Pillar Axiom® 600

Hardware
Installation Guide

pillar
DATA SYSTEMS

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Important Note to Users

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Preface

Audience

This guide is for data center system administrators and Professional Services consultants who install Pillar Axiom Storage System that come with most components already installed in Pillar racks. We assume that you understand how to:

- Assemble hardware components.
- Connect the components to the LAN and to power circuits.
- Use a graphical user interface (GUI) in a web browser.

This guide explains how to:

- Position and stabilize a populated rack in the data center.
- Create rack bays.
- Install hardware components.
- Connect the system to inlet power and to the networks.
- Turn on the system.
- Perform initial configuration.

Before You Read This Guide

Being familiar with certain other Pillar Axiom technical documentation helps you succeed in the use of this guide.

Before you install the Pillar Axiom system, you should be familiar with certain basic characteristics of the environment in which you intend to install the system.

To review those basic environmental characteristics, refer to the following resources that you completed earlier with the assistance of your Pillar Data Systems representative:

- *Site Preparation Survey*

- *Storage Requirements Survey*

In addition to this guide, review the late-breaking information described in the *Pillar Axiom Customer Release Notes*. That information includes important information that was not available at the time this guide was published, including:

- Errata for technical documents (including this guide).

- Network requirements.

- Known issues.

- Various notations on the operation of the Pillar Axiom system.

There is also additional documentation in the *Pillar Axiom 600 SSF Cabling Reference* guide, which includes detailed information on the cabling of Bricks and Slammers in various configurations.

Refer to the *Pillar Axiom Expansion Guide* if you want to expand or upgrade your system by adding Bricks and Slammers.

How This Guide Is Organized

This guide provides procedural and reference information to install the various components within a Pillar Axiom system, power it on, and perform the initial configuration.

To perform any upgrade, you must contact the Pillar World Wide Customer Support Center and refer to the *Pillar Axiom Expansion Guide*. Upgrade information is beyond the scope of this guide.

The guide is divided into seven chapters and three appendices:

- Chapter 1 provides information on Pillar Axiom system components, equipment and tools required by the customer for the installation process, and safety notices.

- Chapter 2 provides information on setting up the rack, component placement plans for various system configurations, and installing mounting rails for the Slammers, the Bricks, and the Pilot.

- Chapter 3 provides information on the installation of power distribution units (PDUs), Slammers, Bricks, and the Pilot.

- Chapter 4 provides information on the data cable connections within the Pillar Axiom system.

- Chapter 5 provides information on the power cable connections within the Pillar Axiom system.

- Chapter 6 provides information on the final steps to complete the installation. This includes procedures on powering on the system, verifying the status of various LEDs, attaching bezels on the system components, and attaching rack doors and panels.

- Chapter 7 provides information on how to access the AxiomONE Storage Services Manager GUI and to perform the initial configuration.

- Appendix A provides information on the various LED codes and what they indicate.

- Appendix B summarizes all warning and caution notices in various languages.

- Appendix C provides reference information on the hardware specifications for the Pillar Axiom system and its various components.

Related Documentation

Table 1 Additional information resources for all systems

Description	Title and part number
The definitions of terms found in Pillar Axiom documentation.	*Pillar Glossary*
An introduction to the hardware and software architecture of a Pillar Axiom system.	*Pillar Axiom System Architecture Overview*
Removal and insertion instructions for field replaceable units (FRUs).	*Pillar Axiom 600 Service Guide*
Cabling instructions for Bricks and Slammers within a Pillar rack.	*Pillar Axiom 600 SSF Cabling Reference*
Expansion and upgrade information for the Pillar Axiom system.	*Pillar Axiom Expansion Guide*
Any late breaking information regarding Pillar Axiom systems.	*Pillar Axiom Customer Release Notes*

Access Documentation

Pillar Data Systems technical documentation (including installation, service, cabling, integration, and administration guides) are available from several sources.

Pillar Axiom GUI   After logging in to the AxiomONE Storage Services Manager on the Pilot, navigate to **Support > Documentation** and click on the document of interest.

Websites   Technical documents (http://www.pillardata.com/techdocs) Customer support portal (https://support.pillardata.com/login.do)

After logging in to the website, click on **Documents** in the left navigation pane, and then click the appropriate category in the expanded list. Click on the document of interest.

Product CD-ROM   Insert the Technical Documentation CD-ROM that came with your Pillar Axiom Storage System into the CD player in a computer. Open the DocMenu PDF and click on the document of interest.

Tip: To search all technical documents on the CD-ROM, click the **Search all PDFs** icon in the top right corner. In the Search dialog, enter the word or phrase for which you would like to search.

Typographical Conventions

Table 2 Typography to mark certain content

Convention	Meaning
italics	Within normal text, words in italics indicate: • A reference to a book title. • New terms and emphasized words. • Command variables.

Table 2 Typography to mark certain content (continued)

Convention	Meaning
monospace	Indicates one of the following, depending on the context: • The name of a file or the path to the file. • *Output* displayed by the system on the command line.
monospace (bold)	*Input* provided by an administrator on the command line.
>	Indicates a menu item or a navigation path in a graphical user interface (GUI). For example, "Click **Storage > Clone LUNs**" means to click the **Clone LUNs** link on the **Storage** page in the graphical user interface (GUI).
...	Used within an expression of a navigation path or within a cascading menu structure. The ellipsis indicates that one or more steps have been omitted from the path or menu structure. For example, in the **Groups > Volume Groups > Actions > ... > Data Protection > Create** menu structure, the ... implies that one or more menu items have been omitted.

Pillar Contacts

Table 3 Contacts at Pillar Data Systems

For help with...	Contact...
Error messages, usage questions, and other support issues	US and Canada: 877-4PILLAR (1-877-474-5527) Europe: +800 PILLAR FS (+800 74 55 27 37) Asia Pacific: +1-408-518-4515 South Africa: +0 800 980 400 Have your system serial number ready. support@pillardata.com Customer support portal (https://support.pillardata.com/login.do)

Table 3 Contacts at Pillar Data Systems (continued)

For help with...	Contact...
Training (custom or packaged)	Training and Education (http://www.pillardata.com/support-education/training/)
Professional services and inquiries	globalsolutions@pillardata.com Global Solutions (http://www.pillardata.com/support/professional-services/)
Sales and general contact information	Company contacts (http://www.pillardata.com/company/contact)
Documentation improvements and resources	docs@pillardata.com Technical documents (http://www.pillardata.com/techdocs) (Log in with your username and password, and select Documents.)

CHAPTER 1

Before You Begin

Pillar Axiom Series Components

Pillar Axiom 600 systems contain a specific combination of the components listed in the following table:

Table 4 Pillar Axiom 600 series components

Product name	Model and description
Brick storage enclosures	• BRX 1000S7—Brick,SATA,13 x 1TB,7200 RPM drives,RoHS • BRX 2000S7—Brick,SATA,13 x 2TB,7200 RPM drives,RoHS • BRX 2000S5—Brick,SATA,13 x 2TB,5400 RPM drives,RoHS • BRX 500S7—Brick,SATA,13x500GB,7200 RPM drives,HSF • BRX 300FCV2—Brick,FC RAID (FCV2),12x300GB,15K RPM Drives,HSF • BRX 450FCV2—Brick,FC RAID (FCV2),12x450GB,15K RPM Drives,HSF • BRX 50SSD—Brick, SSD, 13 x 50GB drives • BRX 200SSD—Brick, SSD, 13 x 200GB drives
Filler panels	• 1U • 2U
Slammer storage controllers	• SLM 600 (Series 1, Series 2, and Series 3)
Pilot management controllers	Pilot

Table 4 Pillar Axiom 600 series components (continued)

Product name	Model and description
Power distribution units (PDUs)	• PDU 500-1P20A—115 or 230V, 20A, 1 φ • PDU 500-1P30A—115 or 230V, 30A, 1 φ • PDU 500-3P30A—115V, 30A; (115/208) • PDU 500-3P16A—230V, 16A, IEC; (230/400)
Racks	• RACK500-42U—42U cabinet assembly with doors

Note: The following Pillar Axiom components continue to be supported but are no longer available for new systems:

- BRX 500-160A7

- BRX 500-250A7

- BRX 500-73F15R

- BRX 500-73F15E

- BRX 500-400A7

- BRX 500-500A7

- BRX 500-750A7

- BRX 500-146F15R

- BRX 500-146F15E

- BRX 300-F15E

- BRX 450-F15E

- BRX 300F15R

- BRX 450F15R

Customer-Supplied Equipment and Tools

Before starting the installation of a Pillar Axiom system, be sure you have the needed equipment and tools installed or available.

Table 5 Required tools

Tool	Purpose	Illustration
1/4 inches (7 millimeters) flat-tip screwdriver	Adjust leveling feet.	
Adjustable wrench, 6 inches (15 centimeters)	Adjust leveling feet.	
#1 and #2 Phillips-head screwdrivers	Remove and secure Pillar Axiom hardware components.	
Socket wrench with a 1/2-inches (13millimeters) socket	Connect two racks.	
Offset box wrench, 13/32 inches (10 millimeters)	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.	
Wire cutters	Cut tie wraps.	

Note: These tools are not included with the Pillar Axiom system.

To install a Pillar Axiom system you need to have the following equipment and supplies available or installed before you start the installation of the system:

Table 6 Required equipment and supplies

On hand?	Item	Purpose
	At least two power sources on independent circuits with appropriate connectors for the voltage and amperage ratings	Provide power to the PDUs. Pillar Axiom systems require redundant power supplies from two PDUs on separate input circuits.
	Copper Ethernet switch with two open 10/100 ports	Connect Pilot management ports to the Ethernet LAN.
	Two Category 5 100BaseT cables	Connect Pilot management ports to the Ethernet switch.
	For each NAS Slammer, two to four GbE capable (copper or optical) cables	Connect NAS Slammer network data ports to the LAN.
	For each NAS Slammer, a copper or optical Ethernet switch with at least two open GbE ports	Each NAS Slammer has four network data ports. At least one port for each Slammer control unit (CU) must be connected.
	For each SAN Slammer, two to four SAN Fiber-optic cables	Connect SAN Slammer data ports to the fabric.
	For each SAN Slammer, two to four open ports on the SAN fabric	Each SAN Slammer has four data ports. At least one port for each Slammer CU must be connected.
	Workstation on the same LAN as the Pilot and with a supported browser	Connect to the AxiomONE Storage Services Manager to carry out the final installation tasks.

Safety Notice Conventions

Hazard signal words conform to the American National Standards Institute (ANSI) Z535.4-2002 meanings. This guide uses the following conventions for safety notices:

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

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

A set of important safety notices apply throughout this guide. Read them before working on a Pillar Axiom system.

Related concepts
- *Safety Statements*

Related references
- *Caution Notices*
- *Warning Notices*

CHAPTER 2

Set Up the Rack

About Component Inspection

Each Pillar Axiom system is built to a customer's specifications and shipped in a single shipment. Check the components you received against the packing slip (or bill of lading), which lists everything that was shipped. If any components are missing, call 1-877-4PILLAR (474-5527) and report what was not included in your shipment. Note how many pallets or containers you received, in case the missing components are in a container that simply has not yet arrived.

⚠ Caution	A Brick weighs up to 65 pounds (29.5 kilograms). For safe handling, use two people to lift it.

⚠ Caution	A Slammer weighs 94 pounds (42.6 kilograms). For safe handling, use two people to lift it.

⚠ Caution	Before you handle a component, make sure that you have taken electrostatic discharge (ESD) precautions:

- The minimum requirement is an anti-static wrist strap connected to a hard ground. We recommend that you remove components from their packaging and place them on an ESD-qualified table equipped with ground points for wrist straps.

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

After you remove the components from their packaging, inspect them for any damage that may have occurred during shipping. If there is any damage:

1 Check your Terms of Sale to see who notifies the carrier.

2 Notify the carrier or Pillar Data Systems, as appropriate, within 72 hours.

3 Record all damage.

4   Call the Pillar World Wide Customer Support Center Center to open a service request for future insurance claims.

Tip: Check the packing materials to verify that you have retrieved all the small parts before recycling.

Important!   Pillar Axiom system components are compatible with racks that are compliant to the EIA-310-D standard. Pillar Axiom Slammers and Bricks may not install successfully into a rack that is not EIA-310-D compliant. We recommend that Pillar racks be used to install Pillar Axiom hardware components. When using non-Pillar racks, do not use Telco two-post racks. Instead, use a four-post rack that can support the weight load of a Pillar Axiom system. Additionally, be sure the non-Pillar rack has square mounting holes in the vertical channels. Round mounting holes are not acceptable.

Illustrations show a Pillar Axiom 42U rack or parts of it. If you have a non-Pillar rack, it should be similar.

Rack Position

The following figure illustrates a floor plan for new rack installations. The space around the rack (or bay, if you have multiple racks) is needed to perform the installation tasks safely.

Figure 1 Floor plan for rack installation

Legend		
	1	Back of unit
	2	60 inches (152 centimeters)
	3	96 inches (244 centimeters)
	4	36 inches (91 centimeters)
	5	139 inches (353 centimeters)

About Multiple Rack Connections

If you are installing more than one rack, make sure that the racks are leveled so that they align correctly before you attach the baying plates. If you do not have multiple Pillar racks, you can skip this section and proceed to adjust the leveling legs.

Related tasks

- *Adjust the Leveling Legs*

Prepare the Racks

To create a bay of Pillar racks, first remove the adjacent (inner) side panels from each rack (see the following figure) and move the racks into position. You will route the cables directly from one rack to the other through the open sides of the racks because the cables are not long enough to route through a raised floor.

Figure 2 Sample 42U side panels

Legend	
1	Side panel, one on each side
2	Latches

1   If locked, unlock the side panel using the supplied keys.

2   Unlatch the side panel by:

- Pushing the release button, or
- Lifting the release handles.

3   Remove the side panel and set it aside.

4   Position the racks so that their open sides abut and their front sides are flush.

Attach the Connection Bracket

The connection bracket provides extra rigidity to the bay.

Important! Make sure that at least one of the racks is not anchored so you can adjust its position while you attach them together.

1   Locate the two adjacent frame corners at the top and at the back of two racks that are to be connected.

Figure 3 Location of frame corners

Legend	
	1 Front
	2 Top rear frame corner
	3 Second rack, inside view
	4 Threaded screw holes
	5 Looking up into top rear frame corner, with a second rack moved close for attachment

2   Place the connection bracket into the frame corner.

Figure 4 Connection bracket installation

Legend

1	Frames
2	Baying connection bracket
3	M8 hex screws

3   Insert an M8 hex screw through the hole in one of the bracket corners.

4   Loosely screw the M8 screw into the threaded hole in the frame.

5   Insert an M8 hex screw through one of the other corner holes in the bracket and loosely screw it into the threaded hole in the frame.

6   Repeat Step 5 for the other two corner holes.

7   Tighten the screws after all the bay connections are in place.

Attach the Baying Plates

Baying plates bind two Pillar racks together at the roof and bottom of the rack.

Tip: Use the stabilizer plate in conjunction with the baying kit that comes with each rack.

1 At the front of each rack roof, use a T30 Torx® screwdriver to remove the two adjacent Torx-head screws and set them aside.

2 Place a baying plate over the two holes.

Figure 5 Roof baying plate attachment

Legend
1	Roof baying plates
2	M12 Torx screws

3 Insert a Torx screw (from Step 1) into each plate hole.

4 Re-seat the Torx screws loosely.

5 Repeat Steps 1 through 4 for the two holes at the back of the roof.

6 At the bottom of the adjacent rack sides, remove the anti-tip brackets, if any, and unscrew the anchor bolts.

Figure 6 Adjacent anchor bolts at the front of the racks

Legend   1 Anchor bolts

7   Hold the baying plate across the two anchor-bolt holes and loosely replace the anchor bolts.

8   Repeat Steps 6 and 7 in the back of the racks.

9   Use the socket wrench to tighten the connection bracket screws.

10   Use the T30 Torx-head screwdriver to tighten the top baying plate screws.

11   Use the 3/4-inches (19-millimeters) open-end wrench to tighten the bottom baying plate anchor bolts.

Related tasks

- *Install a Stabilizer Plate (Optional)*

Adjust the Leveling Legs

Racks have built-in leveling legs at each corner. Adjust these legs so they are in firm contact with the floor and the rack is level. If the rack connects to others, adjust the legs so the racks are at the same height and can be bolted together.

1   Turn each leveling leg clockwise to lower the feet until they touch the floor. Use a 1/4-inches (7-millimeters) flat-tip screwdriver in the slot at the top of the leg.

Figure 7 Rack leveling leg locations

Legend

1	Caster brackets
2	Leveling legs are pre-installed in each caster bracket.

2   Use a 3/4-inches (19-millimeters) open-end wrench on the bottom of the legs to jack up the rack. Raise the rack until it is level with all the casters off the floor.

Figure 8 Leveling leg adjustment

Legend

1	Caster brackets
2	Slot in the leveling leg for a screwdriver

Note: If you connect racks in a bay it is more important that the racks be at the same height than level so that you can bolt them together.

About Rack Stability

After you move the rack to its final position and adjust the legs, you must stabilize it to keep it from shifting when you install the components.

You can use any combination of the following actions to stabilize the rack:

- Attach anti-tip brackets and secure them to the floor.

- Attach a stabilizer plate and secure it to the floor.

- Install a seismic stabilization system.

Important! If the rack will be part of a bay of racks, attach the rack to the bay before you install stabilizer plates or some other seismic stabilization system.

Related tasks
- *Install the Anti-Tip Brackets*
- *Install a Stabilizer Plate (Optional)*

About Anti-Tip Brackets

One stabilization option is to install the anti-tip brackets that are included with the system. Before you install the anti-tip brackets, consider:

- If you intend to bay the rack with another Pillar rack, you must use baying plates on connecting corners. Baying plates prevent the use of anti-tip brackets so you must stabilize the bay with stabilization plates.

- Make sure that the rack is in its final position before you secure anti-tip brackets to the floor.

- Anti-tip brackets may require a sub-floor tie-down system if the floor has removable panels.

- For solid floors, drill holes into the floor and use appropriate anchor bolts to secure the anti-tip brackets.

Important! If you intend to install an optional stabilizer plate, do not install the front anti-tip brackets.

Install the Anti-Tip Brackets

1   Screw the anchor bolt into the bottom outside corner of the rack frame until the bolt is seated.

Figure 9 Attach anchor bolts to rack

2   Slide the bracket fingers into the anchor bolt pocket as illustrated in the following figure.

Figure 10 Position anti-tip brackets

Legend	1 Anti-tip bracket fingers	2 Anchor bolt

3　Position the anti-tip bracket so that it points away from the rack and is parallel to the sides.

4　Adjust the anchor bolt so that it is finger-tight against the anti-tip bracket, and secure the anti-tip bracket to the floor.

Figure 11 Secure anti-tip brackets to the floor

5　Repeat Step 1 through Step 4 for all four corners.

About Stabilizer Plate Installation

At the front of the rack, you can install an optional stabilizer plate instead of anti-tip brackets. Stabilizer plates provide greater stability than anti-tip brackets, which must be removed in order to install a stabilizer plate. You cannot use anti-tip brackets in a bay because the anchor bolts are used to hold the baying plates in place. Therefore you should use stabilizer plates for racks in a bay.

