the chassis containing that FRU.

  Note: Guided Maintenance does not control the LEDs for power supplies, fans, and Slammer motherboards.

- Shuts off all other LEDs on the front and back of all other Bricks and Slammers.

To reverse identify the target FRU, Guided Maintenance, blinks all Brick and Slammer LEDs, except for the target FRU's LEDs. Use this if you are having trouble spotting the light patterns of Identify.

When identifying Pilots, Guided Maintenance lights the red drive-activity LED on the target Pilot CU to a steady red.

Important! The drive-activity LED may be flickering quite rapidly at times, appearing nearly steady red. This is the case during event log synchronization or Call-Home activity. Look closely to distinguish whether the LED is steady or flickering. When in doubt, you can have Guided Maintenance reverse identify the Pilot CU, which lights the drive-activity LED to a steady red on the partner CU.

For Bricks, Guided Maintenance blinks all LEDs to identify the FRU except for the following fault-related LEDs (which light solid amber instead):

- Fault LED on the bezel.
- Power LED that is adjacent to the triangular icon on the power supply.
- FLT LED on the RAID controller.
- Left LED on the Enclosure Services (ES) module.
- FLT LED on the spare disk drive.

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Important! When using Guided Maintenance to identify a FRU, be sure to stand in front of the Pillar Axiom system to locate the target control unit (CU). The LEDs on the bezel will be blinking.

Important! Pillar Axiom systems ensure continuous data access during single points of failure. A second failure, including operator errors, may cause system failure. Use care and take full advantage of Guided Maintenance features.

Identify the Target FRU

This procedure is Step 1 of Guided Maintenance.

1 Click the Identify button.

  Guided Maintenance turns off the LEDs on all other FRUs and beacons the target FRU LEDs.

  Note: Click the Reverse Identify button if the physical LEDs on the target component do not seem to be working. This beacons all FRUs in the system except for the target FRU.

  Note: The Slammer LEDs may fail to beacon when Reverse Identifying a Brick.

2 Click the Cancel Identify button after you identify the target FRU.

3 Click the Next button to display the Prepare System page and to continue Guided Maintenance.

About System Preparation for FRU Replacement

Before Guided Maintenance prompts you to replace a FRU, the Pillar Axiom system performs some preparatory steps that reallocate or move resources so that you can safely remove a FRU. For example, these steps:

- Allow the administrator to power down a Slammer control unit, if necessary, before replacing a network interface module.
- Fail over LUNs to the peer controller when a RAID controller is about to be replaced.
- Spin down a disk drive when it is about to be replaced.

During Guided Maintenance, watch for specific Administrator Actions that tell you when to remove or replace a particular FRU.

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CAUTION In some replacement procedures, the system issues a stop command to components. When Guided Maintenance or an Administrator Action instructs you to remove the FRU, please do so—even if you are only testing fault injection and recovery; otherwise, automatic recovery may be inhibited and data loss may result. Also, you should not exit Guided Maintenance prematurely; otherwise, you will leave that component out of service, which may impact redundancy and recovery in the event of another fault.

Prepare the System for FRU Replacement

This procedure is Step 2 of Guided Maintenance.

1. On the Prepare System page, click the Prepare System button.
2. For some FRUs, such as a Slammer memory module, you are prompted for additional information. If prompted, enter the requested information.
3. Click the Next button when Guided Maintenance enables it.
4. If system preparation fails, Guided Maintenance reports the failure and provides an error description. Click the Prepare System button to attempt system preparation again.

   Important! If system preparation fails a second time, contact Technical Support.
5. When prompted, proceed with the appropriate FRU replacement procedure.

   Important! Watch for Administrator Actions on the GUI Status Bar instructing you to remove and replace the FRU. The time when the most recent Administrator Action was generated is in the small box to the right of the Administrator Action area.
   For a list of these procedures, see Table 4, Pillar Axiom FRU replacement procedures.

About Target FRU Removal

Replacement procedures involve the removal of an existing FRU and the insertion of a replacement FRU.

Removing a target FRU is considered the third step in any Guided Maintenance replacement procedure and is performed manually by the technician.

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The following table lists shortcuts to the start of each major FRU replacement procedure that you can perform. Each hardware component section below contains all of the tasks and information required to successfully service a FRU.

Table 4 Pillar Axiom FRU replacement procedure information

Hardware component	Shortcut
Pilot	About Pilot Bezel Replacement.
	About Pilot Control Unit Replacement.
Slammer	About Slammer Bezel Replacement.
	About Slammer Battery Replacement.
	About Slammer Fan Module Replacement.
	About Slammer Motherboard Tray Replacement.
	About Slammer Network Interface Module Replacement.
	About SFP Module Replacement.
	About Slammer Power Supply Replacement.
	About Slammer Private Interconnect Module Replacement.
	About Slammer SCSI or FC Card Replacement.
	About Slammer iSCSI Card Replacement.
Brick	About Brick Bezel Replacement.
	About Brick Disk Drive Replacement.
	About Brick Power Supply and Fan Module Replacement.
	About Brick RAID Controller Removal.
	About Brick ES Module Replacement.
	About SATA Brick Spare Disk Drive Replacement.

Important! If you need to replace FRUs on both control units (CUs) of a Slammer at the same time, contact Technical Support for assistance.

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For NAS Slammers:

- If the automatic recovery setting (Enable Automatic Failback of NAS Control Units) has been selected, Guided Maintenance automatically fails back the target Slammer CU from its partner.
- If the automatic recovery setting has not been selected, this procedure becomes Step 4 of Guided Maintenance in which failback is manually controlled.

You can override automatic failback by not selecting the Enable Automatic Failback of NAS Control Units option. When this option is not selected, Guided Maintenance displays the Resume button to allow you to control manually when the failback occurs.

Note: SAN Slammers always have automatic recovery enabled.

To manually fail back the CU from its partner, click the Resume button.

Important! Watch for Administrator Actions, because you may be instructed to restart the system to recover system resources. Restarting the Pillar Axiom system takes it offline for about 15 to 30 minutes on average. If you are instructed to restart the system, and if it is acceptable to your business to temporarily run the Pillar Axiom system with partial system resources, you can postpone restarting until that evening.

About Replacement FRU Status Verification

In all cases of FRU replacement (other than that for bezels), after you have replaced a FRU, Guided Maintenance displays the Verify page.

When all is well, Guided Maintenance reports a Normal status for the FRU.

Note: You may see a FRU status of Testing, Warning, or Verifying. For example, replacement batteries are tested for several minutes and displays Testing until the test completes.

To close the Verify page, click the Next or Finish button. Which button displays depends on whether a system restart is required.

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About System-Wide Service Procedures

This section provides system-wide procedures that you might need to perform while you service a Pillar Axiom system.

About Data Backups

Regular backups are prudent IT practice. When you service hardware components that directly affect user data paths, we highly recommend that you first back up all user data to external media.

Important! Extraordinary system hardware changes (such as replacing a Brick) and software configuration changes (such as resetting the system to a factory-fresh state) and all other modifications not specifically mentioned in this document should only be attempted after consultation with Technical Support. A backup of data should always be done prior to all but routine maintenance actions.

Full system backups to external media must be performed when you want to perform any of the following actions:

- Remove a Brick permanently from the Pillar Axiom system.
- Clear the system configuration. This action requires an encrypted system key that Technical Support can supply. This action removes all user and system data, including licenses.

  ⚠ CAUTION Before you clear the system configuration, consult with Technical Support to avoid the risk of losing system configuration data.

To back up the system, refer to the *Pillar Axiom NDMP Integration Guide for NAS Systems* and to the documentation for your NDMP-based backup application.

About Power Cycles

Contact Pillar Technical Support before power cycling a Pillar Axiom 500 system except in the event of an emergency, in which case, drop all power and then contact Technical Support. Contact Technical Support before touching any power cables or switches. There are some situations where not power cycling the entire system is the correct action.

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For failure testing, do not power cycle individual components without first contacting Pillar Technical Support.

If you need to turn off the system, use the Shutdown capability in the GUI. Because of the redundant architecture, you may not turn off the system by switching off components (including the power distribution units).

Note: If you will be powering down the system for more than a day, remove the Slammer batteries so they do not discharge.

About Rack Door Removal

To make the replacement or addition of PDUs and component chassis easier, we suggest that you remove the front and back doors from the rack.

Figure 2 Sample 42U rack front door

Legend

1 Front door

Note: Your rack may look slightly different.

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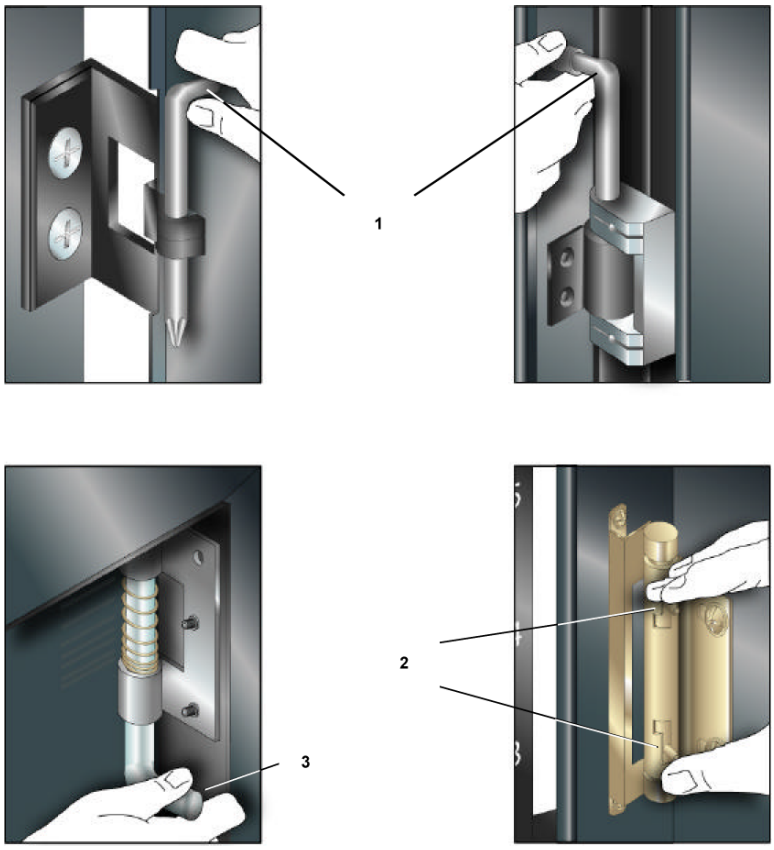
Front and back doors are hinged to the frame. These hinges can be of the following types:

Figure 3 Different types of rack door hinges



Legend

1 Pull up on the handle to unpin the hinge.
2 Squeeze the ends together to release the hinge.
3 Pull down on the handle to unpin the hinge.

Important! After servicing a Pillar Axiom system, replace the doors and keep them closed to maintain compliance with FCC requirements.

Remove the Doors From a Rack

1 If locked, unlock the front and back doors.

2 Disconnect the ground strap from each door.

For Pillar racks, only the back door has a ground strap.

3 Based on the type of hinge, release all door hinges.

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Go to About Rack Door Removal for more information.

4 Remove the doors and set them aside.

Note: Use care to place the doors where they cannot fall on people, slide, or scratch the front-door plastic.

About Rack Side Panel Removal

Removal of the side panels of a rack facilitates:

- Bolting racks together.
- Replacing PDUs, Pilot control units (CUs), Bricks, and Slammers or expanding the system.
- The cabling of Bricks that reside in expansion racks.

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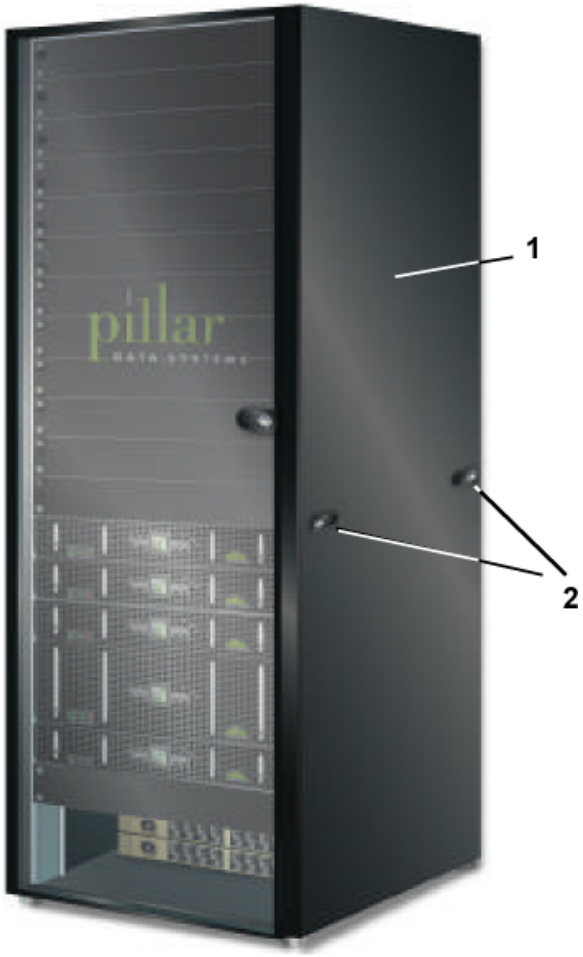
Figure 4 Sample 42 U side panels



Legend

1	Side panel, 1 each side
2	Latches

Remove a Side Panel From a Rack

1. If locked, unlock the side panel.
2. Unlatch the side panel by:
   - Pushing the release button, or
   - Lifting the release handle(s).
3. Remove the side panel and set it aside.

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Attach the Rack Doors

1 Based on the type of door hinge, reassemble the hinges.

Go to About Rack Door Removal for more information.

2 Reattach the doors.

3 Reattach the door grounding straps at the bottom of the back door.

4 Lock the front and back doors to the rack (optional).

Attach the Rack Side Panels

1 Hang the top of the panel on the top of the rack frame and latch the panel to close it.

Important! Be sure not to pinch any cables that might have strayed from their proper moorings.

2 Secure the panel using the option below that is appropriate for your rack:

- Engage the latch handle(s) and snap the panel into place.
- Screw the panels to the rack frame at the top and bottom.

3 Lock both side panels (optional).

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CHAPTER 3

Service the Pilot and Pilot FRUs

About Pilot Service Procedures

Each control unit (CU) within a Pilot management controller contains an operating system and support for a variety of applications, including:

- Graphical user interface (GUI)
- Command line interface (CLI)
- Network Data Management Protocol (NDMP)
- Storage Management Initiative-Specification (SMI-S, on 2 Gb CUs only)
- Simple Network Management Protocol (SNMP)

Pilot CU failure does not disrupt user data paths. User data paths are supported entirely by Slammers.

Even if both CUs fail, the Pillar Axiom system continues to operate. If both CUs fail, the system simply has no management interface. In this condition, the Pillar Axiom system cannot perform the following actions:

- Respond to GUI or CLI requests.
- Change configuration, including quotas.
- Recover a Slammer CU in the event of a software warm-start or failover.
- Notify administrators (through alerts) or Technical Support (through Call-Home messages) of the problem.
- Accept new hardware into the system.
- Run backups.
- Perform automatic recovery and failback procedures (such as failing over access if a Brick RAID CU crashes) or a Slammer warm-start.
- Run automatically scheduled work such as scheduled snapshots.

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When a single Pilot CU fails, the system operation is unaffected. The system status is changed to Warning to indicate the failure. However, full management control, notification, and recovery remains available.

When the failed CU is replaced, the system automatically upgrades all software modules to match those on the remaining CU. The system then synchronizes all configuration information, and event logs. The new Pilot CU may stay in Warning until these actions complete.

When a single Pilot CU fails, any or all of the following notification methods occur:

- If email and the Call-Home feature are configured and enabled, a Call-Home message is sent to Technical Support. A Technical Support Engineer initiates a service call.
- If email and alerts are configured and enabled, an alert is emailed to designated recipients.
- An event is written to the event log.
- AxiomONE Storage Services Manager displays a Failed status in the Health pages and on the status bar.

Note: No Pilot LEDs blink, however, to indicate the failure.

There is no Guided Maintenance for Pilots. If the Pilot bezel fails, you replace the bezel. If a single Pilot CU fails, you replace the CU. You can replace the bezel and a failed CU while the Pillar Axiom system is operational. This is known as hot swapping.

⚠ CAUTION After receiving a replacement 1U Pilot control unit (CU), do not power it on outside of the Pilot replacement procedure documented in the Pillar Axiom Service Guide. If a Pilot CU is powered on prematurely, you must contact Technical Support. Also, when you need to replace a Pilot CU, contact Technical Support for assistance.

The following table lists the FRU replacement tasks for a Pilot.

Table 5 Pilot FRU replacement tasks

Component	Hot swap?	Tasks
Bezel	Yes	1 Remove a Pilot Bezel. 2 Attach a Pilot Bezel.
Control unit	Yes	1 Remove a Pilot Bezel. 2 Identify a Pilot Control Unit (CU).

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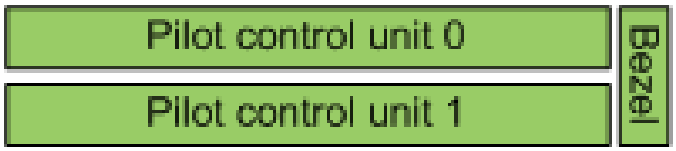
Table 5 Pilot FRU replacement tasks (continued)

Component	Hot swap?	Tasks
		3 Remove a Pilot Control Unit (CU). 4 Insert a Pilot Control Unit (CU). 5 Attach a Pilot Bezel.

Map of Pilot FRUs

The following figure illustrates the replaceable FRUs in a Pilot.

Figure 5 Schematic of replaceable Pilot FRUs



Note: This is the default assignment. It is possible that Pilot CU 0 is the bottom CU. Use Guided Maintenance Identify to make certain you are replacing the correct Pilot CU.

Pilot FRU Part Numbers

The following table lists the field replaceable units (FRUs) that are in a Pillar Axiom Pilot.

Table 6 Pilot FRUs

Part number	FRU description
1450-00072-XX	Bezel
1450-00106-XX 1450-00164-XX 1450-00170-XX	Pilot control unit (CU), 512 KB Pilot CU, 2 GB, RoHS Pilot CU, 2GB

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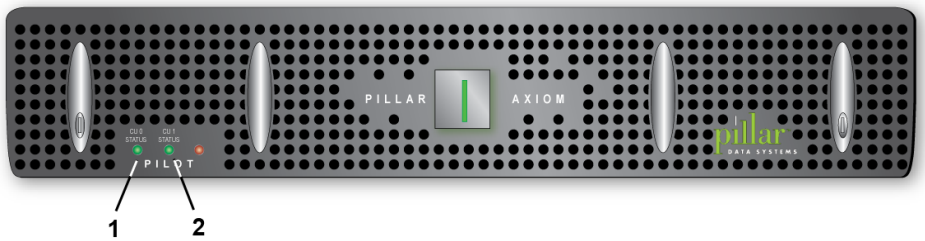
About Pilot Bezel Replacement

Pilot bezels can be replaced while the Pilot is operational. Guided Maintenance is not used to remove a Pilot bezel.

LEDs on a Pilot bezel indicate only whether power is on for the two control units (CUs). The status of a CU's power is indicated by its status LED. There are no fault LEDs on a Pilot bezel.

Figure 6 Pilot bezel LEDs



Legend

1	CU 0 LED
2	CU 1 LED

To replace a Pilot bezel, perform the tasks that are outlined in the following table.

Table 7 Pilot bezel replacement tasks

Task		Reason
1	Remove a Pilot Bezel.	To make room for the bezel replacement.
2	Attach a Pilot Bezel.	To reattach the bezel.

Remove a Pilot Bezel

1 Press the button on each ejector tab to unlock the tabs.

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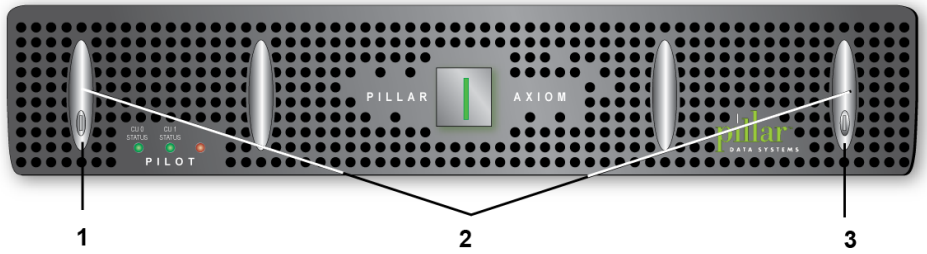
Figure 7 Pilot bezel ejector tabs



Legend

1 Button
2 Ejector tabs
3 Button

2 Lift each ejector tab at the same time to disengage the Pilot bezel from the rack mounts.

3 Carefully rotate the top of the bezel outward and, as the latches disengage, lift the bezel slightly to disengage the bottom of the bezel.

4 Detach both USB cables from the bezel and set the bezel aside on an antistatic surface.

Attach a Pilot Bezel

Note: Ensure that there is no interference at the edges of the bezel so it seats properly.

1 Connect the USB cable from Pilot control unit (CU) 0 to the USB port on the back of the bezel that is marked Node 0.

2 Connect the USB cable from Pilot CU 1 to the USB port on the back of the bezel that is marked Node 1.

3 Tilt the top of the bezel slightly towards you and insert the bottom two hooks into the mounting tabs.

Important! The USB cables are attached to a swingable arm. Ensure that the arm swings freely and that the cables are not pinched.

4 Press the top corners of the bezel to engage the top two bezel hooks with the top rail tabs.

5 Press both ejector tabs until they lock in place.

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About Pilot Control Unit Replacement

The administrator decides when to replace a Pilot control unit (CU), which is influenced by any or all of the following:

- Email
- Alerts
- Call-Home
- GUI Status
- Instructions from Technical Support

The following figure shows a sample Pilot CU.

Figure 8 Sample Pilot CU

Note: The Pilot CU displayed above is representative. The CU that is installed in your system may differ.

To replace a Pilot CU, perform the tasks that are outlined in the following table.

Important! We recommend that you contact Technical Support before you replace a Pilot CU. In the very rare circumstance where you need to replace both Pilot CUs, you must contact Technical Support.

Table 8 Pilot CU replacement tasks

Task		Reason
1	Remove a Pilot Bezel.	To gain access to the Pilot control units (CUs).

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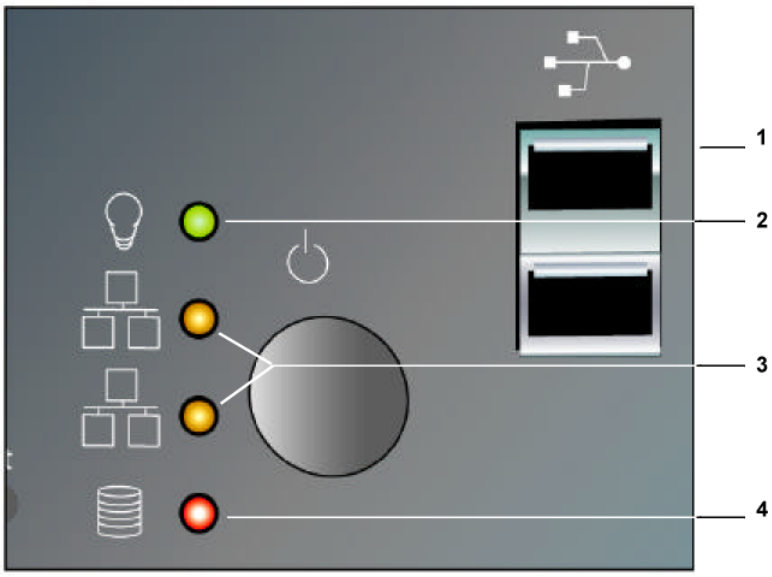
Table 8 Pilot CU replacement tasks (continued)

Task		Reason
2	Identify a Pilot Control Unit (CU).	To locate the target Pilot CU.
3	Remove a Pilot Control Unit (CU).	To make room for the Pilot CU replacement.
4	Insert a Pilot Control Unit (CU).	To insert the Pilot CU replacement.
5	Attach a Pilot Bezel.	To reattach the bezel.

About Pilot Control Unit Identification

A Pilot control unit (CU) has a disk drive LED on the front panel that Guided Maintenance can light to help you identify the target CU.

Figure 9 Disk drive LED on Pilot CU



Legend

1 Front Panel
2 DC power LED
3 Private Ethernet activity
4 Disk drive LED

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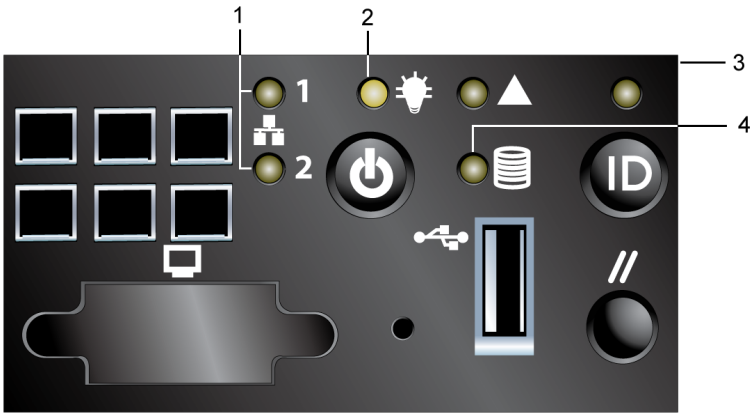
Figure 10 Disk drive LED on a typical Pilot CU control panel



Legend

1 Private Ethernet activity
2 DC power LED
3 Front panel
4 Disk drive LED

Note: The front panels displayed in the above figures are representative of a Pilot CU. The CU that is installed in your system may differ.

Note: Reverse Identify for a particular Pilot CU flashes the disk drive LED on the front panel of the other Pilot CU.

The GUI Health page may be used to display whether Pilot CU 0 or CU 1 is the active or standby Pilot. Normally, CU 0 is the top unit and CU 1 is the bottom unit.

Important! If you have difficulty telling the difference between an Identify operation and normal disk LED activity or are unable to identify clearly the correct Pilot CU, use the serial numbers displayed in the AxiomONE Storage Services Manager or contact Technical Support.

The DC power LED (top green LED) indicates that DC power is being supplied to the Pilot CU. This LED should be on at all times while the Pilot CU has AC power.

The private Ethernet activity LED indicate Private Ethernet activity. These LEDs flash while the Ethernet cables for the private management network are connected. These LEDs flash independent of DC power availability or of the Pilot CU being functional.

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Identify a Pilot Control Unit (CU)

1 Remove the Pilot bezel.

2 Click the Health icon in the top context pane.

3 Click the Pilot link in the left navigation pane.

4 For the target Pilot CU, click the Identify button.

Note: The disk drive LED on the target CU will light solid for one minute.

Tip: If there is heavy disk drive activity on the Pilot CU, use both Identify and Reverse Identify to determine the correct CU. If you still cannot tell, ping the Pilot's CU unique IP addresses (10.0.0.3 and 10.0.0.4) and momentarily back the management ethernet connector out of the port to make sure you are about to replace the correct CU.

5 Click the Finish button.

About Pilot Control Unit Removal

Before you remove a Pilot control unit (CU), label each cable that you detach from the CU:

- One power cord to the power supply.
- One serial null-modem cable to the serial port. This cable supports the heartbeat between the two Pilot CUs.
- Two Ethernet cables to the ETH 0 and ETH 1 ports. These cables support the private management network.
- One Ethernet cable to the MGMT port. This cable supports the management console on the public LAN.

Tip: The label should note where the cable needs to be reattached on the replacement CU.

Important! Remove power only from the Pilot CU that you want to replace.

When removing power from an active Pilot control unit (CU), the GUI will show a Warning state for that CU and one of theSlammer CUs. The Slammer CU shows a Warning state because it lost its connection to the Pilot CU that was taken offline.

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This is a normal, expected state for the Slammer CU in that case. However, the Pilot CU should be brought back up as soon as possible to avoid any potential problems.

Remove a Pilot Control Unit (CU)

1 If you have not already done so, remove the Pilot bezel.

2 Use Guided Maintenance to identify the target Pilot CU.

3 Detach the power cable from the target CU.

Important! Do not power down the Pilot with the DC power button.

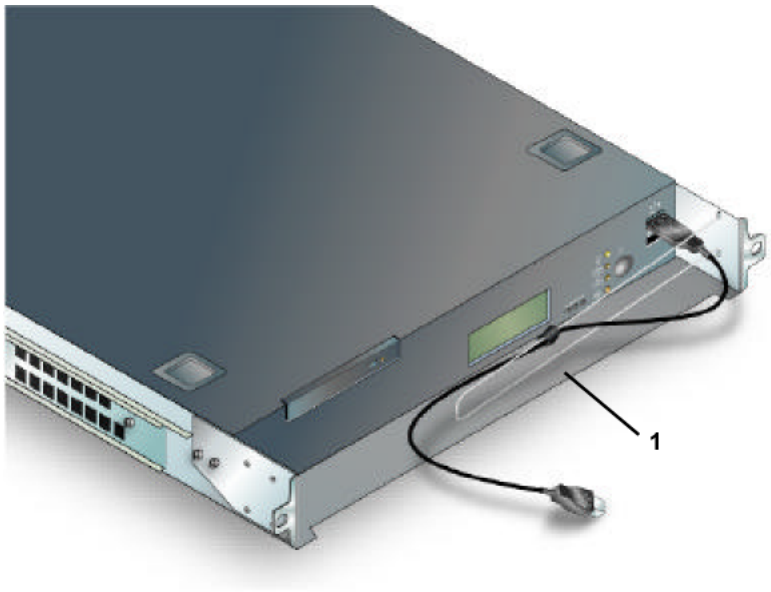
4 In the back of the target CU, detach the Ethernet cables from ports ETH 0, ETH 1, and MGMT.

5 In the back of the target CU, detach the serial null-modem cable from the serial port.

6 In the front of the CU, remove the two screws (one on each side) that secure the CU ears to the rack rails.

7 Grasp the bezel adapter flange and pull gently to extract the CU.

Figure 11 Bezel adapter flange



Legend

1 Bezel adapter flange

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8 Set the Pilot CU aside on an antistatic surface.

About Pilot Control Unit Insertion

When you replace a Pilot control unit (CU), the existing Pilot CU updates the replacement CU with this information:

- Linux operating system.
- Pillar Axiom software that includes current, previous, and staged software and firmware for all components.
- Pilot identity.
- Public and private IP configuration, including IP addresses and gateways.

Important! The above information update completes satisfactorily only if you have not powered on the replacement CU prior to cabling it to the serial link or the private management Ethernet and serial port of the surviving Pilot CU.

CAUTION After receiving a replacement 1U Pilot control unit (CU), do not power it on outside of the Pilot replacement procedure documented in the Pillar Axiom Service Guide. If a Pilot CU is powered on prematurely, you must contact Technical Support. Also, when you need to replace a Pilot CU, contact Technical Support for assistance.

When you cable the Pilot CU replacement, refer to the labels on the Ethernet cables to guide you.

For complete information on how to cable a Pilot CU into the system, see the *Pillar Axiom 500 SSF Cabling Reference*.

Insert a Pilot Control Unit (CU)

CAUTION In the following procedure, do not attach AC power cords until instructed to do so.

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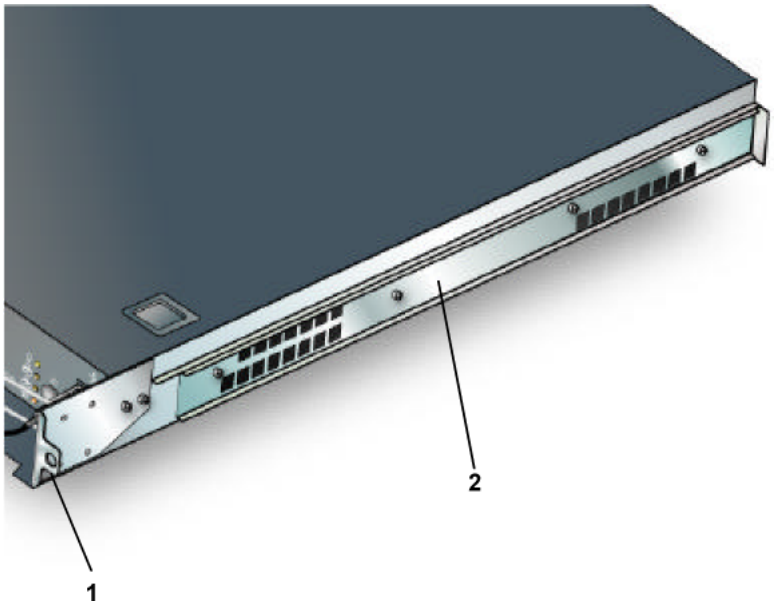
CAUTION Because a Pilot CU automatically powers on as soon as AC power is available, *do not* attach the AC power cord to the replacement CU until *after* you have installed the CU and cabled the private management network (Ethernet and serial cables). If you power on the Pilot CU replacement before you perform these actions, the replacement CU will be misconfigured. If this occurs, contact Technical Support.

1 Place the Pilot CU onto the empty set of Pilot rack rails. Hold the Pilot CU horizontally to align and engage the support brackets on each side of the CU with the rack rails.

Figure 12 Pilot CU support brackets



Legend

1 Bezel adapter bracket
2 Support bracket

2 Slide the Pilot CU all the way in until the ears on the bezel adapter bracket seat against the rack rail ears.

3 Insert the two 10-32 screws into the holes in the bezel adapter ears (one on each side) and secure the CU to the rack rails.

4 In the back of the CU, attach the serial null-modem cable to the serial port.

5 In the back of the Pilot CU replacement, attach the Ethernet cables to ports ETH 0, ETH 1, and MGMT.

6 Attach the AC power cable to the CU replacement.

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7 On the front of the Pilot CU replacement, check whether the top green LED (DC power) is lit.

- If the top green LED is lit, wait until the bottom red LED (system disk) blinks before continuing.

  Note: If the bottom red LED does not begin to blink within a few minutes, contact Technical Support.

- If the top green LED is not lit, press and hold the DC power button on the front of the Pilot CU for two to five seconds. Select one of the following options:

  - If the top green LED lights, wait until the bottom red LED blinks before continuing.

    Note: If the bottom red LED does not begin blinking within a few minutes, contact Technical Support.

  - If the top green LED does not light, contact Technical Support.

Note: The two middle amber LEDs (network activity) may blink even though the DC power is off.

Note: It is normal for the new Pilot CU to restart up to three times while the system attempts to accept it.

8 Add the Pilot bezel.

Note: Insert the USB cables into the front of each Pilot CU as marked. Ensure that the cable arm has no interference when attaching the bezel.

9 Log into the GUI, open the Support tab, and select Software Modules to verify that only one version of Pilot OS and Pilot Software displays.

Important! If you see two different version numbers for either software component, contact Technical Support for recovery assistance.

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About Pilot Configuration Resets

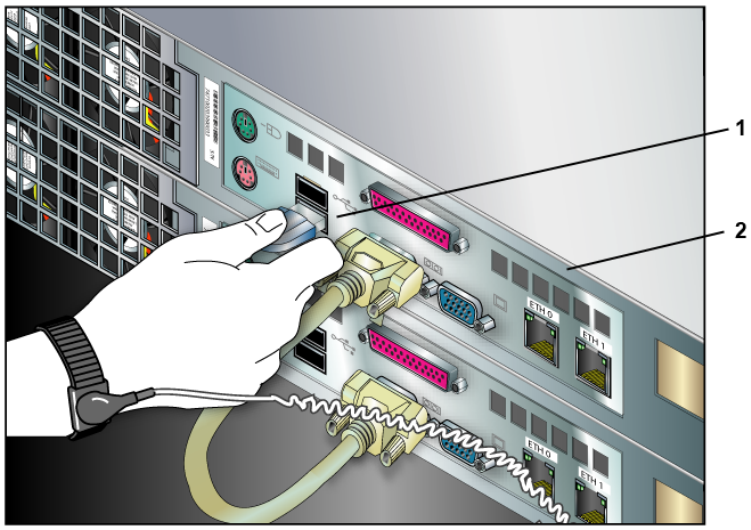
Conditions might require certain configuration parameters to be reset. For example, the Primary System Administrator may have forgotten the login password or incorrectly set an IP address. You can obtain special recovery files from Technical Support and use them to reset the following parameters to their factory defaults:

- Primary System Administrator password.
- Certain TCP/IP settings (such as IP address, netmask, and gateway) for the management console network.
- The internal identity of a Pilot control unit (CU). If the proper power-up sequence for a replacement Pilot CU was not followed, both CUs may contend as to which is CU 0, which requires the internal ID of one of them to be reset.

Parameter reset is accomplished by insertion of a USB key that contains the recovery files. The following figure shows a USB key connected to a Pilot USB port.

Important! Insert the USB key into one of the two USB ports on the back of the Pilot CU. Never insert a USB key into the USB ports on the front of the Pilot CU.

Figure 13 USB key in a Pilot CU



Legend

1 USB key inserted into the lower USB port
2 Back of Pilot

Note: The displayed Pilot CUs are representative. The CUs that are installed in your system may differ slightly.

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Customer Service provides a particular recovery file that the customer downloads into a USB key. This recovery file is specific for a particular configuration parameter and will reset that parameter to the factory default.

Recovery files are encrypted with the customer's system serial number and can be used only by that customer on a specific Pillar Axiom system.

The USB key can contain any combination of recovery files, all of which will be read by the Pilot's operating system. The USB key and its recovery files can be reapplied, if necessary.

After a recovery file is applied, the Pilot CU may restart.

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Reset a Configuration Parameter

1 Call Technical Support and describe the problem.

Technical Support sends the appropriate text file to reset the configuration parameters.

