Pillar Axiom

Service Guide

pillar™
DATA SYSTEMS

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Table of Contents

Chapter 3, Service the Pilot and Pilot FRUs

Chapter 4, Service the Slammer and Slammer FRUs

Appendix D, Slammer LED Startup Progress Codes

Appendix E, Axiom Component Power Consumption

Appendix F, Return a Failed Component

Appendix G, Hardware Specifications

List of Figures

List of Tables

CHAPTER 1

Introduction to Pillar Axiom Service Procedures

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.

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.

Warnings and Cautions

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

Safety Notice Conventions

This guide uses the following conventions for safety notices:

WARNING Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate 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 Axiom FRUs. See Safety Statements in Appendix A.

About Axiom Product Configurations

This guide explains how to replace the FRUs contained in the following Pillar Axiom 500 Series components:

Table 1 Pillar Axiom 500 Series components

Product name	Model
Brick	• BRX 500-160A7 • BRX 500-400A7
Slammer	• SLM 500
Pilot	• PLT 500
Power distribution unit (PDU)	• 115 V 1 ϕ • 230 V 1 ϕ • 208 V 3 ϕ
Filler panel	• 1 U • 2 U
Rack	• 42 U

Important! The only hardware supported on an Axiom system are Pillar-supplied parts. Hardware that does not conform to Pillar specifications or is not a Pillar-supplied part voids the warranty and may compromise data integrity.

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

Required Tools

Use the following tools to work with Axiom hardware components.

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.

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, which must be connected to a hard ground to be effective. We recommend that you remove components from their packaging and place them on an ESD-qualified table that is equipped with ground points for wrist straps.

- Static charges can build up rapidly on rolling carts. If a hardware component is transported by cart, the cart should be grounded by a drag chain on an ESD floor. If there is no ESD cart available or ESD floor, you should first ground yourself before you touch a component that has been transported on a cart.

Contact Information

Table 3 Contacts at Pillar Data Systems

For help with...	Contact...
• Error messages • Usage questions	Context-sensitive help that is available in the graphical user interface (GUI). support@pillardata.com. USA: 1.877.4PILLAR (1.877.474.5527)—request Technical Support at the prompt. International: +1.408.518.4400. Web: http://support.pillardata.com/. Have your system serial number ready.
• Implementation assistance • System information • Enhancement requests	sales@pillardata.com. USA: 1.877.4PILLAR (1.877.474.5527)—request Sales at the prompt. International: +1.408.503.4200.
Documentation improvements and resources	docs@pillardata.com. http://www.pillardata.com/techdocs/—log in with your username and password.

Service the Pillar Axiom Storage System

Introduction to System Service Procedures

Most service procedures require Guided Maintenance, which is accessed through the Axiom Storage Manager. This chapter:

- Tells you how to initiate Guided Maintenance.

- Provides service procedures to help you replace hardware components and field replaceable units (FRUs).

Initiate Guided Maintenance

To maintain or restore reliability to an Axiom system, you sometimes need to replace a hardware component. To replace a hardware component, you must use Guided Maintenance. You access Guided Maintenance through the Axiom Storage 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 the first. To initiate Guided Maintenance:

- Log In to the Graphical User Interface (GUI).

- Enter Guided Maintenance for the Target FRU.

Use Guided Maintenance to:

- Identify the Target FRU (Optional) that is to be replaced.

- Prepare the System for FRU Replacement.

- Replace the Target FRU.

- Fail Back the Control Unit (Optional). Perform this step if the Enable Automatic Recovery setting in Global Settings is not selected.

- Verify The Status of the Replacement FRU.

Log In to the Graphical User Interface (GUI)

To log in to the graphical user interface (GUI):

1 Start the browser software on your workstation.

2 Specify the 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.

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.

Enter Guided Maintenance for the Target FRU

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

When you enter Guided Maintenance, if the Enable Automatic Recovery option has been selected, Guided Maintenance warns you of that fact on the introductory page. This option is found in the Global Settings section of Axiom Storage Manager and is described in *Administrator's Help*.

When automatic recovery is enabled, Guided Maintenance will automatically fail back the target control unit (CU) after you replace the FRU. If you want to fail back the CU manually, de-select the Enable Automatic Recovery option before you continue with Guided Maintenance.

To enter Guided Maintenance:

1   Click the Health icon in the top context pane.

Figure 1 Hardware health

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 these options:

   • 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.

Identify the Target FRU (Optional)

This procedure is Step 1 of Guided Maintenance. If you 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.

Important! Axiom storage 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.

For Slammers, Guided Maintenance blinks all LEDs (except those for power supplies) to identify a target FRU. Both the Identify and Reverse Identify buttons are available for Slammers.

For Bricks, Guided Maintenance blinks all LEDs to identify the FRU except for the fault-related LEDs:

- 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.

Fault-related LEDs light solid amber.

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

To identify the target FRU:

1   Click the Identify button.

    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.

2   Choose one of these options:

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

    • Click the Close button to discontinue Guided Maintenance.

Prepare the System for FRU Replacement

This procedure is Step 2 of Guided Maintenance.

Before Guided Maintenance prompts you to replace a FRU, the Pillar Axiom system performs some preparatory steps. FRU replacement procedures explain what these steps are.

Note: In some replacement procedures, the software powers down one or both Slammer control units (CUs). The service technician can then safely unplug the CU power cords.

To prepare the system for FRU replacement:

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 Choose one of these options as appropriate:

- Click the Next button when Guided Maintenance enables it.

- If system preparation fails, Guided Maintenance reports the failure and provides an error description. Choose one of these options:

  - Click the Prepare button to attempt system preparation again.

    If system preparation fails a second time, contact Technical Support.

  - Click the Exit button to end the Guided Maintenance session.

4 When prompted, proceed with the appropriate FRU replacement procedure.

For a list of these procedures, see Table 4, [Pillar Axiom FRU replacement procedures](#).

Replace the Target FRU

This procedure is Step 3 of Guided Maintenance and is performed manually. Replacement procedures involve the removal of an existing FRU and the insertion of a replacement FRU.

[Table 4](#) lists the FRU replacement procedures that you can perform.

Table 4 Pillar Axiom FRU replacement procedures

Hardware component	Procedure
Pilot	[Replace Pilot Control Units]().
Slammer	[Replace Slammer Batteries]().
	[Replace Slammer Fan Modules]().
	[Replace Slammer Motherboard Trays]().
	[Replace Slammer Network Interface Modules]().
	[Replace Slammer Power Supplies]().
	[Replace Slammer Private Interconnect Modules]().
	[Replace Slammer PCI Cards]().
	[Replace Slammer Chassis]().
Brick	[Replace Brick Disk Drives]().
	[Replace Brick Power Supply / Fan Modules]().
	[Replace Brick RAID Controllers]().
	[Replace Brick ES Modules]().
	[Replace Brick Spare Disk Drives]().
	[Replace Brick Chassis]().

Fail Back the Control Unit (Optional)

If you have not selected Enable Automatic Recovery, this procedure becomes Step 4 of Guided Maintenance in which failback is manually controlled. However, if you have selected Enable Automatic Recovery, Guided Maintenance automatically fails back the target Slammer CU from its partner.

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

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

Verify The Status of the Replacement FRU

In all cases of FRU replacement (other than that for bezels), after you have replaced a FRU, Guided Maintenance:

- Displays the Verify page.

- Continually probes the FRU for its status.

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

Note: Guided Maintenance continues to probe for status until the Verify page is closed.

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

System-Wide Service Procedures

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

Back Up Data

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:

- Replace a Brick chassis.

  Important! Contact Technical Support so that a Brick backplane replacement can be tailored for your system.

- Clear the system configuration. This action requires an encrypted system key that Technical Support can supply. This action destroys access to all user and system data.

  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 one of these documents:

- The NDMP section of *Administrator's Help* and to the documentation for your NDMP-based backup application.

- The dump and restore sections of *Administrator's Guide to the CLI*. The request names are PerformDump and PerformRestore.

Remove Rack Doors

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

Figure 2 Sample 42U rack front door

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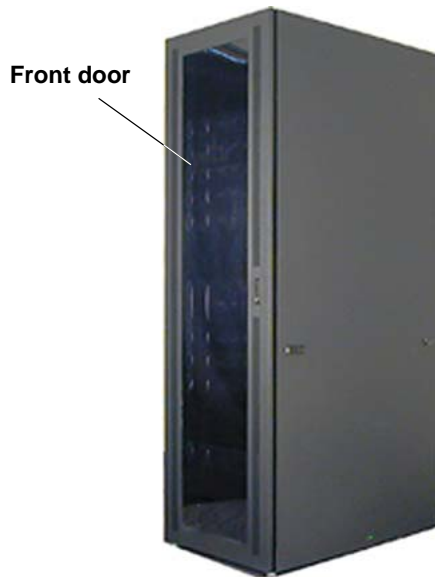
Front and back doors are hinged to the frame. These hinges can be of the following types:

Figure 3 Different types of rack door hinges

Squeeze the ends to release the hinge.

Pull down on the handle to unpin the hinge.

Pull up on the handle to unpin the hinge.
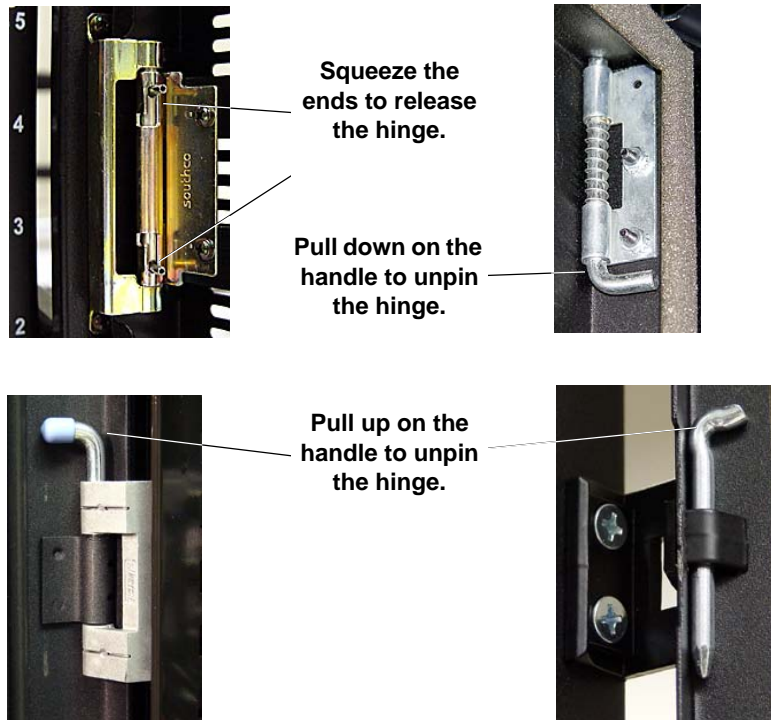
Important! After servicing a Pillar Axiom system, replace the doors and keep them closed; otherwise, compliance with FCC requirements cannot be assured.

To remove the doors from a rack:

1 If locked, unlock the front and back doors.

2 Disconnect the ground strap from each door.

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

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.

Remove Rack Side Panels

Removal of the side panels of a rack facilitates:

• The creation of a Pillar Axiom bay.

• The removal and replacement or addition of PDUs and component chassis.

• The cabling of residual Bricks in the second rack into the Storage System Fabric (SSF).

Figure 4 Sample 42 U side panels

Side panel,
1 each side

Latches
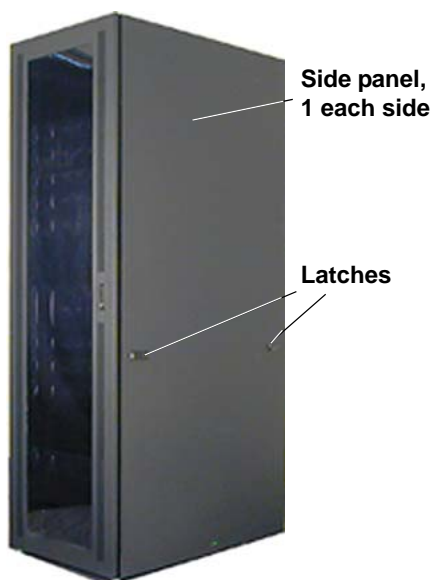
To remove a side panel from a rack:

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.

Attach the Rack Doors

To reattach the doors on a rack:

1   Get the rack's front and back doors.

2   Based on the type of door hinge, reassemble the hinges to reattach the doors.

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

See Figure 3, Different types of rack door hinges.

Attach the Rack Side Panels

To reattach the side panels on a rack:

1   Get the rack's two side panels.

2 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.

3 Secure the panel appropriately using one of the following options:

- Engage the latch handle(s) and snap the panel into place.

- Screw the panels to the rack frame at the top and bottom.

4 Lock both side panels (optional).

Service the Pilot and Pilot FRUs

Introduction to Pilot Service Procedures

Each control unit (CU) within a Pilot management controller contains:

- An operating system.

- Various Axiom applications.

  These applications include the graphical user interface (GUI), the command line interface (CLI), and Network Data Management Protocol (NDMP) and Simple Network Management Protocol (SNMP) support.

Pilot CU failure does not disrupt user data paths. User data paths are supported entirely by Slammers. Even if both CUs fail, the Axiom system continues to operate. If both CUs fail, the system simply has no management interface. In this condition, the Axiom system cannot:

- Respond to GUI or command line interface (CLI) requests.

- Change configuration.

- Cold start a CU.

- Notify administrators (through alerts) or Technical Support (through Call-Home messages) of the problem.

- Accept new hardware into the system.

- Run backups.

- Run automatically scheduled work such as scheduled snapshots.

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.

- Axiom Storage Manager displays a Failed status in the Health pages.

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 Axiom system is operational.

Table 5 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. 3 Remove a Pilot Control Unit. 4 Insert a Pilot Control Unit 5 Attach a Pilot Bezel.

Map of Pilot FRUs

Figure 5 illustrates the replaceable FRUs in a Pilot.

Figure 5 Schematic of replaceable Pilot FRUs
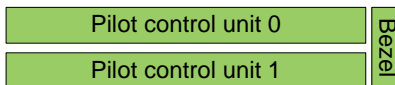
Pilot FRU Part Numbers

The table below lists the field replaceable units (FRUs) that are in an Axiom Pilot.

Table 6 Pilot FRUs

Part number	FRU description
1450-00072-00	Bezel
1450-00106-00	Pilot control unit (CU)

Replace Pilot Bezels

Pilot bezels can be replaced while the Pilot is operational.

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

CU 0   CU 1
LED   LED

To replace a Pilot bezel, perform the tasks that are outlined in [Table 7](#).

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

Guided Maintenance is not used to remove a Pilot bezel.

To remove a Pilot bezel:

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

Figure 7 Pilot bezel ejector tabs

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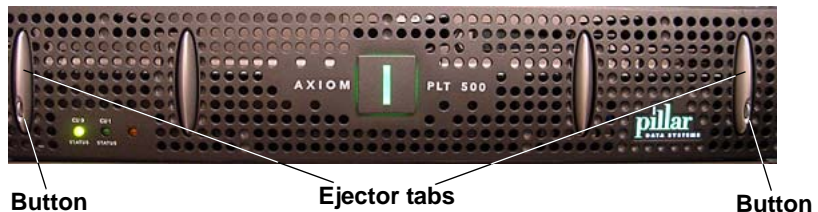
2 Lift each ejector tab at the same time to disengage the Pilot bezel from the rack mounts.

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.

5   Set the bezel aside.

Attach a Pilot Bezel

Guided Maintenance is not used to attach a Pilot bezel.

To attach a Pilot bezel:

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. When you attach the bezel, ensure that the arm swings freely and that the USB 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.

Replace Pilot Control Units

The administrator decides when to replace a Pilot. This decision is influenced by any or all of these notifications:

- Email

- Alerts

- Call-Home

The figure below shows a Pilot control unit (CU).

Figure 8 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 Table 8.

Table 8 Pilot CU replacement tasks

Task	Reason
1 Remove a Pilot Bezel.	To gain access to the Pilot control units (CUs).
2 Identify a Pilot Control Unit.	To locate the target Pilot CU.

Table 8 Pilot CU replacement tasks (continued)

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

Identify a Pilot Control Unit

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.

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

Figure 9 Disk drive LED on Pilot CU

Front panel

Disk drive LED
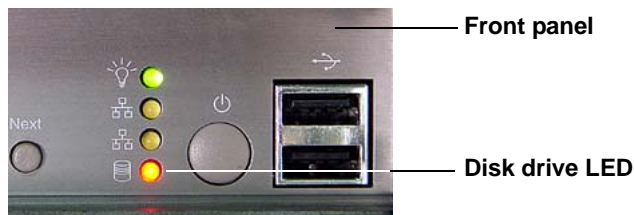
Note: The front panel displayed above is representative of a Pilot CU. The CU that is installed in your system may differ.

To 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.

5   Click the Finish button.

Remove a Pilot Control Unit

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.

To 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 (optional).

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

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

5 Detach the power cable from the target CU.

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

7 Grasp the bezel adapter flange and extract the CU.

Figure 10 Bezel adapter flange

Bezel
adapter
flange
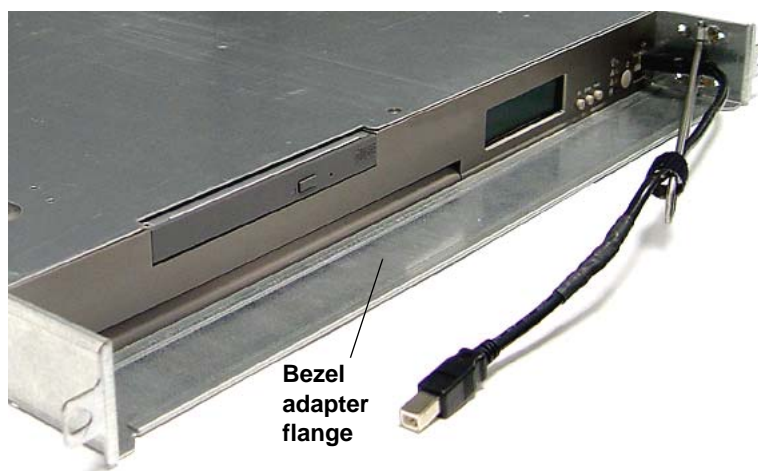
8 Set the Pilot CU aside.

Insert a Pilot Control Unit

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

- Public and private IP addresses

- Linux operating system

- Build number

- Pilot identity

When you cable the Pilot control unit (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 Table 80, FRU cable table reference, in Appendix C, Private Management Network and SSF Cable Reference. Before you refer to those tables, see Figure 5, Schematic of replaceable Pilot FRUs, to determine whether the replacement CU is CU 0 or CU 1. The cabling tables in Appendix C refer to these CU designations.

To insert a Pilot control unit (CU):

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 11 Pilot CU support brackets

Support bracket

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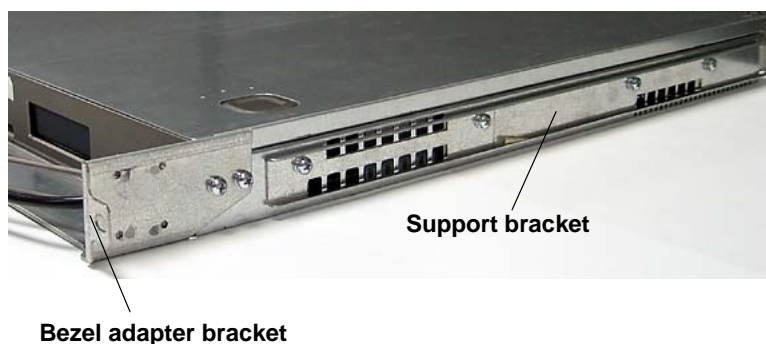
2   Slide the Pilot CU all the way in until the ears on the bezel adapter bracket seat against the rack rail ears.

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.

Important! To avoid system outage, contact Technical Support before connecting the private management Ethernet (CU 0 and CU 1) to the Slammers or performing a Restart System through the graphical user interface (GUI).

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

Important! If you replaced a single Pilot CU, make sure that the surviving CU has been powered on for at least one minute before you perform the next step. If you replaced both Pilot CUs at the same time:

- Power on the top replacement CU first.

- Wait for at least one minute.

- Power on the bottom replacement CU.

Powering up Pilot CUs in a staged manner avoids contention between them as to which is CU 0 and which is CU 1.

6   Attach the power cable to the CU.

7   Add the Pilot bezel.

Reset the Primary Password, Public IP, or Pilot Identity

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 use special recovery files to reset these parameters to their factory defaults:

- The 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 file(s). The figure below shows a USB key connected to a Pilot USB port.

Figure 12 USB key in a Pilot control unit
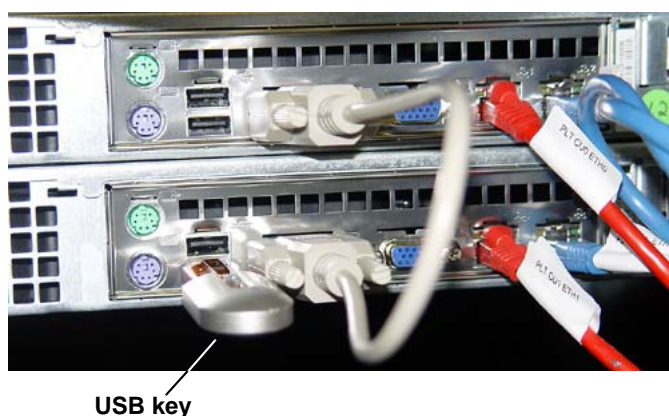
USB key

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

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.

To reset a configuration parameter:

1 Call Technical Support and describe the problem.

   Technical Support sends the appropriate text file to reset the configurations parameter(s).

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 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 control units 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 and the shared management IP will be set to 10.0.0.2. If the administrator account password is reset, it will be set to pillar.

CHAPTER 4

Service the Slammer and Slammer FRUs

Introduction to 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.

- Axiom Storage Manager displays a Failed status in the Health pages.

- One or more LEDs blink (except for power supply LEDs).

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. Others you can replace only after the CU has been powered down and power has been removed from the CU power supply inlets.

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 and powers down the affected CU gracefully. While you replace a target FRU, the partner CU continues to support all user data paths.

Important! If you need to power off a Slammer CU for more than 12 hours, remove its battery.

Table 9 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. The state can be normal, conservative mode, or failed over.

  Note: In conservative mode, the Axiom system does not depend on battery-backed memory in the target CU. The system flushes cached data and commits all disk writes to the storage array.

- Lists the replacement tasks for those FRUs.

Table 9 Slammer FRU replacement tasks

FRU	AC on?	Slammer state	Tasks
Battery	No	Target CU is in conservative mode	1 Identify the Target FRU (Optional). 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.
Chassis	No	System is down	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Chassis. 4 Insert a Slammer Chassis.
Fan module	Yes	Normal	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Bezel. 4 Remove a Slammer Fan Module. 5 Insert a Slammer Fan Module. 6 Attach a Slammer Bezel.

Table 9 Slammer FRU replacement tasks (continued)

FRU	AC on?	Slammer state	Tasks
Motherboard tray	No	Target CU is failed over	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Bezel. 4 Remove a Slammer Battery. 5 Remove a Slammer Fan Module. 6 Remove a Slammer Motherboard Tray. 7 Insert a Slammer Motherboard Tray. 8 Insert a Slammer Fan Module. 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 (Optional). 2 Prepare the System for FRU Replacement 3 Remove a Slammer Network Interface Module. 4 Insert a Slammer Network Interface Module.
Power supply	Yes	Target CU in conservative mode	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Power Supply. 4 Insert a Slammer Power Supply.

Table 9 Slammer FRU replacement tasks (continued)

FRU	AC on?	Slammer state	Tasks
Private interconnect module	No	Target CU is failed over	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Private Interconnect Module. 4 Insert a Slammer Private Interconnect Module.
SCSI card	No	Target CU is failed over	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement. 3 Remove a Slammer Network Interface Module. 4 Remove a Slammer PCI Card. 5 Insert a Slammer PCI Card. 6 Insert a Slammer Network Interface Module.

Note: Slammer chassis replacement is disruptive. Guided Maintenance terminates all user data paths and powers down all Slammers.

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

For information on the Guided Maintenance feature, see Initiate Guided Maintenance.

Map of Slammer FRUs

Figure 13 illustrates the set of replaceable FRUs in a Slammer.