Also note that if you have removable floor panels, you must bolt the stabilizer plates through to the solid sub-floor.

Install a Stabilizer Plate (Optional)

Use stabilizer plates to provide greater stability than anti-tip brackets for the Pillar Axiom system.

1　Place the stabilizer plate at the front of the rack with the short side up.

2   While adjusting the leveling legs to raise or lower the rack, align the holes in the short side with the holes in the rack frame.

3   Insert an M8 bolt into each hole in the short side of the stabilizer plate.

4   Use the hex wrench to tightly bolt the stabilizer plate to the rack.

Figure 12 Stabilizer plate attached to the rack base and floor

Legend	
1	M12 (or larger) floor bolts
2	M8 allen-head bolts

5   Secure the stabilizer plate to the floor with bolts and washers that are appropriate for the type of floor.

Important! The floor bolts must be no smaller than M12 in size.

About Component Placement

For non-Pillar racks, all component rails must be installed before loading components into the racks.

Racks from Pillar Data Systems come with the component rails pre-installed. If you have Pillar racks, you can install the components right away.

Install the component rails according to the component placement diagrams for your system configuration. Install them in the order of:

- First, Pilot rails near the bottom of the rack, 2U above the PDUs.

- Second, Slammer rails above the Pilot rails.

- Third, Brick rails above the Slammer rails.

⚠ Caution	Some Pillar Axiom components weigh over 65 pounds (29.5 kilograms). Make sure all rail components are tightly secured before loading the components to prevent damage and injury.

If you are building a rack that only contains Bricks, you should still start from the bottom.

Related concepts
- *About Component Placement for One Slammer and SATA Bricks*
- *About Component Placement for One Slammer and FC Bricks*
- *About Component Placement for Two or Three Slammers and FC Bricks*
- *About Component Placement for Four Slammers and 64 Bricks*

Configuration Limits for a Pillar Axiom 600 System

The minimum configuration of the Pillar Axiom system is:

- One Pilot

- One Slammer

- One Brick

The maximum configuration of the Pillar Axiom system is:

- One Pilot

- Four Slammers

- 64 Bricks

Table 7 defines the maximum configuration limits for a Pillar Axiom 600 system. The maximum number of Bricks that a Pillar Axiom system can support depends on the number of Slammers in the system. The maximum configurations are given in terms of width (the number of strings), depth (the number of Bricks for each string), and the maximum number of Bricks that the system supports.

Table 7 Configuration limits for a Pillar Axiom 600 system

Number of Slammers	Maximum number of strings	Maximum number of Bricks in a string	Maximum number of Bricks in the system
1	4	8	32
2	8	8	64
3	8	8	64
4	16	8	64

Brick storage enclosures can contain Fibre Channel (FC), Serial ATA (SATA), or solid state drives (SSDs), depending upon the type of RAID controllers.Table 8 further classifies the configuration limits by the type of Bricks in the Pillar Axiom 600 system. The maximum number of a specific Brick (SATA, FC, or SSD) allowed in the Pillar Axiom system also depends on the number of Slammers in the system.

Table 8 Brick Configuration limits for the Pillar Axiom 600 system

Number of Slammers	Maximum number of SATA Bricks	Maximum number of FC Bricks	Maximum number of SSD Bricks
1	32	16	8
2	64	32	16
3	64	32	16
4	64	32	32

For single-Slammer Pillar Axiom 600 configurations, the minimum number of Bricks is one. However, for mixed configurations, the minimum number of Bricks is three, as outlined below:

- For a mix of FC and SATA (or SSD) Bricks: 2 SATA (or SSD) + 1 FC or 2 FC + 1 SATA (or SSD).

- For a mix of SSD and SATA Bricks: 2 SATA + 1 SSD or 2 SSD + 1 SATA.

Pillar Axiom 600 systems support up to 32 FC Bricks, or 64 SATA Bricks, or 32 SSD Bricks or any combination of these three types, provided there are no more than 64 total Bricks, 32 FC Bricks or 32 SSD Bricks in the system.

Important! Contact the Pillar World Wide Customer Support Center for any newly available, time-sensitive information regarding cabling. Also, refer to the Pillar Axiom *Customer Release Notes* for the latest system configurations.

About Component Placement for One Slammer and SATA Bricks

Pillar Axiom 600 systems with one Slammer support up to 32 SATA Bricks.

Install the components in the rack as shown in the following figure.

Figure 13 42U racks containing one Slammer and up to 32 SATA Bricks

Brick 16	42	
	40	
Brick 15	38	
Brick 14		
	36	
Brick 13	34	
Brick 12		
	32	
Brick 11	30	
Brick 10		
	28	
Brick 9	26	
Brick 8		
	24	
Brick 7	22	
Brick 6		
	20	
Brick 5	18	
Brick 4		
	16	
Brick 3	14	
Brick 2		
	12	
Brick 1		

Legend

1	Reserved for PDU cable routing
2	Rack unit (RU) locators

Note: The Brick names used above are for illustration. Actual names, as seen in the AxiomONE Storage Services Manager, may be different.

This figure illustrates how the Pillar Axiom system components are mapped into 42U racks for the following configuration:

- 1 Pilot

- 1 Slammer

- 32 SATA Bricks (Pillar Axiom 600 systems)

Note: Filler panels should be mounted wherever an airflow path short-circuit could exist. Filler panels should be mounted on the front rails to fill any spaces below the Pilot or the lowest Pillar Axiom component in the rack. Single Phase PDUs are mounted on the rear rails so that there are filler panels in the front. Three-phase PDUs are mounted on the front rails so that there is no need for the filler panels or the 2U of space above them.

Any components that are not installed must be replaced with filler panels.

Note: 2U of space is reserved above the PDUs for cable routing. The number and type of PDUs depends on the power supply. If more PDUs are needed, or when you need to add additional components into the rack (such as adding another Slammer), then everything has to move up to make room, keeping the 2U of reserved space, and moving any Bricks displaced at the top to the next rack.

Note: In a system that is configured for the maximum number of Bricks, connect the additional racks to the first rack before you install and cable the hardware components.

About Component Placement for One Slammer and FC Bricks

Pillar Axiom 600 systems with one Slammer support up to 16 Fibre Channel (FC) Bricks.

Install the hardware components in the rack as shown in the following figure. Any components that are not installed must be replaced with filler panels.

Figure 14 Fully loaded 42U rack for one Slammer and 16 FC Bricks

Legend

1	Reserved for PDU cable routing
2	Rack unit (RU) locators

Note: Filler panels should be mounted wherever an airflow path short-circuit could exist. Filler panels should be mounted on the front rails to fill any spaces below the Pilot or the lowest Pillar Axiom component in the rack. Single Phase PDUs are mounted on the rear rails so that there are filler panels in the front. Three-phase PDUs are mounted on the front rails so that there is no need for the filler panels or the 2U of space above them.

Note: The Brick names used above are for illustration; actual names, as seen in the AxiomONE Storage Services Manager, may be different.

The figure above illustrates how the Pillar Axiom system components are mapped into a fully loaded 42U rack for the following configuration:

- 1 Pilot

- 1 Slammer

- 16 FC Bricks

Note: 2U of space is reserved above the PDUs for cable routing. The number and type of PDUs depends on the power service. If more PDUs are needed, or when you need to add additional components into the rack (such as adding another Slammer), then everything has to move up to make room, keeping the 2U of reserved space, and moving any Bricks displaced at the top to the next rack.

Related concepts
- *About Component Placement for Two or Three Slammers and FC Bricks*
- *About Component Placement for Four Slammers and 64 Bricks*

About Component Placement for Two or Three Slammers and FC Bricks

Pillar Axiom 600 systems with two or three Slammers support up to 32 FC Bricks.

Note: This topic applies only to Pillar Axiom 600 systems.

Install the hardware components in the rack as shown in the following figure. This figure illustrates how the Pillar Axiom system components are mapped into fully loaded 42U racks for the following configuration:

- 1 Pilot

- 3 Slammers

- 32 FC Bricks

Figure 15 Fully loaded 42U racks for three Slammers and 32 FC Bricks

Rack 1	U	Rack 2	U	Rack 3	U
2U Filler Panel	42	2U Filler Panel	42	2U Filler Panel	42
	40		40		40
2U Filler Panel	38	2U Filler Panel	38	2U Filler Panel	38
2U Filler Panel	36	2U Filler Panel	36	2U Filler Panel	36
2U Filler Panel	34	2U Filler Panel	34	2U Filler Panel	34
2U Filler Panel	32	2U Filler Panel	32	Brick 32	32
Brick 18	30	Brick 28	30	Brick 31	30
Brick 17	28	Brick 27	28	Brick 30	28
Brick 12	26	Brick 26	26	Brick 29	26
Brick 11	24	Brick 25	24	Brick 24	24
Brick 10	22	Brick 22	22	Brick 23	22
Brick 9	20	Brick 21	20	Brick 16	20
Brick 4	18	Brick 20	18	Brick 15	18
Brick 3	16	Brick 19	16	Brick 14	16
Brick 2		Slammer 3 CU0 / CU1		Brick 13	14
Brick 1	12		12	Brick 8	12
Slammer 1 CU0 / CU1	8	Slammer 2 CU0 / CU1	8	Brick 7	10
	6		6	Brick 6	8
Pilot CU0 / Pilot CU1	4	2U Filler Panel	4	Brick 5	6
					4
1U PDU	2	1U PDU	2	1U PDU	2
1U PDU	1	1U PDU	1	1U PDU	1

Note: Filler panels should be mounted wherever an airflow path short-circuit could exist. Filler panels should be mounted on the front rails to fill any spaces below the Pilot or the lowest Pillar Axiom component in the rack. Single Phase PDUs are mounted on the rear rails so that there are filler panels in the front. Three-phase PDUs are mounted on the front rails so that there is no need for the filler panels or the 2U of space above them.

Note: The Brick names used in the preceding figure are for illustration; actual names, as seen in the AxiomONE Storage Services Manager, may be different.

Note: Any components that are not installed must be replaced with filler panels. Also, 2U of space is reserved above the PDUs for cable routing. Three-phase PDUs already have 2U of space and do not need the cable routing space. The number and type of PDUs depends on the power service. If more PDUs are needed, or when you need to add additional components into the rack (such as adding another Slammer), everything has to move up to make room, keeping the 2U of reserved space and moving any Bricks displaced at the top to the next rack.

If only two Slammers are being installed, replace Slammer 3 with two filler panels.

Note: In a system that is configured for the maximum number of Bricks, connect the additional racks to the first rack before you install and cable the hardware components.

Related concepts

- *About Component Placement for Four Slammers and 64 Bricks*
- *Sample Power Cabling for One Slammer and Three Bricks*

About Component Placement for Four Slammers and 64 Bricks

Pillar Axiom 600 systems with four Slammers support up to 64 Serial ATA (SATA) Bricks, or a combination of up to 32 FC Bricks and 32 SATA Bricks in a mixed system.

Note: This topic applies only to Pillar Axiom 600 systems.

Install the components in the rack as shown in the following figure, which illustrates how the Pillar Axiom system components are mapped into a fully loaded 42U racks for the maximum configuration of:

- 1 Pilot

- 4 Slammers

- 64 Bricks

Figure 16 Fully loaded 42U racks for four Slammers and 64 Bricks

Note: The Brick names used above are for illustration; actual names, as seen in the AxiomONE Storage Services Manager, may be different.

Note: Any components that are not installed must be replaced with filler panels. Also, 2U of space is reserved above the PDUs for cable routing. The number and type of PDUs depends on the power supply. If more PDUs are needed, then everything has to move up to make room, keeping the 2U of reserved space, and moving any Bricks displaced at the top to the next rack.

When using SATA Bricks, the preceding configuration can use as few as two Slammers. Replace the empty spaces for the missing Slammers with filler panels.

Note: In a system that is configured for the maximum number of Bricks, connect the additional racks to the first rack before you install and cable the hardware components.

Related concepts

- *About Component Placement for Two or Three Slammers and FC Bricks*

Pilot Rail Kit Parts

Verify that the rail kit contains all the parts listed in the table.

Before installing a pair of Pilot rack rails, make sure you have:

- One Pilot rail kit with rails and scopes pre-attached

- #20 Torx wrench

- Socket wrench

Pilot rails are 2U rack rail assemblies that contain the following parts:

Table 9 Pilot rail kit parts

Component	Drawing (not to scale)	Quantity
Pilot rail kits 1475-00036-xx 1450-00037-xx		One left-right pair

Table 9 Pilot rail kit parts   (continued)

Component	Drawing (not to scale)	Quantity
Pilot rail scopes 2525-00093-xx 2525-00095-xx		One left-right pair
10-32 Hex nuts for attaching scopes to rails 2500-01051-xx		Eight
Rack mount spacers 2500-01065-xx		Four
Rack mount nut bar 2526-00106-xx		Two
10-32 x 1/2 inch Torx head (#20) screws 2500-01071-xx		12

Install a Pair of Pilot Mounting Rails

1   Hang the scope hook in the appropriate hole at the back of the rack, as shown in the following figure:

Figure 17 Scope hook attachment

Legend

1	Vertical rail at back of rack
2	Rack unit (RU) 32
3	Scope hook
4	Bottom holes for each unit
5	RU 31

In the preceding figure, two labeled rack units, 31 and 32, are shown at the back of the rack.

- The bottom of unit 31 is just out of sight below its bottom hole.

- The scope hook is one-and-a-half units above the bottom of the rail.

- When you place the hook in the middle of unit 32, the bottom of the rail lines up with the bottom of unit 31.

- A 2U Pilot rail would fill units 31-32 in the preceding illustration.

2 At the front of the rack, slide the rail scopes until the rail reaches the holes at the front.

The rail flange goes in front of the rack mount holes, and the four-hole spacer bar goes behind, as shown in the figure in the next step.

3   While keeping the rail horizontal, fit the four-hole spacer bar into the four square rack holes that span the boundary between the two units that this rail is to occupy.

The following figure shows positioning a spacer for units 35 and 36.

Figure 18 Positioning spacer bar

Legend

1	Rack unit boundary

Figure 19 Pilot rail front attachment

Legend	1 Back
	2 Four-hole spacer bars
	3 Front
	4 Slider lock nuts

4   Use two 10-32 Torx Washer Head screws to secure the rail through the rack into the two center holes in the spacer bar.

The top and bottom holes are use to secure the Pilot control units to the rack.

5   At the back of the frame, place a spacer on a 10-32 Torx Washer Head screw and screw it through the hole in the frame and into the rail under the scope hook.

Install the second screw the same way. Ensure that the spacer is centered inside the rack's square mounting hole.

6   Repeat Steps 1 through 5 for the other side rail.

7   Tighten the four slider lock nuts that attach each rail scope to the rail.

Slammer Rail Kit Parts

Verify that the rail kit contains all the parts listed in the table below.

To install a pair of Slammer rails, you need:

- One Slammer rack rail kit with rails and scopes pre-attached

- #20 Torx wrench

- Socket wrench

Slammer rails are 4U rack rail assemblies that contain the following parts:

Table 10 Slammer rail kit parts

Component	Drawing (not to scale)	Quantity
Slammer rails 1475-00024-xx 1475-00025-xx		1 left-right pair
Slammer rail scopes 2525-00093-xx 2525-00095-xx		1 left-right pair
10-32 Hex nuts for attaching scopes to rails 2500-01051-xx		8
Rack mount spacers 2500-01065-xx		8
10-32 x 1/2 inch Torx Washer Head screws 2500-01071-xx		10

Install a Pair of Slammer Mounting Rails

1 Hang the scope hook in the appropriate hole at the back of the rack, as shown below. These rail scopes are always used for components that take up at least two rack units.

Figure 20 Scope hook attachment

Legend

1	Rack unit 32
2	Rack unit 31
3	Vertical rail at back of rack
4	Scope hook
5	Bottom holes for each unit

In the preceding figure, two labeled rack units, 31 and 32, are shown at the back of the rack.

- The bottom of unit 31 is just out of sight below its bottom hole.

- The scope hook is one-and-a-half units above the bottom of the rail.

- When you place the hook in the middle of unit 32, the bottom of the rail lines up with the bottom of unit 31.

- A 4 U Slammer rail would fill units 31-34 in the above illustration.

2 At the front of the rack, slide the rail scopes until the rail reaches the holes at the front.

3 While keeping the rail horizontal, place a spacer on a #20 Torx screw and screw it through the bottom hole in the front frame and into the rail.

See the next figure.

Repeat this step for the hole above it (but not the top hole, which is for securing the Slammer).

4 Secure the screws at the back, under the scope hook.

5 Repeat Steps 1 through 4 for the other side rail.

Figure 21 Slammer rails installed in rack

Legend	1 Back
	2 Front
	3 Slider lock nuts

6 Tighten the four slider lock nuts that attach each rail scope to the rail.

Brick Rail Kit Parts

Verify that the rail kit contains all the parts listed in the table below.

To install a pair of 2U rack rails, you need:

- One Brick rail kit with rails and scopes pre-attached

- #20 Torx wrench

- Socket wrench

Brick rails are 2U rack rail assemblies that contain the following parts:

Table 11 Brick rail kit parts

Component	Drawing (not to scale)	Quantity
Brick rails 1450-00022-xx 1450-00023-xx		1 left-right pair
Brick rail scopes 2525-00093-xx 2525-00095-xx		1 left-right pair
10-32 Hex nuts for attaching scopes to rails 2500-01051-xx		8
Rack mount spacers 2500-01065-xx		4

Table 11 Brick rail kit parts   (continued)

Component	Drawing (not to scale)	Quantity
10-32 x 1/2 inch Torx head (#20) screws 2500-01071-xx		10

Install a Pair of Brick Mounting Rails

1   Hang the scope hook in the appropriate hole at the back of the rack, as shown below. These rail scopes are always used for components that take up at least two rack units.

Figure 22 Scope hook attachment

Legend	
1	Vertical rail at back of rack
2	Rack unit 32
3	Scope hook
4	Bottom holes for each unit
5	Rack unit 31

In the preceding figure, two labeled rack units, 31 and 32, are shown at the back of the rack.

- The bottom of unit 31 is just out of sight below its bottom hole.

- The scope hook is one-and-a-half units above the bottom of the rail.

- When you place the hook in the middle of unit 32, the bottom of the rail lines up with the bottom of unit 31.

- A 2U Brick rail would fill units 31-32 in the above illustration.

2   At the front of the rack, slide the rail scopes until the rail reaches the holes at the front.

3   While keeping the rail horizontal, place a spacer on a #20 Torx screw and screw the Torx screw through the center hole in the front frame and into the rail.

See the next figure.

Repeat this step for the other center screw in the front and for the screws at the back, under the scope hook. The square hole in the front is at the top on the left side and at the bottom on the right side. These square holes are for securing the Brick. Use only the round holes to secure the rails into the rack.

Figure 23 2U rack rails installed in rack

Legend	
1	Back
2	Front
3	Slider lock nuts

4   Repeat Steps 1 through 3 for the other side rail.

5   Tighten the four slider lock nuts that attach each rail scope to the rail.

CHAPTER 3

Install Components

About Power Distribution Unit Installation

Mount power distribution units (PDUs) in the bottom units of the rack. The one-phase PDUs mount on the rear rack rails while the 2U three-phase PDUs mount on the front rails. The default configuration places up to four 1U 220V, 30A PDUs at the bottom of the rack.