2 Follow the instructions that you get from Technical Support to write this text file to a USB key.

3 Insert the USB key into one of the USB ports on the back of one of the Pilots.

The operating system on the Pilot control unit detects the USB key and runs a script that is based on the keyword that is encrypted in the recovery file. This script performs the corrective action, which takes only a few seconds.

4 When the Pilot CU report a Normal status, remove the USB key.

Note: If the IP address of a Pilot CU is reset, it will be set to 10.0.0.3 or 10.0.0.4, the shared public management IP will be set to 10.0.0.2, and the default gateway will be set to 10.0.0.1. If the administrator account password is reset, it will be set to pillar.

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CHAPTER 4

Service the Slammer and Slammer FRUs

About Slammer Service Procedures

When a Slammer storage controller or one of its field replaceable units (FRUs) fails, any or all of the following notification methods occur:

- If the email and Call-Home features are configured and enabled, a Call-Home message is sent to Pillar Data Systems. A service call is automatically initiated.
- If email and alerts are configured and enabled, an alert is emailed to designated recipients.
- An event is written to the event log.
- AxiomONE Storage Services Manager displays a Failed, Warning, or Offline status in the Health pages.
- One or more FLT LEDs light steady amber (except for power supply LEDs, which are not controlled by the system).

A Slammer contains two control units (CUs). Each CU contains a number of FRUs, some of which you can replace while the CU is powered and running (this is known as hot swap). Others you can replace only after the CU has been powered down and power has been removed from the CU power supply inputs.

⚠ CAUTION To avoid data loss, contact Technical Support before you attempt to replace an entire Brick storage enclosure or Slammer storage controller. Technical Support can help you determine whether a particular filesystem or LUN is physically on the Brick.

When you need to replace one of the Slammer FRUs that cannot be replaced while the CU is powered up, Guided Maintenance prepares the system for a graceful power down and instructs you when to remove AC power and when to replace the FRU. While you replace a target FRU, the partner CU continues to support all user data paths.

If you need to turn off the system, use the Shutdown capability in the GUI. Because of the redundant architecture, you may not turn off the system by switching off components (including the power distribution units).

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Note: If you will be powering down the system for more than a day, remove the Slammer batteries so they do not discharge.

Important! On one-Slammer systems, FRU replacement on both control units (CUs) at the same time requires you to put the system into shutdown mode. In such cases, you cannot use Guided Maintenance for FRU replacement. For example, when you upgrade the Slammer's memory, you put the system into shutdown mode, power off the Slammer CUs, upgrade the memory, and then power on the Slammer CUs. During this power on, both Pilot CUs will restart so they can reestablish their connections to the single Slammer.

Important! If you need to power off a Slammer CU in a FRU replacement task, be sure to review the special notices in Remove a Slammer Battery before you power off the CU.

The following table provides information about each FRU and the effect that its replacement has on the CU. This table:

- Identifies the FRUs within a Slammer.
- Indicates whether AC power needs to be removed.
- Indicates the operating state of the target CU in the Slammer.
- Lists the replacement tasks for those FRUs.

Table 9 Slammer FRU replacement tasks

FRU	Hot swap?	Slammer state	Tasks
Battery	Yes	Target CU in conservative mode	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Bezel. 4 Remove a Slammer Battery. 5 Insert a Slammer Battery. 6 Attach a Slammer Bezel.
Bezel	Yes	Normal	1 Remove a Slammer Bezel. 2 Attach a Slammer Bezel.
Fan module	Yes	Normal	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Bezel.

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Table 9 Slammer FRU replacement tasks (continued)

FRU	Hot swap?	Slammer state	Tasks
			4 Remove a Slammer Fan FRU. 5 Insert a Slammer Fan FRU. 6 Attach a Slammer Bezel.
Motherboard tray	No	N/A	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Bezel. 4 Remove a Slammer Battery. 5 Remove a Slammer Fan FRU. 6 Remove a Slammer Motherboard Tray. 7 Insert a Slammer Motherboard Tray. 8 Insert a Slammer Fan FRU. 9 Insert a Slammer Battery. 10 Attach a Slammer Bezel.
Network interface module (copper or optical)	No	Target CU is failed over	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Network Interface Module. 4 Insert a Network Interface Module.
SFP module	Yes	N/A	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove an SFP Module. 4 Insert an SFP Module.
Power supply	Yes	Target CU in conservative mode	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Power Supply. 4 Insert a Slammer Power Supply.

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Table 9 Slammer FRU replacement tasks (continued)

FRU	Hot swap?	Slammer state	Tasks
Private interconnect module	No	Target CU is failed over	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Private Interconnect Module. 4 Insert a Slammer Private Interconnect Module.
SCSI or Fibre Channel card	No	Target CU is failed over	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Network Interface Module. 4 Remove a Slammer SCSI or FC Card. 5 Insert a Slammer SCSI or FC Card. 6 Insert a Network Interface Module.
iSCSI card	No	Target CU is failed over	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Network Interface Module. 4 Remove a Slammer iSCSI Card. 5 Insert a Slammer iSCSI Card. 6 Insert a Network Interface Module.

CAUTION If you are upgrading the NIM to a new NIM model, you must take the Slammer completely offline and replace both NIM FRUs simultaneously.

Important! Replacement of FRUs, other than bezels, must be started through Guided Maintenance.

For information on Guided Maintenance, see About Guided Maintenance Initiation.

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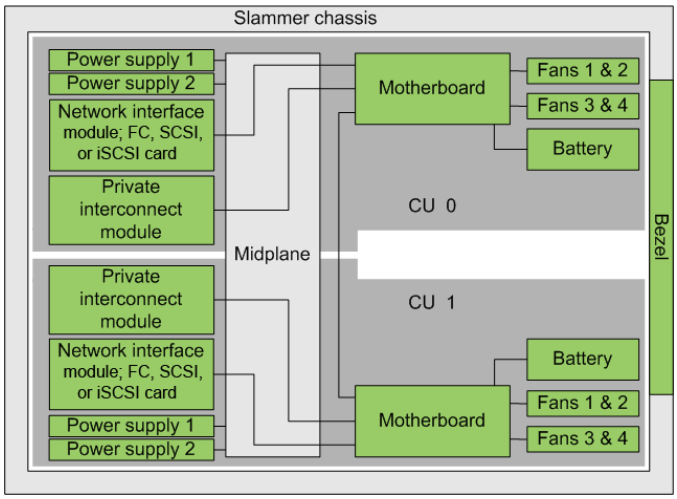
Map of Slammer FRUs

The following figure illustrates the set of replaceable FRUs in a Slammer.

Figure 14 Schematic of replaceable Pillar Axiom Slammer FRUs



Slammer FRU Part Numbers

Below are the field replaceable units (FRUs) that are in a Slammer.

Table 10 Slammer FRU part numbers

Part number	FRU description
1450-00003-XX	Battery
1450-00001-XX	Bezel
1450-00035-XX 1400-00001-XX	Chassis midplane
1450-00005-XX	Fan module
1450-00175-XX	iSCSI HBA

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Table 10 Slammer FRU part numbers (continued)

Part number	FRU description
2010-00001-XX	SCSI PCI interface
2010-00002-XX	Fibre Channel PCI-X HBA
2011-00004-XX	iSCSI PCI-X HBA
1450-00002-XX	Motherboard module
1450-00007-XX	Network interface module (copper)
1450-00008-XX	Network interface module (optical)
1450-00168-XX	Network interface module (quad port, optical)
1450-00169-XX	Network interface module (quad port, copper)
1450-00039-XX	SAN adapter module (2 GB)
1450-00132-XX	SAN adapter module (4 GB)
1450-00135-XX	SAN adapter module (iSCSI, copper)
3130-02548-XX	NAS SFP module (multimode, 1 GBPS)
3130-02607-XX	SAN SFP module (multimode, 1 and 2 GBPS)
3130-02636-XX	NAS SFP module (single mode, 1.062/1.25 GBPS, 10 km)
3130-02638-XX	SAN SFP module (single mode, 2.125/1.062 GBPS, 10 km)
1450-00011-XX	Power supply module
1450-00012-XX 1450-00138-XX	Private interconnect module

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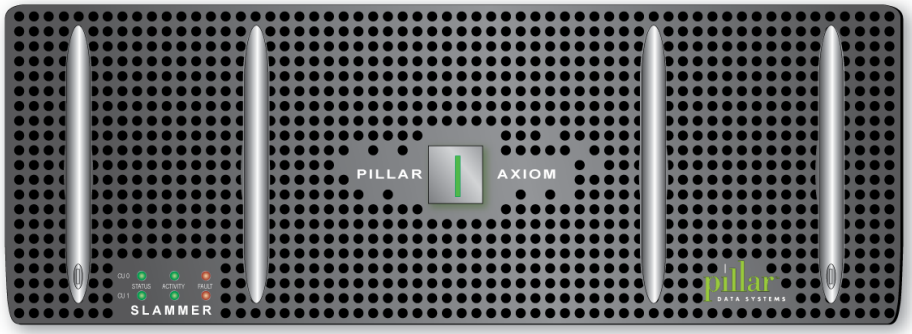
About Slammer Bezel Replacement

Slammer bezels can be replaced while the Slammer is operational. The following figure shows a Slammer bezel FRU.

Figure 15 Slammer bezel



To replace a Slammer bezel, perform the tasks that are outlined in the following table.

Table 11 Slammer bezel replacement tasks

Task		Reason
1	Remove a Slammer Bezel.	To make room for the bezel replacement.
2	Attach a Slammer Bezel.	To add the bezel replacement.

About Slammer Bezel Removal

Guided Maintenance is not used to remove a Slammer bezel.

CAUTION The Slammer bezel is an integral part of EMI shielding. The bezel can and should be reattached even when only one Slammer control unit (CU) is powered on. An example of this situation is when you remove the motherboard tray from the other CU for any length of time.

When a bezel is removed:

- The system generates an event indicating the removal.

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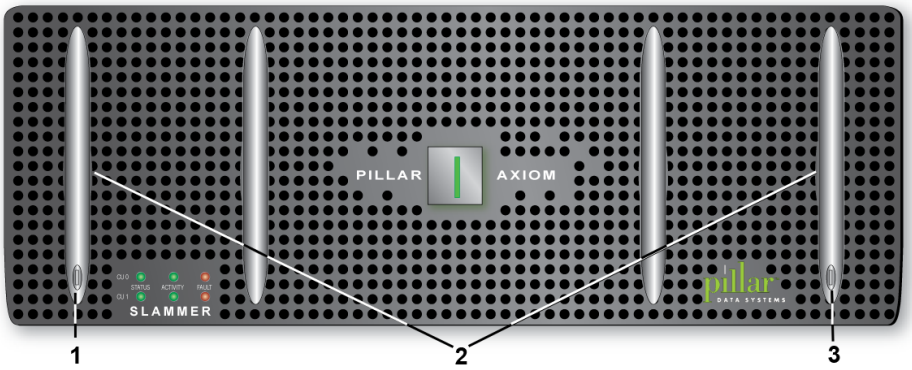
- The system lights the FLT LED on the rear of the Slammer CU.
- The status of the Slammer is green (if bezel removal is the only issue).

Remove a Slammer Bezel

1 Press the button on each ejector tab to unlock the tabs.

Figure 16 Slammer bezel ejector tabs



Legend

1 Button
2 Ejector
3 Button

2 Lift each ejector tab at the same time to disengage the Slammer bezel from the rack mounts.

3 Carefully rotate the top of the bezel outward and, as the latches disengage, lift the bezel slightly to disengage the bottom of the bezel.

4 Set the bezel aside.

Attach a Slammer Bezel

Note: Ensure that there is no interference at the top and bottom of the bezel so it seats properly.

1 Check the receptacle for the bezel power connector to ensure that it is free to move slightly to engage the power on the back of the bezel.

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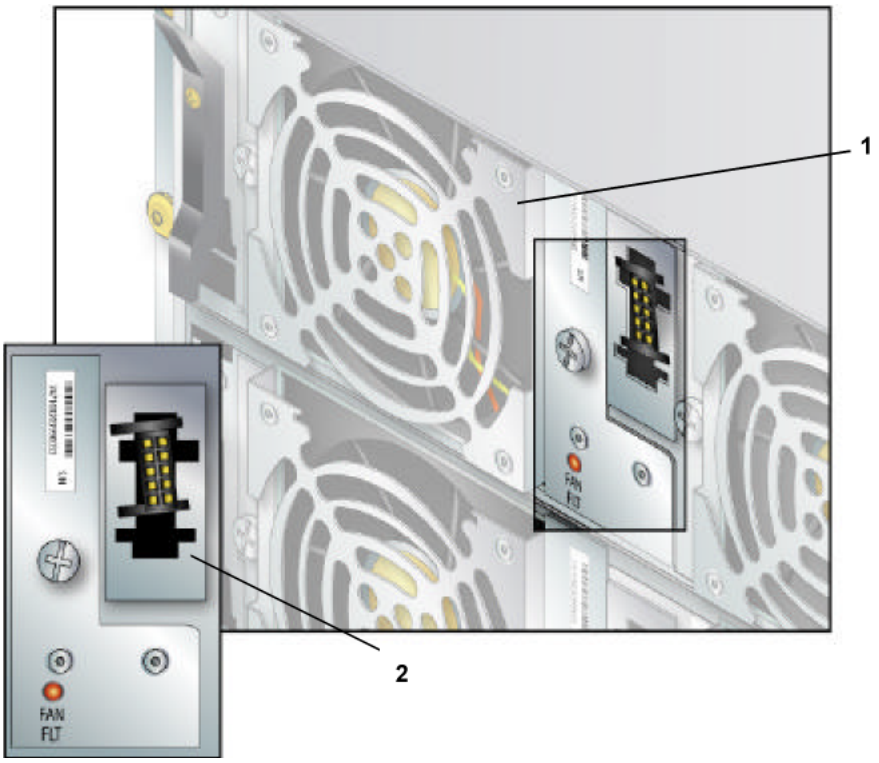
Figure 17 Receptacle for the Slammer bezel power connector



Legend

1 Fan FRU
2 Bezel power connector receptacle

Note: A Slammer has two bezel power receptacles, one for each control unit.

2 If the receptacle is recessed into the holder, pull it forward slightly to engage the tabs so they rest on the front of the chassis.

3 Tilt the top of the bezel away from the Slammer chassis and insert the bottom hooks on the bezel into the holes in the chassis.

4 Tilt the top of the bezel toward the chassis until the bezel power connectors seat into the receptacles. Do not force the bezel into place.

Note: Be sure the power connecters are well seated. If the power and signal connector is not properly seated, the bezel fault LED will be lit.

5 Press the top corners of the bezel to engage the top two bezel hooks with the slots at the top of the chassis.

6 Press both ejector tabs (if open) until they lock in place.

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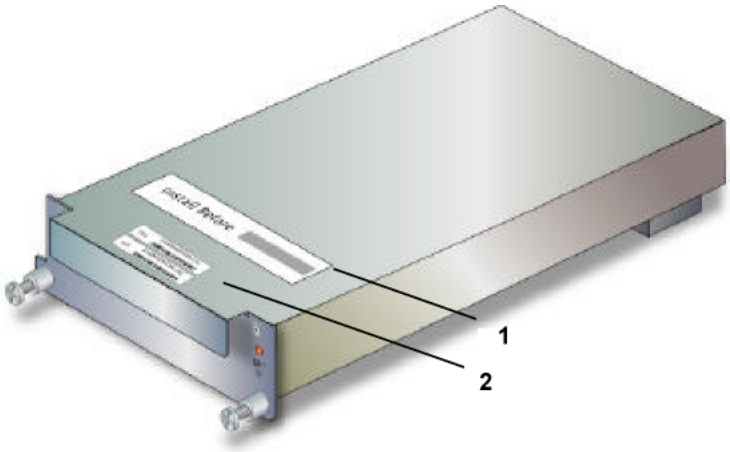
About Slammer Battery Replacement

Each Slammer control unit (CU) has a single battery that provides backup power to two of the six memory module slots on the motherboard. The following figure shows a battery.

Figure 18 Slammer battery FRU



Legend

1 Expiration date
2 Serial number label

The Slammer CU battery charger keeps the battery charged. During a power outage, a fully charged battery can provide power to the two memory slots for:

- 72 hours for systems with 3 or 6 GB of memory per CU
- 48 hours for systems with 12 GB of memory per CU

Important! If a power failure exceeds the above 72- or 48-hour limit, the battery could be overly discharged. In this case, you should replace the battery.

Note: If you will be intentionally powering down the system for more than a day (for example, as part of a maintenance operation), remove the Slammer batteries so they do not discharge.

Important! After recovery from a power failure and while the battery is charging, the system operates in conservative (write-through cache) mode. The system stays in this mode until the battery charge reaches 80% of battery capacity, which may take up to 12 hours of normal power. If the battery is severely discharged, recharge time can take up to 18 hours. If the battery takes longer than 18 hours to reach a full charge, you should replace the battery. See Battery Shelf Life.

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If you need to turn off the system, use the Shutdown capability in the GUI. Because of the redundant architecture, you may not turn off the system by switching off components (including the power distribution units).

During a normal system shutdown, the data in Slammer memory is flushed to the storage pool, after which battery power is no longer needed to maintain data integrity.

Important! *Do remove the batteries* whenever you:

- Shut down a Pillar Axiom system through the AxiomONE Storage Services Manager (GUI), and
- Power down the system, and
- Leave the system unattended for any length of time.

Important! *Do not remove the batteries* (instead, contact Technical Support) in these situations:

- The system fails to shut down.
- Power is lost.
- You turn off the power without first shutting the system down.

The following figure, which shows a Slammer face with the bezel removed, identifies the location of a Slammer battery.

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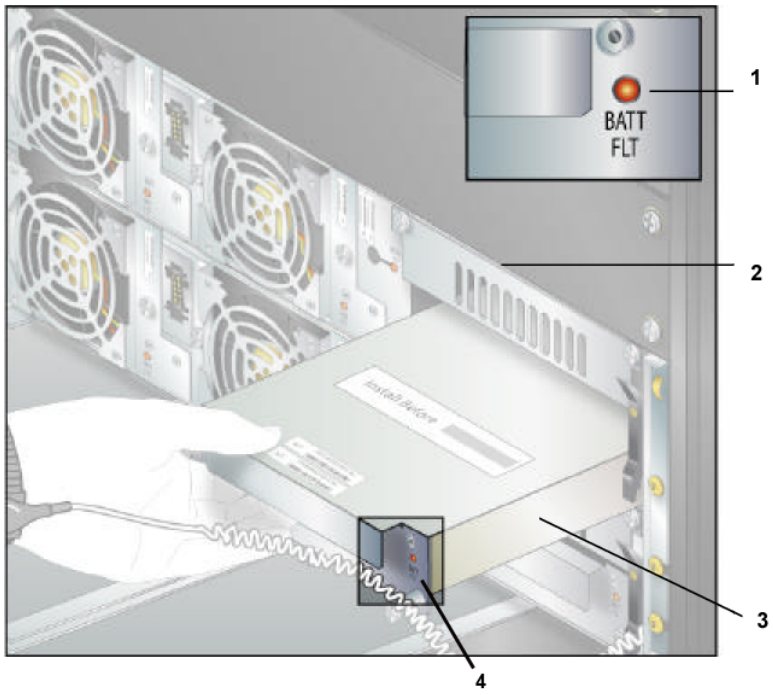
Figure 19 Slammer battery location



Legend

1 Battery fault LED
2 Slammer front with bezel removed
3 Battery
4 Battery fault LED location

About Slammer Battery Removal

To help you identify the target control unit (CU) that has the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target CU. If you choose Reverse Identify in the GUI, Guided Maintenance beacons all LEDs except for the target CU.

After you click the Prepare System button in the GUI, Guided Maintenance prepares the system for replacement of the battery:

- Flushes cached data to the Bricks.
- Sets the status of the target CU to Warning.
- Places all filesystems and LUNs on the Slammer in conservative mode.
- Disables the battery charger on the target CU.

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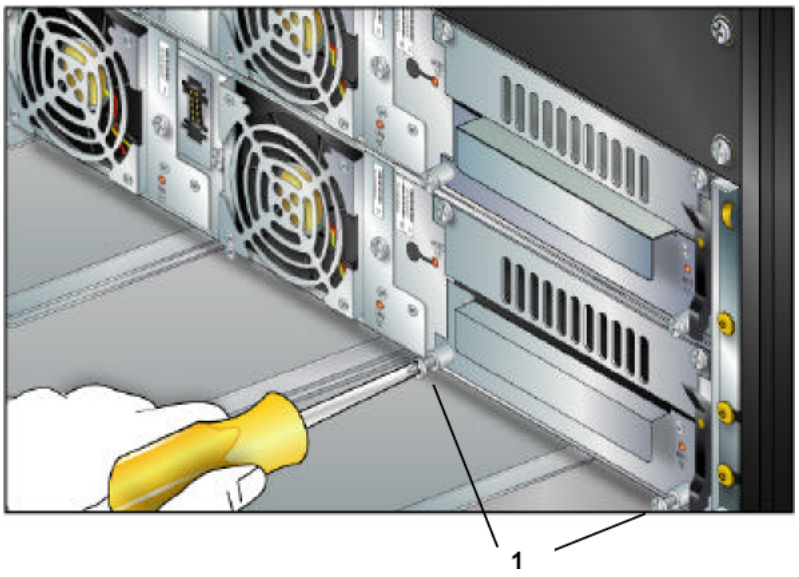
After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

CAUTION Slammer batteries are lead-acid based. To avoid possible explosion, do not burn. Replace only with the Pillar-approved parts. Recycle or discard the batteries as instructed by local regulations.

Remove a Slammer Battery

1. Within Guided Maintenance, click the Next button in the Prepare System page.
2. When Guided Maintenance prompts you to remove the battery, remove the two screws that secure the battery to the Slammer chassis.

Figure 20 Slammer battery screws



Legend

1	Screws

3. Slide the battery out of the chassis and set it aside.

Battery Shelf Life

Check the expiration date that is on the battery.

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Table 12 Battery shelf life

If today is...	Do this...	Comments
On or before the expiration date	Install the battery.	The battery has an operational charge.
Less than 30 months after the expiration date	Install the battery.	The system operates in conservative mode until the battery is recharged, which can take up to 12 hours (severely discharged batteries can take up to 18 hours). If the battery takes longer than 18 hours to reach a full charge, you should replace the battery.
30 months or more beyond the expiration date	Call Customer Service and order a replacement battery.	We do not recommend use of the battery. It may be discharged beyond the point where it can accept a full charge.

Battery Operational Life

Once you install the battery, as long as the Slammer is powered on, the internal battery charger provides a continuous trickle charge to maintain the battery throughout its operational life.

Table 13 Battery operational life

Ambient temperature	Operational Life
77° F (25° C)	3-5 years
68° F (20° C)	5 years

Insert a Slammer Battery

1 Slide the replacement battery into the Slammer chassis.

2 Push the battery firmly into place to engage the battery with the motherboard assembly.

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3 Tighten the two screws to secure the battery to the Slammer chassis.

4 On the Guided Maintenance page, click the Next button.

The system initiates a battery test, which takes approximately 5 minutes to complete.

5 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

6 On a NAS Slammer, look for an Administrator Action. You may be instructed to restart the system, which makes this FRU and all other resources on the target Slammer control unit available.

Note: On a SAN Slammer, the system automatically attempts to recover.

Note: If the Verify page completes within 5 minutes, the Result page displays the message "The replacement battery is currently in a Warning state and may continue to be in a Warning state for up to 24 hours until adequately charged".

7 Click the Finish button.

8 Review the status of the replacement FRU to confirm that it has a Normal status.

9 Follow the appropriate procedure in this guide to reattach the bezel to the Slammer chassis. Go to Attach a Slammer Bezel.

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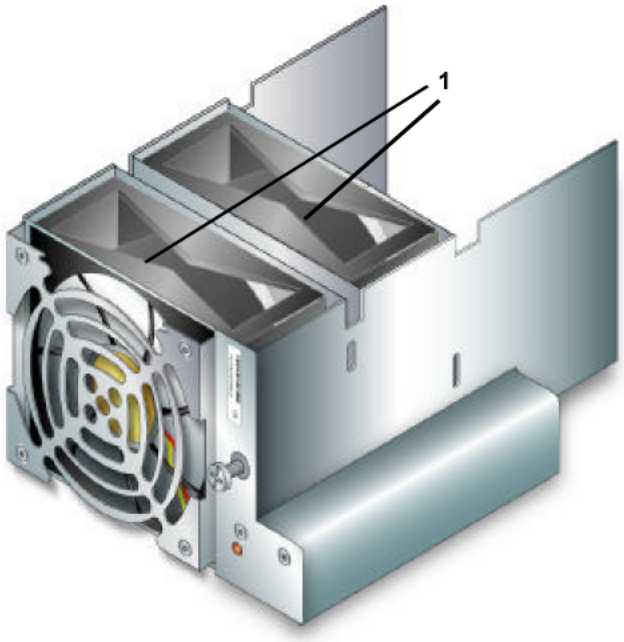
About Slammer Fan Module Replacement

Each Slammer control unit (CU) has two fan FRUs. The following figure shows a fan FRU, which is composed of a pair of fan assemblies. This means that each CU has four fan assemblies for cooling.

Figure 21 Slammer fan FRU



Legend

1 Fan assemblies (2 per fan FRU)

Note: When the fan FRU status shows that the FRU has failed, either fan assembly within the FRU may have failed. It is possible that the visible assembly in front is good while the rear assembly has failed. It is also possible that the good fan in the rear may cause the failed front fan blades to continue to rotate.

The following figure shows a Slammer face with the bezel removed, identifies the location of the Slammer fans.

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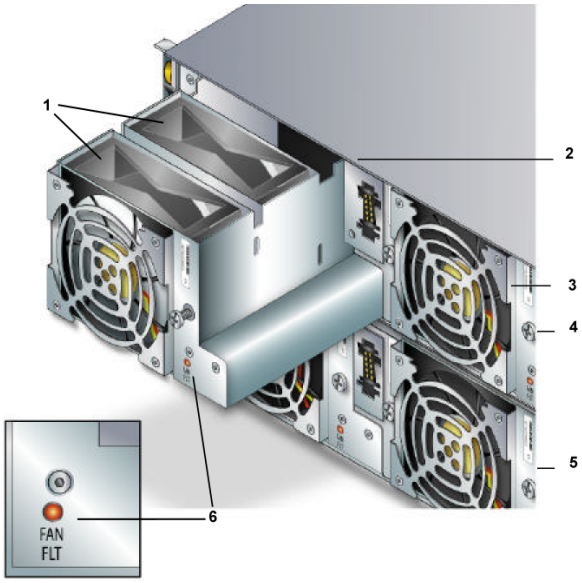
Figure 22 Slammer fan location



Legend

1 CU 0 Fans 1 and 2	4 CU 0
2 Front of Slammer chassis with bezel removed	5 CU 1
3 CU 0 Fans 3 and 4	6 Fan fault LED

Slammer Fan Replacement Tasks

To replace a Slammer fan, perform the tasks that are outlined in the following table.

Table 14 Slammer fan replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the fan FRU: 1 Remove a Slammer Bezel. 2 Remove a Slammer Fan FRU. 3 Insert a Slammer Fan FRU. 4 Attach a Slammer Bezel.
Step 4 Verify Status	Performed as final step in fan replacement.

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About Slammer Fan Module Removal

To help you identify the target control unit (CU) that has the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target CU. If you choose Reverse Identify in the GUI, Guided Maintenance beacons all LEDs except for the target CU.

After you click the Prepare System button in the GUI, Guided Maintenance quiesces certain system components, allowing you to replace the fan module. After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Important! When a fan module is stopped and removed, the internal temperature rises quickly and critical temperature alerts may begin to be issued. To avoid high-temperature buildup within the Slammer:

- Initiate Guided Maintenance only when you are able to replace the fan module immediately.
- Remove and replace the FRU within a five-minute period.
- Replace one fan FRU at a time.

Important! To avoid electrical arcing when you remove the fan FRU, let it spin down before you replace it.

Remove a Slammer Fan FRU

1. Within Guided Maintenance, click the Next button in the Prepare System page.
2. When Guided Maintenance prompts you to remove the fan FRU and after the fans in the FRU have spun down, remove the two screws that secure the fan FRU to the Slammer chassis.

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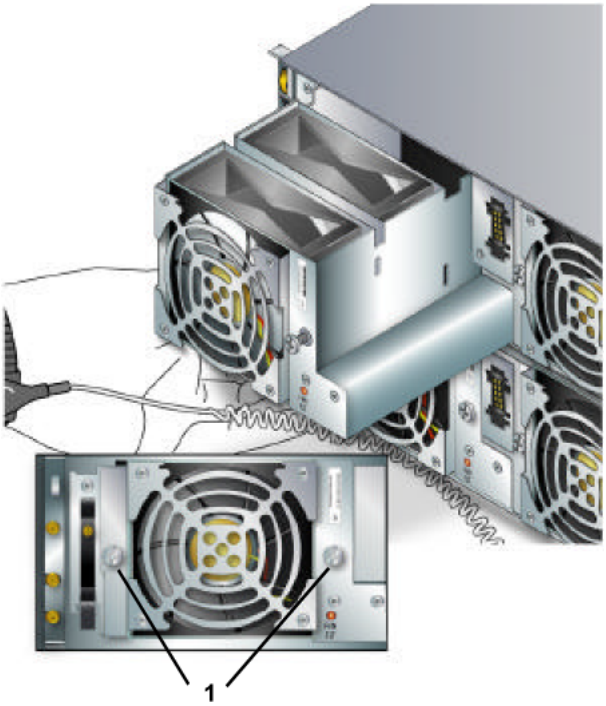
Figure 23 Slammer fan FRU screws



Legend

1	Screws

3 Slide the fan FRU out of the chassis and set it aside.

⚠ CAUTION Immediately replace the component to maintain proper airflow and cooling. Over-temperature conditions will occur if the replacement FRU is not installed into the chassis. Over-temperature conditions can damage other components.

About Slammer Fan Module Insertion

After you insert this FRU into a Slammer control unit (CU), use Guided Maintenance to finish the procedure.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

Important! To avoid high-temperature buildup within the Slammer:

- Replace one fan at a time.
- Replace the fan within a five-minute period.

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Insert a Slammer Fan FRU

1 Slide the replacement fan into the Slammer chassis and push it into place firmly to engage the fan with the motherboard tray.

Note: The system will automatically spin up the fan.

2 Tighten the two screws to secure the fan to the chassis.

3 On the Guided Maintenance page, click the Next button.

4 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

5 Review the status of the replacement FRU to confirm that it has a Normal status.

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About Slammer Motherboard Tray Replacement

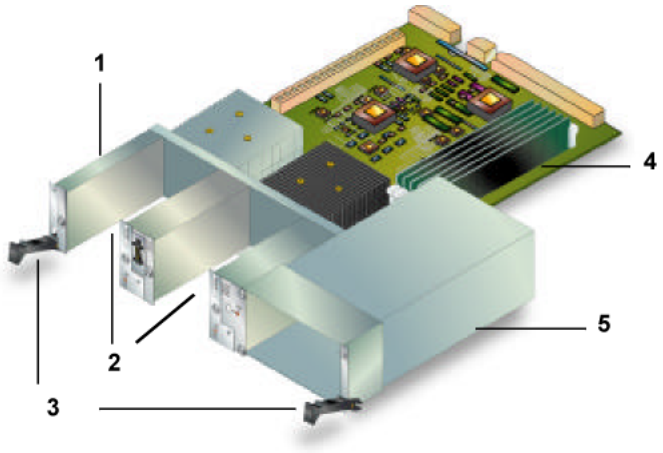
Motherboard replacement requires you to replace the entire motherboard tray. Motherboard replacement in a Slammer disrupts the normal operation of a Pillar Axiom system. To allow the replacement of the motherboard tray in a target control unit (CU), the system induces failover for the target CU to its partner CU.

Important! Even though failover transfers services and data paths to the partner CU, your network topology might make those services and data paths inaccessible. Before you start the replacement procedure, make sure that your network is configured to allow the data paths to switch over to the partner CU.

After you replace the motherboard tray and attach the power cords to the target CU, the Pillar Axiom system induces failback for the target CU.

The motherboard is attached to a motherboard tray, which can also hold a pair of fan modules and a battery. Together, these FRUs are called a motherboard assembly. The following figure shows a motherboard tray with the pair of fan modules and the battery removed.

Figure 24 Slammer motherboard tray



Legend

1 Motherboard tray
2 Fan slots
3 Ejectors
4 Motherboard
5 Battery housing

To replace a motherboard, you replace the motherboard tray.

Access the motherboard tray assembly from behind the bezel on the front of the Slammer, as shown in the following figure. This figure, which shows a Slammer

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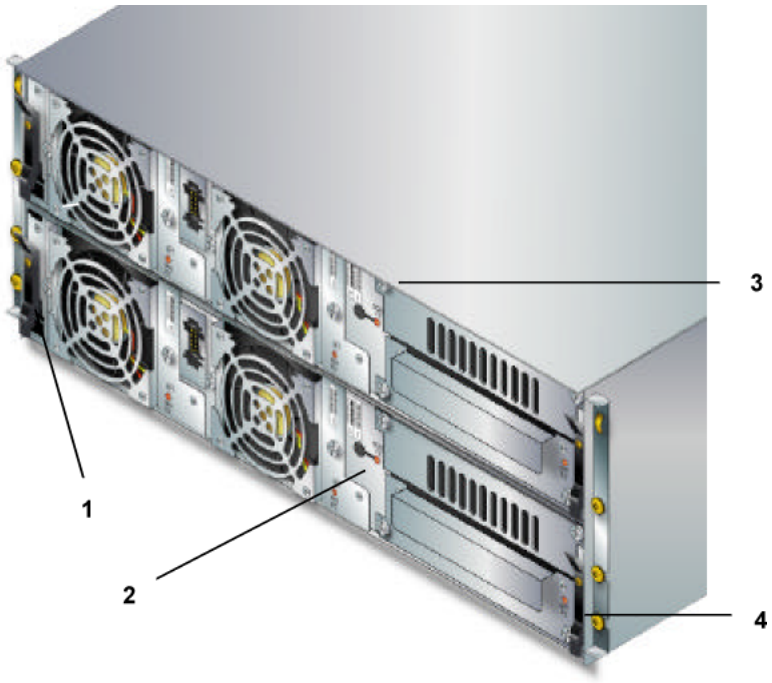
face with the bezel removed, identifies the location of the assembly and its LED for control unit 0.

Figure 25 Motherboard tray assembly location

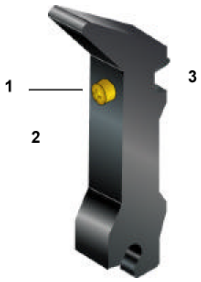


Legend

1 Motherboard tray ejector
2 Motherboard fault LED
3 Slammer front with bezel removed
4 Motherboard tray ejector

The following figure shows a motherboard tray ejector.

Figure 26 Module ejector



Legend

1 Screw
2 Front
3 Back

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About Slammer Motherboard Tray Removal

To help you identify the target control unit (CU) that has the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target CU. If you choose Reverse Identify in the GUI, Guided Maintenance beacons all LEDs except for the target CU.

After you click the Prepare System button in the GUI, Guided Maintenance prepares the system for replacement of that FRU. Guided Maintenance:

- Fails over the target CU to its partner CU.
- Stops services on the target CU and flushes battery-backed memory.
- Tells you to remove the AC power cord from the target CU.

After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Remove a Slammer Motherboard Tray

1. Follow the appropriate procedure in this guide to remove the bezel from the Slammer chassis. See Remove a Slammer Bezel.
2. Within Guided Maintenance, click the Next button in the Prepare System page.
3. When Guided Maintenance prompts you, remove the power cords from both of the power supplies of the target Slammer control unit (CU).

   Important! Do not remove the power cords from the partner CU. That CU supports all the user data paths for this Slammer.
4. Follow the appropriate procedure in this guide to remove both fans from the target motherboard tray. See Remove a Slammer Fan FRU.
5. Follow the appropriate procedure in this guide to remove the battery from the target motherboard tray. See Remove a Slammer Battery.
6. Loosen and disengage the two screws that secure the motherboard tray ejectors to the target Slammer chassis.
7. Press both ejectors down firmly to disengage the motherboard tray from the chassis midplane.

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8 Slide the motherboard tray out of the chassis and set it aside.

About Slammer Motherboard Tray Insertion

After you insert this FRU to a Slammer control unit (CU), use Guided Maintenance to complete the replacement process. After you add the FRU and reattach the power cords, Guided Maintenance fails back the target CU from its partner CU.

Note: When the target CU fails back, if the Slammer is a NAS Slammer and CIFS is enabled, user data paths will pause for up to 30 seconds.

Important! If Guided Maintenance encounters a problem during failback, you must contact Technical Support to continue Guided Maintenance for this FRU.

Watch for an Administrator Alert, which may instruct you to restart the system.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

Insert a Slammer Motherboard Tray

Important! When you replace this FRU, slowly and evenly slide the replacement into place. If the FRU has ejectors or locking tabs, use them for final connector seating.

1 Slide the motherboard tray into the Slammer chassis and push it firmly into place to engage the tray with the chassis midplane.

2 Lift both ejectors up and press firmly to engage the motherboard tray with the chassis midplane.

3 Engage and tighten the two screws that lock the ejectors to the chassis.

4 Follow the appropriate procedure in this guide to reinsert the battery into the motherboard tray and secure the screws tightly. See Insert a Slammer Battery.

5 Follow the appropriate procedure in this guide to reinsert both fans into the motherboard tray and secure the screws tightly. See Insert a Slammer Fan FRU.

6 In the Guided Maintenance page, click the Next button.

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7 When prompted, attach both power cords to both of the target CU power supplies.

