Pillar Axiom® 600

SSF Cabling Reference

pillar®
DATA SYSTEMS

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Preface

Audience

This documentation is intended for service technicians, field engineers, and other individuals who install, maintain, and troubleshoot Pillar Axiom Storage Systems.

You should have the necessary skills and experience in using:

- Computer hardware and its operation.
- Electrostatic discharge (ESD) procedures.

To perform any of the following tasks, you should also have a basic understanding and working knowledge of Pillar Axiom systems:

- Cable the Storage System Fabric (SSF) and private management interface (PMI) easily.
- Enhance the throughput of an existing system by adding and cabling one or more Slammer storage controllers into an existing system.
- Enhance the capacity of an existing system by adding and cabling one or more Brick storage enclosures into an existing system.

Before You Read This Reference

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

This reference contains information about the backend Storage System Fabric (SSF) and private management interface (PMI)) cabling of a Pillar Axiom system. Refer to the *Pillar Axiom Hardware Installation Guide* to cable the Pilot management controller to the customer LAN, the Slammer to the data network, and the power cables.

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

- Slammer and Brick configuration limits
- Network requirements
- System limits
- Known issues
- Errata for technical documents, including this reference

Refer to the *Pillar Axiom Service Guide* for procedural and reference information to remove and insert the various field replaceable units (FRUs) within a Pillar Axiom system.

How This Reference Is Organized

This reference provides reference information for cabling the Storage System Fabric (SSF), a private interconnect (PI) among the Bricks and Slammers in a Pillar Axiom 600 system.

The reference is divided into seven major parts:

- Part I provides an introduction to cabling the PI.
- Part II provides cabling examples, block diagrams, and port-to-port cabling connections for 1-Slammer systems configured with serial ATA (SATA) Bricks.
- Part III provides cabling examples, block diagrams, and port-to-port cabling connections for 2-Slammer systems configured with SATA Bricks.
- Part IV provides cabling examples, block diagrams, and port-to-port cabling connections for 1 and 2-Slammer systems configured with Fibre Channel (FC) Bricks.
- Part V provides cabling examples, block diagrams, and port-to-port cabling connections for 3-Slammer systems.
- Part VI provides cabling examples, block diagrams, and port-to-port cabling connections for 4-Slammer systems.
- Part VII provides two appendixes that provide:
    - Connection lists that show required cable swaps when adding additional Slammers to a system. Note that upgrade information is beyond the scope of this book.

- General cabling rules.

Related Documentation

Table 1 Additional information resources

Description	Title
The definitions of terms found in Pillar Axiom documentation.	*Pillar Glossary*
Instructions for installing hardware components into Pillar and non-Pillar racks.	*Pillar Axiom 600 Hardware Installation Guide*
Removal and insertion instructions for field replaceable units (FRUs).	*Pillar Axiom 600 Service Guide*
Any late breaking information regarding Pillar Axiom systems.	*Pillar Axiom Customer Release Notes*

Access Documentation

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

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

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

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

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

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

Typographical Conventions

Table 2 Typography to mark certain content

Convention	Meaning
italics	Within normal text, words in italics indicate: • A reference to a book title. • New terms and emphasized words. • Command variables.
`monospace`	Indicates one of the following, depending on the context: • The name of a file or the path to the file. • *Output* displayed by the system on the command line.
`monospace` (bold)	*Input* provided by an administrator on the command line.
>	Indicates a menu item or a navigation path in a graphical user interface (GUI). For example, “Click **Storage > Clone LUNs**” means to click the **Clone LUNs** link on the **Storage** page in the graphical user interface (GUI).
...	Used within an expression of a navigation path or within a cascading menu structure. The ellipsis indicates that one or more steps have been omitted from the path or menu structure. For example, in the **Groups > Volume Groups > Actions > ... > Data Protection > Create** menu structure, the **...** implies that one or more menu items have been omitted.

Pillar Contacts

Table 3 Contacts at Pillar Data Systems

For help with...	Contact...
Error messages, usage questions, and other support issues	US and Canada: 877-4PILLAR (1-877-474-5527) Europe: +800 PILLAR FS (+800 74 55 27 37) Asia Pacific: +1-408-518-4515 South Africa: +0 800 980 400 Have your system serial number ready. support@pillardata.com Customer support portal (https://support.pillardata.com/login.do)
Training (custom or packaged)	Training and Education (http://www.pillardata.com/support-education/training/)
Sales and general contact information	Company contacts (http://www.pillardata.com/company/contact)
Documentation improvements and resources	docs@pillardata.com Technical documents (http://www.pillardata.com/techdocs) (Log in with your username and password, and select Documents.)

Part I: Introduction to Cabling Pillar Axiom 600 Systems

SHEET 1

About This Reference

Cautions and Warnings

Hazard signal words conform to the American National Standards Institute (ANSI) Z535.4-2002 meanings.

Caution	Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury or data loss.
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.

SHEET 2

Introduction to Cabling the Pillar Axiom System

About Cabling a Pillar Axiom System

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

Cabling the Pillar Axiom systems consists of two parts:

- Front-end cabling, which involves connecting the Slammer to the customer's data network, and connecting the Pilot to the customer's management network. The Pilot connection uses Ethernet. The Slammer cable connections to the data network uses Fiber Channel (FC) or Ethernet, depending on the Slammer.
- Back-end cabling, which involves cabling the Storage System Fabric (SSF), sometimes referred to as the private interconnect, or simply PI, and the private management interface (PMI).