Prerequisites:

- A 1U or 2U PDU

- Torx T20 screw driver

- Four snap-in cage nuts (for square mounting holes) or four clip-on cage nuts (for round mounting holes)

- Four 10-32 x 1/2" Torx Washer Head screws.

Important! We strongly recommend that you use PDUs from Pillar Data Systems. If you install non-Pillar PDUs, they must meet the Pillar Data Systems PDU specification, which is described in the *Pillar Axiom Site Preparation Survey* and in the hardware specifications appendix.

Related concepts
- *About Pillar Axiom Hardware Specifications*

Install a 1U PDU

1 Choose one of the following options:

- For square mounting holes, snap a 10-32 snap-in cage nut into the bottom and 3rd hole of each vertical rail.

Figure 24 Snap-in cage nut

- For round mounting holes, clip one 10-32 clip-on cage nut into the bottom and 3rd holes of each channel in the pair. (Pillar Data Systems does not provide clip-on cage nuts.)

2   Insert the PDU into the rack, as shown below.

There are no rails for a PDU.

Figure 25 Securing a 1U PDU in the bottom of a rack

Note: This image is for illustration purposes only. Your hardware component may look different.

3   Align the ears of the PDU to the four cage nuts.

4   Insert a 10-32 x 1/2 inch screw through the top and bottom holes in the right and left ears of the PDU and into the cage nuts.

Figure 26 An installed PDU at the bottom of the rack

Legend	
1	10-32 x 1/2 inch screws
2	Rack unit (RU) marker

Important! Do not plug the PDU into a power supply until the rack is complete and ready for startup.

5   Secure both screws tightly.

6   Repeat this procedure to install any other 1U PDUs.

Install a 2U PDU

1   Depending on the type of rack mounting holes, choose one of:

- For square mounting holes, snap a 10-32 snap-in cage nut into the bottom and seventh hole of each vertical rail.

   Figure 27 Snap-in cage nut

- For round mounting holes, clip one 10-32 clip-on cage nut into the bottom and seventh holes of each channel in the pair. (Pillar Data Systems does not provide clip-on cage nuts.)

2   Align the slots in the PDU ears to the four cage nuts.

Figure 28 2U PDU layout and ear locations

Legend	1 Front of PDU	2 PDU ears on left side
	3 PDU ears on right side	

Note: This image is for illustration purposes only. Your hardware component may look different.

3   Insert a 10-32 x 1/2 inch screw through the bottom hole in the right and left ears of the PDU and into the cage nuts. Secure both screws tightly.

4   Repeat Step 3 for the top holes in both ears.

Important! Until you are instructed to do so, do not plug the PDU into an inlet power supply.

5   Repeat this procedure to install any other 2U PDUs.

Install a Pilot Management Controller

Installation of the Pilot control units at the bottom of the rack, just above the power distribution units (PDUs), is efficient and makes future expansion as easy as possible.

Required tools:

- Torx T20 screw driver

- Antistatic wrist strap

⚠ Warning	Ensure that component distribution in the rack is balanced. Follow the hardware placement map to ensure this balance. Uneven distribution can cause hazardous instability. The rack must have stabilization plates or anti-tip brackets installed so the rack does not tip when you install a component.
⚠ Warning	Mounting rail assemblies must be used to support and secure a Pilot in the rack. The mounting ears of a Pilot control unit (CU) by themselves cannnot support the weight of the Pilot.

1   Put on an antistatic wrist strap, ground strap, or heel strap and attach the grounding wire to ground.

2   From the front of the rack, place the back side of the first Pilot CU on the bottom mounting rails and slide the CU into place.

    Important! When sliding a Pilot CU into the rack, keep the CU level to avoid bending the rail supports.

3   Insert the second Pilot CU above the first CU, as shown in the following figure:

Figure 29 Insertion of the upper Pilot CU

Note: This image is for illustration purposes only. Your hardware component may look different.

4   Use a 10-32 Torx screw through the hole in each Pilot CU ear and tighten the screw securely using a #20 Torx wrench.

Important! Do not plug the Pilot chassis into a PDU until instructed to do so.

⚠ 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.

Pilot Versions

There are several versions of Pilot control units (CUs) available. Figure 30 to Figure 33 illustrate the different versions of the Pilot:

Figure 30 Pilot CU (1450–00259–XX) (Back view)

Legend	
1	Serial port
2	USB flash memory drive inserted into the lower USB port
3	Ethernet slots
4	Management port

Figure 31 Pilot CU (1450–00179–XX) (Back view)

Legend

1	Pilot power switch
2	Ethernet port (ETH1)
3	Ethernet port (ETH0)
4	Management port

Figure 32 Pilot CU (1450–00164–XX) Intel

Legend

1	Back view of the Pilot unit
2	Front view of the Pilot unit
3	Ethernet port (ETH1)
4	Ethernet port (ETH0)
5	Management port

Figure 33 Pilot CU (1450–00170–XX) MSI, non-RoHS

Legend

1	Back view of the Pilot unit
2	Ethernet port (ETH0)
3	Ethernet port (ETH1)
4	Management port
5	Front view of the Pilot unit

Install a Slammer Storage Controller

Install the Slammers above the Pilot near the bottom of the rack.

Required tools:

- Torx T20 screw driver

- Antistatic wrist strap

⚠ **Caution**	A Slammer weighs 94 pounds (42.6 kilograms). For safe handling, use two people to lift it.

⚠ **Warning**	Ensure that component distribution in the rack is balanced. Follow the hardware placement map to ensure this balance. Uneven distribution can cause hazardous instability. The rack must have stabilization plates or anti-tip brackets installed so the rack does not tip when you install a component.

1   Put on an antistatic wrist strap, ground strap, or heel strap and attach the grounding wire to ground.

2   From the front side of the rack, set the back of the Slammer onto the mounting rails and slide the Slammer into place.

Leave about one inch (2.5 centimeters) of clearance between the Slammer ears and the vertical channels.

Important! When sliding the Slammer into the rack, keep the Slammer level to avoid bending the rail supports, which would cause difficulty when inserting a component below.

Figure 34 Insertion of a Slammer

3   Put a spacer on a 10-32 x 1/2 inch Torx screw, then insert the screw through the hole in the ear on the left side of the Slammer.

4   Push the Slammer so that its ears and the spacers rest against the vertical channels, then start the Torx screws with your fingers.

5   Use a #20 Torx wrench to secure the screws to the rack.

    Note: This step only keeps the Slammer in place; the screws provide no other support.

6   Repeat Steps 3 through 5 for the right side of the Slammer.

7   (Pillar Axiom 600 systems only) If you have a two, three, or four Slammer system, install the remaining Slammers now.

Important! Do not apply power to the Slammers until instructed to do so.

Related references
  • *Cable Length Limits for SAN Fibre Channel Connections*

Install the Slammer Batteries

Slammer batteries are shipped separately.

1 Ensure the *Install Before Date* on the Slammer batteries have not expired.

The *Install Before Date* is printed on the label on top of the battery. If a battery is past the *Install Before Date*, contact the Pillar World Wide Customer Support Center.

2 Remove the front cover (bezel).

If the bezel is not attached, skip to Step 5.

3 Press the Slammer ejector tabs on the bezel to unlock them.

4 Lift both ejector tabs to disengage the bezel from the rack.

Figure 35 Slammer bezel removal

Legend	1 Ejector tab
	2 Button
	3 Disengage the bezel from the rack

5 Insert the batteries into the Slammer, but do not secure them until you complete the installation.

Tip: When you secure them, they start to discharge as they preserve data in memory. Because there is no data to preserve, you should wait until you are ready to power on the system before securing the batteries.

Figure 36 Slammer battery insertion

Note: This image is for illustration purposes only. Your hardware component may look different.

Install a Brick Storage Enclosure

When you install the Bricks, work from the bottom of the rack toward the top. If you have additional racks of Bricks, install those Bricks from the top down in the additional racks.

Required tool: Torx T20 screw driver.

Note: Pillar Data Systems packages and ships the Brick storage enclosures separately from the system.

1   Put on an antistatic wrist strap, ground strap, or heel strap and attach the grounding wire to ground.

2   At the front of the rack, insert the Brick onto the mounting rack rails and slide into place.

> ⚠ **Caution**   A Brick weighs up to 65 pounds (29.5 kilograms). For safe handling, use two people to lift it.

Important! When you slide the component into the rack, keep the Brick level to avoid bending the rail supports, which would cause difficulty when inserting a component below.

Figure 37 Insertion of a Brick

3 Use two 10-32 Torx screws (one on each side) and a Torx T20 driver to secure the Brick ears to the rack.

Important! Use care as you install the screws on the right to avoid damaging the printed circuit, which provides power and signals to the Brick bezel.

Figure 38 Brick ears

Legend

1	Printed circuit assembly
2	10-32 Torx screw

4 Inspect the drives to ensure each drive is flush and securely seated.

Securely seat the drives by:

- Fully opening the cam latch on the drive carrier.

- Pressing the drive carrier into the Brick chassis until it stops.

- Closing the cam latch until it snaps shut to engage the drive with the Brick midplane.

Figure 39 Brick front with the bezel removed

Note: This image is for illustration purposes only. Your hardware component may look different.

5 If you have multiple Bricks, install them all now, even those that require additional racks.

CHAPTER 4

Connect Data Cables

About Cabling a Pillar Axiom System

The Pillar Axiom system is a scalable storage system that consists of a Pilot management controller, at least one Slammer storage controller, and some number of Brick storage enclosures depending upon your system model.

Cabling the Pillar Axiom systems consists of two parts:

- Front-end cabling, which involves connecting the Slammer to the customer's data network, and connecting the Pilot to the customer's management network. The Pilot connection uses Ethernet. The Slammer cable connections to the data network uses Fiber Channel (FC) or Ethernet, depending on the Slammer.

- Back-end cabling, which involves cabling the Storage System Fabric (SSF), sometimes referred to as the private interconnect, or simply PI, and the private management interface (PMI).

Pillar Axiom systems transmit data among its hardware components (Bricks, Slammers, and the Pilot) through the SSF and PMI cabling.

The SSF cables provide the inter and intra-cabling connections between the Bricks and the Slammers to support all data traffic, the cross connections among the Slammer control units (CUs), and the cross connections among the Brick CUs.

The fast Ethernet network between the Pilot and the Slammers in a Pillar Axiom system is called the PMI. The PMI also includes the cross connections between the Slammer CUs as well as the cross connections between the Pilot CUs. These cross connections between the Pilot CUs permit each CU to monitor the heartbeat of the other CU. The heartbeat connection allows the passive Pilot CU to induce a failover, if the active Pilot CU fails.

The Pilot has no physical connection to the user data and, therefore, no cable connection exists between the Pilot and the Bricks.

Figure 40 provides a symbolic illustration of the back-end cabling in a sample Pillar Axiom system.

Figure 40 Pillar Axiom back-end cabling overview

Legend

1	Pilot
2	Slammers
3	Bricks
4	PMI cabling among the Pilot and Slammers
5	SSF cabling among the Slammers and Bricks
6	Brick strings, in which Bricks are connected to each other and the Brick at the head of the string is connected to the Slammer

Fiber Optic Cable Handling Tips

Fiber optic cables are delicate and can easily be damaged when you disconnect the cables from the ports or the connectors. Fiber optic cables are also sensitive to dirt and contaminants. Follow these tips when handling fiber optic cables.

- Do not bend the fiber optic cable beyond its minimum bend radius (MBR). All fiber optic cables have an MBR specified by the manufacturer, which is usually 20 times the diameter of the cable. Bending the cables into smaller curves than specified by the MBR can break the fibers inside the fiber optic cable and increase fiber attenuation (power loss). Any damage to the fibers may not appear as a physical damage to the outside cable jacket. Damage to the fibers can require you to replace the entire section or length of the cable. As a general rule, especially if you do not know the MBR, do not to bend the fiber optic cable into a turn with a radius of less than two inches (5.1 cm).

- Do not exceed the pulling tension specification of the fiber optic cable that is specified by the manufacturer. Pulling tension specification is the force placed on one square unit of a cross section of the fiber optic cable. Generally, this tension is 25 pounds.

- Do not use force or rock the connector from side-to-side or up and down to remove the connector because this action can damage the socket.

- Do not pull the cables using a mechanical device. If you need to pull a cable, pull by hand.

- Do not pull the cables tight when dressing the cables. Leave some slack in the cables.

- Do not use tie wraps or any other crimping style of wrap on high speed cables (optical or copper) because they may crimp the cable insulation and cause data transmission problems. Only use velcro strips to tie cables.

- Do not apply sideways force on the fiber optic cables.

- Do not push or step on a fiber optic cable or connector.

- Do not set any hardware components or other objects on top of the cables.

- Do not let the cables get pinched by closed doors or door lock hardware.

- Do not twist the cable into itself to secure the ends.

- Do not wrap the fiber optic cables around your hands, arms, or shoulders, as this may result in causing sharp bends or a small coiling radius.

- Do not let fiber optic cables cross over or get too close to the power supply cords. Keep them separated to minimize the electro-magnetic interference (EMI).

- Do not plug the high-speed serial data cables (HSSDC) cables to the small form factor pluggable (SFP) ports because this may cause damage to the cables.

- Do not plug the SFP cables to the HSSDC ports because this may cause damage to the cables.

- Allow service loops and do not block access for replacing any Pillar Axiom component.

- Pillar Data Systems recommends a flexible hook and loop type of fastener be used to tie wrap cables.

- Use both hands to disconnect the connector in a module overly populated with cables and connectors. Do not disturb or deflect other plugs or cables during the removal operation.

⚠ **Caution**	To disconnect the cables from the HSSDC2 connectors, carefully hold the cable connector and, while pushing the connector gently into the socket, press the latch on the top of the connector to unlatch it. Merely grasping the latch or jerking and pulling at the connector will not fully disengage the connector but will damage the connector.
⚠ **Caution**	To disconnect the cables from the SFP connectors, carefully grasp the cable connector and, while pushing the connector gently into the socket, press the latch on the bottom of the connector to unlatch it. Then, gently pull the connector straight out to release the connector with the cable

Important! On the SATA RAID controller version 2, the connectors are upside down, which puts the latch on the bottom.

Clean Fiber Optic Cables

Follow these tips to clean fiber optic cables.

- Keep the end caps of the plugs installed whenever the plug is not installed.

- Have a fiber optic cable cleaning kit available while handling fiber optic cables. A fiber optic cable cleaning kit includes the following items:

  - Lint-free wipes

  - Isopropyl alcohol

  - Special fiber optic cleaning swabs

  - Canned pressurized air

1 To clean a fiber optic plug, blow away any dust particles from the connector surface (particularly the sides and end face of the connector) using canned pressurized air. Hold the nozzle of the optical duster approximately two inches (5.08 centimeters) away from the connector and provide three to five short blasts of air. Fold a wipe in half and place the wipe on a hard surface. Moisten the wipe with isopropyl alcohol. Hold the face of the cable connector to the wipe and slide it gently across the moistened area in one sweeping move.

2 To clean a fiber optic connector receptacle, blow away any dust particles from the inside surface of the connector (particularly the inside walls of the alignment sleeve) using canned pressurized air. Hold the nozzle of the optical duster approximately two inches (5.08 centimeters) away from the connector and provide three to five short blasts of air. Moisten the end of a swab with isopropyl alcohol and insert the swab into the cable receptacle. Move the swab in and out two or three times and then remove it and discard. Dry the inside of the receptacle by holding canned pressurized air approximately two inches (5.08 centimeters) away from the end and provide three to five short blasts of air.

Important! Never reuse swabs.

Summary of Cabling Rules

These cabling rules describe fundamental principles that need to be applied when cabling Fiber Channel (FC), Serial ATA (SATA), and solid state drive (SSD) Bricks in a Pillar Axiom system.

Brick Strings

- A string is a collection of Bricks connected together. The head of the string connects to two Slammer ports. Each of the other Bricks in the string are connected to the previous Brick in the string.

- Strings contain combinations of FC RAID Bricks, FC Expansion Bricks, SATA Bricks, and SSD Bricks.

- A string may contain up to eight SATA Bricks.

- A string may contain up to four FC RAID Bricks. Best practice recommendation: FC RAID Bricks should be placed upstream from SATA Bricks within a string, or preferably placed in an FC-only Brick string.

- A string may contain at most one SSD Brick and the SSD Brick must be at the beginning of the Brick string.

- 1-Slammer systems have at most four strings. 2 and 3-Slammer systems have at most eight strings. 4-Slammer systems have at most 16 strings.

- Systems that have been upgraded by adding an additional Slammer can run with the number of strings appropriate to the prior configuration.

Adding Bricks to Strings

- Add Bricks to strings so that the number of Bricks in any string differs by no more than two between the longest and the shortest strings.

- When adding SATA or FC RAID Bricks to a string, attach them to the last SATA or FC RAID Brick on that string.

- When adding SATA Bricks to a Pillar Axiom system that previously had only FC Bricks, add all the SATA Bricks before you respond to the **Media Placement Recommendations** Administrator Action item.

Connecting Bricks to Slammers

○ SATA, SSD, and FC RAID Bricks can connect to the private interconnect module (PIM) ports in Slammers.

Tip: SATA RAID controllers are either version 1 (containing one set of four FC ports) or version 2 (containing two pair of FC ports). Similarly, private interconnect modules (PIMs) are either version 1   (13-port) or version 2 (16-port) PIMs. When connecting a version 1 SATA RAID controller to a version 2 PIM, a special FC cable (HSSDC2-SFP) is needed. Plug the HSSDC2 connector into the version 1 SATA RAID controller and the SFP connector into the version 2 PIM.

Tip: Version 2 SATA and FC RAID controllers can connect to version 2 PIMs optically. The Version 2 SATA and FC RAID controllers and the version 2 PIMs need the Pillar-supplied small form factor pluggable (SFP) modules with the appropriate optical cables that accompany it.

○ SSD Bricks, FC RAID Bricks, and SATA Bricks can also be connected to other Bricks, which directly or indirectly connect to Slammer ports.

○ FC RAID Bricks and SSD Bricks use Slammer ports in the same order as the scheme for connecting SATA Bricks. This scheme fosters balance among the strings while maintaining predictable assignment of Bricks to strings. A given Brick will always be on a particular string with particular Slammer ports. The same cable labels are used for SSD, SATA, and FC RAID Bricks.

Use of Brick Network Ports

○ Brick CU-0 upstream ports are connected to Slammer CU-0 ports or the CU-0 downstream ports of another Brick; likewise, Brick CU-1 ports are connected to Slammer CU-1 ports or Brick CU-1 ports.

○ FC Expansion Bricks are connected to FC RAID Bricks using the J0, J1, and Pnet ports. The current release restricts FC Brick deployment to zero or one FC Expansion Brick on each FC RAID Brick.

FC Brick Connections

○ FC RAID Bricks can be configured alone or in pairs of one FC RAID Brick and one FC Expansion Brick.

