Pillar Axiom 600

Hardware Installation Guide

ORACLE

PILLAR AXIOM

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Preface

Audience

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

- 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 perform the following actions:

- 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
- Add additional Brick storage enclosures and Slammer storage controllers to expand an existing Oracle Pillar Axiom 600 system

Before You Read This Guide

Being familiar with certain other technical documentation for Oracle's Pillar Axiom 600 helps you succeed in the use of this guide.

Before you install Oracle's Pillar Axiom 600 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 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 Oracle's Pillar Axiom 600 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.

How This Guide Is Organized

This guide provides procedural and reference information to install the various components within an Oracle Pillar Axiom 600 system, power it on, and perform the initial configuration.

To perform any upgrade, you must contact the Pillar World Wide Customer Support Center. Upgrade procedures are beyond the scope of this guide.

The guide is divided into seven chapters and three appendices:

- Chapter 1 provides information on the Oracle Pillar Axiom 600 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 Oracle Pillar Axiom 600 system.

- Chapter 5 provides information on the power cable connections within the Oracle Pillar Axiom 600 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 Pillar Axiom 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 Oracle Pillar Axiom 600 system and its various components.
- Appendix D provides information on adding additional Bricks to an Oracle Pillar Axiom 600 system and the associated cabling of those Bricks.
- Appendix E provides information on adding additional Slammers to an Oracle Pillar Axiom 600 system and the associated cabling of those Slammers.

Related Documentation

Table 1 Additional information resources for all systems

Description	Title and part number
The definitions of terms found in the Oracle Pillar Axiom 600 documentation.	*Pillar Axiom Glossary*
An introduction to the hardware and software architecture of an Oracle Pillar Axiom 600 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*

Table 1 Additional information resources for all systems (continued)

Description	Title and part number
Any late breaking information regarding the Oracle Pillar Axiom 600 systems.	*Pillar Axiom Customer Release Notes*

Access Documentation

Technical documentation (including installation, service, cabling, integration, and administration guides) for Oracle's Pillar Axiom 600 storage system is available from several sources.

Pillar Axiom Storage Services Manager	Log in to your Pillar Axiom system. Navigate to the **Support** area in the Pillar Axiom Storage Services Manager and select the **Documentation** link.
Pillar Axiom HTTP access	For Pillar Axiom systems running release 5.0 (and higher) software, point your browser to `http://`*system-name-IP*`/documentation.php`, where *system-name-IP* is the name or the public IP address of your system.
Internet	Customer support portal (http://support-portal.pillardata.com/csportal/login.seam). Log in and click **Documents** in the left navigation pane.
Product CD-ROM	Insert the Technical Documentation CD-ROM (came with your Pillar Axiom system) into the CD player and open the `DocMenu` PDF. **Tip:** To search all technical documents on the CD-ROM, click **Search all PDFs** in the top right corner.

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.
`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

Table 3 Contacts at Pillar Data Systems (continued)

For help with...	Contact...
	Have your system serial number ready. support@pillardata.com Pillar Customer Support (http://support-portal.pillardata.com/csportal/login.seam)
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 600 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 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 3)
Pilot management controllers	Pilot
Power distribution units (PDUs)	• PDU 500-1P20A—115 to 230V, 20A, 1 ϕ • PDU 500-1P30A—115 to 230V, 30A, 1 ϕ • PDU 500-3P30A—115V, 30A; (115/208)

Table 4 Pillar Axiom 600 series components (continued)

Product name	Model and description
	• PDU 500-3P16A—230V, 16A, IEC; (230/400)
Racks	• RACK500-42U—42U cabinet assembly with doors

Note: The following Pillar Axiom 600 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
- BRX 2000S5
- SLM 600 (Series 1, Series 2)

Customer-Supplied Equipment and Tools

Before starting the installation of a Pillar Axiom 600 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 600 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 600 system.

To install a Pillar Axiom 600 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 600 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 Pillar Axiom 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 600 system.

Related concepts

- *Safety Statements*

Related references

- *Caution Notices*
- *Warning Notices*

CHAPTER 2

Set Up the Rack

About Component Inspection

Each Pillar Axiom 600 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.

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

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

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. Pillar recommends that you remove components from their packaging and place them on an ESD-qualified table that is equipped with ground points for wrist straps.
- Static charges can build up rapidly on rolling carts. If 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 the Pillar World Wide Customer Support Center, 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.

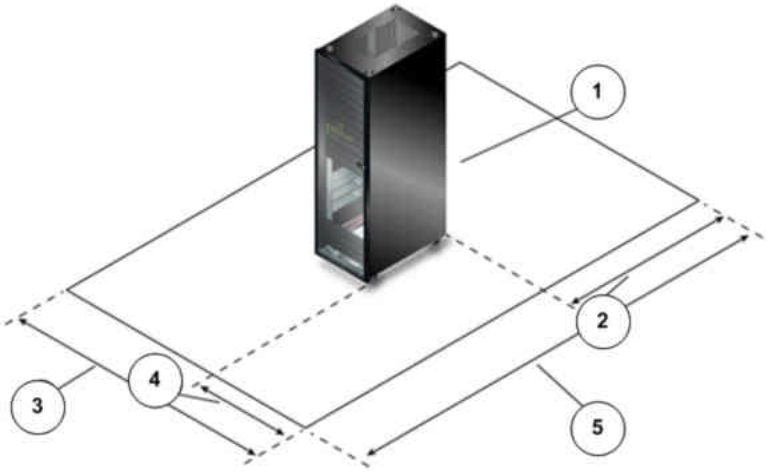
Important! Pillar Axiom 600 system components are compatible with racks that are compliant to the EIA-310-D standard. Pillar Axiom 600 Slammers and Bricks may not install successfully into a rack that is not EIA-310-D compliant. We recommend that Pillar racks be used to install Pillar Axiom 600 hardware 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 600 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 600 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.

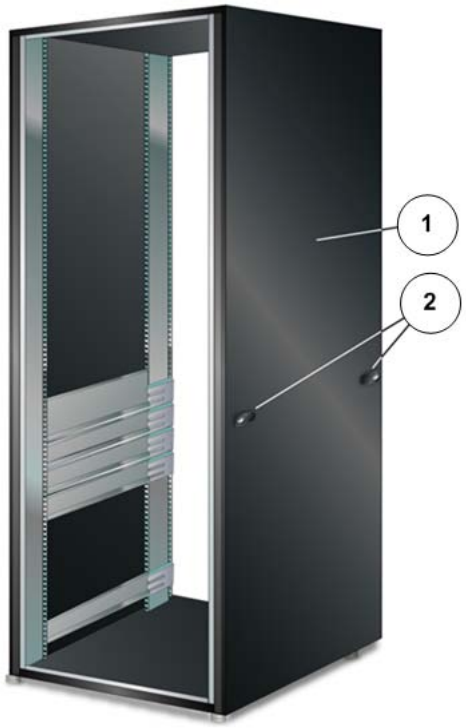
Related tasks

- *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.

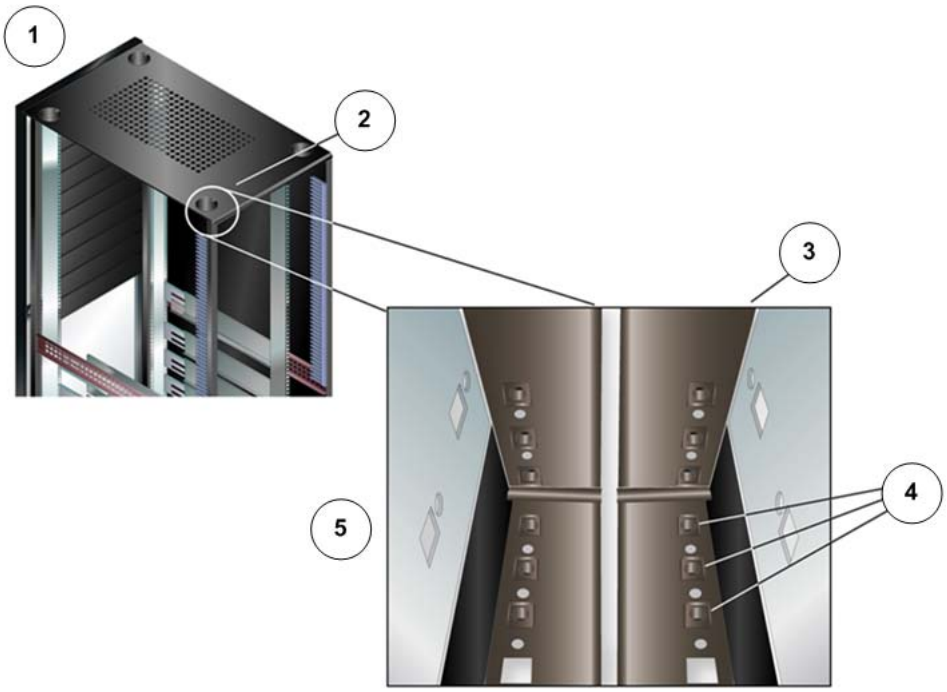
Attach the Connection Bracket

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.

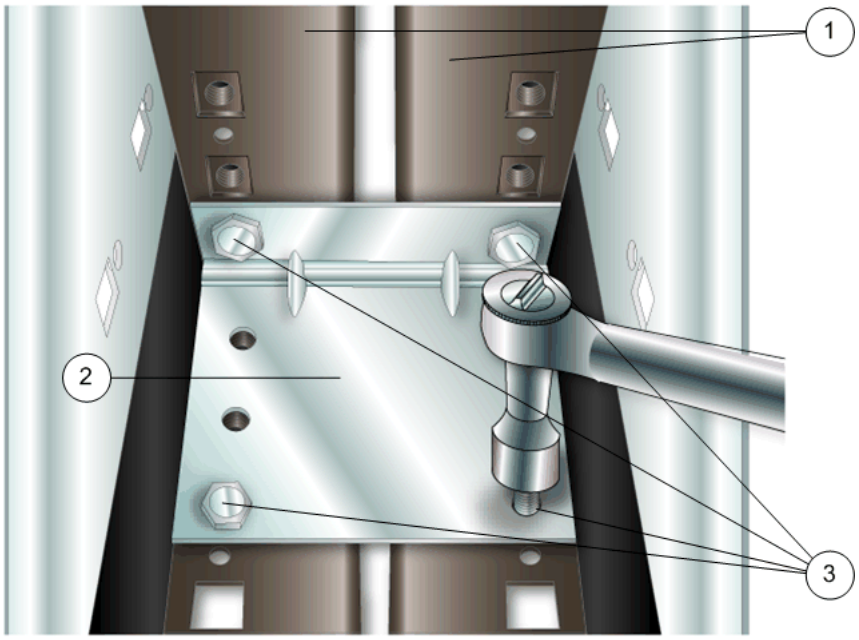
Figure 3 Location of frame corners



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

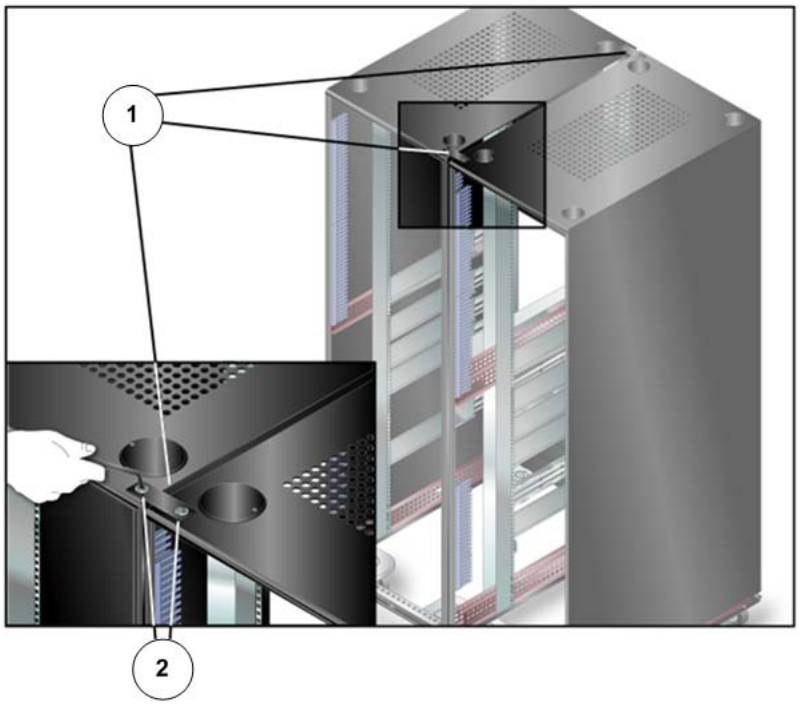
Baying plates bind two Pillar racks together at the roof and bottom of the rack.

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

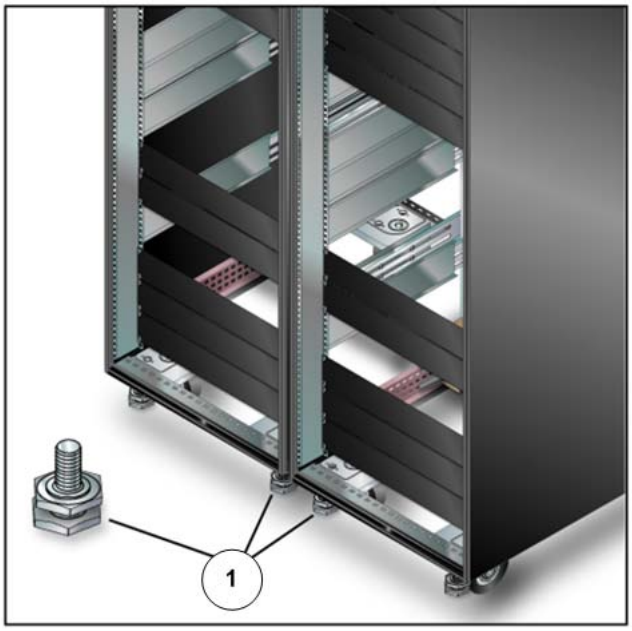
3 Insert a Torx screw (from Step 1) into each plate hole.

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

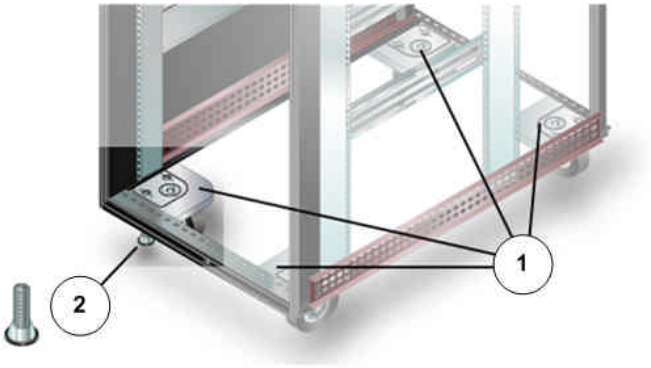
- *Install a Stabilizer Plate (Optional)*

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.

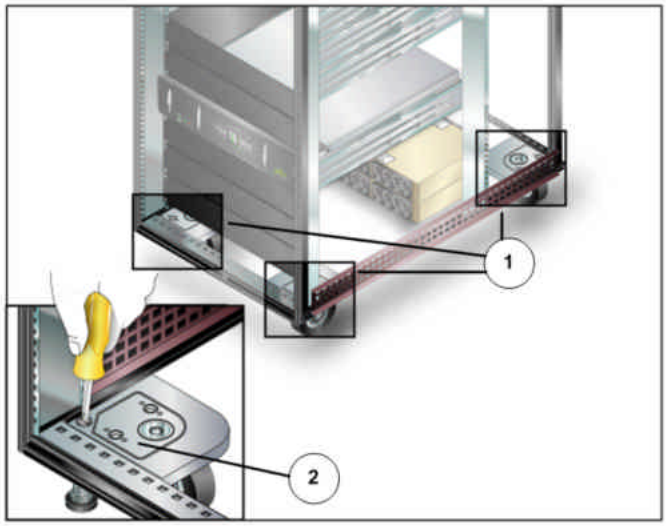
Figure 7 Rack leveling leg locations



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:

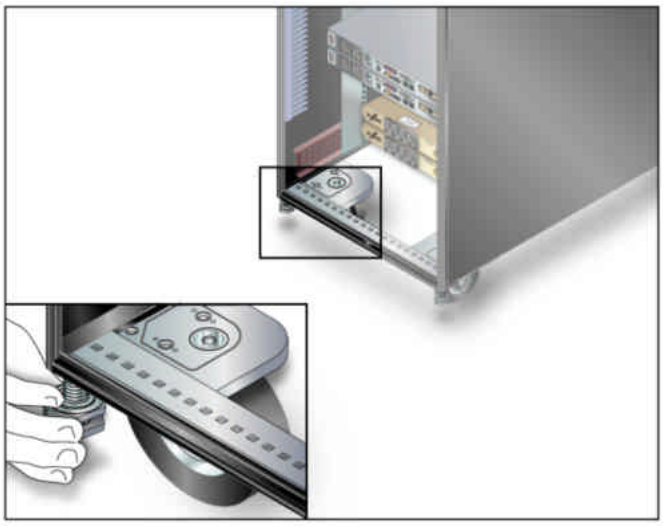
- If you intend to bay the rack with another Pillar rack, you must use baying plates on connecting corners. Baying plates prevent the use of anti-tip brackets so you must stabilize the bay with stabilization plates.
- Make sure that the rack is in its final position before you secure anti-tip brackets 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

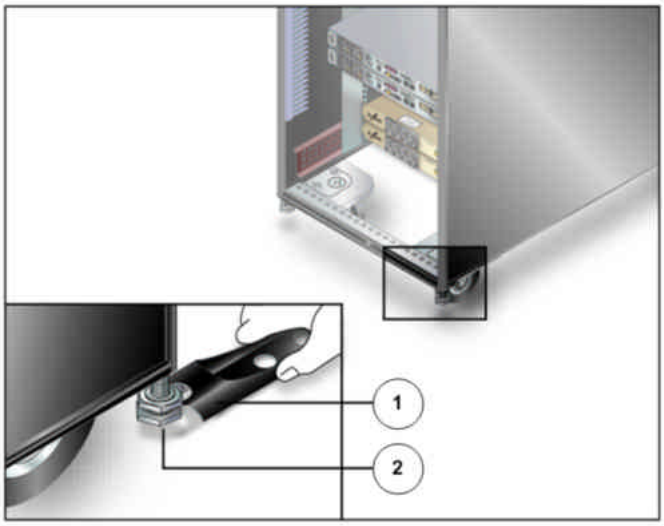
1 Screw the anchor bolt into the bottom outside corner of the rack frame until the bolt is seated.

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

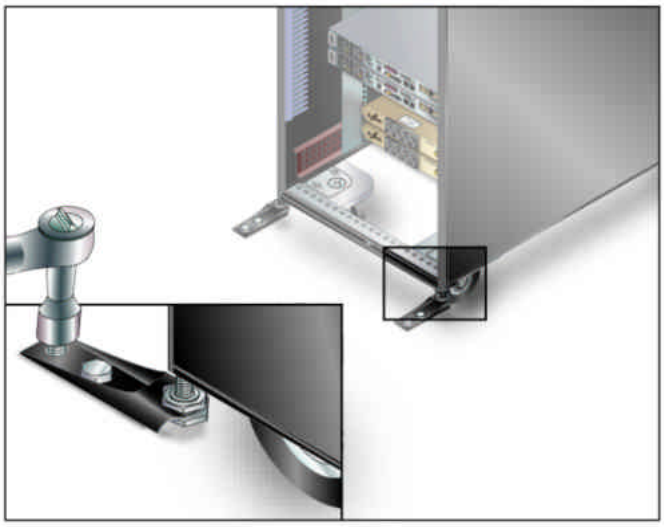


Legend		
	1 Anti-tip bracket fingers	2 Anchor bolt

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 600 system.