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

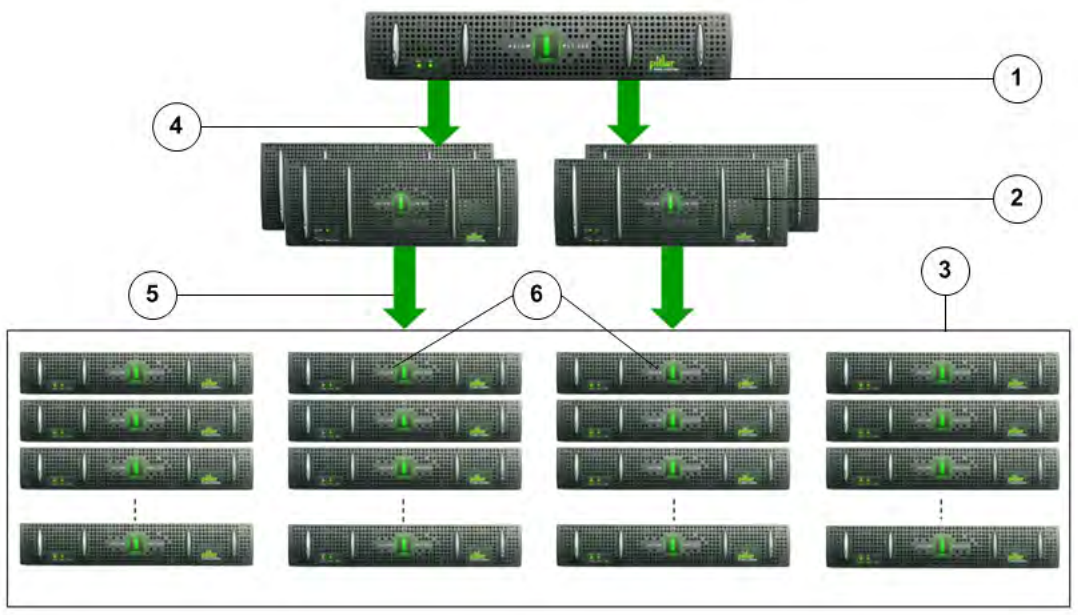
The SSF cables provide the inter and intra-cabling connections between the Bricks and the Slammers to support all data traffic, the cross connections among the Slammer control units (CUs), and the cross connections among the Brick CUs.

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

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

Figure 1 provides a symbolic illustration of the back-end cabling in a sample Pillar Axiom system.

Figure 1 Pillar Axiom back-end cabling overview



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

Configuration Limits for a Pillar Axiom 600 System

The minimum configuration of the Pillar Axiom system is:

- One Pilot
- One Slammer

- One Brick

The maximum configuration of the Pillar Axiom system is:

- One Pilot
- Four Slammers
- 64 Bricks

Table 4 defines the maximum configuration limits for a Pillar Axiom 600 system. The maximum number of Bricks that a Pillar Axiom system can support depends on the number of Slammers in the system. The maximum configurations are given in terms of width (the number of strings), depth (the number of Bricks for each string), and the maximum number of Bricks that the system supports.

Table 4 Configuration limits for a Pillar Axiom 600 system

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

Brick storage enclosures can contain Fibre Channel (FC), Serial ATA (SATA), or solid state drives (SSDs), depending upon the type of RAID controllers.Table 5 further classifies the configuration limits by the type of Bricks in the Pillar Axiom 600 system. The maximum number of a specific Brick (SATA, FC, or SSD) allowed in the Pillar Axiom system also depends on the number of Slammers in the system.

Table 5 Brick Configuration limits for the Pillar Axiom 600 system

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

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

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

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

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

Supported Hardware Components

Pillar Axiom systems support different versions of hardware that may impact the cable connections.

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

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

Different versions are available for the following Pillar Axiom hardware components that may impact cabling:

- Slammer storage controllers
- Private interface modules (PIMs)
- Serial ATA (SATA) RAID controllers
- FC RAID (FCR) controllers

Supported Slammer Storage Controllers

Slammers are available in three different series and are classified based on the versions of hardware components that the Slammer supports such as the motherboard, the network interface module (NIM), and the private interface module (PIM).

The table below lists these Slammers and the field replaceable units (FRUs) associated with them, including their part numbers.

Table 6 Slammer series compatibility list of supported FRUs

Slammer series	Supported motherboard	Supported NIMs	Supported PIMs
Series 1: 1400-00052-2X	1450-00185–XX	1450-00132–XX 1450-00135–XX 1450-00168–XX 1450-00169–XX	1450-00138–XX 1450-00193–XX
Series 2: 1400-00058-2X and 1400-00058-3X	1450-00199–XX	1450-00132–XX 1450-00135–XX 1450-00168–XX 1450-00169–XX	1450-00138–XX 1450-00193–XX
Series 3: 1400-00076-3X and 1400–00080–3X	1450-00219–XX	1450–00132–XX 1450-00135–XX 1450-00168–XX 1450-00169–XX 1450-00257–XX 1450-00261-XX	1450-00193–XX

Supported Private Interconnect Modules (PIMs)

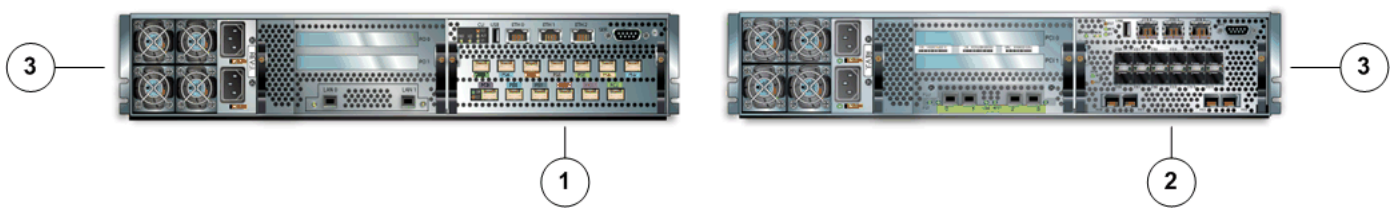
Each Slammer series contains a different version of private interconnect module (PIM). Because these PIMs differ, the cabling of these PIMs differs as well.