○ FC RAID Bricks, including pairs of RAID and Expansion Bricks, may be added to a running system as long as

they are cabled within the rack, powered on, and have completed initialization prior to connecting them to the existing configuration.

Tip: After RAID controllers finish initializing, scrubbing normally starts on the drives. Scrubbing causes all the drive LEDs to blink rapidly.

Important! When adding pairs of FC RAID and Expansion Bricks, cable all the links between the new Bricks, power them up, permit them to initialize, and then add the links to the previously running system.

Multi-Slammer Brick Connections

○ In 3 and 4 Slammer configurations, each Brick must connect to the Slammers as follows:

- 3-Slammer configuration: Connect to Slammer 1 or Slammer 3 *and* to Slammer 2.

- 4-Slammer configuration: Connect to Slammer 1 or Slammer 2 *and* to Slammer 3 or Slammer 4.

Tip: To maximize performance and avoid having a Slammer control unit traverse an inter-switch link to get to the Brick, be sure the above conditions are met.

Factory Configurations

○ Systems upgraded in the field may have a configuration different from those built in the factory.

○ For systems built at the factory, strings that mix SATA Bricks and FC Bricks will have the FC RAID Bricks closest to the Slammer. Field upgrades may differ— newly added Bricks can be connected to the last FC RAID or SATA Brick at the end of existing strings.

About Cable Connections Between Two Racks

Note: This topic applies only to Pillar Axiom 600 systems.

Be sure the two racks are bayed before you make connections between them. Route the FC cables directly from one rack to the other through the open sides. Do not route cables from rack to rack through the raised floor. The cables supplied are not long enough.

When routing an FC cable from one rack to the other, route the cable through the plastic chase that is dedicated to FC cables on the right side of the rack (from the back). The FC chase to use depends on which side the racks join.

Important! Make sure the FC cables do not cross over or get too close to the power supply cords. Keep them separated to minimize EMI.

About Cabling the SSF and PMI

Back-end cabling, which involves cabling the Storage System Fabric (SSF) (sometimes referred to as the private interconnect, or simply PI) and the private management interface (PMI).

The SSF cables provide the connections between the Bricks and the Slammers to support all data traffic. The PMI cables provide the connections between the Pilot and the Slammers to support management traffic.

The SSF operates at 2 Gb/s (copper) or 4 Gb/s (optical) depending on the hardware that is configured on the Pillar Axiom system and on the cables and connectors that are used.

For the SSF back-end fabric to operate at 4 Gb/s, the following conditions must be met:

- Both control units (CUs) in all the Slammers must contain a combination of only version 2 PIMs .

- Both CUs in all the Bricks must contain only version 2 SATA RAID controllers or version 2 FC RAID (FCR) controllers.

- All ports on the version 2 PIMs, version 2 SATA RAID controllers, and version 2 FC RAID controllers (FCR) must contain only 4 Gb/s small form-factor pluggable (SFP) connectors.

- The patch cables connecting these 4 Gb/s SFPs must be optical.

Important! Pillar provides a set of SFPs for version 2 PIMs, version 2 SATA RAID controllers, and version 2 FC RAID (FCR) controllers.

⚠ Caution	Use of any SFP or cable not provided by Pillar Data Systems can lead to performance and reliability issues when unqualified SFPs are used. Use of third party SFPs can also void the warranty of your Pillar Axiom system, if the third party SFP or cable is determined to be the cause of any problems within the Pillar Axiom system.

If any of the following conditions are true, the back-end fabric operates at 2 Gb/s:

- A version 1 FC Brick is configured into the storage array.

- A version 1 SATA Brick or version 1PIM is included in the configuration.

- An HSSDC2 (high-speed serial data connection)-to-HSSDC2 copper cable is used.

- An SFP-to-SFP copper cable is used.

- An SFP-to-HSSDC2 hybrid copper cable is used.

Note: 2 Gb/s optical SFPs should not be inserted into any fabric port when the SSF is configured to run at 4 Gb/s. If such an SFP is inserted into a fabric port, the system disables the port, even after a restart of the Pillar Axiom system.

Note: If the SSF is being configured for 4 Gb/s operation, the SFP modules must be installed prior to connecting the optical cables.

All of the possible SSF and PMI cable combinations are fully detailed in the appropriate *SSF Cabling Reference* for your system.

Related tasks
- *Connect the Pilot to Your Management LAN*
- *Connect a Slammer to the Data Network*

About Jumbo Frames

You can use large Internet Protocol (IP) frames, called *jumbo frames*, in a high-performance network to increase performance over long distances.

To implement jumbo frames, be sure that all Ethernet network interface cards (NICs) in all systems, Ethernet switches, local router interfaces, and all other network devices on the same local networks as the Pillar Axiom system are capable of supporting jumbo frames and are configured for the same effective maximum transmission unit (MTU).

Refer to your switch documentation for information on prerequisite software and firmware and for instructions on configuring the switch for jumbo frames. Refer to the documentation for the NIC in all client systems and other network devices for information and restrictions on configuring jumbo frames.

The performance boost with jumbo frames is most noticeable for client systems with slower processors or interrupt handlers that may benefit from the lower interrupt rate offered by jumbo frames. The increase in performance is most noticeable for single-client stream data transfers.

Connect the Pilot to Your Management LAN

Prerequisites:

- Two 100 BaseT ports for the public connection to the management network. For added redundancy, the two connections should be to separate switches. The Pillar Axiom system provides a standard Cat 5 RJ-45 jack on each Pilot control unit (CU) for this connection.

- The external switch ports must be configured for auto-negation, if the Pillar Axiom system is also configured for auto-negation. If the external switch ports are manually set to a certain speed or a duplex setting, the Pilot must be set to match those settings.

- Three IP addresses on the same subnet: one IP for each physical interface and one shared IP.

- If AxiomONE Path Manager (APM) is installed on a SAN host, that host will require an Ethernet interface for communication with the AxiomONE Storage Services Manager. Because APM communicates with the Pilot over secure, encrypted XML, the network configuration must permit the SAN host to reach the Pilot management IP Ethernet interfaces on port 26004.

Note: VLAN tagging is not supported on the management interfaces.

The Pillar Axiom system is shipped with the following default IP addresses and settings, with the Dynamic Host Configuration Protocol (DHCP) disabled:

- 10.0.0.1 (Default gateway)

- 10.0.0.2 (Shared IP)

- 10.0.0.3 (Pilot CU 0)

- 10.0.0.4 (Pilot CU 1)

- 255.255.255.0 (Netmask)

- Auto-negation: Enabled

> ⚠️ **Caution**
>
> Do not connect the Pillar Axiom Pilot management interfaces to any network unless you are sure that the default IP addresses of the Pillar Axiom system are not currently in use on that network. Using the default Pillar Axiom IP addresses in your network can interfere with other workstations on the network as well as cause problems when you configure the Pillar Axiom system.

1   Connect a workstation directly to the Pilot management Ethernet to modify the default IP addresses and interface settings before connecting the Pilot management interfaces to any network.

2   Attach that workstation to the top Pilot CU0 (PLT-0) and ping 10.0.0.2.

3   If you get a ping response, continue to Step 4. If you do not get a ping response, attach the workstation to the bottom Pilot CU1 (PLT-1) and retry the ping.

4   Connect the Pilot CU on which you receive a ping response to the AxiomONE Storage Services Manager.

5   In the left navigation pane, click on the **Networking** link under **Global Settings** to modify the IP addresses of the Pilot so that they are appropriate for your network.

6   If the customer network requires that auto-negation be disabled, manually configure the interface speed and duplex setting to match the network.

7   For Pilot CU0 — PLT-0 (the top CU), connect the MGMT port to the Ethernet LAN that is used for managing the Pillar Axiom system.

Figure 41 Pilot management cables

Note: This image is for illustration purposes only. Your hardware component may look different.

8   Using a second cable, repeat the above step for Pilot CU1 (PLT-1) (the bottom CU).

Related tasks
- *Start the Graphical User Interface*

Connect the Pilot CUs

Connect the two control units (CUs) of the Pilot to each other to ensure a heartbeat.

Prerequisites:

- One serial null modem cable

- One 0.5 meter Cat 5e Ethernet cable

1   Connect one end of the serial null modem cable to the bottom Serial port of the Pilot CU 0 (the top CU). Connect the other end of the serial null modem cable to the bottom Serial port of the Pilot CU1 (the bottom CU). This creates a heartbeat connection between the two CUs of the Pilot.

Figure 42 Pilot CU cabling

Legend	1 Pilot CU0
	2 Serial port
	3 USB port
	4 Ethernet port
	5 Pilot CU1

Note: This image is for illustration purposes only. Your hardware component may look different.

2   Connect one end of the Ethernet cable to the Ethernet port (ETH0) of the Pilot CU0 (the top CU). Connect the other end of the Ethernet cable to the Ethernet port (ETH0) of the Pilot CU1 (the bottom CU). Refer to the *Pillar Axiom SSF Cabling Reference* for more information.

3   Connect the Ethernet port (ETH1) of the top Pilot CU (PLT-0) to the Ethernet port (ETH0) of the top Slammer CU (CU0) using a two meter Cat 5e Ethernet cable. Also, connect the Ethernet port (ETH1) of the bottom Pilot CU (PLT-1) to the Ethernet port (ETH2) of the bottom Slammer CU (CU1) using a two meter Cat 5e Ethernet cable. Refer to the *Pillar Axiom SSF Cabling Reference* for more information.

Connect a Slammer to the Data Network

Prerequisites:

- NAS data paths require 1 gigabit Ethernet (GbE) or 10 GbE connections. Both fiber and copper connections are supported.

  - For optical connections: The 1 GbE connections require Pillar supplied 1 GbE small form-factor pluggable (SFP) modules and the 10 GbE connections require Pillar supplied 10 GbE SFP Plus modules.

    - For copper connections: The 10 GbE connections require direct attached copper cables with SFP Plus connectors.

- SAN data paths require 1 Gb/s, 2 Gb/s, 4 Gb/s, or 8 Gb/s Fibre Channel (FC) optical multi-mode connections. Use Pillar supplied SFP modules for the respective optical Fiber Channel (FC) connections.

Note: The type of connection (GbE or FC) was specified when the system was ordered. Contact your Account Representative if you need to change the type.

⚠ **Caution**	Do not mix the SFP modules for the various optical front end connections. Use only the Pillar supplied SFP modules for the respective front end connections.

Refer to the following image when performing this task:

Figure 43 Slammer network cables

Legend		
1 GbE Slammer connections		2 Optical Slammer connections

Note: This image is for illustration purposes only. Your hardware component may look different.

1   For SAN Slammers, connect FC cables from the network interface module (NIM) ports on the Slammer to any open data ports available on two separate FC network switches.

2   For NAS Slammers, connect a gigabit Ethernet (GbE) cable or a 10 gigabit Ethernet (GbE) cable from each NIM port to an open data port on a separate network switch.

Note: For both the SAN FC and NAS Ethernet connections, do not exceed the maximum recommended cable lengths.

Related concepts
- *About Cabling the SSF and PMI*

Related references
- *Cable Length Limits for NAS Ethernet Connections*
- *Cable Length Limits for SAN Fibre Channel Connections*

CHAPTER 5

Connect Power Cables

Component Power Usage

The Pillar Axiom system components must be plugged into the PDUs such that they do not exceed the amperage rating of any outlet group. If you exceed the amperage rating, the circuit breakers trip.

Except where indicated, the maximum rated amperage of the outlet banks remains the same regardless of the electrical service voltage. Therefore, components draw about half the amperage at 230V than at 115V, and you can plug more components into each power distribution unit (PDU). The table below lists the maximum electrical requirements of the Pillar Axiom components. Each component has redundant power cords plugged into different PDUs on separate circuits.

Table 12 Pillar Axiom 600 electrical requirements

Component	Amps. at 115 volts	Amps. at 208 volts	Amps. at 230 volts	Power (watts)
Slammer (for both CUs combined)	4.72A	2.73A	2.46A	540W
SATA Brick	2.26A	1.25A	1.15A	260W
FC Brick	2.89A	1.67A	1.50A	330W
SSD Brick	1.52A	1.13A	0.80A	175W
Pilot (for each CU)	1.25A	0.72A	0.65A	143W

Note: For information on the electrical requirements of a specific Pillar Axiom component or the electrical requirements of a mix of various components, contact the Pillar World Wide Customer Support Center.

With redundant power supplies, the amperage draw for each power cord is rated for the case when one circuit fails, which increases the amperage draw on the other cord.

PDU Outlet Amperage Limits

The number of Pillar Axiom system components you can plug into each Pillar-supplied power distribution unit (PDU) varies.

The Pulizzi TPC2105 shown in the following figure can use 115V, 208V, or 230V, 30A (32A in Europe) electrical service. The overall amperage limits are 24A and the they are the same at any input voltage.

Figure 44 Pulizzi TPC2105-1 outlet amperage limits

Legend		
1 Front	6 Supports 10A	
2 Back	7 Supports 12A	
3 Supports 10A	8 Supports 12A	
4 Supports 10A	9 Supports 24A maximum across all outlets	
5 Supports 10A		

The Pulizzi TPC2104 shown in the following figure can use 115V, 208V, or 230V, 20A (16A in Europe) electrical service. The amperage limits for the four-outlet group are different for 115V and 230V, but the overall amperage limit is 16A regardless of the input voltage.

Figure 45 Pulizzi TPC2104 outlet amperage limits

Legend

1 Front	5 Supports 10A
2 Back	6 Supports 10A
3 Supports 115V, 208V, or 230V	7 Supports 10A
4 Supports 10A	8 Supports 16A maximum across all outlets

The Pulizzi PC3365 shown in the following figure requires 230 or 400 VAC WYE three-phase input power. The output at each outlet is always 230V. This PDU is only available outside the United States.

Figure 46 Pulizzi PC3365 outlet amperage limits

Legend

1 Phase X: 16A	
2 Phase Y: 16A	
3 Phase Z: 16A	
4 Each four-outlet group has an 10A limit	

Note: The Pulizzi PC3365–3314 (PN: 1475–00097–20) is a three-phase PDU for domestic configurations. The outlet field is the same, but there are four switches on the front panel.

About Power Cabling

With a Pillar Data Systems rack, the Brick power cords are pre-installed in the rack with colored tie wraps, ready for you to plug into the back of each Brick. All cords of the same color connect to one set of power distribution units (PDUs), while the other cords connect to the other set of PDUs.

Sample Power Cabling for One Slammer and Three Bricks

The configuration in the figure below uses 230V power and two Pulizzi TPC 2104 PDUs. The power cords for each component must connect to separate PDUs, connected to separate power circuits. A sample power cabling scheme such as the one below would distribute the load within the limits of each outlet bank.

Figure 47 Sample power cabling scheme with 230V power, 20A PDU

Legend		
1 Brick 1	4 Slammer with two control units
2 Brick 2	5 Pilot
3 Brick 3	6 PDUs

Note: This image is for illustration purposes only. Your hardware component may look different.

In the preceding example, the Slammer control unit (CU) 0, the three Bricks, and the Pilot in the four-outlet bank require 1.525A, 1.525A, 1.24A, 1.24A, 1.24A, and 0.80A respectively, or 7.57A total. This total load is below the 10A limit for a four-outlet bank.

If we modify the example to use 120V, the cable connection configuration depends on which PDU you are using. The same two Slammer CUs and three Bricks draw 3.05A, 3.05A, 2.54A, 2.54A, 2.54A, and 1.50A or 15.22A total. This total load is acceptable for the Pulizzi TPC 2104 PDU because the amperage limit for a four-outlet bank is 15A at 115V.

For both the TCP2105 PDU and TCP2104 PDU at 115V, the maximum for four outlets is 10A for each of the quad outlets. There are three Bricks and one Slammer connected to one quad in the preceding figure, so that the load is 10.67A. This load exceeds the 10A limit on the quad. Reposition one Brick load

to the quad with the Slammer and the Pilot, so that the load for the middle quad with two Bricks and one Slammer is 8.13A. The load on the right quad with one Slammer, one Brick, and one Pilot is 7.09A. You can distribute the plugs as shown in the following figure:

Figure 48 Sample power cabling scheme with 115V on a TCP2105-1 PDU

Legend	1 SATA Brick 1: 2.25Adrawn	8 No amps. drawn for group
	2 SATA Brick 2: 2.25A drawn	9 Total of 4.50A drawn for group
	3 SATA Brick 3: 2.25A drawn	10 Total of 4.50A drawn for group
	4 SATA Brick 4: 2.25A drawn	11 Total of 5.97A drawn for group
	5 Slammer CU 0: 2.36A drawn	12 Total of 4.50A drawn for group
	6 Slammer CU 1: 2.36A drawn	13 Total of 10.47A drawn for groups
	7 Pilot: 1.25A drawn	

Other configurations are possible. Make sure that you do not exceed the rating for a four-outlet bank or the rating for a set of two banks, which is 12A for this PDU.

Note: Another PDU is still needed for the power cords for the redundant circuit, which was left out of the above figures for simplicity. The redundant PDU should be cabled the same way.

Note: The amperage requirements for an FC Brick is higher than a SATA Brick at 115V. The FC Bricks draw close to an additional one amp each. Configuring for FC Bricks may require upgrading your PDU specification. If you have any questions about your PDU configuration contact the Pillar World Wide Customer Support Center.

Sample Power Cabling for One Slammer and 16 SATA Bricks

Note: This topic applies only to Pillar Axiom 600 systems.

One Slammer and 16 SATA Bricks (and a Pilot) represent a fully-loaded 42U rack. Split power cables (the plug end splits into two outlet ends) enable you to connect two components to a single outlet in the PDU and reduce the density of the cabling.

Tip: The total amperage draw for each outlet bank is more important than which Brick is plugged into which outlet. The following figure illustrates one way to distribute the load. Always try to balance the load among the outlet banks.

Figure 49 Sample power cabling scheme with 230V (one circuit shown)

Legend

1–16 (Brick 16 through Brick 1): SATA, 1.17A drawn	21 Total 7.08A drawn
17 Slammer CU 0: 1.525A drawn	22 Total 7.08A drawn
18 Slammer CU 1: 1.525A drawn	23 Total 6.07A drawn
19 Pilot: 0.8A drawn	24 Grand total 11.8A drawn
20 Total 4.72A drawn	25 Grand total 10.8A drawn

Important! If you use split power cables, as shown in the figure above, make sure the split cables power separate components. Do not use a split power cable to power two sides of the same component. The two sides need to be on separate circuits, in case one side fails.

Note: The amperage requirements for an FC Brick is higher than a SATA Brick at 115V. The FC Bricks draw close to an additional one amp each. Configuring for FC Bricks may require upgrading your PDU specification. If you have any questions about your PDU configuration, contact the Pillar World Wide Customer Support Center.

Connect Power Cables

When you ordered your Pillar Axiom system, you specified the type of service outlets (in terms of voltage, amperage, and phases) that you have at your facility. The plugs on the power distribution units (PDUs) that you ordered match that service.

If you are using Pillar racks, the system comes with components and PDUs already installed in the rack. If you are using non-Pillar racks, you need to install the hardware components and PDUs manually.

> ⚠️ **Caution**   Be sure to maintain reliable grounding of rack-mounted equipment. You should give particular attention to supply connections other than direct connections to the branch circuit, such as connections to power strips.