Figure 13 Schematic of replaceable Slammer FRUs
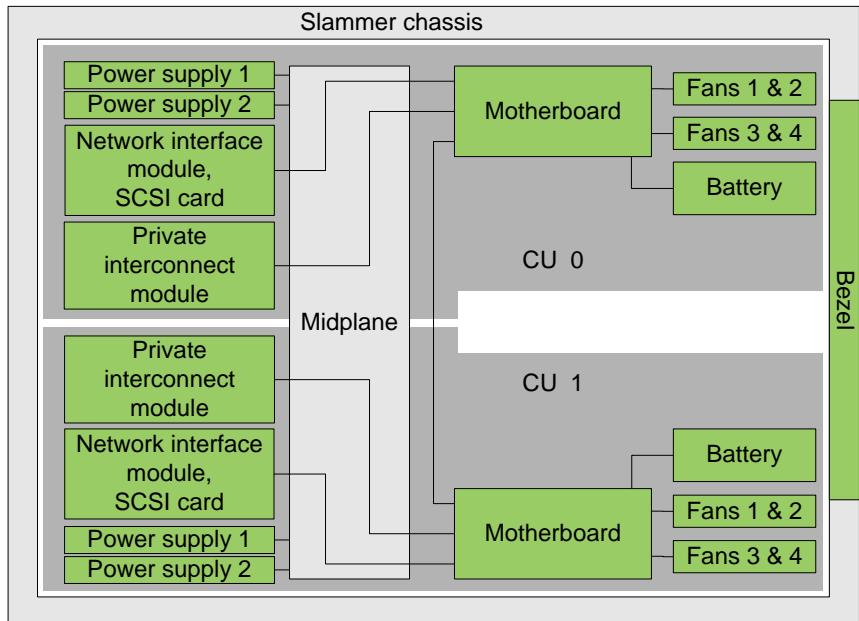
Slammer FRU Part Numbers

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

Table 10 Slammer FRU part numbers

Part number	FRU description
1450-00003-00	Battery
1450-00001-00	Bezel
1450-00035-00	Chassis. Houses all the FRUs that make up a Slammer.
1450-00005-00	Fan module
1450-00002-04	Motherboard module
1450-00007-00	Network interface module (copper)
1450-00008-00	Network interface module (optical)
1450-00039-00	SAN adapter module
1450-00011-00	Power supply
1450-00012-00	Private interconnect module

Replace Slammer Batteries

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 figure below shows a battery.

Figure 14 Slammer battery FRU

Serial number label

Install-before date

Back

The battery charger within a Slammer CU keeps the battery charged. The battery can sustain power to the two memory slots for 72 hr for systems with 3 or 6 GB of memory per CU and for 48 hr for systems with 12 GB of memory per CU.

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

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 hr of normal power. If the battery is severely discharged, recharge time can take up to 18 hr or more. If the battery takes longer that 18 hr to reach a full charge, you should replace the battery.

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

Figure 15 Slammer battery location
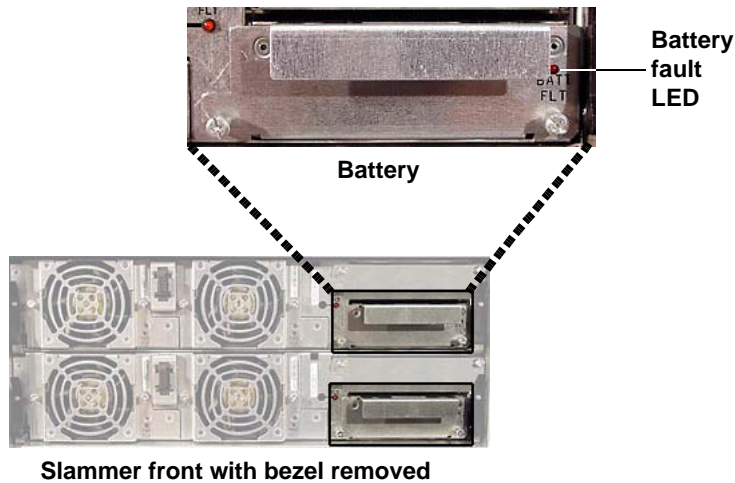
The table below describes the status of the battery LED.

Table 11 Slammer battery LED status

Label	Color	Meaning
BATT FLT	Amber	Battery in this CU has failed.
	Off	No failure exists.

To allow battery replacement in a target Slammer CU, Guided Maintenance first places the CU in conservative mode. In this mode, the 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

To replace a Slammer battery, perform the tasks that are outlined in Table 12.

Table 12 Battery 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 battery FRU: 1 Remove a Slammer Bezel to gain access to the battery. 2 Remove a Slammer Battery to make room for the replacement battery. 3 Insert a Slammer Battery to insert the replacement battery. 4 Attach a Slammer Bezel to reattach the bezel.
Step 4 Verify Status	Performed as final step in battery replacement.

Remove a Slammer Battery

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.

- Places the target CU in conservative mode.

- Powers down the battery charger.

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. Exchange only with the Pillar-approved part. Recycle or discard the battery as instructed by local regulations.

To remove a Slammer battery:

1 Follow the appropriate procedure in this guide to remove the bezel from the Slammer chassis.

2 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

3 When Guided Maintenance prompts you to remove the battery, remove the two screws that secure the battery to the Slammer chassis.

Figure 16 Slammer battery screws

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

Insert a Slammer Battery

Check the install-before date that is on the battery.

Table 13 Battery shelf life

If the current date is…	Perform this action…	Comments
On or before the install-before date	Install the battery.	The battery has an operational charge.
Less than 30 months after the install-before date	Install the battery.	The system operates in conservative mode until the battery is recharged, which can take up to 12 hr (severely discharged batteries can take up to 36 hr).
30 months or more beyond the install-before date	Call Customer Service and order a replacement battery.	Use of the battery is not recommended. It may be discharged beyond the point where it can accept a full charge.

Once you install the battery, as long as the Slammer is powered on, the internal battery charger will provide a continuous trickle charge to maintain the battery throughout its life (see the table below).

Table 14 Battery operational life

Ambient temperature	Operational Life
77⁰ F (25⁰ C)	3-5 yr
68⁰ F (20⁰ C)	5 yr

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 Axiom system takes the target CU out of conservative mode and reports the status of the FRU.

To 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.

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

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

5 On the Verify page, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

    - Click the Try Again button and reseat the FRU.

        If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

    - Click the Exit button and contact Technical Support.

- Click the Next button, if it is enabled.

6 Follow the directions that are provided to restart the system. This step makes this FRU and all other resources on the target Slammer control unit available.

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.

Replace Slammer Bezels

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

Figure 17   Slammer bezel

To replace a Slammer bezel, perform the tasks that are outlined in Table 12.

Table 15   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.

Remove a Slammer Bezel

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.

To remove a Slammer bezel:

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

Figure 18 Slammer bezel ejector tabs

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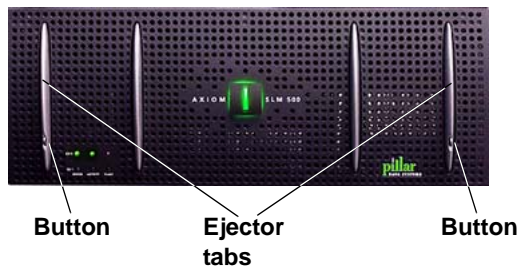
2 Lift each ejector tab at the same time to disengage the Slammer bezel from the rack mounts.

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

Guided Maintenance is not used to add a Slammer bezel.

To attach a Slammer bezel:

1 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.

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

Figure 19 Receptacle for the Slammer bezel power connector

Bezel power connector receptacle

Fan FRU
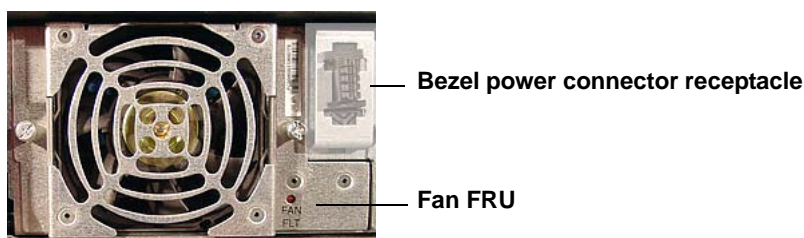
Note: A Slammer has two bezel power receptacles, one per control unit.

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

4 Press both ejector tabs until they lock in place.

Replace Slammer Fan Modules

Each Slammer control unit (CU) has two fan FRUs. The figure below 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 20 Slammer fan FRU

Fan assemblies (2 per fan FRU)

Back
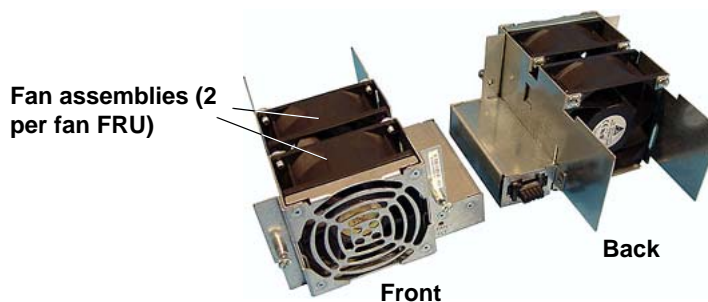
Front

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.

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

Figure 21 Slammer fan location

CU 0
Fans 1 & 2

Fan fault
LED

CU 0

CU 1

Front of
Slammer
chassis
with bezel
removed

Fans 1 & 2   Fans 3 & 4
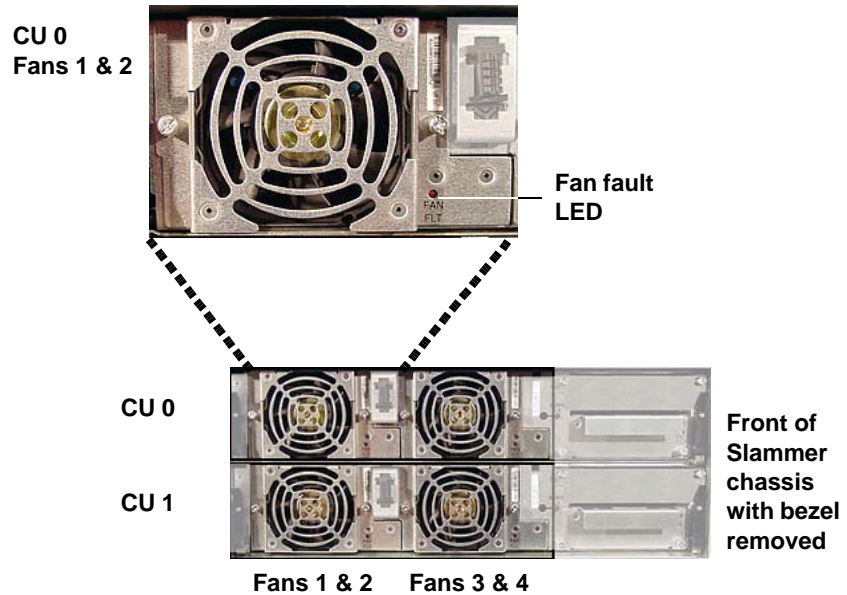
The table below describes the status of the fan LED.

Table 16 Slammer fan LED status

Label	Color	Meaning
FAN FLT	Amber	Fan in this CU has failed.
	Off	No failure exists.

To replace a Slammer fan, perform the tasks that are outlined in Table 17.

Table 17 Fan 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 fan FRU: 1 Remove a Slammer Bezel to gain access to the fan. 2 Remove a Slammer Fan Module to make room for the replacement fan. 3 Insert a Slammer Fan Module to insert the replacement fan. 4 Attach a Slammer Bezel to reattach the bezel.
Step 4 Verify Status	Performed as final step in fan replacement.

Remove a Slammer Fan Module

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 powers down the fan module, allowing the fans to spin down. 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.

To remove a Slammer fan FRU:

1 Follow the appropriate procedure in this guide to remove the bezel from the Slammer chassis.

2 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

3 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.

Figure 22 Slammer fan FRU screws
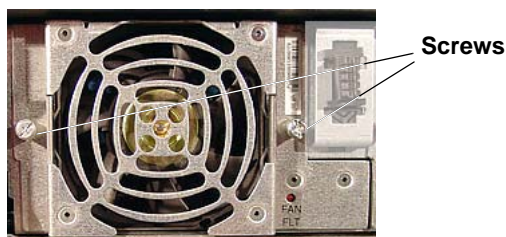
4   Slide the fan FRU out of the chassis and set it aside.

⚠ **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.

Insert a Slammer Fan Module

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.

To insert a Slammer fan:

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   In the Guided Maintenance screen, click the Next button.

4   On the Verify page, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

  - Click the Try Again button and reseat the FRU.

    If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

  - Click the Exit button and contact Technical Support.

- Click the Finish button, when Guided Maintenance enables it.

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

6   Follow the appropriate procedure in this guide to reattach the bezel to the Slammer chassis.

Replace Slammer Motherboard Trays

Motherboard replacement requires you to replace the entire motherboard tray. Motherboard replacement in a Slammer disrupts the normal operation of an 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 and powers down 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 the motherboard tray and reattach the power cords to the target CU, the Axiom system powers up the target CU and 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 figure below shows a motherboard tray with the pair of fan modules and the battery removed.

Figure 23 Slammer motherboard tray
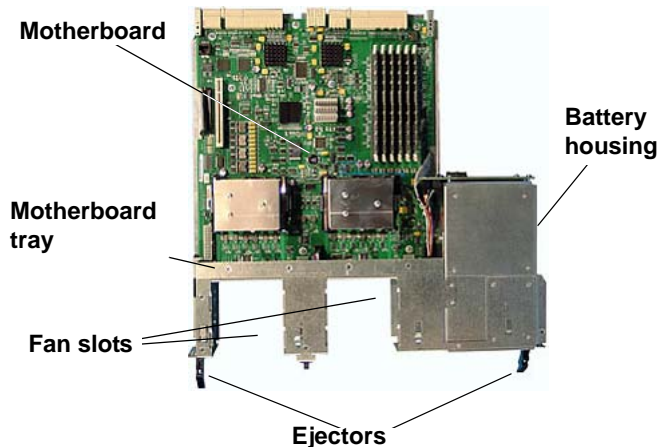
To replace a motherboard, you replace the motherboard tray.

Access the motherboard tray assembly from behind the bezel on the front of the Slammer, as shown in the figure below. This figure, which shows a Slammer face with the bezel removed, identifies the location of the assembly and its LED for control unit 0.

Figure 24 Motherboard tray assembly location
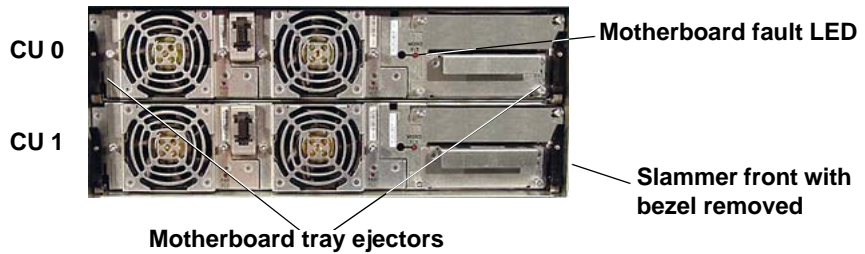
Here is what an ejector looks like:

Figure 25 Motherboard tray ejector
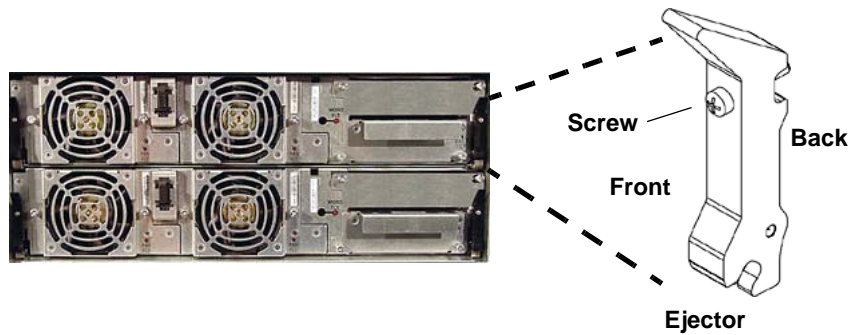
The table below describes the status of motherboard LEDs.

Table 18 Slammer motherboard LED status

Label	Color	Meaning
MOBO FLT	Amber	Motherboard in this CU has failed.
	Off	No failure exists.

After you replace this FRU, Guided Maintenance restarts the target control unit (CU).

To replace a Slammer motherboard tray, perform the tasks that are outlined in Table 19.

Table 19 Motherboard tray replacement tasks

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU (Optional).
Step 2 Prepare	Prepare the System for FRU Replacement.

Table 19 Motherboard tray replacement tasks (continued)

Guided Maintenance	Task
Step 3 Replace	Replace the motherboard FRU: 1 Remove a Slammer Bezel to gain access to the motherboard tray assembly. 2 Remove a Slammer Battery to ease the removal of the motherboard tray and to remove power from the battery-backed memory modules. 3 Remove a Slammer Fan Module to ease the removal of the motherboard tray. 4 Remove a Slammer Motherboard Tray to make room for the replacement tray. 5 Insert a Slammer Motherboard Tray to insert the replacement motherboard tray. 6 Insert a Slammer Fan Module to insert the fan into the replacement motherboard tray. 7 Insert a Slammer Battery to insert the battery into the replacement motherboard tray. 8 Attach a Slammer Bezel to reattach the bezel.
Step 4 Resume	Performed as part of motherboard replacement.
Step 5 Verify Status	Performed as the final step in motherboard tray replacement.

Step 4 Resume shows only when the Enable Automatic Recovery 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 Motherboard Tray

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 control unit (CU) to its partner CU.

- Powers down the target CU.

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

To remove a Slammer motherboard tray:

1 Follow the appropriate procedure in this guide to remove the bezel from the Slammer chassis.

2 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

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.

5   Follow the appropriate procedure in this guide to remove the battery from the target motherboard tray.

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.

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

Insert a Slammer Motherboard Tray

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 sec.

Important! If Guided Maintenance encounters a problem during failback, 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.

To insert a Slammer motherboard tray:

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.

5 Follow the appropriate procedure in this guide to reinsert both fans into the motherboard tray and secure the screws tightly.

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

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

8 In the Guided Maintenance screen, 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 Recovery 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, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

    - Click the Try Again button and reseat the FRU.

        If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

    - Click the Exit button and contact Technical Support.

- Click the Next button, if it is enabled.

11 Follow the directions that are provided to restart the system. This step makes this FRU and all other resources on the target Slammer control unit available.

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.

Replace Slammer Network Interface Modules

Network interface 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 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), the system induces failover for the target CU to its partner CU and powers down 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 the network interface module and reattach the power cords to the target CU, the Axiom system powers up the target CU and induces failback for the target CU.

The figure below shows an optical network interface module. The copper version is the same except for the two network ports, which are RJ-45 based.

Figure 26 Network interface module (optical) FRU
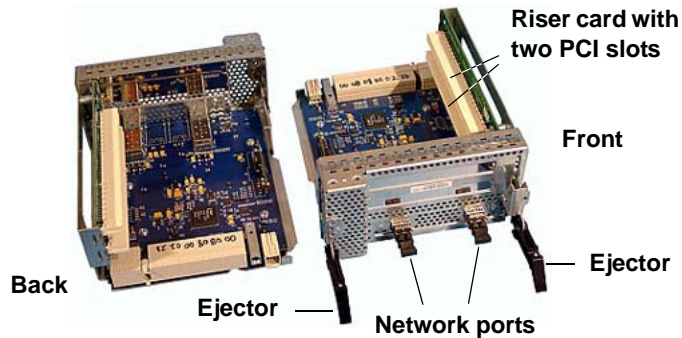
Access network interface modules from the back of the Slammer chassis, as shown in the figure below. Each CU has its own network interface module. This figure identifies the location of the network interface module and Fault LED for CU 0.

Figure 27 Network interface module (optical) location
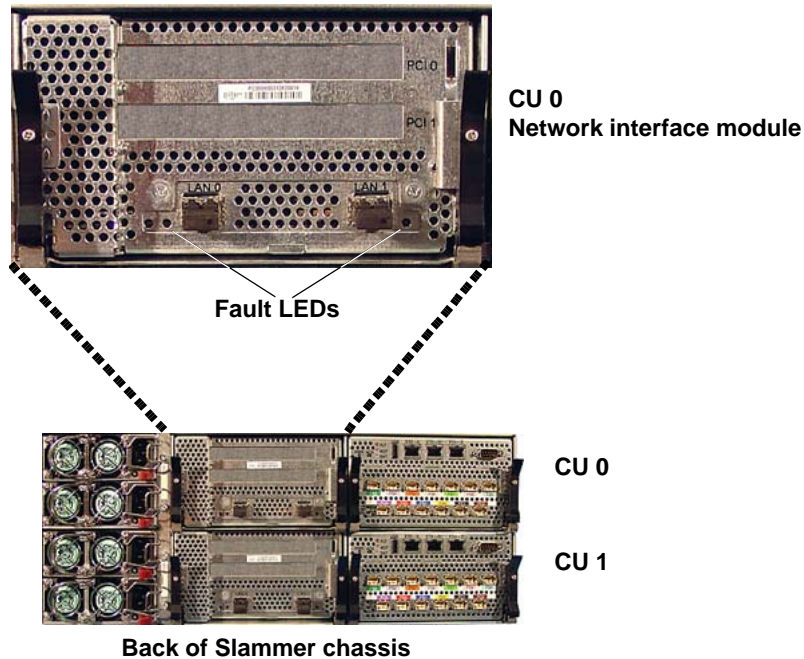
The network interface modules in both control units of a Slammer must be either NAS-specific or SAN-specific. For a NAS Slammer, GbE copper-based and GbE optical-based CUs may coexist. (Contact Technical Support if you want to mix copper and optical CUs within the same Slammer.)

The table below describes the status of network interface module LEDs.

Table 20 Slammer network interface module LED status

LED identifier and color	Meaning
Orange	Network interface module in this CU has failed.

Table 20 Slammer network interface module LED status (continued)

LED identifier and color	Meaning
Off	No failure is indicated.

After you replace this FRU, Guided Maintenance restarts the target control unit (CU).

To replace a Slammer network interface module, perform the tasks that are outlined in Table 21.

Table 21 Network interface module 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 network interface module (NIM) FRU: 1 Remove a Slammer Network Interface Module to make room for the NIM replacement. 2 Remove a Slammer PCI Card to save the SCSI card for use in the NIM replacement (optional). 3 Insert a Slammer PCI Card to insert the SCSI card into the NIM (optional). 4 Insert a Slammer Network Interface Module to insert the NIM replacement.
Step 4 Resume	Performed as part of network interface module replacement.
Step 5 Verify Status	Performed as the final step in NIM replacement.

Step 4 Resume shows only when the Enable Automatic Recovery 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 Network Interface Module

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:

- Fails over the target CU to its partner CU.

- Powers down the target CU.

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

To remove a network interface module:

1 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

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:

- All public Ethernet 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 28 Network interface module ejector

Screw ———— **Back**

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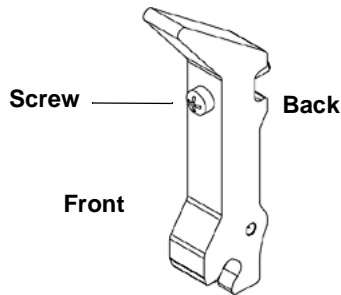
5 Press both ejectors down firmly to disengage the network interface module from the chassis midplane.

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).

Insert a Slammer Network Interface Module

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 sec.

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

As the final step, restart the Axiom system to make the resources of the target CU available.

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.

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.

To insert a network interface module:

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.

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).

- All public Ethernet cables to the network ports.

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

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

8 In the Guided Maintenance screen, 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 Recovery 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, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

  - Click the Try Again button and reseat the FRU.

    If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

  - Click the Exit button and contact Technical Support.

- Click the Next button, if it is enabled.

11 Follow the directions that are provided to restart the system. This step makes this FRU and all other resources on the target Slammer control unit available.

12 Click the Finish button.

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

Replace Slammer Power Supplies

The figure below shows a power supply.

Figure 29 Slammer power supply FRU
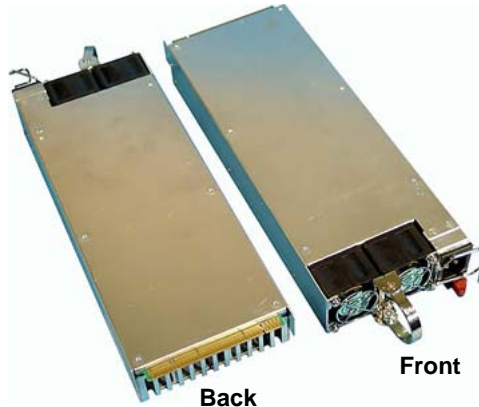
Access power supplies from the back of the Slammer chassis, as shown in the figure below. Each Slammer control unit (CU) has a pair of power supplies. This figure, which shows a single CU, identifies the location of a power supply and its LED.