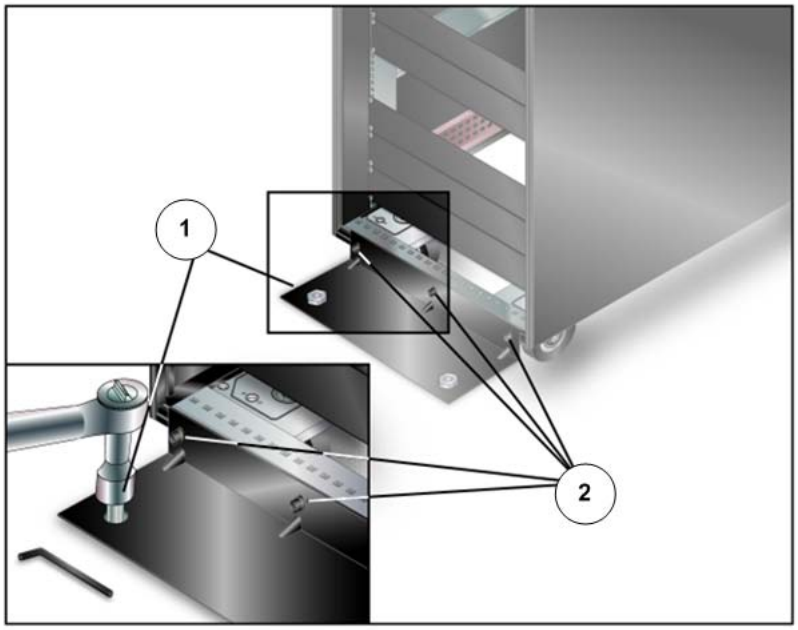
1 Place the stabilizer plate at the front of the rack with the short side up.

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.

Pillar racks 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 600 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.

Note: The physical location of the components in the Pillar Axiom 600 rack can vary if the system is installed in the field. Always check the cables at the back of the rack to validate the physical location of each Brick.

Note: After a new installation or a Brick upgrade, the physical and logical name of a new Brick might not be the same. To avoid potential confusion, Pillar recommends that you change the logical name of the Brick to match the physical name.

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 600 system is:

- One Pilot
- One Slammer
- One Brick

The maximum configuration of the Pillar Axiom 600 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 600 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 600 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	32	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.

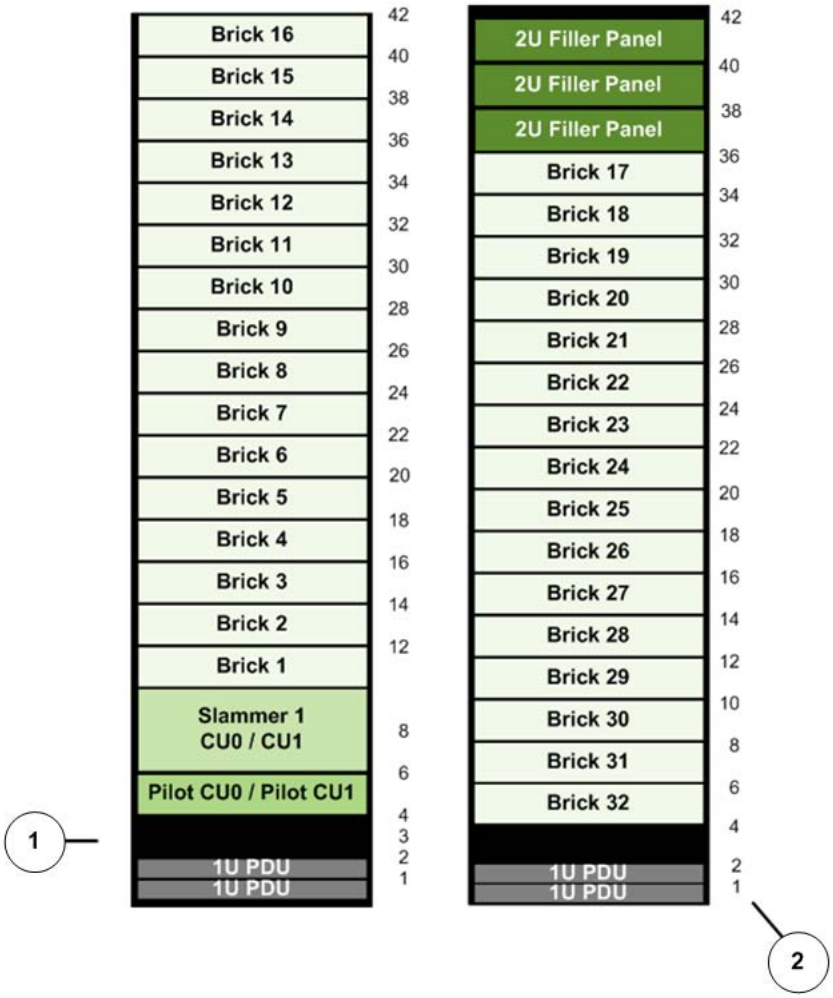
About Component Placement for One Slammer and SATA Bricks

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

The figure above illustrates how the Pillar Axiom 600 system components are mapped into 42U racks for the following configuration:

- 1 Pilot
- 1 Slammer
- 32 SATA Bricks (Pillar Axiom 600 systems)

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



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

Note: The physical Brick names used above are for illustration and indicate the physical location of the Brick in the rack. The actual names or logical names, as seen in the Pillar Axiom Storage Services Manager, can be different. The logical location or numbering of each Brick is determined during the installation and follows the scheme Brick001, Brick002, Brick003, and so on.

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 600 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.

Related references

- *Cabling Practices for the Pillar Axiom 600 System*

Related tasks

- *Rename the Bricks*

About Component Placement for One Slammer and FC Bricks

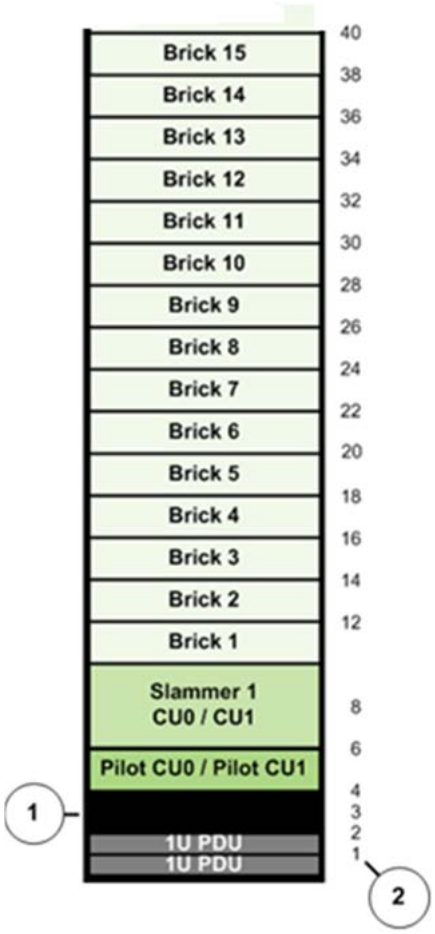
Pillar Axiom 600 systems with one Slammer support up to 15 Fibre Channel (FC) Bricks.

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.

The figure below illustrates how the Pillar Axiom 600 system components are mapped into a fully loaded 42U rack for the following configuration:

- 1 Pilot
- 1 Slammer
- 15 FC Bricks

Figure 14 Fully loaded 42U rack for one Slammer and 15 FC Bricks



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

Note: The physical Brick names used above are for illustration and indicate the physical location of the Brick in the rack. The actual names or logical names, as seen in the Pillar Axiom Storage Services Manager, can be different. The logical location or numbering of each Brick is determined during the installation and follows the scheme Brick001, Brick002, Brick003, and so on.

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 600 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: 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*

Related references

- *Cabling Practices for the Pillar Axiom 600 System*

Related tasks

- *Rename the Bricks*

About Component Placement for Two or Three Slammers and FC Bricks

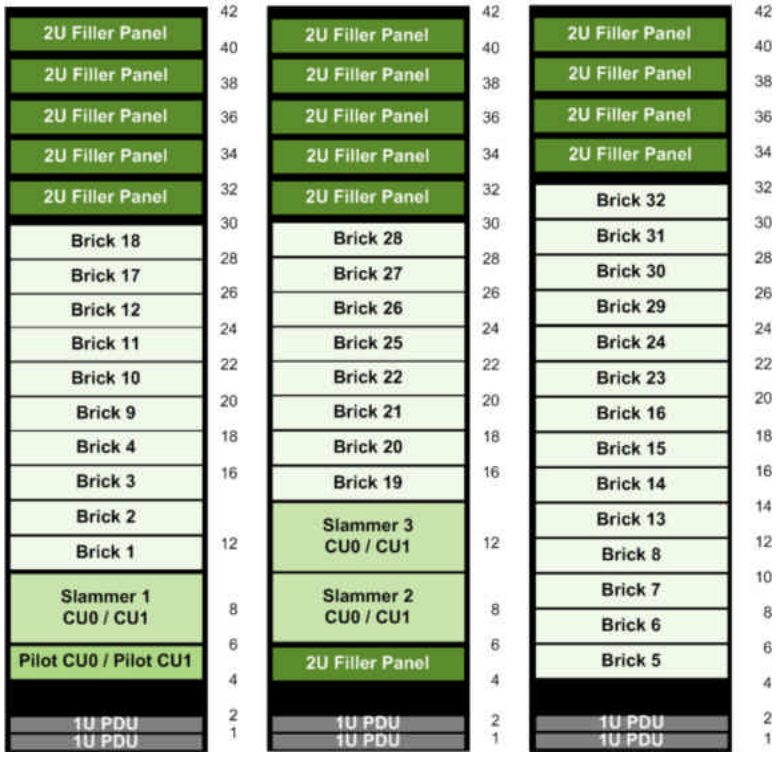
Pillar Axiom 600 systems with two or three Slammers support up to 32 FC Bricks.

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 600 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



Note: The physical Brick names used above are for illustration and indicate the physical location of the Brick in the rack. The actual names or logical names, as seen in the Pillar Axiom Storage Services Manager, can be different. The logical location or numbering of each Brick is determined during the installation and follows the scheme Brick001, Brick002, Brick003, and so on.

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 600 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: 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*

Related references

- *Cabling Practices for the Pillar Axiom 600 System*

Related tasks

- *Rename the Bricks*

About Component Placement for Four Slammers and 64 Bricks

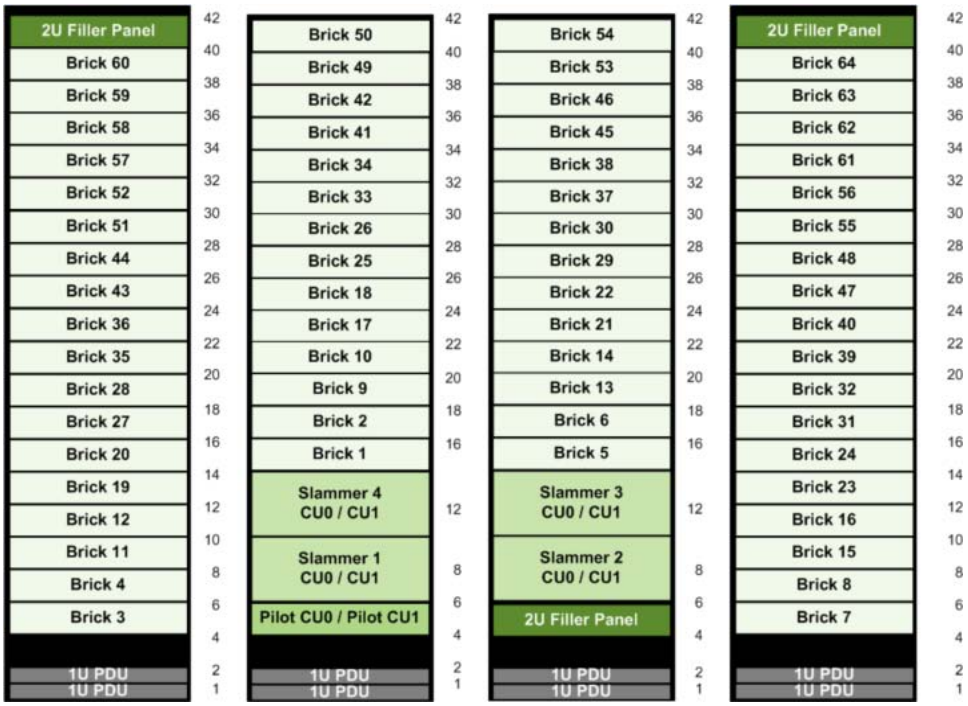
Pillar Axiom 600 systems with four Slammers support up to 64 Serial ATA (SATA) Bricks, or a combination of up to 32 FC Bricks and 32 SATA Bricks in a mixed system.

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 600 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



Important! In the above configuration, make sure Fiber Channel (FC) and serial ATA (SATA) Bricks are loaded in the cabinet so that the power load on the PDU is correct. The illustration assumes a 230 V power supply.

Note: The physical Brick names used above are for illustration and indicate the physical location of the Brick in the rack. The actual names or logical names, as seen in the Pillar Axiom Storage Services Manager, can be different. The logical location or numbering of each Brick is determined during the installation and follows the scheme Brick001, Brick002, Brick003, and so on.

Note: The Brick names used above are for illustration; actual names, as seen in the Pillar Axiom 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.

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.

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*

Related references

- *Cabling Practices for the Pillar Axiom 600 System*

Related tasks

- *Rename the 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

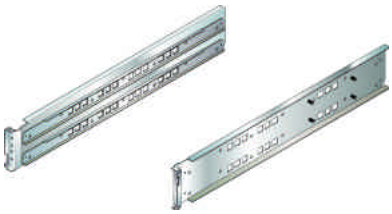
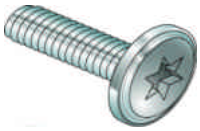
Component	Drawing (not to scale)	Quantity
Pilot rail kits 1475-00036-xx 1450-00037-xx		One left-right pair
Pilot rail scopes 2525-00093-xx 2525-00095-xx		One left-right pair

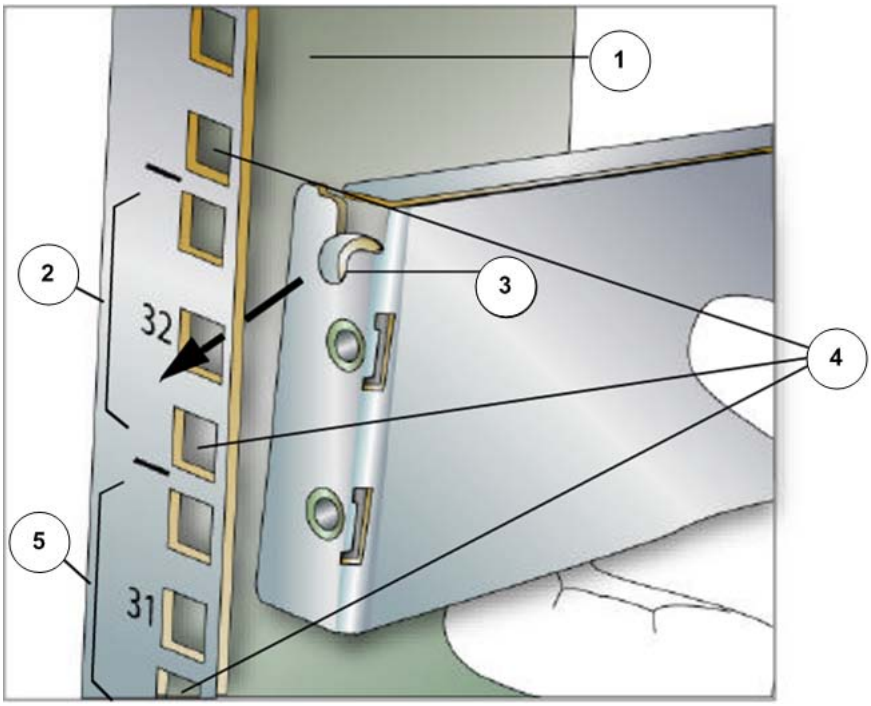
Table 9 Pilot rail kit parts (continued)

Component	Drawing (not to scale)	Quantity
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.

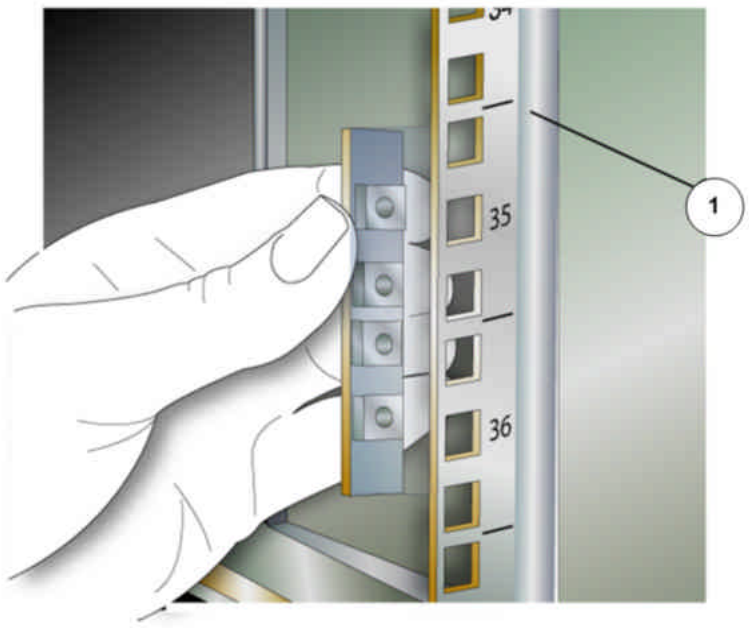
2 At the front of the rack, slide the rail scopes until the rail reaches the holes at the front.

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.

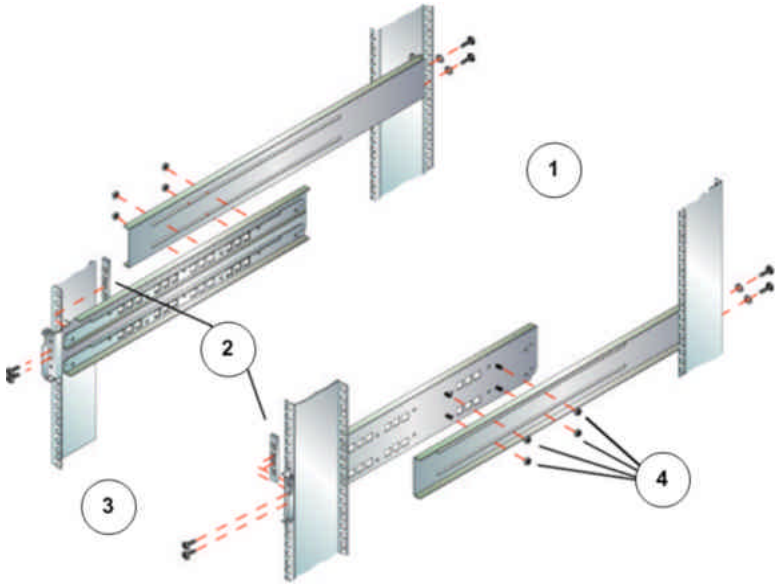
Figure 18 Positioning spacer bar



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

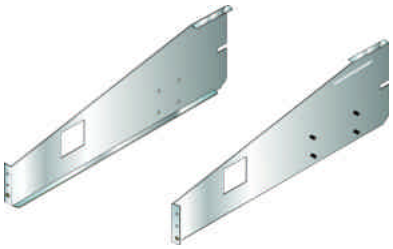
Verify that the rail kit contains all the parts listed in the table below.