1 Review the Pillar Axiom power requirements.

2 Review the information about power cabling and verify that your PDUs meet the electrical requirements.

3 Plug in your system components in such a way so that no PDU amperage limits are exceeded.

4 Dress all power cables to the opposite side of the rack from any data cables.

   We recommend dressing the power cables to the left side (when facing the back of the cabinet).

5 Secure the power cables to the rack such that they do not restrict the removal of any other component.

   Important! You should not turn on any power circuits until the installation is complete and all network cables are in place.

> ⚠️ **Caution**   Apply power to the Pilot only after the serial null modem cable and the Ethernet cable are connected to the two Pilot Control Units (CUs).

> ⚠️ **Caution**   Do not apply power to the Pilot until you attach the serial cable and the Ethernet cable that connect the two Pilot Control Units (CUs) together.

Related concepts

- *Component Power Usage*
- *About Power Cabling*

Related references

- *PDU Outlet Amperage Limits*

Related tasks

- *Power On the System*

Complete the Installation

Power On the System

As part of your site planning, you set up a separate circuit and power outlet for each PDU. These outlets should be located within reach of the 15 ft (4.57 m) PDU power input cables.

1   Ensure the PDU circuit breakers are off.

2   Connect the PDUs to a facility power source. If the facility's main circuit breakers are off, turn them on to supply power to the PDUs.

3   At the front of the system, use a #2 flathead or Phillips head screwdriver to secure the Slammer batteries in place with the two attached screws.

Figure 50 Secure Slammer batteries

Note: This image is for illustration purposes only. Your hardware component may look different.

4　At the back of the system, turn on the power switches for each Brick.

Figure 51 Turn on Brick power

Legend

1	Brick power switches

Note: This image is for illustration purposes only. Your hardware component may look different.

5　Turn on the DC power switch at the back of the Pilot. Some versions of the Pilot have a DC power switch at the back of the unit, but most Slammers and Pilot control units (CUs) automatically power on when you apply power to the system in the next step.

Figure 52 Turn on Pilot power

Legend

1	Pilot power switch
2	Ethernet ports

Note: This image is for illustration purposes only. Your hardware component may look different.

6　At the front of the system, switch on the PDU circuit breakers to apply power to the hardware components.

Figure 53 Turn on PDU power

Note: This image is for illustration purposes only. Your hardware component may look different.

Important! You must turn on all of the PDUs within a period of 10 seconds.

Result:
The Power On LED on the PDU lights and the cooling fans of all hardware components connected to this PDU start.

Verify the Front Status LEDs

You can verify the installation of the hardware by checking the LEDs on the Pilot, Slammer, and Brick bezels.

1   Verify the Pilot CU LEDs are steady green and not blinking.

If the LEDs are off, ensure that the PDU circuit breakers are receiving power and that you have turned them on within a 10 second period of time.

Figure 54 Pilot bezel LEDs

Legend	
1 CU 0 LED	
2 CU 1 LED	

2   If the Pilot has a DC power switch in the back, make sure that the DC power switch is on.

Figure 55 DC power switch at the back of the Pilot

Legend

1	Pilot power switch
2	Ethernet ports

Note: This image is for illustration purposes only. Your hardware component may look different.

3 Verify that the Slammer STATUS LEDs are green and not blinking. Use the table below for information on the Slammer bezel LEDs.

Table 13 LEDs on the Slammer bezel

Status	Activity	Fault	Software module	Meaning
Green	Off	Off	DMS	System is normal with no activity.
Green	Variable green	Off	Various	System is normal and displays some activity. Higher the activity, faster is the blinking of the Activity LED.
Variable	Variable	On	DMS	Fault LED is turned on due to various hardware errors, such as: ● The bezel is not detected

Table 13 LEDs on the Slammer bezel (continued)

Status	Activity	Fault	Software module	Meaning
				(at the PIM side only). • The network interface module (NIM) or PIM is not detected. • There is a DMS initialization error. • There is a power supply error. • The Slammer cannot be powered off due to the thermal or voltage rail being out of bounds.
Slow orange	Slow orange	Slow	DMS	Beaconing. All other FRU Fault LEDs are slowly starting to blink amber.
Variable	Variable	Variable	Various	If the Slammer node is in the boot process and the GUI does not recognize the system, refer to the detailed LED states documented in Slammer LED Startup and Halt Codes.

Figure 56 Slammer bezel LEDs

Legend	
	1 CU 0
	2 CU 1
	3 Fault LEDs
	4 Activity LEDs
	5 Status LEDs

4   Verify that the FAULT LEDs are off.

If they are on at this stage, it is usually because the bezel is not fully seated.

5   For each Brick, make sure that the CU 0 and CU 1 STATUS LEDs are green.

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

Figure 57 Brick bezel LEDs

Legend		
	1	CU 0 STATUS light
	2	CU 1 STATUS light
	3	FAULT LED
	4	Power light
	5	Pillar logo

6   Verify that the FAULT LED for each Brick is off.

A lit FAULT LED at this stage usually means the bezel is not fully seated.

Related concepts
- *About LED Startup Codes*

Related references
- *Slammer LED Startup and Halt Codes*

Verify the Back Status LEDs

At the back of the system:

1 Verify that the connectivity LEDs on each Pilot control unit (CU) are green. Blinking indicates activity, which may be normal during bootup. Sometimes the Ethernet LEDs are amber even when the Pilot boots up normally. When the connectivity LEDs are amber, it indicates that the Ethernet LEDs are running at a one GB level, instead of a 100 MB level.

Note: The Ethernet LEDs may be on even if the DC power to the Pilot is off. If the LEDs are off, check both Pilot private management inter-connections and check both public management connections to your Ethernet LAN.

Figure 58 Pilot connectivity LEDs

Legend		
	1	Private LAN connectivity LEDs
	2	Public management port connectivity LEDs

Note: This image is for illustration purposes only. Your hardware component may look different.

2 On the Slammers, verify:

- The power supply LEDs are green and not blinking.

Figure 59 Slammer connectivity LEDs

Legend

1	Power supply LEDs
2	GbE network interface module (NIM) port LEDs
3	CU LEDs
4	Private interconnect module (PIM) Fibre Channel LEDs

> ⚠ **Caution** If you are using a Version 2 PIM, there must be a cable from port FC3 to FS10. Otherwise none of the other FS ports will be on.

Note: This image is for illustration purposes only. Your hardware component may look different.

If the power supply LEDs are off or amber, remove the power cables from both the power supplies on that Control Unit (CU). Unlatch the power supplies, realign them, and then apply power. Make sure that the power cable is securely connected at both ends and that the PDUs are powered on.

- On a NAS Slammer, for any 2-port or 4-port network interface module (NIM) GbE port, the LED on the left is green and not blinking, and the one on the right is amber. If they are off, check the network connections.

- On a SAN Slammer, the NIM port LEDs are green and not blinking.

- For the control unit LEDs, the ST LED is green. The ACT LED might be on if the Slammer is configured and active, but is normally off at this stage of installation. For more information, refer to Table 13: LEDs on the Slammer bezel.

  Note: The ST LED refers to the Status LED, the ACT LED refers to the Activity LED, and the FLT LED refers to the Fault LED.

- All NIM port LEDs with an FC or FS cable port connection are green and not blinking. If they are amber or off, check the FC cabling.

3 On the Bricks, verify:

- The thumb-wheel on the Enclosure Services (ES) module is set to 0 for the following Brick types: Serial ATA (SATA), SATA Version 2, solid state drives (SSD), and Fibre Channel RAID (FC RAID).

- The thumb-wheel on the ES module is set to 1 for all FC Expansion (FCE) Bricks.

- The power supply LEDs are green and not blinking.

Figure 60 Brick LEDs

Legend	1 RAID controller LEDs (SATA)
	2 Power supply LED
	3 ES module LED
	4 Spare drive LEDs

Note: This image is for illustration purposes only. Your hardware component may look different.

If either power supply LED is amber or turned off:

- Ensure the power cable on that side is securely connected at both ends.

- Ensure the PDU and Brick are powered on.

- The ES module LED is green and not blinking. If the ES module LED is amber, ensure that both power cables are securely connected to both the Brick and the PDU.

- The RAID controller LEDs are green. If the RAID controller LEDs are off or are blinking green, check the network connections.

- The spare drive LEDs are green and not blinking.

  Note: If the ES module, RAID controller, or spare drive has failed, contact the Pillar World Wide Customer Support Center.

  Note: Use a wet finger to check if the Brick power supply fans are spinning. Some fan models have curved supports so that it look like the fan blades are not spinning.

Related references

- *8 Gb/s Fiber Channel (FC) HBA LED Status*
- *10 Gb/s Ethernet HBA LED Status*

8 Gb/s Fiber Channel (FC) HBA LED Status

Table 14 8 Gb/s FC HBA LED status

LED identifier and color		Meaning
8 (top LED)	Yellow	Link is operating at 8 Gb/s, blinking with I/O activity.
	Off	Link is not operating at 8 Gb/s.
	Note: In a normal operating optimized port, the speed should be 8 Gb/s.	
4 (middle LED)	Green	Link is operating at 4 Gb/s, blinking with I/O activity.
	Off	Link is not operating at 4 Gb/s.
2 (bottom LED)	Amber	Link is operating at 2 Gb/s, blinking with I/O activity.
	Off	Link is not operating at 2 Gb/s.
Note: All three LEDs are turned on and blinking when power is applied to the HBA and after the firmware initialization for the 8 Gb/s FC HBA.		
Note: All three LEDs are turned on solid when power is applied to the HBA and before the firmware initialization for the 8 Gb/s FC HBA.		
Note: All three LEDs blinking alternately indicates a firmware error for the 8 Gb/s FC HBA.		

Table 14 8 Gb/s FC HBA LED status (continued)

LED identifier and color	Meaning
Note: The blinking of the 8 Gb/s LED and the 2 Gb/s LED indicates that the LED is a beacon.	

10 Gb/s Ethernet HBA LED Status

Table 15 10 Gb/s Ethernet HBA LED status

LED identifier and color		Meaning
Speed (left LED)	Solid green	The HBA is operating at 10 Gb/s.
	Solid yellow	The HBA is operating at 1 Gb/s.
	Off	No physical connection to the port or the port is not operational.
	Note: In a normal operating optimized port, the speed should be 10 Gb/s.	
Activity or Link (right LED)	Solid green	Link on this port is operational.
	Blinking green	Indicates activity on this port.
	Off	No physical connection to the port or the port is not operational.

Attach the Bezels

You must attach all bezels or the system generates an error condition and lights the FLT LEDs amber.

1   Install all Pilot, Slammer, and Brick bezels as required.

2   For Bricks, at the front of the system, fully seat all drives by pressing each drive carrier into the Brick chassis.

3   Insert the bottom two hooks on the bezel into the rack rail tabs at the bottom of the hardware component.

Figure 61 Bezel hook on the right side of the bezel

Legend   1   Insert the bezel hooks into the tabs on each side of the Brick

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 (if open) until they lock in place.

The top hooks should latch with an audible click. If the bezel does not light when you apply power to the system, verify that the top and bottom hooks are properly engaged.

Figure 62 Press the ejector tabs to secure the bezel

Legend 1 Press the ejector tabs to secure the bezel

About HBA Driver and Firmware Installation (SAN Only)

You must install FC HBAs in the SAN hosts, including any software required by the HBAs, before you can access the LUNs on Pillar Axiom servers. Complete the instructions from your HBA vendor to:

- Install the HBAs in the SAN hosts.

- Download required drivers and firmware.

- Install or update the computer BIOS on the SAN host, if required.

Note: Each 8 Gb/s Fiber Channel (FC) HBA has its own unique World Wide Name (WWN). This WWN must be used when updating the FC switch configuration and installing or replacing the 8 Gb/s FC HBA.

Note: If you intend to install the AxiomONE Path Manager software, refer to the appropriate *AxiomONE Path Manager Installation Guide and Release Notes* for your particular platform.

Related concepts

- *About AxiomONE Path Manager Installation (SAN Only)*

About Switch Zone for HBA Set Up (SAN Only)

If appropriate, follow the instructions from your switch vendor to set up zones to:

- Permit host HBA ports to access the Slammer ports.

- Segregate network servers with different operating systems.

- Segregate network servers with different security requirements.

Note: The 8 Gb/s Fiber Channel (FC) HBA has its own unique World Wide Name (WWN). This WWN must be used to update any FC switch configuration data.

Attach the Rack Doors and Panels

In this procedure, you reattach the front and back doors and both side panels to the rack. These steps help to ensure the security and proper cooling of Pillar Axiom system components.

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

2 Reattach the doors.

3 Reattach the door grounding straps on the rear door.

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

Attach the Rack Side Panels

1. Hang the top of the panel on the top of the rack frame and latch the panel to close it. If the racks are bayed, you must install only the outer two panels.

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

2. 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.

3. Lock both side panels (optional).

CHAPTER 7

Initial Configuration

Pre-Configuration Checklist

To configure your system, you will need to have at hand certain information, such as IP addresses.

You may want to print this list and check off each item after you complete it.

Table 16 Global system parameters

Done	Information
❑	Check the *Customer Release Notes* and the Pillar Data Systems Support Portal to see if any software updates are available. For instructions on installing software updates, refer to the *Release Notes* and to the *Pillar Axiom Administrator's Guide*.
GUI access	
❑	Get the management network IP address of the Pilot (the default is 10.0.0.2) and the user ID and password from the *Site Preparation Survey* or from Pillar Data Systems.
❑	Get access to the AxiomONE Storage Services Manager, the command line interface (CLI), and the AxiomOne Path Manager.
Global system parameters	
❑	Get the IP address of your primary NTP server for synchronizing system time.
❑	Get the operating mode of the management Ethernet: auto-negotiation, or manual speed and duplex.
❑	Get three IP addresses that you can assign to the public interface of the Pilot.

Table 16 Global system parameters (continued)

Done	Information
❏	Get the management network subnet mask and the IP address for the gateway to be used.
❏	Understand link aggregation. Decide whether you will use it for the Slammer data paths.
❏	Decide whether you want the system to e-mail alerts to administrators. If so, get the IP address of your e-mail server.
❏	The Pillar Axiom system defaults to the correct Call-Home connection parameters and IP addresses, if it uses a direct connection to the Pillar Call-Home servers. If you are using a Proxy server, the information on the Call-Home connection parameters and IP addresses comes from the local network and firewall administrators. Get the Call-Home configuration modes from the site network and/or firewall administrators.
NAS storage parameters	
❏	If you saved a performance profile (from another Pillar Axiom system), you must know where it is so you can navigate to it.
❏	Decide on an IP address that is available in your network for the initial File Server. The IP address must not be on the management network. This network should be appropriate for sustained high utilization file server traffic.
❏	Obtain the data path network subnet mask and gateways for the data network. This should be on a network suitable for sustained high utilization.
❏	Obtain Virtual LAN (VLAN) IDs from the network administrator and find out whether the Pillar Axiom system must be configured with VLAN Tags.
❏	Obtain the identity and IP addresses of the naming servers, the domain controllers (DC), and the name of the Common Internet File Systems (CIFS) domain.
❏	Understand enough about filesystems and storage to specify capacity, type of redundancy, priority over other volumes, Clone FS settings, typical file size, random or sequential file access, read or write I/O bias, and snapshot strategy.

Table 16 Global system parameters (continued)

Done	Information
❑	Understand file sharing, naming services, and authentication for CIFS and Network File System (NFS), including exporting, user accounts, and specifying permitted hosts or networks.
SAN storage parameters	
❑	Understand enough about SANs to specify capacity, type of redundancy, priority over other volumes, random or sequential file access, read or write I/O bias, and Clone LUN space requirements.
❑	Use the unique World Wide Name (WWN) for the 8 Gb/s Fiber Channel (FC) HBA when you update any FC switch configuration data.

Start the Graphical User Interface

The AxiomONE Storage Services Manager is a graphical user interface (GUI) to manage the Pillar Axiom system. Access the GUI by connecting to the high-availability IP address of the Pilot, the default of which is 10.0.0.2.

⚠ **Caution**	Do not connect the Pilot Management interfaces to the customer network without checking to make sure that the following IP addresses: 10.0.0.2, 10.0.0.3, and 10.0.0.4 are not already in use on the customer network.

Note: In most instances, you must directly connect a workstation to the Pillar Axiom system to set the initial IP addresses to IP addresses that will be available on the customer network.

1 Configure a workstation with an IP address in the range of 10.0.0.5 through 10.0.0.254, a netmask of 255.255.255.0 and a default gateway of 10.0.0.1.

2 Connect to the top Pilot Control unit (CU) and attempt to ping 10.0.0.2 and 10.0.0.3. If 10.0.0.3 responds to the ping, but 10.0.0.2 does not respond to the ping, connect to the bottom Pilot CU and attempt to ping 10.0.0.2 and 10.0.0.4. If neither Pilot CU responds to 10.0.0.2, contact the Pillar World Wide Customer Support Center for assistance.

3 Connect the workstation to the Pilot CU that responds to 10.0.02. Attempt to open http://10.0.0.2 and log in.

4 Use the following values to log in:

- Login Name: administrator

- Password: pillar

5 When prompted, enter a new password.

Note: Get the password that is to be used from the *Site Preparation Survey*. Be sure that the Primary system administrator also gets this password.

Note: We strongly recommend that you set up an additional Type 1 Administrator account when you install the system. A Type 1 Administrator can modify account passwords without knowing the previous password for any accounts.

Note: Do not lose the password. If you lose the password, contact the Pillar World Wide Customer Support Center for assistance.

6   Click **OK**.

7   Check the **System Status** icon in the bottom left corner of the status bar of theGUI. The **System Status** icon should display as a round green circle, which indicates that all hardware components in the Pillar Axiom system have successfully booted to Normal status. If this **System Status** icon is a yellow triangle (that indicates warning) or a red circle (that indicates critical), go to the **System Health Summary** screen and note which components are not Green and Normal.

8   Make sure all components are powered on and that there are no loose or incorrectly connected cables. The Pillar Axiom system may place some components in warning status if there is a cabling error.

It is recommended to set the text size to the smallest font size in your Web browser, so that the entire screen is visible including the status line icons.

If there is a flashing upside down triangle in the lower left corner of the status bar of the GUI, click on it and check to see if it indicates a topology error. The **System Health Summary** screen may assist in identifying the error through the warning status icon for private management interface (PMI) links, private interconnect wiring errors, and the Pillar Axiom components.

If there is a connection error, verify that the cables are all fully seated and properly connected.

Refer to the *Pillar Axiom SSF Cabling Reference* for more information. If the error persists, contact the Pillar World Wide Customer Support Center.

Troubleshoot a Failed Cable Connection

1   Check the administrator actions to identify any cabling issues. All cabling issues generate administrator actions.

2   Navigate to the System Health Summary screen and note all the components that do not display the Green icon, which indicates Normal status.

3   If a single Pilot Control Unit (CU) and a single Slammer CU are in warning status, and that Slammer CU is connected to that Pilot CU, check the Private Management Network Ethernet cable.

4   On the Slammer and the Bricks, verify that each field replaceable unit (FRU) displays the Green icon, which indicates Normal status.