Figure 30 Slammer power supply location

Slammer back (single CU)
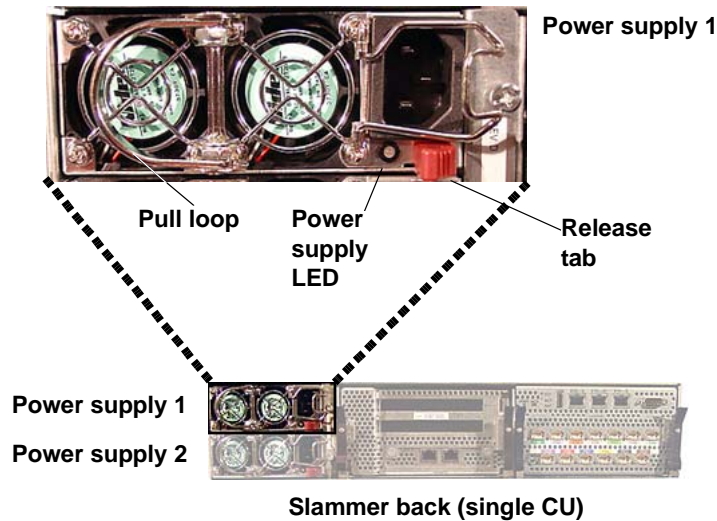
The table below describes the status of power supply LEDs.

Table 22 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.

Note: Axiom systems do not control the power supply LEDs.

After you replace this FRU, Guided Maintenance restarts the target control unit (CU).

To replace a Slammer power supply, perform the tasks that are outlined in Table 23.

Table 23 Power supply 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 power supply FRU: 1 Remove a Slammer Power Supply to make room for the power supply replacement. 2 Insert a Slammer Power Supply to insert the power supply replacement.
Step 4 Verify Status	Performed as the final step in power supply replacement.

Remove a Slammer Power Supply

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.

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 the target CU in conservative mode.

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

To remove a Slammer power supply:

1 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

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.

Insert a Slammer Power Supply

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

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

To 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 31 Power supply correctly positioned

   Release tab

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

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

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

4 On the Verify page, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

    - Click the Try Again button and reseat the FRU.

        If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

    - Click the Exit button and contact Technical Support.

- Click the Finish button, when Guided Maintenance enables it.

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

Replace Slammer Private Interconnect Modules

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 and powers down 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 the private interconnect module, the Axiom system powers up the target CU and induces failback for the target CU.

The figure below shows a private interconnect module.

Figure 32 Slammer private interconnect module FRU

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

Figure 33 Private interconnect module location
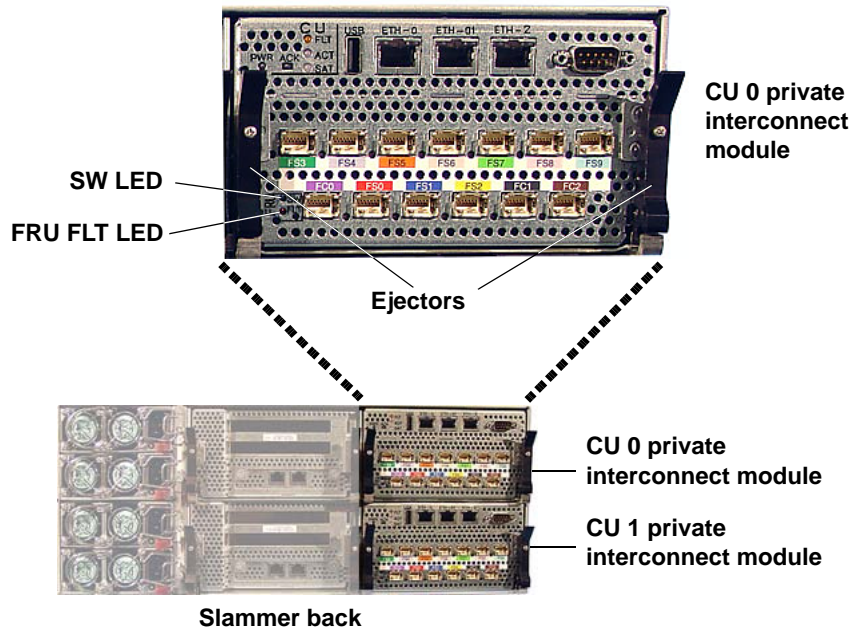
The table below describes the status of private interconnect module LEDs.

Table 24 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.

After you replace this FRU, Guided Maintenance restarts the target control unit (CU).

To replace a Slammer private interconnect module, perform the tasks that are outlined in Table 25.

Table 25 Private interconnect module 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 private interconnect module FRU: 1 Remove a Slammer Private Interconnect Module to make room for the private interconnect module replacement. 2 Insert a Slammer Private Interconnect Module to insert the private interconnect module replacement.
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 Recovery 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 Private Interconnect Module

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 control unit (CU) to its partner CU.

- Powers down the target CU.

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

To remove a private interconnect module:

1 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

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.

   Important! Before removing any cables, label them 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.

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

Note: Carefully grasp the connector and, while pressing the latch on the top of the connector, press the connector gently *into* the socket. Then pull gently on the connector to remove it.

Important! Do not pull on the connector; otherwise, it will break the latch on the socket. Do not rock the connector from side to side or up and down to remove it.

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

Figure 34 Private interconnect module ejector
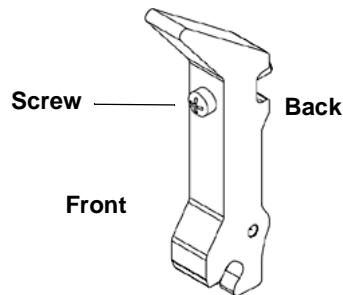
6 Press both ejectors down firmly to disengage the private interconnect module from the chassis midplane.

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

Insert a Slammer Private Interconnect Module

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 sec.

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

As the final step, restart the Axiom system to make the resources of the target CU available.

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

For complete information on how to cable a private interconnect module into the system, see Table 80, FRU cable table reference, in Appendix C, Private Management Network and SSF Cable Reference. Before you refer to those tables, see Figure 33, Private interconnect module location, to determine to which CU this module belongs. The cabling tables in Appendix C refer to Slammer CUs.

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.

To insert a 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.

4   Reconnect all Fibre Channel 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.

    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 screen, click the Next button.

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

8   In the Guided Maintenance screen, 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 Recovery 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, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

  - Click the Try Again button and reseat the FRU.

    If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

  - Click the Exit button and contact Technical Support.

- Click the Next button, if it is enabled.

11 Follow the directions that are provided to restart the system. This step makes this FRU and all other resources on the target Slammer control unit available.

12 Click the Finish button.

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

Replace Slammer PCI Cards

SCSI and Fibre Channel PCI cards are used to interface to tape backup facilities.

Figure 35 Sample PCI card

**An Adaptec 29160
SCSI controller**

PCI cards are located in the riser of a network interface module (see the figure below).

Figure 36 Riser PCI slots in a network interface module

Riser card PCI slots (2)

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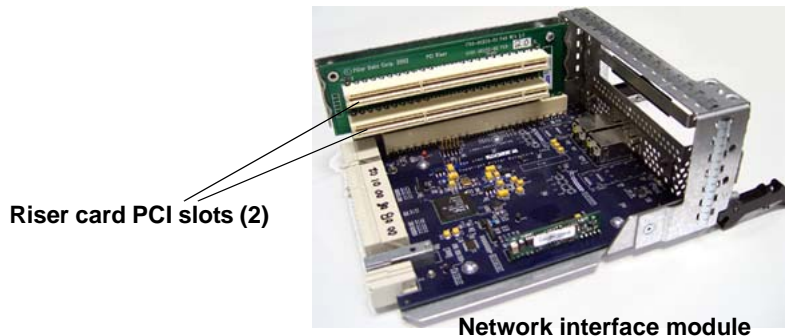
Because the PCI card is located in the riser card of a network interface module, replacement requires the removal of the network interface module. This removal disrupts the normal operation of an Axiom system.

To allow PCI card replacement, the system induces failover for the target control unit (CU) to its partner CU and powers down the target CU. After you have completed the replacement procedure, the Axiom system powers up the target CU and 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, Guided Maintenance restarts the target control unit (CU).

To replace a SCSI card, perform the tasks that are outlined in Table 26.

Table 26 PCI card 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 SCSI card FRU: 1 Remove a Slammer Network Interface Module to gain access to the SCSI card. 2 Remove a Slammer PCI Card to make room for the SCSI card replacement. 3 Insert a Slammer PCI Card to insert the SCSI card replacement. 4 Insert a Slammer Network Interface Module to reinsert the host network interface module.

Table 26 PCI card replacement tasks (continued)

Guided Maintenance	Task
Step 4 Resume	Performed as part of PCI card replacement.
Step 5 Verify Status	Performed as the final step in PCI card replacement.

Step 4 Resume shows only when the Enable Automatic Recovery 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 PCI 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 you click the Prepare System button in the GUI, Guided Maintenance:

- Fails over the target CU to its partner CU.

- Powers down the target CU.

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

To remove a PCI card:

1 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

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.

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.

Insert a Slammer PCI Card

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 sec.

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

As the final step, restart the Axiom system to make the resources of the target CU available.

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

To insert a PCI 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 open PCI slot.

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

Figure 37 PCI card and open PCI slots
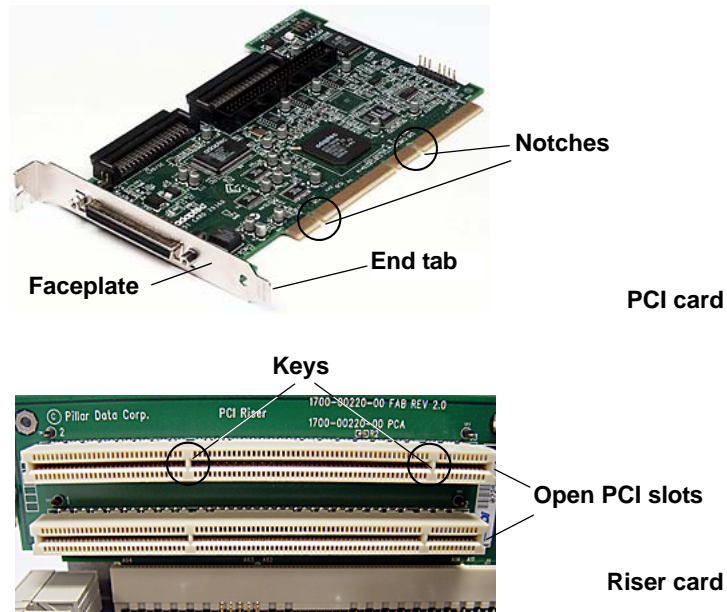
3 Align the PCI card over the PCI slot.

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 PCI card edge connector into the PCI slot

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

7   Secure the PCI 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.

Figure 38 PCI card faceplate secured to the Slammer chassis
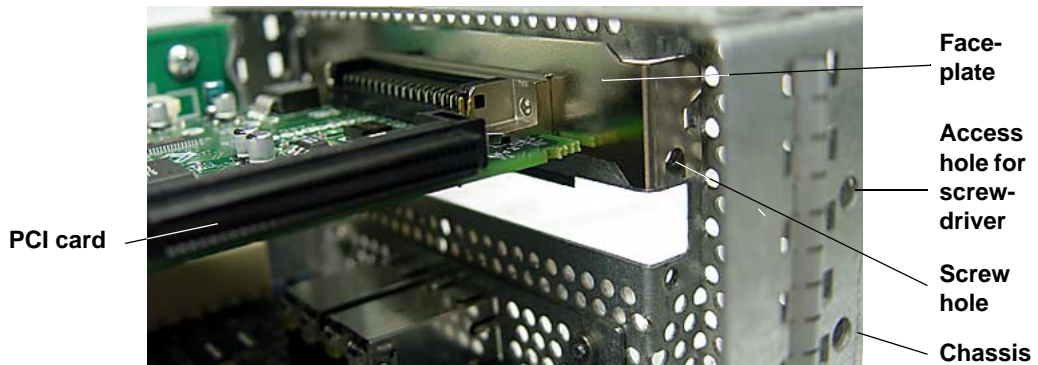
8   Follow the appropriate procedure in this guide to add the network interface module into the Slammer chassis.

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

12 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 Recovery 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, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

    - Click the Try Again button and reseat the FRU.

      If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

    - Click the Exit button and contact Technical Support.

- Click the Next button, if it is enabled.

14 Follow the directions that are provided to restart the system. This step makes this FRU and all other resources on the target Slammer control unit available.

15 Click the Finish button.

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

Replace Slammer Chassis

Slammer chassis replacement is a disruptive action because user data paths are unavailable. Slammer chassis replacement is necessary when the midplane connectors or the power supply bay connectors are damaged. In this case, inspect the FRUs that were installed in these bays for matching damage and replace those FRUs as well.

Important! You should inform all users of the Axiom system of the pending system outage.

The administrator decides when to replace a Slammer. This decision is influenced by any or all of these notifications:

- LEDs

- Email

- Alerts

- Call-Home

The figure below shows a Slammer chassis midplane and a power supply bay. The midplane is shown for reference only. It is not separately replaceable in the field. To correct a faulty midplane or power supply bay, replace the Slammer chassis.

Figure 39 Slammer chassis midplane

Midplane

Power supply bay

Slammer chassis

Back
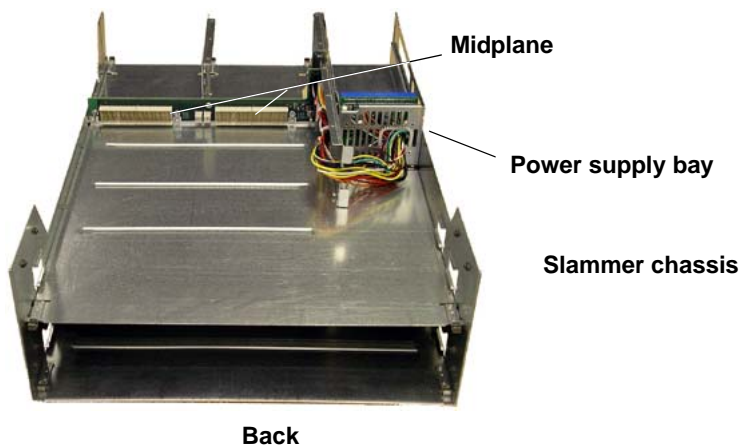
Important! The above photo shows the top cover removed to show detail. You should not remove the chassis cover.

On the Slammer bezel, each Slammer control unit (CU) has a row of LEDs to indicate the status and activity for that CU.

Figure 40 Slammer bezel LEDs
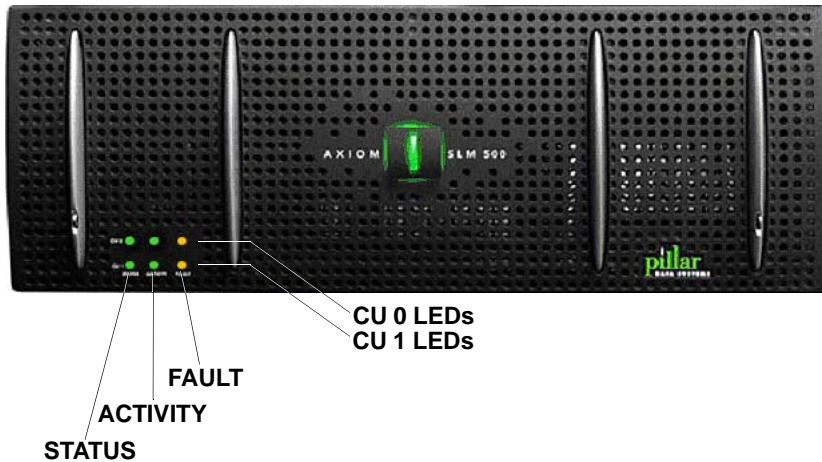
Use the following table to interpret the meanings of the LEDs on a Slammer's bezel.

Table 27 LEDs on the Slammer bezel

Label	Color	Meaning
Status	Green (solid)	Operational.
	Amber	Boot mode (also used for Guided Maintenance).
Activity	Amber	Boot mode.
	Green (blinking)	Activity in progress.
Fault	Amber	Failed.
	Off	No failure is indicated.

After you replace this FRU, Guided Maintenance restarts the entire Slammer.

Before you remove a Slammer chassis, label each cable that you detach. The label should note where the cable needs to be reattached on the CUs in the replacement chassis.

- Power cords. Each of the four power supplies has one power cord.

- Public Ethernet cables that connect to the LAN. Each Slammer chassis has two network interface modules, one for each CU. Each network interface module has two network ports. One or both of these ports on each module has a gigabit Ethernet cable.

- Private Ethernet cables that interconnect the Slammers and the Pilot. The ETH ports have 100Base-T Ethernet cables attached to them.

- Private Fibre Channel cables that interconnect the Slammers and the Bricks. The number of Fibre Channel cables attached to the FC and FS ports on each private interconnect module depends on the number of Slammers and Bricks in your Axiom system.

To replace a Slammer chassis, perform the tasks that are outlined in Table 28.

Table 28 Slammer chassis replacement tasks

Guided Maintenance	Task
External to Guided Maintenance	1 Back Up Data (optional). 2 Remove Rack Doors. 3 Remove Rack Side Panels

Table 28 Slammer chassis replacement tasks (continued)

Guided Maintenance	Task
Step 1 Identify	Identify the Target FRU (Optional).
Step 2 Prepare	Prepare the System for FRU Replacement.
Step 3 Replace	To replace the Slammer chassis, perform the tasks that are listed below: 1 Remove a Slammer Bezel so the Slammer chassis can be removed. 2 Remove a Slammer Chassis to make room for a Slammer chassis replacement. 3 Insert a Slammer Chassis to insert the Slammer chassis replacement. As a part of this task, you also need to perform the following tasks: • For each CU, Remove a Slammer Motherboard Tray from the old chassis and Insert a Slammer Motherboard Tray to the new chassis. • For each CU, Remove a Slammer Power Supply from the old chassis and Insert a Slammer Power Supply to the new chassis. Each CU has two power supplies. • For each CU, Remove a Slammer Network Interface Module from the old chassis and Insert a Slammer Network Interface Module to the new chassis. • For each CU, Remove a Slammer Private Interconnect Module from the old chassis and Insert a Slammer Private Interconnect Module to the new one. 4 Attach a Slammer Bezel to the new chassis.
Step 4 Resume	Performed as part of a chassis replacement.
Step 5 Verify Status	Performed as the final step in chassis replacement.

Table 28 Slammer chassis replacement tasks (continued)

Guided Maintenance	Task
External to Guided Maintenance	1 Restore any data to the system from the emergency backup. To restore the system, refer to *Administrator's Help* or to *Administrator's Guide to the CLI* (optional). 2 [Attach the Rack Side Panels](#). 3 [Attach the Rack Doors](#).

Step 4 Resume shows only when the Enable Automatic Recovery 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 Chassis

To help you locate the Slammer chassis that needs to be replaced, Guided Maintenance beacons all bezel LEDs on the target Slammer.

After you click the Prepare System button in the GUI, Guided Maintenance:

- Stores the current WWN/MAC base address. This base address will be written to the replacement chassis EEPROM so that the replacement looks like the original chassis.

- Initiates a clean shutdown of all Slammers in the Axiom system.

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

⚠️ **CAUTION** Slammers weigh 100 lb (45.4 kg). To handle them safely, use an appropriate number of persons.

To remove a Slammer chassis:

1 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

2 When Guided Maintenance prompts you to replace the Slammer chassis, flip the PDU circuit breaker(s) that supply power to the Slammer to their off positions. Be sure to power off both control unit (CUs) of the target Slammer.

Tip: When you disconnect the cables, be sure to label each cable to identify the plug or port to which they were connected. These labels will be useful when you reconnect them to the FRUs in the replacement chassis.

3 Disconnect the following cables from the Slammer:

- Four power cables—two for each CU.

- Two to four public Ethernet cables—one or two for each network interface module.

- Private Ethernet cables—two for one-Slammer systems and five for two-Slammer systems. These cables interconnect the Slammers and the Pilot.

- All Fibre Channel cables, which connect to the Bricks.

Note: Carefully grasp the connector and, while pressing the latch on the top of the connector, press the connector gently *into* the socket. Then pull gently on the connector to remove it.

Important! Do not pull on the connector; otherwise, it will break the latch on the socket. Do not rock the connector from side to side or up and down to remove it.

4 Follow the appropriate procedure in this guide to remove the Slammer bezel. Set it on the workbench.

5 Remove the screws that secure the Slammer ears to the mounting rails. Set the screws on the workbench.

Important! Use care when removing the Slammer to ensure that no Fibre or other cables are entangled; otherwise, the cable or socket can be damaged.

Tip: If the screws are damaged by removal, replace them with new ones.

6 Slide the Slammer out of the rack and set it on an ESD-qualified mat or surface, next to the replacement chassis.

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.

Insert a Slammer Chassis

After you insert a Slammer chassis, use Guided Maintenance to finish the replacement process.

If the power up process is successful, the Axiom system allows the Slammer replacement to join the system.

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

The cabling pattern that you follow to recable the Slammer depends on whether your Axiom system has one or two Slammers. For cabling information, refer to Table 80, FRU cable table reference, in Appendix C.

Important! When you insert the FRUs into the Slammer chassis in the following procedure, use care so that you do not crush or bend the pins on the chassis midplane. If the midplane is damaged, you must replace the entire chassis.

To insert a Slammer chassis:

1 Slide the chassis replacement onto the appropriate mounting rails within the rack.

2 Secure the Slammer ears to the mounting rails with the screws that you had removed earlier.

3 Follow the appropriate procedures in this guide to remove the following FRUs, one at a time, from the old chassis and to add them into their corresponding location in the new chassis:

- The motherboard assembly for each control unit.

  This assembly holds two fans, the battery, and the motherboard tray for the control unit (CU).

- Two power supplies for each CU.

- The network interface module for each CU.

- The private interconnect module for each CU.

4 Connect all cables to the Slammer:

  - Storage System Fabric (SSF) cables that connect to the Bricks. Gently insert the cables straight into the socket and use gentle pressure to latch them in place.

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

  - SSF cables that cross-connect the Slammer.

  - Private management network cables that connect to the Pilot.

  - Public Ethernet cables, which are connected to the network ports in the network interface module.

  - Power cables.

  Note: Refer to the one-Slammer or two-Slammer cabling tables in the Appendix. Use the set of tables that is appropriate for your Axiom system.

5 For the power distribution units (PDUs) that will supply power to the Slammers, flip the PDU circuit breaker(s) to their on positions. Be sure to turn on power to both CUs of all Slammers.

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

7   On the Verify page, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

  - Click the Try Again button and reseat the FRU.

    If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

  - Click the Exit button and contact Technical Support.

- Click the Finish button, when Guided Maintenance enables it.

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

9   Follow the appropriate procedure in this guide to reattach the Slammer bezel.

CHAPTER 5

Service the Brick and Brick FRUs

Introduction to 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 an Axiom system.

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 of the component's LEDs blink.

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.

Table 29 identifies the FRUs within a Brick, indicates whether the FRU is hot swappable, and lists the replacement tasks for those FRUs.

Table 29 Brick FRU replacement tasks

Component	Hot swap?	Failover?	Task
Bezel	Yes	No	1 Remove a Brick Bezel. 2 Attach a Brick Bezel.
Chassis	No	No. *The entire system is brought down.*	1 Back up Pillar Axiom storage system to external media. 2 Identify the Target FRU (Optional). 3 Prepare the System for FRU Replacement 4 Remove a Brick Chassis. 5 Insert a Brick Chassis. 6 Restore the Pillar Axiom storage system from external media.
Disk drive	Yes	No. *The disk drive is rebuilt.*	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement 3 Remove a Brick Disk Drive. 4 Insert a Brick Disk Drive.

Table 29 Brick FRU replacement tasks (continued)

Component	Hot swap?	Failover?	Task
Enclosure Services (ES) module	Yes	No	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement 3 Remove a Brick ES Module. 4 Insert a Brick ES Module.
Power supply and fan	Yes, one at a time	No	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement 3 Remove a Brick Power Supply / Fan Module. 4 Insert a Brick Power Supply / Fan Module.
RAID controller	Yes, one at a time	Yes	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement 3 Remove a Brick RAID Controller. 4 Insert a Brick RAID Controller.
Spare disk drive	Yes	No	1 Identify the Target FRU (Optional). 2 Prepare the System for FRU Replacement 3 Remove a Brick Spare Disk Drive. 4 Insert a Brick Spare Disk Drive.