Important! After the target CU powers up, the system may need to update the firmware on the replacement motherboard. To allow this update to occur, wait 10 minutes before continuing with the next step.

⚠ CAUTION Clicking the Next button prematurely may result in having to recover the system manually or replace the motherboard.

8 In the Guided Maintenance page, click the Next button.

9 To fail back the control unit (CU), click the Resume button, which fails back the CU from its partner (optional).

Note: If the Enable Automatic Failback of NAS Control Units option is set as part of the global settings, the Resume button is not displayed. Instead, Guided Maintenance automatically fails back the target CU.

10 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

11 On a NAS Slammer, look for an Administrator Action. You may be instructed to restart the system, which makes this FRU and all other resources on the target Slammer CU available.

Note: On a SAN Slammer, the system automatically attempts to recover.

12 Click the Finish button.

13 Review the status of the replacement FRU to confirm that it has a Normal status.

14 Follow the appropriate procedure in this guide to reattach the bezel to the Slammer chassis. See Attach a Slammer Bezel.

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About Slammer Network Interface Module Replacement

Network interface module (NIM) replacement disrupts access over those cables that interface with this module. However, if this module is the only failure point and the system is cabled to the customer switches in the manner that we recommend, access to data is not disrupted during the procedure to replace the network interface module.

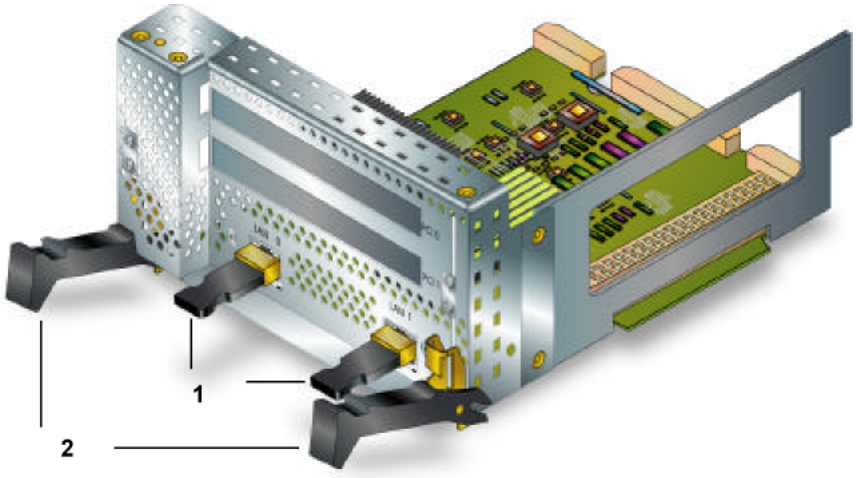
To allow the replacement of this module in a target control unit (CU), you induce failover for the target CU to its partner CU by detaching the power cable to the target CU.

Important! Even though failover transfers services and data paths to the partner CU, your network topology might make those services and data paths inaccessible. Before you start the replacement procedure, make sure that your network is configured to allow the data paths to switch over to the partner CU.

After you replace the NIM and attach the power cords to the target CU, the Pillar Axiom system induces failback for the target CU.

The following figure shows a two-port optical network interface module. The copper version is the same except for the two network ports, which would be RJ-45 based.

Figure 27 Network interface module (optical) FRU



Legend

1 Network ports
2 Ejector

Note: There are different versions of NIMs available for Slammers, including a four port version. The NIM installed on the Slammer may vary slightly from one shown above.

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Additional features:

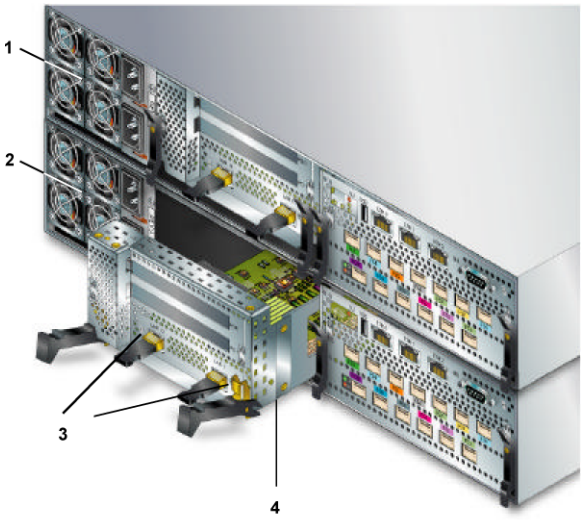
- SAN NIMs are similar to the optical gigabit module except that the network connections have removable GBICs for short or long wave SAN.
- A SAN NIM may contain an iSCSI HBA in the top PCI slot.
- A NAS NIM may contain a SCSI interface card or FC HBA in one of the PCI slots.

Note: When replacing a NIM that contains an FC, iSCSI, or SCSI HBA, if you want to continue using that HBA, remove it from the old NIM and insert it into the new one.

⚠ CAUTION If you are upgrading the Slammer NIM to a new NIM model, you must take the Slammer completely offline and replace both NIM FRUs simultaneously.

Access NIMs from the back of the Slammer chassis. Each CU has its own network interface module. The following figure identifies the location of the NIM and Fault LED for CU 0.

Figure 28 Network interface module (optical) location



Legend

1 CU 0
2 CU 1
3 Fault LEDs for the 2-port NIM.
4 Network interface module

Note: The 4-port GbE NIM has fault LEDs adjacent to each port, just like the 2-port NIM shown in the previous figure.

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The NIMs in both control units of a Slammer must be either NAS-specific or SAN-specific. For a NAS Slammer, GbE copper-based and GbE optical-based CUs may coexist. Contact Technical Support if you want to mix copper and optical CUs within the same Slammer.

Network Interface Module LED Status

Table 15 Slammer network interface module LED status

LED identifier and color	Meaning
Amber	Network interface module in this CU has failed.
Off	No failure is indicated.

Slammer NIM Replacement Tasks

To replace a Slammer network interface module, perform the tasks that are outlined in the following table.

⚠ CAUTION If you are upgrading the Slammer NIM to a new NIM model, you must take the Slammer completely offline and replace both NIM FRUs simultaneously.

Table 16 Network interface module replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the network interface module (NIM) FRU: 1 Remove a Network Interface Module. 2 Remove a Slammer SCSI or FC Card (optional). 3 Insert a Slammer SCSI or FC Card (optional). 4 Remove a Slammer iSCSI Card (optional). 5 Insert a Slammer iSCSI Card (optional). 6 Insert a Network Interface Module.

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Table 16 Network interface module replacement tasks (continued)

Guided Maintenance	Task
Step 4 Resume	Performed as part of network interface module replacement.
Step 5 Verify Status	Performed as the final step in NIM replacement.

Note: Step 4, Resume, shows only when the Enable Automatic Failback of NAS Control Units option has not been selected in the Global Settings section of the GUI. When this option has been selected, Step 4 becomes Verify Status.

About Slammer Network Interface Module Removal

To help you identify the target control unit (CU) that has the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target CU. If you choose Reverse Identify in the GUI, Guided Maintenance beacons all LEDs except for the target CU. Reverse Identify may make the FRU easier to find.

After you click the Prepare System button in the GUI, Guided Maintenance, fails over the target CU to its partner CU.

After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Remove a Network Interface Module

⚠ CAUTION If you are upgrading the Slammer NIM to a new NIM model, you must take the Slammer completely offline and replace both NIM FRUs simultaneously.

1. Within Guided Maintenance, click the Next button in the Prepare System page.
2. When Guided Maintenance prompts you, remove the power cords from both of the power supplies for the target Slammer control unit (CU).

   Important! Do not remove the power cords from the partner CU. That CU supports all the user data paths for this Slammer.
3. Disconnect the following cables from the network interface module:

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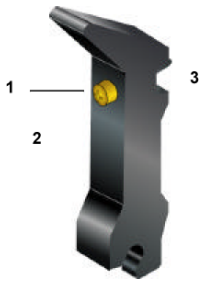
- All public cables from the network ports.
- All cables, if any, from the cards in the PCI slots (optional).

Note: Make a notation that shows which cable connects to which port and to which PCI card.

4 Loosen and disengage the two screws that secure the network interface module ejectors to the Slammer chassis. Ejectors look like this:

Figure 29 Module ejector



Legend

1 Screw
2 Front
3 Back

5 Press both ejectors down firmly to disengage the network interface module from the chassis midplane.

6 Slide the network interface module out of the chassis and set it aside.

7 If there is a PCI card in the network interface module's riser card, remove the PCI card and set it on an ESD-qualified workbench (optional).

About Slammer Network Interface Module Insertion

After you insert this FRU to a Slammer control unit (CU), use Guided Maintenance to complete the replacement process. After you add the FRU and reattach the power cords, the system automatically fails back the target CU from its partner CU.

Note: When the target CU fails back, if CIFS is enabled on the Slammer, user data paths will pause for up to 30 sec.

Important! If Guided Maintenance encounters a problem during failback, you must contact Technical Support to continue Guided Maintenance for this FRU.

Watch for an Administrator Alert, which may instruct you to restart the system.

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Note: For NAS Slammers, a replacement network interface module does not have to be of the same type as the one that you replaced. Optical and copper NAS network interface modules can be interchanged. However, SAN and NAS network interface modules cannot be interchanged.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

Note: Some systems may be using an optional interface or HBA within a network interface module (NIM). If you have an FC or iSCSI HBA or a SCSI interface that needs to be inserted into the replacement NIM, insert the HBA or interface card before continuing with this procedure. See the appropriate service procedure for inserting the HBA or interface card. See Insert a Slammer SCSI or FC Card or Insert a Slammer iSCSI Card for more information.

Insert a Network Interface Module

Important! When you replace this FRU, slowly and evenly slide the replacement into place. If the FRU has ejectors or locking tabs, use them for final connector seating.

1. If you removed a PCI card from the old network interface module, insert the PCI card into the riser card of the replacement network interface module.

   Note: Refer to the appropriate procedure in this guide for complete instructions on how to insert a PCI card. See Insert a Slammer SCSI or FC Card or Insert a Slammer iSCSI Card for more information.

2. Slide the replacement network interface module into the Slammer chassis and push the module into place firmly.
3. Lift both ejectors up and press firmly to engage the network interface module with the chassis midplane.
4. Engage and tighten the two screws that lock the ejector to the chassis.
5. Reconnect the following cables to the network interface module:
   - All cables, if any, to the cards in the PCI slots (optional).
   - For NAS Slammers, all public Ethernet cables to network ports.
   - For SAN Slammers, all Fibre Channel (FC) cables to the network ports.
6. In the Guided Maintenance page, click the Next button.

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7 When prompted, attach both power cords to both of the target power supplies, which causes the control unit (CU) to power up and fail back the CU from its partner.

8 In the Guided Maintenance page, click the Next button.

9 For NAS Slammers, to fail back the CU, click the Resume button, which fails back the CU from its partner (optional).

Note: If the Enable Automatic Failback of NAS Control Units option is set as part of the global settings, the Resume button is not displayed. Instead, Guided Maintenance automatically fails back the target CU.

10 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

11 On a NAS Slammer, look for an Administrator Action. You may be instructed to restart the system, which makes this FRU and all other resources on the target Slammer CU available.

Note: On a SAN Slammer, the system automatically attempts to recover.

12 Click the Finish button.

13 Review the status of the replacement FRU to confirm that it has a Normal status.

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About SFP Module Replacement

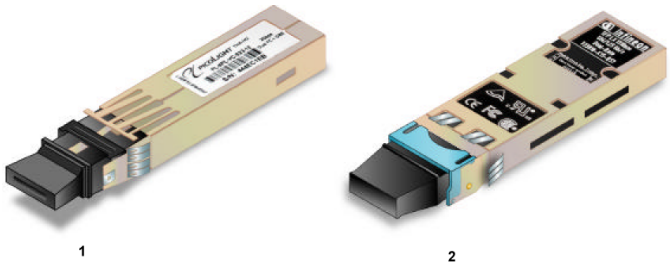
Small Form Factor Pluggable (SFP) module replacement disrupts access over the optical fiber that connects to this module. However, if this module is the only failure point and the system is cabled to the customer switches in the manner that we recommend, access to data is not disrupted during the procedure to replace the SFP module.

Important!

We recommend that all hosts that use this data path be quiesced before you replace an SFP module.

The following figure shows two typical SFP modules:

Figure 30 SFP module FRU



Legend

1 SAN multimode SFP
2 NAS single mode SFP

Note: The SFP modules displayed above are representative. The SFP module installed in your system may differ.

Optical fiber-based network interface modules support the following types of connector:

- NAS SFP modules
- SAN SFP modules

Access SFP modules from the back of the Slammer chassis, as shown in the following figure. A Slammer control unit (CU) has a pair of SFP modules located within the CU's network interface module. This figure, which shows a network interface module in CU 0, identifies the location of the SFP modules.

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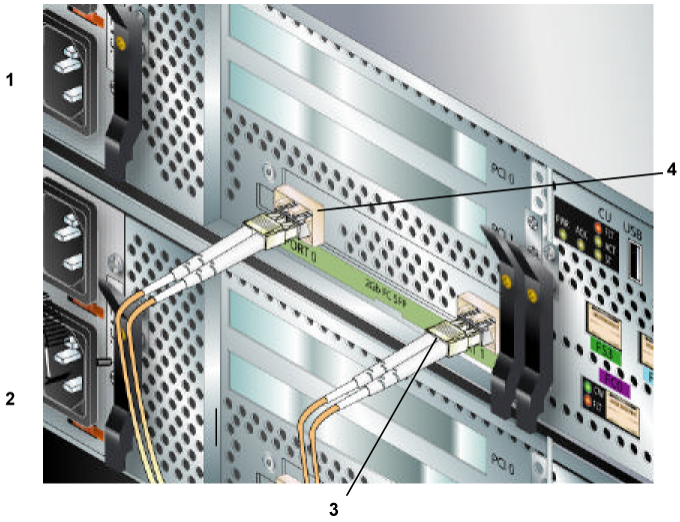
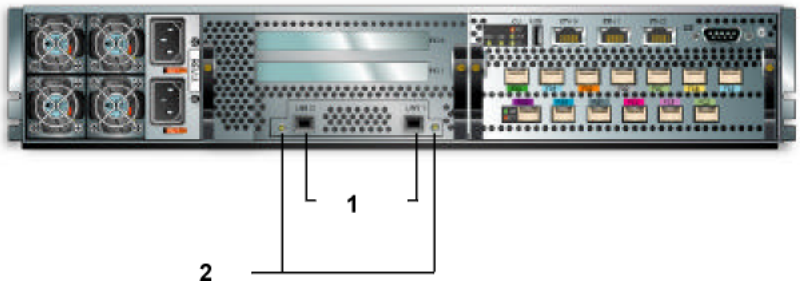
Figure 31 Slammer SFP module location



Legend

1 Slammer CU 0
2 Slammer CU 1
3 Fiber optic cable
4 SFP module port 0

Figure 32 Optical network port LEDs



Legend

1 Optical ports
2 Network status LEDs

Table 17 Slammer optical network port status

LED identifier and color	Meaning
Amber (blink)	Traffic exists; if off, no traffic exists.
Green	Link is established; if off, no link exists.

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Remove an SFP Module

There is no Guided Maintenance for SFP module replacement.

1. Quiesce all NAS or SAN host activity over this data path.
2. Ensure the fiber optic cable connected to the SFP module is labeled so you can correctly reconnect the cable later.
3. Press down on the locking tab on the top of the fiber cable with your thumb, gently detach the fiber optic cable from the SFP module, and move the fiber aside.
4. Pull the latch handle on the SFP module down until the latch stops and then extract the SFP module.

Insert an SFP Module

There is no Guided Maintenance for inserting an SFP module.

1. Orient the replacement SFP module so that its PCB connector is facing down.
2. Insert the replacement SFP module into the appropriate optical port. Push firmly until the PCB connector is fully seated.
3. Ensure the latch handle on the replacement SFP module is fully up.
4. With the locking tab on the fiber optic cable facing up, insert the fiber cable into the replacement SFP module.
5. Push the fiber cable firmly into place until the locking tab snaps shut.
6. Check that the LED next to the network port containing the SFP module shows green.
7. Inform NAS or SAN clients to reestablish their storage connections.

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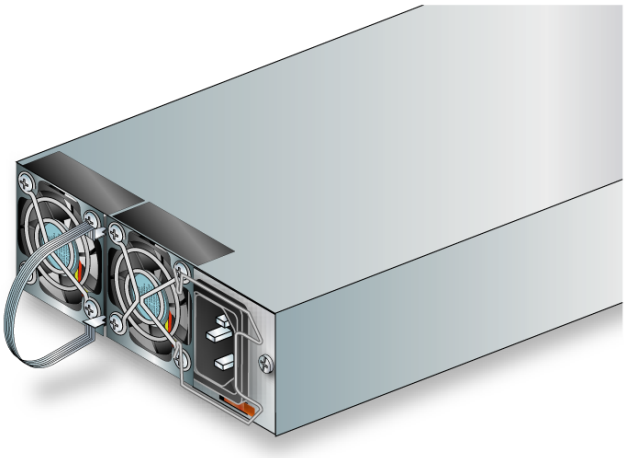
About Slammer Power Supply Replacement

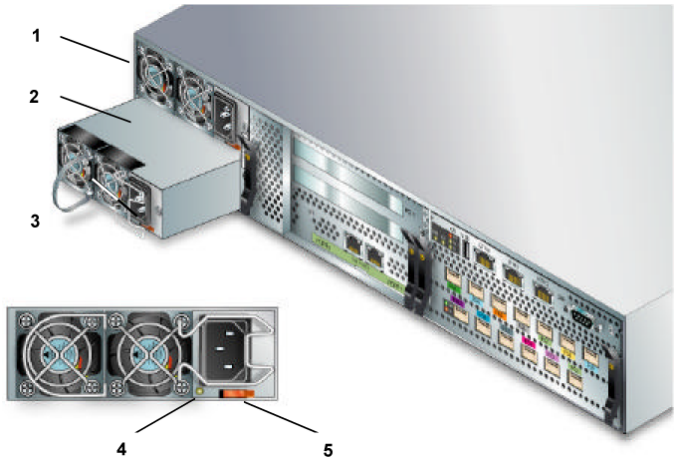
The following figure shows a power supply.

Figure 33 Slammer power supply FRU



Access power supplies from the back of the Slammer chassis, as shown in the following figure. Each Slammer control unit (CU) has a pair of power supplies. This figure, which shows a single CU, identifies the location of a power supply and its LED.

Figure 34 Slammer CU power supply location



Legend

1 Power supply 1
2 Power supply 2
3 Pull loop
4 Power supply LED
5 Release tab

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Slammer Power Supply LED Status

Table 18 Slammer power supply LED status

LED identifier and color	Meaning
Amber	Power supply in this control unit (CU) has failed.
Green	AC is applied and DC is active.

Note: Pillar Axiom systems do not control the power supply LEDs. After you replace this FRU, Guided Maintenance restarts the target CU.

Important! You may instead receive an Administrator Alert to restart the system.

To replace a Slammer power supply, perform the tasks that are outlined in the following table.

Table 19 Power supply replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the power supply FRU: 1 Remove a Slammer Power Supply. 2 Insert a Slammer Power Supply.
Step 4 Verify Status	Performed as the final step in power supply replacement.

About Slammer Power Supply Removal

To help you identify the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs to identify the target control unit (CU). If you choose Reverse Identify, Guided Maintenance beacons all LEDs except for the bezel LEDs on the target CU.

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After you click the Prepare System button in the GUI, Guided Maintenance prepares the system for replacement of that FRU. Guided Maintenance:

- Flushes cached data to the storage array.
- Places all filesystems or LUNs on the Slammer in conservative mode.

After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Remove a Slammer Power Supply

1. Within Guided Maintenance, click the Next button in the Prepare System page.
2. When Guided Maintenance prompts you, remove the power cord from the target power supply.

   Important! Do not remove the power cord from the other power supply. The target control unit (CU) is operational in conservative mode.
3. Slide the power supply's release tab to the left and pull the loop to disengage the power supply from the midplane.
4. Slide the power supply out of the Slammer chassis and set it aside.

CAUTION Immediately replace the component to maintain proper airflow and cooling. Over-temperature conditions will occur if the replacement FRU is not installed into the chassis. Over-temperature conditions can damage other components.

CAUTION When you remove a power supply, voltage is present from the partner power supply. Do not insert any instruments or tools into the open slot.

About Slammer Power Supply Insertion

After you insert this FRU into a Slammer control unit (CU), use Guided Maintenance to finish the procedure.

As the final step, the Pillar Axiom system takes the target CU out of conservative mode, places it in normal mode, and reports the status of the FRU.

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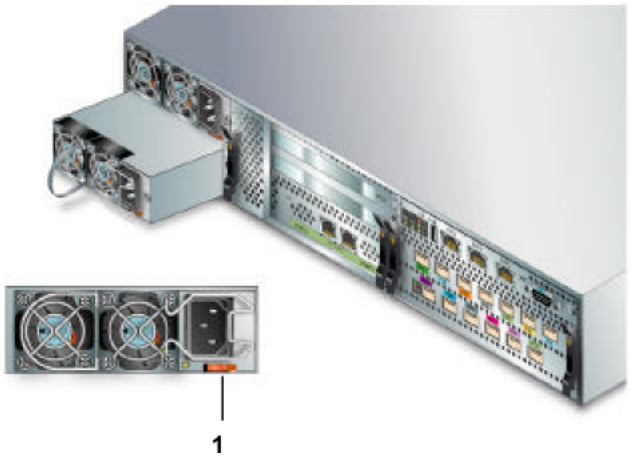
Important! When you replace this FRU, slowly and evenly slide the replacement into place. If the FRU has ejectors or locking tabs, use them for final connector seating.

Insert a Slammer Power Supply

1 Slide the replacement power supply into the Slammer chassis and push it firmly into place to engage the power supply with the midplane.

Important! Be sure to install the power supply so that the red release tab is in the lower right corner, as shown in the following figure.

Figure 35 Power supply correctly positioned



Legend

1 Release tab

When the power supply is seated correctly, the release tab will lock the power supply in place.

2 In the Guided Maintenance page, click the Next button.

3 When prompted, attach the power cord to the target power supply.

4 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

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5 Review the status of the replacement FRU to confirm that it has a Normal status.

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About Slammer Private Interconnect Module Replacement

Private interconnect module replacement disrupts access over those cables that interface with this module. However, if this module is the only failure point and the system is cabled in the manner that we recommend, access to data is not disrupted during the procedure to replace the private interconnect module.

To allow the replacement of this module in a target control unit (CU), the system induces failover for the target CU to its partner CU.

Important! Even though failover transfers services and data paths to the partner CU, your network topology might make those services and data paths inaccessible. Before you start the replacement procedure, make sure that your network is configured to allow the data paths to switch over to the partner CU.

Important! If your system has only one Slammer and you intend to replace both private interconnect modules on that Slammer, replace them one at a time; otherwise, the Pilot restarts and all I/O paths are disrupted.

After you replace the private interconnect module and attach the power cable, the Pillar Axiom system induces failback for the target CU.

Access private interconnect modules from the back of the Slammer chassis, as shown in the following figure. Each CU has its own private interconnect module FRU. This figure identifies the location of this FRU and status LEDs for CU 0.

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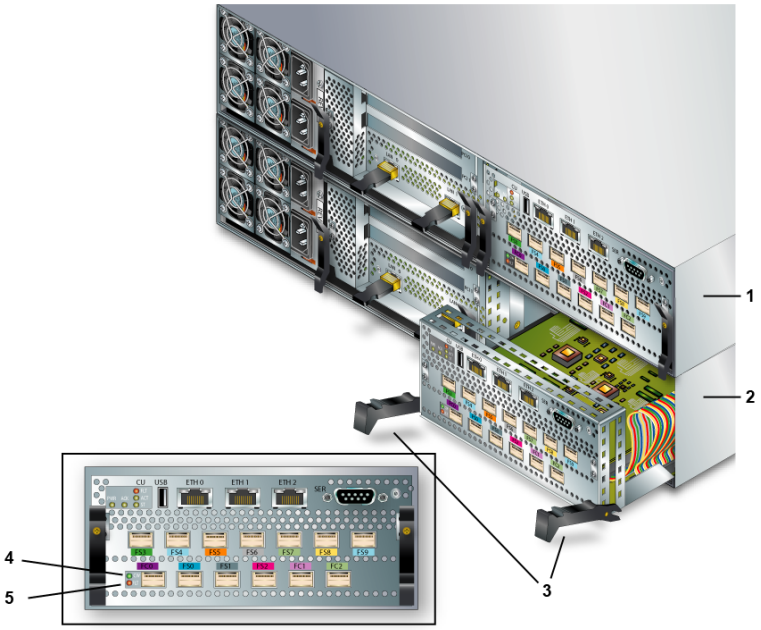
Figure 36 Private interconnect module location



Legend

1 CU 0 private interconnect module
2 CU 1 private interconnect module
3 Ejectors
4 SW LED
5 FRU FLT LED

Slammer Private Interconnect Module LED Status

Table 20 Slammer private interconnect module LED status

LED identifier and color		Meaning
SW	Off	Fibre Channel (FC) switch is not initialized or a problem exists. For the latter, FLT should be amber.
	Green	FC switch is ready and in switch mode.
FRU FLT	Amber	Fault exists in FC switch logic, interface, or other FRU circuitry.
	Off	No failure exists.

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Note: The FRU FLT LED is next to the FC 0 connector on the bottom left of the private interconnect module.

Note: The three LEDS (FLT, ACT, and ST) at the top left of the private interconnect module reflect the state of the entire Slammer CU and have the same meaning as the LEDs on the bezel.

After you replace this FRU, Guided Maintenance restarts the target CU.

Important! You may instead receive an Administrator Alert to restart the system.

To replace a Slammer private interconnect module, perform the tasks that are outlined in the following table.

Table 21 Slammer private interconnect module replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the private interconnect module FRU: 1 Remove a Private Interconnect Module 2 Insert a Slammer Private Interconnect Module
Step 4 Resume	Performed as part of private interconnect module replacement.
Step 5 Verify Status	Performed as the final step in private interconnect module replacement.

Step 4 Resume shows only when the Enable Automatic Failback of NAS Control Units option has not been selected in the Global Settings section of the GUI. When this option has been selected, Step 4 becomes Verify Status.

About Slammer Private Interconnect Module Removal

To help you identify the target control unit (CU) that has the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target CU. If you choose Reverse Identify in the GUI, Guided Maintenance beacons all LEDs except for the target CU.

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After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Remove a Private Interconnect Module

1 Within Guided Maintenance, click the Next button in the Prepare System page.

2 When Guided Maintenance prompts you, remove the power cords from both power supplies of the target control unit (CU).

Important! Do not remove the power cords from the partner CU. That CU supports all the user data paths for this Slammer.

Note: Before removing cables in the following steps, label them or draw a diagram to show which cable connects to which port on the private interconnect module.

3 Disconnect all Ethernet cables from the ETH ports in the target CU.

Note: Fibre Channel (FC) cables are color coded and labelled and should match the FC labels attached below the port socket connectors. If the cable and port labels do not match, contact Technical Support.

4 Disconnect all FC cables from the FC and FS ports in the target CU.

Note: Carefully grasp the cable connector and, while pushing the connector gently *into* the socket, press the latch on the top of the connector to unlatch it. Gently, pull the connector straight out.

Important! Do not use force or rock the connector from side to side or up and down to remove it. Doing so will damage the socket. Also, for the FC cables:

- Do not pull on the FC cables.
- Do not apply sideways force on the FC cables.
- Do not pull the FC cables tight. Leave them slack at all times.

5 Loosen and disengage the two screws that secure the private interconnect module ejectors to the Slammer chassis. Ejectors look like this:

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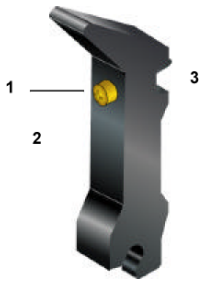
Figure 37 Module ejector



Legend

1 Screw
2 Front
3 Back

6 Press both ejectors down firmly to disengage the private interconnect module from the chassis midplane.

7 Slide the private interconnect module out of the chassis and set it aside.

About Slammer Private Interconnect Module Insertion

After you insert this FRU into a Slammer control unit (CU), use Guided Maintenance to complete the replacement process. After you add the FRU and reattach the power cords, Guided Maintenance fails back the target CU from its partner CU.

Note: When the target CU fails back, if the Slammer is a NAS Slammer and CIFS is enabled, user data paths will pause for up to 30 seconds.

Important! If Guided Maintenance encounters a problem during failback, you must contact Technical Support to continue Guided Maintenance for this FRU.

Watch for an Administrator Alert, which may instruct you to restart the system.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

For complete information on how to cable a private interconnect module into the system, go to *Pillar Axiom 500 SSF Cabling Reference* located on support.pillardata.com.

Important! When you replace this FRU, slowly and evenly slide the replacement into place. If the FRU has ejectors or locking tabs, use them for final connector seating.

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Insert a Slammer Private Interconnect Module

1 Slide the replacement private interconnect module into the Slammer chassis and push the module firmly into place.

2 Lift both ejectors up and press firmly to engage the private interconnect module with the chassis midplane.

3 Engage and tighten the two screws that lock the ejectors to the Slammer chassis.

⚠ CAUTION When reconnecting Fibre Channel (FC) cables, be sure to reconnect them in their correct locations; otherwise, the system may not function properly or resources may go offline.

4 Reconnect all FC cables to the FC and FS ports in the target CU. Gently insert the cables straight into the socket and use gentle pressure to latch them in place.

Tip: Place your finger on the top and bottom of the connector to guide the connector gently into the socket.

Important! Do not rock the connector from side to side or up and down to insert it.

5 Reconnect all Ethernet cables to the ETH ports.

6 In the Guided Maintenance page, click the Next button.

7 When prompted, attach both power cords to both power supplies of the target CU, which causes the CU to power up.

8 In the Guided Maintenance page, click the Next button.

9 For NAS Slammer, to fail back the CU, click the Resume button, which fails back the CU from its partner (optional).

Note: If the Enable Automatic Failback of NAS Control Units option is set as part of the global settings, the Resume button is not displayed. Instead, Guided Maintenance automatically fails back the target CU.

10 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

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Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

11 On a NAS Slammer, look for an Administrator Action. You may be instructed to restart the system, which makes this FRU and all other resources on the target Slammer CU available.

Note: On a SAN Slammer, the system automatically attempts to recover.

12 Click the Finish button.

13 Review the status of the replacement FRU to confirm that it has a Normal status.

Important! Visually inspect the replaced part and all other private interconnect modules and RAID CUs in the system. For every port that has a cable, the port LED should be in one of the following states (if this is not the case, contact Technical Support):

- Green, which means the FC port is online.
- Amber, which means the FC port has faulted or has been disabled.
- Flashing green, which means the FC port is initializing.

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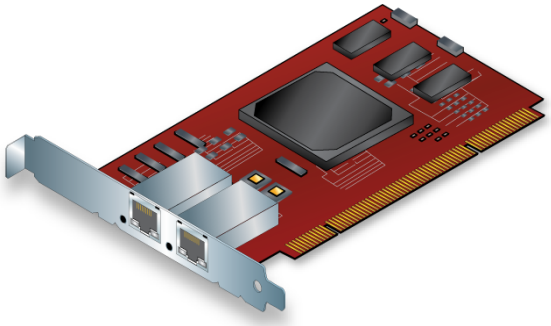
About Slammer iSCSI Card Replacement

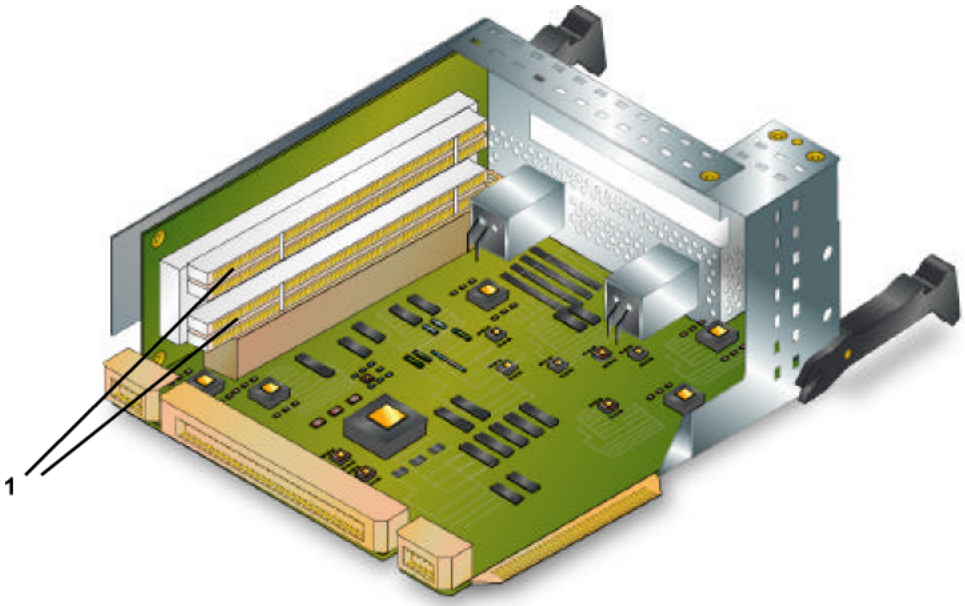
iSCSI PCI cards are used to interface SAN Slammers to iSCSI networks.

Figure 38 Sample iSCSI card



An iSCSI PCI card is located in the top riser slot of the network interface module (see the following figure).

Figure 39 Riser PCI slots in a network interface module



Legend

1 Riser card PCI slots (2)

Because the iSCSI card is located in the riser card of a network interface module, replacement requires the removal of the network interface module. This removal disrupts the normal operation of a Pillar Axiom system.

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To allow iSCSI card replacement, the system induces failover for the target control unit (CU) to its partner CU when you detach the power cable from the target CU. After you complete the replacement procedure and attach the power cable, the Pillar Axiom system induces failback for the target CU.

Important! Even though failover transfers services and data paths to the partner CU, your network topology might make those services and data paths inaccessible. Before you start the replacement procedure, make sure that your network is configured to allow the data paths to switch over to the partner CU.

After you replace this FRU, attach the power plug to the new FRU and the target CU will power on automatically.

Important! You may instead receive an Administrator Alert to restart the system.

To replace an iSCSI card, perform the tasks that are outlined in the following table.

Table 22 iSCSI card replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the iSCSI card FRU: 1 Remove a Network Interface Module. 2 Remove a Slammer iSCSI Card. 3 Insert a Slammer iSCSI Card. 4 Insert a Network Interface Module.
Step 4 Verify Status	Performed as the final step in iSCSI card replacement .

About Slammer iSCSI Card Removal

To help you locate the network interface module that contains the iSCSI card that needs to be replaced, Guided Maintenance beacons the bezel LEDs to identify the Slammer control unit (CU).

After you click the Prepare System button in the GUI, Guided Maintenance fails over the target CU to its partner CU.

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After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Remove a Slammer iSCSI Card

1. Within Guided Maintenance, click the Next button in the Prepare System page.
2. When Guided Maintenance prompts you, remove the power cords from both power supplies of the target Slammer control unit (CU).

   Important! Do not remove the power cords from the partner CU. That CU supports all the user data paths for this Slammer.
3. Follow the appropriate procedure in this guide to remove the network interface module from the target Slammer CU. See Remove a Network Interface Module.
4. Put on an antistatic wrist strap. Attach the alligator clip to a nonpainted metal surface on the Slammer chassis.
5. Firmly grasp the specified iSCSI card, extract it from the PCI slot, and set the card aside.

About Slammer iSCSI Card Insertion

After you insert this FRU to a Slammer control unit (CU), use Guided Maintenance to complete the replacement process. After you add the FRU and reattach the power cords, Guided Maintenance fails back the target CU from its partner CU.

Important! If Guided Maintenance encounters a problem during failback, you must contact Technical Support to continue Guided Maintenance for this FRU.

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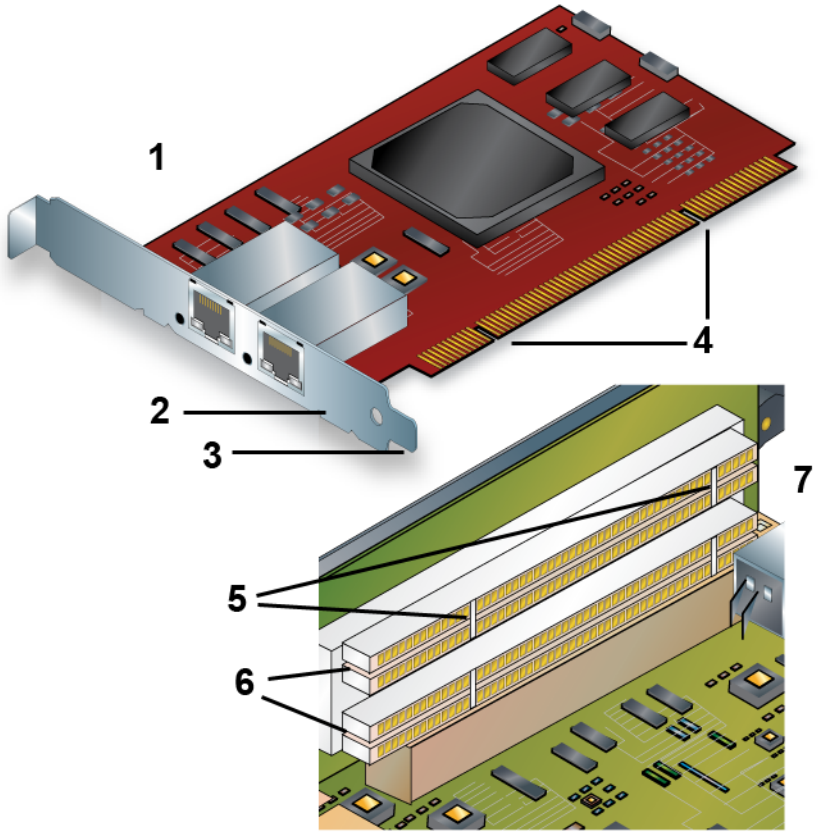
Figure 40 iSCSI card and open PCI slots



Legend

1 iSCSI card	5 Keys
2 Faceplate	6 Open PCI slots
3 End tab	7 Riser card
4 Notches	

Watch for an Administrator Alert, which may instruct you to restart the system.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the network interface module.