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:

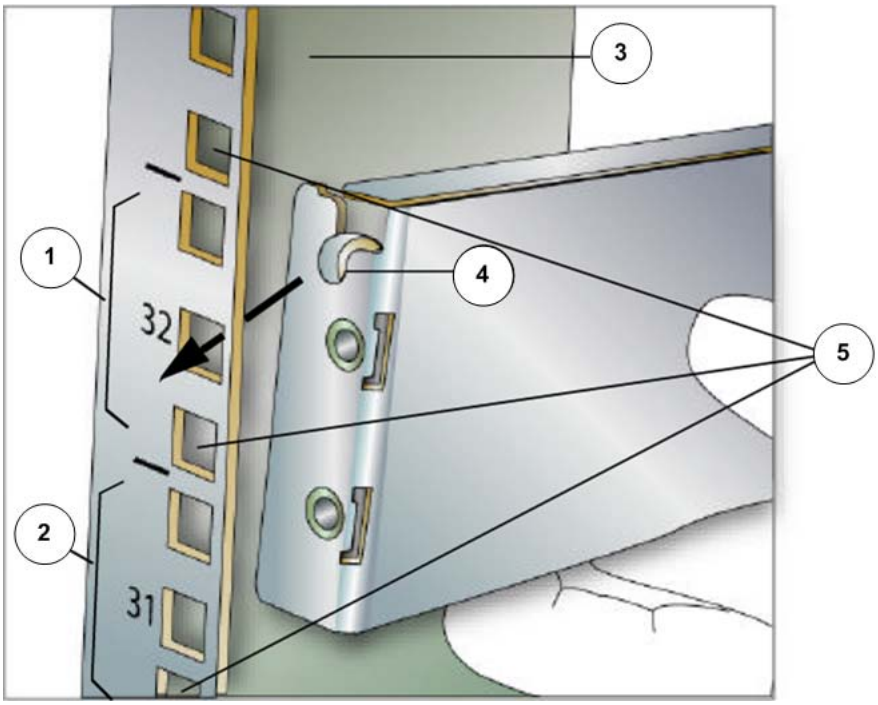
Table 10 Slammer rail kit parts

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.

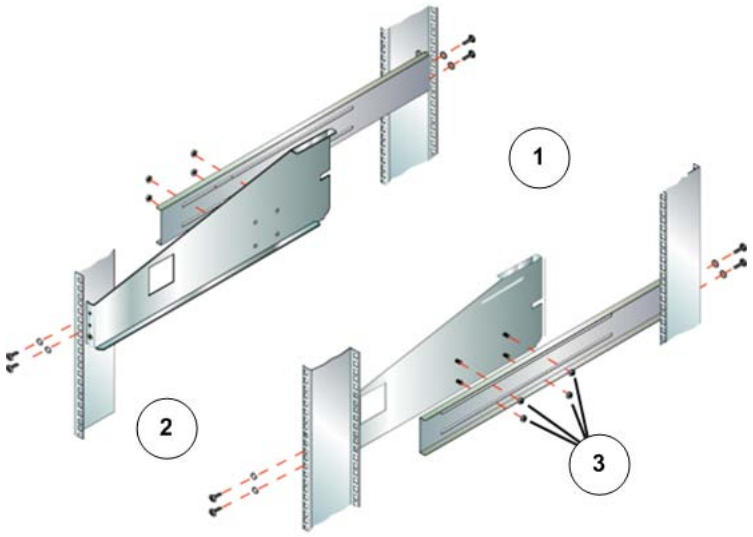
See the next figure.

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

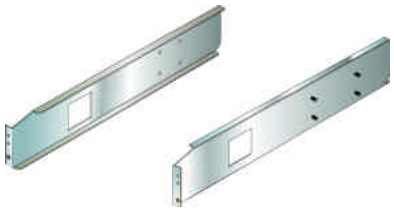
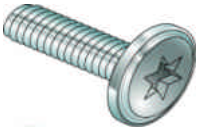
Component	Drawing (not to scale)	Quantity
Brick rails 1450-00022-xx 1450-00023-xx		1 left-right pair
Brick rail scopes 2525-00093-xx 2525-00095-xx		1 left-right pair
10-32 Hex nuts for attaching scopes to rails 2500-01051-xx		8
Rack mount spacers 2500-01065-xx		4

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

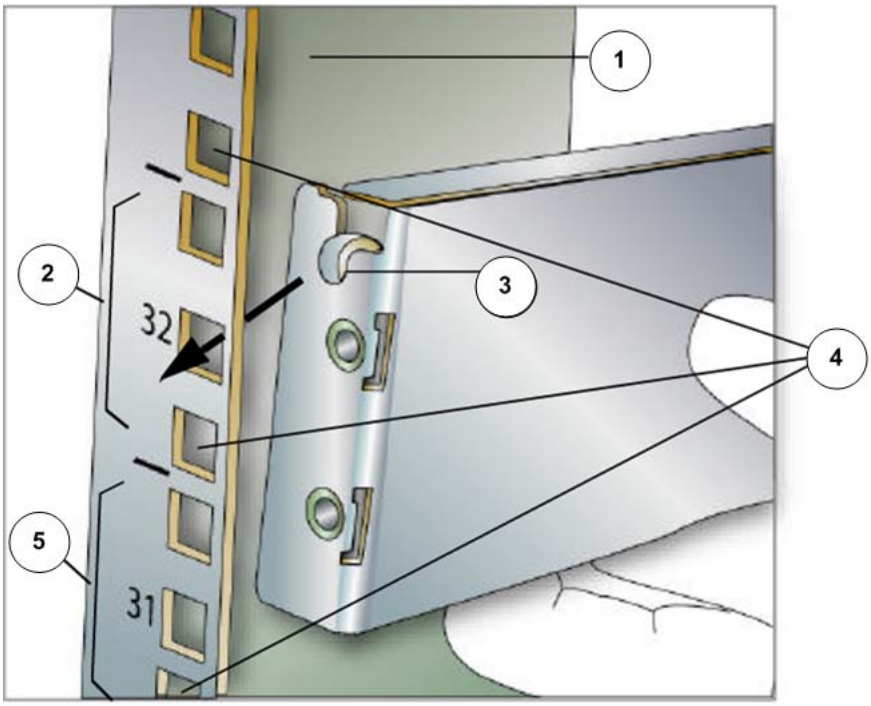
Related tasks

- *Install a Pair of Brick Mounting Rails*

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.

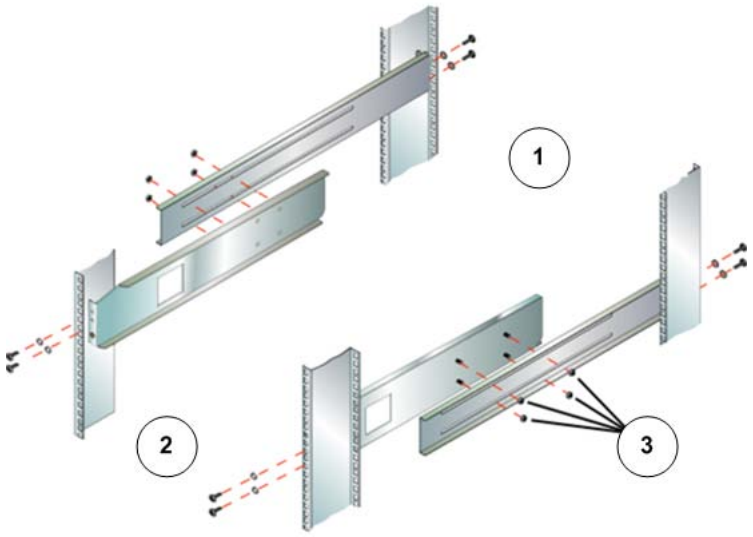
2 At the front of the rack, slide the rail scopes until the rail reaches the holes at the front.

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.

Related references

- *Brick Rail Kit Parts*

Related tasks

- *Install a Brick Storage Enclosure*

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 Pillar Axiom 600 PDUs. If you install non-Pillar PDUs, they must meet the PDU specification described in the *Pillar Axiom Site Preparation Survey* and in the hardware specifications appendix.

Important! If the external power supplied to the Pillar Axiom 600 is 208V instead of 230V, the number of components that can be powered by a single PDU is reduced. Because of the lower voltage of 208V circuits, use of this connection type lowers the number of Bricks that can be placed in a rack. Pillar recommends using 230V circuits instead.

Tip: Use a voltmeter to verify the voltage of the available power. The Pillar Axiom 600 PDUs support multiple ranges of voltage and the current rating on the PDU breakers varies with the external available power. The external available power determines the number of Pillar Axiom 600 components that can be connected to the PDU port groups or circuit breakers (CB). If the voltage of the input power into the PDU is lower than the nominal rating of the PDU, the current rating on the breakers is decreased to compensate the lower voltage of the available power. For example, a 15A breaker on a 230V PDU is rated at 12A if the voltage of the input available power into the PDU is 208V.

Related concepts

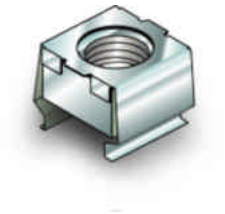
- *About Pillar Axiom 600 Hardware Specifications*

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 Axiom 600 systems are not shipped with clip-on cage nuts.)

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

There are no rails for a PDU.

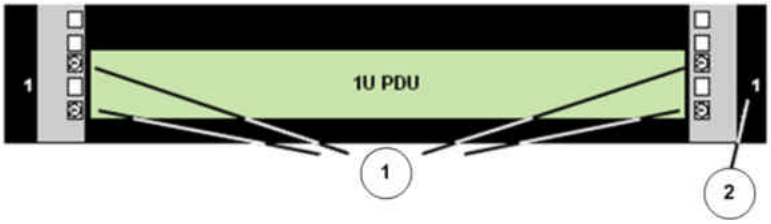
Figure 25 Securing a 1U PDU in the bottom of a rack

Note: This image is for illustration purposes only. Your hardware component might 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.

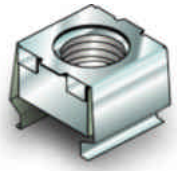
6 Repeat this procedure to install any other 1U PDUs.

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 Axiom 600 systems are not shipped with 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 might 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 might 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.

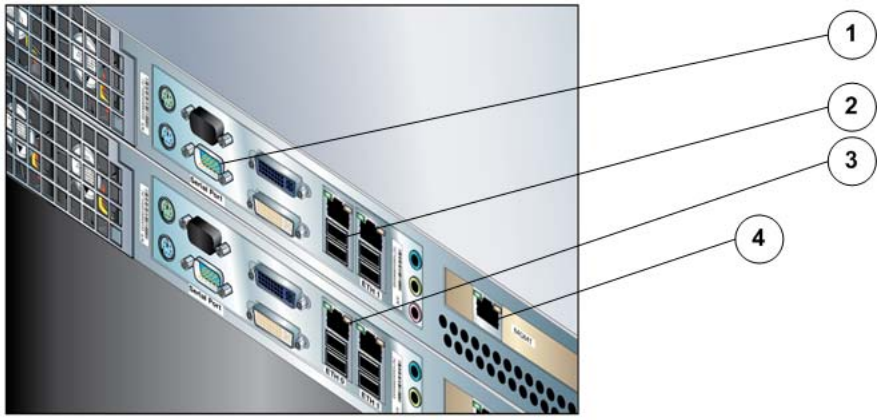
Warning

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)

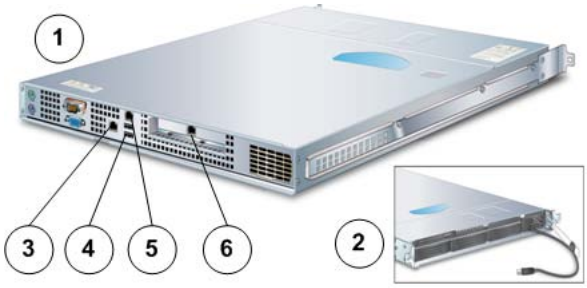


Legend
1 Serial port
2 USB flash memory drive inserted into the lower USB port
3 Ethernet ports
4 Management port

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

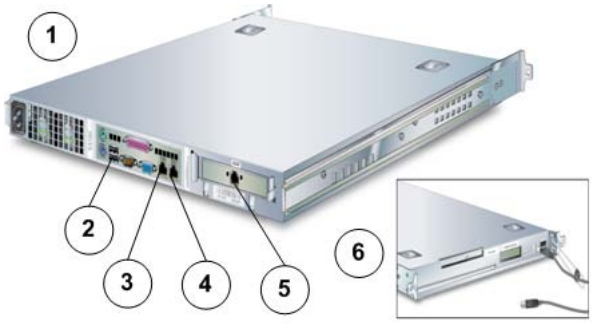
Legend		
	1 Pilot power switch	4 Management port
	2 Ethernet port (ETH1)	5 USB port
	3 Ethernet port (ETH0)	

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



Legend		
	1 Back view of a Pilot CU	4 USB port
	2 Front view of a Pilot CU	5 Ethernet port (ETH0)
	3 Ethernet port (ETH1)	6 Management port

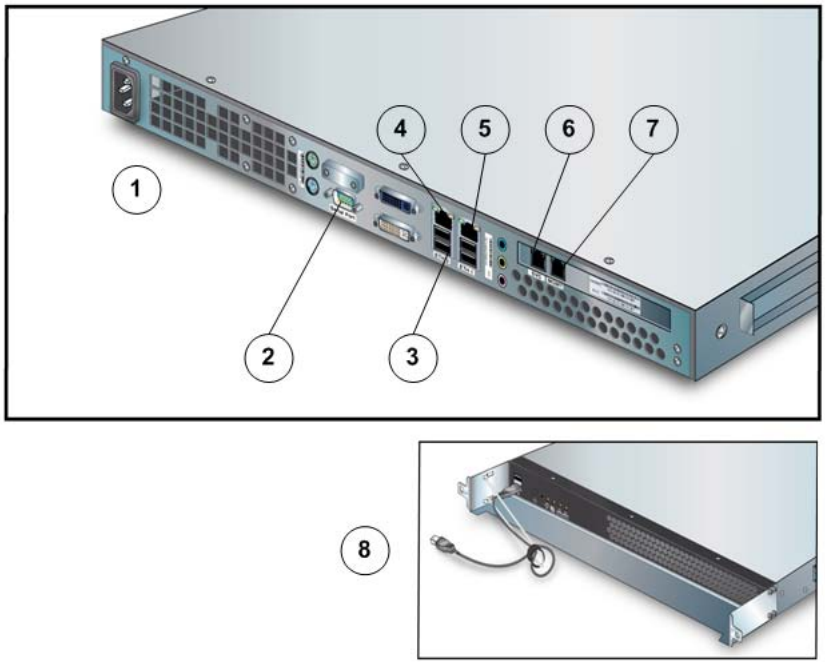
Figure 33 Pilot CU (1450–00170–XX) MSI, non-RoHS



Legend

1 Back view of a Pilot CU	4 Ethernet port (ETH1)
2 USB port	5 Management port
3 Ethernet port (ETH0)	6 Front view of a Pilot CU

Figure 34 Pilot CU (1450-00268-XX and 1030-00005-XX)



Legend

1 Back view of a Pilot CU	5 Ethernet port (ETH1)
2 Serial port	6 SVC Ethernet port for direct connection to the Pilot
3 USB port	7 Management port
4 Ethernet port (ETH0)	8 Front view of a Pilot CU

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.

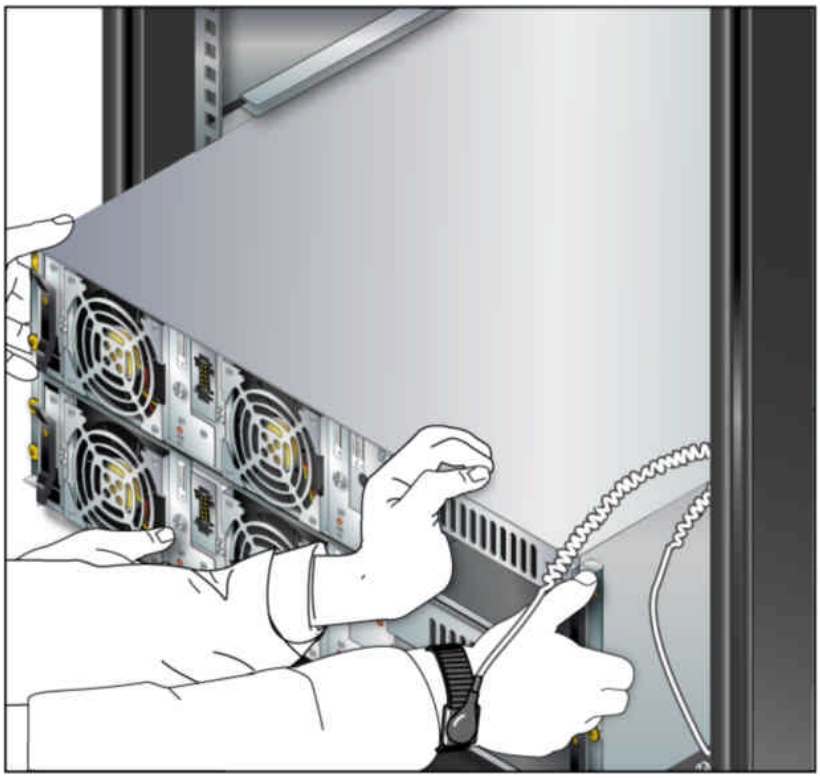
1 Put on an antistatic wrist strap, ground strap, or heel strap and attach the grounding wire to ground.

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 35 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.

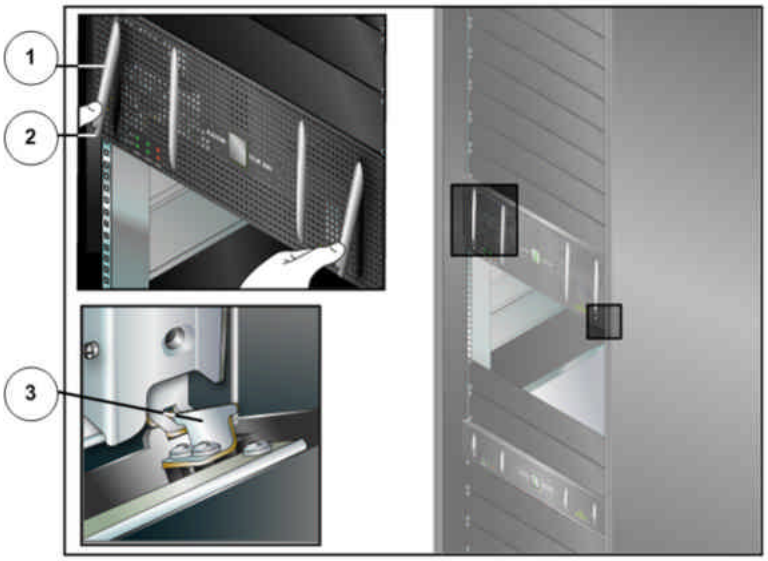
2 Remove the front cover (bezel).

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 36 Slammer bezel removal

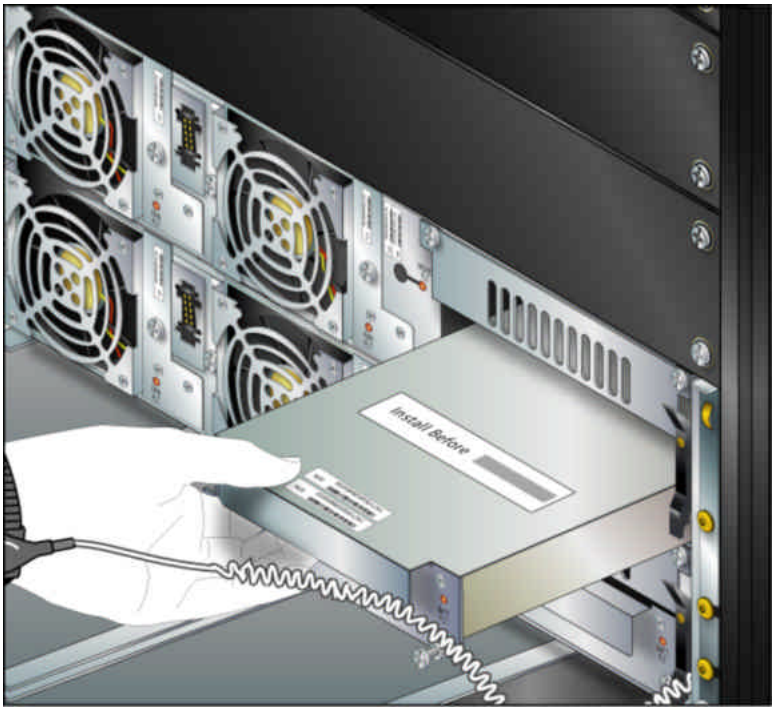


Legend	
1	Ejector tab
2	Button
3	Disengage the bezel from the rack

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 37 Slammer battery insertion



Note: This image is for illustration purposes only. Your hardware component might 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, tie wraps, and velcro ties.