Note: Brick chassis replacement is disruptive. Guided Maintenance terminates all user data paths and powers down all Slammers.

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

For information on the Guided Maintenance feature, see Initiate Guided Maintenance.

Map of Brick FRUs

Figure 41 illustrates the set of replaceable FRUs in a Brick.

Figure 41 Schematic of replaceable Brick FRUs
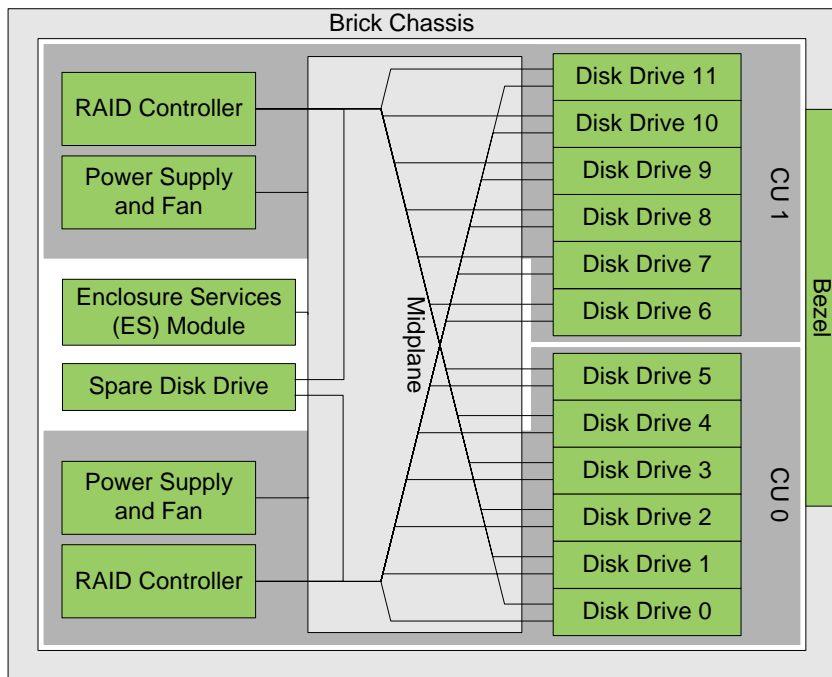
Brick FRU Part Numbers

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

Table 30 Brick FRUs

Part number	FRU description
1450-00013-00	Bezel.
1450-00040-01	Chassis. Houses all the FRUs that make up a Brick.
1450-00028-01	160 GB SATA disk drive.
1450-00108-00	400 GB SATA disk drive.
1450-00016-01	Enclosure services (ES) module.
1450-00015-01	Power supply / fan module.
1450-00014-02	RAID Controller.
1450-00031-01	160 GB SATA spare disk drive.
1450-00109-00	400 GB SATA spare disk drive.

Note: The capacities of array and spare disk drives are measured in units of one gigabyte (GB), where one GB equals 10^9 (1,000,000,000) bytes.

Replace Brick Bezels

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

Figure 42 Brick bezel

To replace a Brick bezel, perform the tasks that are outlined in Table 31.

Table 31 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.

Remove a Brick Bezel

Guided Maintenance is not used to remove a Brick bezel.

To remove a Brick bezel:

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

   Figure 43 Brick bezel ejector tabs

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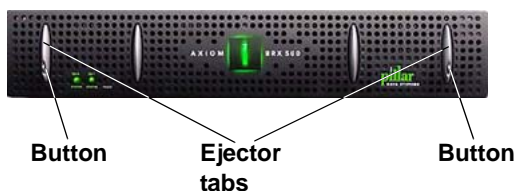
2 Lift each ejector tab at the same time to disengage the Brick bezel from the rack mounts.

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

Guided Maintenance is not used to add a Brick bezel.

To attach a Brick bezel:

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 until they lock in place.

Replace Brick Disk Drives

Each Brick contains 12 disk drives and two RAID controllers.
Each RAID controller controls the six disk drives that are
included in one of the two Brick control units (CUs).

Note: A Brick also has a spare disk drive, which is shared by
the two RAID controllers. The spare disk drive is located in
the back of the Brick.

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

Figure 44 Disk drive FRU
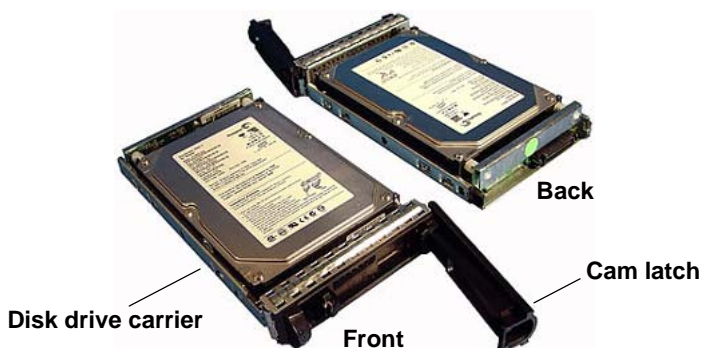
Access any disk drive in the storage array from behind the Brick's bezel as shown in the figure below. Disk drives are numbered from 0 to 11 as shown in this figure. As an example, the figure identifies the location of disk drive 3.

Figure 45 Location of a disk drive

Brick front with bezel removed

Brick bezel
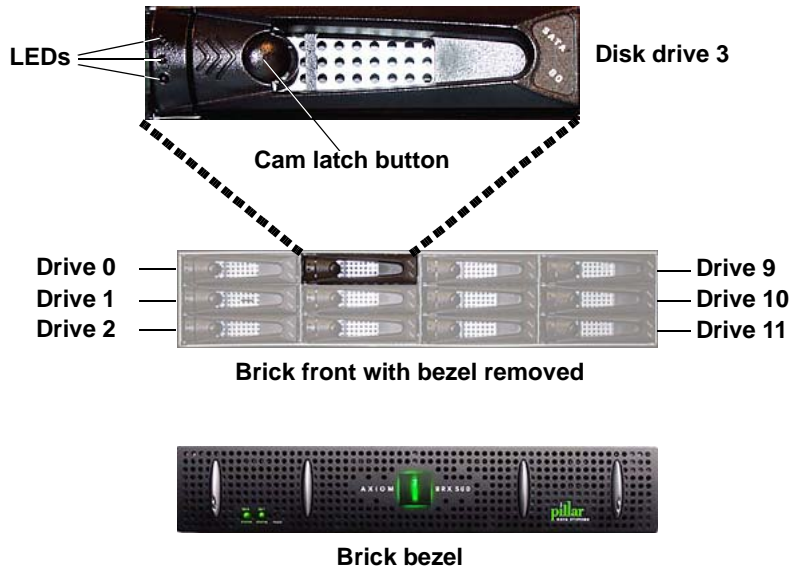
The table below explains the status of disk drive LEDs.

Table 32 LEDs on a disk drive carrier

Position	Color	Meaning
Top	Green (blink)	Activity from RAID controller 1.

Table 32 LEDs on a disk drive carrier (continued)

Position	Color	Meaning
Middle	Amber	Disk drive FRU has failed.
	Off	ES module has been removed.
	Green (blink)	Disk drive discovery. The Brick is determining the physical existance of this disk drive after power up or disk drive FRU insertion.
	Green	Disk drive FRU is ready.
Bottom	Green (blink)	Activity from RAID controller 0.

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

- Turns off the top and bottom LEDs.

- Blinks the middle LED.

Important! Use Guided Maintenance to coordinate the replacement of the target disk drive. The system may need to copy data from the target disk drive to the spare disk drive. This process may cause some performance degradation along user data paths while the data is copied. Some performance degradation may also occur when the data is copied back after the disk drive is replaced.

To replace a Brick's disk drive, perform the tasks that are outlined in Table 33.

Table 33 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 RAID array fails before the data on the first drive has been rebuilt to the spare disk drive, you should immediately repair both disk drives.

⚠ **CAUTION** Do not replace more than one disk drive at a time. Replacement of more than one disk drive at the same time causes data loss. Allow a disk drive replacement to rebuild before you replace another disk drive. The rebuild operation can take several hours, depending on the capacity of the Brick.

Remove a Brick Disk Drive

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 target FRU:

- If the array disk drive is in a normal state and the spare disk drive is available, the system copies all data from the disk drive to the spare.

- If the array disk drive is in a normal state and the spare disk drive is not available, Guided Maintenance terminates.

  Note: Disk drive replacement cannot occur until the spare disk drive is made available.

- If the array disk drive is in a rebuild state, Guided Maintenance waits for the rebuild operation to complete.

- If the array disk drive is in a degraded or failed state, Guided Maintenance continues.

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

Important! Make sure that you remove the correct disk drive. Removal of the incorrect disk drive can disrupt data access.

To remove an array disk drive:

1   After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

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 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.

Insert a Brick Disk Drive

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 Axiom system rejects it.

After Guided Maintenance successfully validates the disk drive replacement, the disk drive is bound to the Brick in which it was added.

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 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 Axiom system reports the status of the FRU.

To insert a disk drive:

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

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

3 In Axiom Storage Manager, click the Next button.

4 Choose one of these options as appropriate:

- If prompted to acknowledge the successful discovery of the disk drive replacement, click the OK button.

- 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.

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.

5 When the copy back process completes, review the status of the replacement FRU to ensure that it has a Normal status.

Replace Brick ES Modules

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.

The figure below shows an ES module.

Figure 46 ES module FRU

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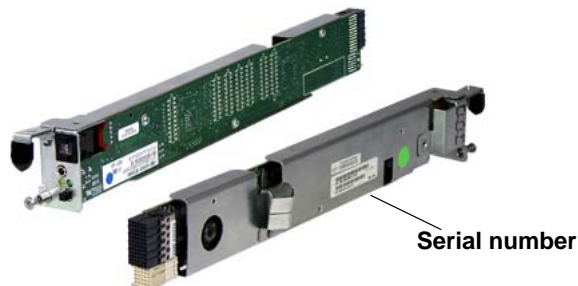
Access the ES module from the back of the Brick chassis, as shown in the figure below. This figure identifies the location of the ES module and its LEDs.

Figure 47 ES module location

Brick back
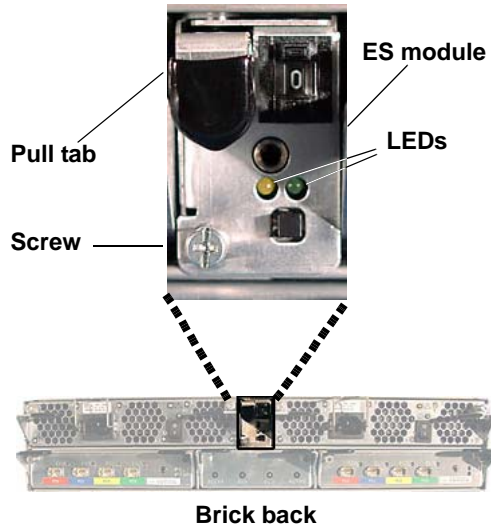
The table below explains the status of ES module LEDs.

Table 34 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.

To replace a Brick ES module, perform the tasks that are outlined in Table 35.

Table 35 ES module 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 RAID controller FRU: 1 Remove a Brick ES Module to make room for the ES module replacement. 2 Insert a Brick ES Module to insert the ES module replacement.
Step 4 Verify Status	Performed as final step in ES module replacement.

Remove a Brick ES Module

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.

To remove an Enclosure Services (ES) module:

1 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

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.

 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.

Insert a Brick ES Module

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 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.

To 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 sec. The system will not recognize the ES module until it completes this self test. It is recommended that you wait 10-15 sec before you perform Step 4.

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

Note: The Axiom system does not use the SCSI address toggle.

4 In the Axiom Storage Manager, click the Next button.

5 On the Verify page, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

  - Click the Try Again button and reseat the FRU.
    If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

  - Click the Exit button and contact Technical Support.

- Click the Finish button, when Guided Maintenance enables it.

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

Replace Brick Power Supply / Fan Modules

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.

The figure below shows a power supply / fan module.

Figure 48 Power supply / fan module FRU
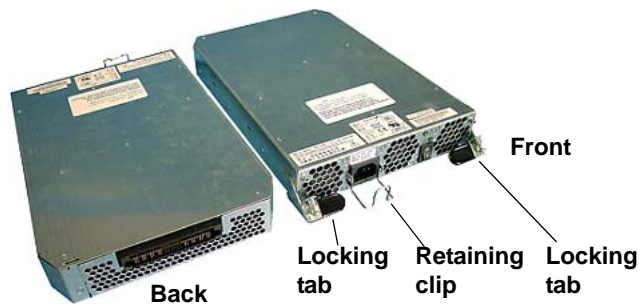
Access power supply / fan modules from the back of the Brick chassis, as shown in the figure below. The figure helps you locate power supply / fan module 2 and its LEDs.

Figure 49 Brick power supply / fan module location
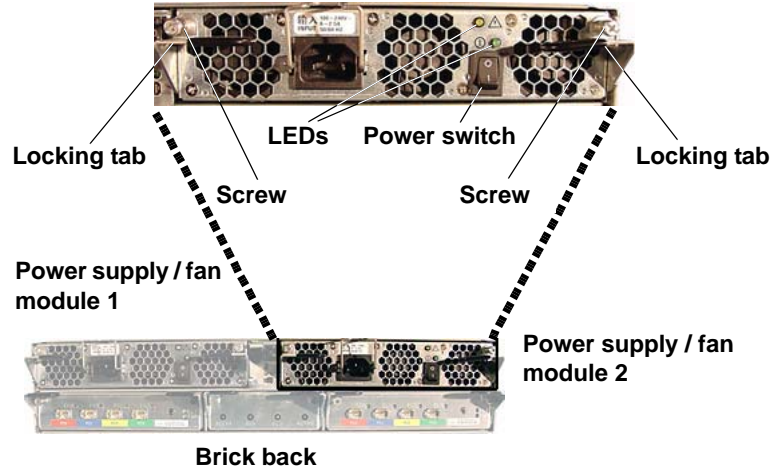
The table below explains the status of power supply / fan module LEDs.

Table 36 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.
	Off	Power supply / fan module in this controller has not failed.

Table 36 Brick power supply / fan module LED status (continued)

LED identifier and color		Meaning
I	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.

To replace a Brick power supply / fan module, perform the tasks that are outlined in Table 37.

Table 37 Power supply / fan module 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 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.

Remove a Brick Power Supply / Fan Module

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.

To remove a power supply / fan module:

1　After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

2　When Guided Maintenance prompts you to power off the power supply / fan module, switch off the power to the target module.

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

　　Note: You may 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.

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.

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.

Insert a Brick Power Supply / Fan Module

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 Axiom system reports the status of the FRU.

To insert a 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.

7 In the Axiom Storage Manager, click the Next button.

8 On the Verify page, choose one of these options:

   • If Guided Maintenance displays a verification failed message, choose one of these options:

      • Click the Try Again button and reseat the FRU.

        If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

      • Click the Exit button and contact Technical Support.

   • Click the Finish button, when Guided Maintenance enables it.

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

Replace Brick RAID Controllers

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

The figure below shows a RAID controller.

Figure 50 RAID controller FRU

Locking tab

Front

Locking tab
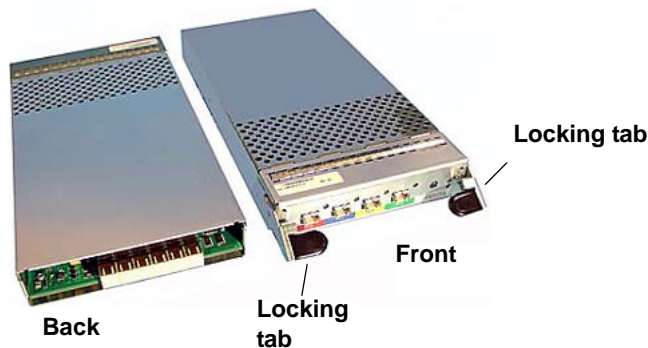
Back

Access RAID controllers from the back of the Brick chassis, as shown in the figure below. This figure identifies the location of RAID controller 0 and its LEDs.

Figure 51 Brick RAID controller location

Locking tab

Screw

Locking tab

Screw

FLT LED

PWR LED

FC 0-3 LEDs

Brick back

RAID controller 1
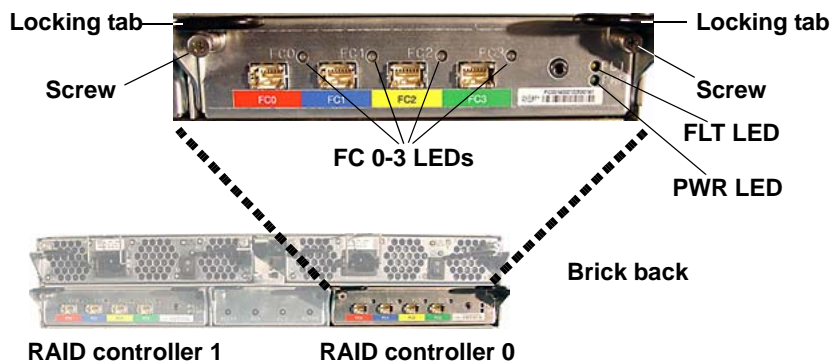
RAID controller 0

The table below explains the status of RAID controller LEDs.

Table 38 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. The error may be on the partner RAID controller.
	Off	No failure exists.
PWR	Green	Power is available.
	Off	Power is not available.

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.

Important! Use Guided Maintenance to coordinate the replacement of the target RAID controller. The 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.

To replace a Brick RAID controller, perform the tasks that are outlined in Table 39.

Table 39 RAID controller 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 RAID controller FRU: 1 Remove a Brick RAID Controller to make room for the RAID controller replacement. 2 Insert a Brick RAID Controller to insert the RAID controller replacement.
Step 4 Verify Status	Performed as final step in RAID controller replacement.

Remove a Brick RAID Controller

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

To remove a RAID controller:

1 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

2 If the Fibre Channel cables are not labled to show where they connect on the RAID controller, make a notation that shows which cable connects to which port.

3 When Guided Maintenance prompts you to remove the RAID controller, disconnect all Fibre Channel cables from the FC ports on the target controller.

   Note: Carefully grasp the connector and, while pressing the latch on the top of the connector, press the connector gently *into* the socket. Then pull gently on the connector to remove it.

Important! Do not pull on the connector; otherwise, it will break the latch on the socket. Do not rock the connector from side to side or up and down to remove it.

4 Unscrew the two screws that secure the locking tabs to the RAID controller casing. Springs retain the screws in the locking tabs.

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

6 Slide the RAID 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.

Insert a Brick RAID Controller

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 Axiom system reports the status of the FRU.

For complete information on how to cable a RAID controller into the system, see Table 80, FRU cable table reference, in Appendix C, Private Management Network and SSF Cable Reference. Before you refer to those tables, see Figure 51, Brick RAID controller location, to determine to which CU the RAID controller belongs. The cabling tables in Appendix C refer to Brick CUs.

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.

To insert a RAID controller:

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

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

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

4 In the Axiom Storage Manager, 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.

5　On the Verify page, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

    - Click the Try Again button and reseat the FRU.

        If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

    - Click the Exit button and contact Technical Support.

- Click the Finish button, when Guided Maintenance enables it.

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

Replace Brick Spare Disk Drives

Each Brick has a spare disk drive that provides backup capacity for the RAID controllers if any of the twelve standard disk drives fail.

The figure below shows a spare disk drive.

Figure 52 Spare disk drive FRU

Front
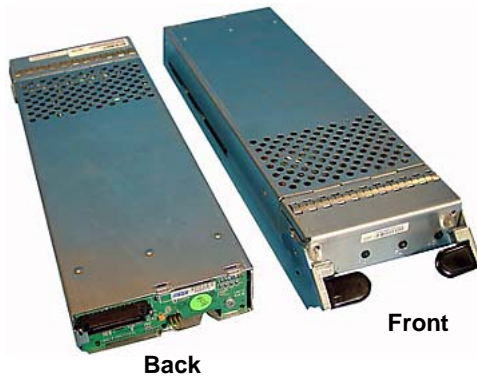
Back

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

Figure 53 Spare disk drive location

Locking tabs

Screws

Spare disk drive module

Brick back
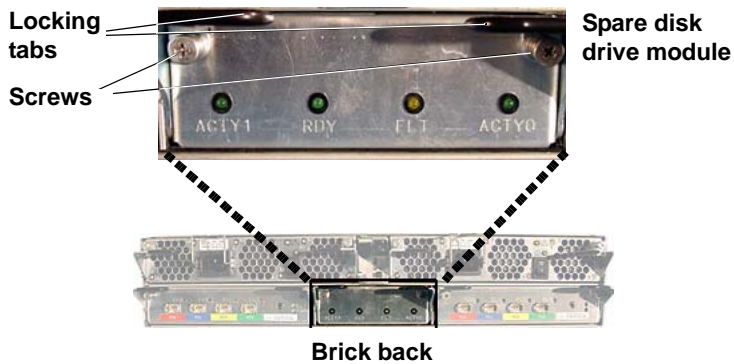
The table below explains the status of spare disk drive LEDs.

Table 40 Brick spare disk drive LED status

LED identifier and color		Meaning
ACTY1	Green (blink)	RAID controller 0 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.
FLT	Amber	The spare disk drive has failed.
	Off	No failure exists.
ACTY2	Green (blink)	RAID controller 1 activity.

Important! If ACTY1 or ACTY2 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 ACTY1, RDY, and ACTY2 LEDs.

- Lights the FLT LED solid amber.

To replace a spare disk drive in a Brick, perform the tasks that are outlined in Table 41.

Table 41 Spare 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 spare disk drive FRU: 1 Remove a Brick Spare Disk Drive to make room for the spare disk drive replacement. 2 Insert a Brick Spare Disk Drive to insert the spare disk drive replacement.
Step 4 Verify Status	Performed as final step in spare disk drive replacement.

Remove a Brick Spare Disk Drive

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.

To remove a spare disk drive:

1 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

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.

Insert a Brick Spare Disk Drive

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 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 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.

To insert a 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.

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 Axiom Storage Manager, click the Next button.

5 Choose one of these options as appropriate:

- 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 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.

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

Replace Brick Chassis

Brick chassis replacement is a disruptive action. User data paths are unavailable and the storage array is exposed to a risk of data loss. Because of this risk, we recommend full external backups of the entire Axiom storage system in advance of Brick chassis replacement.

Important! Chassis replacement should not be done without direct assistance from Technical Support. If it is necessary to swap out a Brick chassis, Pillar Data Systems will create the replacement chassis with the appropriate system serial number and identifying information.

Brick chassis replacement is necessary to replace the Brick midplane or the Brick's physical enclosure.

The administrator decides when to replace a Brick chassis. This decision is influenced by any or all of these notifications:

- LEDs

- Email

- Alerts

- Call-Home

The figure below shows an empty Brick chassis.

Figure 54 Brick chassis

**Brick chassis with all
other FRUs removed**
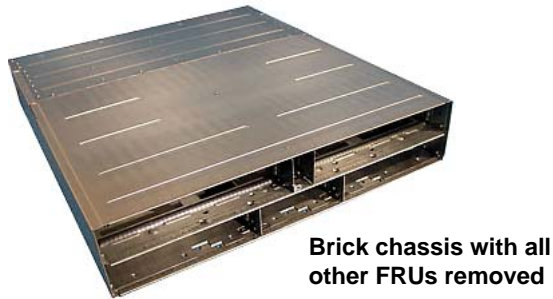
The figure below shows a Brick chassis midplane. The midplane is shown for reference only. It is not separately replaceable in the field. To correct a faulty midplane, replace the Brick chassis.

Figure 55 Brick chassis midplane

Brick chassis midplane

Back
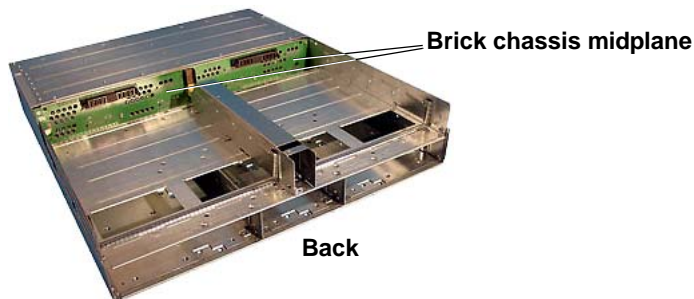
Note: The above photo shows the top cover removed to show detail. You should not remove the chassis cover.

The figure below shows a Brick bezel and its LEDs.