5   Select the I/O Port details on each FRU and note any connections that do not display a connected status. Verify the cable connections using the *SSF Cabling Reference*. Contact the Pillar World Wide Customer Support Center for assistance after checking that all the cabling connections are correct as indicated in the *Pillar Axiom 600 SSF Cabling Reference*.

6   Contact the Pillar World Wide Customer Support Center for help in determining whether you have a bad cable or port and which one is bad:

- Request a replacement FC cable for a bad cable.

- Request a replacement private interconnect module for a bad Slammer port or a RAID controller for a bad Brick port.

About AxiomONE Path Manager Installation (SAN Only)

To operate your SAN system, you may optionally install the Pillar AxiomONE Path Manager (APM) drivers and software on your SAN hosts. APM provides these benefits:

- Ensures your SAN host operating system does not interpret multiple paths as multiple drives.

- Provides path failover.

- Streamlines system management.

Important! Configure the LUNs on the Pillar Axiom system before you install the APM system software on the SAN host.

Complete the procedures in the appropriate *AxiomONE Path Manager Installation Guide and Release Notes* to install the APM driver and software on the SAN host.

Reset the Primary System Administrator Password

If you forget the Primary system administrator password, you can reset it.

1   Use a Type 1 Administrator account, if one exists, to reset the password. A support administrator cannot reset the Primary Administrator password.

2   If no Type 1 Administrator account is available, contact the Pillar World Wide Customer Support Center for the encrypted file (for resetting the password), which may be placed in a USB key. Use the USB key as instructed.

Important! We strongly recommend that you set up an additional Type 1 Administrator account when you install the system. Only a Type 1 Administrator can modify account passwords without knowing the previous password for any accounts.

APPENDIX A

Slammer LED Startup Progress Codes

About LED Startup Codes

When a Slammer is powered on, it goes through a sequence of actions. Generally, the time to finish these actions for a new installation is about 12 minutes.

The time to start up your system may be shorter or longer, depending on the number of configured entities (filesystems, LUNs, Snap FSs, Clone LUNs, quotas, and so on) and, to some degree, on the configuration of Slammers and Bricks. Slammers cannot complete the startup sequence without the Pilot being powered on and functioning.

While a Slammer performs startup diagnostics and then waits for its runtime image to download from the Pilot:

- The Fault LED (FLT) is off.

- The Activity LED (ACT) is green and blinks fast.

- The Status LED (ST) is green and blinks slowly.

During the remainder of the startup process, FLT and ACT are off while ST slowly blinks amber once each second. During this time, the GUI shows the Slammer to have a status of `Booting 0xnnnn` while the Pilot initializes the Slammer' s data services components.

When the Slammer successfully completes the startup sequence, ST is steady green.

Tip: If the front bezel Fault (FLT) LED or the private interconnect module (PIM) FLT LED is on steady and no other fault indicators on the Slammer are lit, the bezel may not be properly seated. Slammers always light FLT when the bezel is off.

Tip: The FLT, ST, and ACT LED indicators are duplicated on the upper left of the PIM in the rear of the Pillar Axiom system.

If the Slammer halts during startup, the three LEDs on the back of the chassis (FLT, ACT, and ST) or the three LEDs on the bezel (Status, Activity, and Fault) help you identify where the Slammer halted in the startup sequence.

About Slammer LED Codes

The Slammer bezel has Fault, Status, and Activity LEDs that can display various colors and blink rates. These LEDs also appear on the private interface module at the back of the Slammer chassis, and are labeled FLT (Fault), ACT (Activity), and ST (Status).

These LEDs can:

- Be green or amber.

- Be on or off.

- Be steady, with no blinks.

- Blink rapidly—slightly more than two blinks for each sec (2.375 hz).

- Blink slowly—one blink for each 1.5 sec (0.67 hz).

Slammer LED Startup and Halt Codes

The following table describes the meaning of the Slammer startup and halt codes as indicated by the LEDs.

The system may go through this sequence more than once if the network is having trouble responding.

Table 17 Slammer LED boot block status codes

Code			Software module	Meaning
FLT	ACT	ST		
Off	Off	Rapid green	EEL_BOARD_INIT_0	Clean progress to BoardInit0.
Off	Orange	Rapid green	EEL_BOARD_INIT_1	Clean progress to BoardInit1.
Off	Green	Rapid green	EEL_BOARD_INIT_2	Clean progress to BoardInit2.
On	Green	Rapid orange	EEL_MEM_INIT	Memory training has begun.
Off	Rapid orange	Rapid green	EEL_BOARD_INIT_4	Clean progress to BoardInit4.
Off	Green	Slow orange	EEL_MEM_READY	Memory training has completed.
Off	Slow orange	Rapid green	EEL_BOARD_INIT_6	Clean progress to BoardInit6.
Off	Rapid green	Rapid green	EEL_BOARD_INIT_8	Clean progress to BoardInit8.
Off	Slow green	Rapid green	EEL_BOARD_INIT_10	Clean progress to BoardInit10.
Off	Green	Green	EEL_RAM_LOADER	Clean progress to RAM loader.

Table 18 Slammer LED boot block error codes

Code			Software module	Meaning
FLT	ACT	ST		
On	Rapid orange	Rapid green	EEL_BATTERY_MISSING_ERR	Battery is not present.
On	Rapid orange	Slow green	EEL_BATTERY_LOW_ERR	Battery voltage is low (below 5.5 V).
On	Slow orange	Rapid orange	EEL_VRT_CLEAR_ERR	CMOS is invalid due to low battery.
On	Slow orange	Slow orange	EEL_VRT_CMOS_ERR	Error in checking CMOS VRT
On	Slow orange	Rapid green	EEL_AGESA_CMOS_ERR	Error in checking the CMOS training-data-valid flag.
On	Slow orange	Slow green	EEL_AGESA_CMOS_INVALID	Memory controller DQS data in NVRAM is corrupt.
On	Rapid green	Rapid orange	EEL_CLAMP_UNEXPECTED_ERR	CPLD memory clamp was set, even though it should not have been set.
On	Rapid green	Slow orange	EEL_CLAMP_EXPECTED_ERR	CPLD memory clamp was not set even though it should have been set.

Table 18 Slammer LED boot block error codes

Code			Software module	Meaning
FLT	ACT	ST		
On	Rapid green	Rapid green	EEL_CLAMP_STATUS_UNKNOWN_ERR	CPLD memory clamp is in an indeterminate state.
On	Rapid green	Slow green	EEL_CRC_FAILED	A PROM sector has an invalid CRC.
On	Slow green	Rapid orange	EEL_ALT_PAGE_BOOT	Ready to switch to the PROM alternate page.
On	Slow green	Green	EEL_BOOT_FAILED	Both A and B page CRC failed.
On	Slow green	Slow green	EEL_RAM_LOADER_ERROR	Problem in switching from the bootblock code to the ramloader code. See the serial console output for details.
NA	NA	NA	EEL_I2C_SCL_STUCK	I2C SCL is stuck low.
NA	NA	NA	EEL_I2C_SDA_STUCK	I2C SDA stuck low.
On	Green	Rapid orange	EEL_MEM_INIT_FAILURE	Memory training has failed. See the bootblock console

Table 18 Slammer LED boot block error codes (continued)

Code			Software module	Meaning
FLT	ACT	ST		
				output for details.

Table 19 Slammer LED RAM loader codes

Code			Software module	Meaning
FLT	ACT	ST		
Rapid	Off	Off	EEL_MAIN	Entered "C" code main routine.
Rapid	Off	Slow orange	EEL_INIT_IDT	The ramloader has initialized the IDT.
Rapid	Off	Slow green	EEL_POWERFAIL_INIT	Ramloader is ready to handle NMI (powerfail) interrupts.
Rapid	Orange	Off	EEL_COM1_INIT	Diagnostic serial port is ready for use.
Rapid	Orange	Slow orange	EEL_FANS_INIT	Fans are about to be initialized.
Rapid	Rapid orange	Off	EEL_PCI_INIT	About to enumerate the PCI topology.
Rapid	Rapid orange	Slow green	EEL_MONITOR	About to enter the ramloader monitor (diagnostic environment only).

Table 19 Slammer LED RAM loader codes (continued)

Code			Software module	Meaning
FLT	ACT	ST		
Rapid	Slow orange	Off	EEL_CONTINUE	Exited the ramloader monitor (diagnostic environment only).
Rapid	Slow orange	Green	EEL_MPOST	About to enter MPOST (diagnostic environment only).
Rapid	Slow orange	Slow orange	EEL_MEMORY_CONFIG	About to check the memory configuration.
Rapid	Slow orange	Slow green	EEL_MEM_CONFIG_CHANGED	Mismatch between the discovered memory configuration and the EEPROM memory configuration.
Rapid	Rapid green	Off	EEL_MEM_CONFIG_ERROR	Mismatch between the discovered memory configuration and the CMOS memory configuration.
Rapid	Rapid green	Green	EEL_UNSUPPORTED_MEM_CONFIG	The installed memory configuration is not valid

Table 19 Slammer LED RAM loader codes (continued)

Code			Software module	Meaning
FLT	ACT	ST		
Rapid	Rapid green	Slow orange	EEL_EEPROM_DATA_ERROR	Unrecognized DIMM size is installed.
Rapid	Rapid green	Slow green	EEL_MEMTEST	About to start memory test.
Rapid	Slow green	Off	EEL_MEMTEST_FAILED	Memory test detected an error.
Slow	Slow green	Slow green	EEL_NETBOOT	Transition to the startup program codes.

Table 20 Slammer LED states after POST process completion

Code			Meaning
FLT	ACT	ST	
Off	Rapid orange	Slow orange	MicroDMS starting in Netboot. This is a very brief transient state.
Off	Rapid green	Slow green	MicroDMS has completed one pass in Netboot and is downloading and booting slammer.ifs.
Off	Off	Slow orange	DMS started.
Off	Off	Green	MCCAgent cold or warmstart complete.
Off	Variable	Green	The Slammer has booted and is waiting for the Pilot. The ACT LED tracks activity and is variable.

APPENDIX B

Safety Statements

About Safety Statements

For the Pillar Axiom system, safety statements provide specific warning and cautionary notices about the electrical and weight properties that are associated with a Pillar Axiom system and its hardware components.

Important! Procedures listed in the body of this document assume that the electrical characteristics of the power supply to which Pillar Axiom system components are connected comply with the technical specifications for those components.

Related concepts
- *About Pillar Axiom Hardware Specifications*

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. |

Electrical Warning in Other Languages

Table 21 Electrical warning in other languages

Waarschuwing	Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen.
Varoitus	Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista.
Attention	Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents.
Warnung	Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt.
Avvertenza	Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi

Table 21 Electrical warning in other languages   (continued)

	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.
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 está ndar de prevención de accidentes.
Varning	Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på nå gon utrustning må ste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador.

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

⚠️ **Warning**   When removing a power supply, do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected.

⚠️ **Warning**   The power supply cord is used as the main disconnect device. Ensure that the socket outlet is located or installed near the equipment and is easily accessible.

⚠ **Warning**	When working on a chassis or near power supplies, use extreme caution because line voltages may be present within the chassis.
⚠ **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 Pillar Axiom 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 plates or anti-tip brackets installed so the rack does not tip when you install a component.

Lightning Activity Warning

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

Lightning Warning in Other Languages

Table 22 Lightning warning in other languages

Waarschuwing	Tijdens onweer dat gepaard gaat met bliksem, dient u niet aan het systeem te werken of kabels aan te sluiten of te ontkoppelen.
Varoitus	Älä työskentele jä rjestelmä n parissa ä lä kä yhdistä tai irrota kaapeleita ukkosilmalla.
Attention	Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage.
Warnung	Arbeiten Sie nicht am System und schließ en Sie keine Kabel an bzw. trennen Sie keine ab, wenn es gewittert.
Avvertenza	Non lavorare sul sistema o collegare oppure scollegare i cavi durante un temporale con fulmini.
Advarsel	UtfØr aldri arbeid på systemet, eller koble kabler til eller fra systemet nå r det tordner eller lyner.

Table 22 Lightning warning in other languages (continued)

Aviso	Não trabalhe no sistema ou ligue e desligue cabos durante perÍ odos de mau tempo (trovoada).
Advertencia	No operar el sistema ni conectar o desconectar cables durante el transcurso de descargas eléctricas en la atmósfera.
Varning	Vid å ska skall du aldrig utföra arbete på systemet eller ansluta eller koppla loss kablar.

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.

Power Supply Warning in Other Languages

Table 23 Power supply warning in other languages

Waarschuwing	U dient de voeding niet aan te raken zolang het netsnoer aangesloten is. Bij systemen met een stroomschakelaar zijn er lijnspanningen aanwezig in de voeding, zelfs wanneer de stroomschakelaar uitgeschakeld is en het netsnoer aangesloten is. Bij systemen zonder een stroomschakelaar zijn er lijnspanningen aanwezig in de voeding wanneer het netsnoer aangesloten is.
Varoitus	Älä kosketa virtalä hdettä virtajohdon ollessa kytkettynä . Virrankatkaisimella varustetuissa jä rjestelmissä on virtalä hteen sisä llä jä ljellä verkkojä nnite, vaikka virrankatkaisin on katkaistu-asennossa virtajohdon ollessa kytkettynä . Jä rjestelmissä , joissa ei ole virrankatkaisinta, on virtalä hteen sisä llä verkkojä nnite, kun virtajohto on kytkettynä .

Table 23 Power supply warning in other languages (continued)

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 ààl'arrêt. Avec les systèmes sans commutateur marche-arrêt, l'alimentation est sous tension quand le cordon d'alimentation est branché.
Warnung	Berü hren Sie das Netzgerä t nicht, wenn das Netzkabel angeschlossen ist. Bei Systemen mit Netzschalter liegen Leitungsspannungen im Netzgerä t vor, wenn das Netzkabel angeschlossen ist, auch wenn das System ausgeschaltet ist. Bei Systemen ohne Netzschalter liegen Leitungsspannungen im Netzgerä t vor, wenn das Netzkabel angeschlossen ist.
Avvertenza	Non toccare l'alimentatore se il cavo dell'alimentazione è collegato. Per i sistemi con un interruttore di alimentazione, tensioni di linea sono presenti all'interno dell'alimentatore anche quando l'interruttore di alimentazione è en posizione di disattivazione (off), se il cavo dell'alimentazione è collegato. Per i sistemi senza un interruttore, tensioni di linea sono presenti all'interno dell'alimentatore quando il cavo di alimentazione è collegato.
Advarsel	BerØ r ikke strØ mforsyningsenheten nå r strØ mledningen er tilkoblet. I systemer som har en strØ mbryter, er det spenning i strØ mforsyningsenheten selv om strØ mbryteren er slå tt av og strØ mledningen er tilkoblet. Nå r det gjelder systemer uten en strØ mbryter, er det spenning i strØ mforsyningsenheten nå r strØ mledingen er tilkoblet.
Aviso	Não toque na unidade abastecedora de energia quando o cabo de alimentaçção estiver ligado. Em sistemas com interruptor, a corrente eléctrica estará presente na unidade abastecedora, sempre que o cabo de alimentação de energia estiver ligado, mesmo quando o interruptor se encontrar desligado. Para sistemas sem interruptor, a tensão eléctrica dentro da unidade abastecedora só estará presente quando o cabo de alimentação estiver ligado.
Advertencia	No tocar la fuente de alimentació n mientras el cable esté enchufado. En sistemas con interruptor de alimentació n, hay voltajes de lÍ nea dentro de la fuente, incluso cuando el interruptor esté en Apagado (OFF) y el cable de alimentació n enchufado. En sistemas sin interruptor de alimentació n, hay voltajes de lÍ nea en la fuente cuando el cable está enchufado.

Table 23 Power supply warning in other languages (continued)

Varning	Vidrör inte strömförsörjningsenheten nä r nä tsladden ä r ansluten. För system med strömbrytare finns det nä tspä nning i strömförsörjningsenheten ä ven nä r strömmen har slagits av men nä tsladden ä r ansluten. För system utan strömbrytare finns det nä tspä nning i strömförsörjningsenheten nä r nä tsladden ä r ansluten.

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.

Power Disconnect Warning in Other Languages

Table 24 Power disconnect warning in other languages

Attention	Le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée àproximité de l'équipement et être facile d'accés.

Installation Warning

⚠ **Warning**   When working on a chassis or near power supplies, follow the Guided Maintenance procedures in the *Pillar Axiom Administrator's Guide* for instructions on how to work with and around power supplies. Use extreme caution because line voltages may be present within the chassis.

Table 25 Installation warning in other languages

Waarschuwing	Raadpleeg de installatie-aanwijzingen voordat u het systeem met de voeding verbindt.

Table 25 Installation warning in other languages (continued)

Varoitus	Lue asennusohjeet ennen jä rjestelmä n yhdistä mistä virtalä hteeseen.
Attention	Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.
Warnung	Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließ en.
Avvertenza	Consultare le istruzioni di installazione prima di collegare il sistema all'alimentatore.
Advarsel	Les installasjonsinstruksjonene fØ r systemet kobles til strØ mkilden.
Aviso	Leia as instruç ões de instalação antes de ligar o sistema àsua fonte de energia.
Advertencia	Ver las instrucciones de instalació n antes de conectar el sistema a la red de alimentació n.
Varning	Lä s installationsanvisningarna innan du kopplar systemet till dess strömförsörjningsenhet.

Power Disconnect Warning

 Warning When working on a chassis or near power supplies, follow the Guided Maintenance procedures in the *Pillar Axiom Administrator's Guide* 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 26 Warnings for Norway and Sweden

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

Restricted Access Area Warning

⊘ 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.

Restricted Access Warning in Other Languages

Table 27 Restricted access warning in other languages

Waarschuwing	Dit toestel is bedoeld voor installatie op plaatsen met beperkte toegang. Een plaats met beperkte toegang is een plaats waar toegang slechts door servicepersoneel verkregen kan worden door middel van een speciaal instrument, een slot en sleutel, of een ander veiligheidsmiddel, en welke beheerd wordt door de overheidsinstantie die verantwoordelijk is voor de locatie.
Varoitus	Tä mä laite on tarkoitettu asennettavaksi paikkaan, johon pä ä sy on rajoitettua. Paikka, johon pä ä sy on rajoitettua, tarkoittaa paikkaa, johon vain huoltohenkilöstö pä ä see jonkin erikoistyökalun, lukkoon sopivan avaimen tai jonkin muun turvalaitteen avulla ja joka on paikasta vastuussa olevien toimivaltaisten henkilöiden valvoma.
Attention	Cet appareil est àinstaller dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité. L'accès aux zones de sécurité est sous le contr ô le de l'autorité responsable de l'emplacement.
Warnung	Diese Einheit ist zur Installation in Bereichen mit beschrä nktem Zutritt vorgesehen. Ein Bereich mit beschrä nktem Zutritt ist ein Bereich, zu dem nur Wartungspersonal mit einem Spezialwerkzeugs, Schloß und Schlü ssel oder anderer Sicherheitsvorkehrungen Zugang hat, und der von dem fü r die Anlage zustä ndigen Gremium kontrolliert wird.

