

Pillar Axiom 600



Hardware Installation Guide

ORACLE®

PILLAR AXIOM

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Table of Contents

Preface

Chapter 1 Before You Begin

Pillar Axiom 600 Series Components.	18
Customer-Supplied Equipment and Tools.	21
Safety Notice Conventions.	24
Configuration Limits for a Pillar Axiom 600 System.	25

Chapter 2 Set Up the Rack

About Component Inspection.	27
About Unpacking Rack-Mounted Systems.	29
Rack Position.	30
About Multiple Rack Connections.	30
Adjust the Leveling Legs.	35
About Rack Stability.	37
About Rail Installation.	41
Pilot Rail Kit Parts.	41
Install a Pair of Pilot Mounting Rails.	42
Slammer Rail Kit Parts.	46
Install a Pair of Slammer Mounting Rails.	47
Brick Rail Kit Parts.	49
Install a Pair of Brick Mounting Rails.	50
About Component Placement.	53
About Component Placement for One Slammer and SATA Bricks.	54
About Component Placement for One Slammer and FC Bricks.	56
About Component Placement for Two or Three Slammers and FC Bricks.	58
About Component Placement for Four Slammers and 64 Bricks.	60

Chapter 3 Install Components

About Power Distribution Unit Installation.	63
Install a 1U PDU.	64

Install a 2U PDU.	66
Install a Pilot Management Control Unit.	68
Pilot Versions.	70
Install a Slammer Storage Controller.	73
Install the Slammer Batteries.	75
Install a Brick Storage Enclosure.	77
Set the Identity of Bricks.	80
Replace a Brick Storage Enclosure.	82
Chapter 4 Connect Data Cables	
About Cabling a Pillar Axiom 600 System.	85
Cable Handling Tips.	88
Clean Fiber Optic Cables.	90
Cabling Practices for the Pillar Axiom 600 System.	91
About Cable Connections Between Two Racks.	100
About Cabling the SSF and PMI.	101
About Jumbo Frames for iSCSI and Ethernet.	103
Connect the Pilot to Your Management LAN.	104
Connect the Pilot CUs.	107
Connect a Slammer to the Data Network.	109
Chapter 5 Connect Power Cables	
Component Power Usage.	111
PDU Outlet Amperage Limits.	112
About Power Cabling.	114
Sample Power Cabling for One Slammer and Three Bricks.	114
Sample Power Cabling for One Slammer and 16 SATA Bricks.	117
Connect Power Cables.	120
Chapter 6 Complete the Installation	
Power On the System.	122
Verify the Front Status LEDs.	125
Verify the Back Status LEDs.	129
8 Gb/s Fiber Channel (FC) HBA LED Status.	132
10 Gb/s Ethernet HBA LED Status.	133
Attach the Bezels.	134
About HBA Driver and Firmware Installation (SAN Only).	136
About Switch Zone for HBA Set Up (SAN Only).	137
Attach the Rack Doors and Panels.	138
Attach the Rack Side Panels.	139

Chapter 7 Initial Configuration

Pre-Configuration Checklist.	140
Start the Graphical User Interface.	142
Rename the Bricks.	144
Troubleshoot a Failed Cable Connection.	146
About Pillar APM Installation (SAN Only).	147
Reset the Primary System Administrator Password.	148

Appendix A Slammer LED Startup Progress Codes

About LED Startup Codes.	149
About Slammer LED Codes.	150
Slammer LED Startup and Halt Codes.	151

Appendix B Safety Statements

About Safety Statements.	158
Warning Notices.	159
Electrical Warning in Other Languages.	159
Lightning Activity Warning.	162
Lightning Warning in Other Languages.	162
Power Supply Warning.	163
Power Supply Warning in Other Languages.	163
Main Power Disconnect Warning.	165
Power Disconnect Warning in Other Languages.	165
Installation Warning.	165
Power Disconnect Warning.	166
Warning Statement for Norway and Sweden.	167
Restricted Access Area Warning.	167
Restricted Access Warning in Other Languages.	167
Product Disposal Warning.	169
Product Disposal Warning in Other Languages.	169
Jewelry Removal Warning.	170
Jewelry Removal Warning in Other Languages.	170
Qualified Personnel Warning.	171
Warning Statement for Finland.	172
Warning Statement for Sweden.	173
Power Cabling Warning.	173
Power Cabling Warning in Other Languages.	173
Supply Circuit Warning.	174
Supply Circuit Warning in Other Languages.	174

Voltage Mismatch Warning.	175
Voltage Mismatch Warning in Other Languages.	175
SELV Circuit Warning.	176
SELV Circuit Warning in Other Languages.	177
Incorrect Connection Warning.	178
Incorrect Connection Warning in Other Languages.	179
Caution Notices.	180

Appendix C Pillar Axiom Hardware Specifications

About Hardware Specifications.	182
About Pillar Axiom 600 Hardware Specifications.	183
System Power Requirements.	183
System Environmentals.	184
System Regulatory Agency Compliance.	186
System Packaging and Transportation.	191
System Warranty.	191
About Pilot Hardware Specifications.	192
Pilot Dimensions and Weight.	192
Pilot Power Characteristics.	192
Pilot Regulatory Agency Compliance.	193
Pilot Packaging and Transportation.	194
About Slammer Hardware Specification.	195
Slammer Dimensions and Weight.	195
Slammer Power Characteristics.	195
Slammer Regulatory Agency Compliance.	196
Slammer Packaging and Transportation.	196
Cable Length Limits for SAN Fibre Channel Connections.	197
Cable Length Limits for NAS Ethernet Connections.	197
About Brick Hardware Specification.	199
Brick Dimensions and Weight.	199
Brick Power Characteristics.	199
Brick Regulatory Agency Compliance.	200
Brick Packaging and Transportation.	201
Pillar Axiom 600 PDU Hardware Specification.	202
Pillar Axiom Rack Hardware Specification.	204

Appendix D Expansion of a Pillar Axiom 600 System Configuration

About Expanding a Pillar Axiom 600 Configuration.	207
Complete the Brick Pre-Installation Checklist.	207

Complete the Slammer Pre-Installation Checklist.	208
About Additional Brick Storage Enclosures.	209
Add a New Brick Storage Enclosure.	210
Verify a Newly Added Brick.	213
About Additional Slammer Storage Controllers.	214
Add a New Slammer Storage Controller.	215
Storage System Fabric (SSF) Cabling Reference.	217
Appendix E Replacement of a Slammer Storage Controller	
About Replacing a Slammer.	220
Complete the Slammer Replacement Prerequisites.	221
About Cloning a Replacement Slammer.	222
Verify the Cloning of the Slammer.	224
Modify the Cloned Slammer.	226
Replace the Slammer.	229
Index.	231

List of Figures

Figure 1 Floor plan for rack installation. 30

Figure 2 Sample 42U side panels. 31

Figure 3 Location of frame corners. 32

Figure 4 Connection bracket installation. 33

Figure 5 Roof baying plate attachment. 34

Figure 6 Adjacent anchor bolts at the front of the racks. 35

Figure 7 Rack leveling leg locations. 36

Figure 8 Leveling leg adjustment. 36

Figure 9 Attach anchor bolts to rack. 38

Figure 10 Position anti-tip brackets. 38

Figure 11 Secure anti-tip brackets to the floor. 39

Figure 12 Stabilizer plate attached to the rack base and floor. 40

Figure 13 Scope hook attachment. 43

Figure 14 Positioning spacer bar. 44

Figure 15 Pilot rail front attachment. 45

Figure 16 Scope hook attachment. 48

Figure 17 Slammer rails installed in rack. 49

Figure 18 Scope hook attachment. 51

Figure 19 2U rack rails installed in rack. 52

Figure 20 42U racks containing one Slammer and up to 32 SATA Bricks. 55

Figure 21 Fully loaded 42U rack for one Slammer and 16 FC Bricks. 57

Figure 22 Fully loaded 42U racks for three Slammers.	59
Figure 23 Fully loaded 42U racks for four Slammers and 64 Bricks.	61
Figure 24 Snap-in cage nut.	64
Figure 25 Securing a 1U PDU in the bottom of a rack.	65
Figure 26 An installed PDU at the bottom of the rack.	65
Figure 27 Snap-in cage nut.	66
Figure 28 2U PDU layout and ear locations.	66
Figure 29 Insertion of the upper Pilot CU.	69
Figure 30 Pilot CU (1450-00259-XX) back view.	70
Figure 31 Pilot CU (1450-00179-XX) back view.	71
Figure 32 Pilot CU (1450-00164-XX) Intel.	71
Figure 33 Pilot CU (1450-00170-XX) MSI, non-RoHS.	72
Figure 34 DC Pilot CU (1450-00268-XX and 1030-00005-XX).	72
Figure 35 Insertion of a Slammer.	74
Figure 36 Slammer bezel removal.	75
Figure 37 Slammer battery insertion.	76
Figure 38 Insertion of a Brick.	77
Figure 39 Brick ears.	78
Figure 40 Brick front with the bezel removed.	78
Figure 41 ES module location.	80
Figure 42 Brick connections in strings.	86
Figure 43 Pillar Axiom 600 back-end cabling overview.	87
Figure 44 Pilot management cables.	105
Figure 45 Pilot CU cabling.	107
Figure 46 Slammer network cables.	110
Figure 47 Pulizzi TPC2105-1 outlet amperage limits.	112
Figure 48 Pulizzi TPC2104 outlet amperage limits.	113
Figure 49 Pulizzi PC3365 outlet amperage limits.	113

Figure 50 Sample power cabling scheme with 230V power, 20A PDU.	115
Figure 51 Sample power cabling scheme with 115V on a TCP2105-1 PDU.	116
Figure 52 Sample power cabling scheme with 230V (one circuit shown).	118
Figure 53 Sample power cabling scheme with two 208V single phase PDU.	119
Figure 54 Secure Slammer batteries.	122
Figure 55 Turn on Brick power.	123
Figure 56 Turn on Pilot power.	123
Figure 57 Turn on PDU power.	124
Figure 58 Pilot bezel LEDs.	125
Figure 59 DC power switch at the back of the Pilot	126
Figure 60 Slammer bezel LEDs.	127
Figure 61 Brick bezel LEDs.	128
Figure 62 Pilot connectivity LEDs.	129
Figure 63 Slammer connectivity LEDs.	130
Figure 64 Brick LEDs.	131
Figure 65 Bezel hook on the right side of the bezel.	134
Figure 66 Press the ejector tabs to secure the bezel.	135
Figure 67 Logical Brick names on the GUI.	144
Figure 68 Maximum tilt angles for stationary Pillar Axiom 42U racks.	206

List of Tables

Table 1 Oracle resources. 15

Table 2 Typography to mark certain content. 16

Table 3 Typography to mark command syntax. 17

Table 4 Pillar Axiom 600 series components. 18

Table 5 Required tools. 21

Table 6 Required equipment and supplies. 22

Table 7 Brick configuration limits for the Pillar Axiom 600 system. 25

Table 8 Pilot rail kit parts 41

Table 9 Slammer rail kit parts 46

Table 10 Brick rail kit parts 50

Table 11 Cabling principles for system level issues. 91

Table 12 Cabling principles for system size related issues. 92

Table 13 Cabling principles for Slammer connection issues. 93

Table 14 Cabling principles for Brick connection issues. 94

Table 15 Cabling principles for mixing Brick types. 95

Table 16 Cabling principles for FC Expansion Bricks. 95

Table 17 Cabling principles for Brick order on strings. 96

Table 18 Cabling principles for Brick balance on strings. 96

Table 19 Cabling principles for Brick adds on strings. 97

Table 20 Pillar Axiom 600 electrical requirements. 111

Table 21 8 Gb/s FC HBA LED status. 132

Table 22 10 Gb/s Ethernet HBA LED status.	133
Table 23 Global system parameters.	140
Table 24 Slammer LED boot block status codes.	151
Table 25 Slammer LED boot block error codes.	152
Table 26 Slammer LED RAM loader codes.	154
Table 27 Slammer LED states after POST process completion.	156
Table 28 Electrical warning in other languages	159
Table 29 Lightning warning in other languages.	162
Table 30 Power supply warning in other languages.	163
Table 31 Power disconnect warning in other languages.	165
Table 32 Installation warning in other languages.	166
Table 33 Warnings for Norway and Sweden.	167
Table 34 Restricted access warning in other languages.	167
Table 35 Product disposal warning in other languages.	169
Table 36 Jewelry removal warning in other languages.	170
Table 37 Qualified personnel warning in other languages.	171
Table 38 Warning statement for Finland.	172
Table 39 Warning statement for Sweden.	173
Table 40 Power cabling warning in other languages.	173
Table 41 Supply circuit warning in other languages.	174
Table 42 Voltage mismatch warning in other languages.	175
Table 43 SELV circuit warning in other languages.	177
Table 44 Connection warning in other languages.	179
Table 45 Basic components of a Pillar Axiom 600 system.	183
Table 46 System altitude specifications.	184
Table 47 System temperature and humidity specifications.	184
Table 48 System acoustics specification.	185
Table 49 System random vibration specifications.	185

Table 50 Safety, quality, and environmental standards.	186
Table 51 Electromagnetic (EM) emissions and immunity.	189
Table 52 Pilot dimensions and weight (both control units).	192
Table 53 Pilot power characteristics (for each control unit).	192
Table 54 Pilot safety and quality standards.	194
Table 55 Slammer dimensions and weight.	195
Table 56 Slammer power characteristics.	195
Table 57 Slammer safety and quality standards.	196
Table 58 Cable lengths limitations on Slammer FC ports.	197
Table 59 Cable lengths limitations (10 Gb/s optical short range).	198
Table 60 Cable lengths limitations (Passive copper cables 10 Gb/s direct attach).	198
Table 61 Brick dimensions and weight.	199
Table 62 Brick power characteristics.	199
Table 63 Brick safety and quality standards.	200
Table 64 PDU specifications.	202
Table 65 Rack specifications for a Pillar Axiom 600 system.	204
Table 66 Slammer cross connection configuration version 1 PIMs.	217
Table 67 Slammer cross connection configuration version 2 PIMs.	218
Table 68 Swapping head-of-string Brick cables.	219

Preface

Related Documentation

- *Pillar Axiom Glossary*
- *Pillar Axiom System Architecture Overview*
- *Pillar Axiom 600 Service Guide*
- *Pillar Axiom 600 SSF Cabling Reference*
- *Pillar Axiom Customer Release Notes*

Oracle Contacts

Table 1 Oracle resources

For help with...	Contact...
Support	http://www.oracle.com/support/index.html
Training	https://education.oracle.com
Documentation	<ul style="list-style-type: none"> • Oracle Technical Network: http://www.oracle.com/pls/topic/lookup?ctx=pillardocs • From the Pillar Axiom Storage Services Manager (GUI): Support > Documentation • From Pillar Axiom HTTP access: http://system-name-ip/documentation.php where <i>system-name-ip</i> is the name or the public IP address of your system.
Documentation feedback	http://www.oracle.com/goto/docfeedback

Table 1 Oracle resources (continued)

For help with...	Contact...
Contact Oracle	http://www.oracle.com/us/corporate/contact/index.html

Typographical Conventions

Table 2 Typography to mark certain content

Convention	Meaning
<i>italics</i>	Within normal text, words in italics indicate one of the following: <ul style="list-style-type: none"> • A reference to a book title • New terms and emphasized words • Command variables
<code>monospace</code>	Indicates one of the following, depending on the context: <ul style="list-style-type: none"> • The name of a file or the path to the file • <i>Output</i> displayed by the system on the command line
monospace (bold)	<i>Input</i> provided by an administrator on the command line.
>	Indicates a menu item or a navigation path in a GUI. For example, “Click Storage > Clone LUNs ” means to click the Clone LUNs link on the Storage page in the 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.

Command Syntax Conventions

Table 3 Typography to mark command syntax

Typographic symbol	Meaning
[]	Square brackets. Delimits an optional command parameter or a set of optional command parameters.
{ }	Curly braces. Delimits a set of command parameters, one of which must be selected.
	Vertical bar. Separates mutually exclusive parameters.
...	Ellipsis. Indicates that the immediately preceding parameter or group of parameters can be repeated.
monospace	Indicates the name of a command or the name of a command option (sometimes called a <i>flag</i> or <i>switch</i>).
<i>italic</i>	Indicates a variable for which you need to supply a value.

Command parameters that are *not* enclosed within square brackets ([]) are required.

Important! The above symbols (and font styling) are based on the IEEE Std 1003.1-2004 standard. These symbols are used in the command syntax only to clarify how to use the command parameters. Do not enter these symbols on the command line.

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	Part Numbers	Description
Brick storage enclosures	1000-00023-XX	SSD Brick with thirteen 50 GB SSDs
	1000-00029-XX	SSD Brick with thirteen 200 GB SSDs
	1001-00010-XX	Fiber Channel (FC) Brick with twelve 300 GB 15000 rpm 3.5-inch FC HDDs
	1001-00011-XX	FC Brick with twelve 600 GB 15000 rpm 3.5-inch FC HDDs
	1000-00021-XX	SATA Brick with thirteen 1 TB 7200 rpm 3.5-inch SATA HDDs
	1000-00028-XX	SATA Brick with thirteen 2 TB 7200 rpm 3.5-inch SATA HDDs
Slammer storage controllers	1400-00102-XX and 1450-00169-XX (NIM)	Pillar Axiom NAS Slammer with eight 1 Gb/s copper ports and 48 GB cache with HEPS, rack mounted
	1400-00102-XX and 1450-00168-XX (NIM)	Pillar Axiom NAS Slammer with eight 1 Gb/s optical ports and 48 GB cache with HEPS, rackmounted

Table 4 Pillar Axiom 600 series components (continued)

Product name	Part Numbers	Description
	1400-00102-XX and 1450-00261-XX (NIM)	Pillar Axiom NAS Slammer with four 10 Gb/s copper ports and 48 GB cache with HEPS, rack mounted
	1400-00102-XX and 1450-00261-XX (NIM)	Pillar Axiom NAS Pillar Axiom with four 10 Gb/s optical ports and 48 GB cache with HEPS, rackmounted
	1400-00102-XX and 1450-00132-XX (NIM)	Pillar Axiom iSCSI Slammer with four 1 Gb/s copper ports and 48 GB cache with HEPS, rackmounted
	1400-00102-XX and 1450-00132-XX (NIM)	Pillar Axiom FC SAN Slammer with four 4 Gb/s FC ports and 48 GB cache with HEPS, rackmounted
	1400-00102-XX and 1450-261-XX (NIM)	Pillar Axiom FC SAN Slammer with four 8 Gb/s FC ports and 48 GB cache with HEPSU, rack-mounted (for factory installation)
Pilot management controllers	1450-00268-XX	Pillar Axiom Pilot with 4 GB memory, rackmounted
	1450-00259-XX	Pillar Axiom Pilot with 2 GB memory, rackmounted
Power Distribution Units	1475-00076-XX	PDU with mounting brackets, 20 A (for factory installation)
	7045690	PDU with power cord assembly (NEMA)
	7045698	PDU with power cord assembly (IEC)
	7064624	PDU with power cord assembly (Australia)

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 500S7—Brick, SATA, 13 x 500 GB, 7200 RPM drives, HSF
- BRX 500-146F15R
- BRX 500-146F15E
- BRX 300-F15E
- BRX 450-F15E
- BRX 300F15R
- BRX 450F15R
- BRX 2000S5
- SLM 600 (Series 1, Series 2)
- PDU 500-1P20A—115 to 230 V, 20 A, 1 ϕ
- PDU 500-1P30A—115 to 230 V, 30 A, 1 ϕ
- PDU 500-3P30A—115 V, 30 A; (115/208)
- PDU 500-3P16A—230 V, 16 A, IEC; (230/400)
- RACK500-42U—42U cabinet assembly with doors

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 (13 millimeters) 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.
	Three IP addresses and optional hostnames	For access to the Pilot management ports.
	Two Category 5 100BaseT cables	Connect Pilot management ports to the Ethernet switch.
	<p>For each NAS Slammer, we need 1 GbE cables (that can be supplied by the customer) or 10 GbE cables (that can be supplied by Oracle).</p> <ul style="list-style-type: none"> • For copper GbE: Cables are supplied by Oracle. • For optical GbE: 50/125 optical cables can be supplied by the customer. 	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 or 10 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 must initially be on IP subnet 10.0.0.xx (either 10.0.0.1 or 10.0.0.5 or higher),	Connect to the Pillar Axiom Storage Services Manager to

Table 6 Required equipment and supplies (continued)

On hand?	Item	Purpose
	be capable of supporting Java, and also have a browser.	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](#)

Configuration Limits for a Pillar Axiom 600 System

The minimum and maximum configurations for the Pillar Axiom 600 system is summarized in the following table:

Table 7 Brick configuration limits for the Pillar Axiom 600 system

Number of Slammers	Minimum number of Bricks		Maximum number of Brick strings	Maximum number of Bricks
	Supported	Recommended		
1	1	3	4	32
2	4	5	8	64
3	6	8	8	64
4	8	8	16	64

Note: The maximum number of SSD Bricks depends on the number of Slammers:

- 1 Slammer = 8 Bricks
- 2 and 3 Slammers = 16 Bricks
- 4 Slammers = 32 Bricks

Note: The maximum number of Bricks in any string is 8.

For Fiber Channel (FC) Bricks:

- Version 1 FC Bricks are available as FC RAID Bricks and FC Expansion Bricks. Each Version 1 FC RAID Brick supports the attachment of a single Version 1 Expansion Brick.

Note: Version 2 FC Bricks do not have an FC Expansion Bricks option.

- Pillar Axiom systems have a limit of 32 FC Bricks, regardless how many Slammers are in the system.
- A given Brick string can contain up to four FC Bricks (RAID or Expansion). Maximum number of FC Expansion Bricks in any string, however, is two.

For a complete list of the rules for configuring FC, SATA, and SSD Bricks, see the appropriate *Pillar Axiom SSF Cabling Reference* for your Pillar Axiom system.

CHAPTER 2

Set Up the Rack

About Component Inspection

Each Pillar Axiom 600 system is built to a customer's specifications. Check the components you received against the packing slip (or bill of lading), which lists everything that was shipped. Note how many pallets or containers you received, in case the missing components are in a container that simply has not yet arrived.

Customer can order Pillar Axiom systems to be either rack-ready or rack-mounted. Rack-ready systems require that the components (Slammers, Bricks, PDUs and the Pilot) are mounted in pre-existing customer owned racks. Rack-mounted systems are shipped with the components pre-installed in the rack. In case of multi-rack systems, the connections between racks are cabled at the customer site.

Rack-mounted systems are considerably heavier than the rack-ready systems and can weigh upto 1800 pounds due to the additional weight of the components, cables and the pallet.

Note: The weight of the Pillar Axiom rack with panels is 333 pounds (151 kilograms). The weight of the Pillar Axiom rack with the panels and the pallet is 374 pounds (169 kilograms).

 **Caution** A Brick weighs up to 61 pounds (28 kilograms). For safe handling, use two people to lift it.

 **Caution** A Slammer weighs 98 pounds (45 kilograms). For safe handling, use two people to lift it.



Caution

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

- The minimum requirement is an anti-static wrist strap connected to a hard ground. We recommend that you remove components from their packaging and place them on an ESD-qualified table 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 within 72 hours.
- 3 Record all damage.
- 4 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 Oracle racks be used to install Pillar Axiom 600 hardware components. When using non-Oracle 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-Oracle 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-Oracle rack, it should be similar.

Related concepts

- [About Unpacking Rack-Mounted Systems](#)
- [About Component Placement](#)

About Unpacking Rack-Mounted Systems

Rack-mounted systems are considerably heavier than the rack-ready systems and can weigh up to 1800 pounds due to the additional weight of the components, cables and the pallet.

Refer to the unpacking instructions included with the system when you remove the rack from the shipping carton. After unpacking the rack, follow local laws and guidelines to recycle the packaging properly.

 **Caution** Carefully unpack the rack from the packaging and the shipping pallet. Always use qualified personnel to unpack and install the rack.

 **Caution** Rocking or tilting the rack can cause it to fall over and might cause serious injury or death. Gravity can cause the rack to roll down the ramp. For a full rack, a sideways force of approximately 150 pounds can be generated when trying to accelerate the rack. This force must be resisted to keep the rack in control. Otherwise, the rack and the pallet can tip over.