Figure 56 Brick bezel LEDs

CU 0 STATUS LED   CU 1 STATUS LED   FAULT LED   Pillar icon LED   Pillar LED
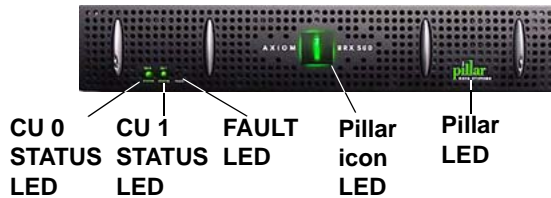
The table below explains the status of Brick bezel LEDs.

Table 42 Brick bezel LED status

Label	Color	Meaning
CU 0 Status	Green (blink)	This control unit is active. Blink rate is constant at 20 hz.
CU 1 Status	Green (blink)	This control unit is active. Blink rate is constant at 20 hz.
Fault	Amber	An enclosure FRU has failed.
	Off	No enclosure FRU has failed.
Pillar	Green (solid)	Power is on.
	Off	Power is off or bezel power cable is damaged.

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.

To replace a Brick chassis, perform the tasks that are outlined in Table 43.

Table 43 Brick chassis replacement tasks

Guided Maintenance	Task
External to Guided Maintenance	1 Back Up Data. 2 Remove Rack Doors. 3 Remove Rack Side Panels.
Step 1 Identify	Identify the Target FRU (Optional).
Step 2 Prepare	Prepare the System for FRU Replacement.

Table 43 Brick chassis replacement tasks (continued)

Guided Maintenance	Task
Step 3 Replace	To replace the Brick chassis: 1 Remove a Brick Bezel so the Brick chassis can be removed. 2 Remove a Brick Chassis to make room for the Brick chassis replacement. 3 Perform the following tasks so that the FRUs can be saved and reinserted into the replacement chassis: • Remove a Brick Disk Drive. • Remove a Brick Power Supply / Fan Module. • Remove a Brick RAID Controller. • Remove a Brick ES Module. • Remove a Brick Spare Disk Drive. 4 Insert a Brick Chassis to insert the Brick chassis replacement. 5 For the Brick FRUs that you had saved earlier, perform the following tasks to insert them into the replacement chassis. • Insert a Brick Spare Disk Drive. • Insert a Brick ES Module. • Insert a Brick RAID Controller. • Insert a Brick Power Supply / Fan Module. • Insert a Brick Disk Drive. • Attach a Brick Bezel.
Step 4 Verify Status	Performed as final step in Slammer chassis replacement.

Table 43 Brick chassis replacement tasks (continued)

Guided Maintenance	Task
External to Guided Maintenance.	1 [Attach the Rack Doors](). 2 [Attach the Rack Side Panels](). 3 Restore the entire Axiom storage system from the emergency backup media. To restore the system, refer to one of these documents: • The NDMP section of *Administrator's Help* and to the documentation for your NDMP-based backup application. • The restore section of *Administrator's Guide to the CLI*. The request name is PerformRestore.

Remove a Brick Chassis

To help you locate the Brick chassis that needs to be replaced, Guided Maintenance beacons the Brick bezel LEDs to identify 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:

- Stores the current WWN base address. This base address will be written to the replacement chassis EPROM so that the replacement looks like the original chassis.

- Initiates a clean shutdown of all Slammers in the Axiom system.

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

CAUTION Bricks weigh 65 lb (29.5 kg) each. For safe handling, use an appropriate number of persons.

To remove a Brick chassis:

1 After Guided Maintenance enables the Next button in the Prepare step, click the Next button.

2 When Guided Maintenance prompts you to replace the Brick chassis, flip the PDU circuit breaker(s) that supply power to the Brick to their off positions. Be sure to power off both CUs.

3 Disconnect the power cables from the Brick —one for each CU.

Tip: When you disconnect the Fibre Channel cables, be sure to label each cable to identify the port to which they were connected. These labels will be useful when you reconnect them to the FRUs in the replacement chassis.

4 Disconnect all Fibre Channel cables:

Note: Carefully grasp the connector and, while pressing the latch on the top of the connector, press the connector gently *into* the socket. Then pull gently on the connector to remove it.

Important! Do not pull on the connector; otherwise, it will break the latch on the socket. Do not rock the connector from side to side or up and down to remove it.

- Two private interconnect cables—one in each CU's port FC 2. These Fibre Channel cables connect either to a Slammer or to another Brick.

- Two private interconnect cables—one in each CU's port FC 1 that cross-connects to the partner CU port FC 3.

- If present, two private interconnect cables—one in each CU's port FC 0 that connects to another Brick.

5 Remove the Brick's bezel and set it on the workbench.

6 Remove the screws that secure the Brick ears to the mounting rails. Set the screws on the workbench.

7 Slide the Brick out of the rack and set it on a soft ESD-qualified mat or surface, next to the replacement chassis.

Insert a Brick Chassis

After you insert a Brick chassis, use Guided Maintenance to finish the replacement process. If the power up process is successful, the Axiom system allows the Brick replacement to join the system.

Important! If Guided Maintenance encounters a problem during power up, you must contact Technical Support to continue Guided Maintenance.

The cabling pattern that you follow to connect the RAID controllers into the Storage System Fabric (SSF) depends on whether your Axiom system has one or two Slammers:

- RAID Controller Cabling in a 1-Slammer System.

- RAID Controller Cabling in a 2-Slammer System.

For complete cabling information, refer to Appendix C.

Important! When you add the FRUs to the chassis replacement in the following procedure, use care when you insert them so that you do not crush or bend the pins on the chassis midplane. If the midplane is damaged, you must replace the entire chassis.

To insert a Brick chassis:

1 Slide the replacement Brick chassis onto the mounting rails at the location of the old chassis in the rack.

2 Secure the Brick ears to the mounting rails with the screws that you had removed earlier.

3 Remove the following FRUs one at a time from the old chassis and add them into their corresponding location in the new chassis:

- Each of the twelve disk drives.

- The spare disk drive.

- The Enclosure Services (ES) module.

- Each of the two power supply/fan modules.

- Each of the two RAID controllers.

Note: For instructions, refer to the appropriate Remove and Add procedures for each of these FRUs.

4   Reconnect all Fibre Channel cables to the Brick.

5   Reconnect the two power cables—one to each CU.

6   For the power distribution units (PDUs) that will supply power to the Brick, flip the PDU circuit breaker(s) to their on positions. Be sure to power on both CUs.

7   In Axiom Storage Manager, click the Next button.

8   On the Verify page, choose one of these options:

- If Guided Maintenance displays a verification failed message, choose one of these options:

    - Click the Try Again button and reseat the FRU.

      If the second attempt is successful, click the Next button; otherwise, you will need to contact Technical Support to continue Guided Maintenance for the FRU.

    - Click the Exit button and contact Technical Support.

- Click the Finish button, when Guided Maintenance enables it.

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

10 Reattach the Brick bezel.

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 an Axiom system and its hardware components.

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 Axiom components are connected comply with the technical specifications for those components.

For electrical characteristics of Axiom components, see Axiom Hardware Specifications in Appendix G.

Warning Notices

 WARNING 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.

Table 44 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.

Table 44 Electrical warning in other languages

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.
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 físicos. 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 possíveis acidentes.

Table 44 Electrical warning in other languages

Advertencia	Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar 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 någon utrustning måste 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.

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 Bricks have two power supply cords and Slammers have four. To reduce the risk of electric shock, disconnect all power supply cords to these components before you open their top covers.

WARNING The 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.

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 feet or brackets installed, or have another mechanism that does not allow the rack to tip when you install the component.

Lightning Activity Warning

WARNING Do not work on the system or connect or disconnect cables during periods of lightning activity.

Table 45 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.

Table 45 Lightning warning in other languages

Varoitus	Älä työskentele järjestelmän parissa äläkä 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 schließen 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 når det tordner eller lyner.
Aviso	Não trabalhe no sistema ou ligue e desligue cabos durante períodos 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 åska skall du aldrig utföra arbete på systemet eller ansluta eller koppla loss kablar.

Power Supply Warning

⚠️ **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.

Table 46 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 virtalähdettä virtajohdon ollessa kytkettynä. Virrankatkaisimella varustetuissa järjestelmissä on virtalähteen sisällä jäljellä verkkojännite, vaikka virrankatkaisin on katkaistu-asennossa virtajohdon ollessa kytkettynä. Järjestelmissä, joissa ei ole virrankatkaisinta, on virtalähteen sisällä verkkojännite, kun virtajohto on kytkettynä.

Table 46 Power supply warning in other languages

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 à l'arrêt. Avec les systèmes sans commutateur marche-arrêt, l'alimentation est sous tension quand le cordon d'alimentation est branché.
Warnung	Berühren Sie das Netzgerät nicht, wenn das Netzkabel angeschlossen ist. Bei Systemen mit Netzschalter liegen Leitungsspannungen im Netzgerät vor, wenn das Netzkabel angeschlossen ist, auch wenn das System ausgeschaltet ist. Bei Systemen ohne Netzschalter liegen Leitungsspannungen im Netzgerät 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.

Table 46 Power supply warning in other languages

Advarsel	Berør ikke strømforsyningsenheten når strømledningen er tilkoblet. I systemer som har en strømbryter, er det spenning i strømforsyningsenheten selv om strømbryteren er slått av og strømledningen er tilkoblet. Når det gjelder systemer uten en strømbryter, er det spenning i strømforsyningsenheten når strømledingen er tilkoblet.
Aviso	Não toque na unidade abastecedora de energia quando o cabo de alimentação 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 alimentación mientras el cable esté enchufado. En sistemas con interruptor de alimentación, hay voltajes de línea dentro de la fuente, incluso cuando el interruptor esté en Apagado (OFF) y el cable de alimentación enchufado. En sistemas sin interruptor de alimentación, hay voltajes de línea en la fuente cuando el cable está enchufado.
Varning	Vidrör inte strömförsörjningsenheten när nätsladden är ansluten. För system med strömbrytare finns det nätspänning i strömförsörjningsenheten även när strömmen har slagits av men nätsladden är ansluten. För system utan strömbrytare finns det nätspänning i strömförsörjningsenheten när nätsladden är ansluten.

Main Power Disconnect Warning

 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.

Table 47 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 à proximité de l'équipement et être facile d'accés.

Installation Warning

 WARNING Read the installation instructions before you connect the system to its power source.

Table 48 Install instructions warning in other languages

Waarschuwing	Raadpleeg de installatie-aanwijzingen voordat u het systeem met de voeding verbindt.
Varoitus	Lue asennusohjeet ennen järjestelmän yhdistämistä virtalähteeseen.
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 anschließen.
Avvertenza	Consultare le istruzioni di installazione prima di collegare il sistema all'alimentatore.

Table 48 Install instructions warning in other languages

Advarsel	Les installasjonsinstruksjonene før systemet kobles til strømkilden.
Aviso	Leia as instruções de instalação antes de ligar o sistema à sua fonte de energia.
Advertencia	Ver las instrucciones de instalación antes de conectar el sistema a la red de alimentación.
Varning	Läs installationsanvisningarna innan du kopplar systemet till dess strömförsörjningsenhet.

Power Disconnect Warning

 WARNING When working on a chassis or near power supplies, follow the Guided Maintenance procedures in the Axiom Storage 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 49 Warnings for Norway and Sweden

Advarsel	Apparatet skal kobles til en jordet stikkontakt.
Varning	Apparaten skall anslutas till jordat nätuttag.

Restricted Access Area Warning

WARNING 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.

Table 50 Restricted access warning for 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	Tämä laite on tarkoitettu asennettavaksi paikkaan, johon pääsy on rajoitettua. Paikka, johon pääsy on rajoitettua, tarkoittaa paikkaa, johon vain huoltohenkilöstö pääsee jonkin erikoistyökalun, lukkoon sopivan avaimen tai jonkin muun turvalaitteen avulla ja joka on paikasta vastuussa olevien toimivaltaisten henkilöiden valvoma.
Attention	Cet appareil est à installer 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 contrôle de l'autorité responsable de l'emplacement.

Table 50 Restricted access warning for other languages

Warnung	Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Ein Bereich mit beschränktem Zutritt ist ein Bereich, zu dem nur Wartungspersonal mit einem Spezialwerkzeugs, Schloß und Schlüssel oder anderer Sicherheitsvorkehrungen Zugang hat, und der von dem für die Anlage zuständigen Gremium kontrolliert wird.
Avvertenza	Questa unità deve 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'autorità responsabile della zona.
Advarsel	Denne enheten er laget for installasjon i områder med begrenset adgang. Et område med begrenset adgang gir kun adgang til servicepersonale som bruker et spesielt verktøy, lås og nøkkel, eller en annen sikkerhetsanordning, og det kontrolleres av den autoriteten som er ansvarlig for området.
Aviso	Esta unidade foi concebida para instalação em áreas de acesso restrito. Uma área de acesso restrito é uma área à qual apenas tem acesso o pessoal de serviço autorizado, que possua uma ferramenta, chave e fechadura especial, ou qualquer outra forma de segurança. Esta área é controlada pela autoridade responsável pelo local.

Table 50 Restricted access warning for other languages

Advertencia	Esta unidad ha sido diseñada para instalarse en áreas de acceso restringido. Área de acceso restringido significa un área a la que solamente tiene acceso el personal de servicio mediante la utilización 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 är avsedd för installation i områden med begränsat tillträde. Ett område med begränsat tillträde får endast tillträdas av servicepersonal med ett speciellt verktyg, lås och nyckel, eller annan säkerhetsanordning, och kontrolleras av den auktoritet som ansvarar för området.

Product Disposal Warning

WARNING Ultimate disposal of this product should be handled according to all national laws and regulations.

Table 51 Product disposal warning for other languages

Waarschuwing	Dit produkt dient volgens alle landelijke wetten en voorschriften te worden afgedankt.
Varoitus	Tämän tuotteen lopullisesta hävittämisestä tulee huolehtia kaikkia valtakunnallisia lakeja ja säännöksiä noudattaen.
Attention	La mise au rebut définitive de ce produit doit être effectuée conformément à toutes les lois et réglementations en vigueur.

Table 51 Product disposal warning for other languages

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 según 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

⚠️ **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.

Table 52 Jewelry removal warning for 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 ja kellot mukaan lukien). Metalliesineet kuumenevat, kun ne ovat yhteydessä sähkövirran ja maan kanssa, ja ne voivat aiheuttaa vakavia palovammoja tai hitsata metalliesineet kiinni liitäntänapoihin.
Attention	Avant d'accéder à cet équipement connecté aux lignes électriques, ôter tout bijou (anneaux, colliers et montres compris). Lorsqu'ils sont branchés à l'alimentation et reliés à la terre, les objets métalliques chauffent, ce qui peut provoquer des blessures graves ou souder l'objet métallique aux bornes.
Warnung	Vor der Arbeit an Geräten, die an das Netz angeschlossen sind, jeglichen Schmuck (einschließlich Ringe, Ketten und Uhren) abnehmen. Metallgegenstände erhitzen sich, wenn sie an das Netz und die Erde angeschlossen werden, und können schwere Verbrennungen verursachen oder an die Anschlußklemmen angeschweißt werden.

Table 52 Jewelry removal warning for other languages

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 può saldarsi ai terminali.
Advarsel	Fjern alle smykker (inkludert ringer, halskjeder og klokker) før du skal arbeide på utstyr som er koblet til kraftledninger. Metallgjenstander som er koblet til kraftledninger og jord blir svært varme og kan forårsake alvorlige brannskader eller smelte fast til polene.
Aviso	Antes de trabalhar em equipamento que esteja ligado a linhas de corrente, retire todas as jóias que estiver a usar (incluindo anéis, fios e relógios). Os objectos metálicos aquecerão em contacto com a corrente e em contacto com a ligação à terra, podendo causar queimaduras graves ou ficarem soldados aos terminais.
Advertencia	Antes de operar sobre equipos conectados a líneas de alimentación, quitarse las joyas (incluidos anillos, collares y relojes). Los objetos de metal se calientan cuando se conectan a la alimentación y a tierra, lo que puede ocasionar quemaduras graves o que los objetos metálicos queden soldados a los bornes.

Table 52 Jewelry removal warning for other languages

Varning	Tag av alla smycken (inklusive ringar, halsband och armbandsur) innan du arbetar på utrustning som är kopplad till kraftledningar. Metallobjekt hettas upp när de kopplas ihop med ström och jord och kan förorsaka allvarliga brännskador; metallobjekt kan också sammansvetsas med kontakterna.

Qualified Personnel Warning

WARNING Only qualified personnel should install or replace this equipment.

Table 53 Qualified personnel warning for other languages

Waarschuwing	Installatie en reparaties mogen uitsluitend door getraind en bevoegd personeel uitgevoerd worden.
Varoitus	Ainoastaan koulutettu ja pätevä henkilökunta saa asentaa tai vaihtaa tämän laitteen.
Avertissement	Tout installation ou remplacement de l'appareil doit être réalisé par du personnel qualifié et compétent.
Achtung	Gerät nur von geschultem, qualifiziertem Personal installieren oder auswechseln lassen.
Avvertenza	Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.

Table 53 Qualified personnel warning for other languages

Advarsel	Kun kvalifisert personell med riktig opplæring bør montere eller bytte ut dette utstyret.
Aviso	Este equipamento deverá ser instalado ou substituído apenas por pessoal devidamente treinado e qualificado.
Atención	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.

Warning Statement for Finland

Table 54 Warnings for Finland

Varoitus	Alleviates ja suojalukitus ohitettaessa olet alttiina nãkymãttõmãlle lasersãteilylle. Ãjã katso sãteeseen.

Warning Statement for Sweden

Table 55 Warnings for Sweden

Varning	Osynlig laserstrålning när denna del är öppen och förregleringen är urkopplad. Rikta inte blicken in mot strålen.

Power Cabling Warning

⚠️ **WARNING** Secure all power cabling when you install this unit to avoid disturbing field-wiring connections.

Table 56 Power cabling warning for 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 tätä laitetta asentaessasi, jotta vältät kentän johdinkytkentöjen vioittumista.
Attention	Lors de l'installation de cet appareil, fixer tous les câbles d'alimentation pour éviter de provoquer des perturbations aux raccordements des câblages propres au site.
Warnung	Bei der Installation dieser Einheit die Netzverkabelung befestigen, um die Störung von Feldkabelanschlüssen 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	Når denne enheten installeres, må alle kraftledninger sikres for å unngå at feltkabelkoblingene forstyrres.
Aviso	Para evitar problemas com as ligações de rede de campanha, prenda todos os cabos de corrente quando instalar esta unidade.

Table 56 Power cabling warning for other languages

Advertencia	Sujetar todo el cableado de alimentación cuando se instale este equipo para evitar que se mezcle con las conexiones del cableado "in situ".
Varning	Fäst allt starkströmskablage vid installation av denna enhet så att fältkopplingen inte rubbas.

Supply Circuit Warning

WARNING Do not overload the circuit when you connect components to the power supply.

Table 57 Supply circuit warning for other languages

Waarschuwing	Let erop dat de toestellen op voedingscircuits worden aangesloten zonder het vermogen van de bedrading te overschrijden.
Varoitus	Laiteyksiköt on yhdistettävä huolellisesti syöttöpiiriin niin, että johdot eivät ole ylikuormitettuja.
Avertissement	Veillez à bien connecter les unités au circuit d'alimentation afin de ne pas surcharger les connections.
Achtung	Beim Anschließen der Geräte an das Stromnetz ist darauf zu achten, daß die Schaltverbindungen nicht überlastet werden.
Avvertenza	Fare attenzione quando si collegano le unità al circuito di alimentazione, per non sovraccaricare i cablaggi.

Table 57 Supply circuit warning for other languages

Advarsel	Vær nøye med å koble enheter til strømforsyningskretsen slik at ledningene ikke overbelastes.
Aviso	Deverá ter precaução ao ligar unidades ao circuito de fornecimento de energia, para não sobrecarregar a instalação.
Atención	Poner mucho cuidado al conectar los equipos al circuito de alimentación a fin de no sobrecargar el cableado.
Varning	Var noga vid anslutning av enheter till matarströmkretsen så att ledningarna inte överbelastas.

Voltage Mismatch Warning

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*.

Table 58 Voltage mismatch warning for 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.

Table 58 Voltage mismatch warning for other languages

Varoitus	Erisuuruisten jännitteiden yhdistäminen voi aiheuttaa laitevaurion ja tulipalon vaaran. Jos tarraan merkitty jännite eroaa pistorasian jännitteestä, älä 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 châssis à la prise.
Achtung	Bei nicht übereinstimmender Spannung kann es zu Geräteschäden und Feuergefahr kommen. Wenn die auf dem Etikett angegebene Spannung nicht mit der Steckdosenspannung übereinstimmt, schließen Sie das Gerät nicht an diese Steckdose an.
Avvertenza	Una tensione inadeguata può causare 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 forårsake skade på utstyret og innebære 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 saída de corrente da parede, não ligue o chassis a esse receptáculo.

Table 58 Voltage mismatch warning for other languages

Atención	Las diferencias en el voltaje pueden causar daños a los equipos y presentar peligro de incendio. Si el voltaje indicado en la etiqueta es diferente al de la toma de alimentación, no conectar el chasis a dicha toma.
Varning	Inkompatibla spänningar kan resultera i materiella skador samt utgör brandfara. Om den spänning som anges på etiketten skiljer sig från strömuttagets spänning ska chassit inte anslutas till detta uttag.

SELV Circuit Warning

⚠️ **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.

Table 59 SELV circuit warning for 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.

Table 59 SELV circuit warning for other languages

Varoitus	Jotta vältyt sähköiskulta, älä kytke pienjännitteisiä SELV-suojapiirejä puhelinverkkojännitettä (TNV) käyttäviin virtapiireihin. LAN-portit sisältävät SELV-piirejä ja WAN-portit puhelinverkkojännitettä käyttäviä piirejä. Osa sekä LAN- että WAN-porteista käyttää RJ-45-liittimiä. Ole varovainen kytkiessäsi kaapeleita.
Attention	Pour éviter une électrocution, ne raccordez pas les circuits de sécurité basse tension (Safety Extra-Low Voltage ou SELV) à des 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 câbles en prenant toutes les précautions nécessaires.
Warnung	Zur Vermeidung von Elektroschock die Sicherheits-Kleinspannungs-Stromkreise (SELV-Kreise) nicht an Fernsprechnetzspannungs-Stromkreise (TNV-Kreise) anschließen. LAN-Ports enthalten SELV-Kreise, und WAN-Ports enthalten TNV-Kreise. Einige LAN- und WAN-Ports verwenden auch RJ-45-Steckverbinder. Vorsicht beim Anschließen 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.

Table 59 SELV circuit warning for other languages

Advarsel	Unngå å koble lavspenningskretser (SELV) til kretser for telenettspenning (TNV), slik at du unngår elektrisk støt. LAN-utganger inneholder SELV-kretser og WAN-utganger inneholder TNV-kretser. Det finnes både LAN-utganger og WAN-utganger som bruker RJ-45-kontakter. Vær forsiktig når du kobler kabler.
Aviso	Para evitar choques eléctricos, não conecte os circuitos de segurança de baixa tensão (SELV) aos circuitos de tensão de rede telefónica (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 telefónica (telephone network voltage = TNV). Los puertos de redes de área local (local area network = LAN) contienen circuitos SELV, y los puertos de redes de área extendida (wide area network = WAN) contienen circuitos TNV. En algunos casos, tanto los puertos LAN como los WAN usan conectores RJ-45. Proceda con precaución al conectar los cables.
Varning	För att undvika elektriska stötar, koppla inte säkerhetskretsar med extra låg spänning (SELV-kretsar) till kretsar med telefonnätspänning (TNV-kretsar). LAN-portar innehåller SELV-kretsar och WAN-portar innehåller TNV-kretsar. Vissa LAN- och WAN-portar är försedda med RJ-45-kontakter. Iaktta försiktighet vid anslutning av kablar.

Incorrect Connection Warning

⚠️ **WARNING** Incorrect connection of this equipment to a general purpose outlet could result in a hazardous situation.

Table 60 Bad connection warning for other languages

Waarschuwing	Incorrecte aansluiting van deze of aangesloten apparatuur op een stopcontact voor algemene doeleinden kan een gevaarlijke situatie tot gevolg hebben.
Varoitus	Tämän laitteen tai siihen liitettyjen laitteiden virheellinen kytkentä yleispistorasiaan voi aiheuttaa vaaratilanteen.
Attention	Un branchement incorrect de cet équipement ou de l'équipement branché à une prise d'usage général peut créer une situation dangereuse.
Warnung	Inkorrektes Anschließen von diesem oder damit verbundenen Geräten 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 può causare una situazione pericolosa.
Advarsel	Feil kobling av dette utstyret eller tilhørende utstyr til et vanlig uttak kan føre 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.