Table 27 Restricted access warning in other languages (continued)

Avvertenza	Questa unitàdeve essere installata in un'area ad accesso limitato. Un'area ad accesso limitato è un'area accessibile solo a personale di assistenza tramite un'attrezzo speciale, lucchetto, o altri dispositivi di sicurezza, ed è controllata dall'autoritàresponsabile della zona.
Advarsel	Denne enheten er laget for installasjon i områ der med begrenset adgang. Et områ de med begrenset adgang gir kun adgang til servicepersonale som bruker et spesielt verktØ y, lå s og nØ kkel, eller en annen sikkerhetsanordning, og det kontrolleres av den autoriteten som er ansvarlig for områ det.
Aviso	Esta unidade foi concebida para instalação em á reas de acesso restrito. Uma á rea de acesso restrito é uma á rea àqual apenas tem acesso o pessoal de serviço autorizado, que possua uma ferramenta, chave e fechadura especial, ou qualquer outra forma de segurança. Esta á rea é controlada pela autoridade responsá vel pelo local.
Advertencia	Esta unidad ha sido diseñ ada para instalarse en á reas de acceso restringido. Área de acceso restringido significa un á rea a la que solamente tiene acceso el personal de servicio mediante la utilizació n de una herramienta especial, cerradura con llave, o algún otro medio de seguridad, y que está bajo el control de la autoridad responsable del local.
Varning	Denna enhet ä r avsedd för installation i områ den med begrä nsat tillträ de. Ett områ de med begrä nsat tillträ de få r endast tillträ das av servicepersonal med ett speciellt verktyg, lå s och nyckel, eller annan sä kerhetsanordning, och kontrolleras av den auktoritet som ansvarar för områ det.

Product Disposal Warning

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

Product Disposal Warning in Other Languages

Table 28 Product disposal warning in other languages

Waarschuwing	Dit produkt dient volgens alle landelijke wetten en voorschriften te worden afgedankt.
Varoitus	Tä mä n tuotteen lopullisesta hä vittä misestä tulee huolehtia kaikkia valtakunnallisia lakeja ja sä ä nnöksiä noudattaen.
Attention	La mise au rebut définitive de ce produit doit être effectuée conformément àtoutes les lois et réglementations en vigueur.
Warnung	Dieses Produkt muß den geltenden Gesetzen und Vorschriften entsprechend entsorgt werden.
Avvertenza	L'eliminazione finale di questo prodotto deve essere eseguita osservando le normative italiane vigenti in materia.
Advarsel	Endelig disponering av dette produktet må skje i henhold til nasjonale lover og forskrifter.
Aviso	A descartagem final deste produto deverá ser efectuada de acordo com os regulamentos e a legislação nacional.
Advertencia	El desecho final de este producto debe realizarse seg\x9c n todas las leyes y regulaciones nacionales.
Varning	Slutlig kassering av denna produkt bör skötas i enlighet med landets alla lagar och föreskrifter.

Jewelry Removal Warning

⚠ 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.

Jewelry Removal Warning in Other Languages

Table 29 Jewelry removal warning in other languages

Waarschuwing	Alvorens aan apparatuur te werken die met elektrische leidingen is verbonden, sieraden (inclusief ringen, kettingen en horloges) verwijderen. Metalen voorwerpen worden warm wanneer ze met stroom en aarde zijn verbonden, en kunnen ernstige brandwonden veroorzaken of het metalen voorwerp aan de aansluitklemmen lassen.
Varoitus	Ennen kuin työskentelet voimavirtajohtoihin kytkettyjen laitteiden parissa, ota pois kaikki korut (sormukset, kaulakorut ja kellot mukaan lukien). Metalliesineet kuumenevat, kun ne ovat yhteydessä sä hkövirran ja maan kanssa, ja ne voivat aiheuttaa vakavia palovammoja tai hitsata metalliesineet kiinni liitä ntä napoihin.
Attention	Avant d'accéder àcet équipement connecté aux lignes électriques, ô ter tout bijou (anneaux, colliers et montres compris). Lorsqu'ils sont branchés àl'alimentation et reliés àla terre, les objets métalliques chauffent, ce qui peut provoquer des blessures graves ou souder l'objet métallique aux bornes.
Warnung	Vor der Arbeit an Gerä ten, die an das Netz angeschlossen sind, jeglichen Schmuck (einschließ lich Ringe, Ketten und Uhren) abnehmen. Metallgegenstä nde erhitzen sich, wenn sie an das Netz und die Erde angeschlossen werden, und können schwere Verbrennungen verursachen oder an die Anschluß klemmen angeschweiß t werden.
Avvertenza	Prima di intervenire su apparecchiature collegate alle linee di alimentazione, togliersi qualsiasi monile (inclusi anelli, collane, braccialetti ed orologi). Gli oggetti metallici si riscaldano quando sono collegati tra punti di alimentazione e massa: possono causare ustioni gravi oppure il metallo puòsaldarsi ai terminali.
Advarsel	Fjern alle smykker (inkludert ringer, halskjeder og klokker) fØ r du skal arbeide på utstyr som er koblet til kraftledninger. Metallgjenstander som er koblet til kraftledninger og jord blir svært varme og kan forå rsake alvorlige brannskader eller smelte fast til polene.

Table 29 Jewelry removal warning in other languages (continued)

Aviso	Antes de trabalhar em equipamento que esteja ligado a linhas de corrente, retire todas as jó ias que estiver a usar (incluindo anéis, fios e reló gios). Os objectos metá licos aquecerão em contacto com a corrente e em contacto com a ligação àterra, podendo causar queimaduras graves ou ficarem soldados aos terminais.
Advertencia	Antes de operar sobre equipos conectados a lÍ neas de alimentació n, quitarse las joyas (incluidos anillos, collares y relojes). Los objetos de metal se calientan cuando se conectan a la alimentació n y a tierra, lo que puede ocasionar quemaduras graves o que los objetos metá licos queden soldados a los bornes.
Varning	Tag av alla smycken (inklusive ringar, halsband och armbandsur) innan du arbetar på utrustning som ä r kopplad till kraftledningar. Metallobjekt hettas upp nä r de kopplas ihop med ström och jord och kan förorsaka allvarliga brä nnskador; metallobjekt kan också sammansvetsas med kontakterna.

Qualified Personnel Warning

⚠️ **Warning** Only qualified personnel should install or replace this equipment.

Table 30 Qualified personnel warning in other languages

Waarschuwing	Installatie en reparaties mogen uitsluitend door getraind en bevoegd personeel uitgevoerd worden.
Varoitus	Ainoastaan koulutettu ja pä tevä henkilökunta saa asentaa tai vaihtaa tä mä n laitteen.
Avertissement	Tout installation ou remplacement de l'appareil doit être réalisé par du personnel qualifié et compétent.
Achtung	Gerä t nur von geschultem, qualifiziertem Personal installieren oder auswechseln lassen.
Avvertenza	Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.

Table 30 Qualified personnel warning in other languages (continued)

Advarsel	Kun kvalifisert personell med riktig opplæring bØ r montere eller bytte ut dette utstyret.
Aviso	Este equipamento deverá ser instalado ou substituÍ do apenas por pessoal devidamente treinado e qualificado.
Atenció n	Estos equipos deben ser instalados y reemplazados exclusivamente por personal técnico adecuadamente preparado y capacitado.
Varning	Denna utrustning ska endast installeras och bytas ut av utbildad och kvalificerad personal.

Warning Statement for Finland

Table 31 Warning statement for Finland

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

Warning Statement for Sweden

Table 32 Warning statement for Sweden

Varning	Osynlig laserstrå lning nä r denna del ä r öppen och förregleringen ä r urkopplad. Rikta inte blicken in mot strå len.

Power Cabling Warning

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

Power Cabling Warning in Other Languages

Table 33 Power cabling warning in other languages

Waarschuwing	Zet alle stroomkabels vast wanneer dit toestel wordt geÏnstalleerd om te voorkomen dat de verbindingen van de veldbedrading worden verstoord.
Varoitus	Kiinnitä kaikki voimakaapelit tiukkaan tä tä laitetta asentaessasi, jotta vä ltä t kentä n johdinkytkentöjen vioittumista.
Attention	Lors de l'installation de cet appareil, fixer tous les câ bles d'alimentation pour éviter de provoquer des perturbations aux raccordements des câ blages propres au site.
Warnung	Bei der Installation dieser Einheit die Netzverkabelung befestigen, um die Störung von Feldkabelanschlü ssen zu vermeiden.
Avvertenza	In fase di installazione dell'unità, assicurare tutti i cablaggi di alimentazione per evitare di alterare i collegamenti degli avvolgimenti di campo.
Advarsel	Nå r denne enheten installeres, må alle kraftledninger sikres for å unngå at feltkabelkoblingene forstyrres.
Aviso	Para evitar problemas com as ligaç ões de rede de campanha, prenda todos os cabos de corrente quando instalar esta unidade.
Advertencia	Sujetar todo el cableado de alimentació n cuando se instale este equipo para evitar que se mezcle con las conexiones del cableado "in situ".
Varning	Fä st allt starkströmskablage vid installation av denna enhet så att fä ltkopplingen inte rubbas.

Supply Circuit Warning

⚠️ **Warning**   Do not overload the circuit when you connect components to the power supply.

Supply Circuit Warning in Other Languages

Table 34 Supply circuit warning in other languages

Waarschuwing	Let erop dat de toestellen op voedingscircuits worden aangesloten zonder het vermogen van de bedrading te overschrijden.
Varoitus	Laiteyksiköt on yhdistettä vä huolellisesti syöttöpiiriin niin, että johdot eivä t ole ylikuormitettuja.
Avertissement	Veillez àbien connecter les unités au circuit d'alimentation afin de ne pas surcharger les connections.
Achtung	Beim Anschließ en der Gerä te an das Stromnetz ist darauf zu achten, daß die Schaltverbindungen nicht ü berlastet werden.
Avvertenza	Fare attenzione quando si collegano le unitàal circuito di alimentazione, per non sovraccaricare i cablaggi.
Advarsel	Vær nØ ye med å koble enheter til strØ mforsyningskretsen slik at ledningene ikke overbelastes.
Aviso	Deverá ter precaução ao ligar unidades ao circuito de fornecimento de energia, para não sobrecarregar a instalação.
Atenció n	Poner mucho cuidado al conectar los equipos al circuito de alimentació n a fin de no sobrecargar el cableado.
Varning	Var noga vid anslutning av enheter till matarströmkretsen så att ledningarna inte överbelastas.

Voltage Mismatch Warning

⚠️ **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*.

Voltage Mismatch Warning in Other Languages

Table 35 Voltage mismatch warning in other languages

Waarschuwing	Aansluiting op een verkeerd voedingsvoltage kan beschadiging van de apparatuur veroorzaken en tot brandgevaar leiden. Het chassis mag niet aangesloten worden als de spanning die op het label staat aangegeven, anders is dan de spanning van het stopcontact.
Varoitus	Erisuuruisten jä nnitteiden yhdistä minen voi aiheuttaa laitevaurion ja tulipalon vaaran. Jos tarraan merkitty jä nnite eroaa pistorasian jä nnitteestä , ä lä yhdistä asennuspohjaa pistorasiaan.
Avertissement	Une erreur de voltage risque d'endommager l'appareil et constitue un risque d'incendie. Si la tension indiquée sur l'étiquette est différente de la tension de l'alimentation, ne connectez en aucun cas le châ ssis àla prise.
Achtung	Bei nicht ü bereinstimmender Spannung kann es zu Gerä teschä den und Feuergefahr kommen. Wenn die auf dem Etikett angegebene Spannung nicht mit der Steckdosenspannung ü bereinstimmt, schließ en Sie das Gerä t nicht an diese Steckdose an.
Avvertenza	Una tensione inadeguata puõcausare danni all'apparecchio e rischio di incendio. Se la tensione riportata sulla targhetta è diversa da quella della presa di alimentazione, non collegare lo chassis a tale presa.
Advarsel	Ulik spenning kan forå rsake skade på utstyret og inneb\xbe re brannfare. Dersom spenningen på merkelappen er

Table 35 Voltage mismatch warning in other languages (continued)

	forskjellig fra spenningen i stikkontakten, må du ikke koble kabinettet til den stikkontakten.
Aviso	Uma voltagem incorrecta poderá causar danos no equipamento e constituir um risco de incêndio. Se a voltagem indicada na etiqueta for diferente da voltagem de saÍ da de corrente da parede, não ligue o chassis a esse receptá culo.
Atenció n	Las diferencias en el voltaje pueden causar dañ os a los equipos y presentar peligro de incendio. Si el voltaje indicado en la etiqueta es diferente al de la toma de alimentació n, no conectar el chasis a dicha toma.
Varning	Inkompatibla spä nningar kan resultera i materiella skador samt utgör brandfara. Om den spä nning som anges på etiketten skiljer sig frå n strömuttagets spä nning ska chassit inte anslutas till detta uttag.

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.

SELV Circuit Warning in Other Languages

Table 36 SELV circuit warning in other languages

Waarschuwing	Om elektrische schokken te vermijden, mogen veiligheidscircuits met extra lage spanning (genaamd SELV = Safety Extra-Low Voltage) niet met telefoonnetwerkspanning (TNV) circuits verbonden worden. LAN (Lokaal netwerk) poorten bevatten SELV circuits en WAN (Regionaal netwerk) poorten bevatten TNV circuits. Sommige LAN en WAN poorten gebruiken allebei RJ-45 connectors. Ga voorzichtig te werk wanneer u kabels verbindt.

Table 36 SELV circuit warning in other languages (continued)

Varoitus	Jotta vä ltyt sä hköiskulta, ä lä kytke pienjä nnitteisiä SELV-suojapiirejä puhelinverkkojä nnitettä (TNV) kä yttä viin virtapiireihin. LAN-portit sisä ltä vä t SELV-piirejä ja WAN-portit puhelinverkkojä nnitettä kä yttä viä piirejä . Osa sekä LAN- että WAN-porteista kä yttä ä RJ-45-liittimiä . Ole varovainen kytkiessä si kaapeleita.
Attention	Pour éviter une électrocution, ne raccordez pas les circuits de sécurité basse tension (Safety Extra-Low Voltage ou SELV) àdes circuits de tension de réseau téléphonique (Telephone Network Voltage ou TNV). Les ports du réseau local (LAN) contiennent des circuits SELV et les ports du réseau longue distance (WAN) sont munis de circuits TNV. Certains ports LAN et WAN utilisent des connecteurs RJ-45. Raccordez les câ bles en prenant toutes les précautions nécessaires.
Warnung	Zur Vermeidung von Elektroschock die Sicherheits-Kleinspannungs-Stromkreise (SELV-Kreise) nicht an Fernsprechnetzspannungs-Stromkreise (TNV-Kreise) anschließ en. LAN-Ports enthalten SELV-Kreise, und WAN-Ports enthalten TNV-Kreise. Einige LAN- und WAN-Ports verwenden auch RJ-45-Steckverbinder. Vorsicht beim Anschließ en von Kabeln.
Avvertenza	Per evitare scosse elettriche, non collegare circuiti di sicurezza a tensione molto bassa (SELV) ai circuiti a tensione di rete telefonica (TNV). Le porte LAN contengono circuiti SELV e le porte WAN contengono circuiti TNV. Alcune porte LAN e WAN fanno uso di connettori RJ-45. Fare attenzione quando si collegano cavi.
Advarsel	Unngå å koble lavspenningskretser (SELV) til kretser for telenettspenning (TNV), slik at du unngå r elektrisk stØ t. LAN-utganger inneholder SELV-kretser og WAN-utganger inneholder TNV-kretser. Det finnes bå de LAN-utganger og WAN-utganger som bruker RJ-45-kontakter. Vår forsiktig nå r du kobler kabler.
Aviso	Para evitar choques eléctricos, não conecte os circuitos de segurança de baixa tensão (SELV) aos circuitos de tensão de rede telefó nica (TNV). As portas LAN contêm circuitos SELV e as portas WAN contêm circuitos TNV. Algumas portas LAN e WAN usam conectores RJ-45. Tenha o devido cuidado ao conectar os cabos.
Advertencia	Para evitar la sacudida eléctrica, no conectar circuitos de seguridad de voltaje muy bajo (safety extra-low voltage =

Table 36 SELV circuit warning in other languages (continued)

	SELV) con circuitos de voltaje de red telefó nica (telephone network voltage = TNV). Los puertos de redes de á rea local (local area network = LAN) contienen circuitos SELV, y los puertos de redes de á rea extendida (wide area network = WAN) contienen circuitos TNV. En algunos casos, tanto los puertos LAN como los WAN usan conectores RJ-45. Proceda con precaució n al conectar los cables.
Varning	För att undvika elektriska stötar, koppla inte sä kerhetskretsar med extra lå g spä nning (SELV-kretsar) till kretsar med telefonnä tspä nning (TNV-kretsar). LAN-portar innehå ller SELV-kretsar och WAN-portar innehå ller TNV-kretsar. Vissa LAN- och WAN-portar ä r försedda med RJ-45-kontakter. Iaktta försiktighet vid anslutning av kablar.

Incorrect Connection Warning

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

Incorrect Connection Warning in Other Languages

Table 37 Connection warning in other languages

Waarschuwing	Incorrecte aansluiting van deze of aangesloten apparatuur op een stopcontact voor algemene doeleinden kan een gevaarlijke situatie tot gevolg hebben.
Varoitus	Tä mä n laitteen tai siihen liitettyjen laitteiden virheellinen kytkentä yleispistorasiaan voi aiheuttaa vaaratilanteen.
Attention	Un branchement incorrect de cet équipement ou de l'équipement branché àune prise d'usage général peut créer une situation dangereuse.
Warnung	Inkorrektes Anschließ en von diesem oder damit verbundenen Gerä ten an einer Allzwecksteckdose kann eine Gefahrensituation verursachen.

Table 37 Connection warning in other languages (continued)

Avvertenza	Un collegamento errato di questo apparecchio, o dell'apparecchiatura a esso collegato, a una presa di uso generale pu\x98 causare una situazione pericolosa.
Advarsel	Feil kobling av dette utstyret eller tilhØ rende utstyr til et vanlig uttak kan fØ re til farlige situasjoner.
Aviso	Uma conexão incorrecta a uma ficha de alimentação eléctrica normal, deste ou de qualquer equipamento a este conectado, poderá resultar numa situação potencialmente perigosa.
Advertencia	La conexió n incorrecta de este equipo, o del equipo conectado, a una toma o receptá culo de tipo general podrÍ a resultar en una situació n peligrosa.
Varning	Felaktig koppling av denna eller ansluten utrustning till ett universaluttag kan orsaka riskfylld situation.

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 Pillar 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 Pillar 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 permit 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**	A Slammer weighs 94 pounds (42.6 kilograms). For safe handling, use two people to lift it.

⚠ Caution Qualified personnel are advised to exercise great care at all times when they work on a Pillar Axiom system. Remember to:

- Remove rings, watches, or other jewelry and neckties before you begin any procedure.

- Use caution near fan assemblies; the moving parts can change speed unexpectedly.

- Use the correct tools for the job.

- Keep all paperwork up to date, complete, and accurate.

⚠ Caution The sum of the ratings of the components that plug into the PDU must be less than 80% of the current and power ratings of the PDU. Similarly, the current rating of the PDU must be less than 80% of the rating for the building supply circuit.