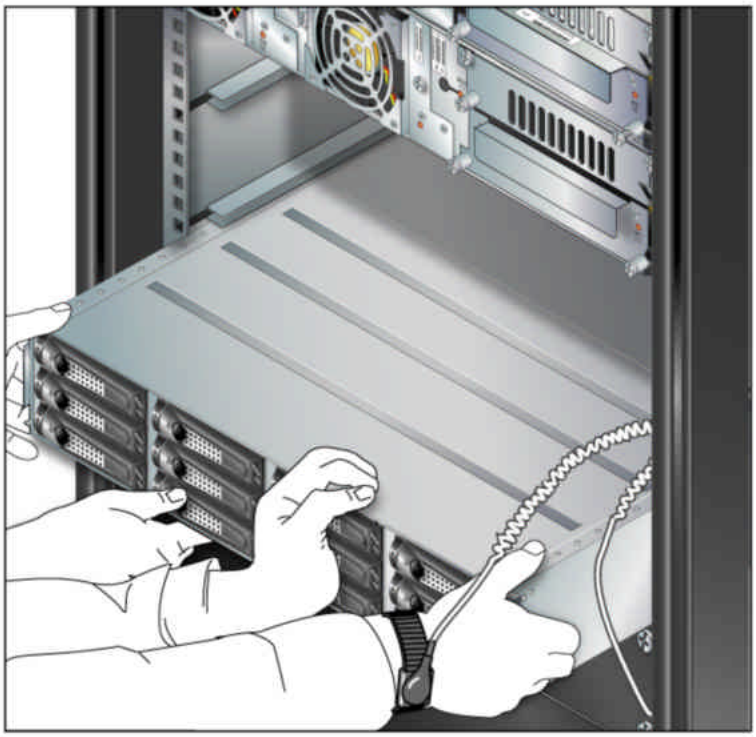
Note: Brick storage enclosures are packaged and shipped separately from the Pillar Axiom 600 system.

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.

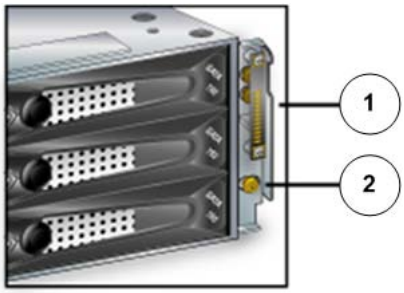
Figure 38 Insertion of a Brick



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 39 Brick ears



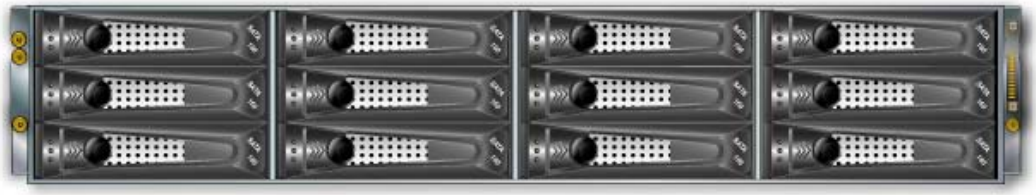
Legend	
1	Printed circuit assembly
2	10-32 Torx screw

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 40 Brick front with the bezel removed



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

5 Verify that the digit setting on the Brick Enclosure Services (ES) module used to set the identity of the Brick is set correctly before powering on the Brick.

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

7 Verify that the digit setting of the Brick is in the proper position. The digit setting must be set to 0 for all Serial ATA (SATA), solid state drive (SSD), and Fiber Channel RAID (FCR) Bricks and to 1 for all Fiber Channel Expansion (FCE) Bricks.

8 Ensure that both the power switches that are on the power distribution units (PDUs) are in the OFF position.

9 When connecting the color coded Wye power cables, ensure that each Brick gets a power feed from two separate PDUs.

10 Connect the FC cables as indicated in the wiring diagrams included in the *Pillar Axiom 600 SSF Cabling Reference* and power on the Bricks.

Related concepts

- *About Power Cabling*

Related tasks

- *Set the Identity of Bricks*
- *Power On the System*
- *Connect Power Cables*
- *Install a Pair of Brick Mounting Rails*
- *Add a New Brick Storage Enclosure*

Set the Identity of Bricks

1 Locate the digital push button at the top of the face of the Enclosure Services (ES) module.

This figure identifies the location of the digital push button, which is used to set the Brick ID.

Figure 41 ES module location

Legend

1 Pull tab	5 Dial settings
2 Screw	6 Digital push button
3 LEDs	7 ES module
4 Brick back	

The digit setting of the Brick is visible in the center of the digital push button and identifies the type of Brick.

2 Verify that the digit setting on the Brick Enclosure Services (ES) module is set correctly for the Brick before powering on the Brick.

Important! The digit setting for all Bricks (SATA, SSD, and FC RAID) is pre-set to 0. The digit setting for the FC Expansion Brick is pre-set to 1. However, the digit setting must always be verified during installation. Otherwise, the Pillar Axiom 600 system cannot bring the Brick online.

3 If the digit setting is not set correctly, push the button using a sharp object, such as the end of a paper clip or a small screwdriver to set the Brick ID.

The top button (-) decrements the counter and the bottom button (+) increments the counter.

Important! Do not change the digit settings while the Brick is powered on.

Related tasks

- *Install a Brick Storage Enclosure*

CHAPTER 4

Connect Data Cables

About Cabling a Pillar Axiom 600 System

The Pillar Axiom 600 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 600 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 600 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.

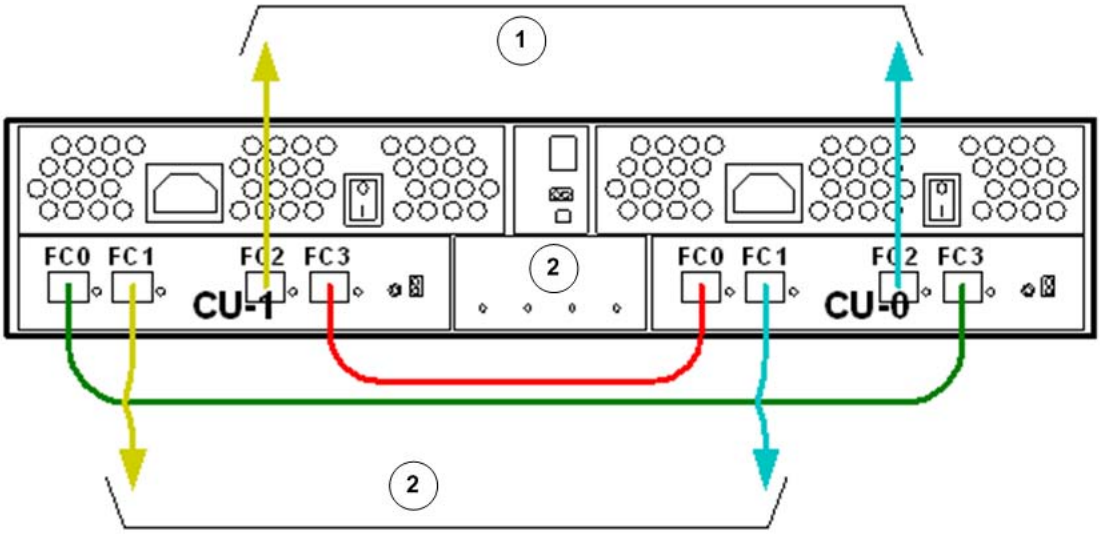
The fast Ethernet network between the Pilot and the Slammers in a Pillar Axiom 600 system is called the PMI. The PMI also includes the cross connections between the Slammer CUs as well as the cross connections between the Pilot CUs. These cross connections between the Pilot CUs permit each CU to monitor 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.

Bricks are connected together in Brick strings. The Brick at the head of the string connects to the Slammer. Each of the other Bricks in the string connect to the previous Brick in the string. A Brick that is higher in a string is one that is closer to the Slammer or head of the string. A Brick that is lower in a string is one that is further from the Slammer or the head of the string.

Figure 42 provides a symbolic illustration of the Brick connections in a string within a Pillar Axiom 600 system.

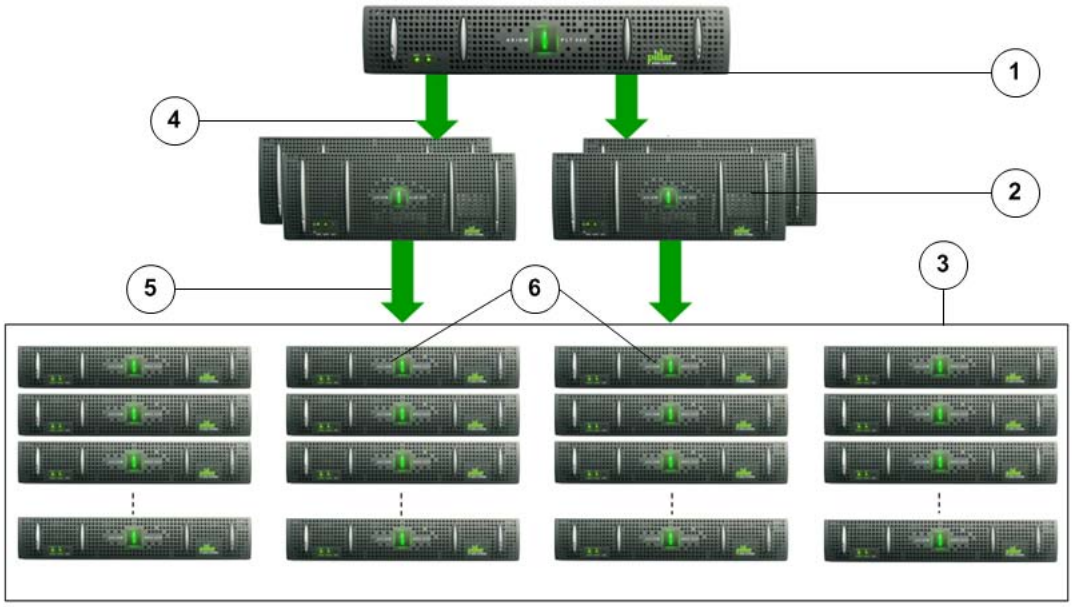
Figure 42 Brick connections in strings



Legend	
1	Brick connections to Slammer or to Bricks higher in the string
2	Brick connections to other Bricks lower in the string

Figure 43 provides a symbolic illustration of the back-end cabling in a sample Pillar Axiom 600 system.

Figure 43 Pillar Axiom 600 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

Cable Handling Tips

High speed data optic cables are delicate and can easily be damaged. The cable plug ends and connectors are also sensitive to dirt and contaminants. Follow these tips when handling cables.

- Do not bend the cables beyond its minimum bend radius (MBR). MBR is the tightest bend that the cable can safely tolerate during or after installation. The MBR for all data cables is two inches (5.1 cm).
- If you do not know the MBR, do not bend the cable to a radius of less than two inches (5.1 cm). Also, the permanent bend radius of the cable is usually larger than the temporary bend radius.
- Do not pull any cable or plug with a force exceeding five inches (12.7 cm.).
- 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.
- Leave some slack in the cables to allow insertion and removal of connectors.
- String cables with service loops so that it is possible to remove FRUs without removing the cables.
- Use only soft velcro or equivalent ties for routing or grouping cables. Do not use hard plastic ties or other hard cinching type of wraps. Using hard plastic ties can cause performance degradation and cable damage.
- Ensure no damage occurs during cable routing by not leaving cables exposed in high traffic areas.
- 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 cables.
- 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. This can also impart a twist to the cable upon uncoiling.
- Do not install cables in such a way that they are supported by other cables or any other SSF cables.

- Support Fiber Channel (FC) cables such that they are not supported by their connectors.
- Do not plug the high-speed serial data cables (HSSDC) into the small form factor pluggable (SFP) ports. Do not plug the SFP cables or transceivers to the HSSDC ports. Either of these actions may cause damage to the plug and connector.
- 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! SFP sockets have the latch on the top and the bottom in the private interconnect module (PIM) and at the bottom on the Brick. Be careful when connecting or disconnecting the SFP connectors.

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 (IPA)
  - Special fiber optic cleaning swabs
  - Canned pressurized air

Tip: Pre-moistened fiber optic wipes may be substituted for the wipes and IPA.

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.

Cabling Practices for the Pillar Axiom 600 System

Follow these fundamental rules and guidelines for cabling Fiber Channel (FC), Serial ATA (SATA), and Solid State Drive (SSD) Bricks in a Pillar Axiom 600 system.

All cabling rules and guidelines are categorized into three categories based on the Pillar Axiom 600 system used. Cabling practices are also categorized based on their impact on the system in case of non-compliance.

ALL: Rules that apply to all Pillar Axiom 600 systems include:	Cabling requirements: Stringent requirements for the system to work. Non-negotiable and integral to the system design. Cabling rules: Stringent rules indicating functional limitations of the system. If these rules are not followed, the system is considered unsupported. Cabling guidelines: Guidelines or best practices unless circumstances prevent strict adherence to these cabling guidelines.
NEW: Rules that apply to new Pillar Axiom 600 systems and can be applied to all Pillar Axiom 600 systems include:	Manufacturing practices: Documented procedures followed by Pillar operations for new systems that allow each Pillar Axiom 600 system to be configured in a consistent manner.
FIELD: Rules that apply to Pillar Axiom 600 systems in the field include:	Field practices: Practices that attempt to optimize high availability, performance, troubleshooting and customer requirements. However, field best practices cannot override cabling rules that apply to all systems. Pertain to Pillar Axiom 600 systems that exist in the field and whose system configurations have evolved over time due to numerous configuration modifications.

Table 12: Cabling principles (system level issues) defines the Pillar Axiom 600 system characteristics that must be considered while cabling the Pillar Axiom 600 system.

Table 12 Cabling principles (system level issues)

Cabling principle	Applicability
The Storage System Fabric (SSF) in a Pillar Axiom 600 system must use either all copper or all optical connections. Note the exceptions in Table 14: Cabling principles (Slammer connection issues) that apply to the Slammer control unit (CU) connections in single Slammer systems.	ALL
Pillar Axiom 600 systems that include any version 1 Bricks or any version 1 PIMs must use only copper connections.	ALL
All new Pillar Axiom 600 systems (shipped after January 31, 2011) have version 2 Bricks and use optical connections.	NEW
Pillar Axiom 600 systems are cabled according to the cabling diagrams in the *Pillar Axiom 600 SSF Cabling Reference*.	ALL
Use cables that are appropriate for the type of Brick and other hardware components on the Pillar Axiom 600 system. For more information, see the *Pillar Axiom 600 SSF Cabling Reference.*	ALL
Pillar Axiom systems that are upgraded in the field might have a Brick string configuration that is different from a Pillar Axiom system built in the factory, especially when systems are upgraded non-disruptively. However, rules that apply to all systems always apply to systems upgraded in the field.	FIELD

Table 13: Cabling principles (system size related issues) defines the influence of system size or configuration on the cabling of the Pillar Axiom 600 system.

Table 13 Cabling principles (system size related issues)

Cabling principle	Applicability
Pillar Axiom 600 systems with one Slammer have a maximum of four Brick strings.	ALL
Pillar Axiom 600 systems with two or three Slammers have a maximum of eight Brick strings.	ALL
Pillar Axiom 600 systems with four Slammers have a maximum of 16 Brick strings, but may be configured with eight Brick strings.	ALL

Table 13 Cabling principles (system size related issues) (continued)

Cabling principle	Applicability
However, Pillar recommends that systems using more than 32 Bricks are configured with 16 Brick strings.	
In Pillar Axiom 600 systems with two Slammers, the Brick at the head of the string must be connected to Slammer 1 and Slammer 2.	ALL
In Pillar Axiom 600 systems with three Slammers, the Bricks at the head of the string must be connected to Slammer 1 or Slammer 3, and to Slammer 2.	ALL
In Pillar Axiom 600 systems with four Slammers, the Bricks at the head of the string must be connected to Slammer 1 or Slammer 2 and to Slammer 3 or Slammer 4.	ALL
Pillar Axiom 600 systems with more than 48 Bricks must use all optical connections. Contact the Pillar World Wide Customer Support Center to upgrade any Pillar Axiom system with more than 32 FC Bricks (version 2). If Bricks are added later, a re-cabling may be necessary to ensure that there are no more than eight Bricks on any Brick string.	ALL
Pillar Axiom systems that are upgraded by adding an additional Slammer can run with the same number of Brick strings from the prior configuration. However, if Bricks are added later, a re-cabling may be necessary to ensure that there are no more than eight Bricks on any Brick string.	FIELD

Table 14: Cabling principles (Slammer connection issues) defines the principles pertinent to connecting Slammers within a Pillar Axiom 600 system.

Table 14 Cabling principles (Slammer connection issues)

Cabling principle	Applicability
The Brick at the head of the string must connect to two Slammer ports on different Slammer control units (CUs).	ALL
In Pillar Axiom 500 and 600 systems, Bricks must always be connected to FS ports on Slammers, never to the FC ports. In Pillar Axiom 300 systems, all ports on the private interconnect	ALL

Table 14 Cabling principles (Slammer connection issues) (continued)

Cabling principle	Applicability
module (PIM) on the Slammer are labeled as FC ports. Thus, in Pillar Axiom 300 systems, Bricks connect to FC1 through FC4 ports.	
Bricks at the head of the string connect to ports on different Slammer CUs. For example: The Brick CU0 FC2 port must connect to a Slammer CU0 PIM; The Brick CU1 FC2 port must connect to a Slammer CU1 PIM.	ALL
Version 2 Slammer PIMs must have an external cable that connects each FC3 port to an FS10 port in the PIM on that CU. This external cable connection is in addition to those required for version 1 PIMs.	ALL
Slammer to Slammer and Slammer to Brick connections have either all copper or all optical connections. Single Slammer systems connect Slammer ports FC0 and FC2 from CU0 to CU1 and CU1 to CU0. Only these links may be optical when the rest of the system is connected with copper cables.	ALL

Table 15: Cabling principles (Brick connection issues) defines the principles pertinent to connecting Bricks within a Pillar Axiom 600 system.

Table 15 Cabling principles (Brick connection issues)

Cabling principle	Applicability
Each Brick in the Brick string connects to the previous Brick in the string. The Brick at the head of the string connects to Slammer ports. The cable connections in a Brick string are serial. Thus, if one or more cables to a Brick are disconnected, all the Bricks beneath it in the Brick string are disconnected from the string.	ALL
The FC2 port in a Brick is the input port. The Brick at the head of the string connects port FC2 on the Brick to ports on different Slammer CUs. For Bricks that are not at the head of the string, the Brick CU0 FC2 port must connect to the CU0 FC1 port of the next Brick, higher in the string. Similarly, the CU1 FC2 port must connect to the CU1 FC1 port of the next Brick higher in the string.	ALL

Table 15 Cabling principles (Brick connection issues) (continued)

Cabling principle	Applicability
The FC0 port of each Brick CU must connect to the FC3 port of the other CU in the same Brick. The two FC0 to FC3 connections on each Brick are cross-over connections.	ALL
The FC1 port is Brick is the output port. The FC1 port on each Brick CU is either left empty or connects to the FC2 port of the same CU of the next Brick lower in the string.	ALL
FC RAID Bricks and SSD Bricks use Slammer ports in the same order as SATA Bricks. This cabling scheme fosters balance among the Brick strings while maintaining a predictable assignment of Bricks to strings. A given Brick should always be on a specific string with specific Slammer ports.	NEW
Cable labels on both ends of the cables are used to indicate port connections for all cables.	NEW

Table 16: Cabling principles (Mixing Brick types) defines the principles that must be followed when mixing Brick types in strings within a Pillar Axiom 600 system.