Insert a Slammer iSCSI Card

1 If you have not already done so, put on an antistatic wrist strap. Attach the alligator clip to a nonpainted metal surface on the Slammer chassis.

2 Orient the card so that the notches in the bottom of the card aligns with the keys in the top PCI slot.

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Important! Hold the iSCSI card by the edges. Do not touch the metal contacts on the bottom of the card.

3 Align the iSCSI card over the top PCI slot.

4 Insert the end tab on the faceplate into the raised guide slot in the sheet metal of the network interface module.

5 Push the iSCSI card edge connector into the PCI slot.

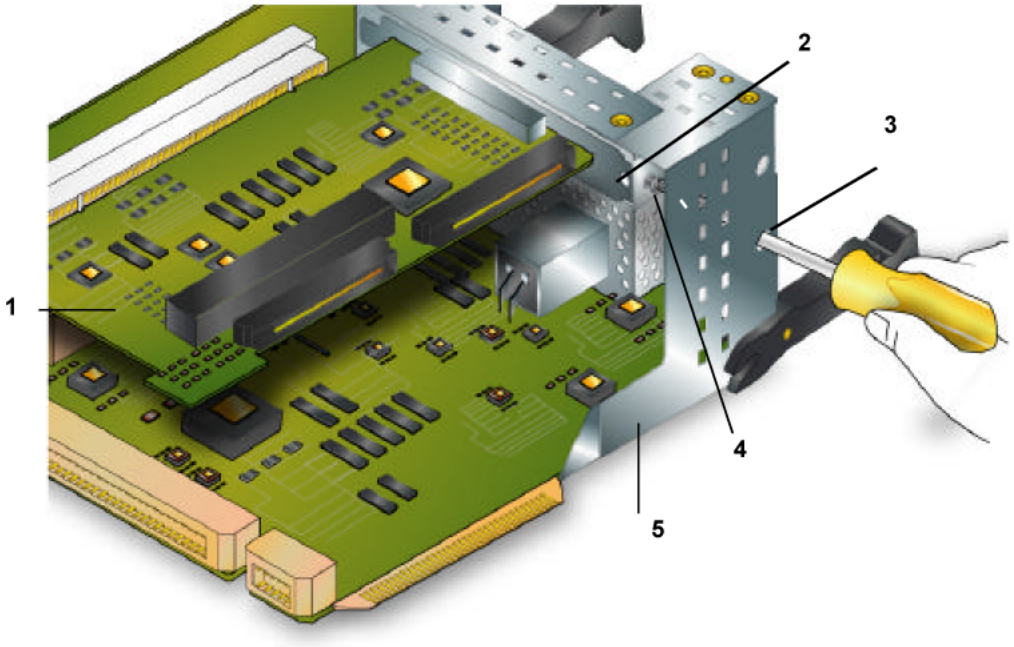
6 Push firmly to seat the card into the PCI slot. Alternate firm pressure on each end of the card until it clicks into place.

7 Secure the card faceplate to the chassis of the network interface module with a Phillips screw.

Tip: Use a small-shank, magnetized Phillips screwdriver that can fit through the 1/8 in (3.175 mm) chassis access hole.

Tip: Put the FRU on its side to do this step.

Figure 41 PCI card faceplate secured to the Slammer chassis



Legend

1 PCI card
2 Face-plate
3 Access hole for screwdriver
4 Screw hole
5 Chassis

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8 Follow the appropriate procedure in this guide to add the network interface module into the Slammer chassis. See Insert a Network Interface Module.

9 In the Guided Maintenance page, click the Next button.

10 When prompted, reattach the power cords to both of the power supplies of the target Slammer control unit (CU).

11 In the Guided Maintenance page, click the Next button.

12 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

13 Click the Finish button.

14 Review the status of the network interface module to confirm that it has a Normal status.

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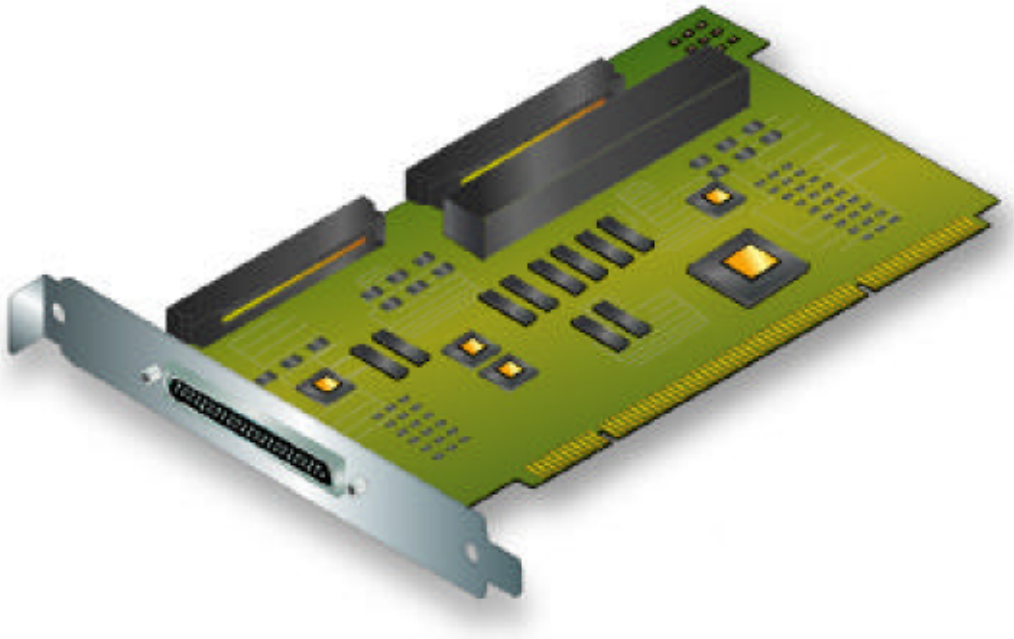
About Slammer SCSI or FC Card Replacement

SCSI and Fibre Channel (FC) PCI cards are used to interface a NAS Slammer to tape backup facilities.

Figure 42 Sample SCSI card



SCSI and FC cards are located in the riser of a network interface module (see the following figure).

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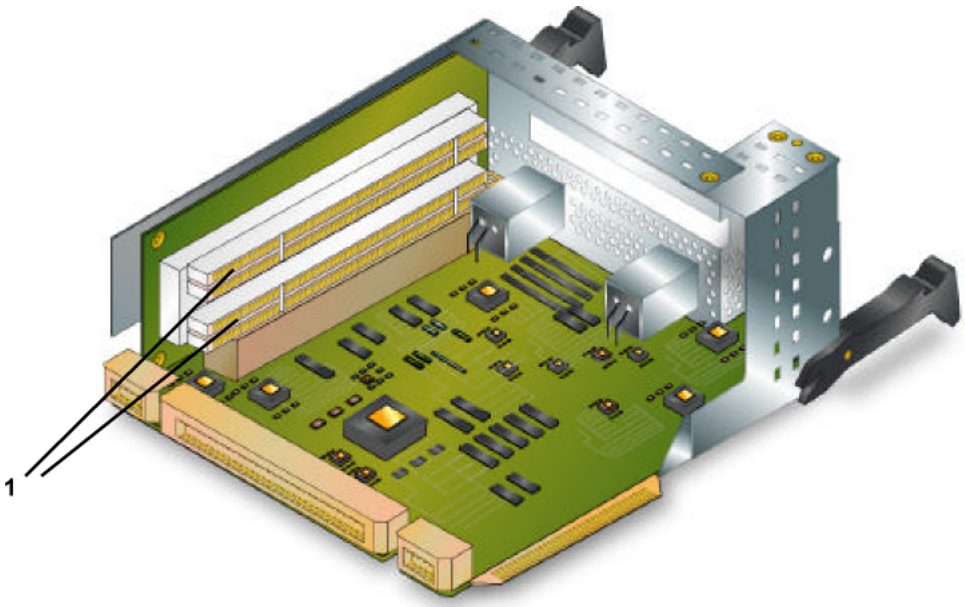
Figure 43 Riser PCI slots in a network interface module



Legend

1 Riser card PCI slots (2)

Because the SCSI or FC card is located in the riser card of a network interface module, replacement requires the removal of the network interface module. This removal disrupts the normal operation of a Pillar Axiom system.

To allow SCSI and FC card replacement, the system induces failover for the target control unit (CU) to its partner CU when you detach the power cable from the target CU. After you complete the replacement procedure and attach the power cable, the Pillar Axiom system induces failback for the target CU.

Important! Even though failover transfers services and data paths to the partner control unit (CU), your network topology might make those services and data paths inaccessible. Before you start the replacement procedure, make sure that your network is configured to allow the data paths to switch over to the partner CU.

After you replace this FRU, attach the power plug to the new FRU and the target CU will power on automatically.

Important! You may instead receive an Administrator Alert to restart the system.

To replace a SCSI card, perform the tasks that are outlined in the following table.

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Table 23 PCI card replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the SCSI card FRU: 1 Remove a Network Interface Module to gain access to the SCSI card. 2 Remove a Slammer SCSI or FC Card to make room for the SCSI card replacement. 3 Insert a Slammer SCSI or FC Card to insert the SCSI card replacement. 4 Insert a Network Interface Module to reinsert the host network interface module.
Step 4 Resume	Performed as part of card replacement.
Step 5 Verify Status	Performed as the final step in card replacement.

Step 4 Resume shows only when the Enable Automatic Failback of NAS Control Units option has not been selected in the Global Settings section of the GUI. When this option has been selected, Step 4 becomes Verify Status.

Remove a Slammer SCSI or FC Card

To help you locate the network interface module that contains the PCI card that needs to be replaced, Guided Maintenance beacons the bezel LEDs to identify the Slammer control unit (CU).

After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

1 Within Guided Maintenance, click the Next button in the Prepare System page.

2 When Guided Maintenance prompts you, remove the power cords from both power supplies of the target Slammer CU.

Important! Do not remove the power cords from the partner CU. That CU supports all the user data paths for this Slammer.

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3 Follow the appropriate procedure in this guide to remove the network interface module from the target Slammer CU. See Remove a Network Interface Module.

4 Put on an antistatic wrist strap. Attach the alligator clip to a nonpainted metal surface on the Slammer chassis.

5 Firmly grasp the specified PCI card, extract it from the PCI slot, and set the card aside.

About Slammer SCSI or FC Card Insertion

After you insert this FRU to a Slammer control unit (CU), use Guided Maintenance to complete the replacement process. After you add the FRU and reattach the power cords, Guided Maintenance fails back the target CU from its partner CU.

Note: When the target CU fails back, if CIFS is enabled on the Slammer, user data paths will pause for up to 30 seconds.

Important! If Guided Maintenance encounters a problem during failback, you must contact Technical Support to continue Guided Maintenance for this FRU.

Watch for an Administrator Alert, which may instruct you to restart the system.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

Insert a Slammer SCSI or FC Card

1 If you have not already done so, put on an antistatic wrist strap. Attach the alligator clip to a nonpainted metal surface on the Slammer chassis.

2 Orient the SCSI or FC card so that the notches in the bottom of the card aligns with the keys in the open PCI slot.

Important! Hold the SCSI or FC card by the edges. Do not touch the metal contacts on the bottom of the card.

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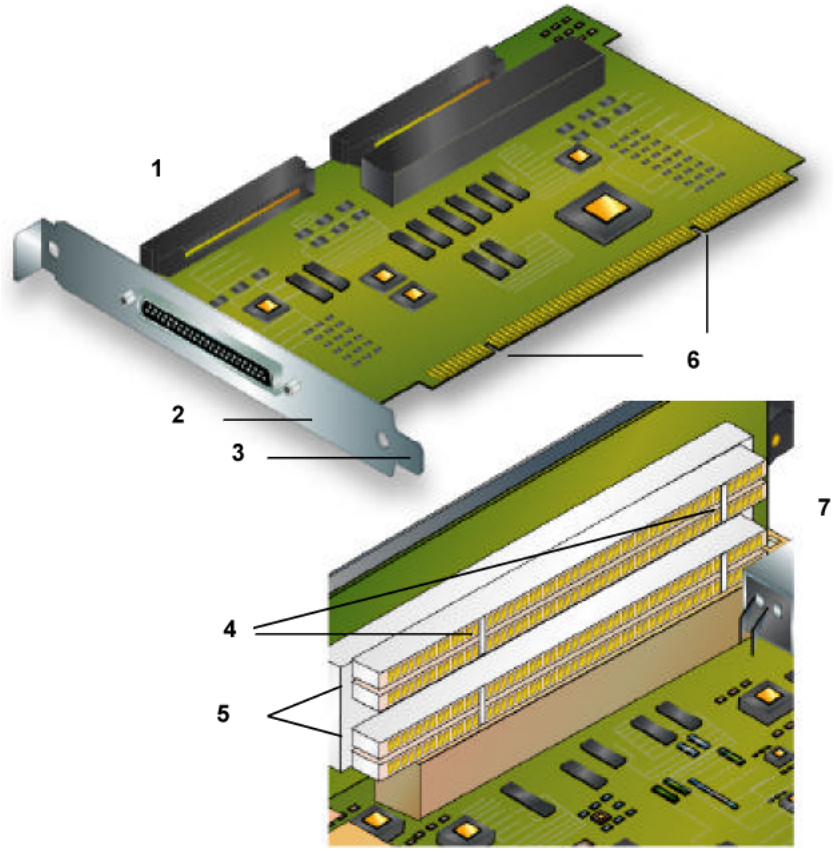
Figure 44 PCI card and open PCI slots



Legend

1 PCI card	5 Open PCI slots
2 Faceplate	6 Notches
3 End tab	7 Riser card
4 Keys	

3 Align the SCSI or FC card over the PCI slot.

4 Insert the end tab on the faceplate into the raised guide slot in the sheet metal of the network interface module.

5 Push the card edge connector into the PCI slot.

6 Push firmly to seat the card into the PCI slot. Alternate firm pressure on each end of the card until it clicks into place.

7 Secure the card faceplate to the chassis of the network interface module with a Phillips screw.

Note: Use a small-shank Phillips screwdriver that can fit through the 1/8 in (3.175 mm) chassis access hole.

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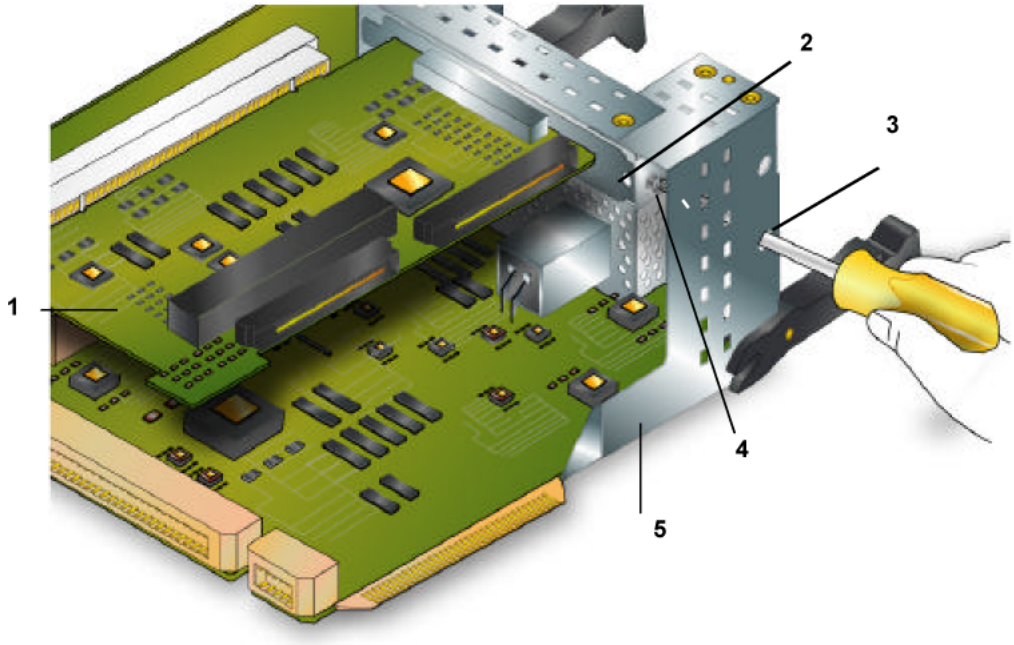
Figure 45 PCI card faceplate secured to the Slammer chassis



Legend

1 PCI card
2 Face-plate
3 Access hole for screwdriver
4 Screw hole
5 Chassis

8 Follow the appropriate procedure in this guide to insert the network interface module into the Slammer chassis. See Insert a Network Interface Module.

9 In the Guided Maintenance page, click the Next button.

10 When prompted, reattach the power cords to both of the power supplies of the target Slammer control unit (CU).

11 In the Guided Maintenance page, click the Next button.

12 For NAS Slammers, to fail back theCU, click the Resume button, which fails back the CU from its partner (optional).

Note: If the Enable Automatic Failback of NAS Control Units option is set as part of the global settings, the Resume button is not displayed. Instead, Guided Maintenance automatically fails back the target CU.

13 On the Verify page, click the Next button.

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If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

14 On a NAS Slammer, look for an Administrator Action. You may be instructed to restart the system, which makes this FRU and all other resources on the target Slammer CU available.

Note: On a SAN Slammer, the system automatically attempts to recover.

15 Click the Finish button.

16 Review the status of the replacement PCI card to confirm that it has a Normal status.

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CHAPTER 5

Service the Brick and Brick FRUs

About Brick Service Procedures

⚠ CAUTION During maintenance of disk drives or other Brick field replaceable units (FRUs), operator error or other mishaps that can occur around a service action can compromise the robust data redundancy that is designed into a Pillar Axiom system.

Note: If you have Fibre Channel (FC) Bricks, Guided Maintenance on them should be done very carefully with only light to medium I/O traffic. Please contact Technical Support for help in running Guided Maintenance on FC Bricks.

When a Brick storage enclosure or one of its FRUs fails, any or all of the following notification methods occur:

- If the email and Call-Home features are configured and enabled, a Call-Home message is sent to Pillar Data Systems. A Technical Support Engineer (TSE) initiates a service call.
- If email and alerts are configured and enabled, an alert is emailed to designated recipients.
- An event is written to the event log.
- The graphical user interface (GUI) displays a Failed status in the Health pages.
- One or more FLT LEDs light steady amber.

A Brick contains two control units (CUs). Each CU contains a number of FRUs, all of which you can replace while the CU is powered and running.

⚠ CAUTION To avoid data loss, contact Technical Support before you attempt to replace an entire Brick storage enclosure or Slammer storage controller. Technical Support can help you determine whether a particular filesystem or LUN is physically on the Brick.

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Brick FRU Replacement Tasks

The following table identifies the FRUs within a Brick, indicates whether the FRU is hot swappable (meaning, can be replaced with out powering down), and lists the replacement tasks for those FRUs.

Table 24 Brick FRU replacement tasks

Component	Hot swap?	Failover?	Task
Bezel	Yes	No	1 Remove a Brick Bezel. 2 Attach a Brick Bezel.
Disk drive	Yes	No. *The disk drive is rebuilt.*	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Brick Disk Drive. 4 Insert a Disk Drive.
Enclosure Services (ES) module	Yes	No	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove an Enclosure Services (ES) Module. 4 Insert an Enclosure Services (ES) Module.
Power supply and fan	Yes, one at a time	No	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Brick Power Supply, Fan Module. 4 Insert a Brick Power Supply, Fan Module.
RAID or FC Expansion controller	Yes, one at a time	Yes	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a RAID or Expansion Controller.

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Table 24 Brick FRU replacement tasks (continued)

Component	Hot swap?	Failover?	Task
			4 Insert a RAID or Expansion Controller.
Spare disk drive	Yes	No	1 Identify the Target FRU. 2 Prepare the System for FRU Replacement. 3 Remove a Spare Disk Drive. 4 Insert a SATA Spare Disk Drive.

Important! Replacement of FRUs, other than bezels, must be started through Guided Maintenance.

For information on Guided Maintenance, see About Guided Maintenance Initiation.

Map of Brick FRUs

The following figures illustrate the set of replaceable FRUs in Brick storage enclosures.

Figure 46 Schematic of replaceable SATA Brick FRUs

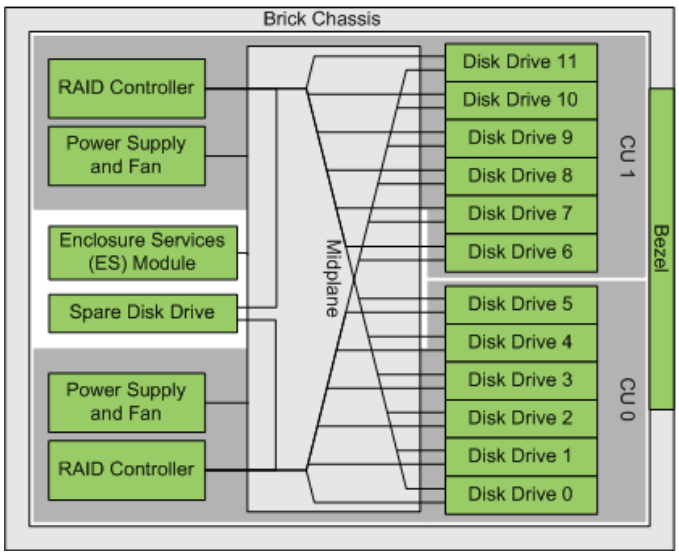

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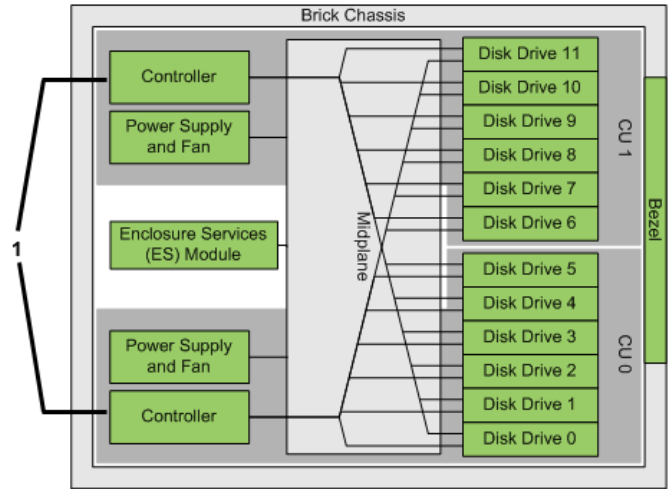
Figure 47 Schematic of replaceable FC Brick FRUs



Legend

1 FC RAID or Expansion Controller, depending on Brick type.

Brick FRU Part Numbers

Below are the field replaceable units (FRUs) that are in a Pillar Axiom Brick.

Table 25 Brick FRUs

Part number	FRU description
1450-00013-XX	Bezel.
1450-00040-XX	Chassis midplane, SATA.
1450-00090-XX	Chassis midplane, Fibre Channel (FC).
1450-00028-XX	160 GB SATA disk drive.
1450-00029-XX	250 GB SATA disk drive.
1450-00108-XX	400 GB SATA disk drive.
1450-00139-XX	500 GB SATA disk drive.
1450-00172-XX	750 GB SATA disk drive.

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Table 25 Brick FRUs (continued)

Part number	FRU description
1450-00181-XX	1 TB SATA disk drive.
1450-00080-XX 1450-00142-XX	73 GB FC disk drive.
1450-00146-XX	146 GB FC disk drive.
1450-00171-XX	300 GB FC disk drive.
1450-00016-XX	Enclosure services (ES) module.
1450-00015-XX	Power supply, fan module, SATA. Bricks.
1450-00165-XX	Power supply, fan module for 750 GB SATA Bricks. Power supply, fan module for FC Bricks.
1450-00014-XX	RAID Controller.
1450-00076-XX	FC RAID Controller.
1450-00077-XX	FC Expansion Controller.
1450-00031-XX	160 GB SATA spare disk drive.
1450-00032-XX	250 GB SATA spare disk drive.
1450-00109-XX	400 GB SATA spare disk drive.
1450-00140-XX	500 GB SATA spare disk drive.
1450-00173-XX	750 GB SATA spare disk drive.
1450-00182-XX	1 TB SATA spare disk drive.

Note: A Pillar Axiom system uses binary units to calculate disk drive capacities. For example, 1GB = 1024^3 bytes (sometimes referred to as 1 gibibyte, GiB).

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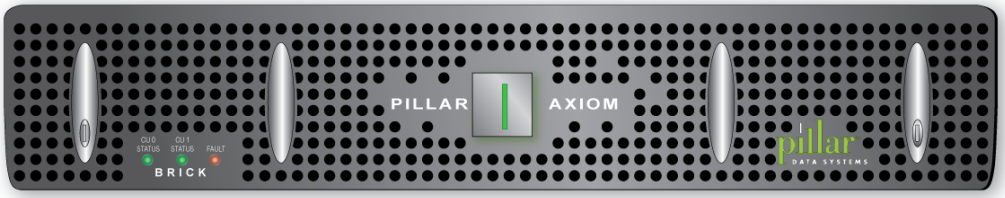
About Brick Bezel Replacement

Brick bezels can be replaced while the Brick is operational. The following figure shows a Brick bezel FRU.

Figure 48 Brick bezel



About Brick Bezel Replacement Tasks

To replace a Brick bezel, perform the tasks that are outlined in the following table.

Table 26 Brick bezel replacement tasks

Task	Reason
1 Remove a Brick Bezel.	To make room for the bezel replacement.
2 Attach a Brick Bezel.	To add the bezel replacement.

About Brick Bezel Removal

Guided Maintenance is not used to remove a Brick bezel.

As the Brick bezel is removed:

- A bezel event is generated.
- The FLT LED is lit on both RAID controllers.

If the bezel is not properly seated, the bezel FLT LED may light.

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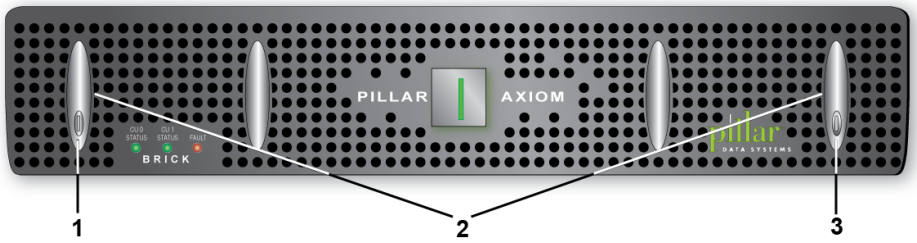
Remove a Brick Bezel

1 Press the button on each ejector tab to unlock the tabs.

Figure 49 Brick bezel ejector tabs



Legend

1 Button
2 Ejector tabs
3 Button

2 Lift each ejector tab at the same time to disengage the Brick bezel from the rack mounts.

3 Carefully rotate the top of the bezel outward and, as the latches disengage, lift the bezel slightly to disengage the bottom of the bezel.

4 Set the bezel aside.

Attach a Brick Bezel

Note: Ensure that there is no interference at the top and bottom of the bezel so it seats properly.

1 Insert the bottom two hooks on the bezel into the bottom rack rail tabs.

2 Press the top corners of the Brick bezel to engage the top two bezel hooks with the top rail tabs.

3 Press both ejector tabs (if open) until they lock in place. The top hooks should latch with an audible click. If the bezel does not light when you apply power to the system, verify that the top and bottom hooks are all properly engaged.

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About Brick Disk Drive Replacement

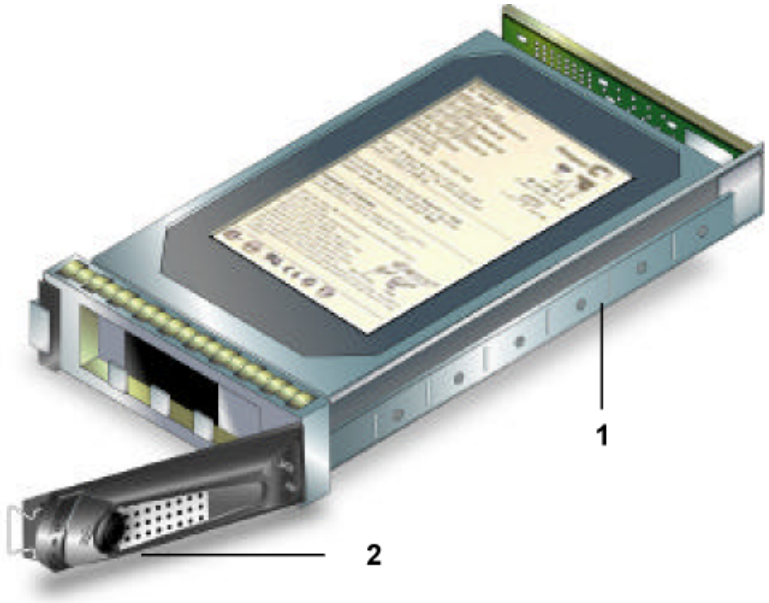
A Brick contains two controllers (either a RAID or Fibre Channel Expansion controllers) and 12 disk drives.

Note: SATA Bricks also contain a 13th spare disk drive. See Spare Disk Drive Replacement Tasks for information.

Each controller manages six of those disk drives. Each controller and its disk drives form what is called an *array* and reside in a Brick control unit (CU).

The following figure shows an array disk drive in its carrier.

Figure 50 Disk drive FRU



Legend

1 Disk drive carrier
2 Cam latch

Note: The FRU shown in the above figure is a SATA disk drive. Fibre Channel (FC) disk drives look slightly different. Check the type and size of the new disk drive to be sure it matches exactly the disk drives in the Brick.

Important! The capacity of the disk drive replacement must be equal to or greater than that of the other disk drives in the Brick enclosure.

Access any disk drive in the storage array from behind the Brick 's bezel as shown in the following figure. Disk drives are numbered from 0 to 11 as shown in this figure.

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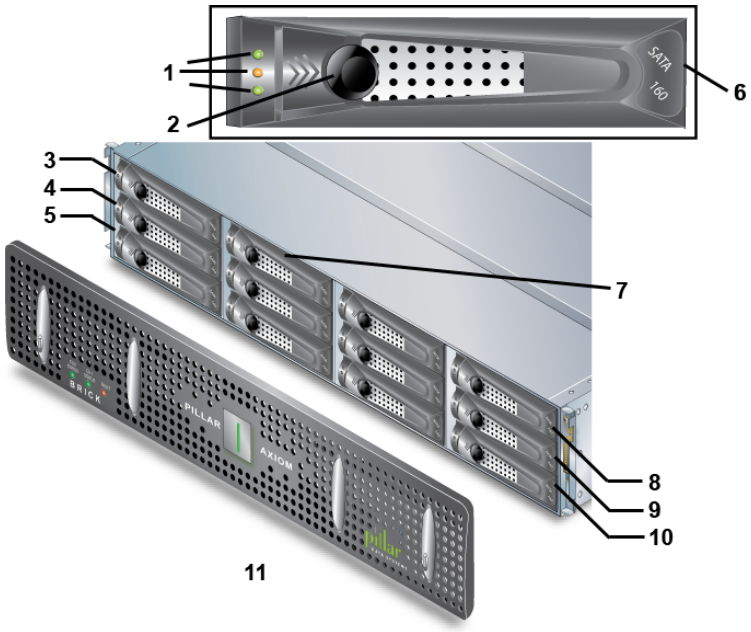
Disk drives 0 to 5 are managed by controller 0, while disk drives 6 to 11 are managed by controller 1.

Figure 51 Location of a disk drive



Legend

1 LEDs	7 Disk drive 3
2 Cam latch button	8 Drive 9
3 Drive 0	9 Drive 10
4 Drive 1	10 Drive 11
5 Drive 2	11 Brick bezel
6 Disk drive type and size indicator	

Do not move disk drives from their original positions. If you move a disk drive, all data on that disk drive will be lost. If multiple drives are moved, you will lose data.

If a disk drive is defective, use Guided Maintenance in the AxiomONE Storage Services Manager GUI to replace the drive.

When replacing a disk drive, always use a new one from Pillar Data Systems.

- If a disk drive fails, do not attempt to recover by removing and reinserting that disk drive. Contact Pillar Data Systems for a new disk drive.
- If a disk drive fails, use a sealed spare disk drive from Pillar Data Systems. Do not use a disk drive of unknown status.
- Do not attempt to replace a failed disk drive with one from another Brick or from another Pillar Axiom system.

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- If testing Drive Pull, wait a few seconds after removing the disk drive before reinserting it. Be sure to check for Administrator Actions to accept the disk drive.
- If a disk drive fails to be accepted into a Brick and the disk drive is set to Rejected status, do not attempt to use that disk drive. Contact Pillar Data Systems for another disk drive and for assistance.
- If an Administrator Action asking you to accept the disk drive is generated, be sure to select the Accept Drive option, which will initiate a copyback operation.

  Important! If an Administrator Action to Accept a Drive is ever answered negatively, do not attempt to use that disk drive again. Contact Pillar Data Systems for another disk drive.

Contact Technical Support for a new replacement disk drive.

LEDs on Disk Drive Carriers

When Guided Maintenance beacons the disk drive to identify it, Guided Maintenance:

Note: When Guided Maintenance beacons the disk drive to identify it, Guided Maintenance:

- Turns off the top and bottom LEDs.
- Blinks the middle LED.

On the front of a Brick chassis (beneath the bezel), you have access to all twelve disk drive carriers. The carriers are numbered as shown in the following figure.

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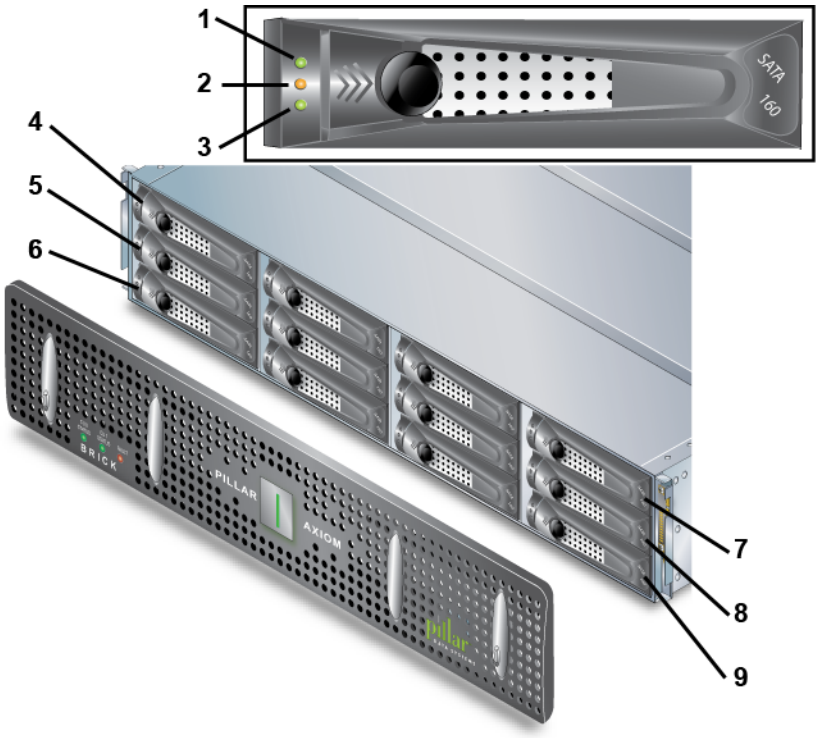
Figure 52 Disk drive carrier numbering in a Brick and carrier LEDs



Legend

1 CU 1	6 Disk drive 2
2 Ready light	7 Disk drive 9
3 CU 0	8 Disk drive 10
4 Disk drive 0	9 Disk drive 11
5 Disk drive 1	

Each carrier has three LEDs to indicate its status.

Table 27 LEDs on disk drive carriers

Position	Color	Meaning
Top	SATA: Green (blink)	Activity from RAID controller 1.
Top	FC: Off	Not used for FC.
Middle	Amber	Disk drive has faulted.
	Off	• ES module is missing.

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Table 27 LEDs on disk drive carriers (continued)

Position	Color	Meaning
		• Disk drive has no power. • Disk drive has spun down.
	Green (blink)	Disk drive discovery. The Brick is determining the physical existence of this disk drive after power up or disk drive insertion.
	Green	Disk drive is ready.
Bottom	SATA drives: Green (blink)	Activity from RAID controller 0.
Bottom	FC drives: Off	Not used for FC.

Note: When there is no I/O activity on a Brick storage enclosure, the RAID firmware runs a background operation that scans all disk drives for media errors and, if media errors are found, performs repair operations. This background activity causes the ACT LEDs to blink green on the idle system or Brick. Such activity can take several hours to complete. When host I/O resumes, this background operation stops; it resumes only when there are no further I/Os from a host.

Note: When Guided Maintenance beacons the disk drive to identify it, Guided Maintenance:

- Turns off the top and bottom LEDs.
- Blinks the middle LED.

Tip: Guided Maintenance also shows the position of the disk drive in the Brick to help you avoid introducing a double fault into a RAID array.

About Disk Drive Replacement Tasks

To replace a Brick disk drive, perform the tasks that are outlined in the following table.