The types of connectors and cables for these PIM versions are listed as follows:

- 13-port (FC) PIM, referred to as version 1 supports HSSDC type connectors and cables. These cables allow a fabric speed of 2 Gb/s.
- 16-port (FC) PIM, referred to as version 2 supports small form-factor pluggable (SFP) type connectors. These SFPs can be copper cables (2 Gb/ s) or fibre cables (4 Gb/s), depending on what other components are installed on the Pillar Axiom system.

Figure 2 indicates the hardware versions available for the PIM.

Figure 2 PIM versions



Legend	
1	Version 1 PIM
2	Version 2 PIM
3	Slammer control unit (CU)

Note: A Slammer contains two homogeneous control units (CUs). Both CUs contain either version 1 or version 2 PIMs. In the above image, only one of those CUs is shown.

Because version 1 and version 2 PIMs use different protocols, version 1 and version 2 PIMs cannot co-exist in the same Slammer chassis. In other words, you cannot use one version to replace the other. You can, however, replace all version 1 PIMs in the Slammer with version 2 PIMs, if you replace all version 1 PIMs at the same time.

Note: A multi-Slammer Pillar Axiom system can contain a mix of version 1 and version 2 Slammers. However, a given Slammer cannot mix PIM versions.

Important! Pillar Data Systems offers a set of SFP modules for version 2 PIMs, version 2 SATA RAID controllers, and version 2 FC RAID controllers. When using optical connections, use only Pillar provided SFP modules for version 2 PIMs. When using copper connections, use only Pillar provided FC copper cables.

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

The cabling of the Fiber Channel (FC) fabric among the Slammer CUs and the Brick CUs differ, depending on the version of PIM in the Slammer.

Supported SATA RAID controllers

Each Slammer series contains a different version of SATA RAID controller. Because these SATA RAID controllers differ, the cabling of these SATA RAID controllers differ as well.

The types of ports in these SATA RAID controller versions are listed as follows:

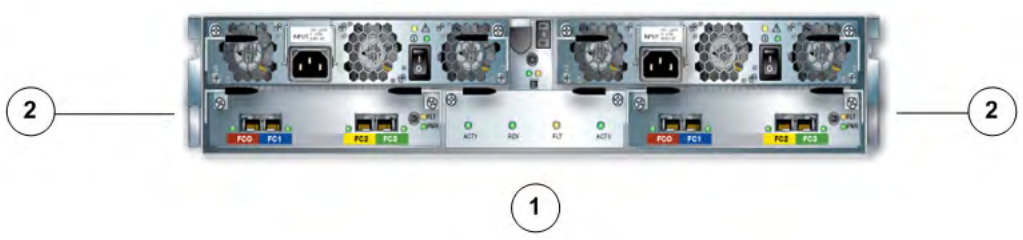
- Version 1 (legacy) controllers have one set of four Fibre Channel (FC) ports and appear in the GUI as type SATA.
- Version 2 controllers have two pair of FC ports and appear in the GUI as type SATA V2.

The following figure depicts the Version 1 SATA RAID controller.

Figure 3 Version 1 SATA RAID controller

Legend	
1	SATA version 1 Brick
2	SATA version 1 RAID controllers

Figure 4 Version 2 SATA RAID controller



Legend	
1	SATA version 2 Brick
2	SATA version 2 RAID controllers

Because version 1 and version 2 SATA controllers use different internal communication protocols, these two types of SATA controllers cannot co-exist in the same Brick chassis. In other words, you cannot use a version 2 SATA controller to replace a legacy version 1 controller. A Pillar Axiom system can, however, contain a mix of version 1 and version 2 SATA Bricks.

Note: A Brick contains two homogeneous control units (CUs). Both CUs contain either version 1 or version 2 SATA RAID controllers.

Additionally, the cabling of the Fiber Channel (FC) fabric among the Brick CUs and the Slammers differs, depending on the version of SATA controller in the Brick.

Supported FC RAID Controllers

Each Slammer series contains a different version of Fiber Channel RAID (FCR) controller. Because these FC RAID controllers differ, the cabling of these FC RAID controllers differ as well.

FC RAID controllers are located in Bricks. The cabling of these controllers depends on the version of the controller.