When moving a heavy rack-mounted system to the installation site, use steel tracks to guide the system on to the floor. We recommend that a minimum of two people are used to move the rack, with one person pushing from the front and one person pulling at the back to help guide the rack. When transporting configured racks from one location to the other, move them at a speed of 0.65 meters per second (2.13 feet per second) or slower. Carefully examine the transportation path and avoid obstacles such as doorways or elevator thresholds that can cause abrupt stops or shocks. Use ramps or lifts to avoid obstacles and enable a smooth transport.

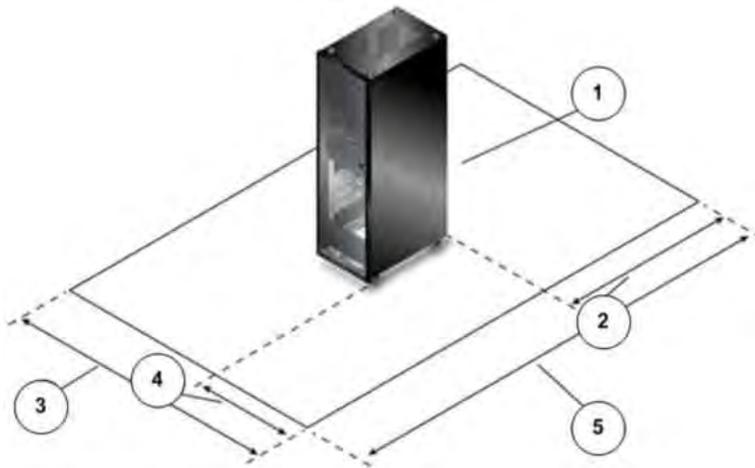
Related concepts

- [About Component Inspection](#)

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 Oracle racks, you can skip this section and proceed to adjust the leveling legs.

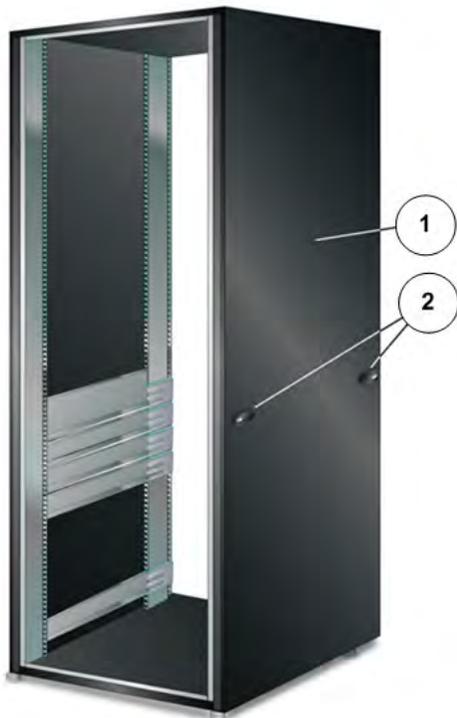
Related tasks

- [Adjust the Leveling Legs](#)

Prepare the Racks

To create a bay of Oracle 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.

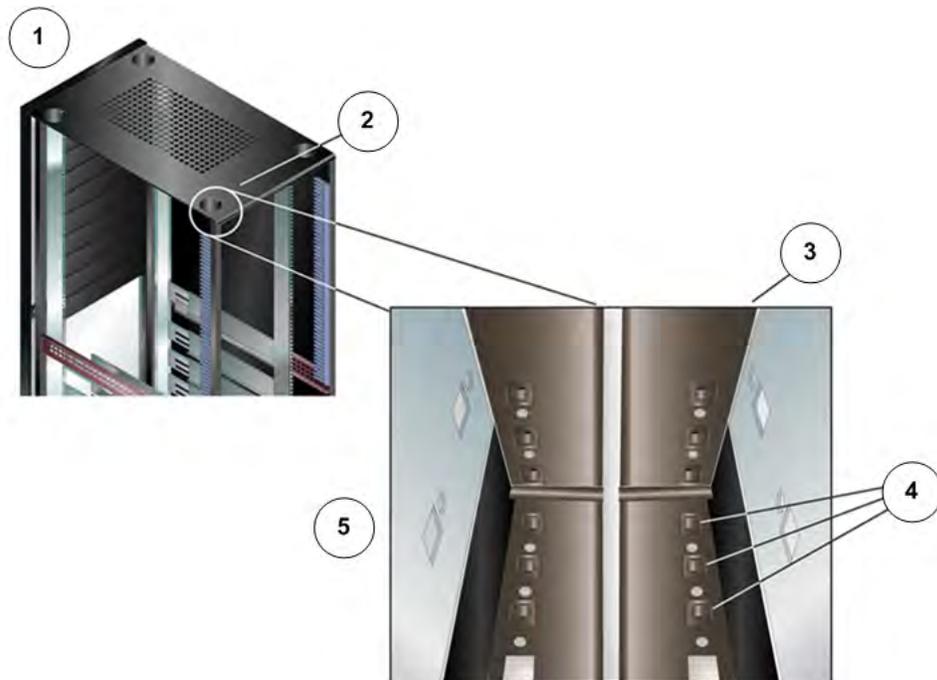
Attach the Connection Bracket

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

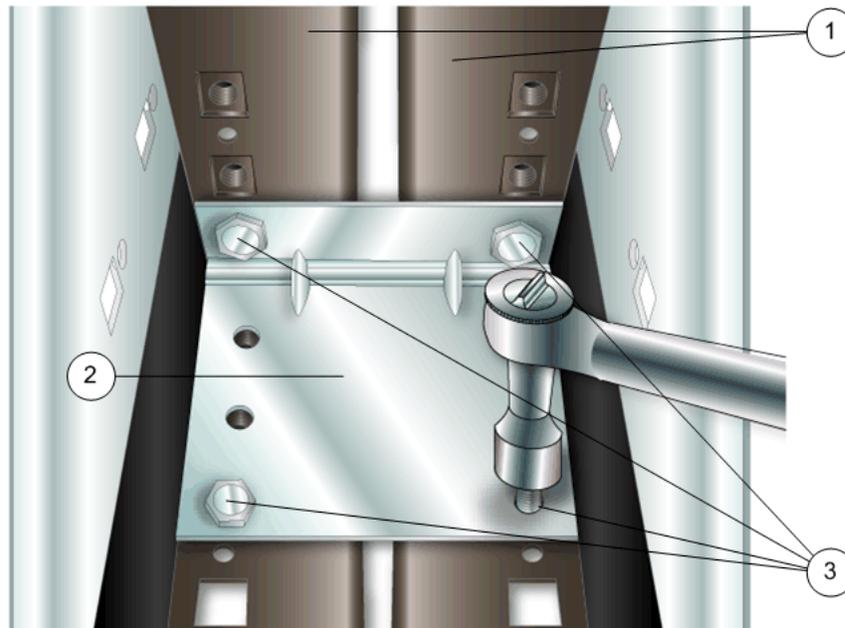


Legend

-
- | | |
|---|--|
| 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.

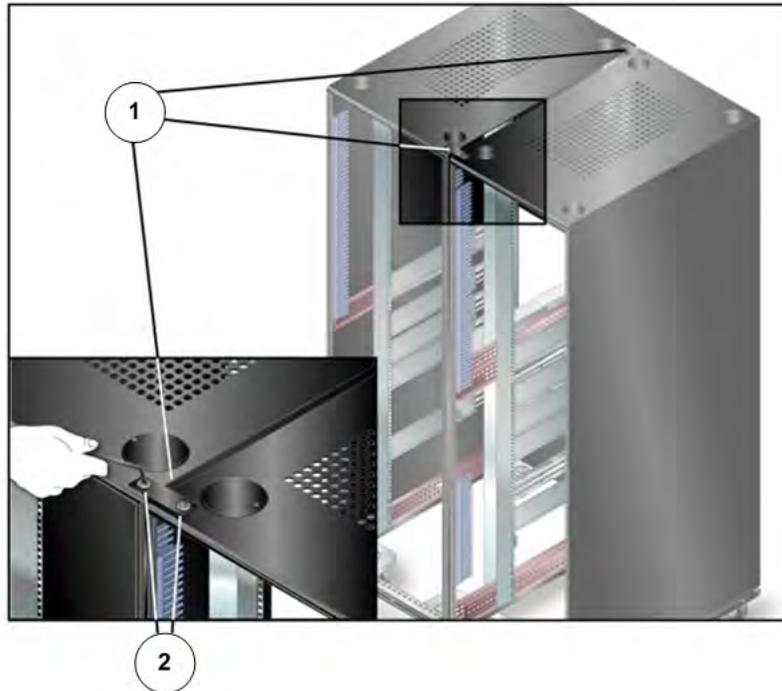
Attach the Baying Plates

Baying plates bind two Oracle 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

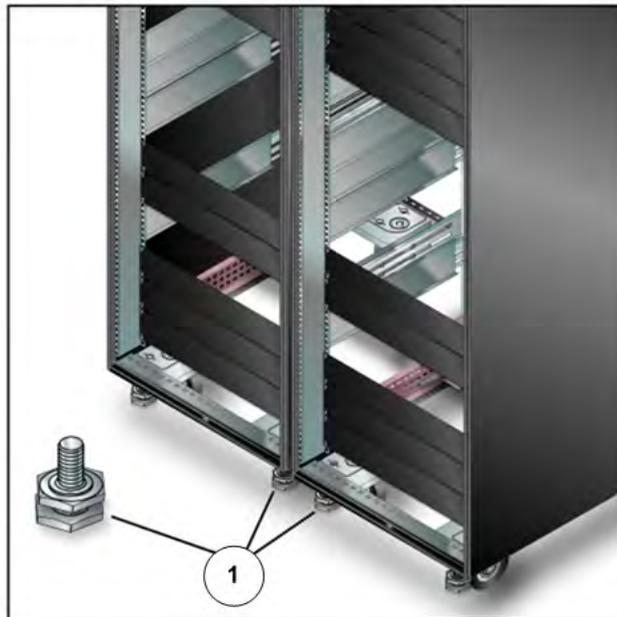


Legend

-
- | | |
|---|--------------------|
| 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

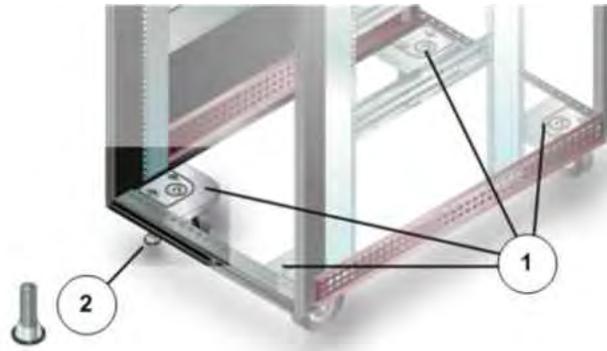
- [*Install a Stabilizer Plate \(Optional\)*](#)

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



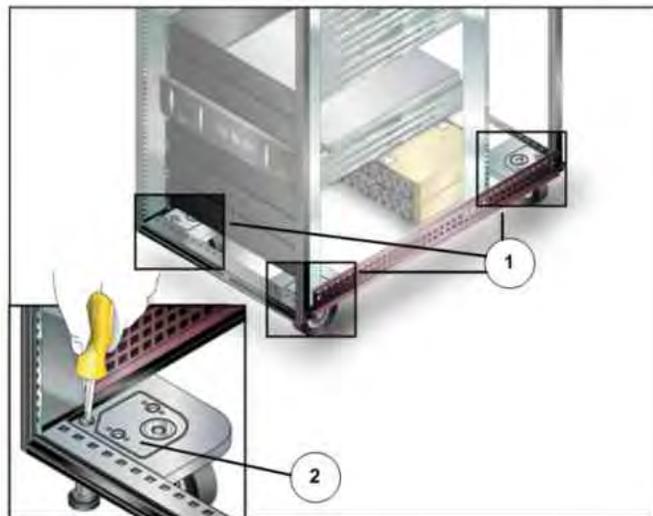
Legend

1 Castor brackets

2 Leveling legs are pre-installed in each castor 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 Castor 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 Oracle 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

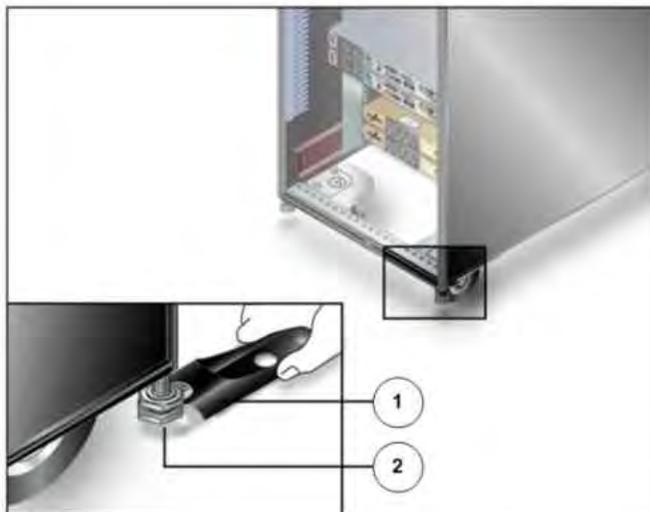
- 1 Screw the anchor bolt into the bottom outside corner of the rack frame until the bolt is seated.

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



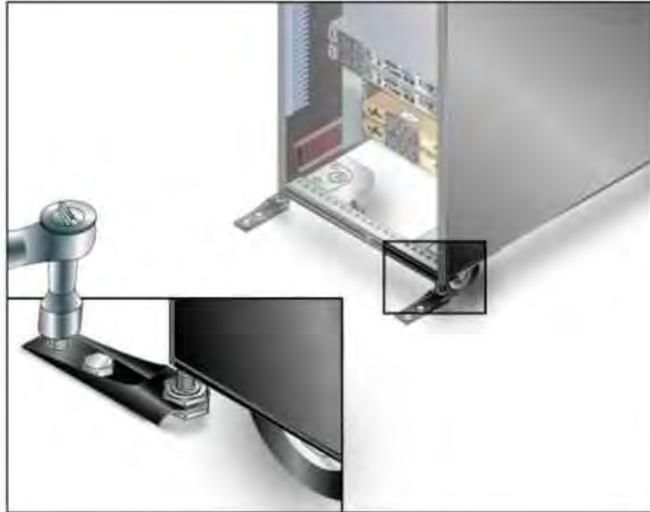
Legend

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.

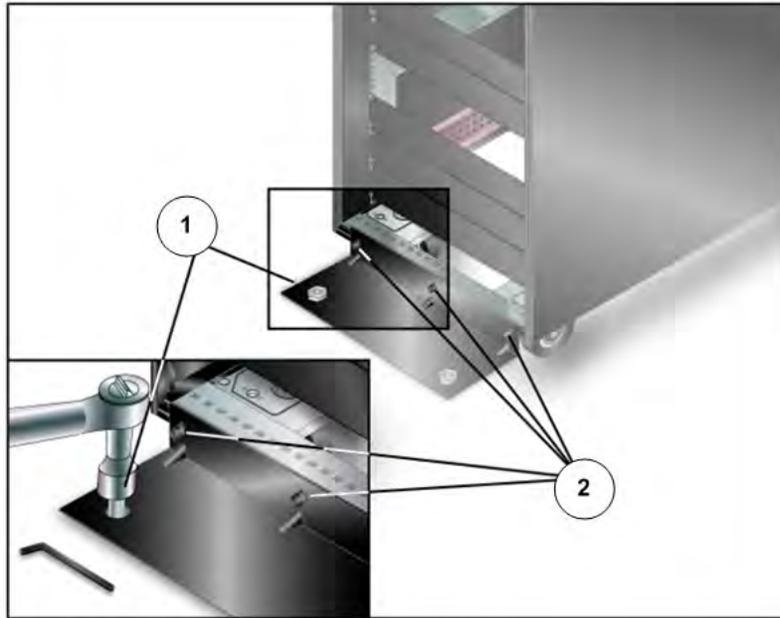
Install a Stabilizer Plate (Optional)

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 Rail Installation

Prior to their placement in the rack, rails need to be installed on all Pillar Axiom 600 components.

Following number of rails must be installed on the Pillar Axiom 600 components:

- One rail must be installed on the Pilot.
- 1 to 4 rails must be installed on the Slammers.
- 1 to 32 rails must be installed on the Fiber Channel (FC) Bricks.
- 1 to 64 rails must be installed on the SATA Bricks.

Related concepts

- [About Component Placement](#)

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:

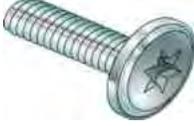
- One Pilot rail kit with rails and scopes pre-attached
- #20 Torx wrench
- Socket wrench

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

Table 8 Pilot rail kit parts

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

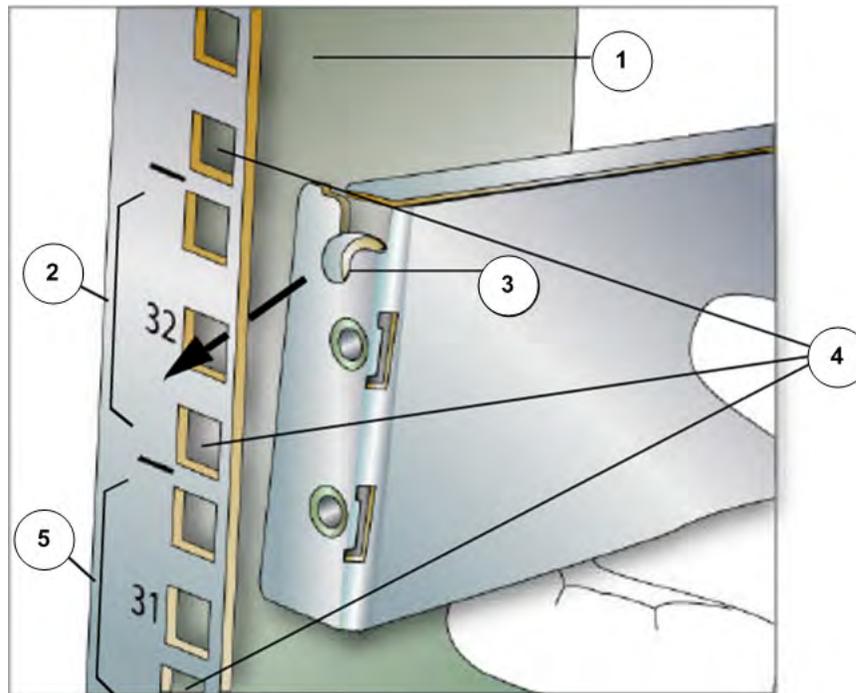
Table 8 Pilot rail kit parts (continued)

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

Install a Pair of Pilot Mounting Rails

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

Figure 13 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.

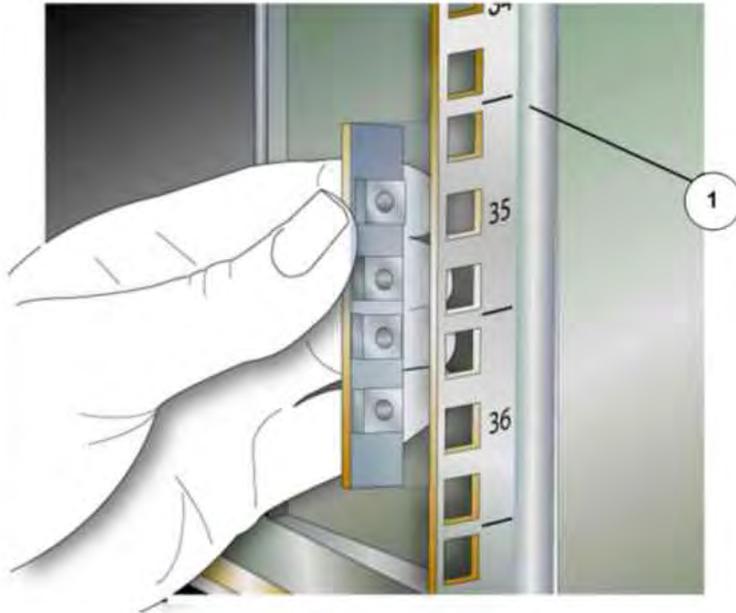
- 2 At the front of the rack, slide the rail scopes until the rail reaches the holes at the front.

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.

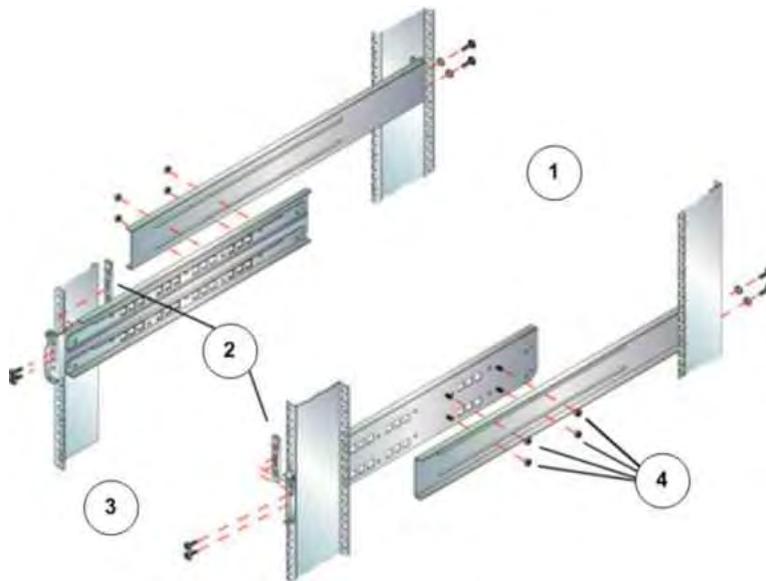
The following figure shows positioning a spacer for units 35 and 36.

Figure 14 Positioning spacer bar



Legend 1 Rack unit boundary

Figure 15 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:

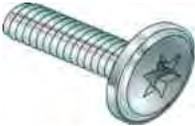
- One Slammer rack rail kit with rails and scopes pre-attached
- #20 Torx wrench
- Socket wrench

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

Table 9 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

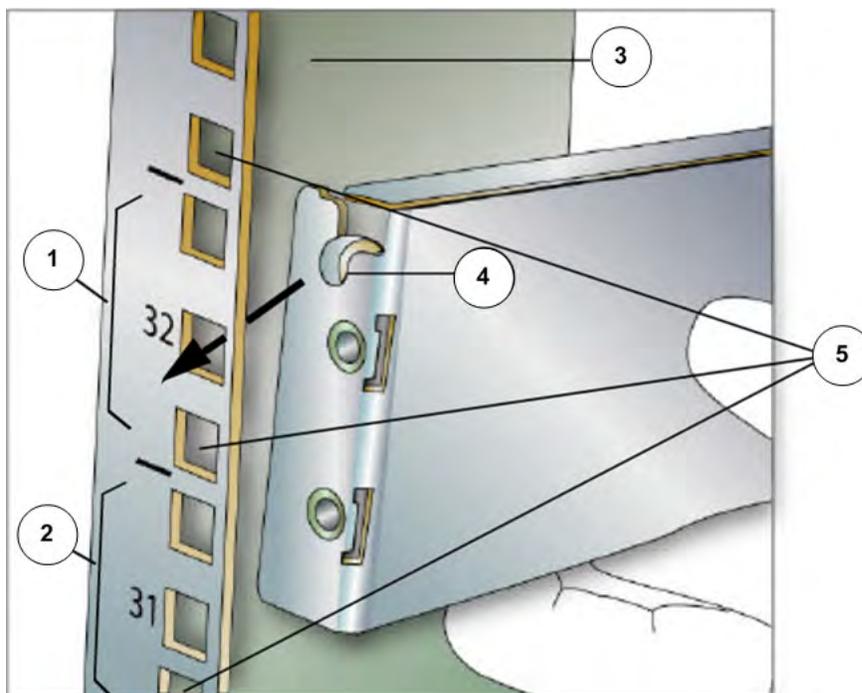
Table 9 Slammer rail kit parts (continued)

Component	Drawing (not to scale)	Quantity
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 16 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.