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Table 28 Disk drive replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU (Optional).
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the disk drive FRU: 1 Remove a Brick Bezel to gain access to the disk drive. 2 Remove a Brick Disk Drive to make room for the disk drive replacement. 3 Insert a Brick Disk Drive to insert the disk drive replacement. 4 Attach a Brick Bezel to reattach the bezel.
Step 4 Verify Status	Performed as final step in disk drive replacement.

Important! If a second disk drive in a given array fails before the system rebuilds the first disk on the spare disk drive, you should immediately repair both disk drives. In this scenario, logical volumes (filesystems and LUNs) having standard redundancy go offline, whereas volumes having double or triple redundancy remain online.

⚠ CAUTION For a given Brick array, do not replace more than one disk drive in that array at a time. Replacement of more than one disk drive at the same time causes data loss for those logical volumes (filesystem or LUNs) that have standard redundancy and that reside on the additional disk drive being replaced. We recommend that you allow a disk drive replacement to rebuild before you replace another disk drive in the same array. The rebuild operation can take several hours, depending on the capacity of the Brick.

About Disk Drive Removal from Bricks

To help you identify the target Brick that has the disk drive FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target Brick. If you choose Reverse Identify in the GUI, Guided Maintenance beacons the LEDs on all Bricks except for the target Brick.

After you click the Prepare System button in the GUI, Guided Maintenance prepares the system for replacement of the target disk drive FRU:

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- If the following conditions are true, the system copies all data from the disk drive to the spare:
  - The array disk drive is in a Normal state.
  - The disk drive has not already been rebuilt on the spare.
  - The spare disk drive is available.
- If the array disk drive is in a Normal state and the spare disk drive is not available, the array rebuilds the data from parity from the existing members of the array onto the replacement disk drive after the replacement disk drive is inserted.

  Note: In most instances, the data is already on the spare disk drive, and the spare disk drive status will be In Use.
- If the array disk drive is in a rebuild state, Guided Maintenance waits for the rebuild to complete before initiating the copyback after the replacement disk drive is inserted.
- If the array disk drive is in a degraded or failed state, Guided Maintenance may continue.

After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Important! Before removing an array disk drive, read the following notices:

- Make sure you remove the correct disk drive. Removal of the incorrect disk drive can disrupt data access and possibly corrupt the data.
- Once you initiate Guided Maintenance to replace a disk drive and proceed to the Prepare System stage, you must finish the entire procedure.
- Guided Maintenance will issue a stop command to the disk drive. To bring that disk drive back online, you must pull it and replace it with a new one.

  Important! Do not cancel this replacement process once it has started.

  Note: If you were simply testing a disk drive pull, you must put the disk drive back or replace it.
- You will see instructions and an Administrator Action to remove the disk drive.
- Failure to remove the disk drive will stop all further recovery operations on this array.

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Remove a Brick Disk Drive

1 Within Guided Maintenance, click the Next button in the Prepare System page.

2 When Guided Maintenance prompts you to remove the disk drive, press the cam latch button on the face of the disk drive carrier to release the cam latch.

3 Open the cam latch fully, which disengages the disk drive from the Brick 's midplane.

Note: The system begins rebuilding the data that was on the disk drive from parity data to the spare disk drive. This process can take several hours.

4 Slide the disk drive out of the chassis and set it aside.

CAUTION Immediately replace the component to maintain proper airflow and cooling. Over-temperature conditions will occur if the replacement FRU is not installed into the chassis. Over-temperature conditions can damage other components.

About Brick Disk Drive Insertion

Only factory-fresh, Pillar Data Systems-supplied disk drives are supported in Pillar Axiom systems. These disk drives have a unique identifier that marks the drive as a Pillar Data Systems disk drive. The process of writing this identifier to the physical disk drive is called branding. If the disk drive is unbranded, the Pillar Axiom system rejects it.

Important! The capacity of the disk drive replacement must be equal to or greater than that of the other disk drives in the Brick enclosure.

After Guided Maintenance successfully validates the disk drive replacement, the disk drive is bound to the Brick in which it was added. Any and all data that existed on the disk drive will be erased.

If you observe an Administrator Action to accept the foreign disk drive, be sure to click Accept. If the disk drive came from a spares kit, the Accept Foreign Drive task should begin automatically within a few minutes.

Note: If a Copyback or Rebuild operation to this disk drive occurs, the Accept Foreign Drive task will not complete until that operation completes.

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After you insert this FRU into a Brick control unit (CU), use Guided Maintenance to complete the replacement procedure.

Important! If Guided Maintenance encounters a problem at this stage, you must contact Technical Support to continue Guided Maintenance for this FRU.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

Insert a Disk Drive

The disk drive latch may appear to be fully latched, but sometimes the disk drive is not making good contact with the Brick chassis midplane. With poor contact, the disk drive will fault, and the GUI will typically display a state of Unknown for that disk drive:

```
Drive 06 05_Fault 00_Unknown
```

To seat an improperly seated disk drive:

1 Fully unlatch the disk drive carrier.

2 Press the disk drive carrier firmly until it snaps into place.

3 Snap shut the latch to lock the carrier in place.

1 Fully open the cam latch on the replacement disk drive and slide the drive into the Brick chassis until it stops.

Important! Do not unlatch and re-latch a disk drive carrier unnecessarily. Doing so can lead to potential troubles in the future.

2 Close the cam latch until it snaps shut to engage the disk drive with the Brick midplane.

The center LED should flash green for up to a minute.

3 In Guided Maintenance, click the Next button.

While the system checks the disk drive for acceptance, the disk drive status displays as Foreign. Also, you should see brief bursts of activity on the top and bottom LEDs as each RAID controller checks the disk drive. After a short while, the center LED should light steady green.

Important! If the center LED lights amber, the system has rejected the disk drive or the disk drive failed to spin up properly. Contact Technical Support.

4 Choose:

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- If prompted to acknowledge the successful discovery of the disk drive replacement, click the OK button to accept the disk drive.
- If the replacement is not new, Guided Maintenance displays a dialog box and asks “Are you sure you want to do this?” Choose one of these options:
  - Click the OK button to accept the replacement. Acceptance binds this disk drive to this Brick and destroys any data that may have existed on the disk drive.
  - Click the Cancel button to reject the replacement. Rejection terminates this procedure and retains any previous data that might have existed on the disk drive.

Important! If you reject the disk drive, you cannot use it in this system again.

Note: When you click the OK button, the system copies the data from the spare disk drive back to the array disk drive. The status of this disk drive is Copying Back and the spare disk drive remains in use during this period. Under some circumstances, if there are two failed disk drives in the Brick, the new disk drive may go to a Rebuild status indicating that the array is being rebuilt from parity.

5 When the copyback process completes, review the status of the replacement FRU to ensure that:
   - The status of the replacement FRU is Normal.
   - The task to accept the disk drive has completed successfully.

6 Before powering on a new or a replacement Brick, visually inspect each disk drive to verify that they are fully seated.

   If a disk drive is not fully seated, either or both of the following will be true:
   - The metal portion of the carrier will be visible.
   - The front of the disk drive carrier will not be flush with the other carriers.

7 If a disk drive is not fully seated:
   a Fully unlatch the disk drive carrier.
   b Press the disk drive carrier firmly until it snaps into place.
   c Snap shut the latch to lock the carrier in place.

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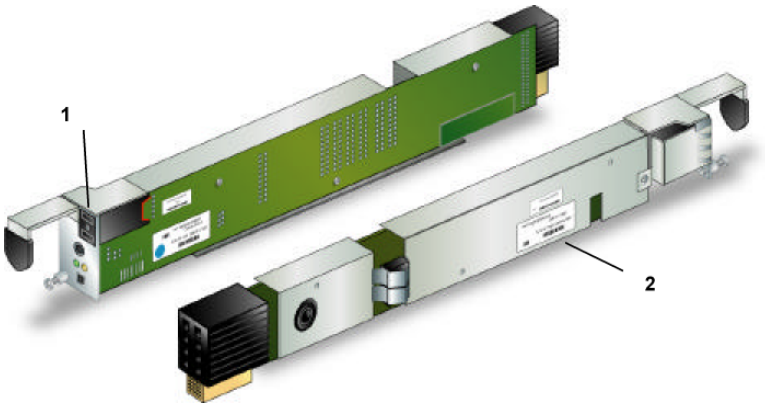
About Brick ES Module Replacement

Each Brick has a single enclosure services (ES) module. This module reports the temperature of the Brick and the status of the Brick 's fans and power supplies. On SATA Bricks, the thumbwheel is not used. On Fibre Channel (FC) Bricks, the thumbwheel is also used to set the Brick ID:

- 0 = FC RAID Brick
- 1 = FC Expansion Brick

The following figure shows an ES module.

Figure 53 ES module FRU



Legend

1 Thumbwheel	
2 Serial number	

Access the ES module from the back of the Brick chassis, as shown in the following figure. This figure identifies the location of the ES module and its LEDs.

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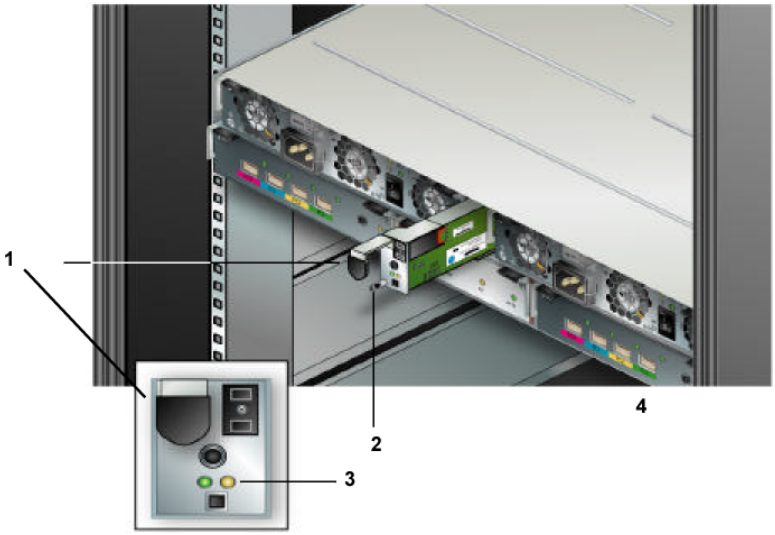
Figure 54 ES module location



Legend

1 Pull tab
2 Screw
3 LEDs
4 Brick back

Brick ES Module LED Status

Table 29 Brick ES module LED status

LED identifier and color		Meaning
Left	Amber	An enclosure-related fault is present.
Right	Green	Brick has power.

Note: Guided Maintenance cannot beacon the enclosure services (ES) module to identify it. Use Brick Identify to make sure you are working on the correct Brick.

Brick ES Module Replacement Tasks

To replace a Brick ES module, perform the tasks that are outlined in the following table.

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Table 30 Brick ES module replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the RAID controller FRU: 1 Remove an Enclosure Services (ES) Module to make room for the ES module replacement. 2 Insert an Enclosure Services (ES) Module to insert the ES module replacement.
Step 4 Verify Status	Performed as final step in ES module replacement.

About Brick ES Module Removal

To help you identify the target Brick that has the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target Brick. If you choose Reverse Identify in the GUI, Guided Maintenance beacons the LEDs on all Bricks except for the target Brick.

After you click the Prepare System button in the GUI, Guided Maintenance prepares the system for replacement of the ES module. After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Remove an Enclosure Services (ES) Module

1. Within Guided Maintenance, click the Next button in the Prepare System page.
2. When Guided Maintenance prompts you to remove the ES module, unscrew the screw that secures the ES module to the Brick chassis. A spring retains the screw in the module.
3. Grasp the pull tab on the ES module and slide the module out of the chassis and set it aside.

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CAUTION Immediately replace the component to maintain proper airflow and cooling. Over-temperature conditions will occur if the replacement FRU is not installed into the chassis. Over-temperature conditions can damage other components.

About Brick ES Module Insertion

Fibre Channel (FC) Bricks must be given an identity so the system can differentiate between the FC RAID Brick and FC Expansion Brick(s) in that FC set. So, when inserting an ES module into an FC Brick, be sure to set the identity of that Brick through the ES module before you insert the module into the Brick.

After you insert this FRU into a Brick control unit (CU), use Guided Maintenance to complete the replacement procedure.

Important! If Guided Maintenance encounters a problem at this stage, you must contact Technical Support to continue Guided Maintenance for this FRU.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

Important! For ES modules in SATA Bricks, always set the identity to zero.

Insert an Enclosure Services (ES) Module

1 Slide the ES module replacement into the Brick chassis until the module stops.

2 Firmly push the ES module into place to engage it with the chassis midplane.

Tip: After you install the module, the module performs a self test, which can take up to 10-15 seconds. The system will not recognize the ES module until it completes this self test. We recommended that you wait 10-15 seconds before you perform Step 4.

3 Tighten the Phillips screw to secure the ES module to the chassis.

4 In the Guided Maintenance page, click the Next button.

5 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

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Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

6 Review the status of the replacement FRU to confirm that it has a Normal status.

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About Brick Power Supply and Fan Module Replacement

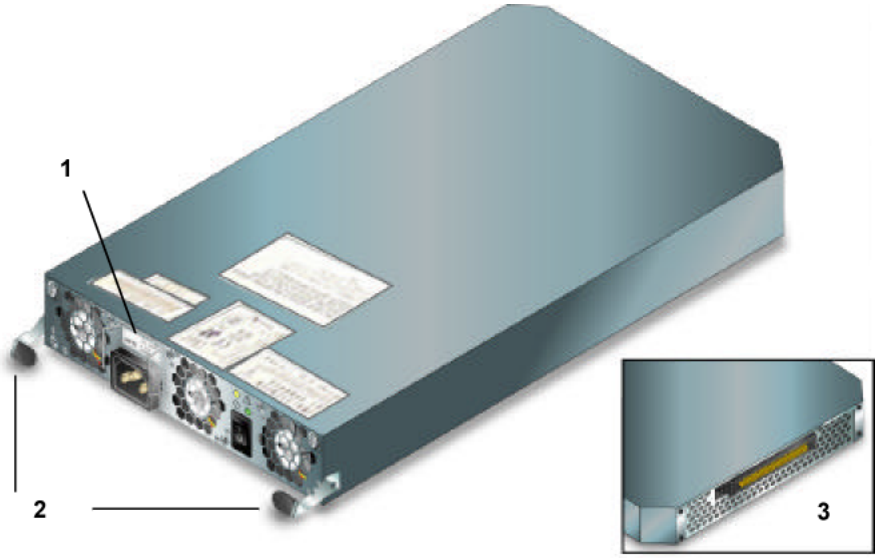
A Brick has two power supply, fan modules, one on each side of the Brick. Each module provides shared power for the whole Brick and focused cooling for one of the control units (CUs). The modules are rated to power the entire Brick.

The cooling fans are powered from a common bus and will be powered from the other module if the module in which they reside fails. If a module fails or is turned off:

- All fans in the Brick increase speed markedly to provide the extra cooling.
- An audible alarm, the only audible alarm on the Pillar Axiom system, is turned on.

The following figure shows a power supply, fan module.

Figure 55 Power supply, fan module FRU



Legend

1 Retaining clip
2 Locking tab
3 Back

Access power supply, fan modules from the back of the Brick chassis, as shown in the following figure. The figure helps you locate power supply, fan module 1 and its LEDs.

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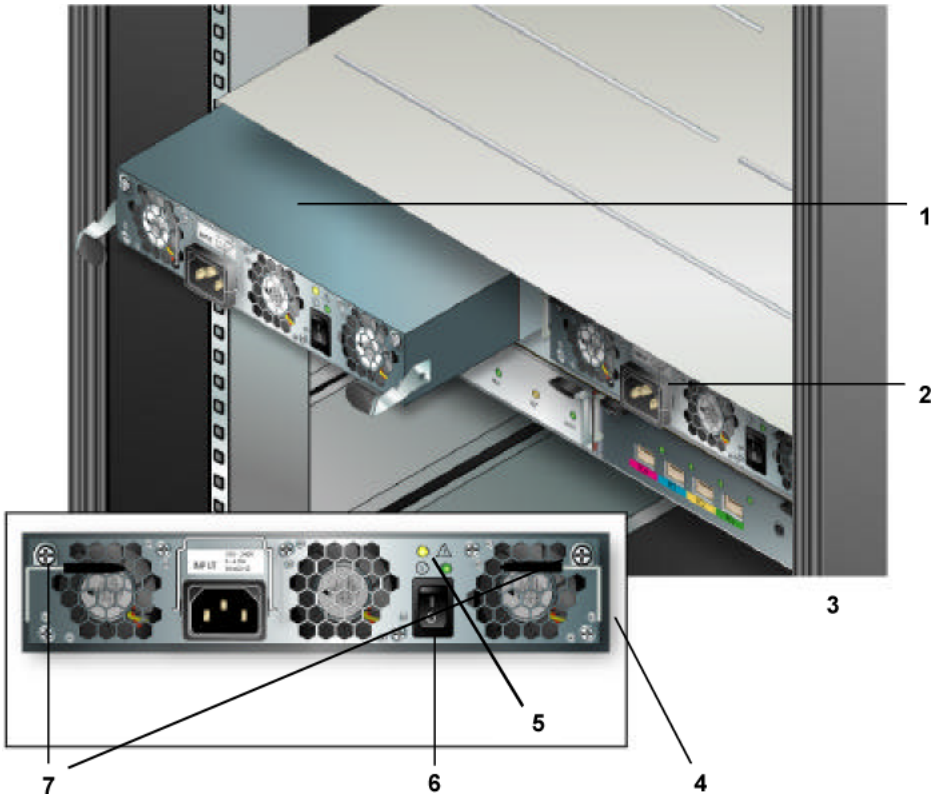
Figure 56 Brick power supply, fan module location



Legend

1 Power supply, fan module 0	5 LEDs
2 Power supply, fan module 1	6 Power switch
3 Back of Brick	7 Screws
4 Pull tab	

Brick Power Supply and Fan Module LED Status

Table 31 Brick power supply, fan module LED status

LED identifier and color		Meaning
⚠	Amber	Power supply, fan module in this controller has failed for one of these reasons: • Power supply AC or DC has failed. • Power supply exceeded its temperature limits. • Fan(s) in this module have failed.

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Table 31 Brick power supply, fan module LED status (continued)

LED identifier and color		Meaning
	Off	Power supply, fan module in this controller is functioning normally.
	Green	AC is available and DC is active.
	Off	AC is not available.

Note: When Guided Maintenance beacons the power supply, fan module to identify it, Guided Maintenance lights the amber LED.

For information on replacing a Brick power supply, fan module, see About Power Supply and Fan Module Replacement Tasks.

About Brick Power Supply and Fan Module Replacement Tasks

Table 32 Brick power supply, fan module replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the power supply, fan module FRU: 1 Remove a Brick Power Supply, Fan Module to make room for the power supply, fan module replacement. 2 Insert a Brick Power Supply, Fan Module to insert the power supply, fan module replacement.
Step 4 Verify Status	Performed as final step in power supply, fan module replacement.

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About Brick Power Supply and Fan Module Removal

To help you identify the target Brick that has the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target Brick. If you choose Reverse Identify in the GUI, Guided Maintenance beacons the LEDs on all Bricks except for the target Brick.

After you click the Prepare System button in the GUI, Guided Maintenance prepares the system for replacement of the power supply, fan module. After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Remove a Brick Power Supply, Fan Module

Important! If you must disconnect Fiber Channel (FC) cables to make room for removal of the power supply, fan module, be careful to mark the cables so you can reconnect them in their correct locations.

1. Within Guided Maintenance, click the Next button in the Prepare System page.
2. When Guided Maintenance prompts you to power off the Brick power supply, fan module, switch off the power to the target module.

   Important! Do not switch off the power to the other Brick power supply, fan module. That module supplies power to both control units (CUs).

   Note: You will hear an audible alarm. The alarm is normal and indicates that the Brick is still operating but with a single power supply, fan module. The audible alarm stops when the power to the Brick is restored to full redundancy. You will also hear an increase in fan noise as all Brick fans increase in speed to provide additional cooling.
3. Slip the power-cord retaining clip up and off the power cord for the target power supply module.
4. Disconnect the power cord from the target power supply.
5. Unscrew the two screws that secure the locking tabs to the power supply module casing. Springs retain the screws in the locking tabs.

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6 Push the power supply module's two locking tabs down, which disengages the power supply module from the Brick midplane.

7 Slide the power supply, fan module out of the chassis and set it aside.

⚠ CAUTION Immediately replace the component to maintain proper airflow and cooling. Over-temperature conditions will occur if the replacement FRU is not installed into the chassis. Over-temperature conditions can damage other components.

Important! Because of airflow impacts within the Brick, swap a power supply, fan module as quickly as possible.

About Brick Power Supply, Fan Module Insertion

After you insert this FRU into a Brick control unit (CU), use Guided Maintenance to complete the replacement procedure.

Important! If Guided Maintenance encounters a problem at this stage, you must contact Technical Support to continue Guided Maintenance for this FRU.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

Insert a Brick Power Supply, Fan Module

1 Slide the power supply, fan module into the Brick chassis until the module stops.

2 Push up the two locking tabs on the power supply to engage the module with the Brick midplane.

3 Screw the two Phillips screws into the power supply module casing to secure the locking tabs.

4 Connect the power cord to the target power supply.

5 Slip the power-cord retaining clip down over the power cord for the target power supply.

6 Switch on the power to the target power supply module.

As you apply power to the replacement FRU, the following should occur:

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- The green LED lights.
- The audible alarm turns off.
- The fan speed decreases.

Important! If the above actions do not occur, contact Technical Support.

7 In the Guided Maintenance page, click the **Next** button.

8 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

9 Review the status of the replacement FRU to confirm that it has a Normal status.

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About Brick RAID Controller Replacement

Bricks can contain SATA or Fibre Channel (FC) disk drives. SATA and FC RAID Bricks contain RAID controllers, and FC Expansion Bricks contain two Expansion controllers.

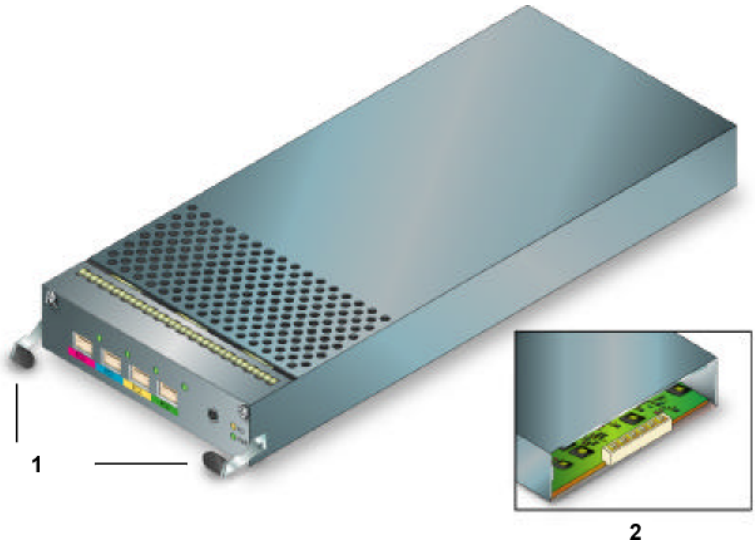
A SATA Brick has two RAID controllers. Each RAID controller provides access to and control over an array of six disk drives that are in a Brick control unit (CU).

A FC RAID Brick has two RAID controllers as well. Each controller provides access to and control over an array of six disk drives that are in a Brick CU. A FC Expansion Brick has two Expansion controllers.

Each Expansion controller provides the FC RAID Brick to which it is connected access to six disk drives in the FC Expansion Brick.

The following two figures show a RAID controller for a SATA Brick. Controllers for FC RAID Bricks and FC Expansion Bricks look similar.

Figure 57 RAID controller FRU in a SATA Brick



Legend

1 Locking tabs
2 Back

Access RAID controllers from the back of the Brick chassis, as shown in the following figure. This figure identifies the location of RAID controller 1 and its LEDs.

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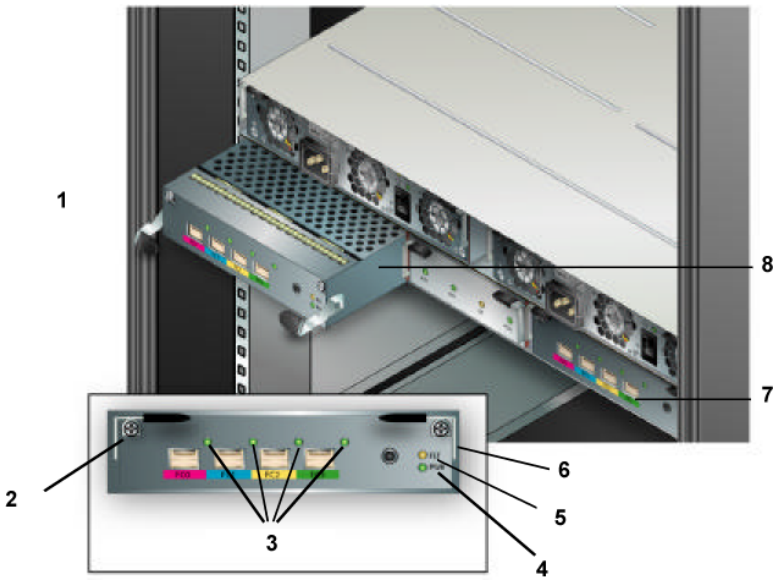
Figure 58 SATA Brick RAID controller location



Legend

1 Brick back	5 FLT LED
2 Screw	6 Locking tab
3 FC 0-3 LEDs	7 RAID controller 0
4 PWR LED	8 RAID controller 1

FC RAID Brick LED Status

Table 33 FC RAID Brick LED status

LED identifier and color		Meaning
PNet 0	Amber (blink)	Polling for PNET connection.
	Green	PNET has established connection.
	Green (off), Amber (slow blink)	PNET is unavailable.
J0 & FC0–FC3	Amber (SOS blink)	Internal error exists within RAID controller FC interface.
	Amber	FC link does not exist.

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Table 33 FC RAID Brick LED status (continued)

LED identifier and color		Meaning
	Amber (fast blink)	Initializing or self-testing.
	Green (slow blink)	Connecting FC link.
	Green	FC link exists.
FLT	Amber	An error condition exists.
	Off	No failure exists.
PWR	Green	Power is available.
	Off	Power is not available.

FC Expansion Brick LED Status

Table 34 FC Expansion Brick LED status

LED identifier and color		Meaning
PNet0 & PNet1	Amber (blink)	Polling for PNET connection.
	Green	PNET has established connection.
	Green (off) Amber (slow blink)	PNET is unavailable.
J0 & J1	Amber (SOS blink)	Internal error exists within Brick controller FC interface.
	Amber	FC link does not exist.
	Amber (fast blink)	Initializing or self-testing.

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Table 34 FC Expansion Brick LED status (continued)

LED identifier and color		Meaning
	Green (slow blink)	Connecting to or waiting for FC link.
	Green	FC link exists.
FLT	Amber	An error condition exists.
	Off	No failure exists.
PWR	Green	Power is available.
	Off	Power is not available.

SATA Brick RAID Controller LED Status

Table 35 SATA Brick RAID controller LED status

LED identifier and color		Meaning
FC0–FC3	Amber (SOS blink)	Internal error exists in Storage System Fabric (SSF).
	Amber	FC link does not exist.
	Amber (fast blink)	Initializing or self-testing.
	Green (slow blink)	Connecting FC link.
	Green	FC link exists.
FLT	Amber	An error condition exists.
	Off	No failure exists.
PWR	Green	Power is available.
	Off	Power is not available.

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Note: Because the local RAID controller has no electrical circuit to light its FLT LED, the partner RAID controller lights the LED on the local controller. Also, the FLT LED will light if the Brick bezel is removed.

Tip: If FC0, FC1, FC2, and FC3 are blinking in unison on one RAID controller and FLT on the other controller is lit, the controller with the blinking FC0-FC3 is in a fault condition.

Note: When a Brick powers up, the FC and FLT LEDs blink. When Guided Maintenance beacons the RAID or Expansion controller to identify it, Guided Maintenance:

- Blinks the FC and PWR LEDs.
- Lights the FLT LED steady amber.

Important! Use Guided Maintenance to coordinate the replacement of the target RAID controller. The Pillar Axiom system must fail over a RAID controller and its Fibre Channel (FC) ports to the partner controller before you can replace the target RAID controller. This reconfiguration may cause some performance degradation along user data paths until you complete the replacement.

Brick RAID or Expansion Controller Replacement tasks

To replace a Brick RAID controller, perform the tasks that are outlined in the following table.

Table 36 RAID or Expansion controller replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the RAID or Expansion controller FRU: 1 Remove a RAID or Expansion Controller to make room for the RAID or Expansion controller replacement. 2 Insert a RAID or Expansion Controller to insert the RAID or Expansion controller replacement.
Step 4 Verify Status	Performed as final step in RAID or Expansion controller replacement.

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About Brick RAID Controller Removal

To help you identify the target Brick that has the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target Brick. If you choose Reverse Identify in the GUI, Guided Maintenance beacons the LEDs on all Bricks except for the target Brick.

After you click the Prepare System button in the GUI, if the reconfiguration has not yet occurred, Guided Maintenance reconfigures the target FC port group so that the data paths that are supported by this port group fail over to the FC port group on the partner CU. This failover causes the partner RAID controller to take over all disk drives in the storage array.

After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Remove a RAID or Expansion Controller

1. Within Guided Maintenance, click the Next button in the Prepare System page.
2. If the Fibre Channel (FC) cables are not labeled to show where they connect on the controller, make a notation that shows which cable connects to which port.
3. When Guided Maintenance prompts you to remove the controller, disconnect all FC cables from the FC ports on the target controller.

   Note: Carefully grasp the cable connector and, while pushing the connector gently *into* the socket, press the latch on the top of the connector to unlatch it. Gently, pull the connector straight out.

   Important! Do not use force or rock the connector from side to side or up and down to remove it. Doing so will damage the socket. Also, for FC cables:

   - Do not pull on them.
   - Do not apply sideways force to them.
   - Do not pull them tight; leave them slack at all times.
4. Unscrew the two screws that secure the locking tabs to the controller casing. Springs retain the screws in the locking tabs.

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5 Push the controller's two locking tabs down, which disengages the controller from the Brick midplane.

6 Slide the controller out of the Brick chassis and set it aside.

⚠ CAUTION Immediately replace the component to maintain proper airflow and cooling. Over-temperature conditions will occur if the replacement FRU is not installed into the chassis. Over-temperature conditions can damage other components.

About Brick RAID or FC Expansion Controller Insertion

After you insert this FRU into a Brick control unit (CU), use Guided Maintenance to complete the replacement procedure. It is very important that the RAID controller locking tabs engage the midplane in a single motion. Partially closing the locking tabs on the RAID controller causes an incorrect data connection and the RAID controller is not allowed to power on.

Important! If Guided Maintenance encounters a problem at this stage, you must contact Technical Support to continue Guided Maintenance for this FRU.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

Important! When you replace this FRU, slowly and evenly slide the replacement into place. If the FRU has ejectors or locking tabs, use them for final connector seating.

Insert a RAID or Expansion Controller

1 Slide the controller replacement into the Brick chassis until the controller stops.

2 Push up the two locking tabs on the controller to engage the controller with the Brick midplane.

Important! Partially engaging the locking tabs on the RAID controller causes an incorrect data connection with the midplane and the RAID controller is not allowed to power up. If the RAID controller does not immediately power on, remove it and wait 60 seconds, then re-engage the locking tabs with a single motion.

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3 Screw the two Phillips screws into the controller casing to secure the locking tabs.

4 Reconnect all Fibre Channel cables into the FC ports on the replacement controller.

Important! Do not use force or rock the cable connector from side to side or up and down to insert it. Doing so will damage the socket. Also, for FC cables:

- Do not pull on them.
- Do not apply sideways force to them.
- Do not pull them tight; leave them slack at all times.

For complete information on how to cable a controller, see the *Pillar Axiom 500 SSF Cabling Reference*.

5 In the Guided Maintenance page, click the Next button.

Note: At this point, Guided Maintenance fails back the FC port group in the replacement controller so that these FC ports again support the data paths.

6 On the Verify page, click the Next button.

If Guided Maintenance displays a verification failed message, click the Try Again button and reseat the FRU. If the second attempt is not successful, contact Technical Support to continue Guided Maintenance for the FRU.

Note: The length of time for the verification step to complete and the system to return a Normal status depends on the I/O load being carried by the Brick. For that reason, it is recommended that the I/O load be lightened as much as possible before replacing the RAID controller.

7 Review the status of the replacement FRU to confirm that it has a Normal status.

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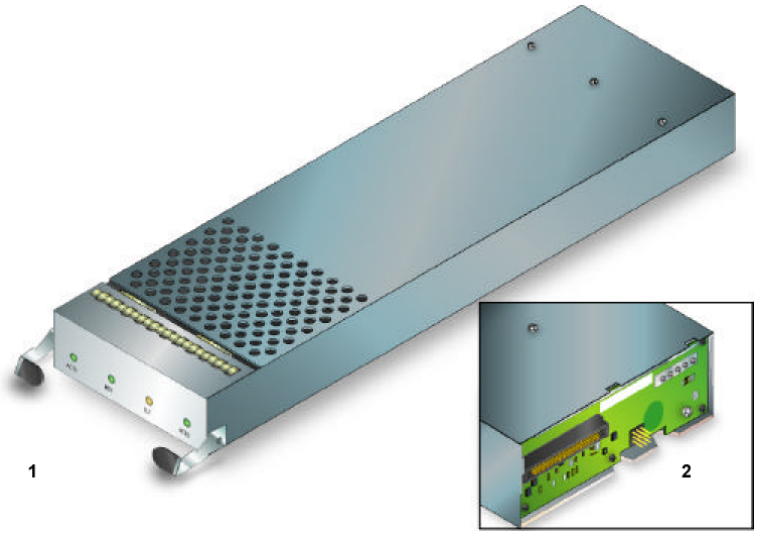
About SATA Brick Spare Disk Drive Replacement

Each SATA Brick has a spare disk drive that provides backup capacity for the RAID controllers if any of the twelve standard disk drives should fail. FC Bricks do not contain spare disk drives.

The spare disk drive is used by the RAID controller is used to replace any disks in the array that might fail. Once the failed disk is replaced, the data is transferred back to the new disk in the original array and the spare disk once again becomes available to both RAID controllers on the Brick.

The following figure shows a spare disk drive.

Figure 59 Spare disk drive FRU



Legend

1	Front
2	Back

The following figure identifies the location of the spare disk drive, which is accessed from the back side of the Brick.

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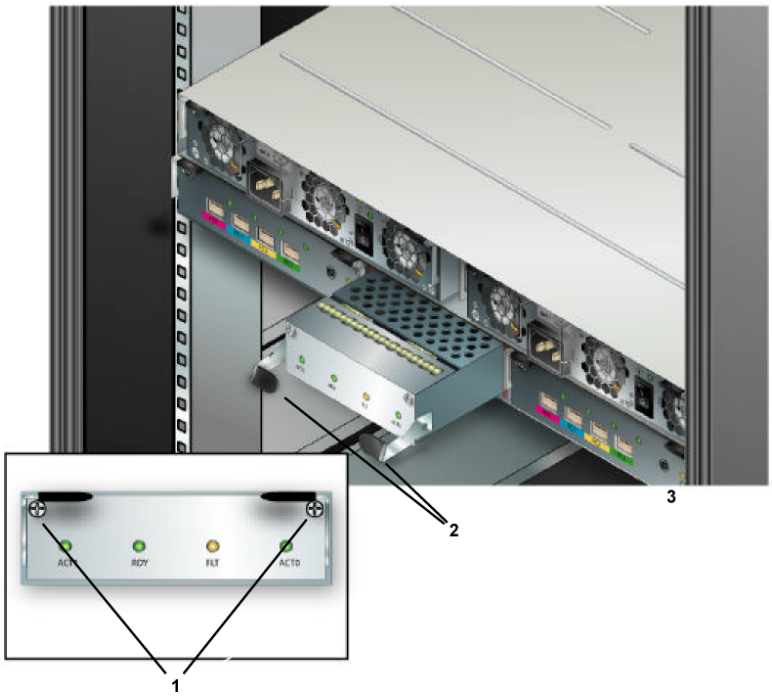
Figure 60 Spare disk drive location



Legend

1 Screws
2 Locking tabs
3 Brick back

SATA Brick Spare Disk Drive LED Status

Table 37 SATA Brick spare disk drive LED status

LED identifier and color		Meaning
ACT1	Green (blink)	RAID controller 1 activity.
RDY	Off	The spare disk drive is not ready for use.
	Green (blink)	Disk drive discovery. The Brick is determining the physical existance of the spare disk drive after power up or after insertion of a spare disk drive FRU.
	Green	The spare disk drive is in a normal state.

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Table 37 SATA Brick spare disk drive LED status (continued)

LED identifier and color		Meaning
FLT	Amber	The spare disk drive has failed.
	Off	No failure exists.
ACT0	Green (blink)	RAID controller 0 activity.

Important! If ACT0 or ACT1 is blinking regularly, the spare disk drive is currently in use. Check for failed disk drives in this Brick, replace as needed, and wait for the copyback to complete before servicing the spare disk drive.

Note: When Guided Maintenance beacons the spare disk drive to identify it, Guided Maintenance:

- Turns off the ACT0, RDY, and ACT1 LEDs.
- Lights the FLT LED solid amber.

Spare Disk Drive Replacement Tasks

To replace a spare disk drive in a Brick, perform the tasks that are outlined in the following table.

Table 38 Spare disk drive replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU.
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	Replace the spare disk drive FRU: 1 Remove a Spare Disk Drive to make room for the spare disk drive replacement. 2 Insert a SATA Spare Disk Drive to insert the spare disk drive replacement.
Step 4 Verify Status	Performed as final step in spare disk drive replacement.