Table 16 Cabling principles (Mixing Brick types)

Cabling principle	Applicability
Brick strings may contain combinations of FC RAID Bricks, FC Expansion Bricks, SATA Bricks (version 2), and SSD Bricks.	ALL
SATA (version 1) Bricks must not be in the same string as an FC RAID Brick or a SATA Brick (version 2) or an SSD Brick. This guideline is strongly recommended to enhance supportability. Existing Pillar Axiom systems may not meet this guideline. Contact the Pillar World Wide Customer Support Center for guidance.	ALL
A Brick string may contain up to eight SATA Bricks (version 1 or version 2), but they cannot be mixed. This guideline is strongly recommended to enhance supportability.	ALL
A Brick string may contain up to four FC RAID Bricks (version 1), each of which may optionally be connected to an FC Expansion Brick. A Brick string may include up to eight FC Bricks (version 2).	ALL

Table 16 Cabling principles (Mixing Brick types) (continued)

Cabling principle	Applicability
A Brick string may contain up to two SSD Bricks. However, it is recommended that only one SSD Brick is placed on a Brick string.	ALL

Table 17: Cabling principles (FC Expansion Bricks) defines the principles that must be followed when cabling FC Expansion Bricks in strings within a Pillar Axiom 600 system.

Table 17 Cabling principles (FC Expansion Bricks)

Cabling principle	Applicability
FC RAID Bricks (version 1) can be configured alone or in pairs of one FC RAID Brick (version 1) and one FC Expansion Brick (version 1). FC RAID Bricks (version 2) do not support FC Expansion Bricks.	ALL
FC Expansion Bricks are connected to FC RAID Bricks (version 1) using the J0, J1, and PNet ports. One FC Expansion Brick is supported with one FC RAID Brick (version 1). For more information, see *Pillar Axiom 600 SSF Cabling Reference.*.	ALL

Table 18: Cabling principles (Brick order in strings) defines the order in which different Bricks are placed in the string within a Pillar Axiom 600 system.

Table 18 Cabling principles (Brick order in strings)

Cabling principle	Applicability
The functionality or performance of Bricks is not affected by their relative position in a Brick string.	ALL
Factory manufacturing practice places SSD Bricks at the head of string position followed by FC Bricks, and then SATA Bricks.	NEW
When adding Bricks to an existing system, attach the new Brick to the last Brick on a string.	FIELD

Table 18 Cabling principles (Brick order in strings) (continued)

Cabling principle	Applicability
Note: The practice of adding Bricks to the last Brick on the string is recommended for non-disruptive upgrades and for existing customer systems. The goal in the field must be to perform non-disruptive upgrades, if at all possible.	

Table 19: Cabling principles (Brick balance in strings) defines the balance that must be maintained between the various Brick types in the Brick strings within a Pillar Axiom 600 system.

Table 19 Cabling principles (Brick balance in strings)

Cabling principle	Applicability
A string may contain up to eight Bricks. (FC Expansion Bricks (version 1) are not included in this number)	ALL
When additional Bricks are added or when SSF performance issues occur, it may be necessary to rearrange the Bricks between strings to better balance the system.	NEW
Bricks in a Pillar Axiom 600 system can follow a heuristic balance or a numerical balance defined by Pillar manufacturing practices.	ALL
A numerical balance allocates Bricks to strings uniformly without regard to the type of Pillar Brick. The longest and shortest Brick strings differ by at most one Brick, with the exception of FC Expansion Bricks.	NEW
Some rules have been developed to achieve a heuristic balance on Brick strings. The heuristic balance on Brick strings helps to optimize performance on larger systems with mixed Brick types. Brick strings are balanced on the basis of load factors allocated to the different Brick types as follows: • SATA Brick: Load factor 1 • FC RAID Brick: Load factor 2 • SSD Brick: Load factor 4 Version 1 and version 2 of all Brick types are allocated the same load factor.	FIELD

Table 19 Cabling principles (Brick balance in strings) (continued)

Cabling principle	Applicability
Note: The recommendation to not mix SATA Bricks (version 1) with other Brick types overrides load factor considerations on Brick strings.	

Table 20: Cabling principles (Brick adds on strings) defines the procedures to be followed when adding Bricks on Brick strings within a Pillar Axiom 600 system.

Table 20 Cabling principles (Brick adds on strings)

Cabling principle	Applicability
Bricks may be added to a Pillar Axiom 600 system without disrupting client data availability. However, considerable care must be taken while performing non-disruptive Brick adds. If there is any sign of excessive disruption of the SSF fabric, disconnect or power down the last Brick that was added to the Pillar Axiom 600 system and contact the Pillar World Wide Customer Support Center.	FIELD
While adding new Bricks, consider rewiring the strings if the existing Pillar Axiom system is not fully compliant with specified cabling rules. For example: If the Pillar Axiom system has Brick strings that mix SATA Brick (version 1) with other types of Bricks or if a better balance (heuristic or numerical) is required between the Brick strings to achieve performance goals. Appropriate rewiring can help to isolate problems in the internal SSF fabric. However, rewiring is usually a disruptive operation and thus, not always possible.	FIELD
Recommended method for a non-disruptive Brick add: Cable all the new Bricks to the Pillar Axiom 600 system without powering them on. Then, power on the Bricks at the rate of one or two at a time. **Note:** When adding a Brick, verify if the Slammer FS and FC port LEDs turn amber. If the Slammer FC and FS port LEDs continue to display amber for three minutes, power off the Brick that was last added to the Pillar Axiom system.	FIELD

Table 20 Cabling principles (Brick adds on strings) (continued)

Cabling principle	Applicability
Note: When adding a Brick to a Pillar Axiom 600 system, check for the appearance of topology discovery tasks. Topology discovery tasks are normal if they do not repeat or last more than five minutes. If a topology discovery task completes and then recurs after five minutes have passed, power off the last Brick that was added to the Pillar Axiom 600 system and contact the Pillar World Wide Customer Support Center for assistance. **Note:** After adding a Brick, check the status of the LUNs. If any LUN goes offline, power off the last Brick that was added and contact the Pillar World Wide Customer Support Center for assistance.	
Alternate method for non-disruptive Brick add: (Used only when recommended by the Pillar World Wide Customer Support Center) Add the new Bricks to the rack along with the crossover cables. Power on the Bricks and wait for the Bricks to initialize. Connect the Bricks to the Pillar Axiom 600 system, one Brick at a time.	FIELD
The Brick type and the Brick model number must both be compatible with the installed software version and the compatibility matrix on the Pillar Axiom 600 system. If the Brick type is supported and the Brick model number is not supported, update the compatibility matrix to the appropriate version. If the Brick type is not supported, the Pillar Axiom 600 software must be updated before the Brick can be added to the system.	FIELD
After a successful Brick add, conduct the following checks: • Verify that there is only one version of firmware for the Brick type that was added. Also, verify that the firmware version is correct for the installed Pillar Axiom 600 release. • Verify that there are no topology discovery tasks in progress and no repeating topology tasks. • Verify that the system capacity has been increased by the amount of storage available from the newly added Bricks. **Note:** If any of the above-mentioned tests fail, contact the Pillar World Wide Customer Support Center for assistance. **Tip:** After the RAID controllers finish initializing, scrubbing normally starts on the drives. Scrubbing causes all the drive LEDs to blink rapidly even with no host I/O activity.	FIELD

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 Fiber Channel (FC) cables do not cross over or get too close to the power supply cords. Keep them separated to minimize EMI (electro-magnetic interference).

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 600 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.

Important! Do not mix copper and optical cable connections on the Slammer in the same Pillar Axiom 600 system.

Caution Use of any SFP or cable not provided by Pillar 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 600 system, if the third party SFP or cable is determined to be the cause of any problems within the Pillar Axiom 600 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 600 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 *Pillar Axiom 600 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 600 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 Pillar Axiom Path Manager (APM) is installed on a SAN host, that host will require an Ethernet interface for communication with the Pillar Axiom 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.

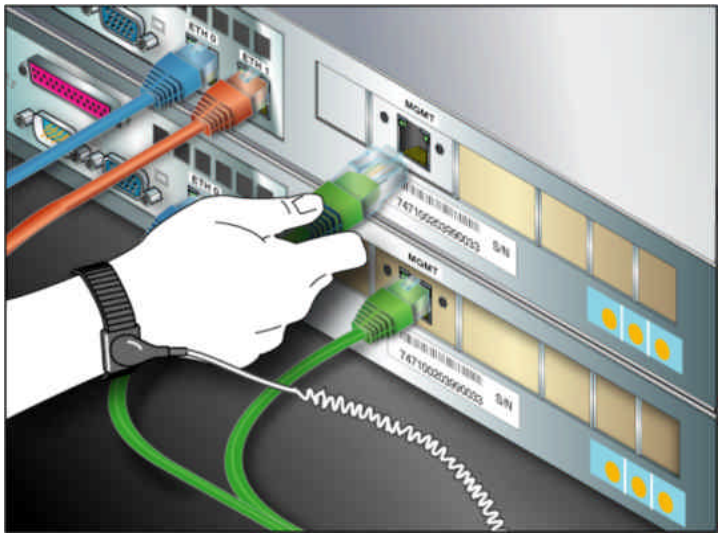
4 Connect the Pilot CU on which you receive a ping response to the Pillar Axiom Storage Services Manager.

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 44 Pilot management cables



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

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

Connect the Pilot CUs

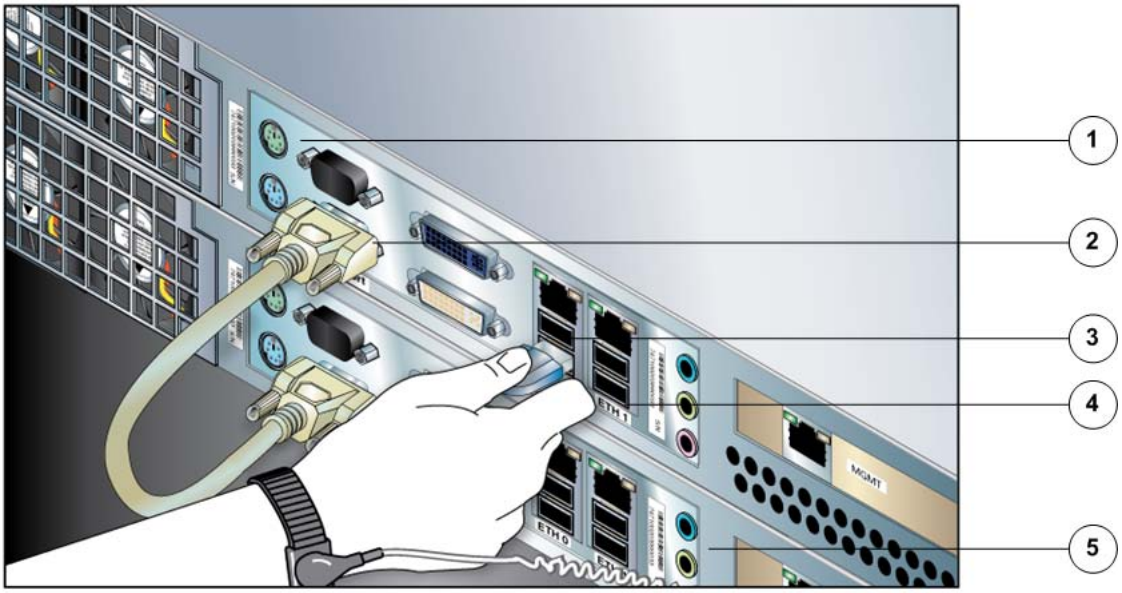
Connect the two control units (CUs) of the Pilot to each other to ensure a heartbeat.

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 45 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 might 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:

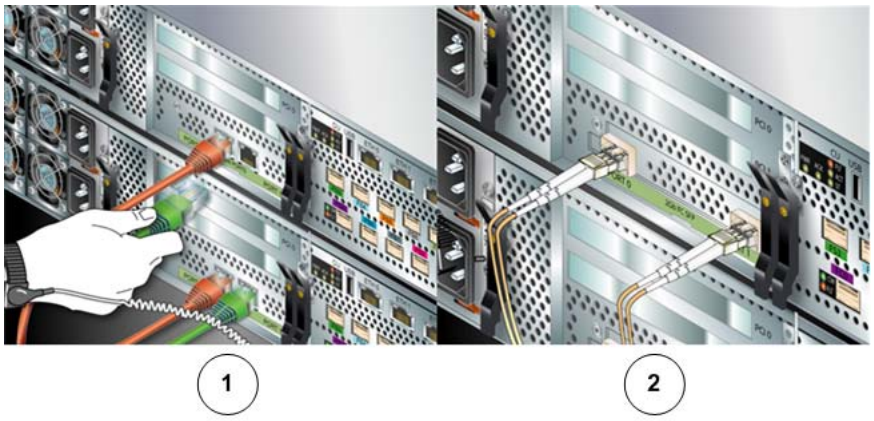
- NAS data paths require 1 gigabit Ethernet (GbE) or 10 GbE connections. Both fiber and copper connections are supported.
    - For optical connections: The 1 GbE connections require Pillar supplied 1 GbE small form-factor pluggable (SFP) modules and the 10 GbE connections require Pillar supplied 10 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 46 Slammer network cables



Legend		
	1 GbE Slammer connections	2 Optical Slammer connections

Note: This image is for illustration purposes only. Your hardware component might 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 600 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 600 components. Each component has redundant power cords plugged into different PDUs on separate circuits.

Table 21 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)	4.82A	2.82A	2.55A	586W
SATA Brick	2.12A	1.30A	1.18A	264W
FC Brick	2.76A	1.58A	1.43A	260W
SSD Brick	1.22A	.97A	0.88A	146W
Pilot (for each CU)	1.45A	0.66A	0.60A	143W

Note: For information on the electrical requirements of a specific Pillar Axiom 600 component or the electrical requirements of a mix of various components, contact the Pillar World Wide Customer Support Center.

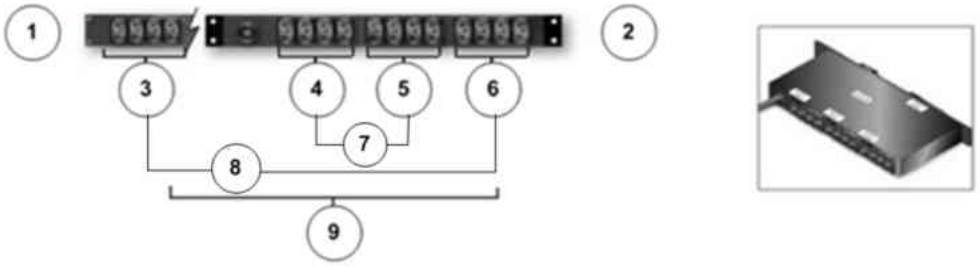
With redundant power supplies, the amperage draw for each power cord is rated for the case when one circuit fails, which increases the amperage draw on the other cord.

PDU Outlet Amperage Limits

The number of Pillar Axiom 600 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 47 Pulizzi TPC2105-1 outlet amperage limits

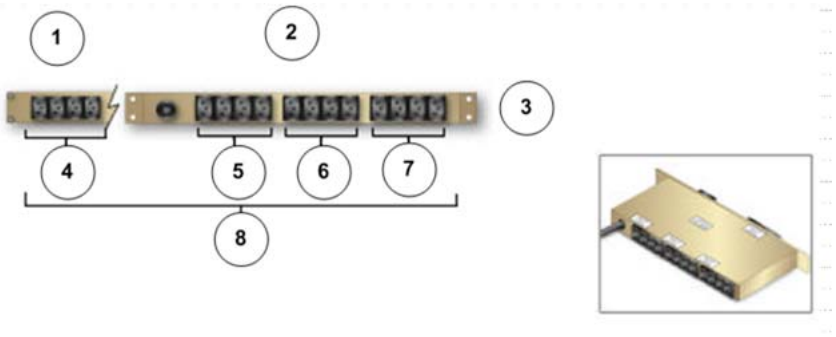


Legend

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 overall amperage limit is 16A regardless of the input voltage.

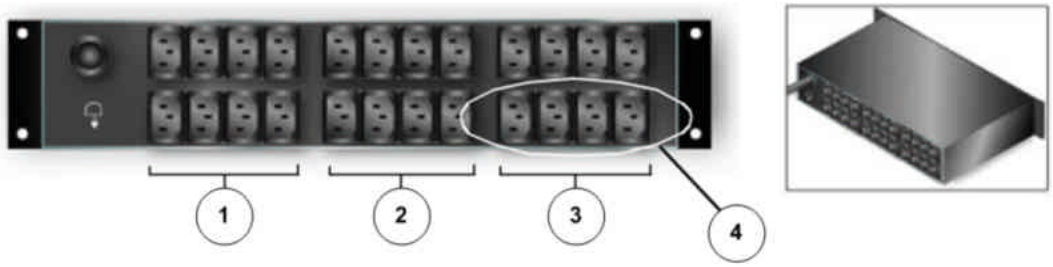
Figure 48 Pulizzi TPC2104 outlet amperage limits



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 230/400 VAC WYE three-phase input power. The output at each outlet is always 230V. This PDU is only available outside the United States.

Figure 49 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

Pillar Axiom 600 racks come with the Brick power cords or Wye power cables pre-installed in the rack with colored tie wraps. These Wye power cables are ready to be plugged into the back of each Brick.

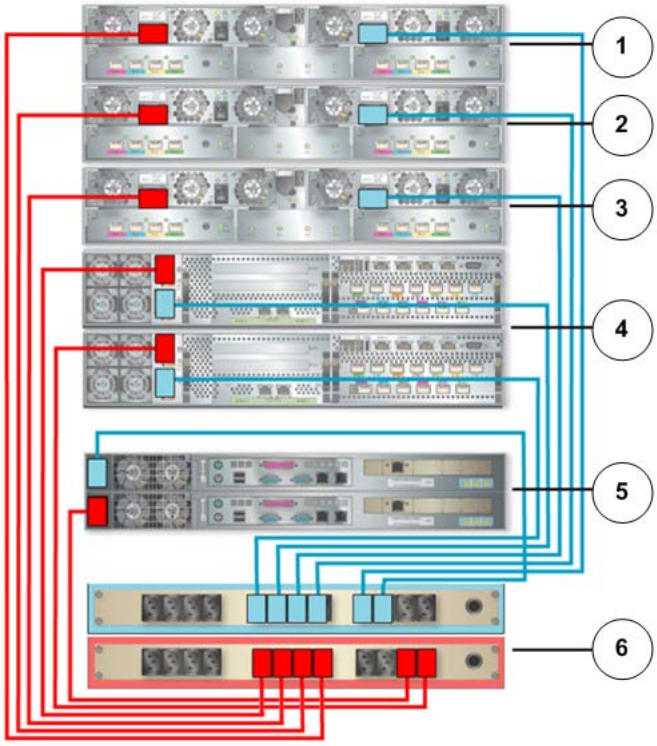
The Wye power cables are color-coded to indicate which PDU circuits will supply power to the Brick component. All cords of the same color connect to one set of power distribution units (PDUs), while the other cords connect to the other set of PDUs. When additional PDUs are added to the cabinet, additional colors are used. For example: All red Wye power cables are in one circuit and all blue Wye power cables are in the other.