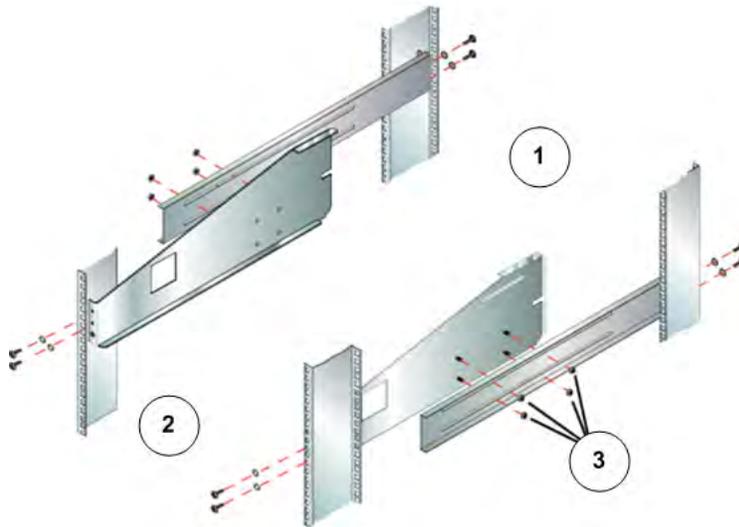
- 2 At the front of the rack, slide the rail scopes until the rail reaches the holes at the front.
- 3 While keeping the rail horizontal, place a spacer on a #20 Torx screw and screw it through the bottom hole in the front frame and into the rail.

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 17 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

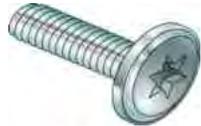
Verify that the rail kit contains all the parts listed in the table below.

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 10 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
10-32 x 1/2 inch Torx head (#20) screws 2500-01071-xx		10

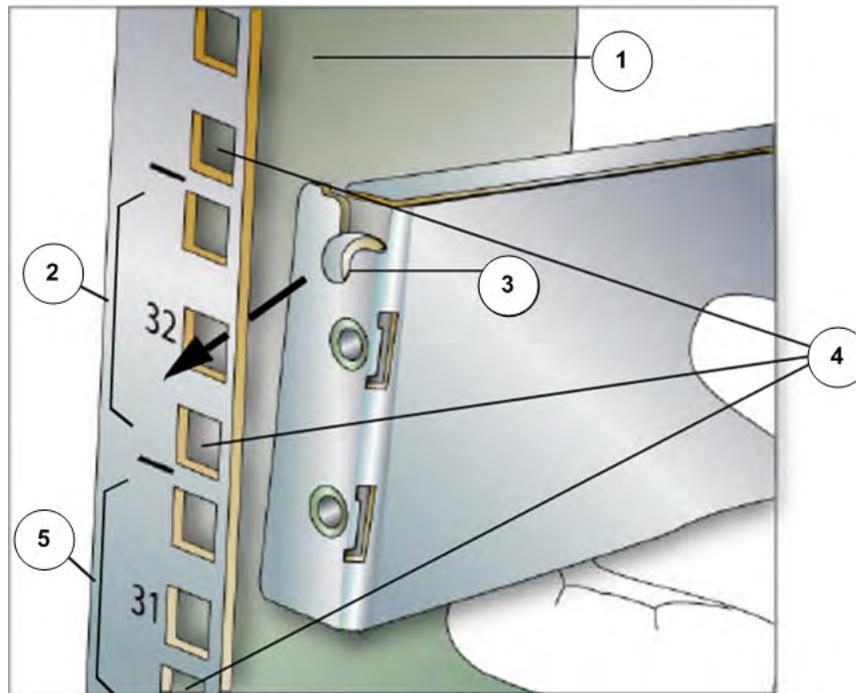
Related tasks

- [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 18 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 |

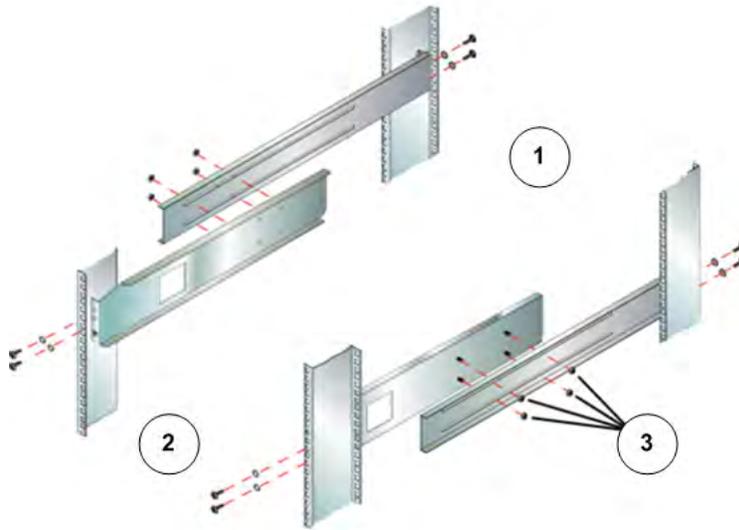
In the preceding figure, two labeled rack units, 31 and 32, are shown at the back of the rack.

- 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 19 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](#)

About Component Placement

For non-Oracle racks, all component rails must be installed before loading components into the racks. Oracle racks come with the component rails pre-installed. If you have Oracle racks, you can install the components right away.

The rack mounted systems are shipped to the customer site with all components (Bricks, Slammers, PDUs, and the Pilot) pre-installed and cabled into the racks.

For rack ready systems, 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.

Note: The component placement for rack ready and rack mounted systems are similar. However, when Bricks are added to a rack mounted system to expand the configuration into a multiple rack scenario, the Bricks must be added from the bottom of the rack.



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, we recommend that you change the logical name of the Brick to match the physical name.

Note: The physical name of a Brick is based on its physical position in the rack as defined in the *Pillar AxiomSSF Cabling Reference*. The logical name of the Brick is either assigned by the system or by an administrator using the graphical user interface (GUI). There is no relationship between the physical and logical name of the Brick unless the Bricks are renamed to match their physical position.

Related concepts

- [About Rail Installation](#)
- [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](#)
- [About Component Inspection](#)

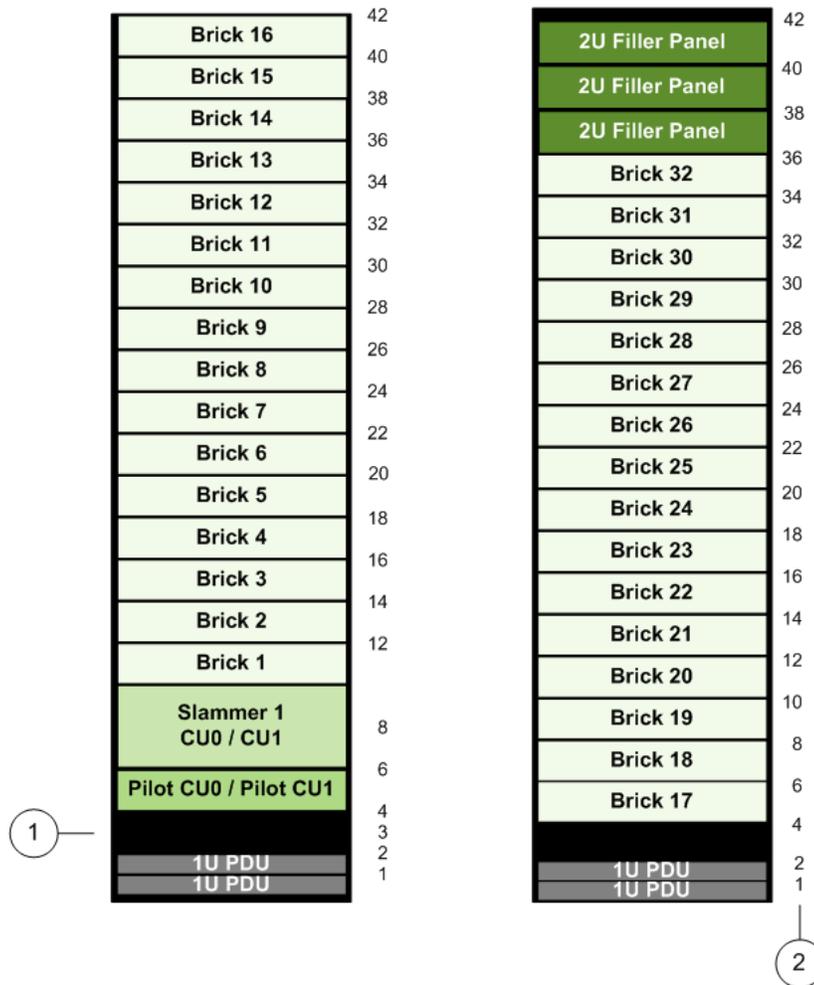
About Component Placement for One Slammer and SATA Bricks

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 20 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 in a single rack support 15 Fibre Channel (FC) Bricks due to rack limits.

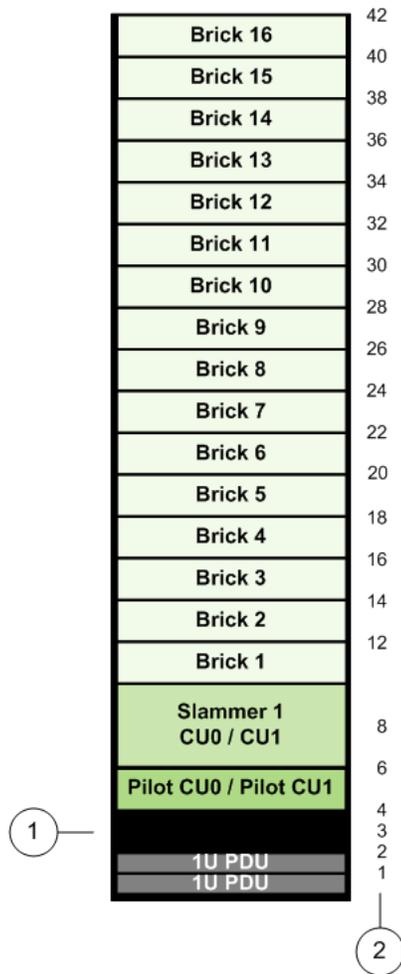
Note: Pillar Axiom 600 systems with one Slammer can support 16 FC Bricks but would require another rack.

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
- 16 FC Bricks

Figure 21 Fully loaded 42U rack for one Slammer and 16 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 22 Fully loaded 42U racks for three Slammers



Note: Optional filler panels can be placed at the top on all the racks.

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, install the two Slammers in the first rack (same as in a three Slammer configuration). The second rack is filled with Bricks from the bottom to the top.

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

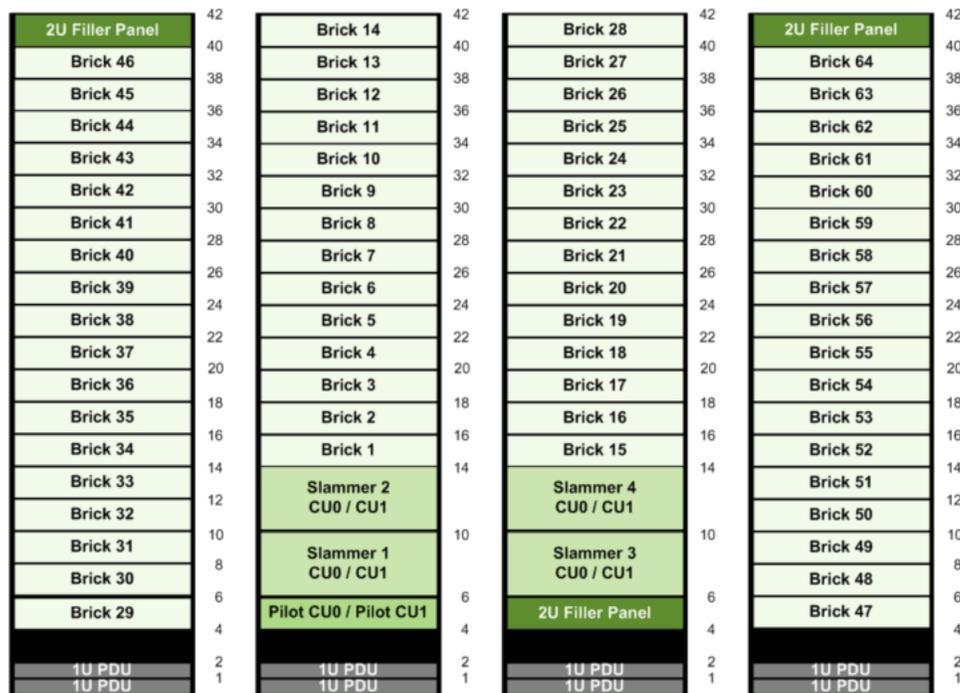
Pillar Axiom 600 systems with four Slammers support up to 64 Serial ATA (SATA) Bricks, or a combination of up to 32 FC Bricks and 32 SATA Bricks in a mixed system.

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 23 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](#)

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-Oracle 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. Oracle 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.)

Note: The 1U PDU is mounted on the rear rails of the cabinet and a 2U PDU is mounted on the front rails of the cabinet.

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

There are no rails for a PDU.

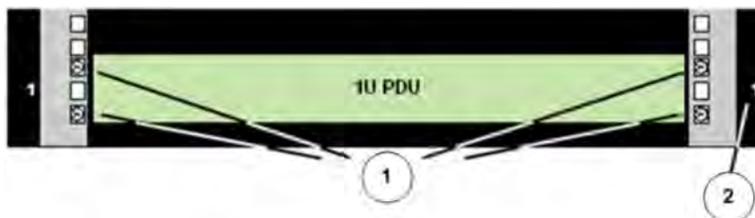
Figure 25 Securing a 1U PDU in the bottom of a rack



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.)

Note: The 2U PDU is mounted on the front rails of the cabinet and a 1U PDU is mounted on the rear rails of the cabinet.

- 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 Control Unit

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 cannot 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.



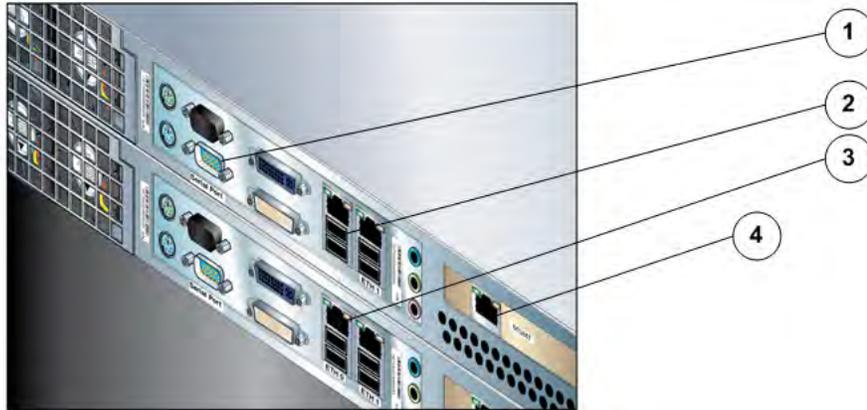
Warning

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 34](#) illustrate the different versions of the Pilot:

Figure 30 Pilot CU (1450-00259-XX) back view



Legend

-
- 1 Serial port

 - 2 USB ports

 - 3 Ethernet ports

 - 4 Management port

Note: USB ports can be used by USB drives to reset accounts and the network.

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

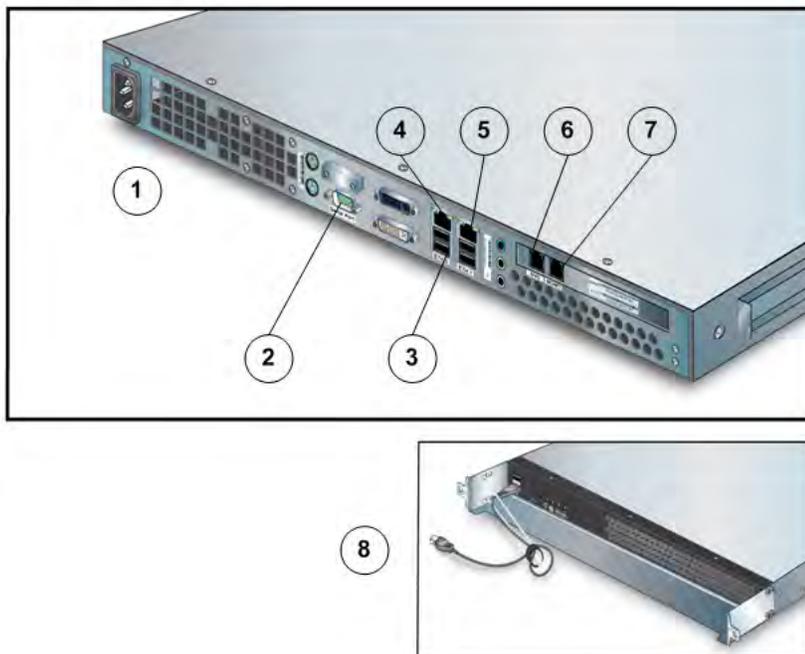
1 Back view of a Pilot CU	4 USB port
2 Front view of a Pilot CU	5 Ethernet port (ETH0)
3 Ethernet port (ETH1)	6 Management port

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 DC 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 is available in the enhanced 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 98 pounds (45 kilograms). For safe handling, use two people to lift it.



Warning

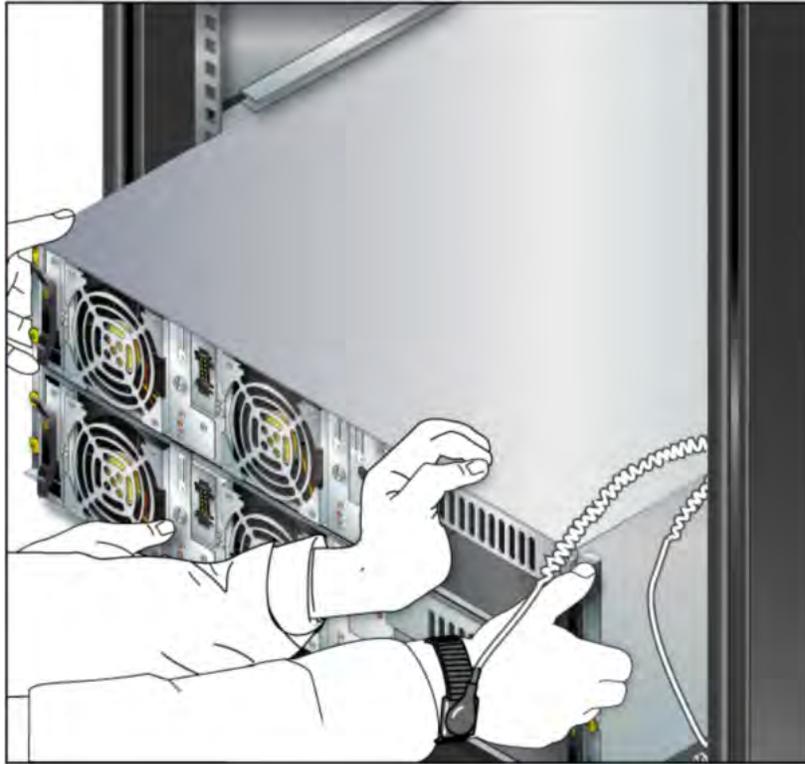
Ensure that component distribution in the rack is balanced. Follow the hardware placement map to ensure this balance. Uneven distribution can cause hazardous instability. The rack must have stabilization plates or anti-tip brackets installed so the rack does not tip when you install a component.

- 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*, order a new battery.
- 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 tools: Torx T20 screw driver, tie wraps, and velcro ties.

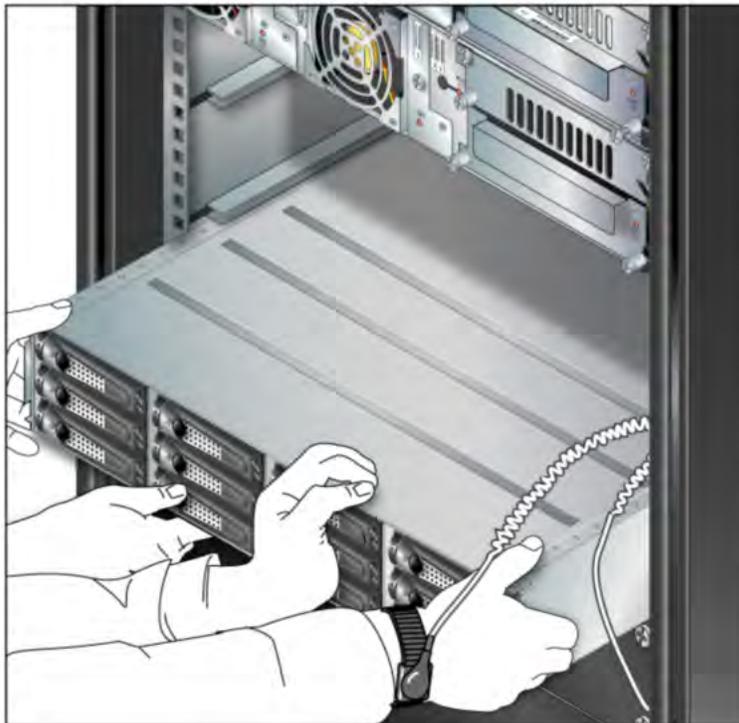
Note: Brick storage enclosures are packaged and shipped separately from the Pillar Axiom 600 system.

- 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 61 pounds (28 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

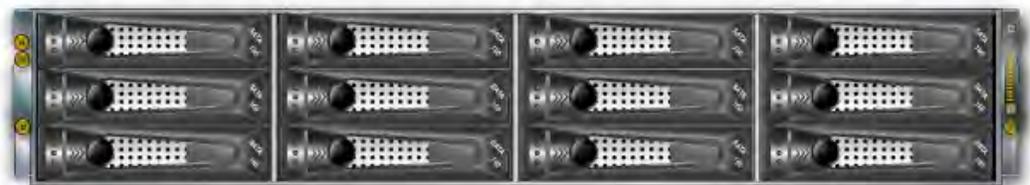
2 10-32 Torx screw

- 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.

Note: Do not re-seat a drive with power applied to the Brick. Re-seat the Brick before any power cables are attached. Otherwise, improperly seated drives might prevent the system from booting successfully.

- 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.

Each Brick contains a small digit switch on the ES Module in the rear of the Brick. This switch must be set to zero "0" for all serial ATA (SATA), solid state drive (SSD), and Fiber Channel RAID (FCR) Bricks. This switch must be set to one "1" for Fibre Channel Expansion (FCE) Bricks.



Caution

Improper setting of the digit switch that is used to set the Brick identity can cause problems when booting up the Pillar Axiom 600 system.

- 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*.
- Note:** Do not power on the Bricks until you are ready to power on the entire Pillar Axiom 600 system.
- 11 Power on individual components of the Pillar Axiom 600 system.