The types of connectors and cables for these FC RAID controller versions are listed as follows:

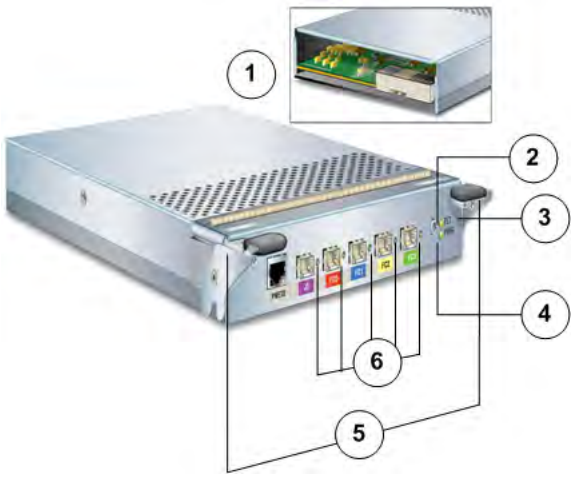
- Version 1 (legacy) FC RAID (FCR) controllers that appears in the GUI as type FC.

- Version 2 FC RAID (FCR) controllers that appears in the GUI as type FC V2.
- FC Expansion (FCE) controllers have ports PNet0, PNet1, J0, and J1 to connect to an FCE Brick.

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

The following figure shows a version 1 FC RAID controller for an FC RAID Brick.

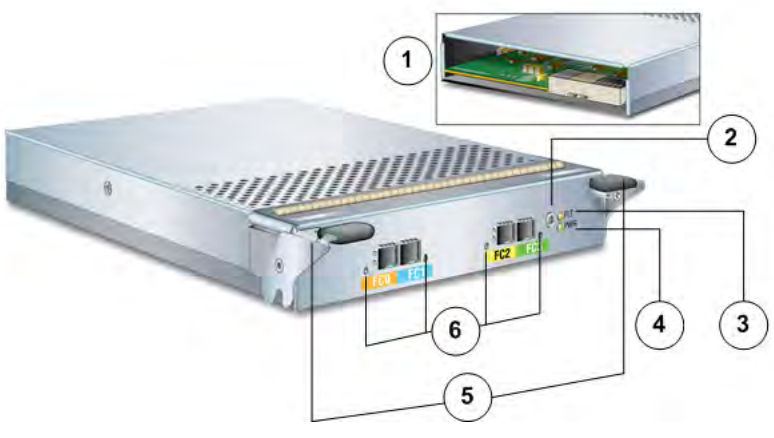
Figure 5 Version 1 FC RAID controller in an FC RAID Brick



Legend		
	1 Back view of version 1 FCR controller	4 Power LED
	2 Screw	5 Locking tabs
	3 Fault (FLT) LED	6 FCR controller LEDs

The following figure shows a version 2 FC RAID controller for an FC RAID Brick.

Figure 6 Version 2 FC RAID controller in an FC RAID Brick

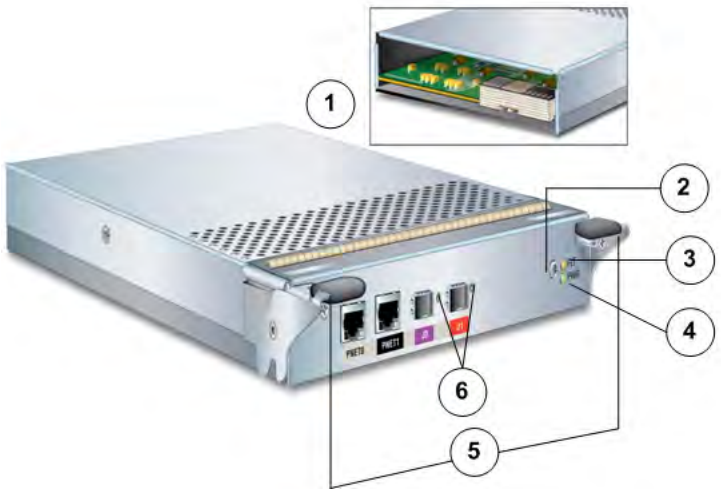


Legend		
	1 Back view of version 2 FCR controller	4 Power LED
	2 Screw	5 Locking tabs
	3 Fault (FLT) LED	6 FCR controller LEDs

Note: The FC RAID controllers displayed above are representative. The FC RAID controllers that are installed in your Brick may differ.

The following figure shows a RAID controller for an FC Expansion Brick.

Figure 7 RAID controller FRU in a FC Expansion Brick



Legend		
	1 Back view of FCE controller	4 Power LED
	2 Screw	5 Locking tabs
	3 Fault (FLT) LED	6 FCE controller LEDs

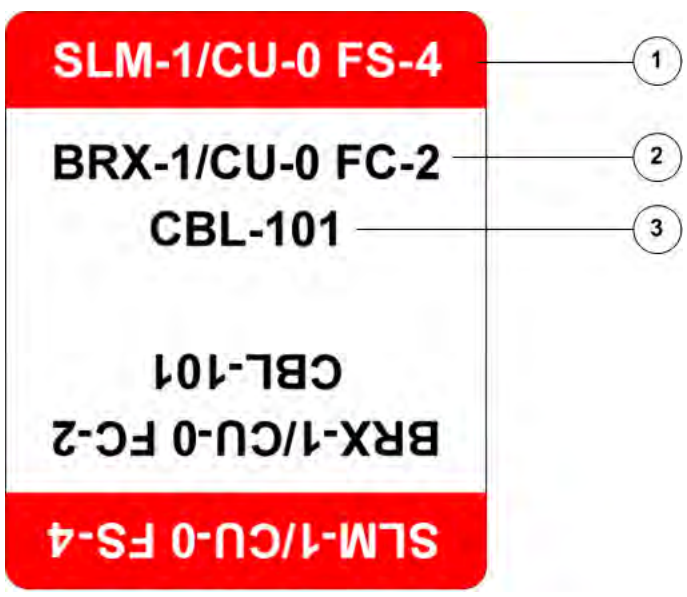
About Cable Labels

The cables that provide the pathways for the Storage System Fabric (SSF) are labeled at each end using a label.