To understand the exact quantities of PDU's required for each system or for each cabinet, contact the Pillar World Wide Customer Support Center.

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 50 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 might look different.

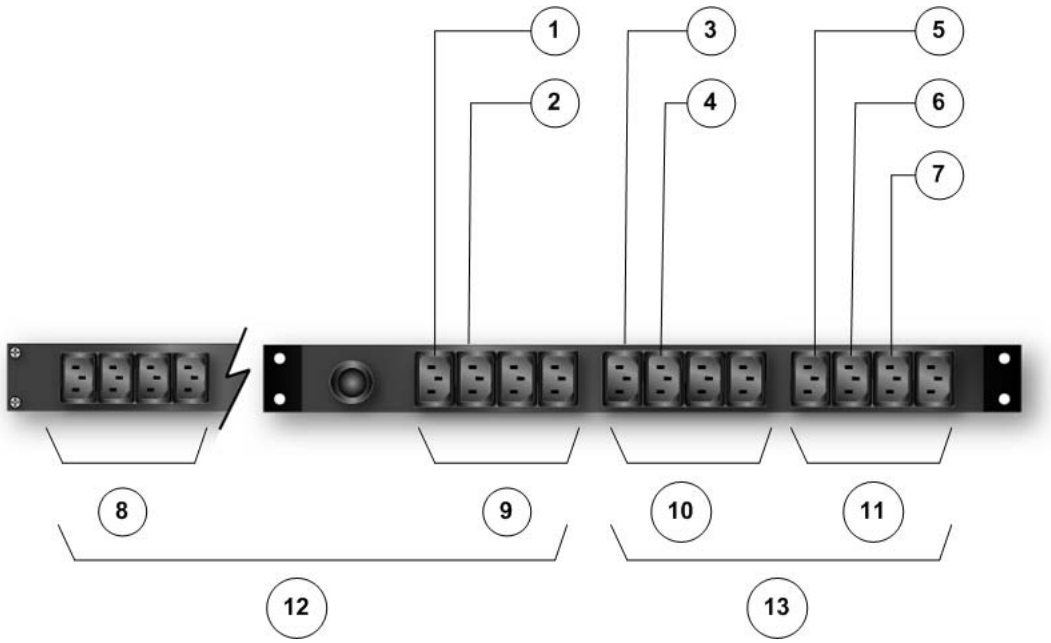
In the preceding example, the Slammer control unit (CU) 0, the three Bricks, and the Pilot in the four-outlet bank require 2.55A, 1.18A, 1.18A, 1.18A, and 0.60A respectively, or 6.69A total. This total load is below the 10A limit for a four-outlet bank.

If we modify the example to use 1115V, the cable connection configuration depends on which PDU you are using. The same two Slammer CUs and three Bricks draw 4.82A, 2.12A, 2.12A, 2.12A, and 1.45A or 12.63A 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 10.53A. 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 8.22A. The load on the right quad with one Slammer, one Brick, and one Pilot is 5.99A. You can distribute the plugs as shown in the following figure:

Figure 51 Sample power cabling scheme with 115V on a TCP2105-1 PDU



Legend

1 SATA Brick 1: 2.12Adrawn	8 No amps. drawn for group
2 SATA Brick 2: 2.12A drawn	9 Total of 4.24A drawn for group
3 SATA Brick 3: 2.12A drawn	10 Total of 4.24A drawn for group
4 SATA Brick 4: 2.12A drawn	11 Total of 6.29A drawn for group
5 Slammer CU 0: 2.42A drawn	12 Total of 4.24A drawn for group
6 Slammer CU 1: 2.42A drawn	13 Total of 10.53A drawn for groups
7 Pilot: 1.45A 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.

Related references

- *Cabling Practices for the Pillar Axiom 600 System*

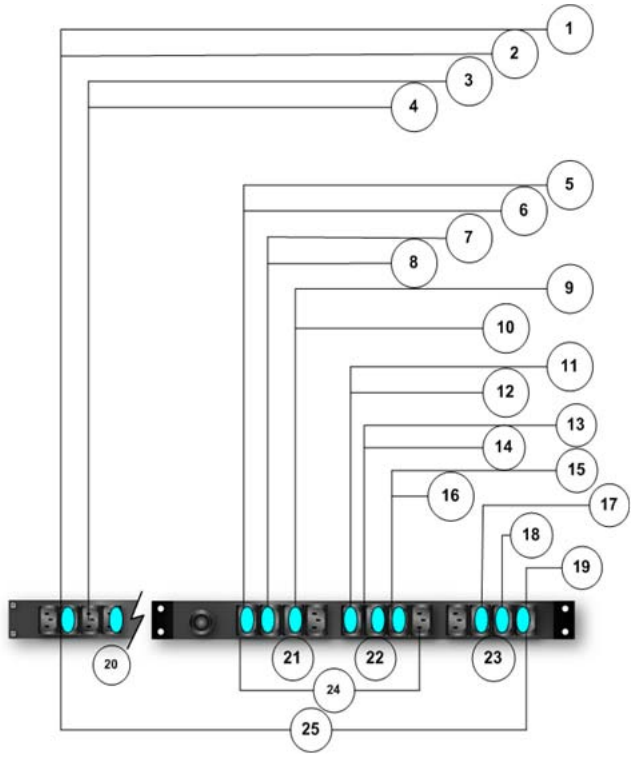
Sample Power Cabling for One Slammer and 16 SATA Bricks

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



Legend

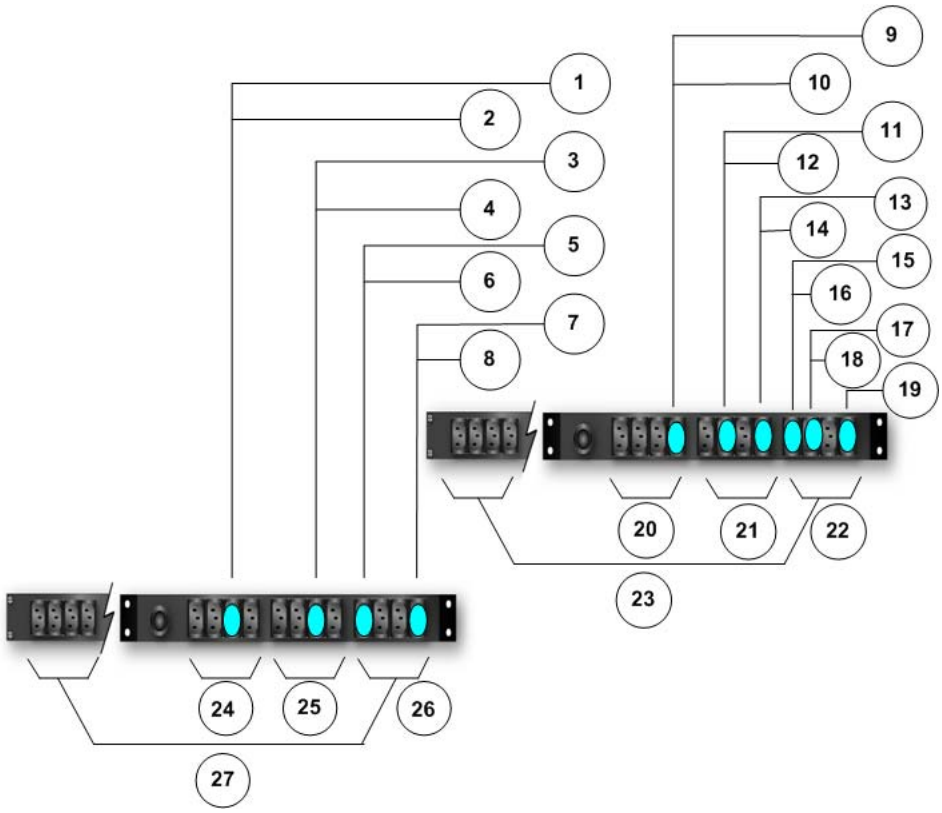
1–16 (Brick 16 through Brick 1): SATA, 1.18A drawn	21 Total 7.08A drawn
17 Slammer CU 0: 1.275A drawn	22 Total 7.08A drawn
18 Slammer CU 1: 1.275A drawn	23 Total 3.145A drawn
19 Pilot: 0.60A drawn	24 Grand total 14.16A drawn
20 Total 4.72A drawn	25 Grand total 22.025A drawn

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.

The amperage requirements for an FC Brick is higher than a SATA Brick. 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.

The following figure illustrates one way to distribute the load with one Slammer and 16 FC Bricks (and a Pilot).

Figure 53 Sample power cabling scheme with two 208V single phase PDU



Legend

1–16 (Brick 16 through Brick 1): FC: 1.58A drawn	22 Total 6.64A drawn
17 Slammer CU 0: 1.41A drawn	23 Grand total 16.12A drawn
18 Slammer CU 1: 1.41A drawn	24 Total 3.16A drawn
19 Pilot: 0.66A drawn	25 Total 3.16A drawn
20 Total 3.16A drawn	26. Total 6.32A
21 Total 6.32A drawn	27 Grand Total 12.64A

Related references

- *Cabling Practices for the Pillar Axiom 600 System*

Connect Power Cables

When you ordered your Pillar Axiom 600 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 600 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*

CHAPTER 6

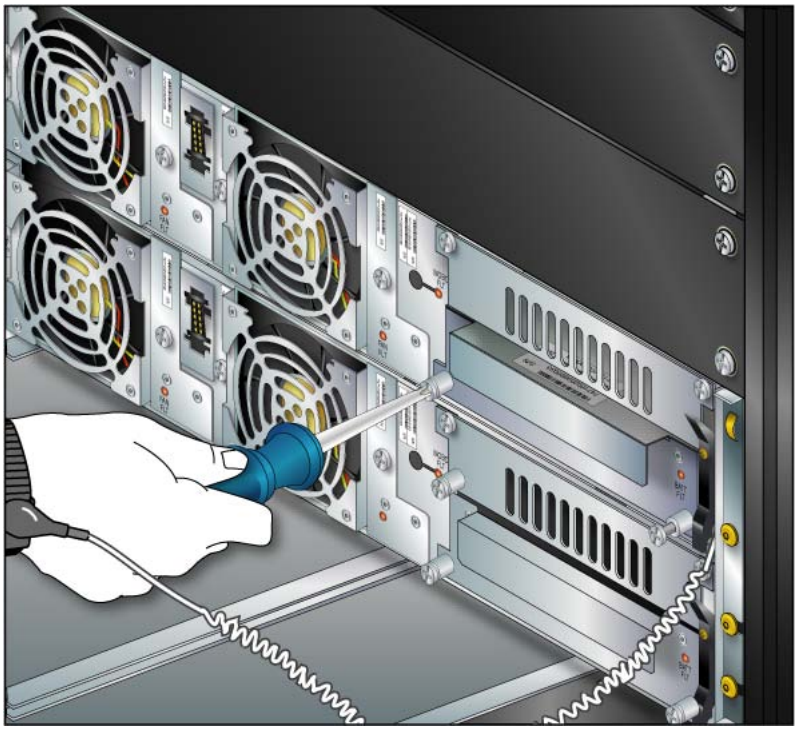
Complete the Installation

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 54 Secure Slammer batteries

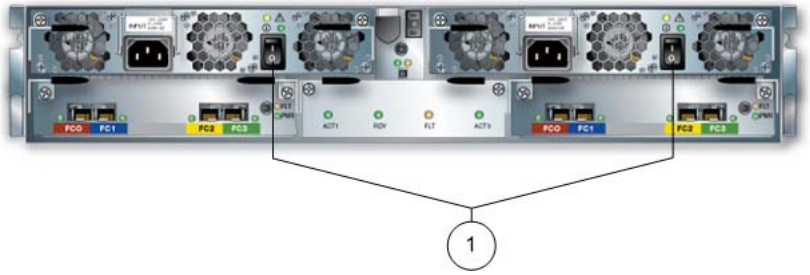


Note: This image is for illustration purposes only. Your hardware component might look different.

4 Verify that the digit setting is set correctly for the Brick before powering on the Brick.

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

Figure 55 Turn on Brick power

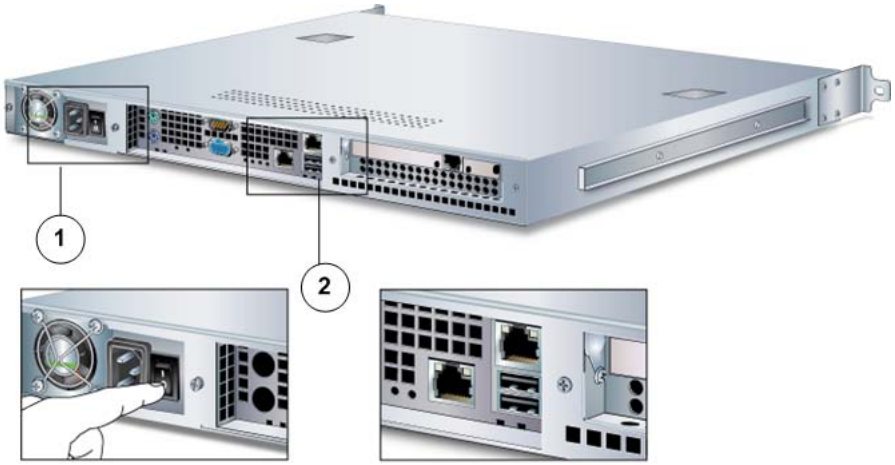


Legend	
1	Brick power switches

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

6 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 56 Turn on Pilot power

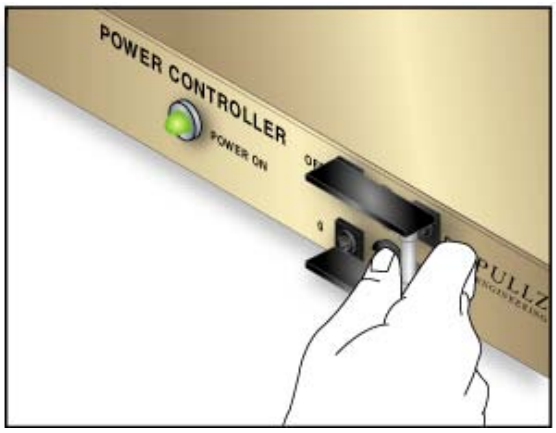


Legend	
1	Pilot power switch
2	Ethernet ports

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

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

Figure 57 Turn on PDU power



Note: This image is for illustration purposes only. Your hardware component might 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.

Related tasks

- *Set the Identity of Bricks*

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.

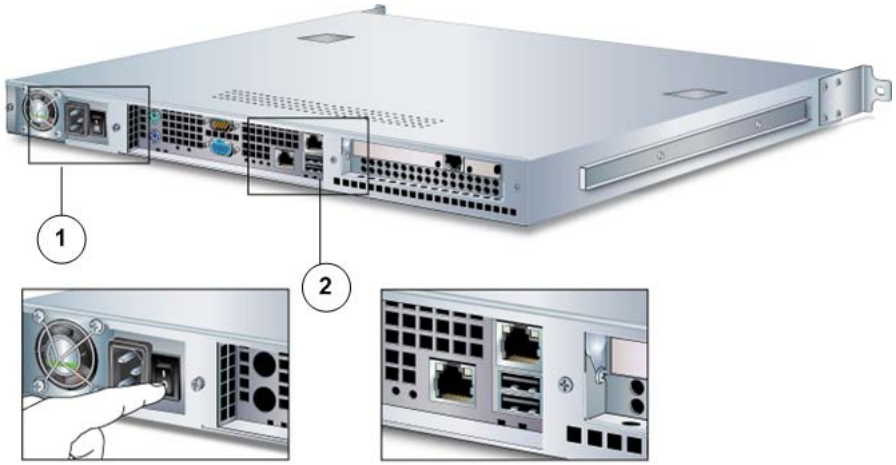
If the LEDs are off, ensure that the PDU circuit breakers are receiving power and that you have turned them on within a 10 second period of time.

Figure 58 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 59 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 might 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.

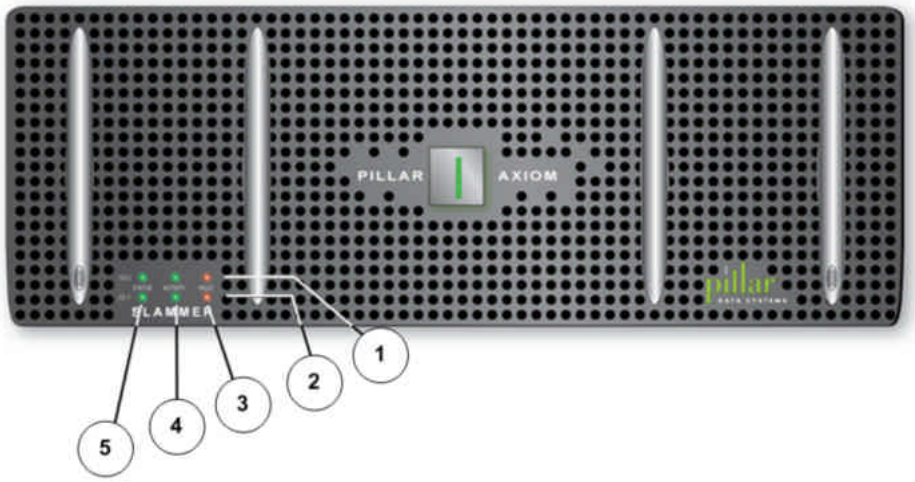
Table 22 LEDs on the Slammer bezel

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 22 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.

Figure 60 Slammer bezel LEDs



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

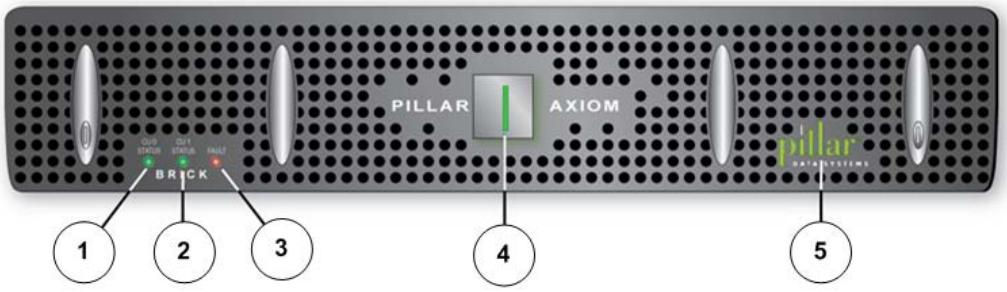
4 Verify that the FAULT LEDs are off.

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 61 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*

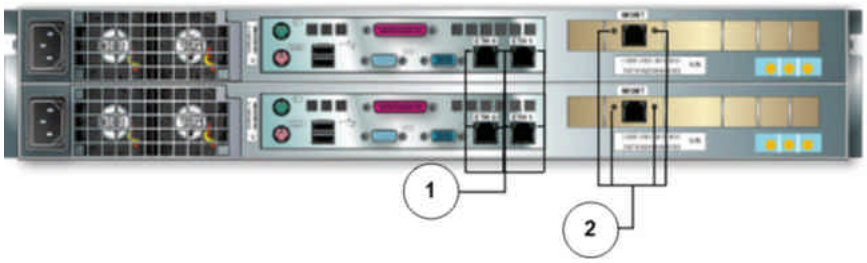
Verify the Back Status LEDs

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 62 Pilot connectivity LEDs



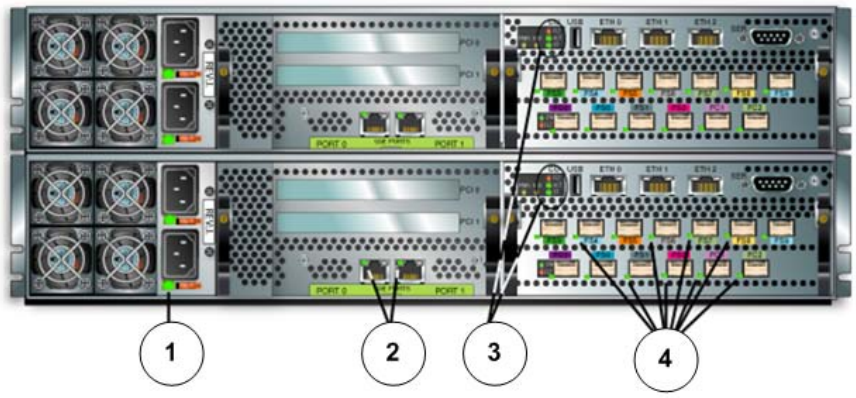
Legend	
1	Private LAN connectivity LEDs
2	Public management port connectivity LEDs

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

2 On the Slammers, verify:

- The power supply LEDs are green and not blinking.