Table 60 Bad connection warning for other languages

Advertencia	La conexión incorrecta de este equipo, o del equipo conectado, a una toma o receptáculo de tipo general podría resultar en una situación peligrosa.
Varning	Felaktig koppling av denna eller ansluten utrustning till ett universaluttag kan orsaka riskfylld situation.

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.

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** Bricks weigh 65 lb (29.5 kg) each. For safe handling, use an appropriate number of persons.

Slammer and Brick LED Statuses

Introduction to 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 Pillar 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 Pillar Technical Support by telephone, you will need the six digits in the middle of your system serial number. For example, if your serial number were A001368BFT, you would need to provide the digits 001368.

An Axiom system includes LEDs to indicate the status of the hardware components:

- A yellow, amber, or 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—2.375 blinks/sec (or 57 blinks/24 sec).

  - Blink slowly—0.67 blink/sec (or 16 blinks/24 sec).

Axiom Storage 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.

Note: LED interpretations in this appendix apply to a system after it has started. For information about BIOS codes that are displayed after a system startup failure, see Appendix D, Slammer LED Startup Progress Codes.

Slammer LED Statuses

LEDs on a Slammer indicate the status of the controller and its two control units. The LEDs are located on the bezel and on the front and back of the controller chassis.

Table 61 LEDs on the Slammer bezel

Label	Color	Meaning
Status	Green (solid)	Operational.
	Amber	Boot mode (also used for Guided Maintenance).
Activity	Amber	Boot mode.
	Green (blinking)	Activity in progress.
Fault	Amber	Failed.
	Off	No failure is indicated.

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.

Figure 57 LEDs on the front of the Slammer chassis
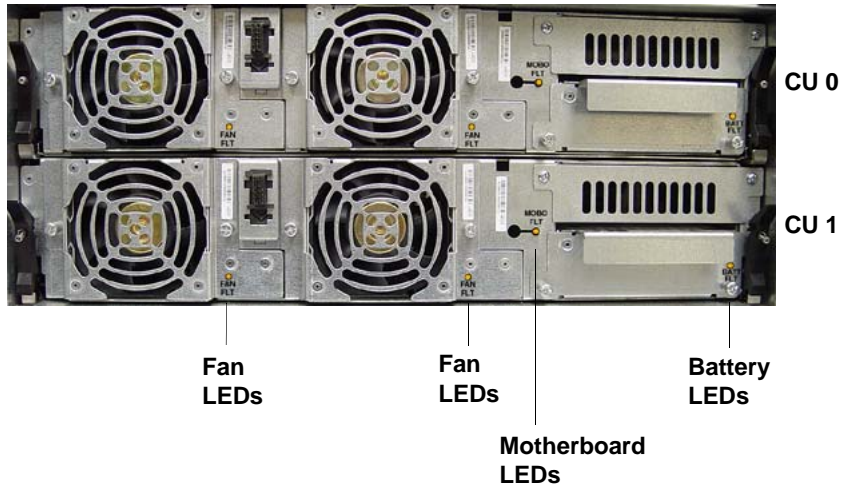
Use the following tables to interpret the meanings of the LEDs on the front of the Slammer chassis.

Table 62 Slammer battery LED status

Label	Color	Meaning
BATT FLT	Amber	Battery in this CU has failed.
	Off	No failure exists.

Table 63 Slammer fan LED status

Label	Color	Meaning
FAN FLT	Amber	Fan in this CU has failed.
	Off	No failure exists.

Table 64 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

    - GbE LAN I/O circuits for optical SFPs

- Private interconnect module

- CU

- Fibre Channel switch (FS) circuits

- Fibre Channel (FC) circuits

Figure 58 LEDs on the back of the Slammer chassis
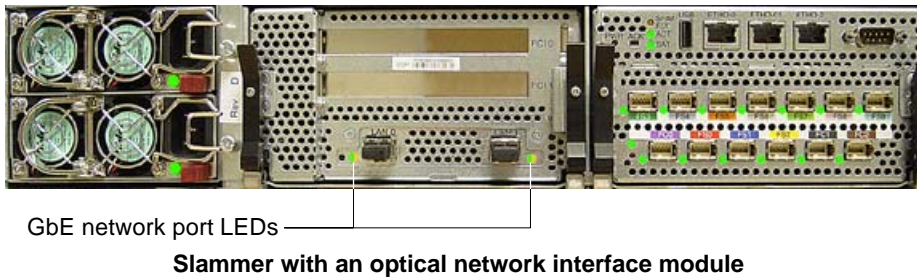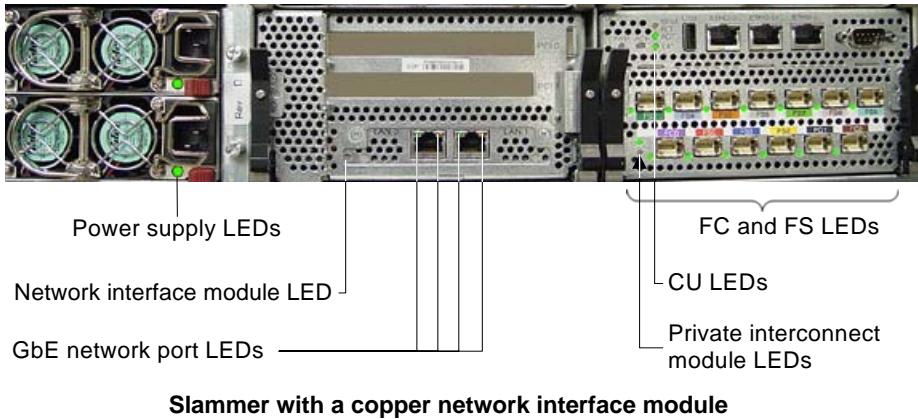
Slammer with a copper network interface module

Slammer with an optical network interface module

Use the following tables to interpret the meanings of the LEDs on the back of the Slammer chassis.

Table 65 Slammer CU LED status

LED identifier and color		Meaning
FLT	Amber	This CU has failed.
	Off	No failure exists.

Table 65 Slammer CU LED status (continued)

LED identifier and color		Meaning
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.

Table 66 Slammer FC circuit LED status

LED identifier and color	Meaning
Yellow (blink)	FS circuits in this CU have failed.
Yellow (solid)	Link exists.
Green (solid)	Link exists.
Green (blink)	Traffic exists.

Table 67 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.

Table 68 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.

Table 69 Slammer optical GbE 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.

Table 70 Slammer network interface module LED status

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

Table 71 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.

Table 72 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.

Brick LED Statuses

Brick LEDs indicate the status of the Brick and its two RAID Controllers and disk arrays. 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 59 Brick bezel LEDs

Three LEDs

Use the following table to interpret the meanings of the Brick bezel LEDs.

Table 73 Brick bezel LED status

Label	Color	Meaning
CU 0 Status	Green (blink)	This control unit is active. Blink rate is constant at 20 hz.
CU 1 Status	Green (blink)	This control unit is active. Blink rate is constant at 20 hz.
Fault	Amber	An enclosure FRU has failed.
	Off	No enclosure FRU has failed.
Pillar	Green (solid)	Power is on.
	Off	Power is off.

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.

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.

Figure 60 Disk drive carrier numbering in a Brick

Each carrier has three LEDs to indicate its status.

Figure 61 Disk drive carrier LEDs

Use the following table to interpret the meanings of the LEDs on the front of the disk drive carriers.

Table 74 LEDs on a disk drive carrier

Position	Color	Meaning
Top	Green (blink)	Activity from RAID controller 1.
Middle	Amber	Disk drive FRU has failed.
	Off	ES module has been removed.
	Green (blink)	Disk drive discovery. The Brick is determining the physical existance of this disk drive after power up or disk drive FRU insertion.
	Green	Disk drive FRU is ready.
Bottom	Green (blink)	Activity from RAID controller 0.

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

- Turns off the top and bottom LEDs.

- Blinks the middle LED.

The back of a Brick chassis displays a set of LEDs for the following FRUs:

- RAID controller 0

- RAID controller 1

- Enclosure Services (ES) module

- Spare disk drive

- Two power supply/fan modules

Each RAID controller has a set of LEDs to indicate the status of the controller and its Fibre Channel (FC) ports.

Figure 62 LEDs on the back of the Brick chassis
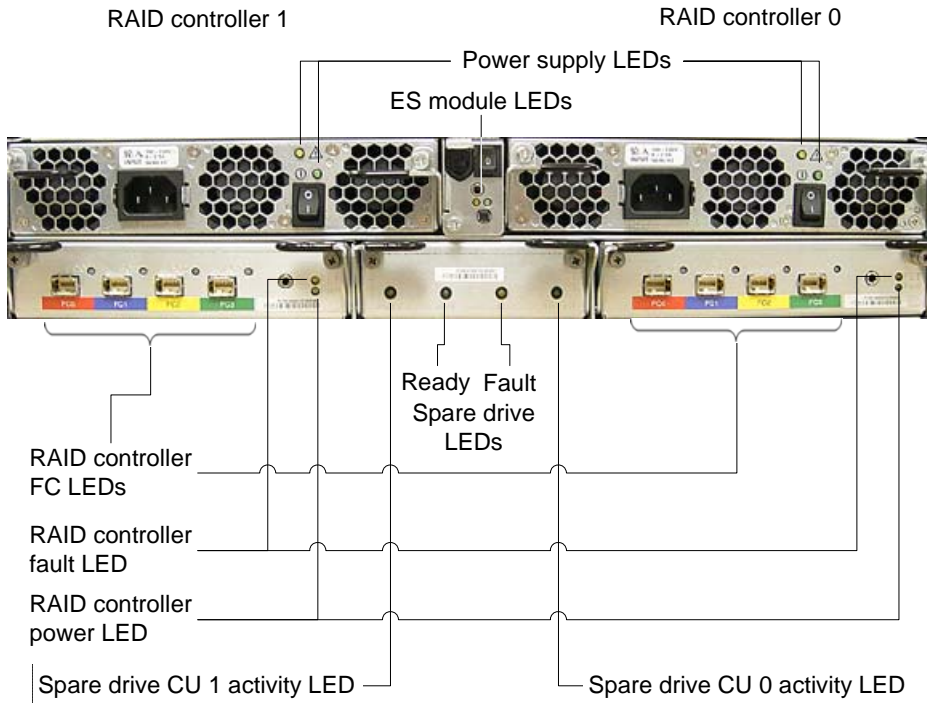
Use the following tables to interpret the meanings of the LEDs on the back of the Brick chassis.

Table 75 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.
	Off	Power supply / fan module in this controller has not failed.
Ⓘ	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.

Table 76 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. The error may be on the partner RAID controller.
	Off	No failure exists.
PWR	Green	Power is available.
	Off	Power is not available.

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.

Table 77 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.

Table 78 Brick spare disk drive LED status

LED identifier and color		Meaning
ACTY1	Green (blink)	RAID controller 0 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.

Table 78 Brick spare disk drive LED status (continued)

LED identifier and color		Meaning
FLT	Amber	The spare disk drive has failed.
	Off	No failure exists.
ACTY2	Green (blink)	RAID controller 1 activity.

Important! If ACTY1 or ACTY2 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 ACTY1, RDY, and ACTY2 LEDs.

- Lights the FLT LED solid amber.

Private Management Network and SSF Cable Reference

Introduction to Private Management Network and SSF Cable Tables

The tables in this appendix provide the information that you need to cable the private management network and the Storage System Fabric (SSF). It is necessary to recable either or both of those components after you have:

- Replaced a Pilot control unit (CU).

- Replaced a private interconnect module.

- Reinserted all FRUs in a Slammer replacement chassis.

- Replaced a RAID controller.

- Reinserted all FRUs in a Brick replacement chassis.

Hardware Component Designators

All cable connection tables include abbreviations to denote Pilot, Slammer, and Brick components and ports. Table 79 defines those abbreviations.

Table 79 Cable connection designations

Designation	Definition
Pilot	The Pilot hardware component. It is located near the bottom of the rack.
Slammer-1	The initial Slammer storage controller. It is located near the center of the rack. In a 2-Slammer system, it is located below Slammer-2.
Slammer-2	In a 2-Slammer system, the Slammer that is located above Slammer-1.
Brick-n	A Brick storage enclosure. Bricks are numbered from 1 through 16, inclusive, and are located below and above the Slammer(s) in a rack. For larger systems, some Bricks can reside in a second rack.
CU0	One of two control units (CUs). The following describes the location of CU0: • For a Pilot, CU0 is above CU1 (factory default). • For Slammers, CU0 is at the top of the chassis. • For Bricks, CU0 is on the right when viewed from the back of the chassis.

Table 79 Cable connection designations (continued)

Designation	Definition
CU1	One of two control units (CUs). The following describes the location of CU1: • For Pilots, CU1 is below CU0 (factory default). • For Slammers, CU1 is at the bottom of the chassis. • For Bricks, CU1 is on the left when viewed from the back of the chassis.
ETHn	Ethernet ports on Pilots and on the private interconnect modules in Slammers. ETH ports are numbered ETH0, ETH1, and ETH2. ETH ports are located: • For Pilots, on the back of the control unit. • For Slammers, at the top of the private interconnect module.
FCn	Fibre Channel ports on the back of Bricks and on the private interconnect modules in Slammers. FC ports are located: • For Slammers, at the bottom of the private interconnect module and are numbered FC0, FC1, and FC2. • For Bricks, in the RAID controller and are numbered FC0, FC1, FC2, and FC3.
FSn	Fibre Channel switch ports at the bottom of the private interconnect modules in Slammers. FS ports are numbered FS0 through FS9.
SER	Serial port on Pilot CUs.

Hardware Maps by Component Designator

To find the information that you need to cable a FRU, follow these steps:

1 Locate the FRU in one of the following maps and determine the designator for that FRU. Use the hardware map that is appropriate for your system:

- Figure 63, FRU location by designator (1-Slammer system).

- Figure 64, FRU location by designator (2-Slammer system)

2 Look up the FRU in Table 80, FRU cable table reference, to find out which set of reference tables to use.

3 Look up the FRU designator in the reference tables to determine the private management network and Storage System Fabric (SSF) ports to which the FRU is connected.

Figure 63 FRU location by designator (1-Slammer system)

Brick 12
Brick 11
Brick 10
Brick 9
Brick 5
Brick 6
Brick 7
Brick 8
Reserved
Slammer 1 CU0 **Slammer 1 CU1**
Brick 1
Brick 2
Brick 3
Brick 4
Reserved
Pilot CU0 **Pilot CU1**
6U reserved for PDUs and access
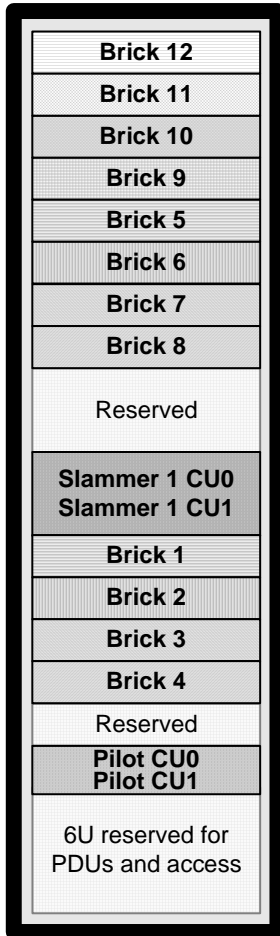
Figure 64 FRU location by designator (2-Slammer system)

Brick 12
Brick 11
Brick 10
Brick 9
Brick 5
Brick 6
Brick 7
Brick 8
Slammer 2 CU0 Slammer 2 CU1
Slammer 1 CU0 Slammer 1 CU1
Brick 1
Brick 2
Brick 3
Brick 4
Reserved
Pilot CU0 Pilot CU1
6U reserved for PDUs and access

FRU Cable Connections Reference

The Storage System Fabric (SSF) cabling scheme conforms to the following conventions:

- For all Slammers:

    - FC1 on one control unit (CU) connects to FS8 on the partner CU.

    - FS0, FS1, FS2, and FS3 connect to Bricks.

- For a Slammer in a system with two or more Slammers:

    - FC0 in one CU connects to FS7 in the same CU on another Slammer.

    - FC2 in one CU connects to FS9 in another Slammer.

- For a Slammer in a system with three or more Slammers:

    - FS4 and FS5 are reserved for Slammer (FC) to switch connections in 3- and 5-Slammer systems.

    - FS6 is reserved for the cascade (switch-to-switch) connection.

- For Bricks:

    - FC0 connects to downstream Bricks, if any.

    - FC1 connects to FC3 of the opposite CU on the same Brick.

    - FC2 connects to a Slammer FS port or to FC0 of an upstream Brick.

Important! Dress all network cables along the right side of the rack (when viewed from the rear). Dress them in a way that would not result in them needing to be disconnected when another FRU needs to be replaced.

The lengths of Fibre Channel cables are as follows:

- CU cross-connections within a Slammer: 1.6 ft (0.5 m).

- From a Slammer to a Brick: 6.6 ft (2 m).

- Between Bricks: 1.6 ft (0.5 m) or 6.6 ft (2 m).

  Note: If the system shipped from Pillar Data Systems with Brick 5 and Brick 9 or Brick 6 and Brick 10 pre-installed, the cables are 1.6 ft (0.5 m). Otherwise, these cables are 6.6 ft (2 m) too.

- CU cross-connections within a Brick: 1.6 ft (0.5 m).

Use the following table to determine the cable tables to which you should refer when you recable a FRU.

Table 80 FRU cable table reference

To recable this FRU …	For a 1-Slammer system, refer to…	For a 2-Slammer system, refer to…
Pilot CU	• Table 81, Pilot CU0 in a 1-Slammer system • Table 82, Pilot CU1 in a 1-Slammer system	• Table 83, Pilot CU0 in a 2-Slammer system • Table 84, Pilot CU1 in a 2-Slammer system

Table 80 FRU cable table reference (continued)

To recable this FRU …	For a 1-Slammer system, refer to…	For a 2-Slammer system, refer to…
Private interconnect module	• Table 85, <u>Slammer 1 / CU0 private interconnect module (1 Slammer)</u> • Table 86, <u>Slammer 1 / CU1 private interconnect module (1 Slammer)</u>	• Table 87, <u>Slammer 1 / CU0 private interconnect module (2 Slammers)</u> • Table 88, <u>Slammer 1 / CU1 private interconnect module (2 Slammers)</u> • Table 89, <u>Slammer 2 / CU0 private interconnect module (2 Slammers)</u> • Table 90, <u>Slammer 2 / CU1 private interconnect module (2 Slammers)</u>
Slammer chassis	• Table 85, <u>Slammer 1 / CU0 private interconnect module (1 Slammer)</u> • Table 86, <u>Slammer 1 / CU1 private interconnect module (1 Slammer)</u>	• Table 87, <u>Slammer 1 / CU0 private interconnect module (2 Slammers)</u> • Table 88, <u>Slammer 1 / CU1 private interconnect module (2 Slammers)</u> • Table 89, <u>Slammer 2 / CU0 private interconnect module (2 Slammers)</u> • Table 90, <u>Slammer 2 / CU1 private interconnect module (2 Slammers)</u>

Table 80 FRU cable table reference (continued)

To recable this FRU …	For a 1-Slammer system, refer to…	For a 2-Slammer system, refer to…
RAID controller Brick chassis	• Table 91, <u>Cabling Bricks 1, 2, 3, and 4</u> • Table 92, <u>Cabling Bricks 5, 6, 7, and 8 (1 Slammer)</u> • Table 93, <u>Cabling Bricks 9, 10, 11, and 12 (1 Slammer)</u> • Table 94, <u>Cabling Bricks 13, 14, 15, and 16</u>	• Table 91, <u>Cabling Bricks 1, 2, 3, and 4</u> • Table 95, <u>Cabling Bricks 5, 6, 7, and 8 (2 Slammers)</u> • Table 96, <u>Cabling Bricks 9, 10, 11, and 12 (2 Slammers)</u> • Table 94, <u>Cabling Bricks 13, 14, 15, and 16</u>

Cable Reference Tables for Pilots

A Pilot provides management services over the LAN and connects to Slammers through the private management network.

Cable connections for a Pilot control unit (CU) differ between 1- and 2-Slammer systems.

Pilot Cabling in a 1-Slammer System

To cable a Pilot FRU in a 1-Slammer system, use the information in the appropriate tables below:

- Table 81, <u>Pilot CU0 in a 1-Slammer system</u>.

- Table 82, <u>Pilot CU1 in a 1-Slammer system</u>.

Important! Connect the serial ports of both Pilot FRUs with the serial null modem cable.

Table 81 Pilot CU0 in a 1-Slammer system

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Pilot	CU0	ETH0	Pilot	CU1	ETH0
		ETH1	Slammer 1	CU0	ETH0
		SER	Pilot	CU1	SER

Table 82 Pilot CU1 in a 1-Slammer system

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Pilot	CU1	ETH0	Pilot	CU0	ETH0
		ETH1	Slammer 1	CU1	ETH2
		SER	Pilot	CU0	SER

Pilot Cabling in a 2-Slammer System

To cable a Pilot FRU in a 2-Slammer system, use the information in the appropriate table below:

- Table 83, Pilot CU0 in a 2-Slammer system

- Table 84, Pilot CU1 in a 2-Slammer system.

Important! Connect the serial ports of both Pilot FRUs with the serial null modem cable.

Table 83 Pilot CU0 in a 2-Slammer system

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Pilot	CU0	ETH0	Pilot	CU1	ETH0
		ETH1	Slammer 1	CU0	ETH0
		SER	Pilot	CU1	SER

Table 84 Pilot CU1 in a 2-Slammer system

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Pilot	CU1	ETH0	Pilot	CU0	ETH0
		ETH1	Slammer 2	CU1	ETH2
		SER	Pilot	CU0	SER

Cable Reference Tables for Private Interconnect Modules

A Slammer control unit (CU) provides data path services for the LAN. The private interconnect module FRU provides access to the storage pool by means of the Storage System Fabric (SSF).

Cable connections for a private interconnect module differ between 1- and 2-Slammer systems.

Private Interconnect Module Cabling in a 1-Slammer System

In a 1-Slammer system, the Slammer designator is Slammer 1. Slammer 1 contains two control units, CU0 and CU1. Based on the CU to which the private interconnect module belongs, refer to one of these tables:

- Table 85, Slammer 1 / CU0 private interconnect module (1 Slammer).

- Table 86, Slammer 1 / CU1 private interconnect module (1 Slammer).

Table 85 Slammer 1 / CU0 private interconnect module (1 Slammer)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Private management network connections					
Slammer 1	CU0	ETH0	Pilot	CU0	ETH1
		ETH1	Slammer 1	CU1	ETH1
Storage System Fabric (SSF) cross-connections					
Slammer 1	CU0	FC1	Slammer 1	CU1	FS8
		FS8	Slammer 1	CU1	FC1
SSF to Brick connections					
Slammer 1	CU0	FS0	Brick 1	CU0	FC2
		FS1	Brick 3	CU0	FC2
		FS2	Brick 2	CU0	FC2
		FS3	Brick 4	CU0	FC2

Table 86 Slammer 1 / CU1 private interconnect module (1 Slammer)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Private management network connections					
Slammer 1	CU1	ETH1	Slammer 1	CU0	ETH1
		ETH2	Pilot	CU1	ETH1

Table 86 Slammer 1 / CU1 private interconnect module (1 Slammer) (continued)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Storage System Fabric (SSF) cross-connections					
Slammer 1	CU1	FC1	Slammer 1	CU0	FS8
		FS8	Slammer 1	CU0	FC1
SSF to Brick connections					
Slammer 1	CU1	FS0	Brick 2	CU1	FC2
		FS1	Brick 4	CU1	FC2
		FS2	Brick 1	CU1	FC2
		FS3	Brick 3	CU1	FC2

Private Interconnect Module Cabling in a 2-Slammer System

In a 2-Slammer system, the Slammer designators are Slammer 1 and Slammer 2. Each Slammer contains two control units, CU0 and CU1. Based on the Slammer and the CU into which the private interconnect module FRU has been inserted, refer to one of these tables to determine how to cable the FRU:

- Table 87, <u>Slammer 1 / CU0 private interconnect module (2 Slammers)</u>.

- Table 88, <u>Slammer 1 / CU1 private interconnect module (2 Slammers)</u>.

- Table 89, <u>Slammer 2 / CU0 private interconnect module (2 Slammers)</u>.

- Table 90, <u>Slammer 2 / CU1 private interconnect module (2 Slammers)</u>.