Related concepts

- [About Power Cabling](#)

Related tasks

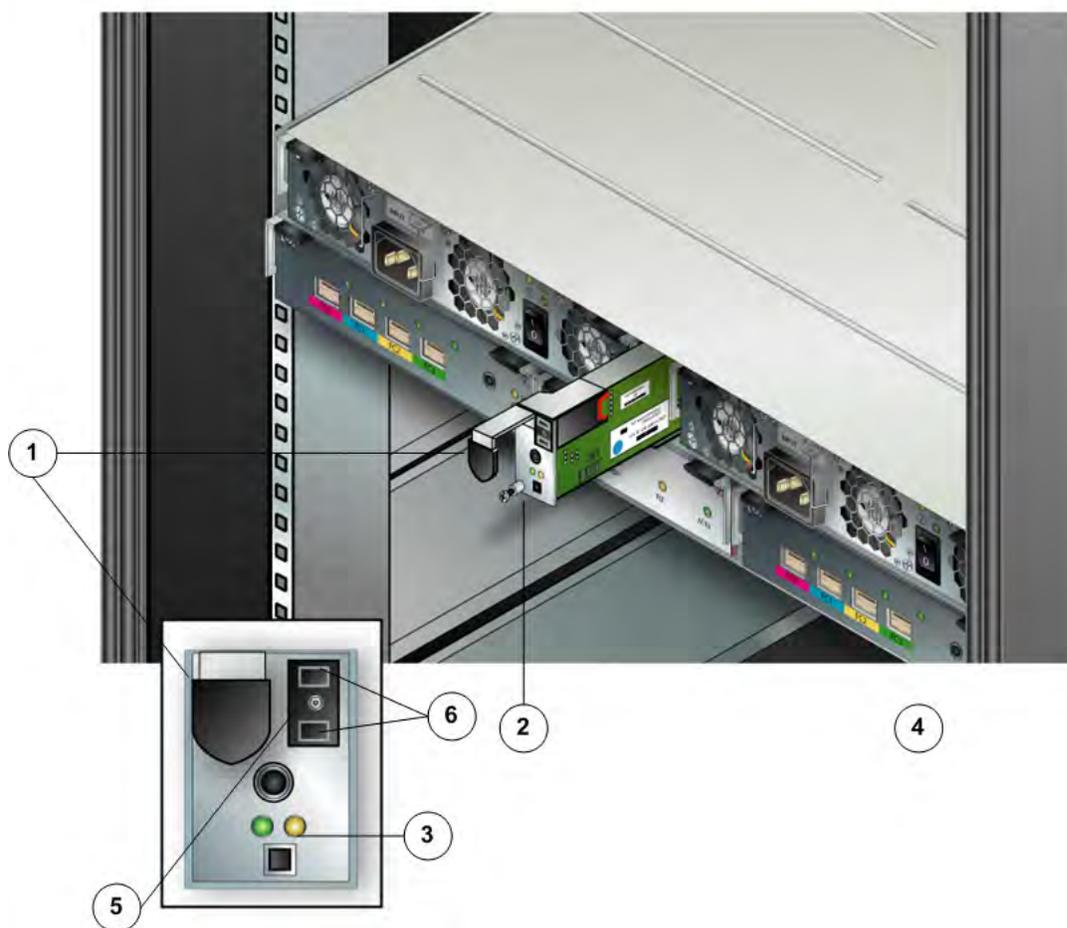
- [Set the Identity of Bricks](#)
- [Power On the System](#)
- [Connect Power Cables](#)
- [Install a Pair of Brick Mounting Rails](#)
- [Add a New Brick Storage Enclosure](#)

Set the Identity of Bricks

- 1 Locate the digital push button switch at the top of the face of the ES module.

This figure identifies the location of the digital push button switch to set the Brick ID.

Figure 41 ES module location



Legend	
1 Pull tab	4 Brick back
2 Screw	5 Dial settings
3 LEDs	6 Digital push button switch

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

- 2 Verify that the digit setting 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 system cannot bring the Brick online.

- 3 Using a sharp object, such as the end of a paper clip or a small screwdriver, set the Brick ID.

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

Important! Do not change the digit settings with the power on.

Replace a Brick Storage Enclosure

You can replace existing Bricks with new Bricks within a storage domain. You must migrate the volumes to the new Bricks because clones are not migrated with the parent volumes when Bricks are replaced.

Prerequisite: Make sure you have software version 5.x or above installed.

Note: Contact Oracle Customer Support to replace a Brick if you have installed software version 4.x or lower.

- 1 Delete the clones of existing volumes in the Bricks that must be replaced.
- 2 Create a minimum of one new Storage Domain.
- 3 Add the new Bricks to the Pillar Axiom 600 system.
- 4 Accept the newly added Bricks into the new Storage Domain.
- 5 Verify that the capacity from the new Bricks has been added successfully in the Pillar Axiom 600 system.
- 6 If the Bricks that must be replaced are in the existing primary Storage Domain, make sure you add a minimum of two Bricks of the same Storage Class to a single new Storage Domain before you promote the new Storage Domain to primary.

The primary domain is the storage domain that contains the System Configuration Database, which is stored on the Persistence VLUN. If there is only one storage domain, it is considered the primary storage domain. If there are multiple storage domains, the primary storage domain is identified in the graphical user interface (GUI) or the output of the command: `axiomcli storage_allocation -list`. For more information on how to identify the primary storage domain using the GUI or CLI respectively, refer to the *Pillar Axiom Administrator's Guide* or the *Pillar Axiom CLI Reference Guide*.

Important! Before making a Storage Domain primary or migrating data to a new Storage Domain, add all the Bricks to the new Storage Domain. Failure to do so may cause performance issues because the Pillar Axiom 600 system might not be able to stripe the data across the appropriate number of Bricks for the Quality of Service (QoS) and Storage Class.

- 7 Make the new Storage Domain primary.

When the new Storage Domain is made primary, the persistence VLUN (also known as the system configuration database) is migrated from the old

primary Storage Domain to the new primary Storage Domain. Make the new storage domain primary only if you are replacing Bricks in the existing primary storage domain. The migration uses Bricks in the following order: serial ATA (SATA), Fiber channel (FC), and solid state drive (SSD).

- 8 Migrate all the volumes on the old Bricks to the desired Storage Class in the new Storage Domain.

Tip: For minimum impact to system performance, migrate one volume at a time.

- 9 Use the storage allocation CLI `axiomcli storage_allocation -list` request to ensure that all volumes have been migrated from the old Bricks that must be replaced.

Important! If you are replacing Bricks in the default or primary Storage Domain, use the storage allocation CLI `axiomcli storage_allocation -list` request to ensure that the persistence volume is not on the Bricks that must be powered down. The persistence volume must be on the Bricks in the new primary Storage Domain.

- 10 For software release 5.x or higher: Use the GUI to remove Bricks from the system configuration. For software release 4.x or below: After verifying that all volumes, including the system configuration, persistence, and volumes have been migrated, power off all the Bricks in the old Storage Domain.

Note: You will not be able to remove Bricks from the system configuration if there is a storage object assigned to the Brick and it is not in Missing status.

**Caution**

For software release 4.x or below, do not attempt to replace Bricks without assistance from Oracle Customer Support. Otherwise, there might be data loss.

- 11 Verify all storage and make sure that all the volumes are online before disconnecting and removing the old Bricks from the system configuration.

Note: The Pillar Axiom 600 system does not allow Bricks to be removed if any resources are allocated on that Brick. If there are problems while removing the Bricks, contact Oracle Customer Support for assistance.

- 12 Select and remove the old Storage Domain.

Note: The Pillar Axiom 600 system does not allow Storage Domains to be removed if any resources are allocated on that Storage Domain. If there are problems while removing the old Storage Domain, contact Oracle Customer Support for assistance.

Related tasks

- [*Accept a Brick*](#)
- [*Create a Storage Domain*](#)
- [*Add a New Brick Storage Enclosure*](#)
- [*Verify a Newly Added Brick*](#)
- [*Delete All Clone LUNs*](#)

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 Brick storage enclosures.

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), iSCSI 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.

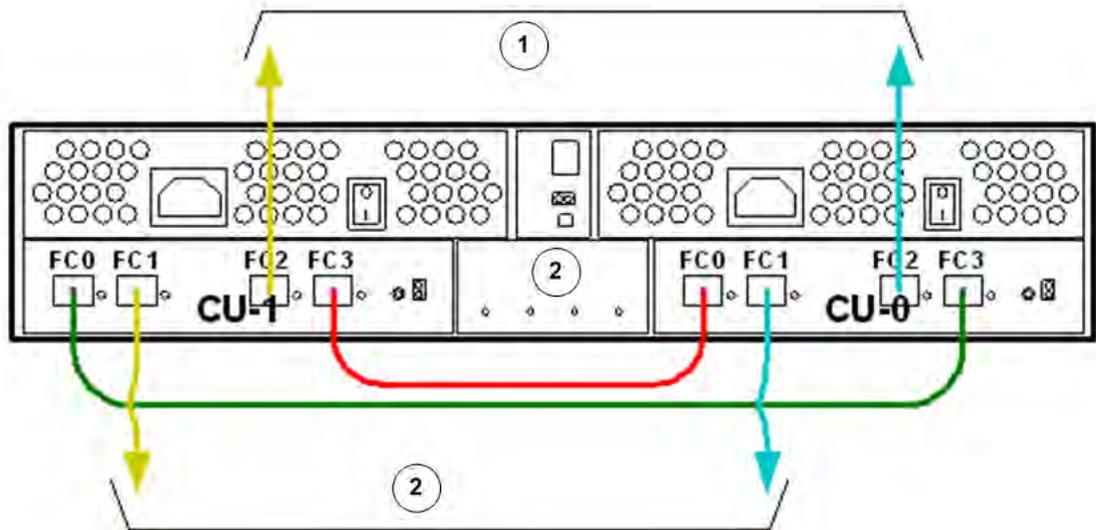
The Pilot has no physical connection to the user data and, therefore, no cable connection exists between the Pilot and the Bricks.

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



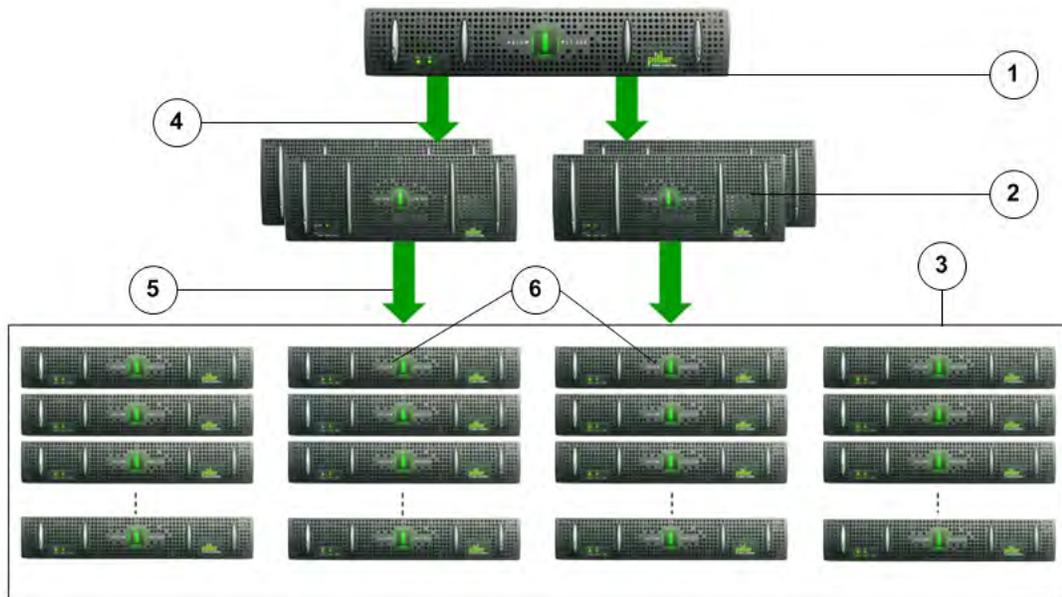
Legend

-
- 1 Brick input connections to Slammer or to Bricks higher in the string
-
- 2 Brick output 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.

Note: The CU0 of the top Brick in a string always connects to the CU0 of a Slammer. The CU1 of the top Brick always connects to the CU1 of a Slammer.

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 data 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 Storage System Fabric (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.

ALL Practices that apply to *all* Pillar Axiom 600 systems:

- **Requirements:** Must be followed for the system to work. They are integral to the system design.
- **Rules:** Must be followed for the system to be supported.
- **Guidelines:** Best practices.

NEW Practices that apply to *new* Pillar Axiom 600 systems.

FIELD Practices that apply to existing Pillar Axiom 600 systems. These rules optimize high availability, performance, and troubleshooting.

Important! If a FIELD rule conflicts with a rule listed as *all*, the latter takes precedence.

The following table defines the general cabling characteristics that apply system wide.

Table 11 Cabling principles for 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. The exceptions in Table 13: Cabling principles for Slammer connection issues 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

Table 11 Cabling principles for system level issues (continued)

Cabling principle	Applicability
Pillar Axiom 600 systems are cabled according to the cabling diagrams in the <i>Pillar Axiom 600 SSF Cabling Reference</i> .	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 <i>Pillar Axiom 600 SSF Cabling Reference</i> .	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.	FIELD

The following table defines the influence of system size or configuration on the cabling of the Pillar Axiom 600 system.

Table 12 Cabling principles for 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
In Pillar Axiom 600 systems with two Slammers, the Brick at the head of the string must be connected to Slammer 1 as well as 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
All Pillar Axiom systems that have more than three Slammers or more than 32 Bricks require optical interconnections.	ALL

Table 12 Cabling principles for system size related issues (continued)

Cabling principle	Applicability
Note: If you have an older Pillar Axiom system that supports only copper cabling and has version 1 private interconnect modules (PIMs), consult your account representative to upgrade the Pillar Axiom system to support more than 32 Bricks and two Slammers. However, no upgrades are provided to convert version 1 copper based cabling to version 2 optical cabling. If Bricks are added later, you may need to re-cable the Bricks to ensure that there are no more than eight Bricks on any Brick string.	
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

The following table defines the principles pertinent to connecting Slammers within a Pillar Axiom 600 system.

Table 13 Cabling principles for 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 module (PIM) on the Slammer are labeled as FC ports. Thus, in Pillar Axiom 300 systems, Bricks connect to FC1 through FC4 ports.	ALL
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

Table 13 Cabling principles for Slammer connection issues (continued)

Cabling principle	Applicability
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

The following table defines the principles pertinent to connecting Bricks within a Pillar Axiom 600 system.

Table 14 Cabling principles for 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
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 14 Cabling principles for Brick connection issues (continued)

Cabling principle	Applicability
With respect to cabling, FC Bricks (version 2 type) follow the same rules as SATA Bricks.	ALL

The following table defines the principles that must be followed when mixing Brick types in strings within a Pillar Axiom 600 system.

Table 15 Cabling principles for 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 Oracle Customer Support 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
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

The following table defines the principles that must be followed when cabling FC Expansion Bricks in strings within a Pillar Axiom 600 system.

Table 16 Cabling principles for 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

Table 16 Cabling principles for FC Expansion Bricks (continued)

Cabling principle	Applicability
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 <i>Pillar Axiom 600 SSF Cabling Reference</i> .	ALL

The following table defines the order in which different Bricks are placed in the string within a Pillar Axiom 600 system.

Table 17 Cabling principles for Brick order on strings

Cabling principle	Applicability
The functionality or performance of Bricks is not affected by their relative position in a Brick string.	ALL
Manufacturing places FC Bricks at the head of string position followed by SSD Bricks, and then SATA Bricks. Also, when you add a Brick to a system, connect the Brick to the end of the existing Brick string. It is not necessary to re-cable Brick strings to put new Bricks into a particular order.	NEW
When adding Bricks to an existing system, attach the new Brick to the last Brick on a string. 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.	FIELD

The following table defines the balance that must be maintained between the various Brick types in the Brick strings within a Pillar Axiom 600 system.

Table 18 Cabling principles for Brick balance on strings

Cabling principle	Applicability
A string may contain up to eight Bricks.	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

Table 18 Cabling principles for Brick balance on strings (continued)

Cabling principle	Applicability
Bricks in a Pillar Axiom 600 system can follow a heuristic balance or a numerical balance defined by manufacturing practices.	ALL
A numerical balance allocates Bricks to strings uniformly without regard to the type of Brick. The longest and shortest Brick strings differ by at most one Brick, with the exception of FC Expansion Bricks.	NEW
<p>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:</p> <ul style="list-style-type: none"> • SATA Brick: Load factor 1 • FC RAID Brick: Load factor 2 • SSD Brick: Load factor 4 <p>Version 1 and version 2 of all Brick types are allocated the same load factor.</p> <p>Note: The recommendation to not mix SATA Bricks (version 1) with other Brick types overrides load factor considerations on Brick strings.</p>	FIELD

The following table defines the procedures to be followed when adding Bricks on Brick strings within a Pillar Axiom 600 system.

Table 19 Cabling principles for 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 Oracle Customer Support.	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	FIELD

Table 19 Cabling principles for Brick adds on strings (continued)

Cabling principle	Applicability
<p>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.</p>	
<p>Recommended method for a non-disruptive Brick add:</p> <p>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.</p> <p>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.</p> <p>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 Oracle Customer Support for assistance.</p> <p>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 Oracle Customer Support for assistance.</p>	FIELD
<p>Alternate method for non-disruptive Brick add: (Used only when recommended by Oracle Customer Support)</p> <p>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.</p>	FIELD
<p>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.</p>	FIELD
<p>After a successful Brick add, conduct the following checks:</p>	FIELD

Table 19 Cabling principles for Brick adds on strings (continued)

Cabling principle	Applicability
<ul style="list-style-type: none"> • 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. <p>Note: For FC Bricks, the raw capacity of each Brick is approximately eleven times the size of an individual drive in the Brick. For SATA and SSD Bricks, the raw capacity of each Brick is approximately twelve times the size of an individual drive in the Brick.</p> <p>Note: If any of the above-mentioned tests fail, contact Oracle Customer Support for assistance.</p> <p>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.</p>	

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 (electromagnetic 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! Oracle 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 Oracle 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 for iSCSI and Ethernet

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-negotiation, if the Pillar Axiom system is also configured for auto-negotiation. 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:

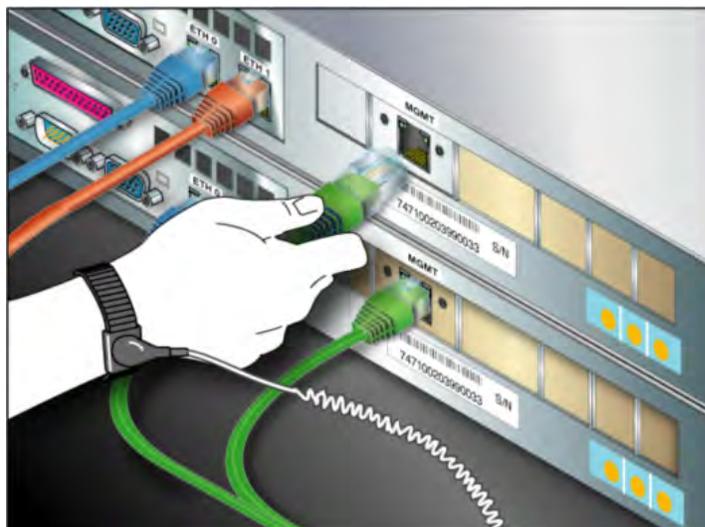
- 10.0.0.1 (Default gateway)
- 10.0.0.2 (Shared IP)
- 10.0.0.3 (Pilot CU 0)
- 10.0.0.4 (Pilot CU 1)
- 255.255.255.0 (Netmask)
- Auto-negotiation: Enabled

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-negotiation 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).

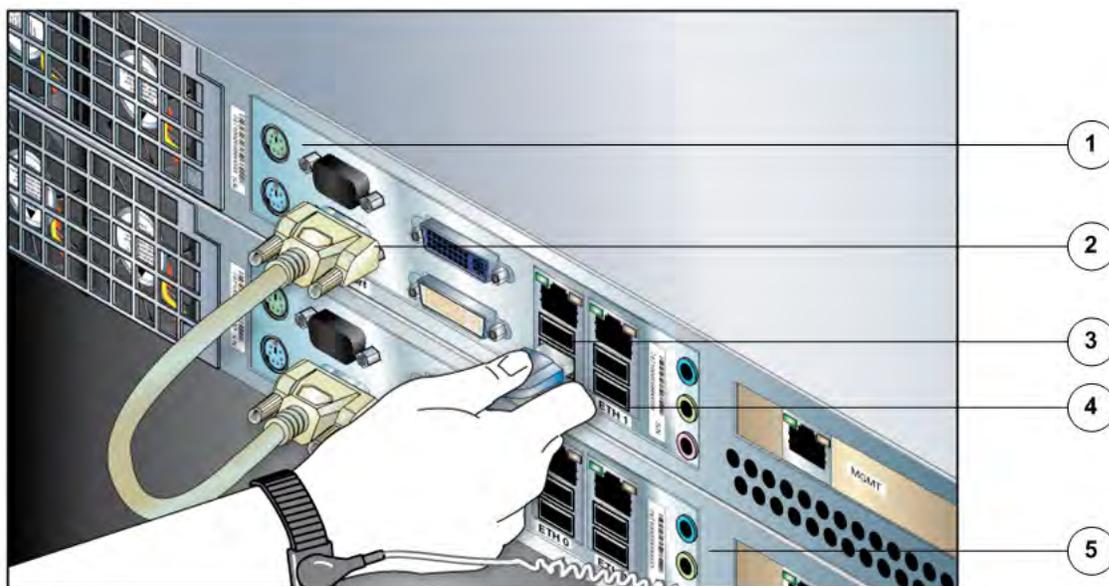
Connect the Pilot CUs

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 Oracle supplied 1 GbE small form-factor pluggable (SFP) modules and the 10 GbE connections require Oracle supplied 10 GbE SFP Plus modules.
 - For copper connections: The 10 GbE connections require direct attached copper cables with SFP Plus connectors provided with the Pillar Axiom system. The 1 Gb/s Ethernet copper cable for iSCSI connections must be rated for 1 Gb/s operations.
- 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 Oracle supplied SFP modules for the respective optical Fiber Channel (FC) connections. SAN iSCSI data paths require 1 Gb/s Ethernet cables rated for 1 Gb/s operation.



Caution

Third party cables might not function properly and can interfere with the Slammer operation.

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 Oracle 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 [optional] If the SAN Slammers have iSCSI interfaces, connect the iSCSI ports to the open data ports on two separate network switches. For best results, the iSCSI traffic must be isolated from the normal TCP/IP data traffic.
- 3 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 20 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 Oracle Customer Support.

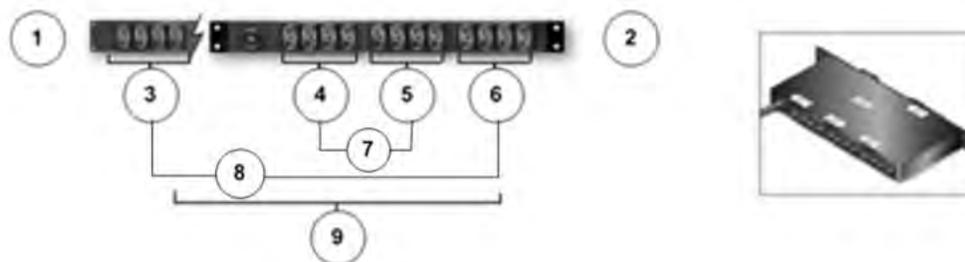
With redundant power supplies, the amperage draw for each power cord is rated for the case when one circuit fails, which increases the amperage draw on the other cord.

PDU Outlet Amperage Limits

The number of Pillar Axiom 600 system components you can plug into each Oracle-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 they are the same at any input voltage.