☣ Caution A Brick weighs up to 65 pounds (29.5 kilograms). For safe handling, use two people to lift it.

APPENDIX C

Pillar Axiom Hardware Specifications

About Hardware Specifications

Hardware specifications (sometimes called data sheets):

- Describe the system's operating environment.

- List the agency approvals.

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

About Pillar Axiom Hardware Specifications

A Pillar Axiom system is an assembly of Pilot management controllers, Slammer storage controllers, Brick storage enclosures. power distribution units (PDUs), and racks.

Table 38 Basic components of a Pillar Axiom system

Component	Pillar Axiom 600 system
Pilot	1
Slammer	1 to 4
Brick	1 to 64 3–64, when Brick types are mixed
PDUs	*The number of PDUs depends on the characteristics of the power inlets and the number of components in each rack.*
42U racks	*The number of racks depends on the number and the distribution of the hardware components that are listed above.*

Related concepts

- *About Slammer Hardware Specification*
- *About Brick Hardware Specification*
- *Pillar Axiom Hardware Specifications*

Related references

- *About Pilot Hardware Specifications*
- *Pillar Axiom PDU Hardware Specification*

System Power Requirements

Pillar Axiom systems require at least two feeds, in which both have one of the power input characteristics shown below. The voltage and frequency show minimum and maximum values.

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

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

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

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

- 230V, 16A or 32A (Europe)

- WYE-connected 3-phase:

  - USA: 199-217V, 47-63Hz, 30A

  - Europe: 380-415V, 47-63Hz, 16A

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

System Environmentals

Table 39 System altitude specifications

Mode	Elevation
Operational	-200 to 10,000 feet (-61 to 3048 meters)
Non-operational	-200 to 40,000 feet (-61 to 12,192 meters)

Table 40 System temperature and humidity specifications

Mode	Ambient temperature	Non-condensing humidity	Max wet bulb temperature	Gradient
Operational	Up to 7000 feet elevation: +41 to 104°F (+5 to 40°C) Up to 10,000 feet elevation: +41 to 95°F (+5 to 35°C)	10–85% 10%/hr gradient	86°F (30°C)	36°F/hr (20°C/hr)
Non-operational	-40 to 158°F (-40 to 70°C)	5–95% 10%/hr gradient	104°F (40°C)	54°F/hr (30°C/hr)

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

Pillar Axiom System Acoustics

Acoustics for a Pillar Axiom system that comprises the following components were tested to ISO 7779 by standard specifications:

- One Pilot

- One NAS Slammer

- Three Bricks

Such a system generates an acoustic level that is no greater than 70 dBA.

Table 41 System acoustics specification

Acoustic level (tested to ISO7779)
Does not exceed 6.5 Bels under normal conditions, which is: • 73.4°F (23°C) ambient • All fans operational • No fault conditions The acoustic level will increase under fault conditions.

System Random Vibration Specifications

Table 42 System random vibration specifications

Mode	Force	Frequency	Time
Operational	0.1 G RMS	3–100 hz (X, Y, and Z axis)	15 minutes
Non-operational	Administered using the Telcordia GR-63 CORE test specifications. Tested with the rack inside a shipping crate.		

System Regulatory Agency Compliance

Agency approvals are based on a Pillar Axiom system that consists of:

- One Pilot

- Two Slammers

- Twelve Bricks

Related references

- *Regulatory Agency Compliances*
- *FCC Warning Statement*
- *European Union Compliance Statement*

Regulatory Agency Compliances

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

Table 43 Safety, quality, and environmental standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15. Operation is subject to the following two conditions: 1 This device may not cause harmful interference. 2 This device must accept any interference that may be received, including interference that may cause undesired operation.
	CB Scheme by IECEE standard IEC 60950, First Edition
CE	Conformite Europeenne /DoC
cULus	UL and CSA under UL (cUL)
GS	TUV/GS

Table 43 Safety, quality, and environmental standards (continued)

Logo	Standard
	Pillar Data Systems offers customers a recycle program to properly dispose of surplus products and products that have reached their end of life. Equipment that is returned to Pillar through this program is disposed of in an environmentally safe manner using processes that comply with the WEEE (EU Directive on Waste Electrical and Electronic Equipment) regulations. Pillar provides (on request) documentation about product disposition when the recycling process is complete. Upon request, Pillar also provides a Certificate of Destruction, which releases the customer from further liability for the equipment returned through the Recycle program. Customers should contact Pillar World Wide Customer Support Center for information on the logistics and location(s) of the approved recycle facilities.
	Pillar Data Systems objectives are to ensure that our high product quality and reliability standards are met through the processes that have been verified and approved. This is achieved through ISO 9001:2000 and the development and deployment of Pb-free solder qualification guidelines for components (RoHS), interconnects, and PCB, PCA reliability. Pillar will continue to work with industry consortia to define common qualification criteria. Pillar will apply Pb-free solder technologies to product designs as required by legislation.
	ISO 9001:2000 Registered manufacturing process

Electromagnetic Emissions and Immunity

Table 44 Electromagnetic (EM) emissions and immunity

Standard
• CISPR 22-A • EN55022 Class A radiated and conducted emissions (110V/220V) • EN55024 Immunity: 　　○ EN 61000-3-2

Table 44 Electromagnetic (EM) emissions and immunity (continued)

Standard

○ 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: 3V
     ○ EN 61000-4-11 Supply dips and interruptions: 30% and 100%
 • VCCI (Japan):
 	
 この装置は、クラスA情報技術装置 です。この装置を家庭環境で使用する と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策 を講ずるよう要求されることがあります。　　　　VCCI −A

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, 110V, 230V)

2 EMC: EN55024 (immunity):

- EN 61000-3-2

- EN 61000-3-3

- EN 61000-4-2 ESD:±4 kV contact,±8 kV air touch

- EN 61000-4-3 Radiated immunity (within the limits that are listed in our technical specifications)

- EN 61000-4-4 Electrical fast transients/burst:±1 kV AC,±0.5 kV I/O

- EN 61000-4-5 Surges ±1 kV differential mode,±2 kV common mode

- EN 61000-4-6 Conducted immunity: 3V

- 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.

  GR-63-CORE, Packaged Equipment Shock (4.3.1), Office Vibration (4.4.3) and Transportation Vibration (4.4.4).

System Warranty

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

Note: The hardware and software warranty for all Pillar Axiom products applies to the system, not to individual components like Slammers and Bricks within the system. Slammers and Bricks that are later added to expand a Pillar Axiom system are warranted to fall within the same renewal cycle as the Pillar Axiom system.

About Pilot Hardware Specifications

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

Pilot Dimensions and Weight

Table 45 Pilot dimensions and weight (both control units)

Attribute	Value
Height	3.5 inches (8.9 centimeters); 2U
Width	17.7 inches (45.0 centimeters)
Depth	20-26 inches (50.8-66.0 centimeters)
Weight	40 pounds (18.1 kilograms)

Note: Pilots are available in multiple models of different physical dimensions. Make sure you do not install anything behind the Pilot control units (CUs) in the rack, because you can get a replacement Pilot of any of the different dimensions.

Pilot Power Characteristics

Table 46 Pilot power characteristics (for each control unit)

Power characteristic	Value
Frequency	47 to 63Hz
AC voltage	100 to 240V
Current draw	1.5A at 115V 0.8A at 230V 143W
Maximum power consumption	143VA

Table 46 Pilot power characteristics (for each control unit) (continued)

Power characteristic	Value
Maximum heat dissipation	750BTU/hr
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.

Table 47 Pilot safety and 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

Pilot packaging meets the following requirements:

- For packages under 150 lb—International Safe Transit Association (ISTA 2A) Procedures 1 and 2.

- For packages over 150 lb—Network Equipment Building System (NEBS) core standards.

  GR-63-CORE, Packaged Equipment Shock (4.3.1), Office Vibration (4.4.3) and Transportation Vibration (4.4.4).

About Slammer Hardware Specification

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

Slammer Dimensions and Weight

Table 48 Slammer dimensions and weight

Attribute	Value
Height	7 inches (17.78 centimeters); 4U
Width	17.72 inches (45 centimeters)
Depth	26–27 inches (66 centimeters)
Weight	94 pounds (42.6 kilograms)

Slammer Power Characteristics

Table 49 Slammer power characteristics

Power characteristic	Value
Frequency	47 to 63Hz
AC voltage	100–120V to 200–240V
Maximum power consumption	540VA
Current draw	Combined for both Slammer CUs: 4.72A at 115V 2.46A at 230V 540W
Maximum heat dissipation	1844 BTU/hr

Table 49 Slammer power characteristics (continued)

Power characteristic	Value
AC plug type	Four IEC 320 C13 connection

Slammer Regulatory Agency Compliance

Slammers comply with the following regulatory agency requirements.

Table 50 Slammer safety and quality standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15. Operation is subject to the following two conditions: 1 This device may not cause harmful interference and 2 This device must accept any interference that maybe received, including interference that may cause undesired operation.
	CB Scheme by IECEE standard IEC 60950, Third Edition (1999)
CE	Conformite Europeenne /DoC
c(UL)us	UL and CSA under UL (cUL)
GS	TUV/GS
	ISO 9001:2000 Registered manufacturing process

Slammer Packaging and Transportation

Packaging meets the following requirements:

- For packages under 150 lb—International Safe Transit Association (ISTA 2A) Procedures 1 and 2.

- For packages over 150 lb—Network Equipment Building System (NEBS) core standards.

  GR-63-CORE, Packaged Equipment Shock (4.3.1), Office Vibration (4.4.3) and Transportation Vibration (4.4.4).

Cable Length Limits for SAN Fibre Channel Connections

SAN Fibre Channel (FC) ports on Slammer network interface modules (NIMs) connect to SAN switches using Fiber Channel cables of specified lengths.

The limits for the lengths of FC cables on the Slammer FC ports are as follows:

Table 51 Cable lengths limitations on Slammer FC ports

FC speed	Cable lengths
1 Gb/s	984 feet (300 meters)
2 Gb/s	984 feet (300 meters)
4 Gb/s	Multi-mode: 492 feet (150 meters)
8 Gb/s	Multi-mode: 164 feet (50 meters)

Note: Multi-mode FC cables must be 125/50 type. However, FC cables of type 125/62.5 are more common and reduce the required cable length by half.

Related tasks
- *Connect a Slammer to the Data Network*

Cable Length Limits for NAS Ethernet Connections

NAS Ethernet ports on Slammer network interface modules (NIMs) connect to NAS switches using Ethernet cables of specified lengths.

The limits for the lengths of the Ethernet cables on the Slammer Ethernet ports are as follows:

Table 52 Cable lengths limitations (10 Gb/s optical short range)

Fiber cable core diameter markings	Minimal modal bandwidth	OM type	Maximum cable lengths
62.5/125	160	OM1	85.28 feet (26 meters)
62.5/125	200	OM1	108.24 feet (33 meters)
50/125	400	OM2	216.48 feet (66 meters)
50/125	500	OM2	268.96 feet (82 meters)
50/125	2000	OM3	984 feet (300 meters)

Table 53 Cable lengths limitations (10 Gb/s direct attach copper)

Maximum cable lengths
16.40 feet (5 meters)

Related tasks

- *Connect a Slammer to the Data Network*

About Brick Hardware Specification

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

Brick Dimensions and Weight

Table 54 Brick dimensions and weight

Attribute	Value
Height	3.5 inches (8.89 centimeters); 2U
Width	17.72 inches (45 centimeters)
Depth	22 inches (55.88 centimeters)
Weight (SATA) Weight (FC)	65 pounds (29.5 kilograms) 70 pounds (31.8kilograms)

Brick Power Characteristics

Table 55 Brick power characteristics

Power characteristic	Value
Frequency	47 to 63Hz
AC voltage	100–120V to 200–240V
Maximum power consumption	260VA (SATA) 175VA (SSD) 330VA (FC)
Current draw	SATA (260W): 2.55A at 115V 1.17A at 230V

Table 55 Brick power characteristics (continued)

Power characteristic	Value
	FC (330W) 3.35A at 115V 1.49A at 230V SSD (175W) 1.52A at 115V 0.80A at 230V
Maximum heat dissipation	1127 BTU/hr
AC plug type	Two IEC 320 connections

Brick Regulatory Agency Compliance

Pillar Axiom Bricks comply with the following regulatory agency requirements.

Table 56 Brick safety and quality standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15. Operation is subject to the following two conditions: 1 This device may not cause harmful interference and 2 This device must accept any interference that maybe received, including interference that may cause undesired operation.
	CB Scheme by IECEE standard IEC 60950, Third Edition (1999)
CE	Conformite Europeenne /DoC
c(UL)us	UL and CSA under UL (cUL)
TUV/GS	TUV/GS

Table 56 Brick safety and quality standards (continued)

Logo	Standard
	ISO 9001:2000 Registered manufacturing process

Brick Packaging and Transportation

Packaging meets the following requirements:

- For packages under 150 lb—International Safe Transit Association (ISTA 2A) Procedures 1 and 2.

- For packages over 150 lb—Network Equipment Building System (NEBS) core standards.

  GR-63-CORE, Packaged Equipment Shock (4.3.1), Office Vibration (4.4.3) and Transportation Vibration (4.4.4)

Pillar Axiom PDU Hardware Specification

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

When you intend to use non-Pillar PDUs, check first with your Pillar Account Representative to ensure you do not jeopardize your system warranty by installing the non-Pillar PDUs.

Table 57 PDU specifications

Criteria	20A single-phase	30A single-phase	3-phase
Form factor	EIA Rack Mountable Height: 1U, or 1.75 inches (4.45 centimeters) Depth: < 8 inches (20.3 centimeters)	EIA Rack Mountable Height: 1U, or 1.75 inches (4.45 centimeters) Depth: < 8 inches (20.3 centimeters)	EIA Rack Mountable Height: 2U, or 3.5 inches (8.9 centimeters) Depth: 9.5 inches (24.13 centimeters)
Receptacles IEC 60320	C13, 12 receptacles minimum. Mounted on rear of chassis (opposite circuit breakers).	C13, 12 receptacles minimum. Mounted on rear of chassis (opposite circuit breakers).	C13, 24 receptacles (8 per phase) minimum. Mounted on back of chassis (opposite circuit breakers).
Inlet cable	15 feet (4.572 meters) minimum Plug options: L6-20P, L5-20P IEC 2P+E 16A	15 feet (4.572 meters) minimum Plug options: L6-30P, L5-30P IEC 2P+E 32A	15 feet (4.572 meters) minimum NEMA L21-30P IEC 3P+N+E 16A 6H
Voltage input	100–240VAC	100–240VAC	120/208VAC, 230/400VAC, both Wye Configuration
Voltage output	100–240VAC	100–240VAC	120V 1-phase, 230V 1-phase

Table 57 PDU specifications (continued)

Criteria	20A single-phase	30A single-phase	3-phase
Circuit breakers (CB)	Two, 10A each. Each circuit breaker controls half of the outlet receptacles.	Two, 15A each. Each circuit breaker controls half of the outlet receptacles.	One main, 30A Three secondary, 20A each
Receptacle retention device	All receptacles have a plug retention device.	All receptacles have a plug retention device.	All receptacles have a plug retention device.
Inlet cable retention device	If a detachable inlet cable is provided, a cable retention device is included.	N/A	N/A
EMI (RFI) filter	Common mode insertion loss: 10 db @ 1MHz, Differential mode: 30 db @ 1MHz. MHz/db: .15/6, .50	Common mode insertion loss: 10 db @ 1MHz, Differential mode: 30 db @ 1MHz. MHz/db: .15/6, .50	Common mode insertion loss: 25 db @ 1MHz. Differential mode: 22 db @ 1MHz. MHz/db: .15/6, .50
Surge suppression	270VAC	320VAC	275VAC

Pillar Rack Hardware Specification

A Pillar Axiom 42U rack can contain any combination of:

- One Pilot.

- One to four Slammers, which can be a mix of network attached storage (NAS) and storage area network (SAN) Slammers.

- One to 16 Bricks.

  Note: A second cabinet can hold up to 19 Bricks (no Slammers or Pilot)

- One to four power distribution units (PDUs).

Table 58 Rack specifications for a Pillar Axiom system

Criteria	Pillar rack	Non-Pillar rack (minimum requirements)
Height (inside)	42U or 73.5 inches (186.7 centimeters)	• Pillar Axiom 600 systems: 42U to hold one Pilot, one to four Slammers, or up to 16 Bricks
Height (outside)	78.7 inches (199.9 centimeters)	N/A
Width (inside)	17.7 inches (45 centimeters)	• 19 inches (48.26 centimeters) panel • 17.7 inches (45 centimeters) rail-to-rail
Width	• 23.8 inches (60.48 centimeters) overall • 17.7 inches (45 centimeters) rail-to-rail • 19 inches (48.26 centimeters) panel	N/A
Depth (inside)	• 35 inches (88.9 centimeters) • 26–30 inches (66–76.2 centimeters) rail-to-rail	• 35 inches (88.9 centimeters) overall • 26–30 inches (66–76.2 centimeters) rail-to-rail

Table 58 Rack specifications for a Pillar Axiom system (continued)

Criteria	Pillar rack	Non-Pillar rack (minimum requirements)
Depth (outside)	39.5 inches (100.3 centimeters)	43 inches (109.2 centimeters) maximum
Front door	- Vented - Light-tint Plexiglas 1.5 inches (3.81 centimeters) deep - Lockable - Open left/right 1 inches (2.54 centimeters) clearance between front vertical channel and inside of frame	- Vented 1 inches (2.54 centimeters) deep minimum 1 inches (2.54 centimeters) clearance between front vertical channel and inside of frame
Rear door	- Vented - Lockable - Open left/right	Vented
Sides	- Solid - Removable - Lockable 1 inches (2.54 centimeters) between side and frame	N/A
Vertical channels	- Square hole, unthreaded 26 inches (66 centimeters) apart	- EIA spacing - Front-to-rear mounting - Cage nuts - Square EIA-standard mounting holes required We recommend that Pillar racks be used to install Pillar Axiom hardware components.
Vents	- Front and back doors - Top	- Front and back doors - Top
PDU	4 PDUs 90–240VAC, 50-60Hz 20-30A	- Redundant power 90–240VAC, 50–60Hz - Wattage: 8350W

Table 58 Rack specifications for a Pillar Axiom system (continued)

Criteria	Pillar rack	Non-Pillar rack (minimum requirements)
	• 64 outlets (for single phase PDU) **Note:** 48 outlets (for three phase PDUs) with two maximum PDUs (115/208V 30A for US and 230/400V 16A for EU). • Horizontal mount	
Heat dissipation	• Pillar Axiom 600 systems: 28,500BTU/hr	• Pillar Axiom 600 systems: 28,500BTU/hr
Frame thickness	N/A	12 gauge to 14 gauge
Loaded weight	• Pillar Axiom 600 systems: 1505 pounds (683 kilograms)	• Pillar Axiom 600 systems: 1505 pounds (683 kilograms)

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

• Front faces downward: 12° maximum slope.

• Back faces downward: 24° maximum slope.

Figure 63 Maximum tilt angles for stationary Pillar 42U racks

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