Table 87 Slammer 1 / CU0 private interconnect module (2 Slammers)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Private management network connections					
Slammer 1	CU0	ETH0	Pilot	CU0	ETH1
		ETH1	Slammer 1	CU1	ETH1
		ETH2	Slammer 2	CU0	ETH0

Table 87 Slammer 1 / CU0 private interconnect module (2 Slammers) (continued)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Storage System Fabric (SSF) cross-connections					
Slammer 1	CU0	FC0	Slammer 2	CU0	FS7
		FC1	Slammer 1	CU1	FS8
		FC2	Slammer 2	CU1	FS9
		FS7	Slammer 2	CU1	FC0
		FS8	Slammer 1	CU1	FC1
		FS9	Slammer 2	CU0	FC2
SSF to Brick connections					
Slammer 1	CU0	FS0	Brick 1	CU0	FC2
		FS1	Brick 3	CU0	FC2
		FS2	Brick 9	CU0	FC2
		FS3	Brick 11	CU0	FC2

Table 88 Slammer 1 / CU1 private interconnect module (2 Slammers)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Private management network connections					
Slammer 1	CU1	ETH0	Slammer 2	CU0	ETH2
		ETH1	Slammer 1	CU0	ETH1
		ETH2	Slammer 2	CU1	ETH0
Storage System Fabric (SSF) cross-connections					
Slammer 1	CU1	FC0	Slammer 2	CU1	FS7
		FC1	Slammer 1	CU0	FS8
		FC2	Slammer 2	CU0	FS9
		FS7	Slammer 2	CU0	FC0
		FS8	Slammer 1	CU0	FC1
		FS9	Slammer 2	CU1	FC2
SSF to Brick connections					
Slammer 1	CU1	FS0	Brick 2	CU1	FC2
		FS1	Brick 4	CU1	FC2
		FS2	Brick 10	CU1	FC2
		FS3	Brick 12	CU1	FC2

Table 89 Slammer 2 / CU0 private interconnect module (2 Slammers)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Private management network connections					
Slammer 2	CU0	ETH0	Slammer 1	CU0	ETH2
		ETH1	Slammer 2	CU1	ETH1
		ETH2	Slammer 1	CU1	ETH0
Storage System Fabric (SSF) cross-connections					
Slammer 2	CU0	FC0	Slammer 1	CU1	FS7
		FC1	Slammer 2	CU1	FS8
		FC2	Slammer 1	CU0	FS9
		FS7	Slammer 1	CU0	FC0
		FS8	Slammer 2	CU1	FC1
		FS9	Slammer 1	CU1	FC2
SSF to Brick connections					
Slammer 2	CU0	FS0	Brick 2	CU0	FC2
		FS1	Brick 4	CU0	FC2
		FS2	Brick 10	CU0	FC2
		FS3	Brick 12	CU0	FC2

Table 90 Slammer 2 / CU1 private interconnect module (2 Slammers)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Private management network connections					
Slammer 2	CU1	ETH0	Slammer 1	CU1	ETH2
		ETH1	Slammer 2	CU0	ETH1
		ETH2	Pilot	CU1	ETH1
Storage System Fabric (SSF) cross-connections					
Slammer 2	CU1	FC0	Slammer 1	CU0	FS7
		FC1	Slammer 2	CU0	FS8
		FC2	Slammer 1	CU1	FS9
		FS7	Slammer 1	CU1	FC0
		FS8	Slammer 2	CU0	FC1
		FS9	Slammer 1	CU0	FC2
SSF to Brick connections					
Slammer 2	CU1	FS0	Brick 1	CU1	FC2
		FS1	Brick 3	CU1	FC2
		FS2	Brick 9	CU1	FC2
		FS3	Brick 11	CU1	FC2

Cable Reference Tables for Bricks

A Brick RAID controller provides access to a segment of Axiom storage. A RAID controller uses the Storage System Fabric (SSF) to communicate with Slammers and to other controllers.

Bricks are arranged in strings. Only the Brick at the head of the string connects directly to a Slammer.

RAID Controller Cabling in a 1-Slammer System

Bricks are designated by the string Brick. Each Brick contains two control units, CU0 and CU1. Based on the CU into which the RAID controller has been inserted, for a 1-Slammer system, refer to one of the following tables:

- Table 91, Cabling Bricks 1, 2, 3, and 4.

- Table 92, Cabling Bricks 5, 6, 7, and 8 (1 Slammer).

- Table 93, Cabling Bricks 9, 10, 11, and 12 (1 Slammer).

- Table 94, Cabling Bricks 13, 14, 15, and 16.

Note: The above tables show all the connections that are needed for a particular FRU that is located in a system that has 16 Bricks. If your system has fewer than 16 Bricks, all the information in these tables may not be applicable.

Table 91 Cabling Bricks 1, 2, 3, and 4

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 1	CU0	FC0	Brick 5	CU0	FC2
		FC1	Brick 1	CU1	FC3
		FC2	Slammer 1	CU0	FS0
		FC3	Brick 1	CU1	FC1
	CU1	FC0	Brick 5	CU1	FC2
		FC1	Brick 1	CU0	FC3
		FC2	Slammer 2	CU1	FS0
		FC3	Brick 1	CU0	FC1
Brick 2	CU0	FC0	Brick 6	CU0	FC2
		FC1	Brick 2	CU1	FC3
		FC2	Slammer 2	CU0	FS0
		FC3	Brick 2	CU1	FC1
	CU1	FC0	Brick 6	CU1	FC2
		FC1	Brick 2	CU0	FC3
		FC2	Slammer 1	CU1	FS0
		FC3	Brick 2	CU0	FC1

Table 91 Cabling Bricks 1, 2, 3, and 4   (continued)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 3	CU0	FC0	Brick 7	CU0	FC2
		FC1	Brick 3	CU1	FC3
		FC2	Slammer 1	CU0	FS1
		FC3	Brick 3	CU1	FC1
	CU1	FC0	Brick 7	CU1	FC2
		FC1	Brick 3	CU0	FC3
		FC2	Slammer 2	CU1	FS1
		FC3	Brick 3	CU0	FC1
Brick 4	CU0	FC0	Brick 8	CU0	FC2
		FC1	Brick 4	CU1	FC3
		FC2	Slammer 2	CU0	FS1
		FC3	Brick 4	CU1	FC1
	CU1	FC0	Brick 8	CU1	FC2
		FC1	Brick 4	CU0	FC3
		FC2	Slammer 1	CU1	FS1
		FC3	Brick 4	CU0	FC1

Table 92 Cabling Bricks 5, 6, 7, and 8 (1 Slammer)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 5	CU0	FC0	Brick 9	CU0	FC2
		FC1	Brick 5	CU1	FC3
		FC2	Brick 1	CU0	FC0
		FC3	Brick 5	CU1	FC1
	CU1	FC0	Brick 9	CU1	FC2
		FC1	Brick 5	CU0	FC3
		FC2	Brick 1	CU1	FC0
		FC3	Brick 5	CU0	FC1
Brick 6	CU0	FC0	Brick 10	CU0	FC2
		FC1	Brick 6	CU1	FC3
		FC2	Brick 2	CU0	FC0
		FC3	Brick 6	CU1	FC1
	CU1	FC0	Brick 10	CU1	FC2
		FC1	Brick 6	CU0	FC3
		FC2	Brick 2	CU1	FC0
		FC3	Brick 6	CU0	FC1

Table 92 Cabling Bricks 5, 6, 7, and 8 (1 Slammer) (continued)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 7	CU0	FC0	Brick 11	CU0	FC2
		FC1	Brick 7	CU1	FC3
		FC2	Brick 3	CU0	FC0
		FC3	Brick 7	CU1	FC1
	CU1	FC0	Brick 11	CU1	FC2
		FC1	Brick 7	CU0	FC3
		FC2	Brick 3	CU1	FC0
		FC3	Brick 7	CU0	FC1
Brick 8	CU0	FC0	Brick 12	CU0	FC2
		FC1	Brick 8	CU1	FC3
		FC2	Brick 4	CU0	FC0
		FC3	Brick 8	CU1	FC1
	CU1	FC0	Brick 12	CU1	FC2
		FC1	Brick 8	CU0	FC3
		FC2	Brick 4	CU1	FC0
		FC3	Brick 8	CU0	FC1

Table 93 Cabling Bricks 9, 10, 11, and 12 (1 Slammer)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 9	CU0	FC0	Brick 13	CU0	FC2
		FC1	Brick 9	CU1	FC3
		FC2	Brick 5	CU0	FC0
		FC3	Brick 9	CU1	FC1
	CU1	FC0	Brick 13	CU1	FC2
		FC1	Brick 9	CU0	FC3
		FC2	Brick 5	CU1	FC0
		FC3	Brick 9	CU0	FC1
Brick 10	CU0	FC0	Brick 14	CU0	FC2
		FC1	Brick 10	CU1	FC3
		FC2	Brick 6	CU0	FC0
		FC3	Brick 10	CU1	FC1
	CU1	FC0	Brick 14	CU1	FC2
		FC1	Brick 10	CU0	FC3
		FC2	Brick 6	CU1	FC0
		FC3	Brick 10	CU0	FC1

Table 93 Cabling Bricks 9, 10, 11, and 12 (1 Slammer) (continued)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 11	CU0	FC0	Brick 15	CU0	FC2
		FC1	Brick 11	CU1	FC3
		FC2	Brick 7	CU0	FC0
		FC3	Brick 11	CU1	FC1
	CU1	FC0	Brick 15	CU1	FC2
		FC1	Brick 11	CU0	FC3
		FC2	Brick 7	CU1	FC0
		FC3	Brick 11	CU0	FC1
Brick 12	CU0	FC0	Brick 16	CU0	FC2
		FC1	Brick 12	CU1	FC3
		FC2	Brick 8	CU0	FC0
		FC3	Brick 12	CU1	FC1
	CU1	FC0	Brick 16	CU1	FC2
		FC1	Brick 12	CU0	FC3
		FC2	Brick 8	CU1	FC0
		FC3	Brick 12	CU0	FC1

Table 94 Cabling Bricks 13, 14, 15, and 16

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 13	CU0	FC1	Brick 13	CU1	FC3
		FC2	Brick 9	CU0	FC0
		FC3	Brick 13	CU1	FC1
	CU1	FC1	Brick 13	CU0	FC3
		FC2	Brick 9	CU1	FC0
		FC3	Brick 13	CU0	FC1
Brick 14	CU0	FC1	Brick 14	CU1	FC3
		FC2	Brick 10	CU0	FC0
		FC3	Brick 14	CU1	FC1
	CU1	FC1	Brick 14	CU0	FC3
		FC2	Brick 10	CU1	FC0
		FC3	Brick 14	CU0	FC1
Brick 15	CU0	FC1	Brick 15	CU1	FC3
		FC2	Brick 11	CU0	FC0
		FC3	Brick 15	CU1	FC1
	CU1	FC1	Brick 15	CU0	FC3
		FC2	Brick 11	CU1	FC0
		FC3	Brick 15	CU0	FC1

Table 94 Cabling Bricks 13, 14, 15, and 16   (continued)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 16	CU0	FC1	Brick 16	CU1	FC3
		FC2	Brick 12	CU0	FC0
		FC3	Brick 16	CU1	FC1
	CU1	FC1	Brick 16	CU0	FC3
		FC2	Brick 12	CU1	FC0
		FC3	Brick 16	CU0	FC1

RAID Controller Cabling in a 2-Slammer System

Bricks are designated by the string *Brick*. Each Brick contains two control units, CU0 and CU1. Based on the CU into which the RAID controller has been inserted, for a 2-Slammer system, refer to one of the following tables:

- Table 91, Cabling Bricks 1, 2, 3, and 4.

- Table 95, Cabling Bricks 5, 6, 7, and 8 (2 Slammers).

- Table 96, Cabling Bricks 9, 10, 11, and 12 (2 Slammers).

- Table 94, Cabling Bricks 13, 14, 15, and 16.

Note: The above tables show all the connections that are needed for a particular FRU that is located in a system that has 16 Bricks. If your system has fewer than 16 Bricks, all the information in these tables may not be applicable.

Table 95 Cabling Bricks 5, 6, 7, and 8 (2 Slammers)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 5	CU0	FC1	Brick 5	CU1	FC3
		FC2	Brick 1	CU0	FC0
		FC3	Brick 5	CU1	FC1
	CU1	FC1	Brick 5	CU0	FC3
		FC2	Brick 1	CU1	FC0
		FC3	Brick 5	CU0	FC1
Brick 6	CU0	FC1	Brick 6	CU1	FC3
		FC2	Brick 2	CU0	FC0
		FC3	Brick 6	CU1	FC1
	CU1	FC1	Brick 6	CU0	FC3
		FC2	Brick 2	CU1	FC0
		FC3	Brick 6	CU0	FC1
Brick 7	CU0	FC1	Brick 7	CU1	FC3
		FC2	Brick 3	CU0	FC0
		FC3	Brick 7	CU1	FC1
	CU1	FC1	Brick 7	CU0	FC3
		FC2	Brick 3	CU1	FC0
		FC3	Brick 7	CU0	FC1

Table 95 Cabling Bricks 5, 6, 7, and 8 (2 Slammers) (continued)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 8	CU0	FC1	Brick 8	CU1	FC3
		FC2	Brick 4	CU0	FC0
		FC3	Brick 8	CU1	FC1
	CU1	FC1	Brick 8	CU0	FC3
		FC2	Brick 4	CU1	FC0
		FC3	Brick 8	CU0	FC1

Table 96 Cabling Bricks 9, 10, 11, and 12 (2 Slammers)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 9	CU0	FC0	Brick 13	CU0	FC2
		FC1	Brick 9	CU1	FC3
		FC2	Slammer 1	CU0	FS2
		FC3	Brick 9	CU1	FC1
	CU1	FC0	Brick 13	CU1	FC2
		FC1	Brick 9	CU0	FC3
		FC2	Slammer 2	CU1	FS2
		FC3	Brick 9	CU0	FC1

Table 96 Cabling Bricks 9, 10, 11, and 12 (2 Slammers) (continued)

Cable this port…			To this port…		
Chassis	**CU**	**Port**	**Chassis**	**CU**	**Port**
Brick 10	CU0	FC0	Brick 14	CU0	FC2
		FC1	Brick 10	CU1	FC3
		FC2	Slammer 2	CU0	FS2
		FC3	Brick 10	CU1	FC1
	CU1	FC0	Brick 14	CU1	FC2
		FC1	Brick 10	CU0	FC3
		FC2	Slammer 1	CU1	FS2
		FC3	Brick 10	CU0	FC1
Brick 11	CU0	FC0	Brick 15	CU0	FC2
		FC1	Brick 11	CU1	FC3
		FC2	Slammer 1	CU0	FS3
		FC3	Brick 11	CU1	FC1
	CU1	FC0	Brick 15	CU1	FC2
		FC1	Brick 11	CU0	FC3
		FC2	Slammer 2	CU1	FS3
		FC3	Brick 11	CU0	FC1

Table 96 Cabling Bricks 9, 10, 11, and 12 (2 Slammers) (continued)

Cable this port…			To this port…		
Chassis	CU	Port	Chassis	CU	Port
Brick 12	CU0	FC0	Brick 16	CU0	FC2
		FC1	Brick 12	CU1	FC3
		FC2	Slammer 2	CU0	FS3
		FC3	Brick 12	CU1	FC1
	CU1	FC0	Brick 16	CU1	FC2
		FC1	Brick 12	CU0	FC3
		FC2	Slammer 1	CU1	FS3
		FC3	Brick 12	CU0	FC1

Slammer LED Startup Progress Codes

Introduction to 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 20 minutes.

Note:

- The time to start up your system may be shorter or longer, depending the configuration of Slammers and Bricks and a number of other factors.

- 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 (Fault, Activity, and Status) help you identify where the Slammer halted in the startup sequence.

- Slammers cannot complete the startup sequence without the Pilot being powered on and functioning.

LED Startup Progress Codes

When a Slammer halts while it is in its startup stage, the FLT, ACT, and ST LEDs have a certain color and blink rate configuration. These LEDs are located on the bezel and on the private interface module at the back of the chassis.

FLT, ACT, and ST LEDs can:

- Be green or amber.

- Be on or off.

- Be steady, with no blinks.

- Blink rapidly—two blinks per sec (2.0 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 at the end of this section.

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 97 Code translation for the FLT LED

LED color	Blink rate	Code
None	Off	0
Amber	Steady	1
	Rapid	2
	Slow	3

Tip: While a Slammer is starting up, the FLT LED will always be on. An amber FLT LED indicates that the Slammer is in the start up process.

The second digit of the startup progress code is determined by the color and blink rate of the ACT LED. Use the information in the following table to determine the second digit of this code.

Table 98 Code translation for the ACT 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 ST LED. Use the information in the following table to determine the third digit of this code.

Table 99 Code translation for the ST LED

LED color	Blink rate	Code
None	Off	0

Table 99 Code translation for the ST LED (continued)

LED color	Blink rate	Code
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 204, which means that the Slammer is ready to do simple memory tests:

- FLT—amber, rapid blink

- ACT—off

- ST—amber, slow blink

The following table describes the meaning of the startup progress codes that are indicated by the FLT, ACT, and ST LEDs. These LEDs are located on the bezel and on the back of Slammers.

Note: The software modules in the table below are defined as follows:

- Boot Block is a software module that contains initialization routines, which include RBIOS validation.

- RBIOS is the runtime BIOS. It is updateable in the field.

- SBIOS is the safe (or backup) BIOS. It is not updateable in the field. SBIOS guarantees that the Slammer can start up even when RBIOS is corrupted.

- MPOST is manufacturing POST and is for testing the motherboard.

Table 100 Slammer LED startup codes

Code	Software module	Meaning
000	Boot Block	CPU did not start to fetch code yet.
100		BIOS started to execute.
101		Ready to initialize memory.
102		Ready to do a simple memory test.
103		Ready to check RBIOS CRC. If CRC is OK, control transfers to RBIOS; otherwise, control transfers to SBIOS.
160	MPOST	MPOST is ready to load.

Table 100 Slammer LED startup codes (continued)

Code	Software module	Meaning
201	RBIOS or SBIOS	RBIOS started to execute.
202		Ready to initialize chipset register using register table.
203		Ready to initialize memory.
204		Ready to do simple memory tests.
205		Ready to do shadow.
206		Ready to enumerate PCI.
210		Extended memory test in progress.
211		Ready to probe storage (ATA and CD-ROM) and prepare the boot tables.
212		Ready to probe PCI Option ROM.
213		Ready to do final CPU initialization.
222		Ready to transfer control to OS.
233		Spurious interrupt.
3XX	OS Boot	LED startup progress code reserved for the OS.

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.

APPENDIX E

Axiom Component Power Consumption

Introduction to Component Power Consumption

Axiom systems use either of the following:

- 115 V or 230 V single-phase power with two or four power distribution units (PDUs)

- 208 V three-phase power with two PDUs

Important! Each PDU should attach to a dedicated supply circuit.

Single-Phase PDUs

Single-phase (115 V / 230 V) PDUs have 16 power outlets, which are organized into two groups of eight. Each group is controlled by a separate circuit breaker (CB), as shown in Figure 65.

- For CB-1, all eight outlets are located at the rear of the PDU.

- For CB-2, four outlets are located at the rear of the PDU and four are located at the front, next to the breakers.

Figure 65 Single-phase PDU circuit breakers (front view)

CB 1   CB 2

Figure 66 shows the distribution of the twelve outlets on the back of the PDU across the two circuit breakers.

Figure 66 Single-phase PDU outlet distribution (back view)

PDU

1 2 3 4   5 6 7 8   1 2 3 4

Power inlet

CB-1   CB-2

(CB-2 also switches four additional outlets on the front of the PDU)
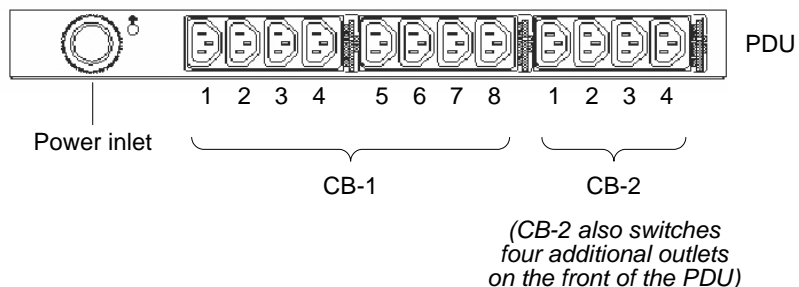
Single-phase PDUs are used in pairs: two for a small system and four for a fully populated rack.

Three-Phase PDUs

Three-phase (208 v) PDUs have 22 power outlets (see Figure 67), which are organized as follows:

- Phase A has eight outlets.

- Phase B has seven outlets.

- Phase C has seven outlets.

Figure 67 Three-phase PDU outlet distribution

Power inlet cable
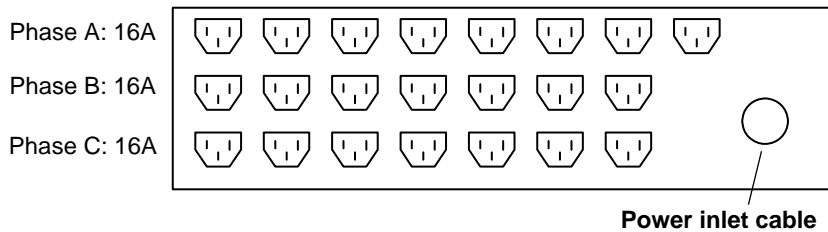
Each phase is protected by a 20A circuit breaker, which has a 16A rating. The phase circuit breakers are ganged together and are all switched on or off at the same time (see Figure 68).

Figure 68 Three-phase PDU circuit breakers

Ganged circuit breakers
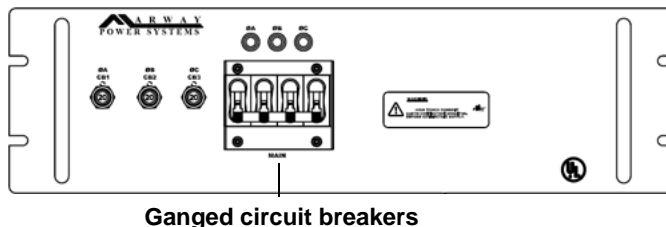
Three-phase Axiom systems use a single pair of three-phase PDUs.

PDU Connections

All illustrations in the following cabling sections show half of the PDUs and their associated cabling. The other half provides redundant power and is cabled in an identical way.

Cabling 115 V Single-Phase PDUs

Axiom systems that have a single pair of 115 V / 20 A, single-phase PDUs can support:

- The Pilot

- One Slammer

- Two Bricks

- One Data Management Systems (DMS) unit

Axiom systems with only a single pair of 115 V / 20 A PDUs cannot support a second Slammer. However, a third Brick can be installed in place of the DMS unit.

Note: For 115 V / 30 A service, see Table 104 for configuration limits.

Figure 69 shows the power cable configuration for a two-PDU (115 V / 20 A) system.

Figure 69 PDU connections for 115 V / 20 A power (2 PDUs)
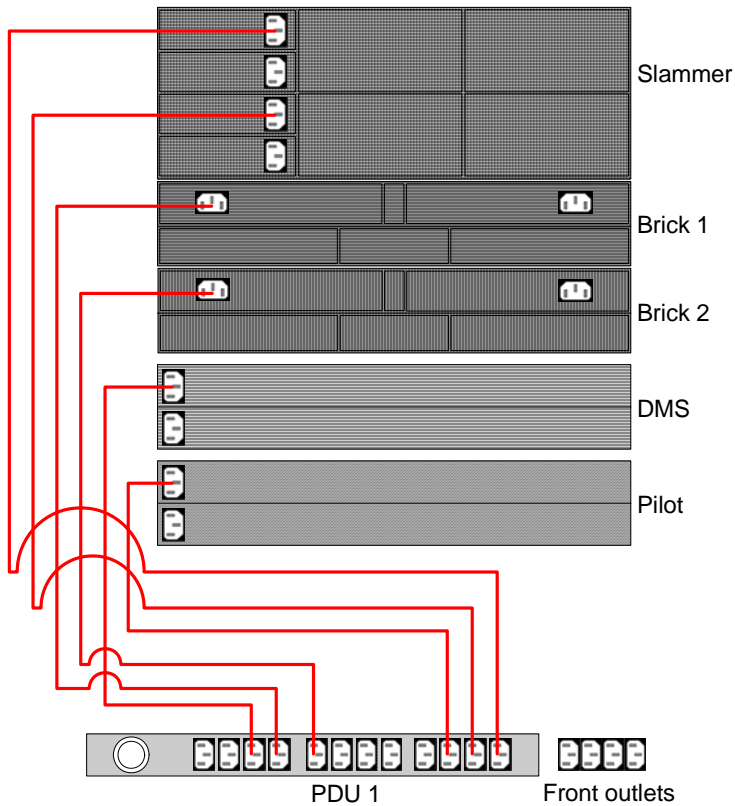
This chart shows ½ of the power cables. A fully cabled, 115 V/20 A, two-PDU system connects the redundant power cables to PDU 2 in a similar pattern.