Figure 47 Pulizzi TPC2105-1 outlet amperage limits

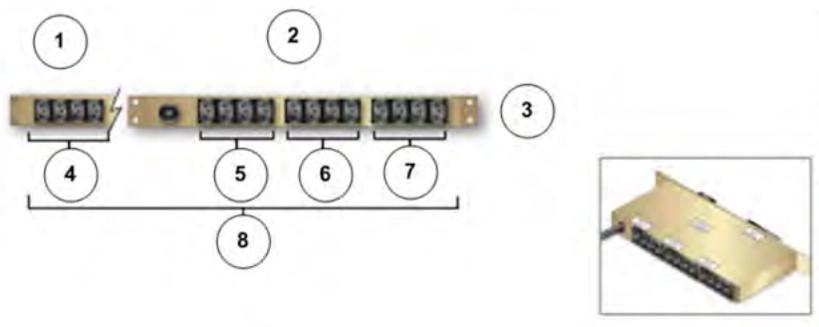


Legend

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

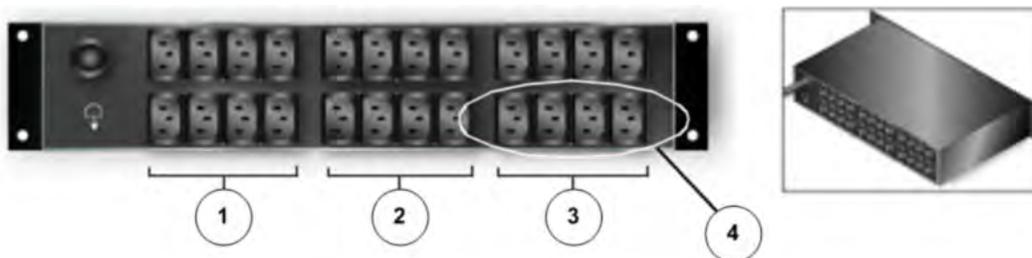


Legend

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

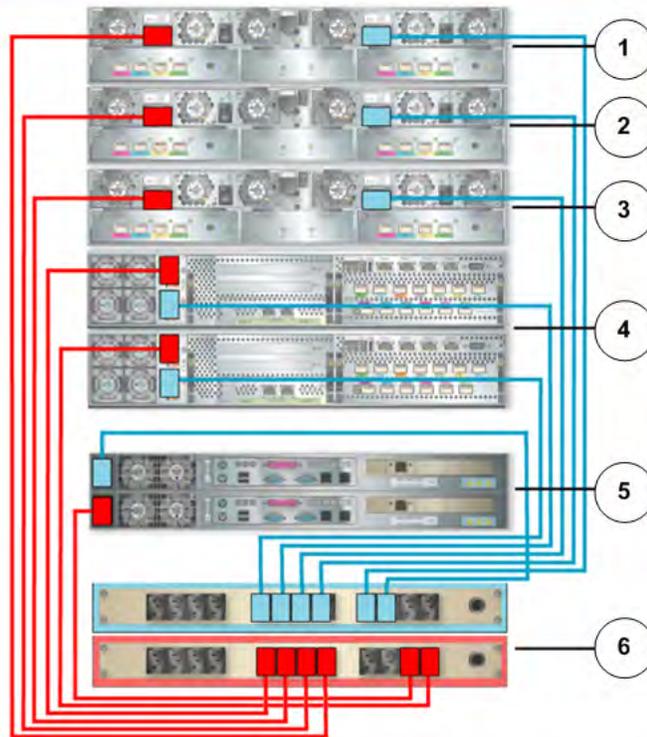
Pillar Axiom 600 racks come with the Brick power cords or Wye power cables pre-installed in the rack with colored tie wraps. These Wye power cables are ready to be plugged into the back of each Brick.

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.

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.

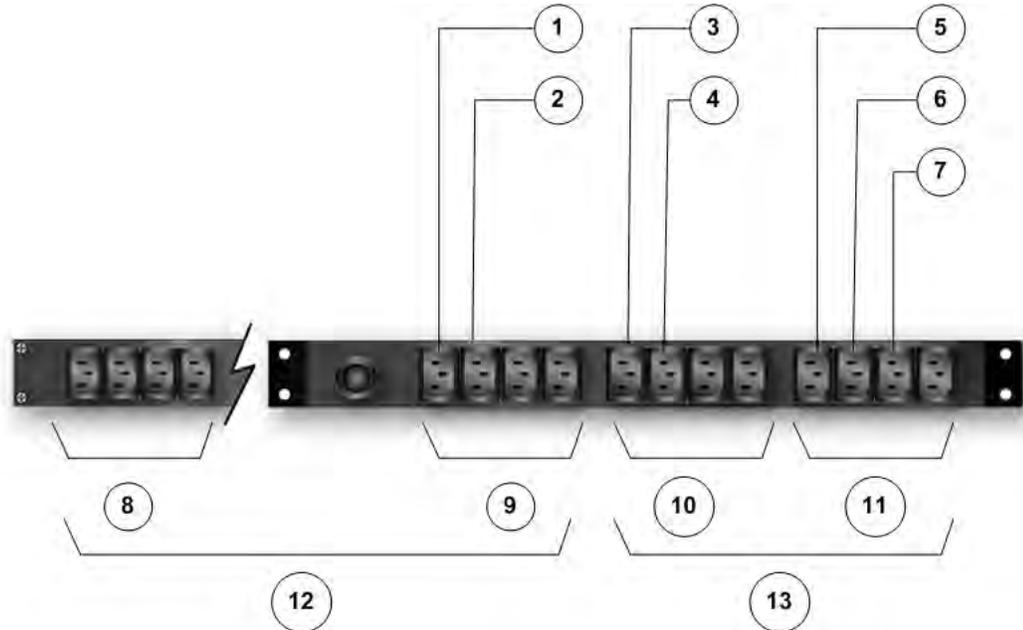
In the preceding example, the Slammer control unit (CU) 0, the three Bricks, and the Pilot in the four-outlet bank require 2.55A, 1.18A, 1.18A, 1.18A, and 0.60A respectively, or 6.69A total. This total load is below the 10A limit for a four-outlet bank.

If we modify the example to use 115V, 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: 2.12A drawn	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 Oracle Customer Support.

Related references

- [Cabling Practices for the Pillar Axiom 600 System](#)

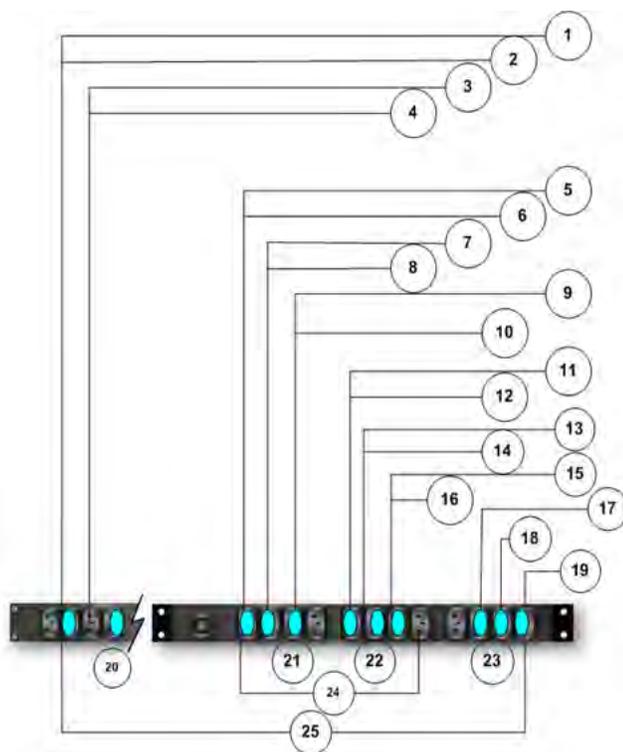
Sample Power Cabling for One Slammer and 16 SATA Bricks

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

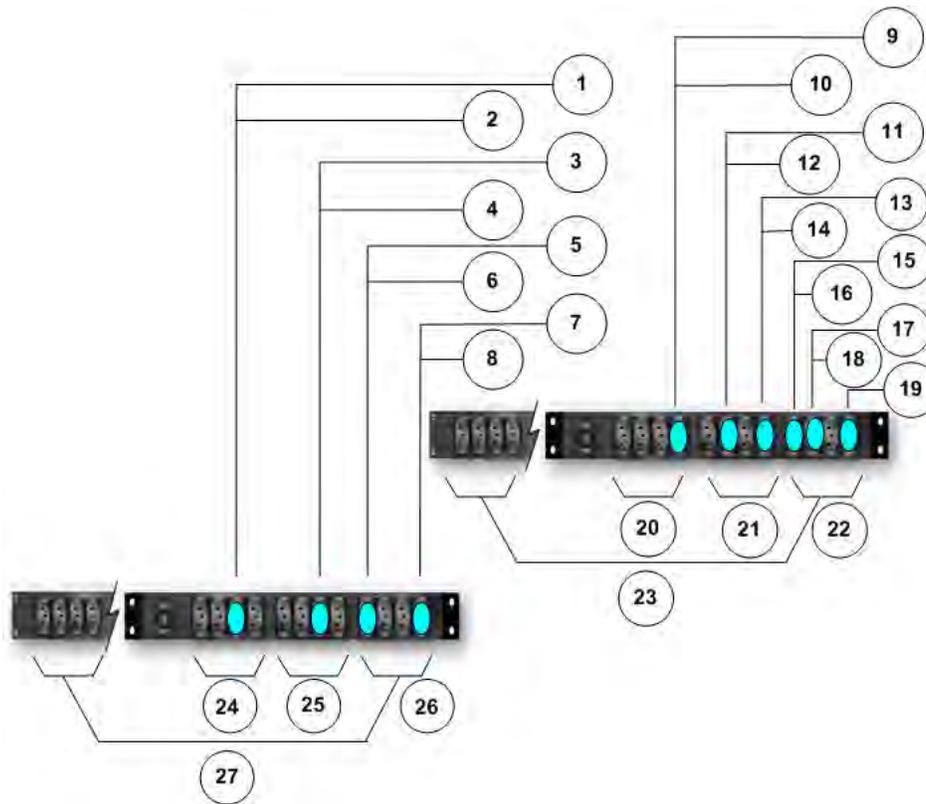
1–16 (Brick 16 through Brick 1): SATA, 1.18A drawn	21 Total 7.08A drawn
17 Slammer CU 0: 1.275A drawn	22 Total 7.08A drawn
18 Slammer CU 1: 1.275A drawn	23 Total 3.145A drawn
19 Pilot: 0.60A drawn	24 Grand total 14.16A drawn
20 Total 4.72A drawn	25 Grand total 22.025A drawn

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 Oracle Customer Support.

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 Oracle racks, the system comes with components and PDUs already installed in the rack. If you are using non-Oracle 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** 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

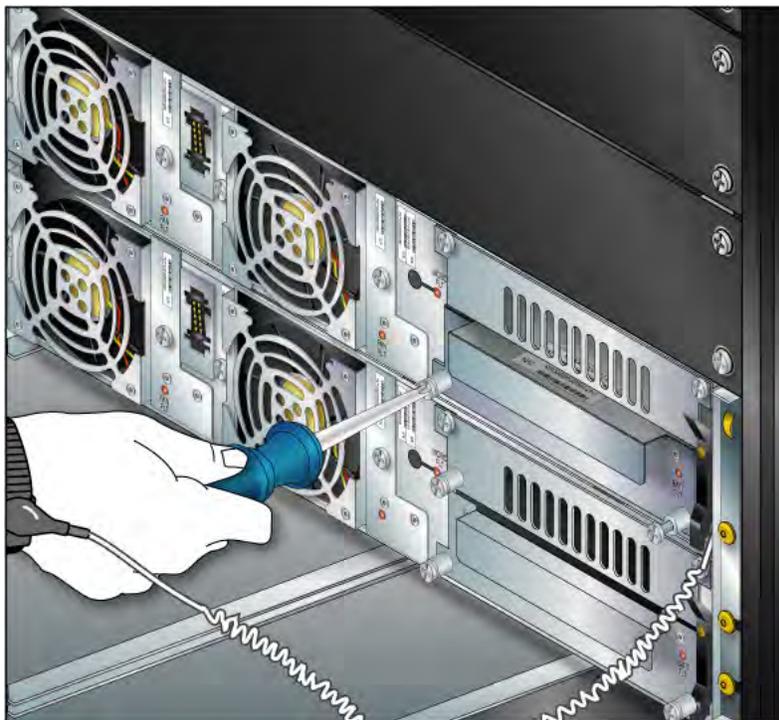
Complete the Installation

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.

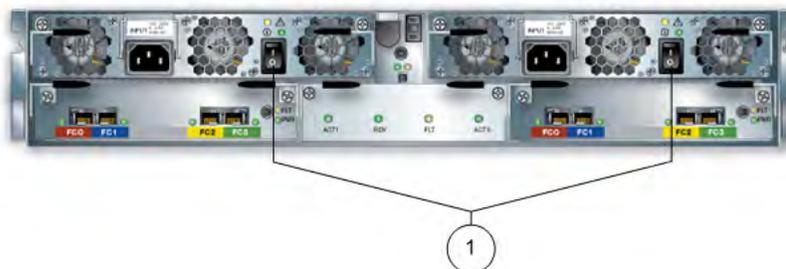
Figure 54 Secure Slammer batteries



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

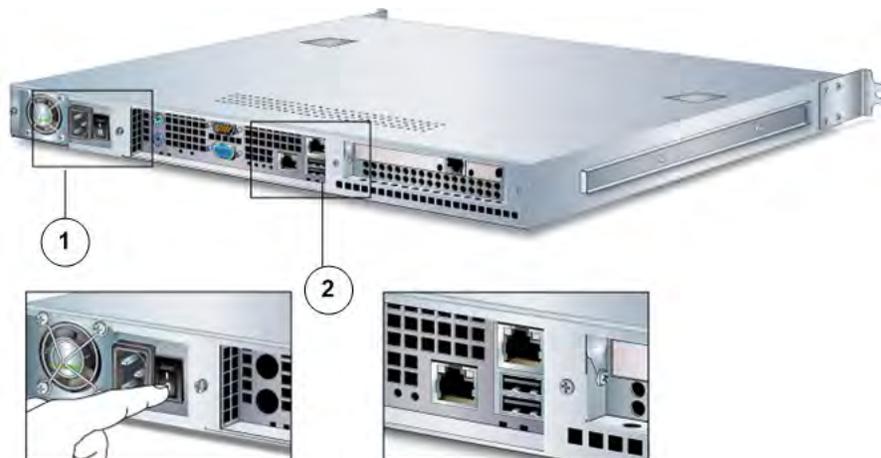


Legend 1 Brick power switches

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 control unit (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

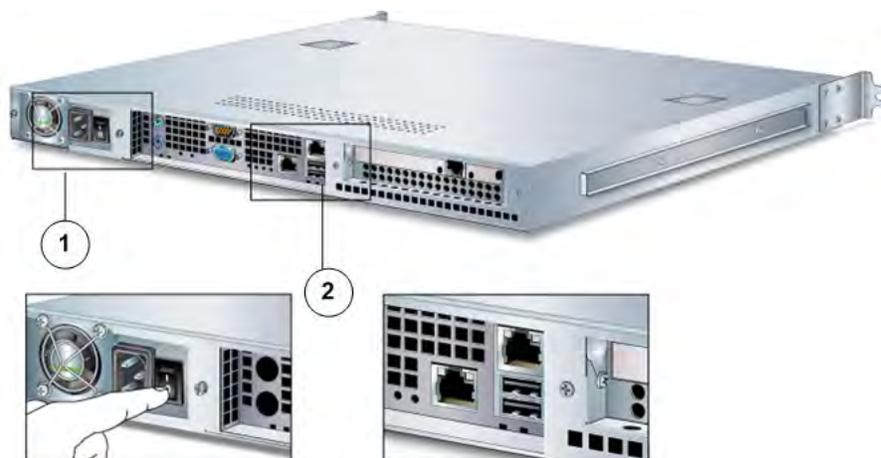
- 2 If AC power is applied to the Pilot, but the Pilot does not power on, make sure the DC power switch in the back is on by removing the bezel and checking the DC power indicators at the front of each Pilot.

The DC power indicator is present in all Pilots as a light bulb, whose color and position may vary depending on the model of the Pilot.
- 3 If the Pilot has a DC power switch in the back, make sure that the DC power switch is on. If the DC power indicator is not on, press the DC power button briefly and release it.

The DC power button is marked by the international DC power button glyph, which is a small circle with a bar at the top, whose position may vary depending on the model of the Pilot.

Note: There are LED indicators for the network ports on the Pilot CU that may be on whether or not DC power is on. Both the drive activity LED and DC power indicator should be checked to verify power.

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.

- 4 Verify that the Slammer LEDs go through the normal boot sequence as indicated below.

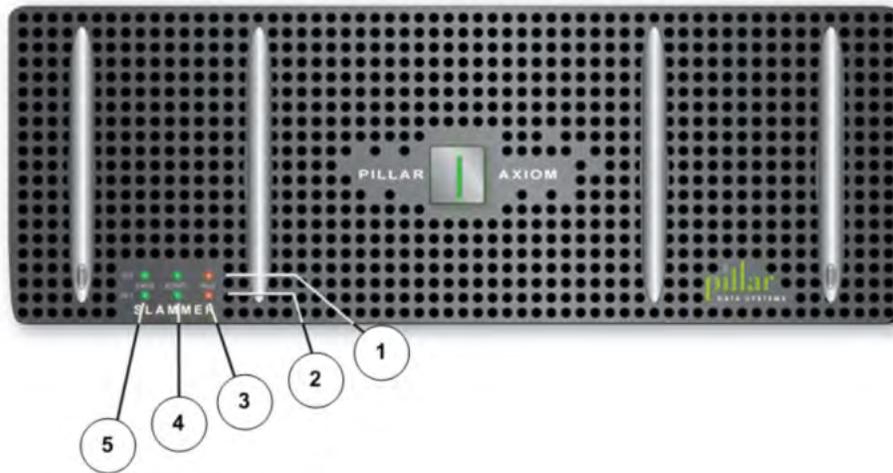
The Pilot must be powered on as the Slammer downloads the software from the Pilot. As the Slammer boots up, the STATUS (ST), ACTIVITY (ACT), and FAULT (FLT) LEDs on the front bezel of the Slammer and on the private interconnect module (PIM) progress through a number of states. Following is the sequence of events for monitoring the LED activity on the Slammer:

- If the Slammer Power On Self Test (POST) is successful, the Slammer CU turns off the FLT LED. The ACT LED is green and blinks fast. The ST LED is green and blinks slow. The LED status of the ACT and ST LED indicates that the POST was successful and the Slammer is attempting to download its software from the Pilot.
- After the software is downloaded on the Slammer, the Pilot software determines whether the Slammer CU must continue the boot process. If the Pilot software proceeds to boot up the Slammer CU, the Pilot initiates the Slammer software module boot sequence. As the Slammer CU enters its software module boot sequence, it sets the FLT and ACT LEDs off, and sets the ST LED blinking.
- When the Pilot software determines that the Pillar Axiom system is ready to proceed to Normal operating mode, the Slammer CU enters

the Normal status, which sets the ST LED to solid green and turns off all the other LEDs.

- As data traffic occurs, the ACT LED might display a blinking green.

Figure 60 Slammer bezel LEDs



Legend

1 CU 0

2 CU 1

3 Fault LEDs

4 Activity LEDs

5 Status LEDs

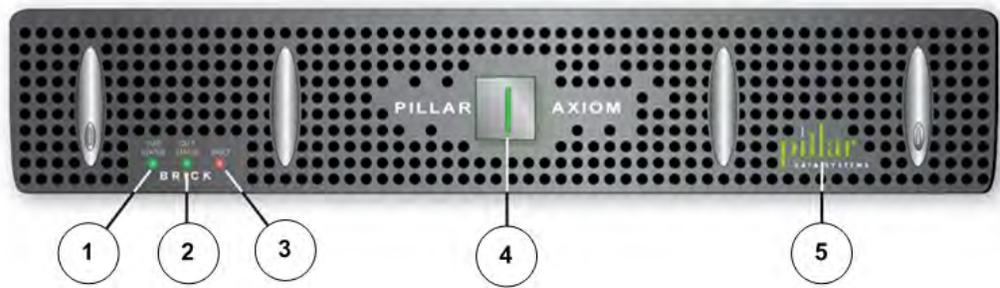
- 5 Verify that the FAULT LEDs are off.

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

- 6 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 |

7 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](#)

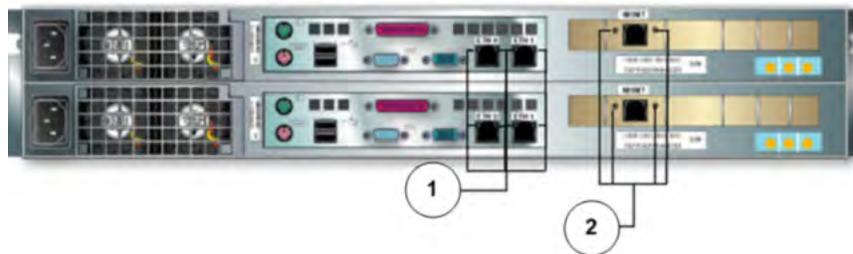
Verify the Back Status LEDs

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

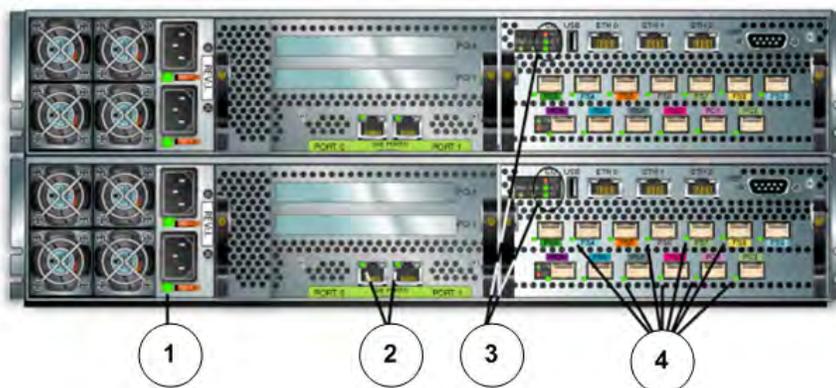
1 Private LAN connectivity LEDs

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 |
| <hr/> | |
| 2 | GbE network interface module (NIM) port LEDs |
| <hr/> | |
| 3 | CU LEDs |
| <hr/> | |
| 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.

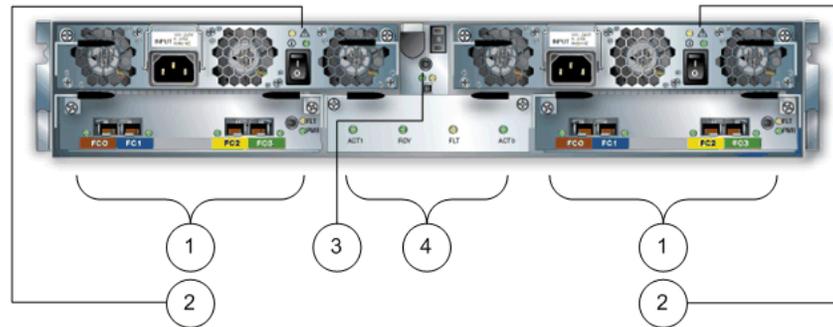
Note: The ST LED refers to the Status LED, the ACT LED refers to the Activity LED, and the FLT LED refers to the Fault LED.

- 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 Oracle Customer Support.

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 21 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.
<p>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.</p> <p>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.</p> <p>Note: All three LEDs blinking alternately indicates a firmware error for the 8 Gb/s FC HBA.</p> <p>Note: The blinking of the 8 Gb/s LED and the 2 Gb/s LED indicates that the LED is a beacon.</p>		

10 Gb/s Ethernet HBA LED Status

Table 22 10 Gb/s Ethernet HBA LED status

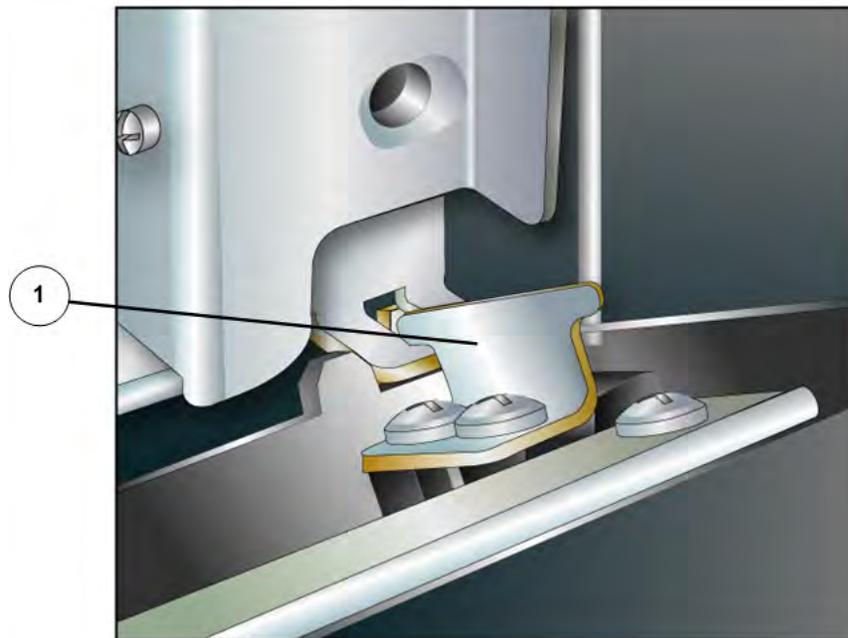
LED identifier and color		Meaning
Speed (left LED)	Solid green	The HBA is operating at 10 Gb/s.
	Solid yellow	The HBA is operating at 1 Gb/s.
	Off	No physical connection to the port or the port is not operational.
	Note: In a normal operating optimized port, the speed should be 10 Gb/s.	
Activity or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



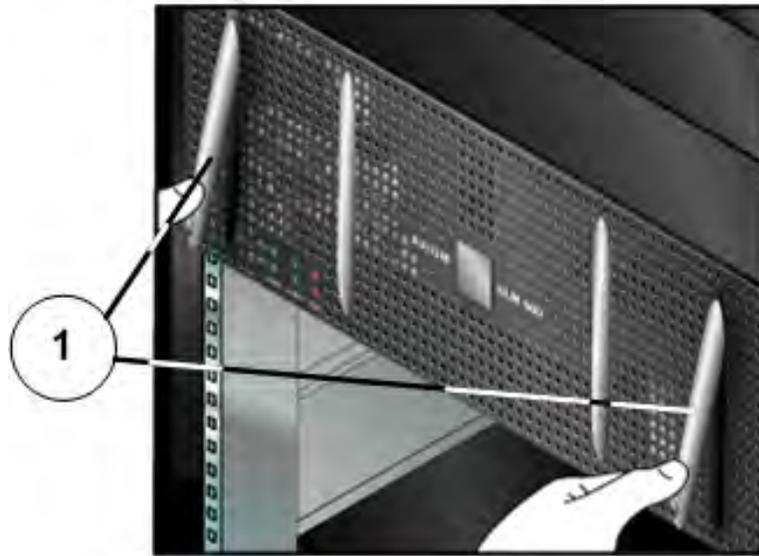
Legend

- 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.
- Configure queue depth, time-outs and retries as indicated in the *Pillar Axiom Path Manager Installation Guide and Release Notes* for your particular platform.