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About SATA Brick Spare Disk Drive Removal

To help you identify the target Brick that has the FRU that needs to be replaced, Guided Maintenance beacons the bezel LEDs on the target Brick. If you choose Reverse Identify in the GUI, Guided Maintenance beacons the LEDs on all Bricks except for the target Brick.

After you click the Prepare System button in the GUI, Guided Maintenance continues the replacement process only if the spare disk drive is not in use. If the spare disk drive is in use, Guided Maintenance reports this fact. You can try again or exit Guided Maintenance.

Important! Removal of the spare disk drive can occur only when it is not in use. A spare disk drive is in use when an array disk drive has failed or is being rebuilt. To replace the spare disk drive, first replace the failed disk drive in the array or wait until the disk drive rebuild process is complete.

After the system is prepared, Guided Maintenance displays a completion message and enables the Next button.

Remove a Spare Disk Drive

1. Within Guided Maintenance, click the Next button in the Prepare System page.
2. When Guided Maintenance prompts you to remove the spare disk drive, unscrew the two screws that secure the locking tabs to the spare disk drive casing. Springs retain the screws in the locking tabs.
3. Push the two locking tabs down, which disengages the spare disk drive from the Brick's midplane.
4. Slide the spare disk drive out of the chassis and set it aside.

⚠ CAUTION Immediately replace the component to maintain proper airflow and cooling. Over-temperature conditions will occur if the replacement FRU is not installed into the chassis. Over-temperature conditions can damage other components.

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About SATA Brick Spare Disk Drive Insertion

Only factory-fresh, Pillar Data Systems-supplied disk drives are supported in Axiom systems. These disk drives have a unique identifier that marks the drive as a Pillar Data Systems disk drive. The process of writing this identifier to the physical disk drive is called branding. If the disk drive is unbranded, the Pillar Axiom system rejects it.

After you insert this FRU into a Brick control unit (CU), use Guided Maintenance to complete the replacement procedure.

Important! If Guided Maintenance encounters a problem at this stage, you must contact Technical Support to continue Guided Maintenance for this FRU.

When the FRU replacement process is complete, the Pillar Axiom system reports the status of the FRU.

After Guided Maintenance successfully validates the disk drive replacement, the drive is bound to that Brick.

Important! The capacity of the disk drive replacement must be equal to or greater than that of the other drives in the Brick.

Insert a SATA Spare Disk Drive

1. Slide the replacement spare disk drive into the Brick chassis and push the disk drive into place.
2. Lift up the locking tabs to engage the spare disk drive with the Brick midplane.

   The RDY LED should begin flashing green when the disk drive is inserted. This LED should stop flashing and light steady green within one minute.

   A burst of flashing should then be seen on the CU 1 and CU 0 LEDs.

   If the RDY LED continues to flash or the FLT LED lights, contact Technical Support.
3. Screw the two screws that are located on either side of the component into the back of the chassis until they are firmly secured. Do not overtighten.
4. In Guided Maintenance, click the Next button.
5. Choose one of these options as appropriate:

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- If prompted to acknowledge the successful discovery of the spare disk drive replacement, click the **OK** button.
- If the replacement is not new, Guided Maintenance opens a dialog box and asks “Are you sure you want to do this?” Choose one of these options:
  - Click the OK button to accept the replacement. Acceptance binds this disk drive to this Brick and destroys any data that may have existed on the disk drive.
  - Click the Cancel button to reject the replacement. Rejection terminates this procedure and retains any previous data that might have existed on the disk drive.

  Important! If you reject the replacement spare disk drive, it cannot be used again in this system.

6 Review the status of the replacement FRU to ensure that it is Normal.

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APPENDIX A

Safety Statements

Introduction to Safety Statements

For the Pillar Axiom storage system, this appendix lists safety statements to provide specific warning and cautionary notices about the electrical and weight properties that are associated with a Pillar Axiom system and its hardware components.

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Safety Statements

The following safety statements include all hazard notices, in all pertinent languages.

Important! Procedures listed in the body of this document assume that the electrical characteristics of the power supply to which Pillar Axiom components are connected comply with the technical specifications for those components.

For electrical characteristics of Pillar Axiom components, see Pillar Axiom Hardware Specifications.

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Warning Notices

DANGER This hazard symbol means warning. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards that are involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Electrical Warning in Other Languages

Table 39 Electrical warning in other languages

Waarschuwing	Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen.
Varoitus	Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista.
Attention	Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents.
Warnung	Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt.
Avvertenza	Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti.

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Table 39 Electrical warning in other languages (continued)

Advarsel	Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan fØre til personskade. FØr du utfØrer arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjØre deg kjent med vanlig praksis når det gjelder å unngå ulykker.
Aviso	Este sÍmbolo de aviso indica perigo. Encontra-se numa situaÇão que lhe poderá causar danos fÍ sicos. Antes de comeÇar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possÍ veis acidentes.
Advertencia	Este sÍmbolo de aviso significa peligro. Existe riesgo para su integridad fÍ sica. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos está ndar de prevención de accidentes.
Varning	Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på nå gon utrustning må ste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador.

Warning Do not work on the system or connect or disconnect cables during periods of lightning activity.

Warning When removing a power supply, do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected.

Warning The power supply cord is used as the main disconnect device. Ensure that the socket outlet is located or installed near the equipment and is easily accessible.

Warning When working on a chassis or near power supplies, use extreme caution because line voltages may be present within the chassis.

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Warning Ultimate disposal of this product should be handled according to all national laws and regulations.

Warning Some equipment is connected to power lines. Before you work on this equipment, remove all jewelry that contains metal. Such jewelry includes rings, necklaces, and watches. Metal objects heat up when connected to power and ground. Hot metal objects can cause serious burns or weld the metal object to the terminals.

Warning Only qualified personnel should install or replace this equipment.

Warning Secure all power cabling when you install this unit to avoid disturbing field-wiring connections.

Warning Do not overload the circuit when you connect components to the power supply.

Warning A voltage mismatch can cause equipment damage and may pose a fire hazard. If the voltage indicated on the label differs from the power outlet voltage, *do not connect the chassis to that receptacle*.

Warning To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.

Warning Incorrect connection of this equipment to a general purpose outlet could result in a hazardous situation.

Warning The Pillar Axiom storage system operates at high voltages. To protect against physical harm, power off the system whenever possible during installation.

Warning Never block the inlet and outlet holes in the chassis components. Sufficient air circulation is required for the components to operate properly and to avoid a fire hazard. Do not push objects of any kind into the ventilation holes. Such action could result in fire or electrical shock. Keep all liquids away from hardware components.

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Warning Ensure that component distribution in the rack is balanced. Follow the hardware placement map to ensure this balance. Uneven distribution can cause hazardous instability. The rack must have stabilization plates or anti-tip brackets installed so the rack does not tip when you install a component.

Lightning Activity Warning

DANGER Do not work on the system or connect or disconnect cables during periods of lightning activity.

Lightning Warning in Other Languages

Table 40 Lightning warning in other languages

Waarschuwing	Tijdens onweer dat gepaard gaat met bliksem, dient u niet aan het systeem te werken of kabels aan te sluiten of te ontkoppelen.
Varoitus	Älä työskentele jä rjestelmä n parissa ä lä kä yhdistä tai irrota kaapeleita ukkosilmalla.
Attention	Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage.
Warnung	Arbeiten Sie nicht am System und schließ en Sie keine Kabel an bzw. trennen Sie keine ab, wenn es gewittert.
Avvertenza	Non lavorare sul sistema o collegare oppure scollegare i cavi durante un temporale con fulmini.
Advarsel	UtfØr aldri arbeid på systemet, eller koble kabler til eller fra systemet nå r det tordner eller lyner.
Aviso	Não trabalhe no sistema ou ligue e desligue cabos durante perÍ odos de mau tempo (trovoada).
Advertencia	No operar el sistema ni conectar o desconectar cables durante el transcurso de descargas eléctricas en la atmósfera.
Varning	Vid å ska skall du aldrig utföra arbete på systemet eller ansluta eller koppla loss kablar.

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Power Supply Warning

DANGER When removing a power supply, do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected.

Power Supply Warning in Other Languages

Table 41 Power supply warning in other languages

Waarschuwing	U dient de voeding niet aan te raken zolang het netsnoer aangesloten is. Bij systemen met een stroomschakelaar zijn er lijnspanningen aanwezig in de voeding, zelfs wanneer de stroomschakelaar uitgeschakeld is en het netsnoer aangesloten is. Bij systemen zonder een stroomschakelaar zijn er lijnspanningen aanwezig in de voeding wanneer het netsnoer aangesloten is.
Varoitus	Älä kosketa virtalä hdettä virtajohdon ollessa kytkettynä . Virrankatkaisimella varustetuissa jä rjestelmissä on virtalä hteen sisä llä jä ljellä verkkojä nnite, vaikka virrankatkaisin on katkaistu-asennossa virtajohdon ollessa kytkettynä . Jä rjestelmissä , joissa ei ole virrankatkaisinta, on virtalä hteen sisä llä verkkojä nnite, kun virtajohto on kytkettynä .
Attention	Ne pas toucher le bloc d'alimentation quand le cordon d'alimentation est branché. Avec les systèmes munis d'un commutateur marche-arrêt, des tensions de ligne sont présentes dans l'alimentation quand le cordon est branché, même si le commutateur est àal'arrêt. Avec les systèmes sans commutateur marche-arrêt, l'alimentation est sous tension quand le cordon d'alimentation est branché.
Warnung	Berü hren Sie das Netzgerä t nicht, wenn das Netzkabel angeschlossen ist. Bei Systemen mit Netzschalter liegen Leitungsspannungen im Netzgerä t vor, wenn das Netzkabel angeschlossen ist, auch wenn das System ausgeschaltet ist.

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Table 41 Power supply warning in other languages (continued)

	Bei Systemen ohne Netzschalter liegen Leitungsspannungen im Netzgerä t vor, wenn das Netzkabel angeschlossen ist.
Avvertenza	Non toccare l'alimentatore se il cavo dell'alimentazione è collegato. Per i sistemi con un interruttore di alimentazione, tensioni di linea sono presenti all'interno dell'alimentatore anche quando l'interruttore di alimentazione è en posizione di disattivazione (off), se il cavo dell'alimentazione è collegato. Per i sistemi senza un interruttore, tensioni di linea sono presenti all'interno dell'alimentatore quando il cavo di alimentazione è collegato.
Advarsel	BerØ r ikke strØ mforsyningsenheten nå r strØ mledningen er tilkoblet. I systemer som har en strØ mbryter, er det spenning i strØ mforsyningsenheten selv om strØ mbryteren er slå tt av og strØ mledningen er tilkoblet. Nå r det gjelder systemer uten en strØ mbryter, er det spenning i strØ mforsyningsenheten nå r strØ mledingen er tilkoblet.
Aviso	Não toque na unidade abastecedora de energia quando o cabo de alimentaççã o estiver ligado. Em sistemas com interruptor, a corrente eléctrica estará presente na unidade abastecedora, sempre que o cabo de alimentação de energia estiver ligado, mesmo quando o interruptor se encontrar desligado. Para sistemas sem interruptor, a tensão eléctrica dentro da unidade abastecedora só estará presente quando o cabo de alimentação estiver ligado.
Advertencia	No tocar la fuente de alimentació n mientras el cable esté enchufado. En sistemas con interruptor de alimentació n, hay voltajes de lÍ nea dentro de la fuente, incluso cuando el interruptor esté en Apagado (OFF) y el cable de alimentació n enchufado. En sistemas sin interruptor de alimentació n, hay voltajes de lÍ nea en la fuente cuando el cable está enchufado.
Varning	Vidrör inte strömförsörjningsenheten nä r nä tsladden ä r ansluten. För system med strömbrytare finns det nä tspä nning i strömförsörjningsenheten ä ven nä r strömmen har slagits av men nä tsladden ä r ansluten. För system utan strömbrytare finns det nä tspä nning i strömförsörjningsenheten nä r nä tsladden ä r ansluten.

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Main Power Disconnect Warning

DANGER The power supply cord is used as the main disconnect device. Ensure that the socket outlet is located or installed near the equipment and is easily accessible.

Power Disconnect Warning in Other Languages

Table 42 Power disconnect warning in other languages

Attention	Le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée àproximité de l'équipement et être facile d'accés.

Installation Warning

DANGER Read the installation instructions before you connect the system to its power source.

Table 43 Installation warning in other languages

Waarschuwing	Raadpleeg de installatie-aanwijzingen voordat u het systeem met de voeding verbindt.
Varoitus	Lue asennusohjeet ennen jä rjestelmä n yhdistä mistä virtalä hteeseen.
Attention	Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.
Warnung	Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließ en.
Avvertenza	Consultare le istruzioni di installazione prima di collegare il sistema all'alimentatore.

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Table 43 Installation warning in other languages (continued)

Advarsel	Les installasjonsinstruksjonene fØ r systemet kobles til strØ mkilden.
Aviso	Leia as instruç ões de instalação antes de ligar o sistema àsua fonte de energia.
Advertencia	Ver las instrucciones de instalació n antes de conectar el sistema a la red de alimentació n.
Varning	Lä s installationsanvisningarna innan du kopplar systemet till dess strömförsörjningsenhet.

Power Disconnect Warning

DANGER When working on a chassis or near power supplies, follow the Guided Maintenance procedures in the AxiomONE Storage Services Manager for instructions on how to work with and around power supplies. Use extreme caution because line voltages may be present within the chassis.

Warning Statement for Norway and Sweden

Table 44 Warnings for Norway and Sweden

Advarsel	Apparatet skal kobles til en jordet stikkontakt.
Varning	Apparaten skall anslutas till jordat nä tuttag.

Restricted Access Area Warning

DANGER This unit is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

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Restricted Access Warning in Other Languages

Table 45 Restricted access warning in other languages

Waarschuwing	Dit toestel is bedoeld voor installatie op plaatsen met beperkte toegang. Een plaats met beperkte toegang is een plaats waar toegang slechts door servicepersoneel verkregen kan worden door middel van een speciaal instrument, een slot en sleutel, of een ander veiligheidsmiddel, en welke beheerd wordt door de overheidsinstantie die verantwoordelijk is voor de locatie.
Varoitus	Tä mä laite on tarkoitettu asennettavaksi paikkaan, johon pä ä sy on rajoitettua. Paikka, johon pä ä sy on rajoitettua, tarkoittaa paikkaa, johon vain huoltohenkilöstö pä ä see jonkin erikoistyökalun, lukkoon sopivan avaimen tai jonkin muun turvalaitteen avulla ja joka on paikasta vastuussa olevien toimivaltaisten henkilöiden valvoma.
Attention	Cet appareil est àinstaller dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité. L'accès aux zones de sécurité est sous le contr ô le de l'autorité responsable de l'emplacement.
Warnung	Diese Einheit ist zur Installation in Bereichen mit beschrä nktem Zutritt vorgesehen. Ein Bereich mit beschrä nktem Zutritt ist ein Bereich, zu dem nur Wartungspersonal mit einem Spezialwerkzeugs, Schloß und Schlü ssel oder anderer Sicherheitsvorkehrungen Zugang hat, und der von dem fü r die Anlage zustä ndigen Gremium kontrolliert wird.
Avvertenza	Questa unitàdeve essere installata in un'area ad accesso limitato. Un'area ad accesso limitato è un'area accessibile solo a personale di assistenza tramite un'attrezzo speciale, lucchetto, o altri dispositivi di sicurezza, ed è controllata dall'autoritàresponsabile della zona.
Advarsel	Denne enheten er laget for installasjon i områ der med begrenset adgang. Et områ de med begrenset adgang gir kun adgang til servicepersonale som bruker et spesielt verktØ y, lå s og nØ kkel, eller en annen sikkerhetsanordning, og det kontrolleres av den autoriteten som er ansvarlig for områ det.

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Table 45 Restricted access warning in other languages (continued)

Aviso	Esta unidade foi concebida para instalação em á reas de acesso restrito. Uma á rea de acesso restrito é uma á rea àqual apenas tem acesso o pessoal de serviço autorizado, que possua uma ferramenta, chave e fechadura especial, ou qualquer outra forma de segurança. Esta á rea é controlada pela autoridade responsá vel pelo local.
Advertencia	Esta unidad ha sido diseñ ada para instalarse en á reas de acceso restringido. Área de acceso restringido significa un á rea a la que solamente tiene acceso el personal de servicio mediante la utilizació n de una herramienta especial, cerradura con llave, o algún otro medio de seguridad, y que está bajo el control de la autoridad responsable del local.
Varning	Denna enhet ä r avsedd för installation i områ den med begrä nsat tillträ de. Ett områ de med begrä nsat tillträ de få r endast tillträ das av servicepersonal med ett speciellt verktyg, lå s och nyckel, eller annan sä kerhetsanordning, och kontrolleras av den auktoritet som ansvarar för områ det.

Product Disposal Warning

DANGER Ultimate disposal of this product should be handled according to all national laws and regulations.

Product Disposal Warning in Other Languages

Table 46 Product disposal warning in other languages

Waarschuwing	Dit produkt dient volgens alle landelijke wetten en voorschriften te worden afgedankt.
Varoitus	Tä mä n tuotteen lopullisesta hä vittä misestä tulee huolehtia kaikkia valtakunnallisia lakeja ja sä ä nnöksiä noudattaen.
Attention	La mise au rebut définitive de ce produit doit être effectuée conformément àtoutes les lois et réglementations en vigueur.

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Table 46 Product disposal warning in other languages (continued)

Warnung	Dieses Produkt muß den geltenden Gesetzen und Vorschriften entsprechend entsorgt werden.
Avvertenza	L'eliminazione finale di questo prodotto deve essere eseguita osservando le normative italiane vigenti in materia.
Advarsel	Endelig disponering av dette produktet må skje i henhold til nasjonale lover og forskrifter.
Aviso	A descartagem final deste produto deverá ser efectuada de acordo com os regulamentos e a legislação nacional.
Advertencia	El desecho final de este producto debe realizarse seg\x9c n todas las leyes y regulaciones nacionales.
Varning	Slutlig kassering av denna produkt bör skötas i enlighet med landets alla lagar och föreskrifter.

Jewelry Removal Warning

DANGER Some equipment is connected to power lines. Before you work on this equipment, remove all jewelry that contains metal. Such jewelry includes rings, necklaces, and watches. Metal objects heat up when connected to power and ground. Hot metal objects can cause serious burns or weld the metal object to the terminals.

Jewelry Removal Warning in Other Languages

Table 47 Jewelry removal warning in other languages

Waarschuwing	Alvorens aan apparatuur te werken die met elektrische leidingen is verbonden, sieraden (inclusief ringen, kettingen en horloges) verwijderen. Metalen voorwerpen worden warm wanneer ze met stroom en aarde zijn verbonden, en kunnen ernstige brandwonden veroorzaken of het metalen voorwerp aan de aansluitklemmen lassen.
Varoitus	Ennen kuin työskentelet voimavirtajohtoihin kytkettyjen laitteiden parissa, ota pois kaikki korut (sormukset, kaulakorut

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Table 47 Jewelry removal warning in other languages (continued)

	ja kellot mukaan lukien). Metalliesineet kuumenevat, kun ne ovat yhteydessä sä hkövirran ja maan kanssa, ja ne voivat aiheuttaa vakavia palovammoja tai hitsata metalliesineet kiinni liitä ntä napoihin.
Attention	Avant d'accéder àcet équipement connecté aux lignes électriques, ô ter tout bijou (anneaux, colliers et montres compris). Lorsqu'ils sont branchés àl'alimentation et reliés àla terre, les objets métalliques chauffent, ce qui peut provoquer des blessures graves ou souder l'objet métallique aux bornes.
Warnung	Vor der Arbeit an Gerä ten, die an das Netz angeschlossen sind, jeglichen Schmuck (einschließ lich Ringe, Ketten und Uhren) abnehmen. Metallgegenstä nde erhitzen sich, wenn sie an das Netz und die Erde angeschlossen werden, und können schwere Verbrennungen verursachen oder an die Anschluß klemmen angeschweiß t werden.
Avvertenza	Prima di intervenire su apparecchiature collegate alle linee di alimentazione, togliersi qualsiasi monile (inclusi anelli, collane, braccialetti ed orologi). Gli oggetti metallici si riscaldano quando sono collegati tra punti di alimentazione e massa: possono causare ustioni gravi oppure il metallo puòsaldarsi ai terminali.
Advarsel	Fjern alle smykker (inkludert ringer, halskjeder og klokker) fØ r du skal arbeide på utstyr som er koblet til kraftledninger. Metallgjenstander som er koblet til kraftledninger og jord blir svært varme og kan forå rsake alvorlige brannskader eller smelte fast til polene.
Aviso	Antes de trabalhar em equipamento que esteja ligado a linhas de corrente, retire todas as jó ias que estiver a usar (incluindo anéis, fios e reló gios). Os objectos metá licos aquecerão em contacto com a corrente e em contacto com a ligação àterra, podendo causar queimaduras graves ou ficarem soldados aos terminais.
Advertencia	Antes de operar sobre equipos conectados a lÍ neas de alimentació n, quitarse las joyas (incluidos anillos, collares y relojes). Los objetos de metal se calientan cuando se conectan a la alimentació n y a tierra, lo que puede ocasionar quemaduras graves o que los objetos metá licos queden soldados a los bornes.
Varning	Tag av alla smycken (inklusive ringar, halsband och armbandsur) innan du arbetar på utrustning som ä r kopplad till kraftledningar. Metallobjekt hettas upp nä r de kopplas ihop med

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Table 47 Jewelry removal warning in other languages (continued)

	ström och jord och kan förorsaka allvarliga brä nnskador; metallobjekt kan också sammansvetsas med kontakterna.

Qualified Personnel Warning

DANGER Only qualified personnel should install or replace this equipment.

Table 48 Qualified personnel warning in other languages

Waarschuwing	Installatie en reparaties mogen uitsluitend door getraind en bevoegd personeel uitgevoerd worden.
Varoitus	Ainoastaan koulutettu ja pä tevä henkilökunta saa asentaa tai vaihtaa tä mä n laitteen.
Avertissement	Tout installation ou remplacement de l'appareil doit être réalisé par du personnel qualifié et compétent.
Achtung	Gerä t nur von geschultem, qualifiziertem Personal installieren oder auswechseln lassen.
Avvertenza	Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.
Advarsel	Kun kvalifisert personell med riktig opplæring bØ r montere eller bytte ut dette utstyret.
Aviso	Este equipamento deverá ser instalado ou substituÍ do apenas por pessoal devidamente treinado e qualificado.
Atenció n	Estos equipos deben ser instalados y reemplazados exclusivamente por personal técnico adecuadamente preparado y capacitado.
Varning	Denna utrustning ska endast installeras och bytas ut av utbildad och kvalificerad personal.

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Warning Statement for Finland

Table 49 Warning statement for Finland

Varoitus	Alleviates ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle.Ãjã katso säteeseen.

Warning Statement for Sweden

Table 50 Warning statement for Sweden

Varning	Osynlig laserstrå lning nä r denna del ä r öppen och förregleringen ä r urkopplad. Rikta inte blicken in mot strå len.

Power Cabling Warning

DANGER Secure all power cabling when you install this unit to avoid disturbing field-wiring connections.

Power Cabling Warning in Other Languages

Table 51 Power cabling warning in other languages

Waarschuwing	Zet alle stroomkabels vast wanneer dit toestel wordt geÏnstalleerd om te voorkomen dat de verbindingen van de veldbedrading worden verstoord.
Varoitus	Kiinnitä kaikki voimakaapelit tiukkaan tä tä laitetta asentaessasi, jotta vä ltä t kentä n johdinkytkentöjen vioittumista.
Attention	Lors de l'installation de cet appareil, fixer tous les câ bles d'alimentation pour éviter de provoquer des perturbations aux raccordements des câ blages propres au site.

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Table 51 Power cabling warning in other languages (continued)

Warnung	Bei der Installation dieser Einheit die Netzverkabelung befestigen, um die Störung von Feldkabelanschlü ssen zu vermeiden.
Avvertenza	In fase di installazione dell'unità, assicurare tutti i cablaggi di alimentazione per evitare di alterare i collegamenti degli avvolgimenti di campo.
Advarsel	Nå r denne enheten installeres, må alle kraftledninger sikres for å unngå at feltkabelkoblingene forstyrres.
Aviso	Para evitar problemas com as ligaç ões de rede de campanha, prenda todos os cabos de corrente quando instalar esta unidade.
Advertencia	Sujetar todo el cableado de alimentació n cuando se instale este equipo para evitar que se mezcle con las conexiones del cableado "in situ".
Varning	Fä st allt starkströmskablage vid installation av denna enhet så att fä ltkopplingen inte rubbas.

Supply Circuit Warning

DANGER Do not overload the circuit when you connect components to the power supply.

Supply Circuit Warning in Other Languages

Table 52 Supply circuit warning in other languages

Waarschuwing	Let erop dat de toestellen op voedingscircuits worden aangesloten zonder het vermogen van de bedrading te overschrijden.
Varoitus	Laiteyksiköt on yhdistettä vä huolellisesti syöttöpiiriin niin, että johdot eivä t ole ylikuormitettuja.

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Table 52 Supply circuit warning in other languages (continued)

Avertissement	Veillez àbien connecter les unités au circuit d'alimentation afin de ne pas surcharger les connections.
Achtung	Beim Anschließ en der Gerä te an das Stromnetz ist darauf zu achten, daß die Schaltverbindungen nicht ü berlastet werden.
Avvertenza	Fare attenzione quando si collegano le unitàal circuito di alimentazione, per non sovraccaricare i cablaggi.
Advarsel	Vær nØ ye med å koble enheter til strØ mforsyningskretsen slik at ledningene ikke overbelastes.
Aviso	Deverá ter precaução ao ligar unidades ao circuito de fornecimento de energia, para não sobrecarregar a instalação.
Atenció n	Poner mucho cuidado al conectar los equipos al circuito de alimentació n a fin de no sobrecargar el cableado.
Varning	Var noga vid anslutning av enheter till matarströmkretsen så att ledningarna inte överbelastas.

Voltage Mismatch Warning

DANGER A voltage mismatch can cause equipment damage and may pose a fire hazard. If the voltage indicated on the label differs from the power outlet voltage, do not connect the chassis to that receptacle.

Voltage Mismatch Warning in Other Languages

Table 53 Voltage mismatch warning in other languages

Waarschuwing	Aansluiting op een verkeerd voedingsvoltage kan beschadiging van de apparatuur veroorzaken en tot brandgevaar leiden. Het chassis mag niet aangesloten worden als de spanning die op het label staat aangegeven, anders is dan de spanning van het stopcontact.
Varoitus	Erisuuruisten jä nnitteiden yhdistä minen voi aiheuttaa laitevaurion ja tulipalon vaaran. Jos tarraan merkitty jä nnite

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Table 53 Voltage mismatch warning in other languages (continued)

	eroaa pistorasian jä nnitteestä , ä lä yhdistä asennuspohjaa pistorasiaan.
Avertissement	Une erreur de voltage risque d'endommager l'appareil et constitue un risque d'incendie. Si la tension indiquée sur l'étiquette est différente de la tension de l'alimentation, ne connectez en aucun cas le châ ssis àla prise.
Achtung	Bei nicht ü bereinstimmender Spannung kann es zu Gerä teschä den und Feuergefahr kommen. Wenn die auf dem Etikett angegebene Spannung nicht mit der Steckdosenspannung ü bereinstimmt, schließ en Sie das Gerä t nicht an diese Steckdose an.
Avvertenza	Una tensione inadeguata puõcausare danni all'apparecchio e rischio di incendio. Se la tensione riportata sulla targhetta è diversa da quella della presa di alimentazione, non collegare lo chassis a tale presa.
Advarsel	Ulik spenning kan forå rsake skade på utstyret og inneb\xbe re brannfare. Dersom spenningen på merkelappen er forskjellig fra spenningen i stikkontakten, må du ikke koble kabinettet til den stikkontakten.
Aviso	Uma voltagem incorrecta poderá causar danos no equipamento e constituir um risco de incêndio. Se a voltagem indicada na etiqueta for diferente da voltagem de saÍ da de corrente da parede, não ligue o chassis a esse receptá culo.
Atenció n	Las diferencias en el voltaje pueden causar dañ os a los equipos y presentar peligro de incendio. Si el voltaje indicado en la etiqueta es diferente al de la toma de alimentació n, no conectar el chasis a dicha toma.
Varning	Inkompatibla spä nningar kan resultera i materiella skador samt utgör brandfara. Om den spä nning som anges på etiketten skiljer sig frå n strömuttagets spä nning ska chassit inte anslutas till detta uttag.

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SELV Circuit Warning

DANGER To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.

SELV Circuit Warning in Other Languages

Table 54 SELV circuit warning in other languages

Waarschuwing	Om elektrische schokken te vermijden, mogen veiligheidscircuits met extra lage spanning (genaamd SELV = Safety Extra-Low Voltage) niet met telefoonnetwerkspanning (TNV) circuits verbonden worden. LAN (Lokaal netwerk) poorten bevatten SELV circuits en WAN (Regionaal netwerk) poorten bevatten TNV circuits. Sommige LAN en WAN poorten gebruiken allebei RJ-45 connectors. Ga voorzichtig te werk wanneer u kabels verbindt.
Varoitus	Jotta vä ltyt sä hköiskulta, ä lä kytke pienjä nnitteisiä SELV-suojapiirejä puhelinverkkojä nnitettä (TNV) kä yttä viin virtapiireihin. LAN-portit sisä ltä vä t SELV-piirejä ja WAN-portit puhelinverkkojä nnitettä kä yttä viä piirejä . Osa sekä LAN- että WAN-porteista kä yttä ä RJ-45-liittimiä . Ole varovainen kytkiessä si kaapeleita.
Attention	Pour éviter une électrocution, ne raccordez pas les circuits de sécurité basse tension (Safety Extra-Low Voltage ou SELV) àdes circuits de tension de réseau téléphonique (Telephone Network Voltage ou TNV). Les ports du réseau local (LAN) contiennent des circuits SELV et les ports du réseau longue distance (WAN) sont munis de circuits TNV. Certains ports LAN et WAN utilisent des connecteurs RJ-45. Raccordez les câ bles en prenant toutes les précautions nécessaires.
Warnung	Zur Vermeidung von Elektroschock die Sicherheits-Kleinspannungs-Stromkreise (SELV-Kreise) nicht an Fernsprechnetzspannungs-Stromkreise (TNV-Kreise) anschließ en. LAN-Ports enthalten SELV-Kreise, und WAN-

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Table 54 SELV circuit warning in other languages (continued)

	Ports enthalten TNV-Kreise. Einige LAN- und WAN-Ports verwenden auch RJ-45-Steckverbinder. Vorsicht beim Anschließ en von Kabeln.
Avvertenza	Per evitare scosse elettriche, non collegare circuiti di sicurezza a tensione molto bassa (SELV) ai circuiti a tensione di rete telefonica (TNV). Le porte LAN contengono circuiti SELV e le porte WAN contengono circuiti TNV. Alcune porte LAN e WAN fanno uso di connettori RJ-45. Fare attenzione quando si collegano cavi.
Advarsel	Unngå å koble lavspenningskretser (SELV) til kretser for telenettspenning (TNV), slik at du unngå r elektrisk stØ t. LAN-utganger inneholder SELV-kretser og WAN-utganger inneholder TNV-kretser. Det finnes bå de LAN-utganger og WAN-utganger som bruker RJ-45-kontakter. Vår forsiktig nå r du kobler kabler.
Aviso	Para evitar choques eléctricos, não conecte os circuitos de segurança de baixa tensão (SELV) aos circuitos de tensão de rede telefó nica (TNV). As portas LAN contêm circuitos SELV e as portas WAN contêm circuitos TNV. Algumas portas LAN e WAN usam conectores RJ-45. Tenha o devido cuidado ao conectar os cabos.
Advertencia	Para evitar la sacudida eléctrica, no conectar circuitos de seguridad de voltaje muy bajo (safety extra-low voltage = SELV) con circuitos de voltaje de red telefó nica (telephone network voltage = TNV). Los puertos de redes de á rea local (local area network = LAN) contienen circuitos SELV, y los puertos de redes de á rea extendida (wide area network = WAN) contienen circuitos TNV. En algunos casos, tanto los puertos LAN como los WAN usan conectores RJ-45. Proceda con precaució n al conectar los cables.
Varning	För att undvika elektriska stötar, koppla inte sä kerhetskretsar med extra lå g spä nning (SELV-kretsar) till kretsar med telefonnä tspä nning (TNV-kretsar). LAN-portar innehå ller SELV-kretsar och WAN-portar innehå ller TNV-kretsar. Vissa LAN- och WAN-portar ä r försedda med RJ-45-kontakter. Iaktta försiktighet vid anslutning av kablar.

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Incorrect Connection Warning

DANGER Incorrect connection of this equipment to a general purpose outlet could result in a hazardous situation.

Incorrect Connection Warning in Other Languages

Table 55 Connection warning in other languages

Waarschuwing	Incorrecte aansluiting van deze of aangesloten apparatuur op een stopcontact voor algemene doeleinden kan een gevaarlijke situatie tot gevolg hebben.
Varoitus	Tä mä n laitteen tai siihen liitettyjen laitteiden virheellinen kytkentä yleispistorasiaan voi aiheuttaa vaaratilanteen.
Attention	Un branchement incorrect de cet équipement ou de l'équipement branché àune prise d'usage général peut créer une situation dangereuse.
Warnung	Inkorrektes Anschließ en von diesem oder damit verbundenen Gerä ten an einer Allzwecksteckdose kann eine Gefahrensituation verursachen.
Avvertenza	Un collegamento errato di questo apparecchio, o dell'apparecchiatura a esso collegato, a una presa di uso generale pu\x98 causare una situazione pericolosa.
Advarsel	Feil kobling av dette utstyret eller tilhØ rende utstyr til et vanlig uttak kan fØ re til farlige situasjoner.
Aviso	Uma conexão incorrecta a uma ficha de alimentação eléctrica normal, deste ou de qualquer equipamento a este conectado, poderá resultar numa situação potencialmente perigosa.
Advertencia	La conexió n incorrecta de este equipo, o del equipo conectado, a una toma o receptá culo de tipo general podrÍ a resultar en una situació n peligrosa.
Varning	Felaktig koppling av denna eller ansluten utrustning till ett universaluttag kan orsaka riskfylld situation.

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Caution Notices

CAUTION It is required that, if interconnecting equipment resides within more than one equipment rack, these racks should be at the same ground potential.

CAUTION When handling any electronic device, be sure to take electrostatic discharge (ESD) precautions. The minimum requirement is a properly grounded antistatic wrist strap and grounding wire.

CAUTION If removal of a FRU or blanking plate leaves a hole, block the hole quickly with a blanking plate or by installing a replacement FRU. Failure to do this can disrupt airflow and seriously reduce cooling.

CAUTION Ambient temperature within the rack may be greater than that of the room. With regard to the maximum rated ambient for Axiom components, do not reduce the amount of airflow that is required for safe operation.

CAUTION Never block the ventilation holes in a chassis. Sufficient air circulation is required for the internal components to operate properly and to prevent the possibility of fire. Do not push objects of any kind into the ventilation holes. Such action could result in fire or electrical shock. Keep all liquids away from Axiom components.

CAUTION Ensure that component weight distribution in the rack is balanced. Uneven weight distribution can cause hazardous instability. The rack should have stabilization feet or brackets installed, or have another means that does not allow the rack to tip when you service it. At a minimum, we recommend that you install stabilization brackets on the rear feet of the rack because the rack is front-heavy.

CAUTION Slammers weigh 100 lb (45.4 kg). To handle them safely, use an appropriate number of persons.

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CAUTION Qualified personnel are advised to exercise great care at all times when they work on an Axiom system. Remember to:

- Remove rings, watches, or other jewelry and neckties before you begin any procedure.
- Use caution near fan assemblies; the moving parts can change speed unexpectedly.
- Use the correct tools for the job.
- Keep all paperwork up to date, complete, and accurate.

CAUTION The sum of the ratings of the components that plug into the PDU must be less than 80% of the current and power ratings of the PDU. Similarly, the current rating of the PDU must be less than 80% of the rating for the building supply circuit.

CAUTION A Brick weighs up to 65 lb (29.5 kg). For safe handling, use two people to lift it.

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APPENDIX B

Slammer and Brick LED Statuses

About LED Statuses

To restore reliability to the Pillar Axiom storage system, you must locate the specific failed component so that you can replace it. Hardware LED configuration helps you identify the failed component.

Important! If you cannot locate the hardware component that needs to be replaced, contact Technical Support:

- USA: 1-877-4PILLAR (1-877-474-5527)
- International: +1 408 518 4400

Tip: Have your system serial number ready. If you contact Technical Support by telephone, you will need the six digits in the middle of your system serial number. For example, if your serial number is A001368BFT, provide the digits 001368.

A Pillar Axiom storage system includes LEDs to indicate the status of the hardware components:

- A yellow or amber (orange) LED typically indicates a fault.
- A green LED indicates a normal operational state, such as when a connection exists or traffic is present.
- An LED can:
  - Be off.
  - Be continuously on.
  - Blink fast—just over 2 blinks per second (or 2.375/sec).
  - Blink slowly—once every 1 ½ seconds (0.67 blinks/sec).

AxiomONE Storage Services Manager's Guided Maintenance feature triggers Slammer and Brick LEDs to blink or display in specific patterns to help you identify component status. Because there is no Guided Maintenance for the Pilot, the Pilot's LEDs do not blink.

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Note: LED interpretations in this appendix apply to a system after it has started. For information about Loader codes that are displayed after a system startup failure, see Slammer LED Startup Progress Codes.

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Slammer LED Statuses

LEDs on a Slammer indicate the status of the controller and its two control units (CU). The LEDs are located on the bezel and on the front and back of the controller chassis.