A 115 V / 20 A system with a second pair of PDUs can support up to six additional Bricks. Figure 70 shows the additional power cable configuration for a four-PDU (115 V / 20 A) system.

Figure 70 PDU connections for 115 V / 20 A power (4 PDUs)
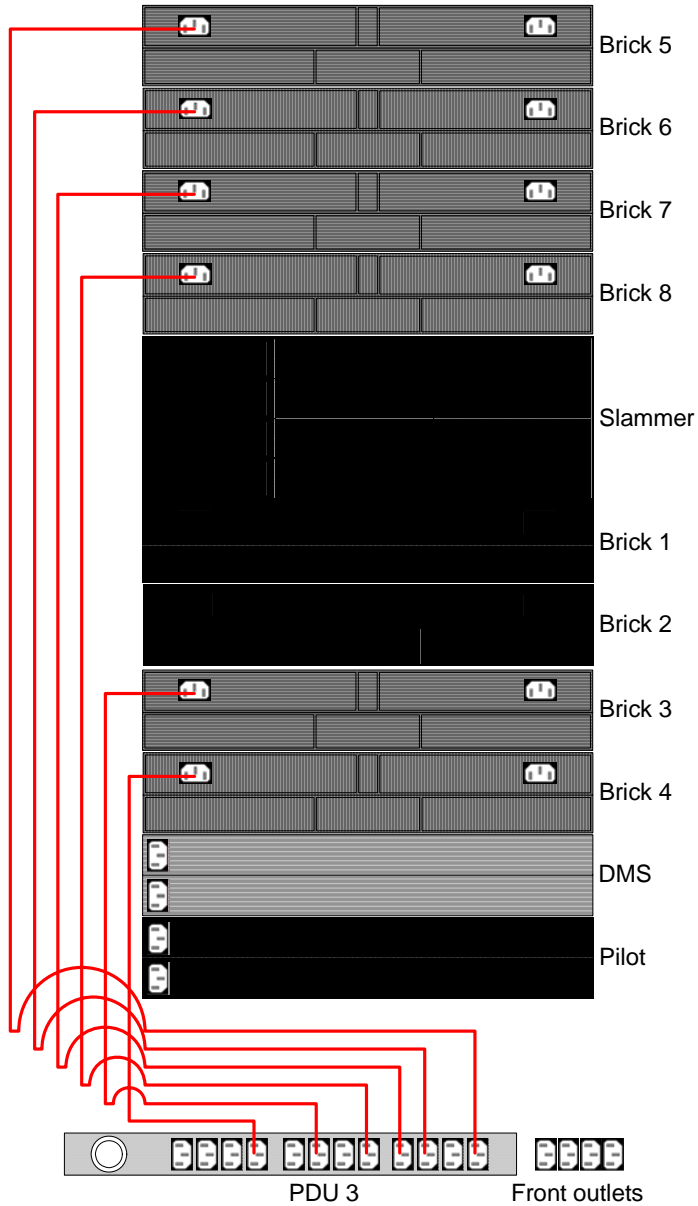
This chart shows ½ of the power cables. A fully cabled, 115 V/20 A, four-PDU system connects the redundant power cables to PDU 4 in a similar pattern.

Cabling 230 V Single-Phase PDUs

Axiom systems that have a single pair of 230 V / 30 A single-phase PDUs can support:

- The Pilot

- One of the following configurations:

    - One Slammer and twelve Bricks

    - Two Slammers and ten Bricks

    Important! For installations outside the United States of America, the limit is six Bricks per PDU.

- A Data Management Systems (DMS) unit.

    Note: Alternatively, you can replace the DMS unit with an additional Brick.

Note: For 230 V / 20 A service, see Table 103 for configuration limits.

Figure 71 shows the power cable configuration for a two-PDU (230 V / 30 A) system.

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, this set of 230 V / 30 A PDUs is installed in a second 42 U rack, these additional PDUs can power up to 18 Bricks. In this case, you should balance the power load across the circuits.

Figure 71 PDU connections for 230 V / 30 A power (2 PDUs)
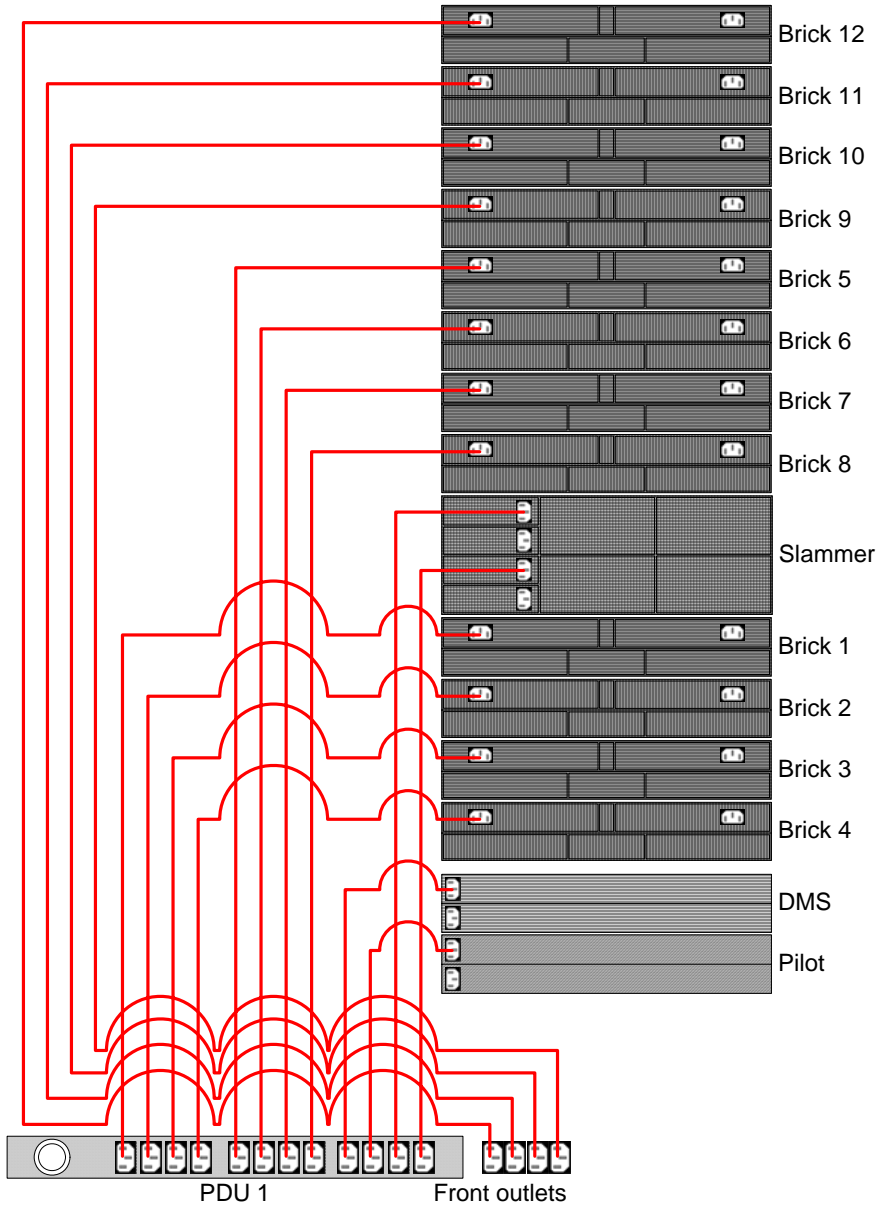
This chart shows ½ of the power cables. A fully cabled, 230 V/30 A, two-PDU system connects the redundant power cables to PDU 2 in a similar pattern.

Cabling 208 V Three-Phase PDUs

Axiom systems that have a pair of 208 V / 30 A three-phase PDUs can support:

- The Pilot

- One Slammer

- 13 Bricks

- A Data Management Systems (DMS) unit.

    Note: Alternatively, you can replace the DMS unit with an additional Brick in phase A.

Figure 72 shows the power cable configuration for a two-PDU, 208 V / 30 A, three-phase system.

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 or phase C.

Figure 72 PDU connections for 208 V / 30 A power (2 PDUs)
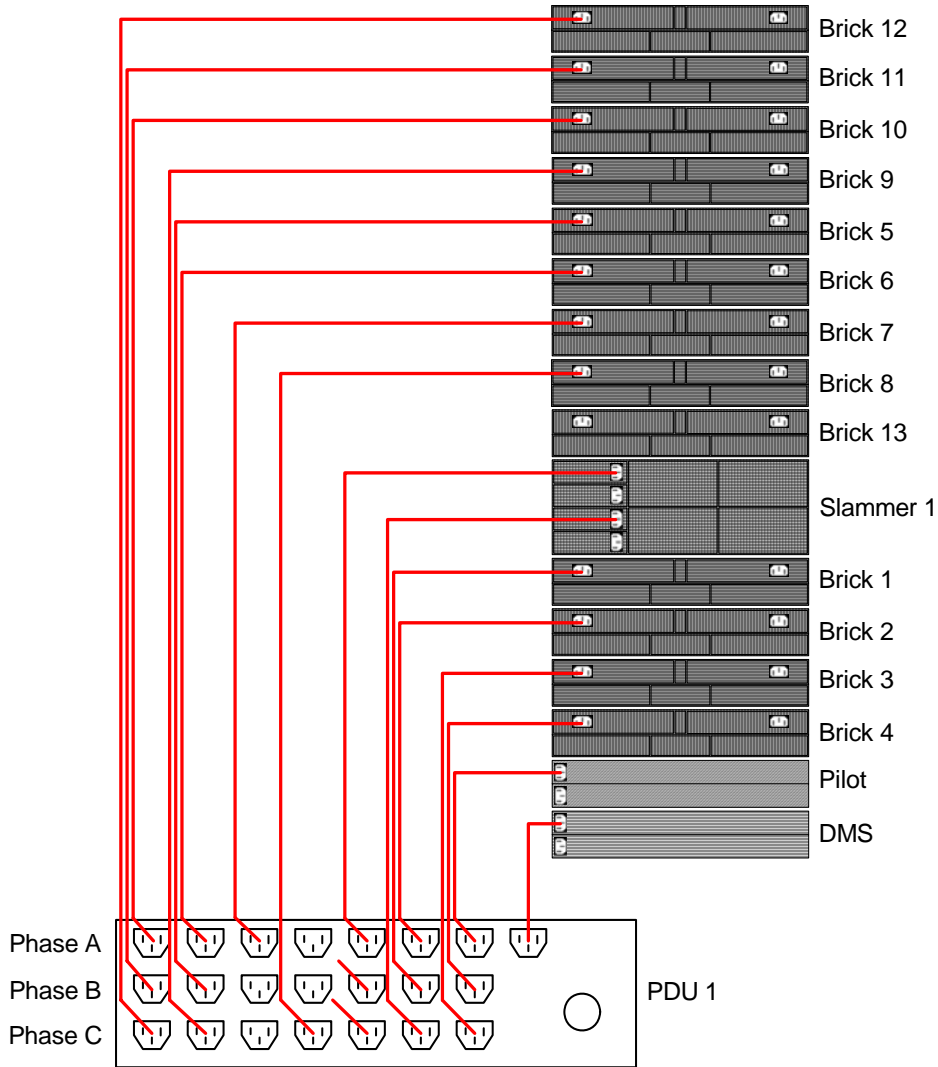
This chart shows ½ of the power cables. A fully cabled, 208 V / 30 A, two-PDU three-phase system connects the redundant power cables to PDU 2 in a similar pattern.

Current and Power Summary

The following tables provide the current and power used by different numbers of Bricks. The calculations include the current and power used by *one* Slammer.

Table 101 Current and power in a 115 V system

Bricks	Current (amps)	Watts
2	13.334	1386.6
3	16.001	1644.9
4	18.668	1903.2
5	21.335	2161.5
6	24.002	2419.8
7	26.669	2678.1
8	29.336	2936.4
9	32.003	3194.7
10	34.670	3453.0
11	37.337	3711.3
12	40.004	3969.3
13	42.671	4227.9
14	45.338	4486.2

Table 102 Current and power in a 230 V system

Bricks	Current (amps)	Watts
2	6.46	1386.6
3	7.69	1644.9
4	8.92	1903.2
5	10.15	2161.5
6	11.38	2419.8
7	12.61	2678.1
8	13.84	2936.4
9	15.07	3194.7
10	16.30	3453.0
11	17.53	3711.3
12	18.76	3969.3
13	19.99	4227.9
14	21.22	4486.2
15	22.45	4744.5
16	23.68	5002.8

Component Configuration Limits

The following tables indicate the maximum numbers of Bricks that can be supported given a particular configuration of PDUs, Slammers, and a Data Management Systems (DMS) unit. All systems include one Pilot. These tables also summarize the current drawn and power consumed by each configuration.

Table 103 System configurations for 20 A service

Voltage	PDUs	Slammers	DMS unit	Maximum Bricks	Current	Power
115	2	1	0	3	16.00	1404
			1	2	15.33	1604
	4	1	0	8	29.34	3006
			1	8	31.34	3206
		2	0	6	30.40	3192
			1	5	29.74	3125

Table 103 System configurations for 20 A service (continued)

Voltage	PDUs	Slammers	DMS unit	Maximum Bricks	Current	Power
230	2	1	0	9	15.07	3195
			1	8	14.84	3136
		2	0	7	15.81	3398
			1	6	15.58	3340
	4	1	0	22	31.06	6553
			1	21	30.83	6494
		2	0	20	31.8	6756
			1	19	31.57	6698

Note: For 20A service, UL allows no more than 16A per PDU. For a 115V supply, this limits the configuration of a two-PDU system to one Slammer, two Bricks and one DMS unit. All systems include one Pilot.

Table 104 System configurations for 30 A service

Voltage	PDUs	Slammers	DMS unit	Maximum Bricks	Current	Power
115	2	1	0	5	21.34	2205
			1	5	23.34	2405
		2	0	3	22.40	2391
			1	2	21.73	2324
	4	1	0	14	45.34	4608
			1	13	44.67	4541
		2	0	12	46.40	4794
			1	11	45.74	4727
230	2	1	0	13	19.99	4228
			1	12	19.76	4170
		2	0	11	20.73	4431
			1	10	20.50	4373
	4	1	0	29	39.67	8361
			1	28	39.44	8302
		2	0	27	40.41	8564
			1	26	40.18	8506

Note: More Bricks are listed than will fit in a single 42 U rack.

APPENDIX F

Return a Failed Component

The Return Material Authorization (RMA) process enables you to obtain replacement parts that have failed during their warranty or support period.

Pillar Data Systems uses an Advance Exchange program. Under this program, Pillar Data Systems ships a replacement component to the customer before the failed component reaches Pillar Data Systems. There is no cost to the customer as long as the defective component is returned within 10 calendar days.

Carefully follow these instructions to ensure the safe and timely return of your defective material.

To pack the FRU:

1 Remove the replacement part from the package in which it was shipped. Retain the anti-static bag if one was provided.

2 Locate and retain the prepaid shipping label that came with your replacement part(s).

3 If the replacement part came in an anti-static bag, place the part to be returned into the bag.

4   Place the part into the empty package.

5   Seal the packag securely with shipping tape.

6   Attach the prepaid shipping label over the old shipping address label.

7   Contact the carrier identified on the shipping label to arrange the pickup of your return.

APPENDIX **G**

Hardware Specifications

Introduction to Hardware Specifications

Hardware specifications (sometimes called data sheets):

- Describe the system's operating environment.

- List the agency approvals.

- List physical attributes of the Axiom system and its hardware components.

Axiom Hardware Specifications

An Axiom storage system is an assembly of the following components, all of which are described in this appendix:

- One Pilot management controller.

  For details, see Pilot Hardware Specifications.

- One or two Slammer storage controllers.

  For details, see Slammer Hardware Specification.

- Two to 16 Brick storage enclosures.

  For details, see 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.

  For details, see Axiom PDU Hardware Specification.

- One or two racks, the number of which depends on the configuration of Slammers and Bricks.

  For details, see Pillar Rack Hardware Specification.

An Axiom storage system has the characteristics that are described on the following pages.

System Power Requirements

Axiom systems require one of these power inlet types:

- Nominal 100-120 V, 47-63 Hz, 20 A

- Nominal 200-240 V, 47-63 Hz, 20 A

- Nominal 100-120 V, 47-63 Hz, 30 A

- Nominal 200-240 V, 47-63 Hz, 30 A

- 199-217 V, 47-63 Hz, 30 A, Wye-connected 3-phase

The total power required by a rack depends on the number and type of hardware that is in the rack. Refer to:

- Current and Power Summary in Appendix E.

- Component Configuration Limits in Appendix E.

System Environmentals

Table 105 System altitude specifications

Mode	Elevation
operational	-200 to 10,000 ft (-61 to 3048 m)
nonoperational	-200 to 40,000 ft (-61 to 12,192 m)

Table 106 System temperature and humidity specifications

Mode	Temperature	Non-condensing Humidity	Max wet bulb temperature	Gradient
operational	+41 to 104º F (5 to 40º C) up to 7000 ft	10–85% 10%/hr gradient	86° F (30° C)	36º F/hr (20º C/hr)
nonoperational	-40 to 158º F (-40 to 70º C)	5–95% 10%/hr gradient	104° F (40° C)	54º F/hr (30º C/hr)

Note: For Bricks that have five-platter disk drives, the maximum ambient operational temperature from 7000 ft to 10,000 ft is 95º F (35º C).

Acoustics for an 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.

Table 107 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.

Table 108 System random vibration specifications

Mode	Force	Frequency	Time
operational	0.1 G RMS	3–100 hz (X, Y, and Z axis)	15 min
nonoperational	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 system that consists of:

- One Pilot.

- Two NAS Slammers.

- Twelve Bricks.

This section identifies:

- [Regulatory Agency Compliances](#)

- [FCC Warning Statement](#)

- [European Union Compliance Statement](#)

Regulatory Agency Compliances

The Axiom storage system complies with the following regulatory agency requirements.

Table 109 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. (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, Third Edition (1999)
CE	Conformite Europeenne /DoC
cULus	UL and CSA under UL (cUL)
TUV/GS	TUV/GS
	ISO 9001:2000 Registered manufacturing process

Table 110 EM emissions & immunity

Standard

• CISPR 22-A
• EN55022 Class A radiated and conducted emissions (110V/220V)
• 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
  • EN 61000-4-6 Conducted immunity: 3 V
  • EN 61000-4-8
  • EN 61000-4-11 Supply dips and interruptions: 30% and 100%

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.)

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, 120v/220v)

2 EMC: 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

  • 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:

- 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.

System Warranty

Hardware components in an Axiom storage system are covered by a three-year warranty.

Pilot Hardware Specifications

A Pilot is an active management and provisioning front end as well as the administrator interface to an Axiom storage system.

Pilot Dimensions and Weight

Table 111 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	24 in (61.0 cm)
Weight	40 lb (18.1 kg)

Pilot Power Characteristics

Table 112 Pilot power characteristics (per control unit)

Power characteristic	Value
Frequency (Hz)	47–63
AC voltage	100–240
Current draw	1.6 A at 115 V 0.8 A at 230 V
Max power consumption (VA)	150
Max heat dissipation (BTU/hr)	750
AC plug type	2 IEC 320 connection

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.

Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

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.

Micro-Star International MS-9211

FC Tested to comply
with FCC Standard

For Home or Office Use

Table 113 Pilot safety & quality standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15 for a class B digital device.
C E	Conformite Europeenne /DoC

Pilot 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.

Slammer Hardware Specification

Slammers are fully redundant controllers within an Axiom storage system. A Slammer can be ordered as either a SAN or a NAS front end.

Slammer Dimensions and Weight

Table 114 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 115 Slammer power characteristics

Power characteristic	Value
Frequency (Hz)	47–63
AC voltage	100–120 / 200–240
Max power consumption (VA)	720

Table 115 Slammer power characteristics (continued)

Power characteristic	Value
Current draw (combined for both control units)	6.4 A at 115 V 3.2 A at 230 V
Max heat dissipation (BTU/hr)	2220
AC plug type	Four IEC 320 C13 connection

Slammer Regulatory Agency Compliance

Axiom Slammers comply with the following regulatory agency requirements.

Table 116 Slammer safety & 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)

Table 116 Slammer safety & quality standards (continued)

Logo	Standard
CE	Conformite Europeenne /DoC
c(UL)us	UL and CSA under UL (cUL)
TUV/GS	TUV/GS
	ISO 9001:2000 Registered manufacturing process

Table 117 Slammer EM emissions & immunity

Standard
• CISPR 22-A • EN55022 Class A radiated & conducted emissions (110v/220v) • 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   • EN 61000-4-6 Conducted immunity: 3 V   • EN 61000-4-11 Supply dips & 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.

Brick Hardware Specification

A Brick is a high-performance disk subsystem with an optimized, proprietary RAID controller.

Brick Dimensions and Weight

Table 118 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	65 lb (29.5 kg)

Brick Power Characteristics

Table 119 Brick power characteristics

Power characteristic	Value
Frequency (Hz)	47–63
AC voltage	100–120 / 200–240
Max power consumption (VA)	267
Current draw	2.667 A at 115 V 1.233 A at 230 V
Max heat dissipation (BTU/hr)	1370
AC plug type	Two IEC 320 connections

Brick Regulatory Agency Compliance

Axiom Bricks comply with the following regulatory agency requirements.

Table 120 Brick safety & 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)
$C\epsilon$	Conformite Europeenne /DoC
	UL and CSA under UL (cUL)
	TUV/GS
	ISO 9001:2000 Registered manufacturing process

Table 121 Brick EM emissions & immunity

Standard

• CISPR 22-A
• EN55022 Class A radiated & conducted emissions (110v/220v)
• 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
   • EN 61000-4-6 Conducted immunity: 3 V
   • EN 61000-4-11 Supply dips and interruptions: 30% & 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.

Axiom PDU Hardware Specification

If you install non-Pillar PDUs, they must meet the Pillar Data Systems PDU specification, as outlined below.

Table 122 PDU specifications

Criteria	20 amp	30 amp
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
Receptacles	C13, 12 receptacles min. Mounted on rear of chassis (opposite circuit breakers).	C13, 12 receptacles min. Mounted on rear 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
Voltage input	100–240 VAC	100–240 VAC
Voltage output	100–240 VAC	100–240 VAC
Circuit breakers	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.
Receptacle 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
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

Table 122 PDU specifications (continued)

Criteria	20 amp	30 amp
Surge suppression	270 VAC	320 VAC

Pillar Rack Hardware Specification

A Pillar 42 U rack contains:

- One Pilot.

- One or two NAS or SAN Slammers

- Two to 15 Bricks. The exact number of Bricks depends on the number of Slammers in the rack.

Table 123 Rack specifications for an Axiom system

Criteria	Pillar 42 U	Non-Pillar 42 U (minimum requirements)
Height (inside)	42 U 73.6 in (187 cm)	42 U 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)	
Width	• 23.8 in (60.48 cm) overall • 17.7 in (45 cm) rail-to-rail • 19 in (48.26 cm) panel	

Table 123 Rack specifications for an Axiom system (continued)

Criteria	Pillar 42 U	Non-Pillar 42 U (minimum requirements)
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 • 1 in (2.54 cm) clearance between front vertical channel and inside of frame.	• Vented • 1 in (2.54 cm) deep min. • 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	
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

Table 123 Rack specifications for an Axiom system (continued)

Criteria	Pillar 42 U	Non-Pillar 42 U (minimum requirements)
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 watts
Heat dissipation	28,500 BTU/hr	28,500 BTU/hr
Frame gauge		12-14
Loaded weight	1505 lb (683 kg)	1505 lb (683 kg)
Topple angle when fully loaded and stationary	• 12º when front of rack faces downward • 24º when rear of rack faces downward	

The center of gravity of a populated Pillar 42 U rack is toward the front. The treshhold tilt angle depends on whether the front or rear of the rack faces down the slope:

- Front faces downward: 12º maximum slope.

- Rear faces downward: 24º maximum slope.

Figure 73 Maximum tilt angles for stationary Pillar 42 U racks

24⁰ maximum tilt

12⁰ maximum tilt

Index