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 APM 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 23 Global system parameters

Done	Information
<input type="checkbox"/>	Check the <i>Customer Release Notes</i> and My Oracle Support (MOS) Portal to see if any software updates are available. For instructions on installing software updates, refer to the <i>Release Notes</i> and to the <i>Pillar Axiom Administrator's Guide</i> .
GUI access	
<input type="checkbox"/>	Get the management network IP address of the Pilot (the default is 10.0.0.2) and the user ID and password from the <i>Site Preparation Survey</i> or from Oracle.
<input type="checkbox"/>	Get access to the Pillar Axiom Storage Services Manager, the command line interface (CLI), and the Pillar Axiom Path Manager.
Global system parameters	
<input type="checkbox"/>	Get the IP address of your primary NTP server for synchronizing system time. This NTP server should not be a Windows system.
<input type="checkbox"/>	Get the operating mode of the management Ethernet: auto-negotiation, or manual speed and duplex.
<input type="checkbox"/>	Get three IP addresses that you can assign to the public interface of the Pilot.

Table 23 Global system parameters (continued)

Done	Information
<input type="checkbox"/>	Get the management network subnet mask and the IP address for the gateway to be used.
<input type="checkbox"/>	Decide whether you want the system to e-mail alerts to administrators. If so, get the IP address of your e-mail server.
<input type="checkbox"/>	The Pillar Axiom system defaults to the correct Call-Home connection parameters and IP addresses, if it uses a direct connection to the Oracle 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	
<input type="checkbox"/>	If you saved a performance profile (from another Pillar Axiom system), you must know where it is so you can navigate to it.
<input type="checkbox"/>	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.
<input type="checkbox"/>	Obtain the data path network subnet mask and gateways for the data network. This should be on a network suitable for sustained high utilization.
<input type="checkbox"/>	Obtain the identity and IP addresses of the naming servers and the domain controllers (DC).
SAN storage parameters	
<input type="checkbox"/>	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.
<input type="checkbox"/>	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 Oracle Customer Support for assistance.
- 3 Connect the workstation to the Pilot CU that responds to 10.0.0.2. 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 Oracle Customer Support for assistance.

- 6 Click **OK**.

- 7 Check the **System Status** icon in the bottom left corner of the status bar of the GUI. 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 Oracle Customer Support.

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.

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 Oracle Customer Support for assistance after checking that all the cabling connections are correct as indicated in the *Pillar Axiom 600 SSF Cabling Reference*.
- 6 Contact Oracle Customer Support 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 APM 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 Oracle Customer Support 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. 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.

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. 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.

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 24 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 25 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

Table 25 Slammer LED boot block error codes (continued)

Code			Software module	Meaning
FLT	ACT	ST		
				should have been set.
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

Table 25 Slammer LED boot block error codes (continued)

Code			Software module	Meaning
FLT	ACT	ST		
				console output for details.

Table 26 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

Table 26 Slammer LED RAM loader codes (continued)

Code			Software module	Meaning
FLT	ACT	ST		
				environment only).
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.

Table 26 Slammer LED RAM loader codes (continued)

Code			Software module	Meaning
FLT	ACT	ST		
Rapid	Rapid green	Green	EEL_UNSUPPORTED_MEM_CONFIG	The installed memory configuration is not valid.
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 27 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.

Table 27 Slammer LED states after POST process completion (continued)

Code			Meaning
FLT	ACT	ST	
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



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 28 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 28 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 personskaade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker.
Aviso	Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes.
Advertencia	Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes.
Varning	Denna varningsymbol 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.



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



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.



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

-  **Warning** When working on a chassis or near power supplies, use extreme caution because line voltages may be present within the chassis.
-  **Warning** Ultimate disposal of this product should be handled according to all national laws and regulations.
-  **Warning** Some equipment is connected to power lines. Before you work on this equipment, remove all jewelry that contains metal. Such jewelry includes rings, necklaces, and watches. Metal objects heat up when connected to power and ground. Hot metal objects can cause serious burns or weld the metal object to the terminals.
-  **Warning** Only qualified personnel should install or replace this equipment.
-  **Warning** Secure all power cabling when you install this unit to avoid disturbing field-wiring connections.
-  **Warning** Do not overload the circuit when you connect components to the power supply.
-  **Warning** A voltage mismatch can cause equipment damage and may pose a fire hazard. If the voltage indicated on the label differs from the power outlet voltage, *do not connect the chassis to that receptacle.*
-  **Warning** To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.
-  **Warning** Incorrect connection of this equipment to a general purpose outlet could result in a hazardous situation.
-  **Warning** Bricks have two power supply cords and Slammers have four. To reduce the risk of electric shock, disconnect all power supply cords to these components before you open their top covers.
-  **Warning** The Pillar Axiom 600 system operates at high voltages. To protect against physical harm, power off the system whenever possible during installation.



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.



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



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

Lightning Warning in Other Languages

Table 29 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 järjestelmän parissa äläkä yhdistä tai irrota kaapeleita ukkosilmalla.
Attention	Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage.
Warnung	Arbeiten Sie nicht am System und schließen Sie keine Kabel an bzw. trennen Sie keine ab, wenn es gewittert.
Avvertenza	Non lavorare sul sistema o collegare oppure scollegare i cavi durante un temporale con fulmini.
Advarsel	Utfør aldri arbeid på systemet, eller koble kabler til eller fra systemet når det tordner eller lyner.

Table 29 Lightning warning in other languages (continued)

Aviso	Não trabalhe no sistema ou ligue e desligue cabos durante períodos de mau tempo (trovoada).
Advertencia	No operar el sistema ni conectar o desconectar cables durante el transcurso de descargas eléctricas en la atmósfera.
Varning	Vid 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 30 Power supply warning in other languages

Waarschuwing	U dient de voeding niet aan te raken zolang het netsnoer aangesloten is. Bij systemen met een stroomschakelaar zijn er lijnspanningen aanwezig in de voeding, zelfs wanneer de stroomschakelaar uitgeschakeld is en het netsnoer aangesloten is. Bij systemen zonder een stroomschakelaar zijn er lijnspanningen aanwezig in de voeding wanneer het netsnoer aangesloten is.
Varoitus	Älä kosketa virtalähdettä virtajohton ollessa kytkettynä. Virrankatkaisimella varustetuissa järjestelmissä on virtalähteen sisällä ja lähellä verkkojännite, vaikka virrankatkaisin on katkaistu-asennossa virtajohton ollessa kytkettynä. Järjestelmissä, joissa ei ole virrankatkaisinta, on virtalähteen sisällä verkkojännite, kun virtajohto on kytkettynä.

Table 30 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 à l'arrêt. Avec les systèmes sans commutateur marche-arrêt, l'alimentation est sous tension quand le cordon d'alimentation est branché.
Warnung	Berühren Sie das Netzgerät nicht, wenn das Netzkabel angeschlossen ist. Bei Systemen mit Netzschalter liegen Leitungsspannungen im Netzgerät vor, wenn das Netzkabel angeschlossen ist, auch wenn das System ausgeschaltet ist. Bei Systemen ohne Netzschalter liegen Leitungsspannungen im Netzgerät vor, wenn das Netzkabel angeschlossen ist.
Avvertenza	Non toccare l'alimentatore se il cavo dell'alimentazione è collegato. Per i sistemi con un interruttore di alimentazione, tensioni di linea sono presenti all'interno dell'alimentatore anche quando l'interruttore di alimentazione è in 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	Berør ikke strømforsyningsenheden når strømfledningen er tilkoblet. I systemer som har en strømbryter, er det spenning i strømforsyningsenheten selv om strømbryteren er slått av og strømfledningen er tilkoblet. Når det gjelder systemer uten en strømbryter, er det spenning i strømforsyningsenheten når strømfledningen er tilkoblet.
Aviso	Não toque na unidade abastecedora de energia quando o cabo de alimentação estiver ligado. Em sistemas com interruptor, a corrente eléctrica estará presente na unidade abastecedora, sempre que o cabo de alimentação de energia estiver ligado, mesmo quando o interruptor se encontrar desligado. Para sistemas sem interruptor, a tensão eléctrica dentro da unidade abastecedora só estará presente quando o cabo de alimentação estiver ligado.
Advertencia	No tocar la fuente de alimentación mientras el cable esté enchufado. En sistemas con interruptor de alimentación, hay voltajes de línea dentro de la fuente, incluso cuando el interruptor esté en Apagado (OFF) y el cable de alimentación enchufado. En sistemas sin interruptor de alimentación, hay

Table 30 Power supply warning in other languages (continued)

	voltajes de línea en la fuente cuando el cable está enchufado.
Varning	Vidrör inte strömförsörjningsenheten när den är ansluten. För system med strömbrytare finns det alltid spänning i strömförsörjningsenheten även när strömmen har slagits av men när den är ansluten. För system utan strömbrytare finns det alltid spänning i strömförsörjningsenheten när den är 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 31 Power disconnect warning in other languages

Attention	Le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée à proximité de l'équipement et être facile d'accès.
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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 32 Installation warning in other languages

Waarschuwing	Raadpleeg de installatie-aanwijzingen voordat u het systeem met de voeding verbindt.
Varoitus	Lue asennusohjeet ennen jä rjestelmä n yhdistä mistä virtalä hteeseen.
Attention	Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.
Warnung	Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließen.
Avvertenza	Consultare le istruzioni di installazione prima di collegare il sistema all'alimentatore.
Advarsel	Les installasjonsinstruksjonene før systemet kobles til strø mkilden.
Aviso	Leia as instruções de instalação antes de ligar o sistema à sua fonte de energia.
Advertencia	Ver las instrucciones de instalación antes de conectar el sistema a la red de alimentación.
Varning	Läs installationsanvisningarna innan du kopplar systemet till dess strömförsörjningsenhet.

Power Disconnect Warning



Warning

When working on a chassis or near power supplies, follow the Guided Maintenance procedures in the *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 33 Warnings for Norway and Sweden

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

Restricted Access Area Warning



Warning

This unit is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

Restricted Access Warning in Other Languages

Table 34 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 à installer dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de

Table 34 Restricted access warning in other languages (continued)

	sécurité. L'accès aux zones de sécurité est sous le contrôle de l'autorité responsable de l'emplacement.
Warnung	Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Ein Bereich mit beschränktem Zutritt ist ein Bereich, zu dem nur Wartungspersonal mit einem Spezialwerkzeug, Schloß und Schlüssel oder anderer Sicherheitsvorkehrungen Zugang hat, und der von dem für die Anlage zuständigen Gremium kontrolliert wird.
Avvertenza	Questa unità deve essere installata in un'area ad accesso limitato. Un'area ad accesso limitato è un'area accessibile solo a personale di assistenza tramite un'attrezzo speciale, lucchetto, o altri dispositivi di sicurezza, ed è controllata dall'autorità responsabile della zona.
Advarsel	Denne enheten er laget for installasjon i områder med begrenset adgang. Et område med begrenset adgang gir kun adgang til servicepersonale som bruker et spesielt verktøy, lås og nøkkel, eller en annen sikkerhetsanordning, og det kontrolleres av den autoriteten som er ansvarlig for området.
Aviso	Esta unidade foi concebida para instalação em áreas de acesso restrito. Uma área de acesso restrito é uma área à qual apenas tem acesso o pessoal de serviço autorizado, que possua uma ferramenta, chave e fechadura especial, ou qualquer outra forma de segurança. Esta área é controlada pela autoridade responsável pelo local.
Advertencia	Esta unidad ha sido diseñada para instalarse en áreas de acceso restringido. Área de acceso restringido significa un área a la que solamente tiene acceso el personal de servicio mediante la utilización de una herramienta especial, cerradura con llave, o algún otro medio de seguridad, y que está bajo el control de la autoridad responsable del local.
Varning	Denna enhet är avsedd för installation i områden med begränsat tillträde. Ett område med begränsat tillträde får endast tillträda av servicepersonal med ett speciellt verktyg, lås och nyckel, eller annan säkerhetsanordning, och kontrolleras av den auktoritet som ansvarar för området.

Product Disposal Warning



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

Product Disposal Warning in Other Languages

Table 35 Product disposal warning in other languages

Waarschuwing	Dit produkt dient volgens alle landelijke wetten en voorschriften te worden afgedankt.
Varoitus	Tä m ä 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 à toutes 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 según todas las leyes y regulaciones nacionales.
Varning	Slutlig kassering av denna produkt bör skötas i enlighet med landets alla lagar och föreskrifter.

Jewelry Removal Warning



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

Table 36 Jewelry removal warning in other languages (continued)

Avvertenza	Prima di intervenire su apparecchiature collegate alle linee di alimentazione, togliersi qualsiasi monile (inclusi anelli, collane, braccialetti ed orologi). Gli oggetti metallici si riscaldano quando sono collegati tra punti di alimentazione e massa: possono causare ustioni gravi oppure il metallo può saldarsi ai terminali.
Advarsel	Fjern alle smykker (inkludert ringer, halskjeder og klokker) før du skal arbeide på utstyr som er koblet til kraftledninger. Metallgjenstander som er koblet til kraftledninger og jord blir svært varme og kan forårsake alvorlige brannskader eller smelte fast til polene.
Aviso	Antes de trabalhar em equipamento que esteja ligado a linhas de corrente, retire todas as jóias que estiver a usar (incluindo anéis, fios e relógios). Os objectos metálicos aquecerão em contacto com a corrente e em contacto com a ligação à terra, podendo causar queimaduras graves ou ficarem soldados aos terminais.
Advertencia	Antes de operar sobre equipos conectados a líneas de alimentación, quitarse las joyas (incluidos anillos, collares y relojes). Los objetos de metal se calientan cuando se conectan a la alimentación y a tierra, lo que puede ocasionar quemaduras graves o que los objetos metálicos queden soldados a los bornes.
Varning	Tag av alla smycken (inklusive ringar, halsband och armbandsur) innan du arbetar på utrustning som är kopplad till kraftledningar. Metallobjekt hettas upp när de kopplas ihop med ström och jord och kan förorsaka allvarliga brannskador; metallobjekt kan också sammansvetsas med kontakterna.

Qualified Personnel Warning



Warning

Only qualified personnel should install or replace this equipment.

Table 37 Qualified personnel warning in other languages

Waarschuwing	Installatie en reparaties mogen uitsluitend door getraind en bevoegd personeel uitgevoerd worden.
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Table 37 Qualified personnel warning in other languages (continued)

Varoitus	Ainoastaan koulutettu ja pätevä henkilökunta saa asentaa tai vaihtaa tämän laitteen.
Avertissement	Tout installation ou remplacement de l'appareil doit être réalisé par du personnel qualifié et compétent.
Achtung	Gerät nur von geschultem, qualifiziertem Personal installieren oder auswechseln lassen.
Avvertenza	Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.
Advarsel	Kun kvalifisert personell med riktig opplæring bør montere eller bytte ut dette utstyret.
Aviso	Este equipamento deverá ser instalado ou substituído apenas por pessoal devidamente treinado e qualificado.
Atención	Estos equipos deben ser instalados y reemplazados exclusivamente por personal técnico adecuadamente preparado y capacitado.
Varning	Denna utrustning ska endast installeras och bytas ut av utbildad och kvalificerad personal.

Warning Statement for Finland

Table 38 Warning statement for Finland

Varoitus	Alleluat ja suojalukitus ohitettaessa olet alltiina näkymättömälle lasersäteilylle. Äjã katso säteeseen.
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Warning Statement for Sweden

Table 39 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.
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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 40 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.

Table 40 Power cabling warning in other languages (continued)

Advarsel	Når denne enheten installeres, må alle kraftledninger sikres for å unngå at feltkabelkoblingene forstyrres.
Aviso	Para evitar problemas com as ligações de rede de campanha, prenda todos os cabos de corrente quando instalar esta unidade.
Advertencia	Sujetar todo el cableado de alimentación cuando se instale este equipo para evitar que se mezcle con las conexiones del cableado "insitu".
Varning	Fäst allt starkströmskablage vid installation av denna enhet så att fästkopplingen 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 41 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 yhdistettävä huolellisesti syöttöpiiriin niin, että johdot eivät ole ylikuormitettuja.
Avertissement	Veillez à bien connecter les unités au circuit d'alimentation afin de ne pas surcharger les connections.
Achtung	Beim Anschließen der Geräte an das Stromnetz ist darauf zu achten, daß die Schaltverbindungen nicht überlastet werden.
Avvertenza	Fare attenzione quando si collegano le unità al circuito di alimentazione, per non sovraccaricare i cablaggi.

Table 41 Supply circuit warning in other languages (continued)

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

Voltage Mismatch Warning



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 42 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 ja nnitteiden yhdistäminen voi aiheuttaa laitevaurion ja tulipalon vaaran. Jos tarraan merkittyjä nните eroaa pistorasian ja nнитеestä, älä yhdistä asennuspohjaa pistorasiaan.
Avertissement	Une erreur de voltage risque d'endommager l'appareil et constitue un risque d'incendie. Si la tension indiquée sur l'étiquette est différente de la tension de l'alimentation, ne connectez en aucun cas le châssis à la prise.

Table 42 Voltage mismatch warning in other languages (continued)

Achtung	Bei nicht übereinstimmender Spannung kann es zu Geräteschäden und Feuergefahr kommen. Wenn die auf dem Etikett angegebene Spannung nicht mit der Steckdosenspannung übereinstimmt, schließen Sie das Gerät nicht an diese Steckdose an.
Avvertenza	Una tensione inadeguata può causare danni all'apparecchio e rischio di incendio. Se la tensione riportata sulla targhetta è diversa da quella della presa di alimentazione, non collegare lo chassis a tale presa.
Advarsel	Ulik spenning kan forårsake skade på utstyret og innebære brannfare. Dersom spenningen på merkelappen er forskjellig fra spenningen i stikkontakten, må du ikke koble kabinettet til den stikkontakten.
Aviso	Uma voltagem incorrecta poderá causar danos no equipamento e constituir um risco de incêndio. Se a voltagem indicada na etiqueta for diferente da voltagem de saída da corrente da parede, não ligue o chassis a esse receptáculo.
Atención	Las diferencias en el voltaje pueden causar daños a los equipos y presentar peligro de incendio. Si el voltaje indicado en la etiqueta es diferente al de la toma de alimentación, no conectar el chasis a dicha toma.
Varning	Inkompatibla spänningar kan resultera i materiella skador samt utgör brandfara. Om den spänning som anges på etiketten skiljer sig från strömuttagets spänning ska chassit inte anslutas till detta uttag.

SELV Circuit Warning



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 43 SELV circuit warning in other languages

<p>Waarschuwing</p>	<p>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.</p>
<p>Varoitus</p>	<p>Jotta vä ltyt sä hköiskulta, ä lä kytke pieniä 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.</p>
<p>Attention</p>	<p>Pour éviter une électrocution, ne raccordez pas les circuits de sécurité basse tension (Safety Extra-Low Voltage ou SELV) à des circuits de tension de réseau téléphonique (Telephone Network Voltage ou TNV). Les ports du réseau local (LAN) contiennent des circuits SELV et les ports du réseau longue distance (WAN) sont munis de circuits TNV. Certains ports LAN et WAN utilisent des connecteurs RJ-45. Raccordez les câ bles en prenant toutes les précautions nécessaires.</p>
<p>Warnung</p>	<p>Zur Vermeidung von Elektroschock die Sicherheits-Kleinspannungs-Stromkreise (SELV-Kreise) nicht an Fernsprechnetzspannungs-Stromkreise (TNV-Kreise) anschlie ß en. LAN-Ports enthalten SELV-Kreise, und WAN-Ports enthalten TNV-Kreise. Einige LAN- und WAN-Ports verwenden auch RJ-45-Steckverbinder. Vorsicht beim Anschlie ß en von Kabeln.</p>
<p>Avvertenza</p>	<p>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.</p>

Table 43 SELV circuit warning in other languages (continued)

Advarsel	Unngå å koble lavspenningskretser (SELV) til kretser for telenettspenning (TNV), slik at du unngår elektrisk støt. LAN-utganger inneholder SELV-kretser og WAN-utganger inneholder TNV-kretser. Det finnes både LAN-utganger og WAN-utganger som bruker RJ-45-kontakter. Vær forsiktig når du kobler kabler.
Aviso	Para evitar choques eléctricos, não conecte os circuitos de segurança de baixa tensão (SELV) aos circuitos de tensão de rede telefónica (TNV). As portas LAN contêm circuitos SELV e as portas WAN contêm circuitos TNV. Algumas portas LAN e WAN usam conectores RJ-45. Tenha o devido cuidado ao conectar os cabos.
Advertencia	Para evitar la sacudida eléctrica, no conectar circuitos de seguridad de voltaje muy bajo (safety extra-low voltage = SELV) con circuitos de voltaje de red telefónica (telephone network voltage = TNV). Los puertos de redes de área local (local area network = LAN) contienen circuitos SELV, y los puertos de redes de área extendida (wide area network = WAN) contienen circuitos TNV. En algunos casos, tanto los puertos LAN como los WAN usan conectores RJ-45. Proceda con precaución al conectar los cables.
Varning	För att undvika elektriska stötar, koppla inte säkerhetskretsar med extra låg spänning (SELV-kretsar) till kretsar med telefonnätspänning (TNV-kretsar). LAN-portar innehåller SELV-kretsar och WAN-portar innehåller TNV-kretsar. Vissa LAN- och WAN-portar är försedda med RJ-45-kontakter. Iaktta försiktighet vid anslutning av kablar.

Incorrect Connection Warning



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

Incorrect Connection Warning in Other Languages

Table 44 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	Tämä laitteen tai siihen liitettyjen laitteiden virheellinen kytkentä yleispistorasiaan voi aiheuttaa vaaratilanteen.
Attention	Un branchement incorrect de cet équipement ou de l'équipement branché à une prise d'usage général peut créer une situation dangereuse.
Warnung	Inkorrektes Anschließen von diesem oder damit verbundenen Geräten an einer Allzwecksteckdose kann eine Gefahrensituation verursachen.
Avvertenza	Un collegamento errato di questo apparecchio, o dell'apparecchiatura a esso collegato, a una presa di uso generale può causare una situazione pericolosa.
Advarsel	Feil kobling av dette utstyret eller tilhørende utstyr til et vanlig uttak kan føre til farlige situasjoner.
Aviso	Uma conexão incorrecta a uma ficha de alimentação eléctrica normal, deste ou de qualquer equipamento a este conectado, poderá resultar numa situação potencialmente perigosa.
Advertencia	La conexión incorrecta de este equipo, o del equipo conectado, a una toma o receptáculo de tipo general podría resultar en una situación peligrosa.
Varning	Felaktig koppling av denna eller ansluten utrustning till ett universaluttag kan orsaka riskfylld situation.