The label wraps around the cable and sticks to itself in a way that provides a colored flag with printed information such as shown in the figure below. The printing is duplicated at each end of the label so that it can be read from either side.

Figure 8 provides an illustration of a sample cable label.

Figure 8 FC cable label sample

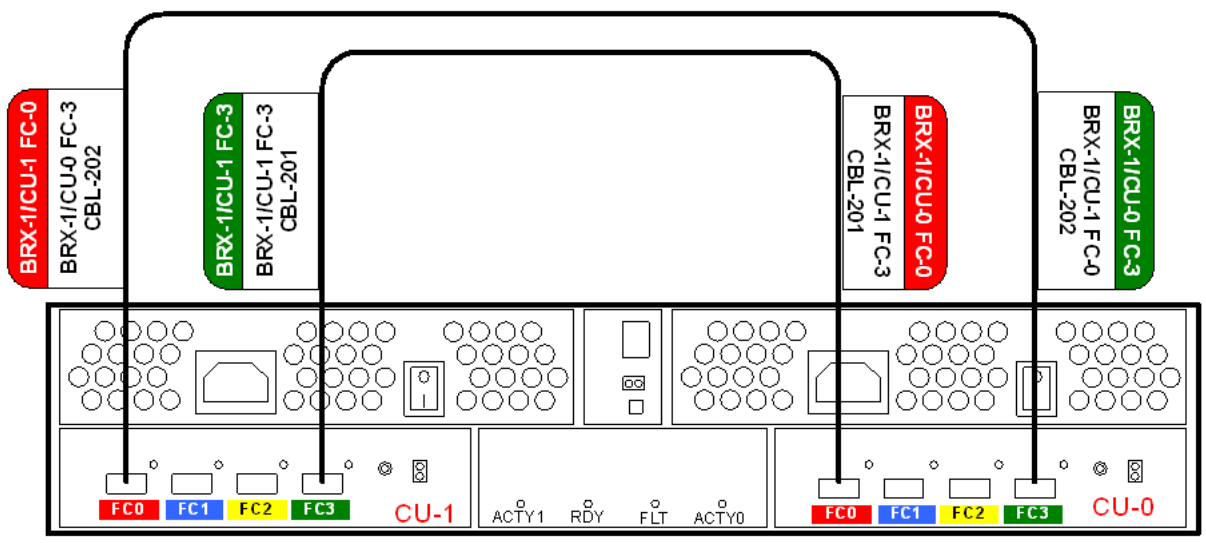


Legend	
	1 Slammer 1, CU 0, FS port number 4
	2 Brick 1, CU 0, FC port number 2
	3 Cable number

Note: This cable number is the same at both ends of the cable and is useful when tracing the other end of a loose cable in a cabinet.

Figure 9 provides an example of how the cable labels are wrapped at both ends of the cable.

Figure 9 Labels at the end of the cables



Cables and Connectors

Several different cables and connectors can be used to connect the various components of the Pillar Axiom system.

Table 7 provides a list of the cables and connectors, their required lengths, part numbers, and the specific hardware versions with which they are used.

Table 7 Cables and connectors

Type	Description	Part number	Cable length	Illustration
Fiber Channel (FC) (HSSDC2–HSSDC2) cables	Used in Pillar Axiom configurations with version 1 hardware: • Version 1 PIMs • Version 1 SATA RAID controllers • Version 1 FC RAID controllers • Version 1 FC Expansion (FCE) controllers	6051-00021-00	6.56 feet (2 m)	
		6051-00026-00	1.64 feet (0.5 m)	
Small form-factor pluggable FC cables or SFP-SFP cables	Used in Pillar Axiom configurations with version 2 hardware: • Version 2 PIMs • Version 2 SATA RAID controllers • Version 2 FC RAID controllers	6051-00085-00	3.28 feet (1 m)	
		6051-00086-00	6.56 feet (2 m)	
		6051-00087-00	1.64 feet (0.5 m)	
SFP Plus modules and cables: (Optical and copper)	Used with Pillar Axiomconfigurations of: • 10 Gb/s Ethernet connections in NAS Slammers • 8 Gb/s Fibre Channel (FC)	3131-02860-00	16.40 ft (5m) **Note:** Passive copper cables are available with the SFP Plus module attached to each end of the cable for use with 10 Gb/s NAS only.	

Table 7 Cables and connectors (continued)