Table 56 LEDs on the Slammer bezel

Label	Color	Meaning
Status	Green (solid)	Operational.
	Amber (blinking)	Startup mode: software initializing. Also used for Guided Maintenance.
Activity	Amber	Startup mode.
	Green (blinking)	Activity in progress.
Fault	Amber	Fault.
	Off	No fault is indicated.

For additional information regarding Slammer LED statuses, see Slammer LED Startup Progress Codes.

On the front of a Slammer chassis (beneath the bezel), each control unit has a set of LEDs to indicate the status of the following components:

- Battery
- Fans
- Motherboard

Note: The LEDs for a particular control unit (CU) may not be lit after that CU is prepared for service through the GUI.

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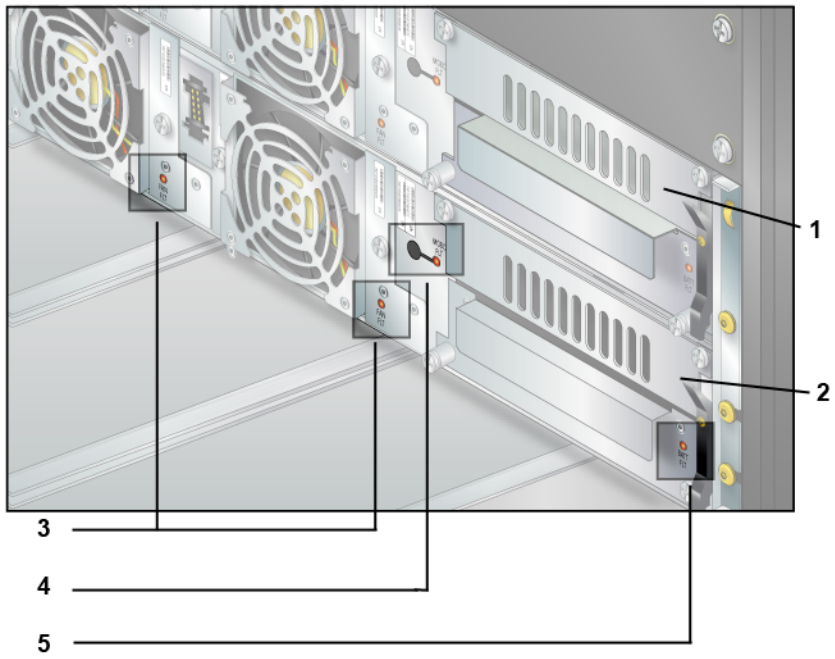
Figure 61 LEDs on the front of the Slammer chassis



Legend

1 CU 0	
2 CU 1	
3 Fan LEDs	
4 Motherboard LEDs	
5 Battery LEDs	

Use the following tables to interpret the meanings of the LEDs on the front of the Slammer chassis.

Slammer Battery LED Status

Table 57 Slammer battery LED status

Label	Color	Meaning
BATT FLT	Amber	Battery in this CU has failed.
	Off	No failure exists.

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To allow battery replacement in a target Slammer CU, Guided Maintenance first places the CU in conservative mode. In this mode, the Pillar Axiom system does not depend on battery-backed memory; instead, the system flushes cached data and commits all disk writes to the storage array.

After you replace this FRU, Guided Maintenance restarts the entire Slammer.

Slammer Fan LED Status

Table 58 Slammer fan LED status

Label	Color	Meaning
FAN FLT	Amber	Fan in this CU has encountered an error or has failed.
	Off	No failure exists.

Slammer Motherboard LED Status

Table 59 Slammer motherboard LED status

Label	Color	Meaning
MOBO FLT	Amber	Motherboard in this CU has failed.
	Off	No failure exists.

On the back of a Slammer chassis, each control unit (CU) has a set of LEDs to indicate the status of the following components in that CU:

- Power supply assemblies
- Network interface module (copper or optical):
  - GbE copper connectors for 1000BaseT
  - GbE optical connectors for optical GbE
  - SAN GBIC for Fibre Channel longwave or shortwave optical connectors
- Private interconnect module

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- CU
- Fibre Channel switch (FS) circuits
- Fibre Channel (FC) circuits

About Control Unit LEDs (Back of Slammer Chassis)

On the back of a Slammer chassis, each control unit (CU) has a set of LEDs to indicate the status of the following components in that CU:

- Power supply assemblies
- Network interface module (copper or optical):
  - GbE copper connectors for 1000BaseT
  - GbE optical connectors for optical GbE
  - SAN GBIC for Fibre Channel longwave or shortwave optical connectors
- Private interconnect module
- CU
- Fibre Channel switch (FS) circuits
- Fibre Channel (FC) circuits

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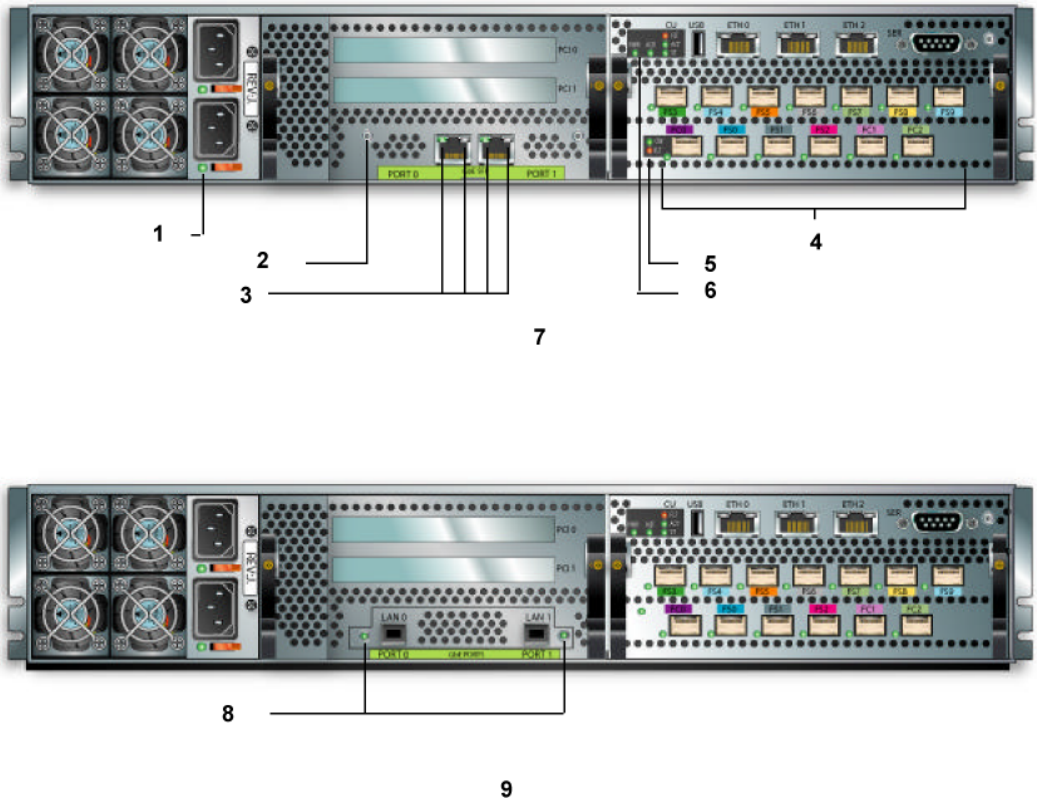
Figure 62 LEDs on the back of the Slammer chassis



Legend

1 Power supply LEDs	6 CU LEDs
2 Network interface module LED	7 Slammer with a copper network interface module
3 Copper network port LEDs	8 Optical network port LEDs for the 2-port NIM.
4 Fibre Channel LEDs	9 Slammer with an optical network interface module
5 Private interconnect module LEDs	

Note: The 4-port GbE NIM also has fault LEDs adjacent to each network port, as shown in item 8 in the previous figure. However, the 4-port GbE NIM is copper-based, not optical.

Slammer CU LED Status

Use the following tables to interpret the meanings of the LEDs on the back of the Slammer chassis.

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Table 60 Slammer CU LED status

LED identifier and color		Meaning
FLT	Amber	This CU has failed.
	Off	No failure exists.
ACT	Green (blink)	Traffic exists.
	Amber	Used in BIOS start codes and for Guided Maintenance.
ST	Green	CU is active.
	Amber	Used in BIOS start codes and for Guided Maintenance.

Note: If the FLT LED at the back of the private interconnect module is lit and no other fault LEDs are lit, and the GUI status is Normal, the bezel is most likely removed or loose.

Slammer FS Port LED Status

Table 61 Slammer FS port LED status

LED identifier and color	Meaning
Yellow	FS circuits in this CU have failed.
Green (solid)	Link exists.
Green (blink)	Traffic exists.

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Slammer Copper GbE Network Port Status

Table 62 Slammer copper GbE network port status

LED identifier and color	Meaning
Amber (blink) [right side]	Traffic exists.
Green [left side]	Link is established; if off, no link exists.

About Slammer Optical Network Port Status

Table 63 Slammer optical network port status

LED identifier and color	Meaning
Amber (blink)	Traffic exists; if off, no traffic exists.
Green	Link is established; if off, no link exists.

Slammmer Network Interface Module LED Status

Table 64 Slammer network interface module LED status

LED identifier and color	Meaning
Amber	Network interface module in this CU has failed.
Off	No failure is indicated.

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Slammer Power Supply LED Status

Table 65 Slammer power supply LED status

LED identifier and color	Meaning
Amber	Power supply in this CU has failed.
Green	AC is applied and DC is active.

Slammer Private Interconnect Module LED Status

Table 66 Slammer private interconnect module LED status

LED identifier and color		Meaning
SW	Off	Fibre Channel switch is not initialized or a problem exists. For the latter, FLT should be amber.
	Green	FC switch is ready and in switch mode.
FRU FLT	Amber	Fault exists in FC switch logic, interface, or other FRU circuitry.
	Off	No failure exists.

Note: The FRU FLT LED is next to the FC 0 connector on the bottom left of the private interconnect module.

Note: The three LEDS (FLT, ACT, and ST) at the top left of the private interconnect module reflect the state of the entire Slammer CU and have the same meaning as the LEDs on the bezel.

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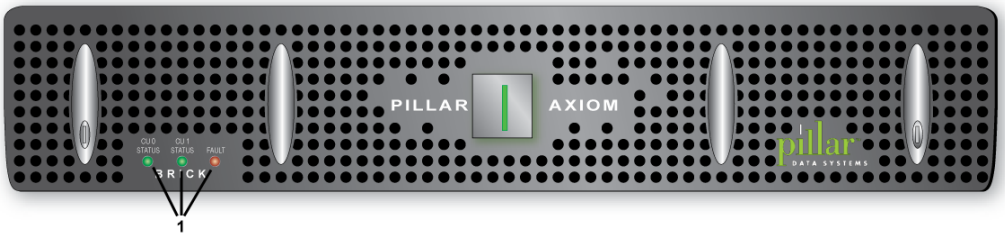
About Brick LED Statuses

Brick LEDs indicate the status of the Brick and disk arrays. For SATA Bricks and FC RAID Bricks, these LEDs also indicate the status of the RAID controllers. The LEDs are on the bezel and on the front and back of the chassis.

On the bezel, each control unit (CU) in the Brick has a status LED to indicate the activity for that CU and whether the Brick is powered on.

Figure 63 Brick bezel LEDs



Legend

1 Three LEDs

Brick Bezel LED Status

Table 67 Brick bezel LED status

LED identifier and color		Meaning
CU 0 Status	Green (blink)	This CU is active. Blink rate is constant at 20 hz.
CU 1 Status	Green (blink)	This CU is active. Blink rate is constant at 20 hz.
Fault	Amber	A FRU failed or the bezel is improperly seated.
	Off	No FRU has failed.
Pillar	Green (solid)	Power is on.
	Off	Power is off or bezel power cable is damaged.

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Note: When Guided Maintenance beacons the Brick to identify it, Guided Maintenance:

- Blinks the CU Status LEDs at 2 hz.
- Lights the Fault LED solid amber.

About Guided Maintenance and LEDs on Bricks

Note: When Guided Maintenance beacons the Brick to identify it, Guided Maintenance:

- Blinks the CU Status LEDs at 2 hz.
- Lights the Fault LED solid amber.

The back of a Brick chassis displays a set of LEDs for the following FRUs:

- RAID controller 0—SATA and Fibre Channel (FC) RAID Bricks only
- RAID controller 1—SATA and FC RAID Bricks only
- Enclosure Services (ES) module
- Spare disk drive—SATA Bricks only
- Two power supply, fan modules

Each RAID controller has a set of LEDs to indicate the status of the controller and its FC ports.

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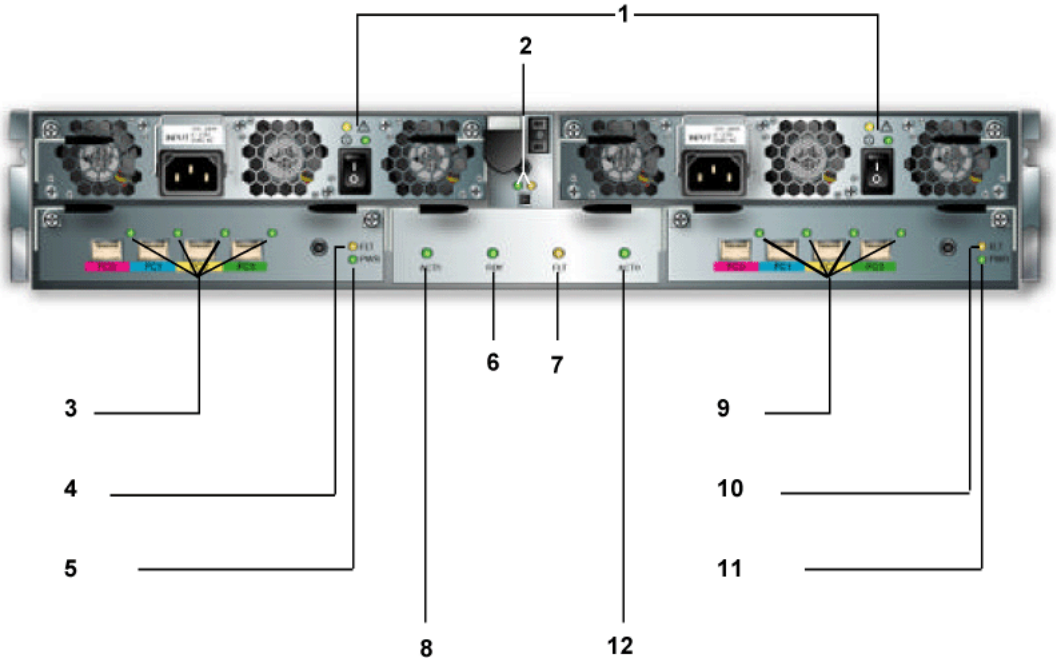
Figure 64 LEDs on the back of a SATA Brick



Legend

1 Power supply LEDs	7 Fault Spare disk drive LEDs
2 ES module LEDs	8 Spare disk drive CU 1 activity LED
3 RAID controller 1 FC LEDs	9 RAID controller 0 FC LEDs
4 RAID controller 1 fault LEDs	10 RAID controller 0 fault LEDs
5 RAID controller 1 power LEDs	11 RAID controller 0 power LEDs
6 Ready Spare disk drive LEDs	12 Spare disk drive CU 0 activity LED

Note: The Brick displayed in the above figure is a SATA Brick. FC Bricks do not have spare disk drives, and FC Expansion Bricks do not have RAID controllers.

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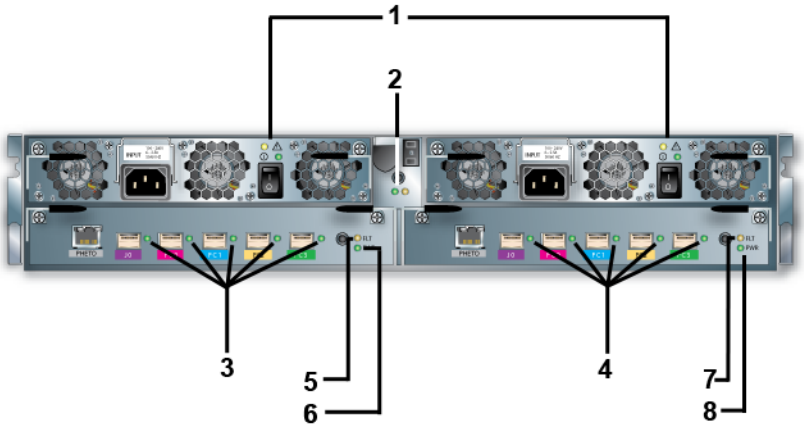
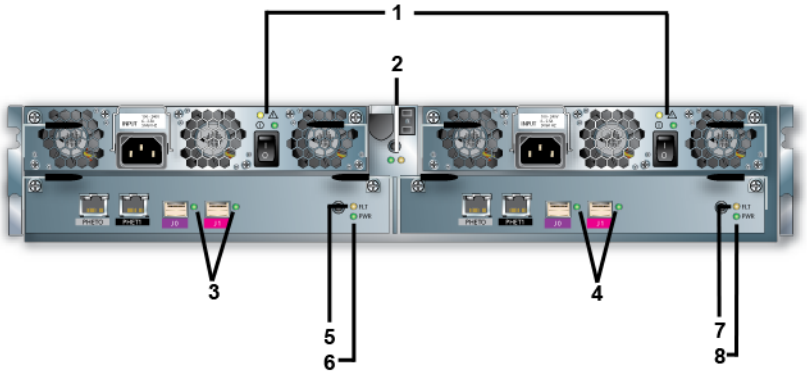
Figure 65 LEDs on the back of a FC RAID Brick



Legend

1 Power supply LEDs	5 FC RAID controller 1 fault LED
2 ES module LEDs	6 FC RAID controller 1 power LED
3 FC RAID controller 1 LEDs	7 FC RAID controller 0 fault LED
4 FC RAID controller 0 LEDs	8 FC RAID controller 0 power LED

Figure 66 LEDs on the back of a FC Expansion Brick



Legend

1 Power supply LEDs	5 FC Expansion controller 1 fault LED
2 ES module LEDs	6 FC Expansion controller 1 power LED
3 FC Expansion controller 1 LEDs	7 FC Expansion controller 0 fault LED
4 FC Expansion controller 0 fault LED	8 FC Expansion controller 0 power LED

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LEDs on Disk Drive Carriers

When Guided Maintenance beacons the disk drive to identify it, Guided Maintenance:

Note: When Guided Maintenance beacons the disk drive to identify it, Guided Maintenance:

- Turns off the top and bottom LEDs.
- Blinks the middle LED.

On the front of a Brick chassis (beneath the bezel), you have access to all twelve disk drive carriers. The carriers are numbered as shown in the following figure.

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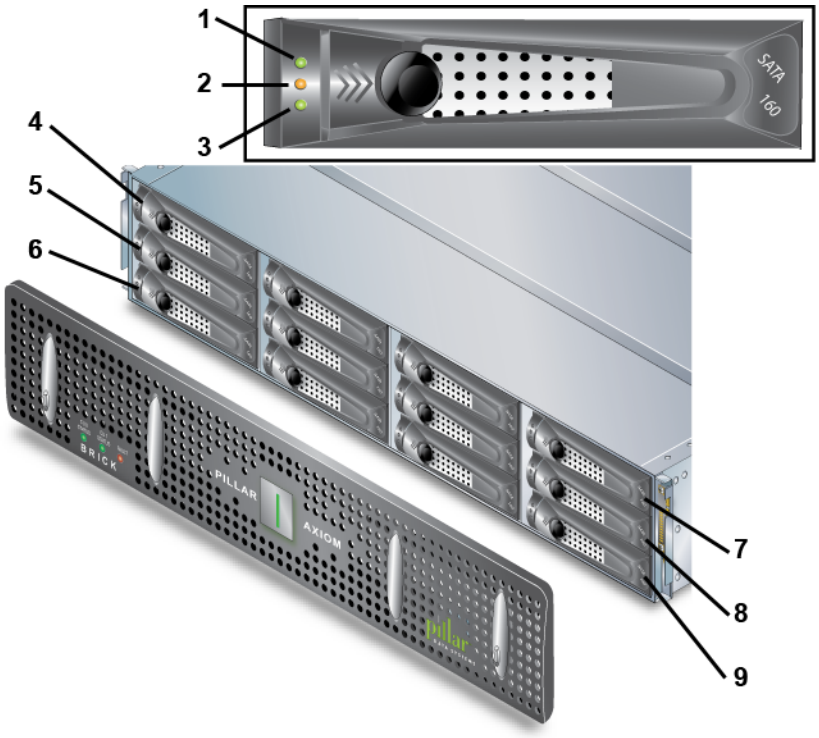
Figure 67 Disk drive carrier numbering in a Brick and carrier LEDs



Legend

1 CU 1	6 Disk drive 2
2 Ready light	7 Disk drive 9
3 CU 0	8 Disk drive 10
4 Disk drive 0	9 Disk drive 11
5 Disk drive 1	

Each carrier has three LEDs to indicate its status.

Table 68 LEDs on disk drive carriers

Position	Color	Meaning
Top	SATA: Green (blink)	Activity from RAID controller 1.
Top	FC: Off	Not used for FC.
Middle	Amber	Disk drive has faulted.
	Off	• ES module is missing.

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Table 68 LEDs on disk drive carriers (continued)

Position	Color	Meaning
		• Disk drive has no power. • Disk drive has spun down.
	Green (blink)	Disk drive discovery. The Brick is determining the physical existence of this disk drive after power up or disk drive insertion.
	Green	Disk drive is ready.
Bottom	SATA drives: Green (blink)	Activity from RAID controller 0.
Bottom	FC drives: Off	Not used for FC.

Note: When there is no I/O activity on a Brick storage enclosure, the RAID firmware runs a background operation that scans all disk drives for media errors and, if media errors are found, performs repair operations. This background activity causes the ACT LEDs to blink green on the idle system or Brick. Such activity can take several hours to complete. When host I/O resumes, this background operation stops; it resumes only when there are no further I/Os from a host.

Note: When Guided Maintenance beacons the disk drive to identify it, Guided Maintenance:

- Turns off the top and bottom LEDs.
- Blinks the middle LED.

Tip: Guided Maintenance also shows the position of the disk drive in the Brick to help you avoid introducing a double fault into a RAID array.

Brick Power Supply and Fan Module LED Status

Table 69 Brick power supply, fan module LED status

LED identifier and color		Meaning
	Amber	Power supply, fan module in this controller has failed for one of these reasons:

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Table 69 Brick power supply, fan module LED status (continued)

LED identifier and color		Meaning
		• Power supply AC or DC has failed. • Power supply exceeded its temperature limits. • Fan(s) in this module have failed.
	Off	Power supply, fan module in this controller is functioning normally.
	Green	AC is available and DC is active.
	Off	AC is not available.

Note: When Guided Maintenance beacons the power supply, fan module to identify it, Guided Maintenance lights the amber LED.

For information on replacing a Brick power supply, fan module, see About Brick Power Supply and Fan Module Replacement Tasks.

FC RAID Brick LED Status

Table 70 FC RAID Brick LED status

LED identifier and color		Meaning
PNet 0	Amber (blink)	Polling for PNET connection.
	Green	PNET has established connection.
	Green (off), Amber (slow blink)	PNET is unavailable.
J0 & FC0–FC3	Amber (SOS blink)	Internal error exists within RAID controller FC interface.
	Amber	FC link does not exist.
	Amber (fast blink)	Initializing or self-testing.

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Table 70 FC RAID Brick LED status (continued)

LED identifier and color		Meaning
	Green (slow blink)	Connecting FC link.
	Green	FC link exists.
FLT	Amber	An error condition exists.
	Off	No failure exists.
PWR	Green	Power is available.
	Off	Power is not available.

FC Expansion Brick LED Status

Table 71 FC Expansion Brick LED status

LED identifier and color		Meaning
PNet0 & PNet1	Amber (blink)	Polling for PNET connection.
	Green	PNET has established connection.
	Green (off) Amber (slow blink)	PNET is unavailable.
J0 & J1	Amber (SOS blink)	Internal error exists within Brick controller FC interface.
	Amber	FC link does not exist.
	Amber (fast blink)	Initializing or self-testing.
	Green (slow blink)	Connecting to or waiting for FC link.
	Green	FC link exists.

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Table 71 FC Expansion Brick LED status (continued)

LED identifier and color		Meaning
FLT	Amber	An error condition exists.
	Off	No failure exists.
PWR	Green	Power is available.
	Off	Power is not available.

SATA Brick RAID Controllers

Table 72 SATA Brick RAID controller LED status

LED identifier and color		Meaning
FC0–FC3	Amber (SOS blink)	Internal error exists in Storage System Fabric (SSF).
	Amber	FC link does not exist.
	Amber (fast blink)	Initializing or self-testing.
	Green (slow blink)	Connecting FC link.
	Green	FC link exists.
FLT	Amber	An error condition exists.
	Off	No failure exists.
PWR	Green	Power is available.
	Off	Power is not available.

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Note: Because the local RAID controller has no electrical circuit to light its FLT LED, the partner RAID controller lights the LED on the local controller. Also, the FLT LED will light if the Brick bezel is removed.

Tip: If FC0, FC1, FC2, and FC3 are blinking in unison on one RAID controller and FLT on the other controller is lit, the controller with the blinking FC0-FC3 is in a fault condition.

Note: When a Brick powers up, the FC and FLT LEDs blink. When Guided Maintenance beacons the RAID controller to identify it, Guided Maintenance:

- Blinks the FC and PWR LEDs.
- Lights the FLT LED solid amber.

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APPENDIX C

Slammer LED Startup Progress Codes

About LED Startup Codes

When a Slammer is powered on, it goes through a sequence of actions. Generally, the time to finish these actions for a new installation is about 12 minutes.

The time to start up your system may be shorter or longer, depending on the number of configured entities (filesystems, LUNs, Snap FSs, Snap LUNs, quotas, and so on) and, to some degree, on the configuration of Slammers and Bricks.

Slammers cannot complete the startup sequence without the Pilot being powered on and functioning.

While a Slammer performs startup diagnostics and then waits for its runtime image to download from the Pilot:

- The Fault LED (FLT) is off.
- The Activity LED (ACT) is green and blinks fast.
- The Status LED (ST) is green and blinks slowly.

During the remainder of the startup, FLT and ACT are off while ST slowly blinks amber once each second. During this time, the GUI shows the Slammer to be in "booting 0xnnnn" status while the Pilot initializes the Slammer' s data services components.

When the Slammer successfully completes the startup sequence, ST is steady green.

Tip: If the front bezel Fault (FLT) LED is on steady and no other fault indicators on the Slammer are lit, the bezel may not be properly seated. Slammers always light FLT when the bezel is off.

If the Slammer halts during startup, the three LEDs on the back of the chassis (FLT, ACT, and ST) or the three LEDs on the bezel (Status, Activity, and Fault) help you identify where the Slammer halted in the startup sequence.

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Slammer LED Codes

The Slammer bezel has Fault, Status, and Activity LEDs that can display various colors and blink rates. These LEDs also appear on the private interface module at the back of the Slammer chassis, and are labeled FLT (Fault), ACT (Activity), and ST (Status).

These LEDs can:

- Be green or amber.
- Be on or off.
- Be steady, with no blinks.
- Blink rapidly—slightly more than two blinks per sec (2.375 hz).
- Blink slowly—one blink per 1.5 sec (0.67 hz).

The configuration of all three LEDs can be translated into a 3-digit progress code. Use this code to identify the cause of failure in the table in LED Code Translation.

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LED Code Translation

The first digit of a startup progress code is determined by the color and blink rate of the FLT LED. Use the information in the following table to determine the first digit of this code.

Table 73 Code translation for the Fault LED

LED color	Blink rate	Code
None	Off	0
Amber	Steady	1
	Rapid	2
	Slow	3

The second digit of the startup progress code is determined by the color and blink rate of the Activity LED. Use the information in the following table to determine the second digit of this code.

Table 74 Code translation for the Activity LED

LED color	Blink rate	Code
None	Off	0
Amber	Steady	1
	Rapid	3
	Slow	4
Green	Steady	2
	Rapid	5
	Slow	6

The third digit of the startup progress code is determined by the color and blink rate of the Status LED. Use the information in the following table to determine the third digit of this code.

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Table 75 Code translation for the Status LED

LED color	Blink rate	Code
None	Off	0
Amber	Steady	1
	Rapid	3
	Slow	4
Green	Steady	2
	Rapid	5
	Slow	6

For example, the following LED configuration represents a progress code of 111, which means that the simple memory test failed on the Slammer:

- FLT—steady amber
- ACT—steady amber
- ST—steady amber

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Slammer LED States During Startup

The following table describes the meaning of the Slammer startup codes as indicated by the LEDs.

Note: The software modules in the following table are defined as follows:

- EEL stands for Early Event Logging and is a diagnostic program used to report the state of the boot process.
- MicroDMS is the very small version of the Diagnostic and Monitoring Service that monitors the boot sequence for the Slammer.
- DMS is the full version of the Diagnostic and Monitoring Service that monitors the health of the Slammer.
- MCCAgent is the Management Console and Control agent.

If any of the modules in the following table, except for EEL_NETBOOT, appears for more than 3 seconds, contact Technical Support. EEL_NETBOOT will run for 10 to 80 seconds, depending on your Slammer configuration. If the code for EEL_NETBOOT appears for more than 120 seconds then contact Technical Support.

The system may go through this sequence more than once if the network is having trouble responding.

Table 76 Slammer LED startup codes

Code			Software module	Meaning
F	A	S		
2	1	6	EEL_CPU_2	The CPU is booting.
2	2	0	EEL_PCI_INIT	The PCI controller is being initialized.
2	2	2	EEL_CPU_2_FAILED	The CPU has failed to boot. Contact Technical Support.
2	2	4	EEL_PROCESSORS_DIFFERENT	The CPU's in the Slammers are not the same model.

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Table 76 Slammer LED startup codes (continued)

Code			Software module	Meaning
F	A	S		
2	2	6	EEL_MONITOR	A step in the POST process.
2	2	0	EEL_CONTINUE	A step in the POST process.
2	2	2	EEL_MPOST	MPOST is manufacturing POST and is for testing the motherboard.
2	2	4	EEL_MEMORY_CONFIG	The RAM configuration is being examined.
2	2	6	EEL_MEM_CONFIG_CHANGED	The RAM configuration has changed since the last boot.
2	5	0	EEL_MEM_CONFIG_ERROR	The Slammer RAM has failed to initialize. Contact Technical Support.
2	5	2	EEL_UNSUPPORTED_MEM_CONFIG	The current RAM configuration is not supported. Contact Technical Support.
2	5	4	EEL_EEPROM_DATA_ERROR	The EEPROM data has failed to load. Contact Technical Support.
2	5	6	EEL_MEMTEST	The RAM test.
2	6	0	EEL_MEMTEST_FAILED	The RAM has failed to it's test. Contact Technical Support.
2	6	2	EEL_CLEAR_HIGH_MEM	A step in the POST process.
2	6	4	EEL_CLEAR_BATT_BACKED_MEM	A step in the POST process.

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Table 76 Slammer LED startup codes (continued)

Code			Software module	Meaning
F	A	S		
3	6	6	EEL_NETBOOT	Downloading and booting the Slammer image file.

Table 77 Slammer LED states after POST process completion

Code			Meaning
F	A	S	
0	2	4	MicroDMS starting in Netboot. This is a very brief transient state.
0	5	6	MicroDMS has completed one pass in Netboot and is downloading and booting slammer.ifs.
0	0	4	DMS started.
0	0	2	MCCAgent cold or warm start complete.
0	X	2	The Slammer has booted and is and waiting for the Pilot. The ACT LED tracks activity and is variable.

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LED Halt Codes

The following table describes the meaning of the halt codes as indicated by the LEDs.

Note: The software modules in the following table are defined as follows:

- Boot Block is a software module that contains initialization routines, which include Preferred and Alternate Boot Page validation.
- MPOST is manufacturing POST and is for testing the motherboard.
- Preferred Boot Page is the preferred runtime start-up code.
- Alternate Boot Page is the safe (or backup) start-up code. Both the Preferred Boot Page and the Alternate Boot Page are alternately updateable in the field. The Alternate Boot Page should ensure that the Slammer can start up even when the Preferred Boot Page is corrupted.

Table 78 Slammer LED halt codes

Code			Software module	Meaning
F	A	S		
0	0	0	Boot Block	CPU did not start to fetch code yet.
0	5	6		The Slammer control unit (CU) PROM has completed startup diagnostics and is waiting for the software to be downloaded from the Pilot.
1	0	2		Ready to initialize memory.
1	1	0		Installed memory is unsupported.
1	0	3		Ready to initialize DQS settings.
1	1	1		Simple memory test failed.
1	0	4		Ready to check preferred boot page CRC. If CRC is OK, control transfers to preferred boot page; otherwise, alternate boot page CRC is checked. If CRC is OK, control transfers to alternate boot page; otherwise, start-up will fail.

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Table 78 Slammer LED halt codes (continued)

Code			Software module	Meaning
F	A	S		
1	1	2		Boot page CRC failed.
1	6	3		Starting up from alternate boot page.
1	6	2		Start-up failed - both boot pages failed their CRC checks.
1	1	3		Shadow RAM failed.
2	4	2	MPOST/Monitor	MPOST is ready to load.
2	3	6		Ready to start loader monitor.
2	4	0		Ready to continue starting up after loader monitor.
2	0	0	Preferred or Alternate Boot Page	Current boot page started to execute.
2	0	4		Ready to initialize IDT.
2	0	6		Ready to initialize NMI handler.
2	1	0		Ready to initialize COM1 serial port.
2	1	2		Ready to initialize CMS hardware.
2	1	4		Ready to initialize fan controller.
2	1	6		Ready to start CPU 2.
2	0	2		Prepare to reset CPU 1 to reconfigure CPU 2.
2	3	0		Ready to initialize PCI devices.
2	4	4		Ready to check memory configuration.
2	4	6		Current memory configuration does not match configuration in EEPROM.
2	5	0		Current memory configuration does not match initial configuration in CMOS.

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Table 78 Slammer LED halt codes (continued)

Code			Software module	Meaning
F	A	S		
2	5	2		Memory DIMMs are different.
2	5	4		Failed to read memory configuration from EEPROM.
2	5	6		Ready to do full memory test.
2	6	0		Full memory test failed.
3	6	6		Exiting Loader; entering netboot.
3	X	X		LED startup progress code reserved for the OS (where X is not 6).

Once the Slammer reaches state 3XX, where the FLT LED is blinking slowly, all further control of the startup process is managed by the Pilot. When the Pilot assumes control of the Slammer, the status LED begins blinking slowly amber until the software components are all successfully brought online.

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APPENDIX D

Pillar Axiom Component Power Consumption

About Component Power Consumption

Pillar Axiom storage systems use one of the following:

- 115 V or 230 V single-phase power that two or four power distribution units (PDUs) supply
- 208 V three-phase (USA) wye power that two PDUs supply (30 A rating)
- 400 V three-phase (Europe) wye power that two PDUs supply (16 A rating)

  Important! Attach each PDU to a dedicated supply.

About Single-Phase PDUs

Single-phase (115 V or 230 V) PDUs have 16 power outlets. These outlets are organized into two groups of eight where each group is controlled by its own circuit breaker (CB):

- For CB 1, all eight outlets are located at the back of the PDU.
- For CB 2, four outlets are located at the back of the PDU and four are located at the front, next to the circuit breakers.

Each circuit can carry the following current loads:

- 20 A (EU 16 A) service
- 30 A (EU 24 A) service

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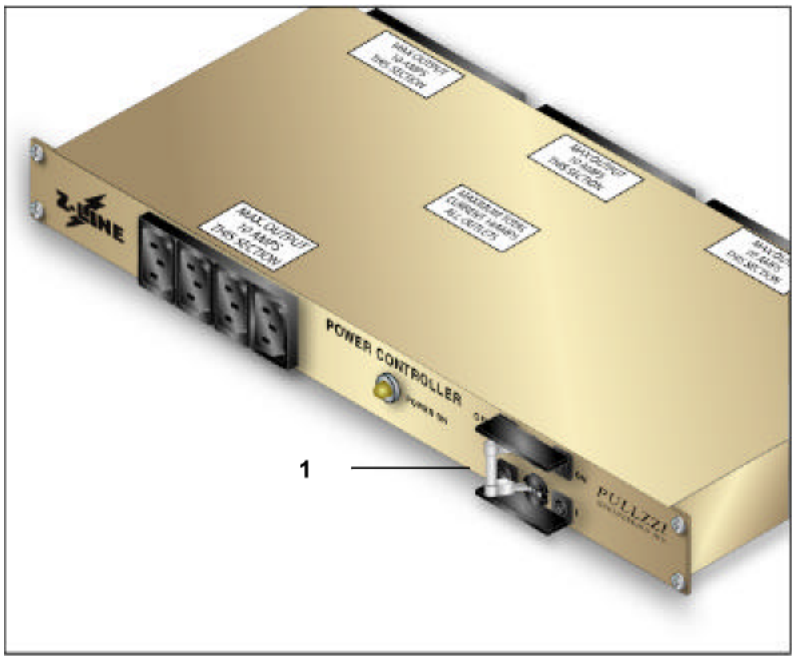
Figure 68 Single-phase 20 A PDU circuit breakers (front view)



Legend

1 CB 1 and CB 2 are controlled by a single switch.

The following figure shows the distribution of the twelve outlets on the back of the PDU across the two circuit breakers.