Caution Notices

-  **Caution** It is required that, if interconnecting equipment resides within more than one equipment rack, these racks should be at the same ground potential.
-  **Caution** When handling any electronic device, be sure to take electrostatic discharge (ESD) precautions. The minimum requirement is a properly grounded antistatic wrist strap and grounding wire.
-  **Caution** If removal of a FRU or blanking plate leaves a hole, block the hole quickly with a blanking plate or by installing a replacement FRU. Failure to do this can disrupt airflow and seriously reduce cooling.
-  **Caution** Ambient temperature within the rack may be greater than that of the room. With regard to the maximum rated ambient for 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 98 pounds (45 kilograms). For safe handling, use two people to lift it.



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.



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.



A Brick weighs up to 61 pounds (28 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 45 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	<i>The number of PDUs depends on the characteristics of the power inlets and the number of components in each rack.</i>
42U racks	<i>The number of racks depends on the number and the distribution of the hardware components that are listed above.</i>

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 46 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 47 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% 10%/hr gradient	104°F (40°C)	54°F/hr (30°C/hr)

Note: For Bricks that have five-platter drives, the maximum ambient operational temperature from 7000 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 48 System acoustics specification

Acoustic level (tested to ISO7779)
<p>Does not exceed 6.5 Bels under normal conditions, which is:</p> <ul style="list-style-type: none"> • 73.4°F (23°C) ambient • All fans operational • No fault conditions <p>The acoustic level will increase under fault conditions.</p>

System Random Vibration Specifications

Table 49 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 50 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: <ol style="list-style-type: none"> 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.
	Conformance Européenne /DoC.

Table 50 Safety, quality, and environmental standards (continued)

Logo	Standard
	UL and CSA under UL (cUL) and UL60950-1-2.
	TUV/GS.
	<p>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 Oracle 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.</p> <p>Oracle provides (on request) documentation about product disposition when the recycling process is complete. Upon request, Oracle also provides a Certificate of Destruction, which releases the customer from further liability for the equipment returned through the Recycle program.</p> <p>Customers should contact Oracle Customer Support for information on the logistics and location(s) of the approved recycle facilities.</p>
	<p>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 9001:2000 and the development and deployment of Pb-free solder qualification guidelines for components (RoHS), interconnects, and PCB, PCA reliability. Oracle will continue to work with industry consortia to define common qualification criteria. Oracle will apply Pb-free solder technologies to product designs as required by legislation.</p>
	ISO 9001:2000 Registered manufacturing process.

Table 50 Safety, quality, and environmental standards (continued)

Logo	Standard
 <p>STORAGE 存储 儲存設備</p> <p>ORACLE AMERICA, INC.  KCC-REM-SUN-SPS1</p> <p>Compliance Model Number (型号)(型號) SPS1</p>	Compliance packaging label: SPS1.
 <p>STORAGE 存储 儲存設備</p> <p>ORACLE AMERICA, INC.  KCC-REM-SUN-SPR1</p> <p>Compliance Model Number (型号)(型號) SPR1</p>	Compliance packaging label: SPR1.
 <p>STORAGE 存储 儲存設備</p> <p>ORACLE AMERICA, INC.  KCC-REM-SUN-SPA1</p> <p>Compliance Model Number (型号)(型號) SPA1</p>	Compliance packaging label: SPA1.
 <p> KCC-REM-SUN-SPS1</p>	KCC-SPS1.
 <p> KCC-REM-SUN-SPR1</p>	KCC-SPR1.
 <p> KCC-REM-SUN-SPA1</p>	KCC-SPA1.
 <p> D33012</p>	BSMI D-Mark.

Electromagnetic Emissions and Immunity

Table 51 Electromagnetic (EM) emissions and immunity

Standard
<ul style="list-style-type: none"> ● CISPR 22-A ● EN55022 Class A radiated and conducted emissions (110V/220V) ● EN55024 Immunity: <ul style="list-style-type: none"> ○ 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): <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">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</p> </div>
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:

- Emissions: EN55022 (Class A radiated and conducted, 110V, 230V)
- 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 52 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- Two control units (CUs)	32 pounds (14 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 53 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 53 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 54 Pilot safety and quality standards

Logo	Standard
	FCC (United States). This device complies with FCC Rules Part 15 for a class B digital device.
	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 55 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	98 pounds (44 kilograms)

Slammer Power Characteristics

Table 56 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 56 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 57 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: <ol style="list-style-type: none"> 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)
	Conformite Europeenne /DoC
	UL and CSA under UL (cUL)
	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 58 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 59 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 60 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 61 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)	61 pounds (27 kilograms)
Weight (FC)	59 pounds (26 kilograms)
Weight (SSD)	52 pounds (23 kilograms)

Brick Power Characteristics

Table 62 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):

Table 62 Brick power characteristics (continued)

Power characteristic	Value
	2.55A at 115V 1.17A at 230V 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 63 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: <ol style="list-style-type: none"> 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)
	Conformite Europeenne /DoC
	UL and CSA under UL (cUL)

Table 63 Brick safety and quality standards (continued)

Logo	Standard
	ISO 9001:2000 Registered manufacturing process

Brick Packaging and Transportation

Packaging meets the following requirements:

- For packages under 150 lb—International Safe Transit Association (ISTA 2A) Procedures 1 and 2.
- For packages over 150 lb—Network Equipment Building System (NEBS) core standards.

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

Pillar Axiom 600 PDU Hardware Specification

If you install non-Oracle PDUs, they must meet the Pillar Axiom 600 PDU specification, as outlined below.

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

Table 64 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 64 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 Axiom 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 65 Rack specifications for a Pillar Axiom 600 system

Criteria	Pillar Axiom rack	Non-Pillar Axiom rack (minimum requirements)
Height (inside)	42U or 73.5 inches (186.7 centimeters)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 19 inches (48.26 centimeters) panel • 17.7 inches (45 centimeters) rail-to-rail
Width	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 35 inches (88.9 centimeters) • 26–30 inches (66–76.2 centimeters) rail-to-rail 	<ul style="list-style-type: none"> • 35 inches (88.9 centimeters) overall • 26–30 inches (66–76.2 centimeters) rail-to-rail

Table 65 Rack specifications for a Pillar Axiom 600 system (continued)

Criteria	Pillar Axiom rack	Non-Pillar Axiom rack (minimum requirements)
Depth (outside)	39.5 inches (100.3 centimeters)	43 inches (109.2 centimeters) maximum
Front door	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Vented • 1 inches (2.54 centimeters) deep minimum • 1 inches (2.54 centimeters) clearance between front vertical channel and inside of frame
Rear door	<ul style="list-style-type: none"> • Vented • Lockable • Open left/right 	Vented
Sides	<ul style="list-style-type: none"> • Solid • Removable • Lockable • 1 inches (2.54 centimeters) between side and frame 	N/A
Vertical channels	<ul style="list-style-type: none"> • Square hole, unthreaded • 26 inches (66 centimeters) apart 	<ul style="list-style-type: none"> • EIA spacing • Front-to-rear mounting • Cage nuts • Square EIA-standard mounting holes required <p>We recommend that Pillar Axiom racks be used to install Pillar Axiom 600 hardware components.</p>
Vents	<ul style="list-style-type: none"> • Front and back doors • Top 	<ul style="list-style-type: none"> • Front and back doors • Top
PDU	<ul style="list-style-type: none"> • 4 PDUs • 90–240VAC, 50-60Hz • 20-30A 	<ul style="list-style-type: none"> • Redundant power • 90–240VAC, 50–60Hz • Wattage: 8350W

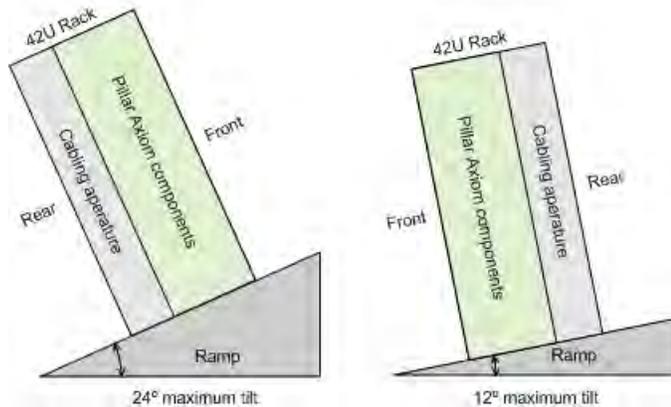
Table 65 Rack specifications for a Pillar Axiom 600 system (continued)

Criteria	Pillar Axiom rack	Non-Pillar Axiom rack (minimum requirements)
	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Pillar Axiom 600 systems: 28,500 BTU/hr 	<ul style="list-style-type: none"> Pillar Axiom 600 systems: 28,500 BTU/hr
Frame thickness	N/A	12 gauge to 14 gauge
Loaded weight	<ul style="list-style-type: none"> Pillar Axiom 600 systems: 1505 pounds (683 kilograms) 	<ul style="list-style-type: none"> Pillar Axiom 600 systems: 1505 pounds (683 kilograms)

The center of gravity of a populated Pillar Axiom 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 Axiom 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 *Pillar Axiom 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 *Pillar Axiom Administrator's Guide*.
 - No background tasks are running. Click **Tasks** on the status bar to open the Tasks overview page.
 - There are no outstanding administrator actions. Click on the Administrator Actions icon on the status bar to open the Administrator Actions overview page and to respond to any alerts that require intervention. For more information, refer to the *Pillar Axiom 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 *Pillar Axiom Administrator's Guide*.

Related references

- [Cable Length Limits for SAN Fibre Channel Connections](#)
- [Cable Length Limits for NAS Ethernet Connections](#)
- [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 Oracle Customer Support 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 Oracle Customer Support 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 administrator actions 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 an administrative action 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 administrator actions 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 Oracle Customer Support for assistance.

Important! If any administrator actions remain, contact Oracle Customer Support.

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 Oracle Customer Support 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 administrator actions for Topology errors or incompatible hardware or software and there should be no Topology Discovery tasks running.
- 13 After you complete the administrator actions to accept this Brick and after you have verified that the RAID controller firmware version is correct, repeat Step 7 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 BRICK-001, BRICK-002, 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 Oracle Customer Support 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 Oracle Customer Support 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 Oracle Customer Support.

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 Oracle Customer Support 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

Follow these steps to add a new Slammer on the Pillar Axiom 600 system to expand the system.

Prerequisite: The Pillar Axiom 600 system should be in shutdown state. For more information on how to shutdown the system and verify that the shutdown has completed successfully, refer to the *Pillar Axiom Administrator's Guide* or the *Pillar Axiom CLI Reference Guide*.

Slammer adds can be disruptive or non-disruptive. If you are adding the Slammer while the system is in normal running state, contact Oracle Customer Support for assistance to avoid data loss. For disruptive Slammer adds, follow the prerequisite of shutting down the Pillar Axiom system as indicated above.

- 1 Physically add the new Slammer to the system.
- 2 Connect the Ethernet and Fibre Channel cables.

For more information on cabling the Slammer in a Pillar Axiom 600 system, refer to the *Pillar Axiom 600 SSF Cabling Reference*

- 3 Attach the Slammer power cables to separate power distribution units (PDUs).

For more information on how to attach power cables, refer to the *Pillar Axiom 600 SSF Cabling Reference*.

- 4 Make sure the Slammer bezel is secure after adding the Slammer.
- 5 Power on the Slammer.
- 6 When you power on the Slammer, verify that the LEDs on the bezel and on the private interconnect module (PIM) are in the following states:
 - ST: Blinking green
 - ACT: Blinking green
 - FLT: Off

These LED statuses indicate that the Slammer control units (CUs) passed the power on self test and are ready to start up when the Pillar Axiom 600 system starts.

- 7 Restart the Pillar Axiom 600 system.

For more information on how to restart the Pillar Axiom system, refer to the *Pillar Axiom Administrator's Guide*.

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

- 8 Check that the system recognizes the new Slammer.

Result:

- The system adds the Slammer to the system configuration.
 - The system starts operating in Normal state.
 - Firmware updates to the Slammer control unit (CU) are completed successfully.
- 9 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.

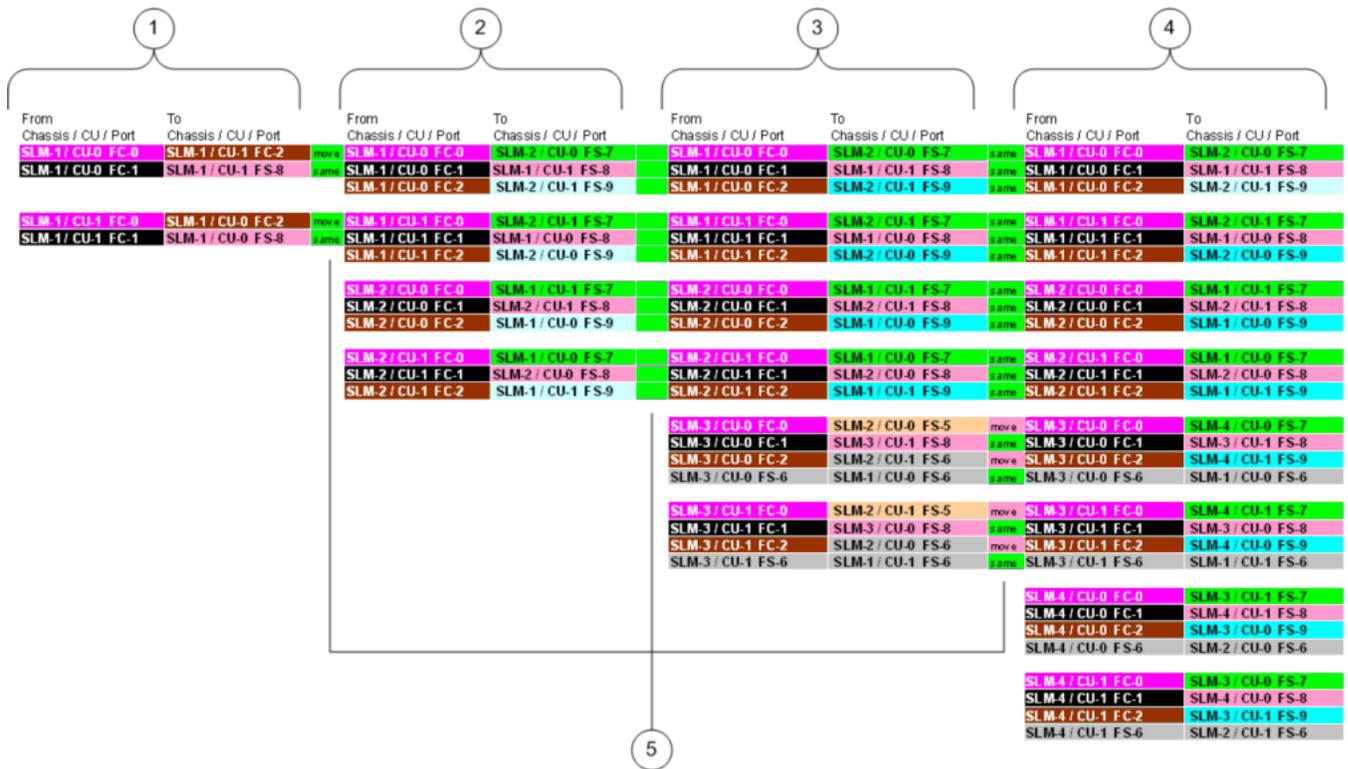
Related tasks

- [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.

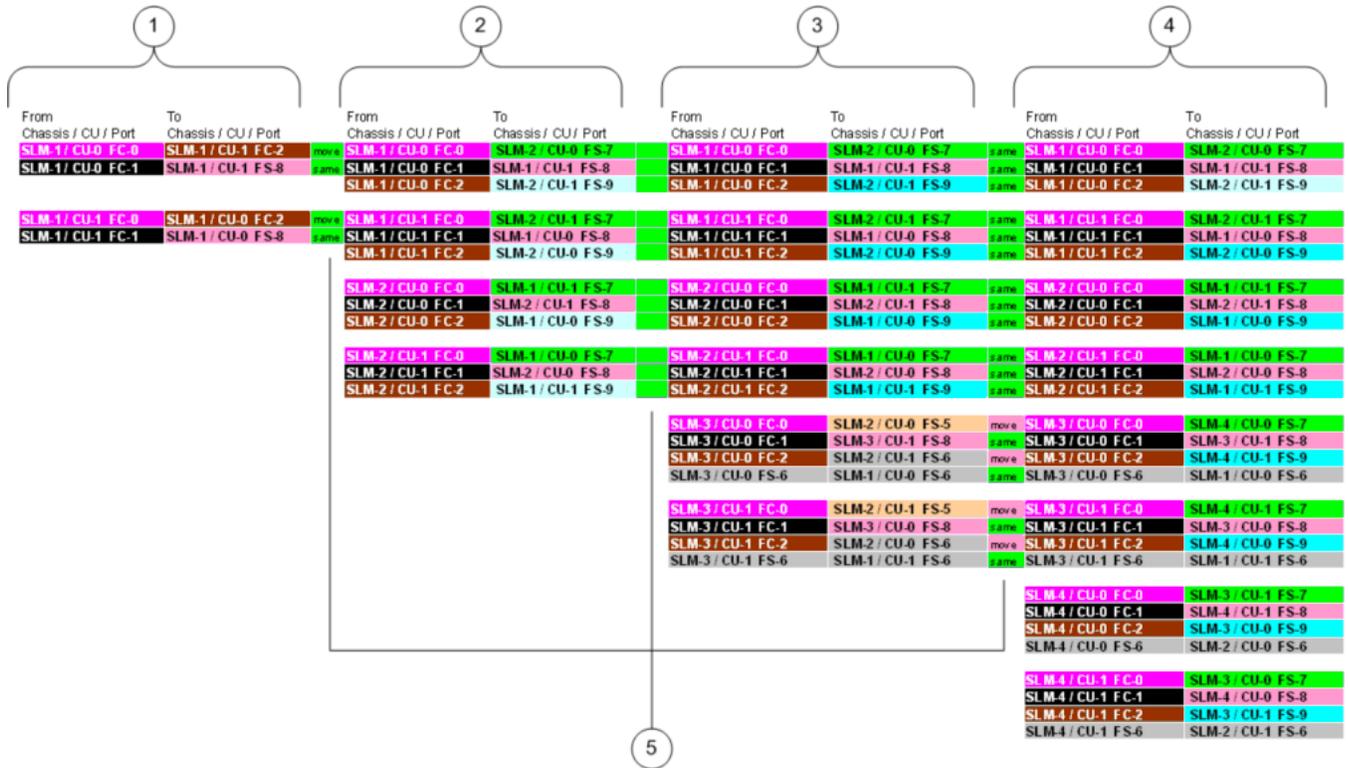
Table 66 Slammer cross connection configuration version 1 PIMs



Legend

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

Table 67 Slammer cross connection configuration version 2 PIMs

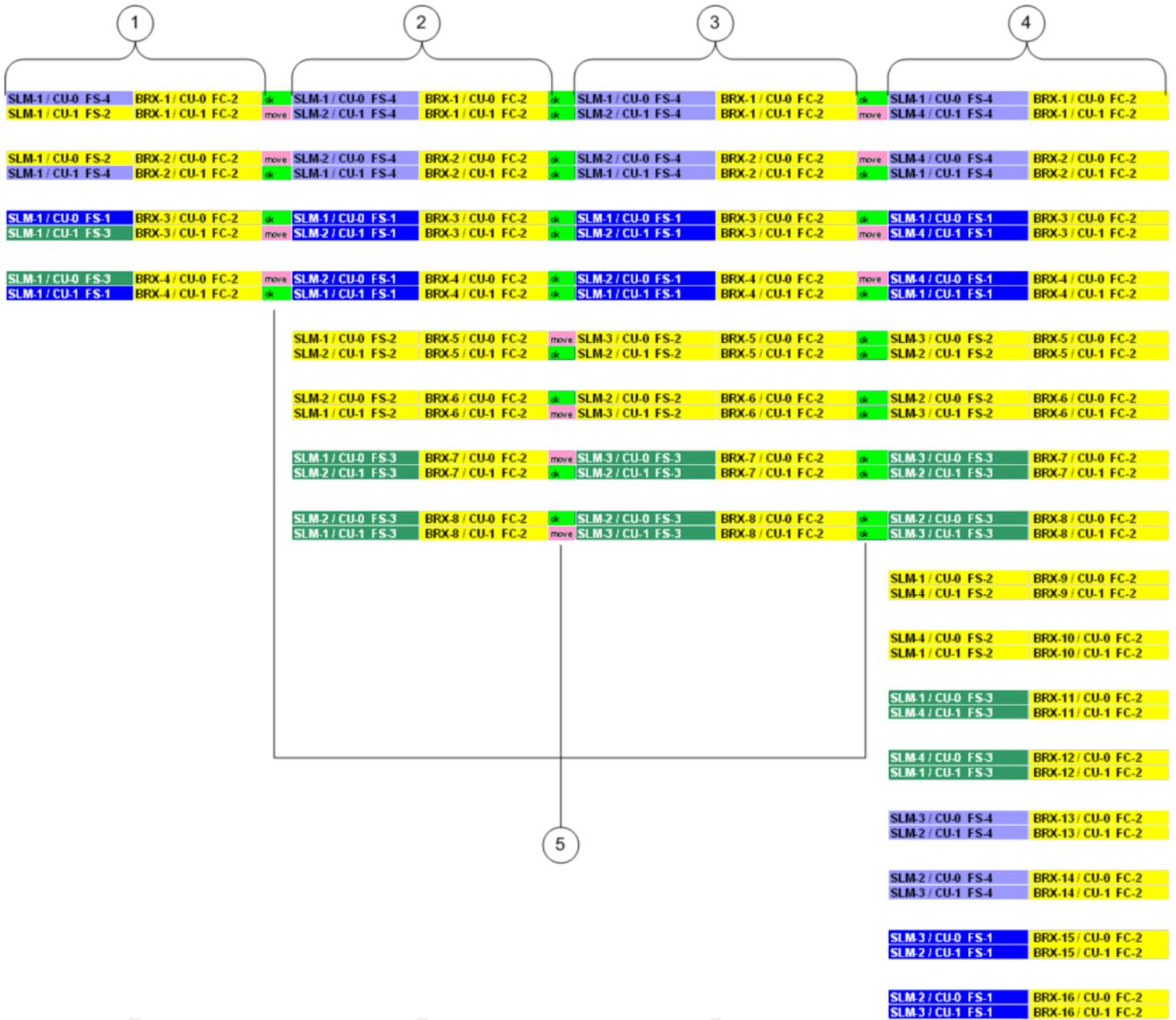


Legend

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

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 an upper layer of a Brick string of version 2 Bricks (SATA or FC RAID) attached to the new Slammer. The first Brick layer directly connected to the Slammers should be an SFP-SFP connection.

Table 68 Swapping head-of-string Brick cables



Legend

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

APPENDIX E

Replacement of a Slammer Storage Controller

About Replacing a Slammer

Replacing a Slammer in a Pillar Axiom 600 system involves cloning the original Slammer that must be replaced by replicating its World Wide Node Name (WWNN) and service type on to the replacement Slammer.

When you replace a Slammer, we recommend that you try to replace it with one in the same Slammer series for compatibility reasons.

You can mix all three Slammer series within the same system. However, mixing Slammers might require you to perform some additional cabling. The higher Slammer series (Series 3 and Series 4) use only version 2 private interconnect modules (PIMs). Additionally, you might also need new network interface modules (NIMs), if you replace a series 1 or series 2 Slammer with a series 3 Slammer.

To replace a series 1, series 2, or series 3 Slammer with a series 4 Slammer in a Pillar Axiom 600 system, you first need to upgrade to a software release of 4.6 or higher.

To replace a Slammer on a Pillar Axiom 300 or Pillar Axiom 500 system with a Pillar Axiom 600 Slammer, contact Oracle Customer Support or your service provider.