Type	Description	Part number	Cable length	Illustration
	connections in SAN Slammers			
Hybrid adapter FC cables or SFP-HSSDC2 cables	Used in Pillar Axiom configurations where there is a mixture of version 1 hardware interconnected with version 2 hardware.	6051-00088-00	6.56 feet (2 m)	
Optical cables	Used in Pillar Axiom 600 configurations for a 4 Gb/s Storage System Fabric (SSF) speed with: • Series 2 Slammers • Version 2 PIMs, • Version 2 SATA RAID controllers • Version 2 FC RAID controllers (FCR)	6051-00090-00:	1.64 feet (0.5 m)	
		6051-00031-00	3.28 feet (1 m)	
		6051-00091-00	6.56 feet (2 m)	
		6051-00032-00	9.84 feet (3 m)	
SFP-optical cable with pluggable transceivers	Used in Pillar Axiom 600 configurations for a 4 Gb/s Storage System Fabric (SSF) speed with : • Series 2 Slammers • Version 2 PIMs • Version 2 SATA RAID controllers • Version 2 FC RAID controllers (FCR)	3131-02727-00	Cable length required	
Serial null modem cable	Connects the two control units (CUs) of the Pilot and establishes a heartbeat connection.	6050-00054-00	1.1 feet (0.36 m)	
Ethernet cables	Ethernet cables connect the two CUs of the Pilot to support the Intelligent Platform Management Interface (PMI).	6051-00045-00	1.64 feet (0.5 m)	
		6051-00046-00	1.64 feet (0.5 m)	
		6051-00047-00	1.64 feet (0.5 m)	
	Ethernet cables are used to establish a fast Ethernet network	6051-00057-00	6.56 feet (2 m)	
		6051-00058-00	6.56 feet (2 m)	

Table 7 Cables and connectors (continued)

Type	Description	Part number	Cable length	Illustration
	between the Pilot and the Slammers.			

Caution To disconnect the cables from the HSSDC connectors, carefully grasp the cable connector and, while pushing the connector gently into the socket, press the latch on the top of the connector to unlatch it.

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.

The following cable lengths are used to connect the various components within the Pillar Axiom system:

- Cable lengths for Slammer to Brick connections: 6.56 feet (2.0 m)
- Cable lengths for Brick to Brick (FC-1 to FC-2) connections: 6.56 feet (2.0 m)
- Cable lengths for cross connections between the CUs of the Brick (FC-0 to FC-3) depend on the Brick type:
  - Version 1 SATA Bricks: 1.64 feet (0.5 m)
  - Version 2 SATA Bricks: 3.28 feet (1.0 m)
  - Version 1 FC RAID (FCR) Bricks: 1.64 feet (0.5 m)
  - Version 2 FC RAID (FCR) Bricks: 3.28 feet (1.0 m)
  - Version 1 FC Expansion (FCE) Bricks: 1.64 feet (0.5 m)

Effects of Cable Types on Fabric Speed

The Storage System Fabric (SSF) can operate at 2 Gb/s (copper) or 4 Gb/s (optical) depending on the hardware that you have configured and on the cabling you have installed.

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

- Both control units (CUs) in all the Slammers must contain a combination of only version 2 PIMs.
- Both CUs in all the Bricks must contain only version 2 SATA RAID controllers or version 2 FC RAID (FCR) controllers.
- All ports on the version 2 PIMs, version 2 SATA RAID controllers, and version 2 FC RAID controllers (FCR) must contain only 4 Gb/s small form-factor pluggable (SFP) connectors.
- The patch cables connecting these 4 Gb/s SFPs must be optical.

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

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

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

- A version 1 FC Brick is configured into the storage array.
- A version 1 SATA Brick or version 1 PIM is included in the configuration.
- An HSSDC2 (high-speed serial data connection)-to-HSSDC2 copper cable is used.
- An SFP-to-SFP copper cable is used.
- An SFP-to-HSSDC2 hybrid copper cable is used.

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

Fiber Optic Cable Handling Tips

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

- Do not bend the fiber optic cable beyond its minimum bend radius (MBR). All fiber optic cables have an MBR specified by the manufacturer, which is usually 20 times the diameter of the cable. Bending the cables into smaller curves than specified by the MBR can break the fibers inside the fiber optic cable and increase fiber attenuation (power loss). Any damage to the fibers may not appear as a physical damage to the outside cable jacket. Damage to the fibers can require you to replace the entire section or length of the cable. As a general rule, especially if you do not know the MBR, do not to bend the fiber optic cable into a turn with a radius of less than two inches (5.1 cm).
- Do not exceed the pulling tension specification of the fiber optic cable that is specified by the manufacturer. Pulling tension specification is the force placed on one square unit of a cross section of the fiber optic cable. Generally, this tension is 25 pounds.
- Do not use force or rock the connector from side-to-side or up and down to remove the connector because this action can damage the socket.
- Do not pull the cables using a mechanical device. If you need to pull a cable, pull by hand.
- Do not pull the cables tight when dressing the cables. Leave some slack in the cables.
- Do not use tie wraps or any other crimping style of wrap on high speed cables (optical or copper) because they may crimp the cable insulation and cause data transmission problems. Only use velcro strips to tie cables.
- Do not apply sideways force on the fiber optic cables.
- Do not push or step on a fiber optic cable or connector.
- Do not set any hardware components or other objects on top of the cables.
- Do not let the cables get pinched by closed doors or door lock hardware.
- Do not twist the cable into itself to secure the ends.
- Do not wrap the fiber optic cables around your hands, arms, or shoulders, as this may result in causing sharp bends or a small coiling radius.
- Do not let copper fiber channel cables cross over or get too close to the power supply cords. Keep them separated to minimize the electro-magnetic interference (EMI).
- Do not plug the high-speed serial data cables (HSSDC) cables to the small form factor pluggable (SFP) ports because this may cause damage to the cables.
- Do not plug the SFP cables to the HSSDC ports because this may cause damage to the cables.
- Allow service loops and do not block access for replacing any Pillar Axiom component.
- Pillar Data Systems recommends a flexible hook and loop type of fastener be used to tie wrap cables.
- Use both hands to disconnect the connector in a module overly populated with cables and connectors. Do not disturb or deflect other plugs or cables during the removal operation.