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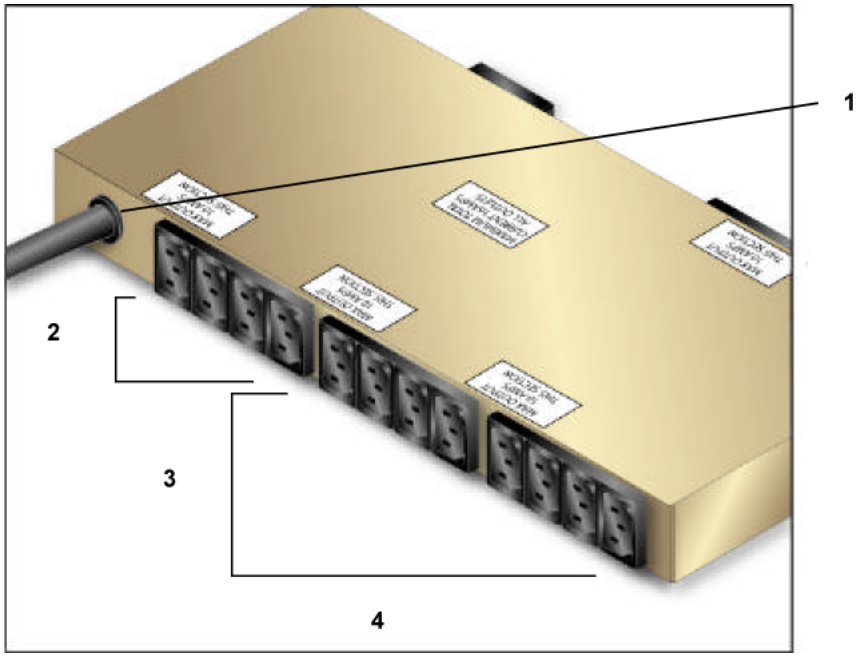
Figure 69 Single-phase 20 A PDU outlet distribution (back view)



Legend

1 Power inlet
2 CB 2
3 CB 1
4 CB 2 also switches four additional outlets on the front of the PDU.

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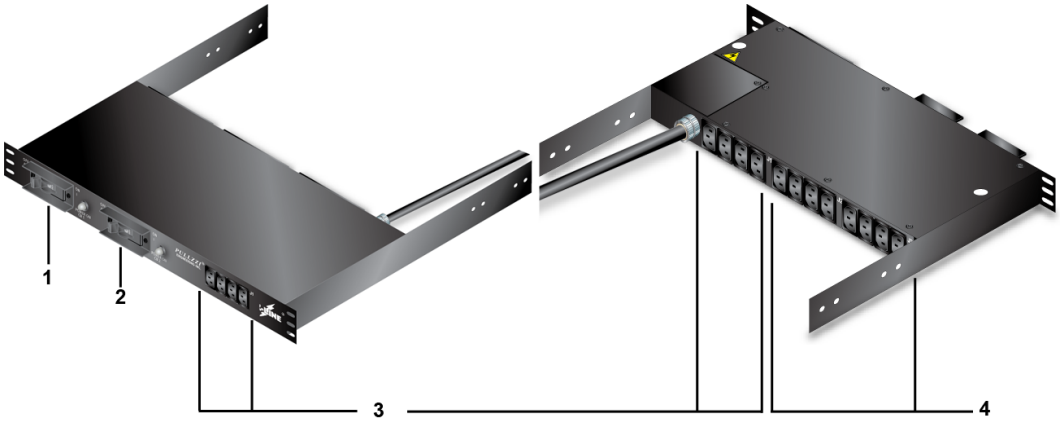
Figure 70 Single-phase 30 A PDU circuit breakers and outlets



Legend

1 Switch for circuit breaker 1
2 Switch for circuit breaker 2
3 Plugs controlled by circuit breaker 2
4 Plugs controlled by circuit breaker 1

Single-phase PDUs operate in pairs: two for a small system and four for a fully populated rack.

About Three-Phase PDUs

Three-phase (208 V, 30 A) PDUs have 24 power outlets. Each outlet supplies 115 V, 10 A service.

Each phase is protected by a 20 A circuit breaker, which has a 16 A rating. The phase circuit breakers switch on and off at the same time.

Three-phase Pillar Axiom storage systems use a pair of three-phase PDUs.

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About PDU Connections

For simplicity, all illustrations in the following cabling sections show half of the PDUs and associated cabling. The other half provides redundant power and is cabled in an identical way.

About Cabling 115 V Single-Phase PDUs

Pillar Axiom systems that have a single pair of 115 V, 20 A single-phase PDUs can support:

- The Pilot
- One Slammer
- Three Bricks

Systems with only a single pair of 115 V, 20 A PDUs can support a second Slammer by replacing the three Bricks.

The following figure shows the power cable configuration for a two-PDU (115 V, 20 A) system. The red and blue lines represent the redundant power supplies on the components connected to the separate PDUs that are connected to separate power circuits.

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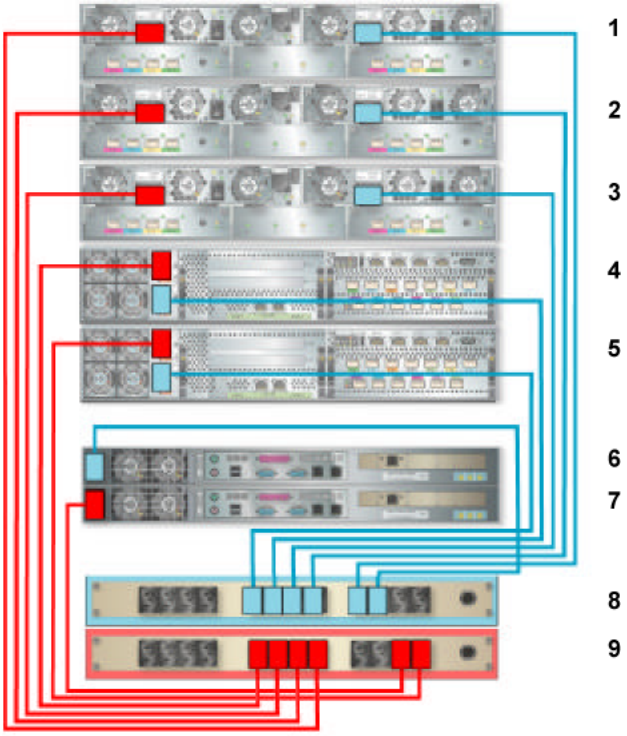
Figure 71 PDU connections for 115 V, 20 A power (two PDUs)



Legend

1 Brick 3	6 Pilot CU 0
2 Brick 2	7 Pilot CU 1
3 Brick 1	8 PDU 2
4 Slammer 1 CU 0	9 PDU 1
5 Slammer 1 CU 1	

A 115 V, 20 A system with a second pair of PDUs supports six additional Bricks in a Pillar Axiom 500 system. The next figure shows the additional cable configuration for a four-PDU (115 V, 20 A) system. It shows half of the power cables. A fully cabled, 115 V, 20 A, four-PDU system connects the redundant power cables to PDU 4 in a similar pattern.

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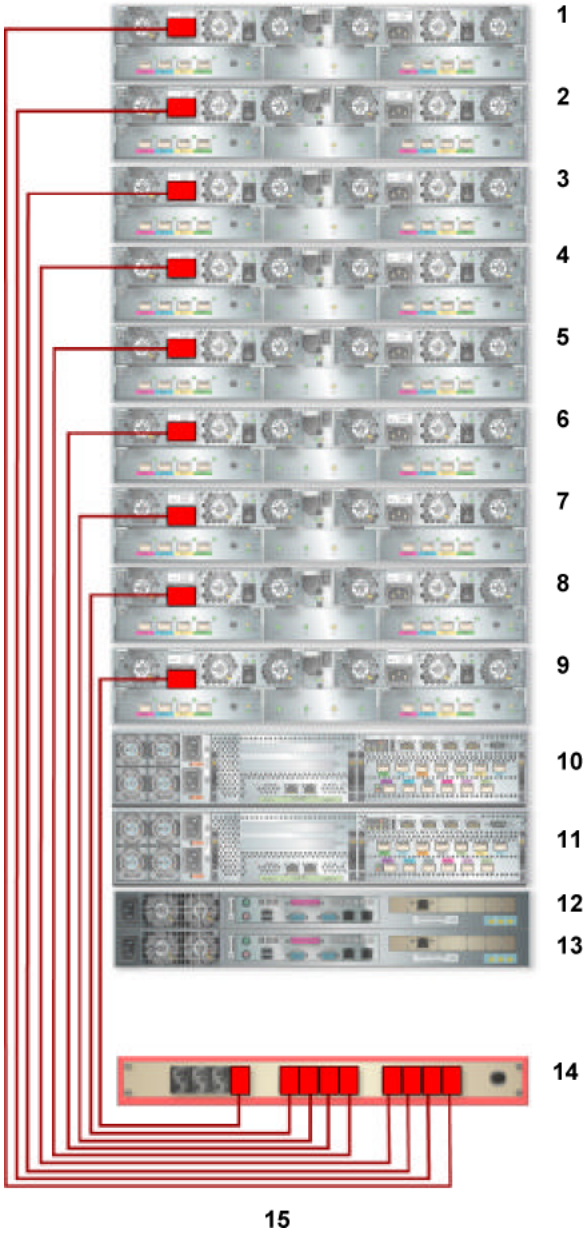
Figure 72 PDU connections for 115 V, 20 A power (four PDUs)



Legend

1 Brick 9	8 Brick 2
2 Brick 8	9 Brick 1
3 Brick 7	10 Slammer 1 CU 0
4 Brick 6	11 Slammer 1 CU 1
5 Brick 5	12 Pilot CU 0
6 Brick 4	13 Pilot CU 1
7 Brick 3	14 PDU 3

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Note: For 115 V, 30 A service, see Component Configuration Limits for Single-Phase Service.

About Cabling 230 V Single-Phase PDUs

Pillar Axiom systems that have a single pair of 230 V, 30 A single-phase PDUs can support:

- The Pilot
- One Slammer and four Bricks
- One of the following configurations:
  - One Slammer and thirteen Bricks
  - Two Slammers and eleven Bricks

  Important! For installations outside the United States of America, the limit is six Bricks per single-phase PDU (and six Bricks per phase in a three-phase PDU).

When you add a second set of PDUs into the rack, because the rack is already nearly full, you can add only two additional Bricks.

If, however, you install this set of 230 V, 30 A PDUs in a second 42 U rack, these additional PDUs can power up to 16 Bricks. In this case, you should balance the power load across the circuits.

The following figure shows the power cable configuration for a two-PDU (230 V, 30 A) system. It shows half of the power cables. A fully cabled, 230 V, 30 A, two-PDU system connects the redundant power cables to PDU 2 in a similar pattern. The red and blue lines are used for clarity.

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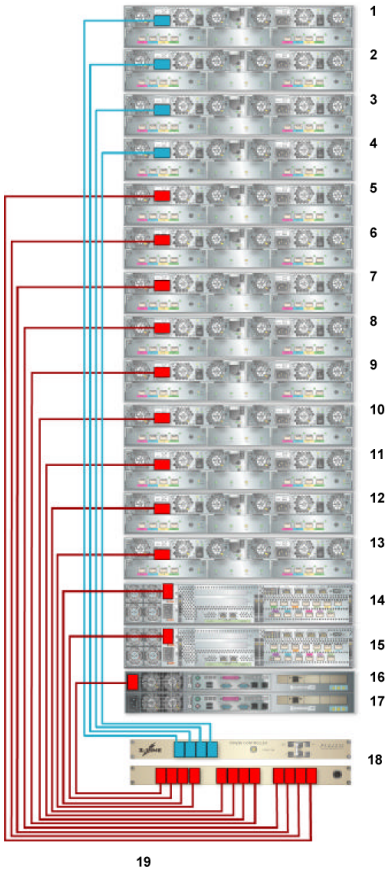
Figure 73 PDU connections for 230 V, 30 A power (two PDUs)



Legend

1 Brick 13	10 Brick 4
2 Brick 12	11 Brick 3
3 Brick 11	12 Brick 2
4 Brick 10	13 Brick 1
5 Brick 9	14 Slammer 1 CU 0
6 Brick 8	15 Slammer 1 CU 1
7 Brick 7	16 Pilot CU 0
8 Brick 6	17 Pilot CU 1
9 Brick 5	18 PDU 1

The following figure shows half of the power cables. A fully cabled, 230 V, 30 A, two-PDU system connects the redundant power cables to PDU 2 in a similar pattern.

Note: For 230 V, 20 A service, see Component Configuration Limits for Single-Phase Service.

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About Cabling 208 V Three-Phase PDUs

Pillar Axiom systems that have a pair of 208 V, 30 A three-phase PDUs can support:

- The Pilot
- One Slammer
- 16 Bricks

Note: Three-phase PDUs are supported only in the USA.

Important! For fewer than 13 Bricks, be sure to balance the load across the three phases.

To add a second Slammer, replace two Bricks that are plugged into phase A and phase C.

The following figure shows the power cable configuration for a two-PDU, 208 V, 30 A, three-phase system. It shows half of the power cables. A fully cabled, 208 V, 30 A, two-PDU system connects the redundant power cables to PDU 2 in a similar pattern.

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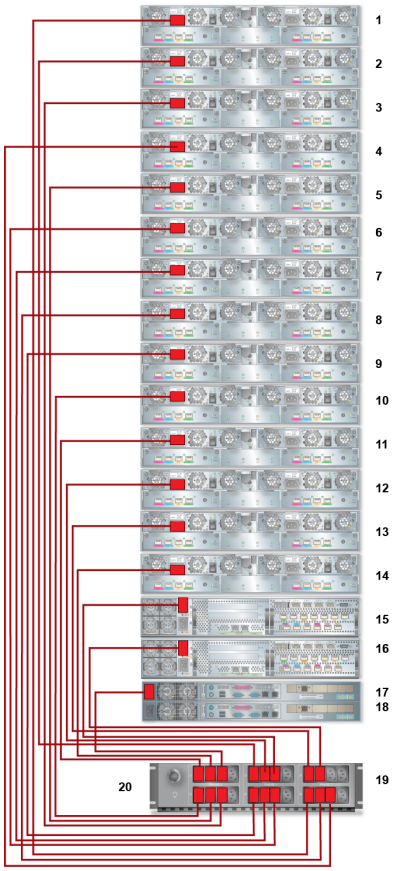
Figure 74 PDU connections for 208 V, 30 A power (two PDUs)



Legend

1 Brick 14	11 Brick 4
2 Brick 13	12 Brick 3
3 Brick 12	13 Brick 2
4 Brick 11	14 Brick 1
5 Brick 10	15 Slammer 1 CU 0
6 Brick 9	16 Slammer 1 CU 1
7 Brick 8	17 Pilot CU 0
8 Brick 7	18 Pilot CU 1
9 Brick 6	19 PDU 1
10 Brick 5	

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Component Configuration Limits for Single-Phase Service

The following tables indicate the maximum numbers of Bricks that a particular configuration of single-phase PDUs and Slammers can support. These tables also summarize the current and power that each configuration draws and consumes.

Note: All systems include one Pilot.

Table 79 System configuration limits for 20 A service

Service voltage, AC	Number of PDUs	Number of Slammers	Maximum number of Bricks	Current required (amps)	Power consumed (watts)
115	2	1	3	16.00	1671
	4	1	9	32.00	3273
		2	6	30.40	3192
230	2	1	9	15.07	3273
		2	7	15.81	3459
	4	1	22	31.06	6774
		2	20	31.8	6930

Note: For 115 V, 20 A service, UL allows no more than 16 A per PDU. This restriction limits the configuration of a two-PDU system to one Slammer and three Bricks. For 230 V, 30 A service, the configuration is limited only by the PDU plug capacity.

Table 80 System configuration limits for 30 A service

Service voltage, AC	Number of PDUs	Number of Slammers	Maximum number of Bricks	Current required (amps)	Power consumed (watts)
115	2	1	6	24.00	2472
		2	3	22.40	2391

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Table 80 System configuration limits for 30 A service (continued)

Service voltage, AC	Number of PDUs	Number of Slammers	Maximum number of Bricks	Current required (amps)	Power consumed (watts)
	4	1	14	45.34	4608
		2	12	46.40	4794
230	2	1	13	19.99	4341
		2	11	20.73	4527
	4	1	29	39.67	8613
		2	27	40.41	8799

Note: This table lists more Bricks than will fit in a single 42 U rack.

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APPENDIX E

Return a Failed Component

About Failed Component Returns

The Return Material Authorization (RMA) process is the mechanism you use to get replacement parts for those that have failed during their warranty or support period.

Pillar Data Systems uses an Advance Exchange program. Under this program, Pillar ships a replacement component to the customer before the failed component reaches Pillar Data Systems. There is no cost to you as long as the defective component is returned within 10 calendar days.

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Return a Defective FRU

Carefully follow these instructions to ensure the safe and timely return of your defective material.

1 Locate and remove the prepaid return label from the replacement shipping package.

Note: In some cases, the return label may be included in the plastic waybill pouch on the exterior of the package.

2 Repackage the defective component using the packing material in which the replacement component was shipped.

3 Seal the package with standard packing tape appropriate for commercial freight.

4 Attach the self-adhesive, prepaid return label to the package so that it covers the previous address.

Note: Place return labels that are not self-adhesive in the plastic waybill pouch so that the address of Pillar Data Systems is clearly visible.

5 Record the Service Request (SR) Number in the space provided on the original package label.

6 Contact the freight carrier indicated on the return label to arrange for pick-up of the return material.

Direct questions or issues regarding return material to support@pillardata.com or call 1-877-474-5527 (USA domestic only).

ATTN: RMA Coordinator
CS Operations Material Return
Pillar Data Systems
2840 Junction Avenue
San Jose, CA 95134

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APPENDIX F

Pillar Axiom Hardware Specifications

About Hardware Specifications

Hardware specifications (sometimes called data sheets):

- Describe the system's operating environment.
- List the agency approvals.
- List physical attributes of the Pillar Axiom storage system and its hardware components.

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About Pillar Axiom Hardware Specifications

A Pillar Axiom storage system is an assembly of the following components, all of which are described in this appendix:

- One Pilot management controller. See About Pilot Hardware Specifications.
- One to four Slammer storage controllers. See About Slammer Hardware Specification.
- One to 64 Brick storage enclosures. See About Brick Hardware Specification.
- One to four PDUs per rack, the number of which depends on power inlet characteristics and the number of components in each rack. See Pillar Axiom PDU Hardware Specification.
- One to four 42U racks, the number of which depends on the configuration of Slammers and Bricks. See Pillar Rack Hardware Specification.

A Pillar Axiom storage system has the characteristics that are described on the following pages.

System Power Requirements

Pillar Axiom storage systems require one of the power inputs shown below. The voltage and frequency show minimum and maximum values.

- 100-120 V, 47-63 Hz, 20 A
- 200-240 V, 47-63 Hz, 20 A
- 100-120 V, 47-63 Hz, 30 A
- 200-240 V, 47-63 Hz, 30 A
- 230 V, 16 A or 32 A (Europe)
- Wye-connected 3-phase:
  - USA: 199-217 V, 47-63 Hz, 30 A
  - Europe: 380-415 V, 47-63 Hz, 16 A

The total power required by a rack depends on the number and type of hardware that is in the rack.

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System Environmentals

Table 81 System altitude specifications

Mode	Elevation
Operational	-200 to 10,000 ft (-61 to 3048 m)
Non-operational	-200 to 40,000 ft (-61 to 12,192 m)

Table 82 System temperature and humidity specifications

Mode	Temperature	Non-condensing humidity	Max wet bulb temperature	Gradient
Operational	+41 to 104°F (5 to 40°C) up to 7000 ft	10–85% 10%/hr gradient	86°F (30°C)	36°F/hr (20°C/hr)
Non-operational	-40 to 158°F (-40 to 70°C)	5–95% 10%/hr gradient	104°F (40°C)	54°F/hr (30°C/hr)

Note: For Bricks that have five-platter disk drives, the maximum ambient operational temperature from 7000 ft to 10,000 ft is 95°F (35°C).

Pillar Axiom Acoustics

Acoustics for a Pillar Axiom system that comprises the following components were tested to ISO 7779 by standard specifications:

- One Pilot
- One NAS Slammer
- Three Bricks

Such a system generates an acoustic level that is no greater than 70 dBA.

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Table 83 System acoustics specification

Acoustic level (tested to ISO7779)
Does not exceed 6.5 Bels under normal conditions, which is: • 73.4°F (23°C) ambient • All fans operational • No fault conditions The acoustic level will increase under fault conditions.

System Random Vibration Specifications

Table 84 System random vibration specifications

Mode	Force	Frequency	Time
Operational	0.1 G RMS	3–100 hz (X, Y, and Z axis)	15 min
Non-operational	Administered using the Telcordia GR-63 CORE test specifications. Tested with the rack inside a shipping crate.		

System Regulatory Agency Compliance

Agency approvals are based on a Pillar Axiom system that consists of:

- One Pilot
- Two Slammers
- Twelve Bricks

This section identifies:

- Regulatory Agency Compliances
- FCC Warning Statement
- European Union Compliance Statement

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Regulatory Agency Compliances

The Pillar Axiom storage system complies with the following regulatory agency requirements.

Table 85 Safety, quality, and environmental standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15. Operation is subject to the following two conditions: 1 This device may not cause harmful interference. 2 This device must accept any interference that may be received, including interference that may cause undesired operation.
	CB Scheme by IECEE standard IEC 60950, First Edition
CE	Conformite Europeenne /DoC
c UL us	UL and CSA under UL (cUL)
	TUV/GS
	Pillar Data Systems offers customers a recycle program to properly dispose of surplus products and products that have reached their end of life. Equipment that is returned to Pillar through this program is disposed of in an environmentally safe manner using processes that comply with the WEEE (EU Directive on Waste Electrical and Electronic Equipment) regulations. Pillar provides (on request) documentation about product disposition when the recycling process is complete. Upon request, Pillar also provides a Certificate of Destruction, which releases the customer from further liability for the equipment returned through the Recycle program. Customers should contact Pillar Customer Service for information on the logistics and location(s) of the approved recycle facilities.

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Table 85 Safety, quality, and environmental standards (continued)

Logo	Standard
RoHS COMPLIANT 2002/95/EC	Pillar Data Systems objectives are to ensure that our high product quality and reliability standards are met through the processes that have been verified and approved. This is achieved through ISO 9001:2000 and the development and deployment of Pb-free solder qualification guidelines for components (RoHS), interconnects, and PCB, PCA reliability. Pillar will continue to work with industry consortia to define common qualification criteria. Pillar will apply Pb-free solder technologies to product designs as required by legislation.
	ISO 9001:2000 Registered manufacturing process

FCC Warning Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

You can determine if your equipment causes interference by turning it off. If the interference stops, it was probably caused by the equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.
- Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits that are controlled by different circuit breakers or fuses.)

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CAUTION Changes or modifications that are not expressly approved by the party that is responsible for compliance could void the user's authority to operate the equipment.

European Union Compliance Statement

This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electro-magnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements that result from a non-recommended modification of the product.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The Limits for Class A equipment were derived for residential environments to provide reasonable protection against interference with licensed communication equipment.

A Declaration of Conformity with the requirements of the Directive has been signed by Pillar Data Systems, 2840 Junction Avenue, San Jose, CA 95134.

The following standards were applied:

1. Emissions: EN55022 (Class A radiated and conducted, 110 V, 240 V)
2. EMC: EN55024 (immunity):
   - EN 61000-3-2
   - EN 61000-3-3
   - EN 61000-4-2 ESD:±4 kV contact,±8 kV air touch
   - EN 61000-4-3 Radiated immunity (within the limits that are listed in our technical specifications)
   - EN 61000-4-4 Electrical fast transients/burst:±1 kV AC,±0.5 kV I/O
   - EN 61000-4-5 Surges ±1 kV differential mode,±2 kV common mode
   - EN 61000-4-6 Conducted immunity: 3 V
   - EN 61000-4-11 Supply dips and interruptions: 30% and 100%

System Packaging and Transportation

Packaging meets the following requirements:

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- For packages under 150 lb—International Safe Transit Association (ISTA 2A) Procedures 1 and 2.
- For packages over 150 lb—Network Equipment Building System (NEBS) core standards.

  GR-63-CORE, Packaged Equipment Shock (4.3.1), Office Vibration (4.4.3) and Transportation Vibration (4.4.4).

System Warranty

Hardware components in a Pillar Axiom storage system are covered by a three-year warranty.

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About Pilot Hardware Specifications

A Pilot is an active management and provisioning front end as well as the administrator interface to a Pillar Axiom storage system.

Pilot Dimensions and Weight

Table 86 Pilot dimensions and weight (both control units)

Attribute	Value
Height	3.5 in (8.9 cm); 2U
Width	17.7 in (45.0 cm)
Depth	20-26 in (50.8-66.0 cm)
Weight	40 lb (18.1 kg)

Pilot Power Characteristics

Table 87 Pilot power characteristics (per control unit)

Power characteristic	Value
Frequency	47 to 63 Hz
AC voltage	100 to 240 V
Current draw	1.5 A at 115 V 0.8 A at 230 V
Max power consumption	143 VA
Max heat dissipation	750 BTU/hr
AC plug type	2 IEC 320 connection

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Pilot Regulatory Agency Compliance

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is may cause harmful interference, in which case the user must correct the interference at his own expense.

[other] The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

[other] Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

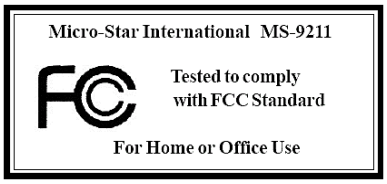

Table 88 Pilot safety and quality standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15 for a class B digital device.
CE	Conformite Europeenne /DoC

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Pilot Packaging and Transportation

Pilot packaging meets the following requirements:

- For packages under 150 lb—International Safe Transit Association (ISTA 2A) Procedures 1 and 2.
- For packages over 150 lb—Network Equipment Building System (NEBS) core standards.

  GR-63-CORE, Packaged Equipment Shock (4.3.1), Office Vibration (4.4.3) and Transportation Vibration (4.4.4).

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About Slammer Hardware Specification

Slammers are fully redundant controllers within a Pillar Axiom storage system. A Slammer can be ordered as either a SAN or a NAS front end.

Slammer Dimensions and Weight

Table 89 Slammer dimensions and weight

Attribute	Value
Height	7 in (17.78 cm); 4U
Width	17.72 in (45 cm)
Depth	26 in (66 cm)
Weight	100 lb (45.4 kg)

Slammer Power Characteristics

Table 90 Slammer power characteristics

Power characteristic	Value
Frequency	47 to 63 Hz
AC voltage	100–120 V to 200–240 V
Max power consumption	685 VA
Current draw (combined for both control units)	6.1 A at 115 V 3.2 A at 230 V
Max heat dissipation	2220 BTU/hr
AC plug type	Four IEC 320 C13 connection

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Slammer Regulatory Agency Compliance

Pillar Axiom Slammers comply with the following regulatory agency requirements.

Table 91 Slammer safety and quality standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15. Operation is subject to the following two conditions: 1 This device may not cause harmful interference and 2 This device must accept any interference that maybe received, including interference that may cause undesired operation.
	CB Scheme by IECEE standard IEC 60950, Third Edition (1999)
CE	Conformite Europeenne /DoC
c UL us	UL and CSA under UL (cUL)
	TUV/GS
	ISO 9001:2000 Registered manufacturing process

Table 92 Slammer EM emissions and immunity

Standard

• CISPR 22-A
• EN55022 Class A radiated and conducted emissions (110 V, 220 V)
• EN55024 Immunity:
  • EN 61000-3-2
  • EN 61000-3-3
  • EN 61000-4-2 ESD: ±4 kV contact, ±8 kV air
  • EN 61000-4-3 Radiated immunity (within the limits that are listed in our technical specifications)
  • EN 61000-4-4 Electrical fast transients/burst: ±1 kV AC, ±0.5 kV I/O
  • EN 61000-4-5 Surges ±1 kV differential mode, ±2 kV common mode

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Table 92 Slammer EM emissions and immunity (continued)

Standard
• EN 61000-4-6 Conducted immunity: 3 V • EN 61000-4-8 • EN 61000-4-11 Supply dips and interruptions: 30% and 100%

Slammer Packaging and Transportation

Packaging meets the following requirements:

- For packages under 150 lb—International Safe Transit Association (ISTA 2A) Procedures 1 and 2.
- For packages over 150 lb—Network Equipment Building System (NEBS) core standards.

  GR-63-CORE, Packaged Equipment Shock (4.3.1), Office Vibration (4.4.3) and Transportation Vibration (4.4.4).

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About Brick Hardware Specification

A Brick is a high-performance disk subsystem with an optimized, proprietary RAID controller.

Brick Dimensions and Weight

Table 93 Brick dimensions and weight

Attribute	Value
Height	3.5 in (8.89 cm); 2U
Width	17.72 in (45 cm)
Depth	22 in (55.88 cm)
Weight (SATA) Weight (FC)	65 lb (29.5 kg) 70 lb (31.8kg)

Brick Power Characteristics

Table 94 Brick power characteristics

Power characteristic	Value
Frequency	47 to 63 Hz
AC voltage	100–120 V to 200–240 V
Max power consumption (SATA) Max power consumption (FC)	267 VA 330 VA
Current draw (SATA) Current draw (FC)	2.55 to 1.17 A at 115 or 230 V 3.35 to 1.49 A at 115 or 230 V
Max heat dissipation	1370 BTU/hr
AC plug type	Two IEC 320 connections

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Brick Regulatory Agency Compliance

Pillar Axiom Bricks comply with the following regulatory agency requirements.

Table 95 Brick safety and quality standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15. Operation is subject to the following two conditions: 1 This device may not cause harmful interference and 2 This device must accept any interference that maybe received, including interference that may cause undesired operation.
	CB Scheme by IECEE standard IEC 60950, Third Edition (1999)
CE	Conformite Europeenne /DoC
c UL us	UL and CSA under UL (cUL)
TUV Rheinland of North America Inc. US	TUV/GS
	ISO 9001:2000 Registered manufacturing process

Table 96 Pillar Axiom EM emissions and immunity

Standard

• CISPR 22-A
• EN55022 Class A radiated and conducted emissions (110 V, 220 V)
• EN55024 Immunity:
  • EN 61000-3-2
  • EN 61000-3-3
  • EN 61000-4-2 ESD: ±4 kV contact, ±8 kV air
  • EN 61000-4-3 Radiated immunity (within the limits that are listed in our technical specifications)
  • EN 61000-4-4 Electrical fast transients/burst: ±1 kV AC, ±0.5 kV I/O

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Table 96 Pillar Axiom EM emissions and immunity (continued)

Standard
• EN 61000-4-5 Surges ±1 kV differential mode, ±2 kV common mode • EN 61000-4-6 Conducted immunity: 3 V • EN 61000-4-11 Supply dips and interruptions: 30% and 100%

Brick Packaging and Transportation

Packaging meets the following requirements:

- For packages under 150 lb—International Safe Transit Association (ISTA 2A) Procedures 1 and 2.
- For packages over 150 lb—Network Equipment Building System (NEBS) core standards.

  GR-63-CORE, Packaged Equipment Shock (4.3.1), Office Vibration (4.4.3) and Transportation Vibration (4.4.4)

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Pillar Axiom PDU Hardware Specification

If you install non-Pillar PDUs, they must meet the Pillar Data Systems PDU specification, as outlined below.

Table 97 PDU specifications

Criteria	20 amp single-phase	30 amp single-phase	3-phase
Form factor	EIA Rack Mountable 1 U high (1.75 in, 4.45 cm) < 8 in (20.3 cm) deep	EIA Rack Mountable 1 U high (1.75 in, 4.45 cm) < 8 in (20.3 cm) deep	EIA Rack Mountable 2 U high (3.5 in, 8.9 cm) 9.5 in (24.13 cm) deep
Receptacles IEC 60320	C13, 12 receptacles min. Mounted on rear of chassis (opposite circuit breakers).	C13, 12 receptacles min. Mounted on rear of chassis (opposite circuit breakers).	C13, 24 receptacles (8 per phase) min. Mounted on back of chassis (opposite circuit breakers).
Inlet cable	15 ft (4.572 m) min Plug options: L6-20P, L5-20P	15 ft (4.572 m) min Plug options: L6-30P, L5-30P	15 ft (4.572 m) min NEMA L21-30P
Voltage input	100–240 VAC	100–240 VAC	120-208 VAC 3-phase
Voltage output	100–240 VAC	100–240 VAC	120 VAC 1-phase
Circuit breakers (CB)	Two, 10 A ea. Each circuit breaker controls half of the outlet receptacles.	Two, 15 A ea. Each circuit breaker controls half of the outlet receptacles.	One main, 30 A Three secondary, 20 A each

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Table 97 PDU specifications (continued)

Criteria	20 amp single-phase	30 amp single-phase	3-phase
Receptacle retention device	All receptacles have a plug retention device.	All receptacles have a plug retention device.	All receptacles have a plug retention device.
Inlet cable retention device	If a detachable inlet cable is provided, a cable retention device is included.	NA	NA
EMI/RFI filter	Common Mode Insertion Loss 10 db @ 1 MHz, Differential Mode 30 db @ 1 MHz. MHz/db - .15/6, .50	Common Mode Insertion Loss 10 db @ 1 MHz, Differential Mode 30 db @ 1 MHz. MHz/db - .15/6, .50	Common mode insertion loss 25 db @ 1 MHz. Differential mode insertion loss 22 db @ 1 MHz. MHz/db - .15/6, .50
Surge suppression	270 VAC	320 VAC	275 VAC

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Pillar Rack Hardware Specification

A Pillar Axiom 42 U rack contains:

- One Pilot.
- One or two NAS or SAN Slammers.
- One to 16 Bricks. The exact number of Bricks depends on the number of Slammers in the rack.
- One to four power distribution units.

Table 98 Rack specifications for a Pillar Axiom system

Criteria	Pillar rack	Non-Pillar rack (minimum requirements)
Height (inside)	42 U 73.6 in (187 cm)	42 U to hold one Pilot, one or two Slammers, and up to 15 Bricks 18 U to hold one Pilot, one Slammer, and up to four Bricks 73.6 in (187 cm)
Width (inside)	17.7 in (45 cm)	• 19 in (48.26 cm) panel • 17.7 in (45 cm) rail-to-rail
Height (outside)	78.7 in (199.9 cm)	NA
Width	• 23.8 in (60.48 cm) overall • 17.7 in (45 cm) rail-to-rail • 19 in (48.26 cm) panel	NA
Depth (inside)	• 35 in (88.9 cm) • 26–30 in (66–76.2 cm) rail-to-rail	• 35 in (88.9 cm) overall • 26–30 in (66–76.2 cm) rail-to-rail
Front door	• Vented • Light-tint Plexiglas • 1.5 in (3.81 cm) deep • Lockable • Open left/right	• Vented • 1 in (2.54 cm) deep min. • 1 in (2.54 cm) clearance between front vertical channel and inside of frame

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Table 98 Rack specifications for a Pillar Axiom system (continued)

Criteria	Pillar rack	Non-Pillar rack (minimum requirements)
	• 1 in (2.54 cm) clearance between front vertical channel and inside of frame	
Rear door	• Vented • Lockable • Open left/right	Vented
Sides	• Solid • Removable • Lockable • 1 in (2.54 cm) between side and frame	NA
Vertical channels	• Square- or round-hole unthreaded • 26 in (66 cm) apart	• EIA spacing • Front-to-rear mounting • Cage nuts • Square or round EIA-standard mounting holes preferred
Vents	• Front and back doors • Top	• Front and back doors • Top
PDU	• 4 PDUs • 90–240 VAC, 50-60 Hz • 20-30 A • 42 C13 outlets • Horizontal mount	• Redundant power • 90–240 VAC, 50-60 Hz • 8350 watts1991 watts
Heat dissipation	28,500 BTU/hr6793 BTU/hr	28,500 BTU/hr6793 BTU/hr r
Frame gauge		12-14
Loaded weight	1505 lb (683 kg)730 lb (332 kg)	1505 lb (683 kg)730 lb (332 kg)
Topple angle when fully loaded and stationary	12° when front of rack faces downward 24° when rear of rack faces downward 24º when rear of rack faces downward	NA

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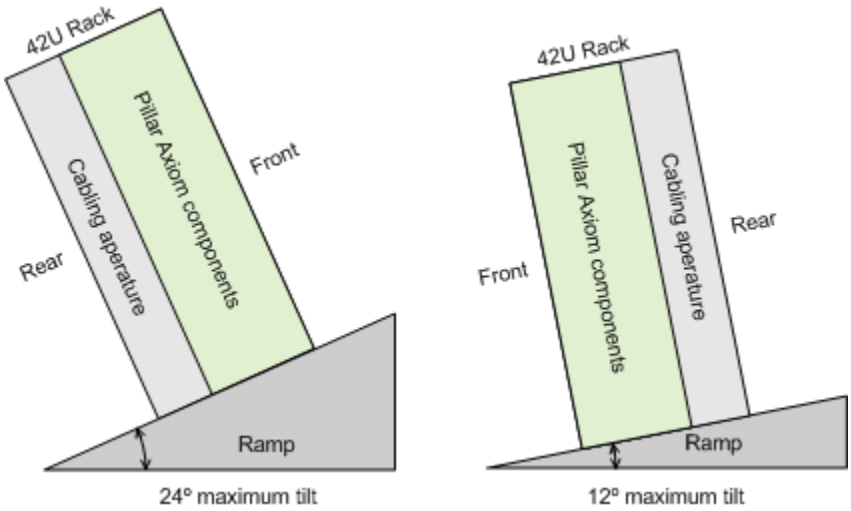
The center of gravity of a populated Pillar 42 U rack is toward the front. The threshhold tilt angle depends on whether the front or rear of the rack faces down the slope:

- Front faces downward: 12° maximum slope.
- Rear faces downward: 24° maximum slope.

Figure 75 Maximum tilt angles for stationary Pillar 42 U racks



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