Important! Replacing and re-cabling a Slammer is a disruptive process and must be performed when the Pillar Axiom system has been shut down.

Related tasks

- [Replace the Slammer](#)

Complete the Slammer Replacement Prerequisites

Complete the prerequisite tasks outlined below prior to replacing a Slammer in a Pillar Axiom 600 system.

- 1 Perform an inventory of all cables, cloned Slammers, and any recommended hardware components that are required for the replacement.
- 2 Request a secure shell (SSH) key from Oracle Customer Support.

If the Pillar Axiom system is running software below release 4.5, request a support tool license from Oracle Customer Support. Download the secure shell (SSH) file and support license keys from the customer support portal or the FTP site specified by Oracle Customer Support.

- 3 Download the wiring diagram for your system configuration.

The wiring diagram for your system configuration can be downloaded from the Pillar Axiom Storage Services Manager GUI or the customer support portal. For more information on cabling your Pillar Axiom system, refer to the *Pillar Axiom SSF Cabling Reference*.

- 4 Verify that the World Wide Node Name (WWNN) and the service type on both control units (CUs) of the original and the replacement Slammer are the same.

If there is a mismatch between the WWNN and the service type of the original and replacement Slammer, make sure you clone the original Slammer by replicating the WWNN and the service type on the replacement Slammer.

Related tasks

- [Replace the Slammer](#)
- [Modify the Cloned Slammer](#)
- [Verify the Cloning of the Slammer](#)

About Cloning a Replacement Slammer

Cloning a Slammer means replicating the World Wide Node Name (WWNN) and the service type onto the replacement Slammer so that they are the same in both Slammers.

The original Slammer must be cloned before it can be replaced in a Pillar Axiom system.

The NVRAM on the midplane of each Slammer control unit (CU) contains the WWNN (also referred to as WWN/MAC Base Address in the graphical user interface (GUI)), which uniquely identifies the Slammer chassis.

The service type, also referred to as the CU_TYPE in the GUI, can have the following values:

- san
- nas_copper
- nas_optical

The WWNNs of the Slammer CUs is required to match the WWNN of the CUs in the cloned Slammer that is sent to the field. The WWNN of a Slammer CU is an 8-byte value represented as 16 hexadecimal digits, as in 2008000b08042312. You can determine the base WWNN or WWN/MAC base address of a Slammer by converting the fourth and the last digit from the front to “0”. For example, given a WWNN is 2008000b08040b42, the base WWNN would become 2000000b08040b40.

Usually, the replacement Slammer that is shipped to the customer site will have the same WWNN and service type as the original Slammer. However, we do recommend checking if the WWNN and service type on both the original Slammer and the replacement Slammer is the same. If the WWNN is not the same, you will be required to perform the cloning on site.

Note: For a given Slammer, the WWNN of only one of its CU is required. However, if you are unable to obtain this information because the Slammer is damaged, contact Oracle Customer Support.

Important! Verify that the WWNN and the service type are the same for both the Slammer CUs of the original and replacement Slammer.

Important! A mismatch between the WWNN and the service type of the original and the replacement Slammer can cause significant data loss.

Related tasks

- [Verify the Cloning of the Slammer](#)

Verify the Cloning of the Slammer

Perform the following tasks to verify the cloning to ensure that the World Wide Node Name (WWNN) and the service type on both control units (CUs) of the original and replacement Slammer match.

Prerequisites:

- A laptop that has been pre-configured with the Pillar Axiom supporttool.
- A 9-pin serial cable.

1 Identify all the existing Slammers on the Pillar Axiom system.

```
pdsccli sub -u adminAccount -p password -H {IPaddress | hostname}  
GetAllSlammers > outputFile
```

where:

- *adminAccount* is the name of the administrator account.
- *password* is the password associated with the administrator account.
- *IPaddress* is the IP address of the Pilot.
- *hostname* is the name of the Pillar Axiom system in the Domain Name Server (DNS) database.
- *outputFile* is the name of the text file that will contain the command output.

Result:

This step returns the list of World Wide Node Names (WWNNs) for the Slammers in the Pillar Axiom system. Redirecting the output of the `GetAllSlammers` command into the `Outfile.txt` allows you to review the results.

2 Using the Guided Maintenance (GM) module of the Pillar Axiom Storage Services Manager graphical user interface (GUI), identify all the Slammers on the Pillar Axiom system .

For more information on how to identify Slammers using GM, refer to the *Pillar Axiom 600 Service Guide*.

3 Record the Slammer names from the GUI and use it to locate the defective Slammer from the output in the `Outfile.txt` file in step 1. Then, mark each Slammer with its base WWNN.

- 4 Note the position of the Slammer in the rack to prevent misidentifying the defective Slammer.
- 5 Ensure that the label on the replacement Slammer matches the WWNN information of the original Slammers in the rack as indicated in step 1.
- 6 Connect the 9-pin serial cable to the 9-pin serial port on the replacement Slammer CU private interconnect module (PIM) and the other end to the serial port on the laptop.
- 7 Set up the serial terminal emulation software.
Required settings:
 - 115,200 bits per second
 - 8 bits no parity and 1 stop bit
 - No parity
 - No flow control
- 8 Set your serial terminal emulation software to the serial port on one of the Slammer CUs to record all output from the Slammer. You might be asked to provide a log of the recorded output to Oracle Customer Support.

We recommend downloading the freeware PuTTY utility (Putty 0.60 or higher) for Windows systems to include serial terminal capability.
- 9 Apply power to the replacement Slammer .
- 10 Record the Slammer base WWNN from the midplane on the Slammer CU
For Example: CU_GUID=2000000b08043f90
- 11 If the replacement Slammer WWNN matches the WWNN returned in Step 1 for the original Slammer, proceed with re-cabling the Pillar Axiom system .

Call Oracle Customer Support if the WWNN of the replacement Slammer does not match the WWNN returned in Step 1 for the original Slammer.
- 12 Check the midplane of the Slammer CU to identify the service type.
- 13 Repeat the above steps for the other CU of the Slammer.

Related concepts

- [About Cloning a Replacement Slammer](#)

Related tasks

- [Replace the Slammer](#)
- [Install a Slammer Storage Controller](#)
- [Complete the Slammer Replacement Prerequisites](#)

Modify the Cloned Slammer

Follow these steps to modify the World Wide Node Name (WWNN) on the Slammer only if the WWNN of the replacement Slammer does not match the WWNN of the original Slammer.

Prerequisites:

- The replacement Slammer must not have any Fiber Channel (FC) or Ethernet private interconnect (PI) connections to any Pillar Axiom system when you modify the cloning of the Slammer.
- A 9-pin serial cable.

You can change the WWNN by using the Electrically Erasable Programmable Read-Only Memory (EEPROM) utility on both of the Slammer CUs.

Note: You need to apply AC Power to only one power supply on one Slammer control unit (CU) at a time to clone the Slammer.

- 1 Connect one end of the serial console cable to a laptop serial port.
- 2 Set up the serial terminal emulation software.

Required settings:

- `115,200 bits per second`
 - `8 bits no parity and 1 stop bit`
 - `No parity`
 - `No flow control`
- 3 Set your serial terminal emulation software to the serial port on one of the Slammer CUs to record all output from the Slammer. You might be asked to provide a log of the recorded output to Oracle Customer Support.
 - 4 Connect the free end of the serial console cable to the serial port on the private interconnect module (PIM) on the back of the Slammer.
 - 5 Apply power to the Slammer CU to which the console cable is connected.
 - 6 Wait until the `microdms` utility is running on the Slammer.

The utility is running when the following message is displayed:
`microdms:
fans and temps OK after 30 secs in netboot`

When the above message appears, immediately perform the next step.

- 7 To prevent the `microdms` utility from resetting the Slammer CU, disable the utility.

The following command disables the `microdms` utility: `$ slay microdms`

This command also enables the EEPROM utility.

- 8 Enter the command `slay microdms` to disable the `microdms` utility and prevent it from resetting the Slammer CU. The `slay microdms` command also enables the EEPROM utility.

Important! Be sure to enter the above command before the `microdms` utility displays the following message:

```
microdms: fans and temps OK after 90 secs in netboot
```

Otherwise, the `microdms` utility resets the Slammer CU after 90 seconds. If the Slammer CU is reset by the `microdms` utility, wait until the first `microdms` output appears and enter the `slay microdms` command again.

- 9 Access the EEPROM utility menu.

To access the EEPROM utility menu, run the following command: `$`

```
eeprom
```

Result:

The EEPROM utility menu is displayed providing several options to select a field replaceable unit (FRU).

- 10 Enter `9` to select the Slammer chassis midplane.

Result:

The EEPROM utility indicates that the Slammer CU midplane is selected and provides the options for writing or reading the EEPROM.

- 11 Enter `1` to read the EEPROM and then enter `0` to indicate that the utility must perform the read operation.

Result:

The EEPROM utility verifies the selection of the Slammer CU midplane and displays a menu.

- 12 Enter `12` to select the WWN/MAC base address.

Result:

The WWN/MAC base address is displayed: **WWN/MAC Base Addr:** `0x2000000B080267d0`. Then, the EEPROM utility prompts you to enter the new WWN/MAC base address.

- 13 Enter the hexadecimal WWN/MAC base address without a `0x` prefix, as in `2000000B080466E0`.

Important! Make sure that you change only the WWN field. Entering incorrect information or modifying any other field other than the WWN/MAC Base Address can make the Slammer defective.

Result:

The utility now displays the new value for the Slammer WWN/MAC base address.

14 Confirm the new value for the Slammer WWN/MAC base address so that the EEPROM utility can write the new WWN/MAC base address information.

15 Repeat steps 1 to 14 to clone the other Slammer CU.

Important! Both CUs of the replacement Slammer must have the same WWNN before you physically replace the Slammer.

Proceed to replace the Slammer in the Pillar Axiom system.

Related tasks

- [Complete the Slammer Replacement Prerequisites](#)

Replace the Slammer

Follow these steps to replace the Slammer in a Pillar Axiom system.

- 1 Disconnect all Fiber Channel (FC) cabling from both the Slammer control unit (CU) private interconnect modules (PIMs), after the Pillar Axiom system has shut down.
- 2 If you want to re-use any of the field replaceable units (FRUs) such as the network interface modules or iSCSI cards in the replacement Slammer, remove them and set them aside.

Note: Some older versions of Slammer hardware might not be compatible in the newer versions of Slammer. For more information on compatibility between the different versions of Slammer hardware, refer to the *Pillar Axiom SSF Cabling Reference*.

Important! If the World Wide Node Name (WWNN) of the original Slammer does not match the WWNN of the cloned replacement Slammer, there might be a risk of data loss. Stop the upgrade process and contact Oracle Customer Support.

- 3 Remove the original Slammer from the rack and set aside for return.

For more information on how to remove a Slammer from the Pillar Axiom rack, refer to the *Pillar Axiom 600 Hardware Installation Guide*.



Caution

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

- 4 Install the cloned replacement Slammer into the rack and secure it using the mounting hardware.

For more information on how to install a Slammer in the Pillar Axiom rack, refer to the *Pillar Axiom 600 Hardware Installation Guide*.

- 5 Cable the Pillar Axiom system.

For more information on cabling the Pillar Axiom system, refer to the *Pillar Axiom 600 SSF Cabling Reference*.

- 6 Restart the Pillar Axiom system and monitor the system to detect any topology errors.

If there are topology errors, contact Oracle Customer Support for assistance.

- 7 After the Pillar Axiom system is in Normal status, contact Oracle Customer Support for assistance in verifying the Storage System Fabric (SSF).

Related concepts

- [*About Replacing a Slammer*](#)

Related tasks

- [*Complete the Slammer Replacement Prerequisites*](#)
- [*Verify the Cloning of the Slammer*](#)

Index

10 Gb/s Ethernet HBA
 LED status *133*
2U rack rails
 Bricks *49*
 Pilots *41*
4U rack rails *46*
8 Gb/s Ethernet HBA
 LED status *132*

A

acoustics specifications *185*
add (expand system)
 Brick *210, 213*
 Bricks *209*
 Slammers *214*
add Brick
 checklist *207*
add Bricks *207*
add Slammers *207*
additional resources *15*
administrator actions
 accept Brick *210, 213*
altitude specifications *184*
amperage
 component draw *120*
 PDU limits *112*
anti-tip brackets
 how to
 install *38*

B

batteries, Slammer
 how to
 install *75*
bays, rack
 attach baying plates *33*
 interconnection bracket *32*
 preparation *31*
bezel attachment *134*
boot-up time, system *149*
bracket, rack connector *32*
Brick hardware components

expanding the system *209*
hardware specifications *199*
how to

 add a new Brick *210*
 install *77*
 install rack rails *50*
 power on *122*
 replace *82*
 set identity of Bricks *80*
 test SSF connections *142*
 verify a new Brick *213*

placement

 1-Slammer systems *54, 56*
 2- and 3-Slammer systems *58*
 4-Slammer systems *60*

rail kit parts *49*

Brick storage enclosures
 cabling rules summary *91*

Bricks

 how to
 set identity *80*
 logical name *144*
 physical name *144*
 rename *144*

BSMI D-Mark *186*

C

cable connections (Fibre Channel)
 swapping cables when expanding *217*
cable lengths *197*
cable swapping
 when adding a Slammer
 head-of-string Brick cables *219*
 with version 1 PIMs *217*
 with version 2 PIMs *218*
cables
 fiber optic, test for failure *146*
cabling
 best practices *91*
 guidelines *91*
 manufacturing practices *91*
 Pillar Axiom 600 *85*

- private management interface (PMI) *85*
- rules *91*
- Storage System Fabric (SSF) *85*
- cabling, Pilot *107*
- casters *35*
- cautions
 - defined *24*
 - in English *180*
- CB Scheme by IEC/IEEE standard *186*
- checklist
 - add Brick *207*
 - pre-installation *207*
- clone replacement Slammer *222*
- cloning
 - replacement Slammer *224*
- complete the installation
 - supply power *122*
 - test SSF configuration *142*
 - turn on the system *122*
- components
 - Pillar Axiom 600 *85*
- components, Pillar Axiom 600 system
 - technical specifications *183*
- components, Pillar Axiom system
 - placement in rack
 - 1-Slammer systems *54, 56*
 - 2- and 3-Slammer systems *58*
 - 4-Slammer systems *60*
 - supported hardware *18*
- configuration limits
 - Pillar Axiom 600 *25*
- configuration, system
 - how to
 - test *142*
- Conformite Europeenne /DoC *186*
- connection bracket *32*
- conservative mode *208*
- contact information *15*
- contacts, Oracle *16*
- conventions
 - command syntax *17*
 - typographical *16*
- cUL compliance *186*
- customer supplied materials *21*
- customer support *15*

D

- data sheets *182*
- digital push button switch, ES module
 - how to
 - set Brick identification *80*
- dimensions and weight
 - Bricks *199*

- Pilots *192*
- Slammers *195*
- distance limitations
 - NAS ports *197*
 - SAN ports *197*
- documentation *15*
 - conventions *24*
 - feedback *15*
 - related to cabling *15*

E

- education programs *15*
- EIA-310-D compliance, rack *28*
- electrical safety issues
 - list of hazards (translated) *158*
- electromagnetic emissions and immunity *189*
- electrostatic discharge (ESD) *27*
- environment, data center
 - Pillar Axiom system requirements *184*
- equipment, required *21*
- ES modules, Brick
 - location *80*
- Ethernet *107*
- Ethernet LAN *104*
- European Union Compliance Statement *190*
- expanding a system
 - add Bricks *207*
 - add Slammers *207*
 - cable swaps *217*

F

- fabric, test *142*
- FC Bricks
 - placement
 - 1-Slammer systems *56*
 - 2- and 3-Slammer systems *58*
- FCC agency
 - compliance statement *186*
 - warning statement *189*
- feedback, documentation *15*
- fiber optic cables
 - handle *88*
 - test for failure *146*
- Fibre Channel (FC) Bricks
 - cabling rules summary *91*
- Fibre Channel switches *110*

G

- gigabit Ethernet switches *110*
- graphical user interface (GUI)
 - how to
 - login *142*
- ground straps

-
- door *138*
 - precautionary use of *27*
- H**
- halt, Slammer
 - codes *151*
 - halt, system
 - evaluate Slammer LED codes *150*
 - Slammer LEDs identify problem *149*
 - hardware specifications
 - acoustics *185*
 - altitude *184*
 - dimensions and weight
 - Bricks *199*
 - Pilots *192*
 - Slammers *195*
 - humidity *184*
 - PDU *202*
 - power characteristics
 - Bricks *199*
 - Pilots *192*
 - Slammers *195*
 - random vibration *185*
 - regulatory agency compliances
 - Bricks *200*
 - Pillar Axiom system *186*
 - Pilots *193*
 - Slammers *196*
 - temperature *184*
 - hardware, Pillar Axiom
 - LED boot-up codes *149*
 - placement maps
 - 1-Slammer systems *54, 56*
 - 2- and 3-Slammer systems *58*
 - 4-Slammer systems *60*
 - specifications *182*
 - supported *18*
 - hazard signal words
 - definitions *24*
 - translated *158*
 - host bus adapters (HBAs)
 - installation *136*
 - how to
 - cable PMI *85*
 - cable SSF *85*
 - handle fiber optic cables *88*
 - humidity specifications *184*
- I**
- identities
 - how to
 - set for Bricks *80*
 - installation procedures
- cable multiple racks *100*
 - connect PDUs to power *120*
 - create a rack bay
 - attach baying plates *33*
 - attach interconnection bracket *32*
 - equipment, required *21*
 - install 2U rack rails *41, 49*
 - install 4U rack rails *46*
 - install Bricks *77*
 - install Pilots *68*
 - install Slammer batteries *75*
 - install Slammers *73*
 - power on the system *122*
 - set up the racks *27*
 - test SSF cables *142*
 - tools, required *21*
 - turn system on *122*
- ISO 9001**
- 2000 manufacturing process *186*
- J**
- jumbo frames, prerequisites for *103*
- K**
- KCC-SPA1 *186*
 - KCC-SPR1 *186*
 - KCC-SPS1 *186*
- L**
- LED codes, Slammer
 - during halt *151*
 - during startup *151*
 - LED blink rates *150*
 - LED statuses
 - 10 Gb/s Ethernet HBA *133*
 - 8 Gb/s Ethernet HBA *132*
 - leveling legs *35*
 - login (GUI) *142*
- M**
- MGMT ports, Pilot *105*
 - mixed Brick types
 - connection rules *91*
 - mounting rail kits
 - Brick *49*
 - Pilot *41*
 - Slammers *46*
- N**
- network connections, customer
 - hardware requirements
 - Pilot *104, 107*
 - Slammers *109*
-

- how to
 - connect the Pilot *104, 107*
 - connect the Slammers *109*
- network interface module (NIM)
 - connects system to data path *109*
- non-disruptive upgrade
 - Brick *209*
 - Slammer *215*
- notice conventions, safety *24*

O

- online help *15*
- Oracle Technical Network (OTN) *15*

P

- panel removal, rack *31*
- password, administrator
 - give to Primary system administrator *142*
 - how to
 - reset *148*
- PDU
 - amperage limits *112*
 - hardware specifications *202*
 - how to
 - install 1U PDUs *64*
 - install 2U PDUs *66*
 - power on components *122*
- Pillar Axiom 600
 - configuration limits *25*
- Pillar Axiom 600 system
 - hardware specifications *183*
- Pillar Axiom Path Manager (APM)
 - about installation *147*
- Pillar Axiom storage system
 - how to
 - connect to the data network *109*
 - connect to the management LAN *104*
 - connect to the Pilot CU *107*
 - using jumbo frames *103*
 - warranty *191*
- Pilot
 - versions *70*
- Pilot hardware components
 - hardware specifications *192*
 - how to
 - install *68*
 - install rack rails *42*
 - power on *122*
 - IP address *142*
 - rail kit parts *41*
 - where to install *68*
- placement of components in rack
 - 1-Slammer systems *54, 56*
 - 2- and 3-Slammer systems *58*
 - 4-Slammer systems *60*
- position the Pillar Axiom rack
 - level the rack *35*
 - stabilize the rack *37*
- power
 - cabling examples
 - sixteen Bricks *117*
 - three Bricks *114*
 - characteristics (hardware components)
 - Bricks *199*
 - Pilots *192*
 - Slammers *195*
 - component usage *120*
 - feed requirements of the system *183*
- power on the system *122*
- pre-installation
 - checklist *207*
- pre-replacement
 - prerequisites
 - Slammer *221*
- prerequisites
 - pre-replacement
 - Slammer *221*
 - replace Slammer *221*
- private management interface (PMI)
 - cabling *85*
- product support *15*
- progress codes, Slammer startup *150*

R

- rack bays
 - attach baying plates *33*
 - interconnection bracket *32*
- rack rails
 - how to
 - install for Bricks *50*
 - install for Pilots *42*
 - install for Slammers *47*
- rack-mounted systems
 - unpacking *29*
- racks
 - doors and panels *138*
 - EIA-310-D compliance *28*
 - how to
 - level *35*
 - stabilize using anti-tip brackets *38*
 - stabilize using stabilizer plates *39*
 - test SSF configuration *142*
 - multiple *31*
 - power connection *120*
 - stabilization
 - methods *37*

- stabilizer plates *39*
- unpacking *29*
- recycling program *186*
- regulatory agency compliances
 - electromagnetic emissions and immunity *189*
 - safety and quality standards
 - Bricks *200*
 - Pillar Axiom systems *186*
 - Pilots *193*
 - Slammers *196*
- related books *15*
- replace Slammer *220, 229*
- replacement procedures
 - replace Bricks *82*
- replacement Slammer
 - cloning *224*
- replacing a Slammer
 - clone Slammer *220, 222*
- RoHS compliance *186*

S

- safety
 - notice conventions *24*
 - statements
 - translated *158*
- safety and quality standards
 - Bricks *200*
 - Pillar Axiom systems *186*
 - Pilots *193*
 - Slammers *196*
- sales information *16*
- SAN environments
 - APM installation *147*
- SATA Bricks
 - placement in rack *54*
- Serial ATA (SATA) Bricks
 - cabling rules summary *91*
- Slammer
 - how to replace *229*
 - modify cloning *226*
- Slammer cloning
 - how to modify *226*
- Slammer hardware components
 - expanding the system *214*
 - hardware specifications *195*
 - how to
 - install *73*
 - install batteries *75*
 - install rack rails *47*
 - power on *122*
 - test SSF connections *142*
- LED codes
 - halt *150, 151*

- startup *151*
- LED status
 - 10 Gb/s Ethernet HBA *133*
 - 8 Gb/s Ethernet HBA *132*
- mixing PIM versions *215*
- placement maps
 - 1-Slammer systems *54, 56*
 - 2- and 3-Slammer systems *58*
 - 4-Slammer systems *60*
- rail kit parts *46*
- Slammer storage controllers
 - cable swaps when adding Slammers
 - head-of-string Brick cables *219*
 - with version 1 PIMs *217*
 - with version 2 PIMs *218*
- Solid State Drive (SSD) Bricks
 - cabling rules summary *91*
- SPA1 *186*
- SPR1 *186*
- SPS1 *186*
- stabilization systems, rack
 - anti-tip brackets *38*
 - stabilizer plates *39*
- startup
 - time *149*
- startup, Slammer
 - codes *151*
- Storage System Fabric (SSF)
 - cabling *85*
 - cabling rules summary *91*
 - how to
 - test configuration *142*
 - swapping cables when expanding *217*
- sub-floor tie-down system *37*
- Support portal *15*
- swapping cables when expanding a system *217*
- switches, network
 - Fibre Channel *110*
 - gigabit Ethernet *110*
 - zone setup (SAN) *137*
- syntax conventions *17*
- system, Pillar Axiom
 - how to
 - test the configuration *142*
 - warranty *191*

T

- technical support *15*
- temperature specifications *184*
- tie-down system, sub-floor *37*
- tools, required *21*
- training programs *15*
- turn on Pillar Axiom systems *122*

TUV/GS compliance *186*
typographical conventions *16*

U

unpacking
 rack-mounted systems *29*
 racks *29*

V

versions, hardware component
 PIMs *215*
vibration specifications, system *185*

W

warnings
 defined *24*
 in English *159*
 non-English translations *158*
warranty information *191*