Figure 63 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 might 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.

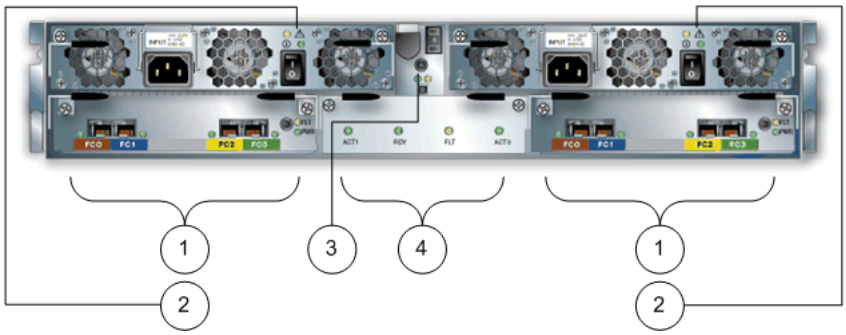
- On a NAS Slammer, for any 2-port or 4-port network interface module (NIM) GbE port, the LED on the left is green and not blinking, and the one on the right is amber. If they are off, check the network connections.
- On a SAN Slammer, the NIM port LEDs are green and not blinking.
- For the control unit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

  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 64 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 might 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 23 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. **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 24 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

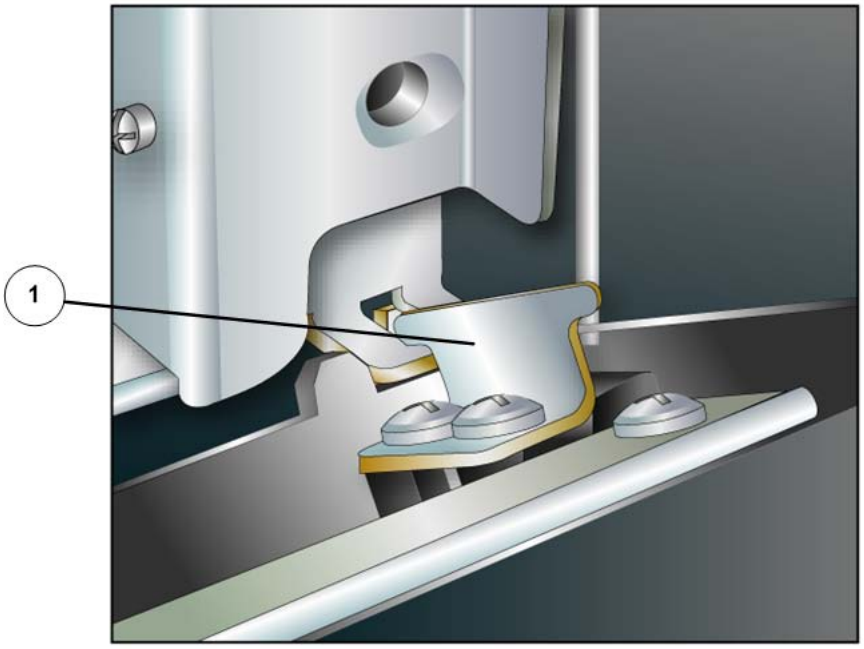
You must attach all bezels or the system generates an error condition and lights the FLT LEDs amber.

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 65 Bezel hook on the right side of the bezel



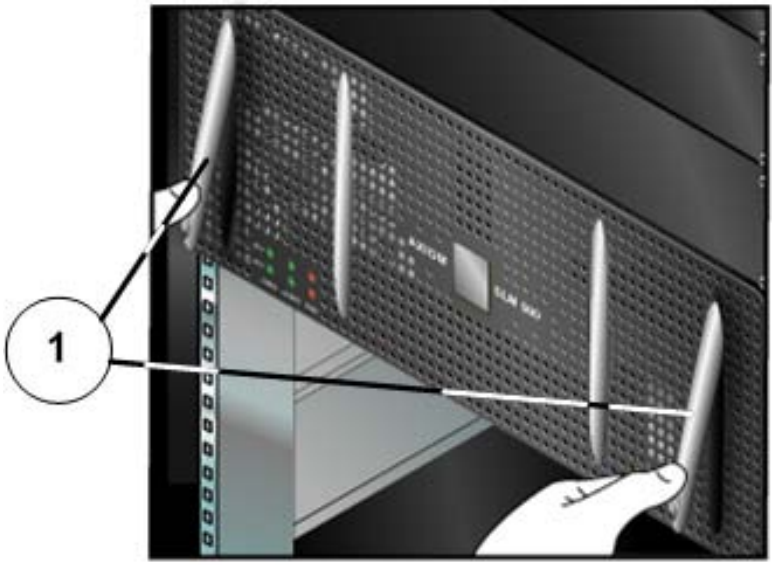
Legend	
	1 Insert the bezel hooks into the tabs on each side of the Brick

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 66 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 600 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 Pillar Axiom Path Manager software, refer to the appropriate *Pillar Axiom Path Manager Installation Guide and Release Notes* for your particular platform.

Related concepts

- *About Pillar Axiom 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 600 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 25 Global system parameters

Done	Information
❑	Check the *Customer Release Notes* and the 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 the Pillar World Wide Customer Support Center.
❑	Get access to the Pillar Axiom Storage Services Manager, the command line interface (CLI), and the Pillar Axiom 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 25 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 600 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 600 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 600 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,

Table 25 Global system parameters (continued)

Done	Information
	typical file size, random or sequential file access, read or write I/O bias, and snapshot strategy.
❑	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 Pillar Axiom Storage Services Manager is a graphical user interface (GUI) to manage the Pillar Axiom 600 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 600 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 600 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 600 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 600 components.

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

Refer to the *Pillar Axiom 600 SSF Cabling Reference* for more information. If the error persists, contact the Pillar World Wide Customer Support Center.

Rename the Bricks

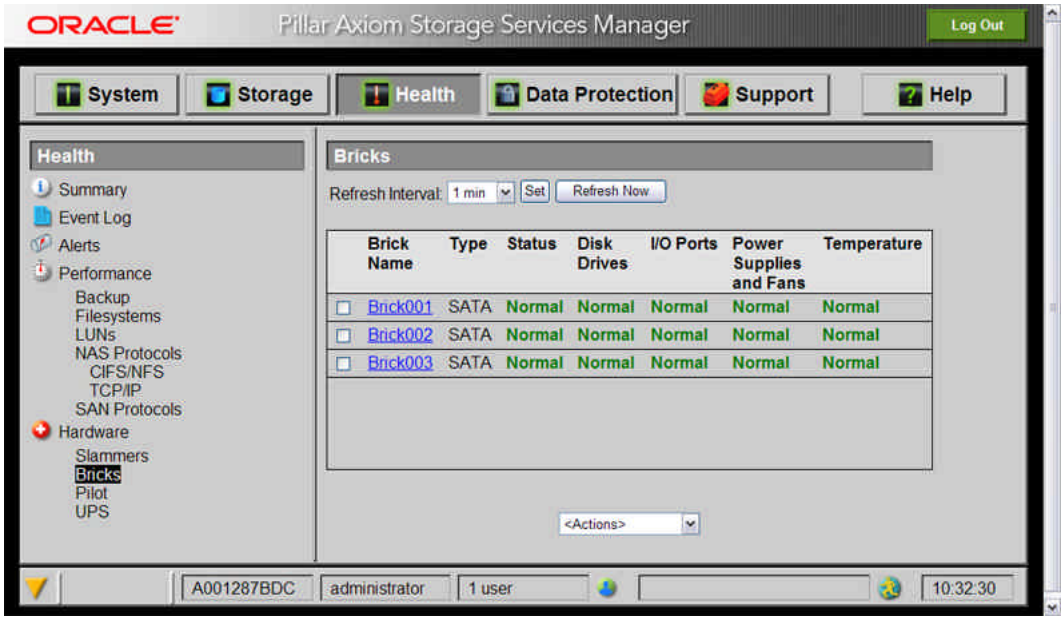
The physical Brick names indicate the physical location of the Brick in the rack. The actual names or logical names, as seen in the Pillar Axiom Storage Services Manager GUI, may be different.

The logical name of each Brick is determined during the installation and follows the scheme Brick001, Brick002, Brick003, and so on. It is likely that after a new installation or a Brick upgrade, a new Brick may not have the same physical and logical name.

Tip: We recommend that in case of a mismatch between the physical and logical name of the Brick, the logical name must be renamed to match the physical name of the Brick. Thus, physical Brick 1 must match the logical Brick name Brick001 that appears in the GUI.

1. Perform a physical inspection of all the Bricks in the Pillar Axiom 600 system to determine the physical location of each Brick within the rack.
2. In the Pillar Axiom Storage Services Manager GUI, click the **Health** icon in the top context pane.

Figure 67 Logical Brick names on the GUI



3. Under **Hardware** in the navigation pane, select **Bricks**.
4. Select the Brick whose logical name you want to modify. For Example: Brick001. This opens the **Modify Brick Name** dialog box.

5 From the **Modify Brick Name** dialog box, select **Identify**. This launches the **Identify Hardware** dialog box in a new window.

6 Select **Identify Brick**.

Note: The flashing status lights indicate the physical location of the selected Brick001.

7 Rename the Brick if the status lights are flashing on any other Brick other than the Brick with the physical location of Brick 1. For example: If the status lights of Brick003 are flashing instead of Brick001.

8 Select **Cancel Identify**.

9 Select **Finish** to close the **Identify Hardware** dialog box.

10 Type the new Brick name in the **Brick Name** field in the **Modify Brick Name** dialog box.

11 Click **OK**. This enables the physical name of the Brick to match the logical name. For Example: Brick001 is renamed as Brick003 and appears at the bottom of the list of Bricks.

12 Repeat this procedure for each Brick in the system.

13 After ensuring that all Bricks in the system have matching physical and logical names, remove the temporary prefix “t” from each Brick name in the GUI.

Related concepts

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

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 Pillar Axiom Path Manager Installation (SAN Only)

To operate your SAN system, you may optionally install the Pillar Axiom 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 600 system before you install the APM system software on the SAN host.

Complete the procedures in the appropriate *Pillar Axiom 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 (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 600 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 (2.375Hz).
- Blink slowly—one blink for each 1.5 sec (0.67Hz).

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 26 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 27 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 27 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 27 Slammer LED boot block error codes

Code			Software module	Meaning
FLT	ACT	ST		
				output for details.

Table 28 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 28 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 28 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 29 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 600 system, safety statements provide specific warning and cautionary notices about the electrical and weight properties that are associated with a Pillar Axiom 600 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 600 system components are connected comply with the technical specifications for those components.

Related concepts

- *About Pillar Axiom 600 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 30 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 30 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 fÍ sicos. Antes de comeÇar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possÍ veis acidentes.
Advertencia	Este sÍmbolo de aviso significa peligro. Existe riesgo para su integridad fÍ sica. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos está ndar de prevención de accidentes.
Varning	Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på nå gon utrustning må ste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador.

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

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

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

When working on a chassis or near power supplies, use extreme caution because line voltages may be present within the chassis.

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

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.

Only qualified personnel should install or replace this equipment.

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

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

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*.

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.

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

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.

The Pillar Axiom 600 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 31 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 31 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 32 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 32 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 alimentaççção 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 32 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

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 33 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

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 34 Installation warning in other languages

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

Table 34 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 35 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

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 36 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 36 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 37 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 38 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 38 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 39 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.

Table 39 Qualified personnel warning in other languages (continued)

Avvertenza	Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.
Advarsel	Kun kvalifisert personell med riktig opplæring bØ r montere eller bytte ut dette utstyret.
Aviso	Este equipamento deverá ser instalado ou substituí do apenas por pessoal devidamente treinado e qualificado.
Atenció n	Estos equipos deben ser instalados y reemplazados exclusivamente por personal técnico adecuadamente preparado y capacitado.
Varning	Denna utrustning ska endast installeras och bytas ut av utbildad och kvalificerad personal.

Warning Statement for Finland

Table 40 Warning statement for Finland

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

Warning Statement for Sweden

Table 41 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 42 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 43 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 44 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 44 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 45 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 45 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 45 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 46 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 46 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 600 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 600 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 600 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 600 system and its hardware components.

About Pillar Axiom 600 Hardware Specifications

A Pillar Axiom 600 system is an assembly of Pilot management controllers, Slammer storage controllers, Brick storage enclosures. power distribution units (PDUs), and racks.

Table 47 Basic components of a Pillar Axiom 600 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 600 PDU Hardware Specification*

System Power Requirements

Pillar Axiom 600 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.

- 100-120VAC, 50–60Hz, 20A
- 100-240VAC, 50–60Hz, 20A/30A
- 100-120VAC, 50–60Hz, 30A

- 200-240VAC, 50–60Hz, 30A
- 230VAC, 16A or 32A (Europe)
- WYE-connected 3-phase:
  - USA: 120/208VAC, 50-60Hz, 30A
  - Europe: 230/400VAC, 50-60Hz, 16A

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

System Environmentals

Table 48 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 49 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	-22 to 158 °F (-30 to 70 °C)	5–95%	104°F (40°C)	54°F/hr (30°C/hr)

Table 49 System temperature and humidity specifications (continued)

Mode	Ambient temperature	Non-condensing humidity	Max wet bulb temperature	Gradient
		10%/hr gradient		

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

System Acoustics

Acoustics for a Pillar Axiom 600 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 50 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 51 System random vibration specifications

Mode	Force	Frequency	Time
Operational	0.1 G RMS	3–100Hz (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 600 system that consists of:

- One Pilot
- Two Slammers
- Twelve Bricks

Related references

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

Regulatory Compliances

The Pillar Axiom 600 system complies with the following regulatory agency requirements.

Table 52 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:

Table 52 Safety, quality, and environmental standards (continued)

Logo	Standard
	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 IEC60950-1-2.
	Conformite Europeenne /DoC.
	UL and CSA under UL (cUL) and UL60950-1-2.
	TUV/GS.
	We offer 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.
	Our 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

Table 52 Safety, quality, and environmental standards (continued)

Logo	Standard
	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.
	Compliance packaging label: SPS1.
	Compliance packaging label: SPR1.
	Compliance packaging label: SPA1.
	KCC-SPS1.
	KCC-SPR1.
	KCC-SPA1.

Table 52 Safety, quality, and environmental standards (continued)

Logo	Standard
	BSMI D-Mark.

Electromagnetic Emissions and Immunity

Table 53 Electromagnetic (EM) emissions and immunity

Standard

• CISPR 22-A
• EN55022 Class A radiated and conducted emissions (110V/220V)
• EN55024 Immunity:
  ○ EN 61000-3-2
  ○ EN 61000-3-3
  ○ EN 61000-4-2 ESD:±4 kV contact,±8 kV air
  ○ EN 61000-4-3 Radiated immunity (within the limits that are listed in our technical specifications)
  ○ EN 61000-4-4 Electrical fast transients/burst:±1 kV AC,±0.5 kV I/O
  ○ EN 61000-4-5 Surges±1 kV differential mode,±2 kV common mode
  ○ EN 61000-4-6 Conducted immunity: 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

SABS
C-TICK

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.

We have signed a Declaration of Conformity with the requirements of the Directive.

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 61000-4-8 PFMF
   - 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 600 system are covered by a three-year warranty.

Note: The hardware and software warranty for all Pillar Axiom 600 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 600 system are warranted to fall within the same renewal cycle as the Pillar Axiom 600 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 600 system.

Pilot Dimensions and Weight

Table 54 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 55 Pilot power characteristics (for each control unit)

Power characteristic	Value
Frequency	50 to 60Hz
AC voltage	100 to 240V
Current draw	1.5A at 115V 0.8A at 230V 143W
Maximum power consumption	143VA

Table 55 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.

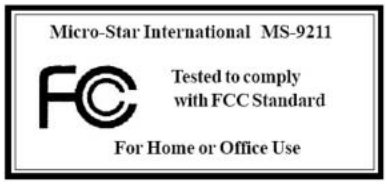


Table 56 Pilot safety and quality standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15 for a class B digital device.

Table 56 Pilot safety and quality standards (continued)

Logo	Standard
CE	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 600 system. A Slammer can be ordered as either a SAN or a NAS front end.

Slammer Dimensions and Weight

Table 57 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 58 Slammer power characteristics

Power characteristic	Value
Frequency	50–60Hz
AC voltage	100–240V
Maximum power consumption	568VA
Current draw	Combined for both Slammer CUs: 4.72A at 115V 2.46A at 230V 546W
Maximum heat dissipation	1864 BTU/hr

Table 58 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 59 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 60 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 61 Cable lengths limitations (10 Gb/s optical short range)

Multimode Fiber (MMF) optical cable type core diameter (micrometers)	Minimal modal bandwidth with short range 850nm laser (MHz*km)	OM type	Maximum cable length
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)

Note: The optical cable is short range multimode fiber with LC-LC duplex connectors.

Note: 10 GbE network interface modules support only passive copper cables. Active copper cables are not supported.

Table 62 Cable lengths limitations (Passive copper cables 10 Gb/s direct attach)

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 63 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 64 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 64 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 600 Bricks comply with the following regulatory agency requirements.

Table 65 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)
GS	TUV/GS
	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 600 PDU Hardware Specification

If you install non-Pillar PDUs, they must meet the Pillar Axiom 600 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 66 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 66 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 600 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 67 Rack specifications for a Pillar Axiom 600 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 67 Rack specifications for a Pillar Axiom 600 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 600 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

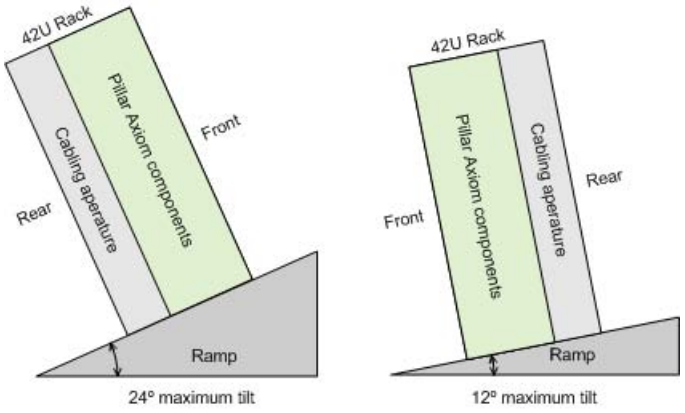
Table 67 Rack specifications for a Pillar Axiom 600 system (continued)

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 68 Maximum tilt angles for stationary Pillar 42U racks



APPENDIX D

Expansion of a Pillar Axiom 600 System Configuration

About Expanding a Pillar Axiom 600 Configuration

You can expand a Pillar Axiom 600 system configuration by adding the required number of additional Brick storage enclosures and Slammer storage controllers to an existing Pillar Axiom 600 system.

A Pillar Axiom 600 can have a maximum number of four Slammers and 64 Bricks attached to the system. The Pillar Axiom 600 system allows you to start your storage system with a small configuration and later, scale up to larger configurations without a disruption to the data access.