Caution To disconnect the cables from the HSSDC2 connectors, carefully hold the cable connector and, while pushing the connector gently into the socket, press the latch on the top of the connector to unlatch it. Merely grasping the latch or jerking and pulling at the connector will not fully disengage the connector but will damage the connector.

Caution To disconnect the cables from the SFP connectors, carefully grasp the cable connector and, while pushing the connector gently into the socket, press the latch on the bottom of the connector to unlatch it. Then, gently pull the connector straight out to release the connector with the cable

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

Clean Fiber Optic Cables

Follow these tips to clean fiber optic cables.

- Keep the end caps of the plugs installed whenever the plug is not installed.
- Have a fiber optic cable cleaning kit available while handling fiber optic cables. A fiber optic cable cleaning kit includes the following items:

- Lint-free wipes
- Isopropyl alcohol (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.

Part II: Cabling Pillar Axiom 600 Systems Using One Slammer and SATA Bricks Only

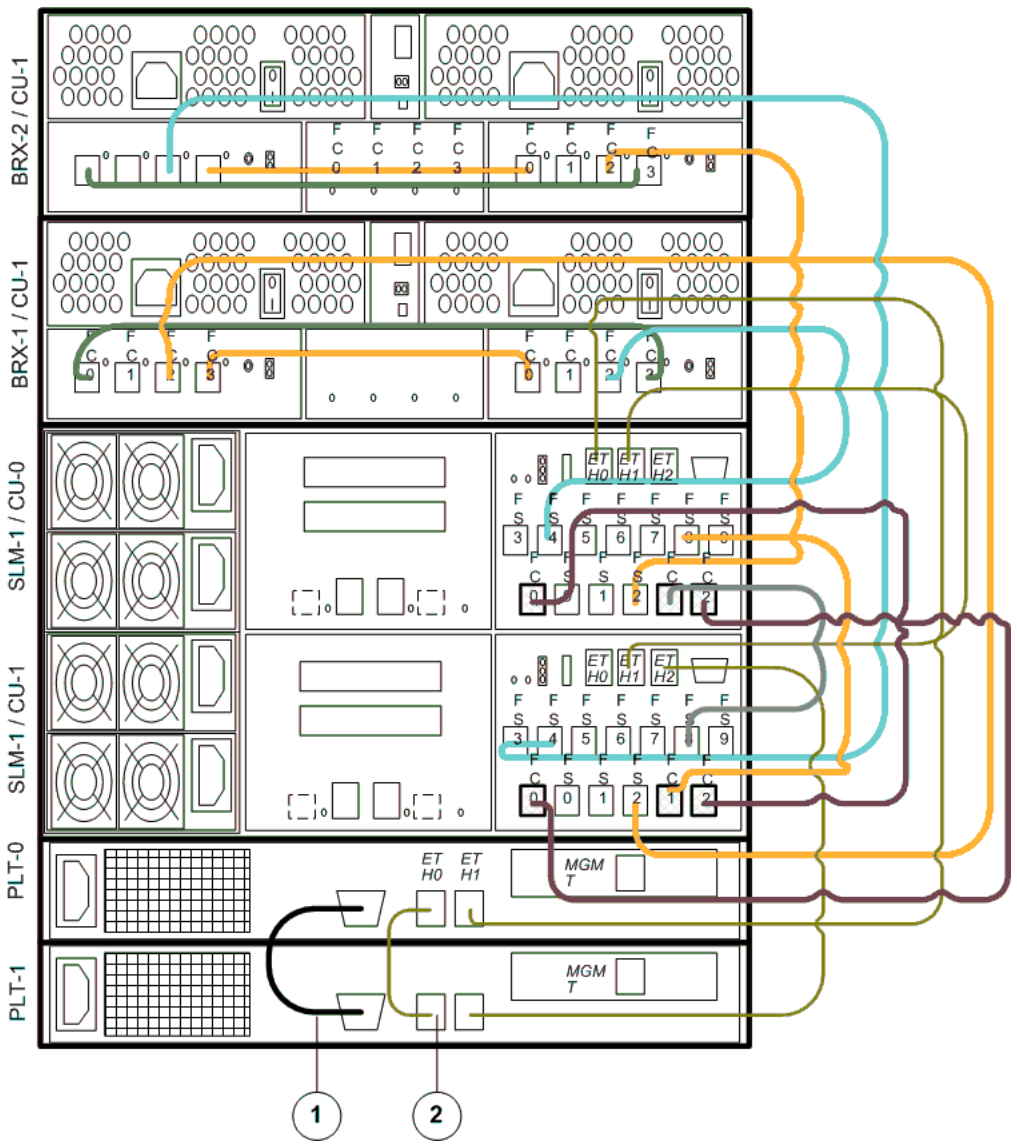
SHEET 3

Cabling Example: 1-Slammer System Using SATA Bricks

Sample Wiring Diagram for a 1x2 System Using SATA Bricks

The figure illustrates the cabling of a Pillar Axiom system with a configuration of one Slammer and two Bricks. The scheme shown is for a Slammer that uses version 1 PIMs and Bricks that use version 1 SATA RAID controllers.

Figure 10 Sample cabling for a 1x2 Pillar Axiom system with SATA Bricks



Legend	
	1 Serial null modem cable connects Pilot CU0 (PLT-0) to Pilot CU1 (PLT—1) for the system heartbeat..
	2 1.64 feet (0.5 m) Cat 5e Ethernet cable cross connects the Ethernet ports (ETH0) between the two Pilot CUs that support the Intelligent Platform Management Interface (IPMI).