Important! Leave the small form-factor pluggable (SFP) in the Slammer or Brick port and only disconnect the fibre optic cable if you remove an optical SFP cable that is used in the Storage System Fabric (SSF) for troubleshooting purposes. Leaving the SFP in the Brick or Slammer port prevents the Pillar Axiom 600 system from setting the port speed to the lower fabric speed of the copper cable.

Related tasks

- *Add a New Brick Storage Enclosure*
- *Add a New Slammer Storage Controller*

Complete the Brick Pre-Installation Checklist

Prior to adding new Bricks to a pre-existing Pillar Axiom 600 system, complete the tasks outlined in the pre-installation checklist.

- When ordering new Bricks, determine if you need additional power distribution units (PDUs) and to devise a cabling plan that specifies to which PDU outlet each Brick power cable connects.
- When ordering cables, check the model type of existing Slammers and Bricks and identify compatibility issues.

- Verify the placement limits for Bricks and Slammers on the rack due to power requirements and cable lengths.
- Verify that the placement of the Brick within the new or existing Brick string follows all cabling guidelines.
- Before the Bricks arrive, decide where you will install each Brick and PDU.

  Add Bricks above the Slammers until they reach the top rack unit, and then start at the top of the next rack and work down. Place the PDUs at the bottom of the rack.
- Install new PDUs.

Related references

- *Cabling Practices for the Pillar Axiom 600 System*

Related tasks

- *Add a New Brick Storage Enclosure*

Complete the Slammer Pre-Installation Checklist

Prior to adding new Slammers to a pre-existing Pillar Axiom 600 system, complete the tasks outlined in the pre-installation checklist.

- Inventory the Slammer and installation components to make sure you have the correct cables and mounting hardware.
- When ordering cables, check the model type of existing Slammers and Bricks and identify compatibility issues.
- Before beginning the installation, check the status of the system to ensure that it is in the correct status, as follows:
  - All Fibre Channel status LEDs on Slammer and Brick ports with connectors inserted are steady green, not amber or flashing green. To determine which LEDs reflect the status of a port, refer to the *Service Guide*.
  - The System Status icon in the GUI is green for all components. The System Status icon is on the left most position of the GUI status bar and indicates the system status of all hardware components. For more information, refer to the *Administrator's Guide*.
  - No background tasks are running. Click **Tasks** on the status bar to open the Tasks overview page.
  - There are no outstanding system alerts. Click on the System Alerts icon on the status bar to open the System Alerts overview page and to

respond to any alerts that require intervention. For more information, refer to the *Administrator's Guide*.

- No LUNs are offline, degraded, or in conservative mode. Check the appropriate status field in the GUI. For more information, refer to the *Administrator's Guide*.

Related references

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

Related tasks

- *Add a New Slammer Storage Controller*

About Additional Brick Storage Enclosures

You can add Bricks to expand a Pillar Axiom 600 system.

Addition of Bricks to the end of an existing Brick string in a Pillar Axiom 600 system is non-disruptive.

Note: Addition of Bricks may be disruptive if additional power distribution units (PDUs) are required to fulfil power requirements. Addition of Bricks may also be disruptive if the current layout of the hardware in the racks is changed to comply with the cable length limits for cables that are used for Slammer to Brick and Brick to Brick connections.

Note: If the installed software version does not support the new Bricks, the new Bricks are not added to the Pillar Axiom 600 system. However, there is no disruption to the data path of the existing Bricks. Contact the Pillar World Wide Customer Support Center to identify any software prerequisites to add additional Bricks.

For best results, ensure that the Pillar Axiom 600 system has the latest software version installed before adding a Brick. If the existing racks are full, you must install additional racks. Refer to the appropriate procedures in this guide to install multiple racks and for correct component placement in the racks.

Add a New Brick Storage Enclosure

Caution While adding new Bricks, verify the status of each Brick as the Brick is powered on to ensure that it has been added to the Pillar Axiom 600 system configuration. Do not wait to conduct the status checks after a few Bricks have been added because doing the status check in a batch might increase the possibility of bringing other resources offline.

Caution While adding new Bricks, contact the Pillar World Wide Customer Support Center to determine the location of the system configuration database before disconnecting or powering off any Bricks to avoid an emergency shutdown of the Pillar Axiom system and subsequent data corruption.

1 Install the new Bricks in the rack.

2 Cable the new Bricks as described in the *Pillar Axiom 600 SSF Cabling Reference*.

You do not need to power down the Pillar Axiom 600 system to cable additional Bricks.

Note: When adding additional Bricks, there may be changes in the existing cabling of the Pillar Axiom 600 system. Refer to the *Pillar Axiom 600 SSF Cabling Reference* for more information.

The Pillar Axiom 600 Slammer and Brick ports and cables are:

- HSSDC
- Small form-factor pluggable (SFP) copper
- SFP optical

The fibre cables available to cable a Pillar Axiom 600 system are:

- HSSDC — HSSDC for legacy connections
- HSSDC — SFP copper, where the SFP is part of the cable for connecting legacy components
- SFP copper — SFP copper, where the SFP is part of the cable
- SFP optical — SFP optical, where the SFP is a separate component from the cable

Note: The cables in any Pillar Axiom 600 system must be either all copper or all optical. The single exception is for single Slammer Pillar Axiom 600 systems with all SFP Slammer ports. Use optical SFP cables for the hotwire connections from ports CU0 FC0 to CU1 FC2 and the ports CU1 FC0 to CU0 FC2. Use copper cables for the rest of the Pillar Axiom 600 system.

Tip: The input data connection to a Brick RAID controller is the FC2 port, which is connected directly to a Slammer or to the next Brick upstream in a Brick string.

Tip: The output data connection on a Brick RAID controller is the FC1 port, which is left empty or connected to the next Brick downstream in a Brick string.

Tip: The FC0 and FC3 ports are crossover ports between the Brick RAID controllers for redundancy. The FC0 port in each RAID controller is connected to the FC3 port of the partner RAID controller.

Dress all the cables so that you can remove any components without disconnecting a cable. 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 rear of the cabinet).

3 Make sure the power switches on the back of the new Bricks are off before connecting the power cables.

4 Dress the power cables and plug them into the power distribution units (PDUs) according to the cabling plan you devised during the earlier preparatory steps.

5 Verify that all drives are seated properly by pressing on each one to make sure it is fully seated.

They are seated correctly if they do not go in any further and none extend out more than the others.

6 Make sure the Pillar Axiom 600 system is powered on and all the new cables are in place.

Important! Ensure that the Pillar Axiom 600 system is in Normal status and that there are no topology or hardware incompatibility errors or pending software system alerts or topology discovery tasks before you begin the next step, so that the system can detect and integrate the new Brick.

7 Check the status of all the LUNs and make sure that they are fully online. No LUN or filesystem should be Offline, Partial Offline, Degraded, or Conservative.

8 In the GUI, navigate to **Support > Software Modules** and check the Software Modules screen to make sure that there is only one revision of Brick firmware for each Brick type.

9 Check and record the total system capacity.

10 Add power to one of the new Bricks.

Power on the Bricks connected directly to a Slammer first, then those that are connected to the first group of Bricks, and so on.

Important! Do not power on the next Brick until the current Brick is verified to be successfully integrated.

11 If you see a system alert in the GUI to accept a foreign Brick, use an Administrator account to accept the new Brick.

Result:

When you add a Brick storage enclosure to an existing Pillar Axiom 600 system, the system begins the process to bring the Brick online. While the system is bringing the Brick online, you may see a series of error and warning messages similar to these:

- `Fibre Channel RAID Array Inaccessible`: Occurs if the Pillar Axiom 600 system needs to upgrade the firmware on the new Brick. The system loads the firmware then resets the RAID controllers to install the firmware.
- `Fibre Channel Path to Brick Failed`: Occurs if the Pillar Axiom 600 system needs to upgrade the firmware.
- `Software Update Succeeded`: Occurs when the Pillar Axiom 600 system needs to update the firmware as it verifies that the firmware update is successful. This message does not indicate that the Pillar Axiom 600 system software is updated but that the Brick firmware is at the required level.

These messages are expected if the Pillar Axiom 600 has to upgrade the firmware on the new Brick to match the installed firmware. During the bring-up process, the status of the Brick will go from red to yellow to green. After the system completes the process, the Brick will show a Normal status and will remove all system alerts related to adding the Brick.

Important! If any existing LUN or filesystem changes status as the Brick is powered on, power off the new Brick immediately and contact the Pillar World Wide Customer Support Center for assistance.

Important! If any system alerts remain, contact the Pillar World Wide Customer Support Center.

Important! It is normal for Topology tasks to appear while the Brick is being added to the internal fabric configuration. However, after powering on a Brick, if the Topology Discovery task completion percentage does not increment or you repeatedly see Topology Discovery tasks, power off the Brick and contact the Pillar World Wide Customer Support Center for assistance.

12 In the GUI, verify that the new Brick is added to the system. If the Brick has a status of Normal, there should be no system alerts for Topology errors or incompatible hardware or software and there should be no Topology Discovery tasks running.

13 After you complete the system alert to accept this Brick and after you have verified that the RAID controller firmware version is correct, repeat Step 1 through Step 12 for each new Brick.

After a Brick has been added, you should verify its operational status. The new Brick will appear in the GUI with a default Brick name that will be the next assigned name in the sequence Brick001, Brick002, Brick003, and so on. After the Brick is online, you can use the GUI to assign a more meaningful name. The Brick status will transition from Booting, to Offline, and finally to Normal. If the firmware must be upgraded, the Brick may repeat this sequence and might display a status of Unknown or Missing as the new firmware is installed.

Related references

- *Cabling Practices for the Pillar Axiom 600 System*

Related tasks

- *Install a Brick Storage Enclosure*
- *Set the Identity of Bricks*
- *Complete the Brick Pre-Installation Checklist*
- *Verify a Newly Added Brick*

Verify a Newly Added Brick

While adding new Bricks, verify the status of each Brick as the Brick is powered on to ensure that it has been added to the Pillar Axiom 600 system configuration. Do not wait to conduct the status checks after a few Bricks have been added because doing the status check in a batch might increase the possibility of bringing other resources offline.

1 After the new Brick is powered on, verify the status of the LEDs. If the new Brick is directly cabled to the Slammer, verify that the FS port LEDs are solid green. If the new Brick is connected to another Brick, verify that the Fiber Channel (FC) port LEDs on the new Brick are solid green.

Note: If there is a cable plugged into the FC port, the port LED must be solid green but may flicker with activity. If there is no cable plugged into the FC port, the port LED must be blinking green at approximately a one second interval. The Fault LED must not be on. Drive activity LEDs may be on due to either storage initialization or drive scrub.

2 Check the status of all the LUNs and make sure that they are fully online. No LUN or filesystem should be Offline, Partial Offline, Degraded, or Conservative.

3 In the GUI, navigate to **Support > Software Modules** to make sure that there is only one revision of Brick firmware for each Brick type.

4 Verify that all `Brick Firmware` entries are the same (only one value for each Brick type).

These entries are associated with the RAID controller type or model.

Note: For `Brick Drive Firmware`, it is acceptable to have more than one entry.

5 If the RAID controller firmware is not updated, contact the Pillar World Wide Customer Support Center for assistance.

6 Verify that the capacity of the new Brick is added to the total system capacity and to the appropriate Storage Class. This increase will approximately be ten times the size of a single drive in the Brick.

- If so, the Brick addition has succeeded and this task is complete.
- If not, an error occurred when adding the Brick. Continue with the remaining steps.

7 Contact the Pillar World Wide Customer Support Center for assistance.

Note: Power off a Brick only if there is an incomplete topology task or if the new Brick causes FC faults or unless directed by the Pillar World Wide Customer Support Center.

Note: Disconnect a Brick only if there is a private interconnect (PI) issue.

Related tasks

- *Add a New Brick Storage Enclosure*

About Additional Slammer Storage Controllers

You can add Slammers to expand a Pillar Axiom 600 system.

Adding a Slammer to a Pillar Axiom 600 system is non-disruptive. However, there are several caveats to adding a Slammer, while the Pillar Axiom 600 system is in normal running status.

Caution If you want to power off or disconnect any Bricks to add new Slammers, contact the Pillar World Wide Customer Support Center to determine the location of the System Root Configuration to avoid a system shutdown while disconnecting or powering off Bricks.

Note: A successful addition of Slammers might require system upgrades, especially when it is a new model.

During the process of adding a Slammer to a Pillar Axiom system, the health checks and command timeout features function in a restricted mode.

Additionally, if the existing racks are full, you must install additional racks and relocate some Bricks to accommodate the new Slammers.

Because version 1 (13-port) and version 2 (16-port) Slammer private interconnect modules (PIMs) use different internal communication protocols, version 1 and version 2 PIMs cannot co-exist in the same Slammer chassis. However, a multi-Slammer Pillar Axiom 600 system can contain Slammers with version 1 PIMs and Slammers with version 2 PIMs.

Add a New Slammer Storage Controller

1. Using the GUI or command line interface (CLI), place the Pillar Axiom 600 system in Shutdown Status and verify that the system has successfully shut down.
2. Physically add the new Slammer to the system.
3. Connect the Ethernet and Fibre Channel cables by following the instructions in the *Pillar Axiom 600 SSF Cabling Reference*.
4. Attach the Slammer power connections to separate PDUs as shown in the *Pillar Axiom 600SSF Cabling Reference*.

   Note: When adding additional Slammers, there will be cabling changes. Refer to the *Pillar Axiom 600 SSF Cabling Reference* for more information.

   Tip: Make sure the Slammer bezel is secure.

Note: When you power on the Slammer, verify that the LED status on the bezel and on the PIM are as indicated below. These LED status indicate that the Slammer control units (CUs) passed the power on self test and are ready to boot when the Pillar Axiom 600 system is started.

- ST: Blinking green
- ACT: Blinking green
- FLT: Off

5 Restart the Pillar Axiom 600 system.

Carefully observe the system health status to ensure that the Slammers proceed through startup and achieve a Normal status.

6 Check that the system recognizes the new Slammer.

The system adds the Slammer to the configuration and performs a successful startup to Normal status, with any firmware updates to the Slammer control unit (CU) completing successfully.

7 Check the Fibre Channel (FC) status LEDs on all ports on all Slammers and Bricks. To determine which LEDs reflect the status of a port, refer to the *Pillar Axiom 600 Service Guide*.

If there is a FC cable connected, the associated port status LED should be solid green and not amber or blinking green.

Related tasks

- *Complete the Slammer Pre-Installation Checklist*

Storage System Fabric (SSF) Cabling Reference

When adding an additional Slammer to a Pillar Axiom 600 system, you need to move some Fibre Channel (FC) cables to different ports on the private interconnect module (PIM). The cable swapping differs depending on the PIM.

Table 68 Slammer cross connection configuration version 1 PIMs

Table 68 Slammer cross connection configuration version 1 PIMs (continued)

Legend

1	First Slammer.
2	Second Slammer.
3	Third Slammer.
4	Fourth Slammer.
5	Move the red FC cables when expanding the system to the next larger configuration.

Table 69 Slammer cross connection configuration version 2 PIMs

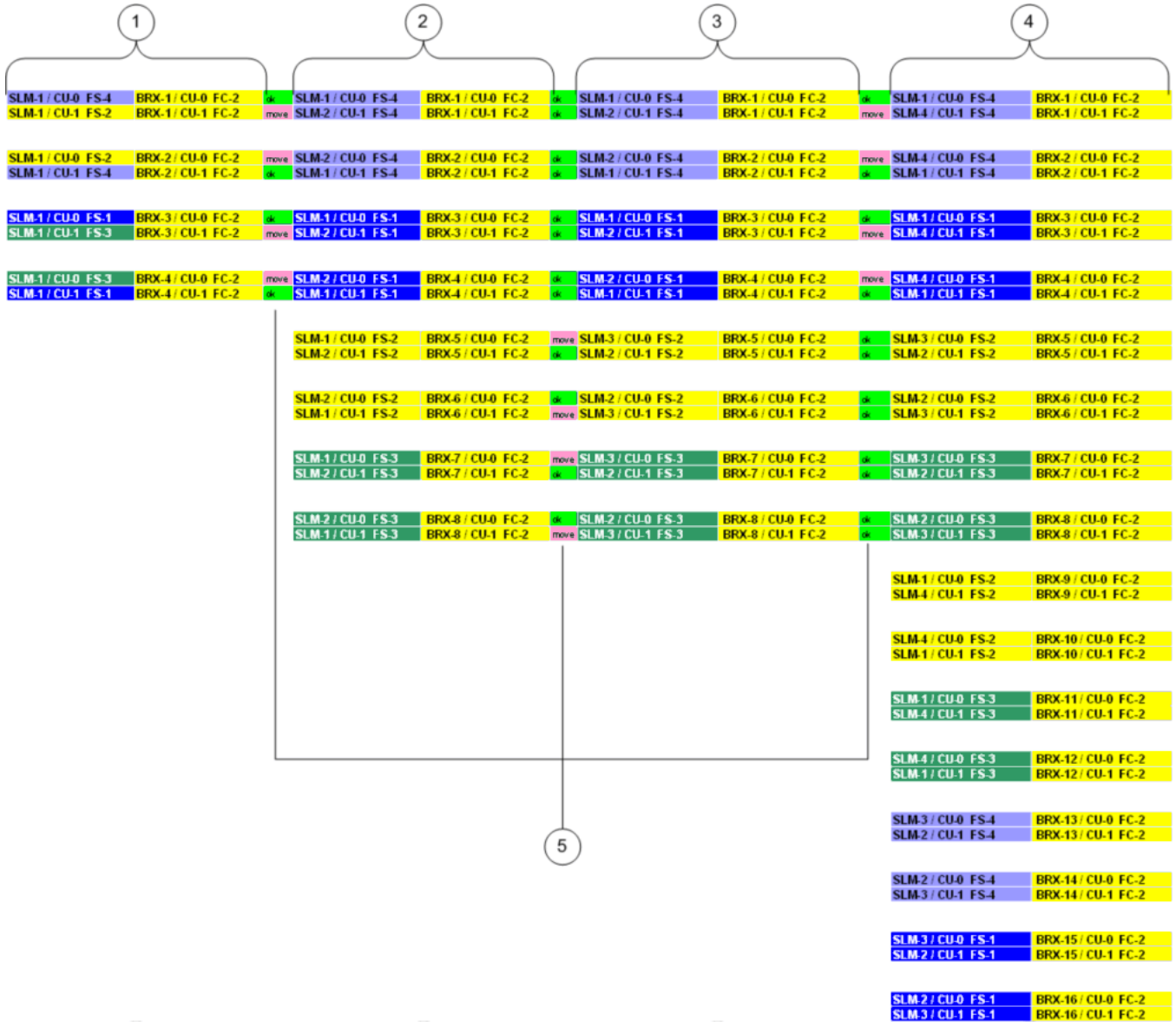
Table 69 Slammer cross connection configuration version 2 PIMs (continued)

Legend	
	1 First Slammer.
	2 Second Slammer.
	3 Third Slammer.
	4 Fourth Slammer.
	5 Move the red FC cables when expanding the system to the next larger configuration.

Note: When adding a fourth Slammer, make sure that the first Brick string that is directly attached to the new Slammer is a SATA Brick (version 2) or an FC RAID Brick (version 2). This practice helps to avoid an excess of radiated emissions and to comply with electro-magnetic (EMI) limits. Any existing SATA Brick (version 1) or FC RAID Brick (version 1) can cascade from the first Brick string of version 2 Bricks (SATA or FC RAID) attached to the new Slammer. The first Brick string must always be an SFP-SFP connection instead of an SFP-HSSDC2 hybrid connection.

Table 70 Swapping head-of-string Brick cables

Table 70 Swapping head-of-string Brick cables (continued)



Legend

1	First Slammer.
2	Second Slammer.
3	Third Slammer.
4	Fourth Slammer.
5	Move the red FC cables when expanding the system to the next larger configuration.

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