Note: Cross controller cabling for single Slammer systems using version 1 PIMs are internally hardwired. Cross controller cabling for single Slammer systems using version 2 PIMs must be explicitly connected with an SFP-to-SFP cable.

Note: The above diagram shows the logical connections, not the physical layout of the cables.

Notes on the 1x2 SATA Wiring Diagram

To cable version 2 SATA Bricks, use the same port connections as those shown in the diagram.

When cabling the fabric, be aware of the following facts:

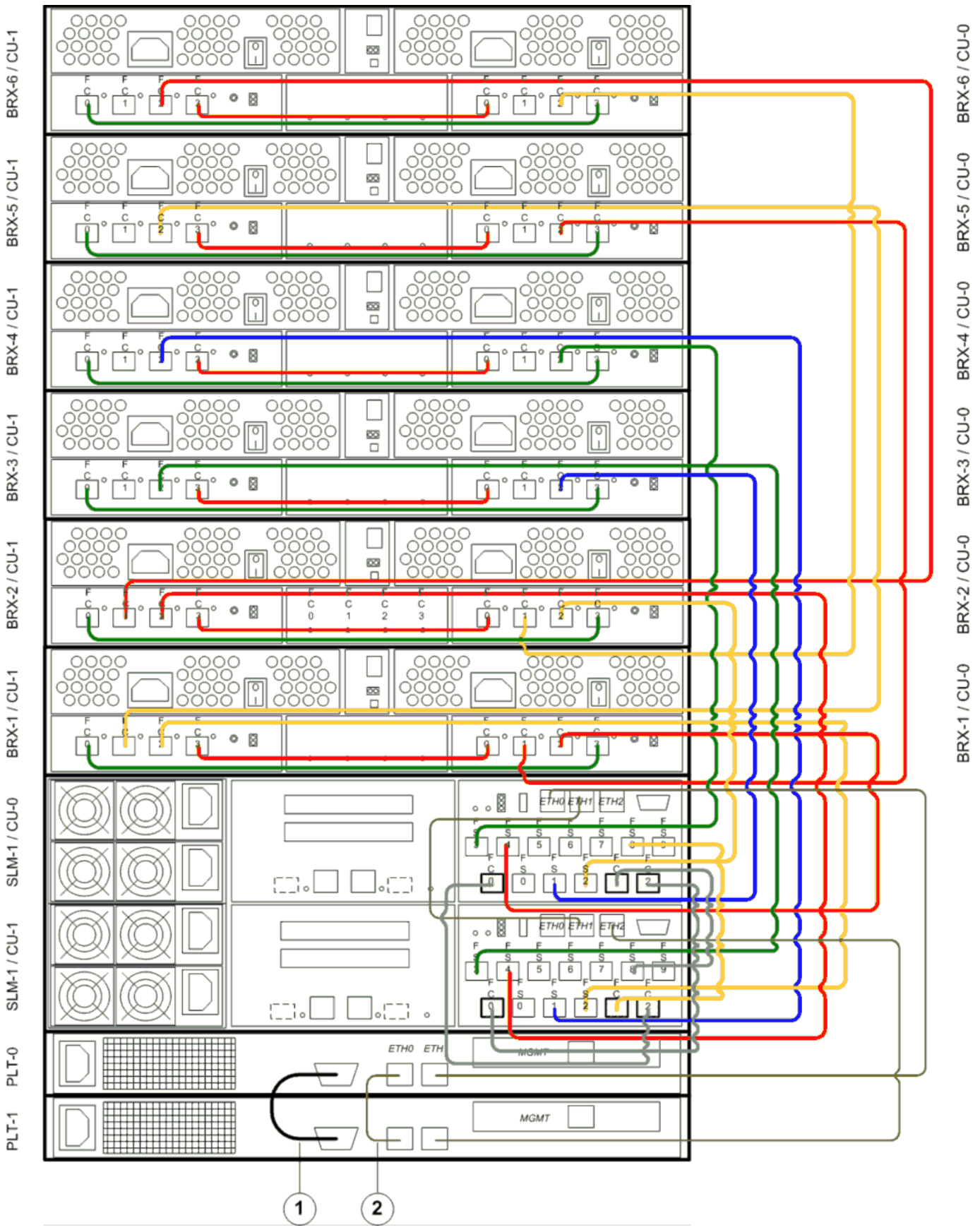
- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.

    - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
    - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
    - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
    - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
    - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
        - Version 1 Bricks: 1.64 ft (0.5 m)
        - Version 2 Bricks: 3.28 ft (1.0 m)

Sample Wiring Diagram for a 1x6 System Using SATA Bricks

The figure below is an example of cabling a Pillar Axiom 600 system. The scheme shown is for a hardware configuration of one Slammer that uses version 1 private interconnect modules (PIMs) and six Bricks that use version 1 SATA RAID controllers.

Figure 11 Sample cabling for a 1x6 system with SATA Bricks



Legend	
1	Serial null modem cable.
2	Cross connect the ports that support the Intelligent Platform Management Interface (IPMI). These ports are labeled ETH-0.

Note:

The above diagram shows the logical connections, not the physical layout of the cables.

Notes on the 1x6 SATA Wiring Diagram

Important! When cabling the cross connections for version 2 PIMs in a single Slammer system, see also Figure 12.

To cable version 2 SATA Bricks, use the same port connections as those shown in the diagram.

When cabling the fabric, be aware of the following facts:

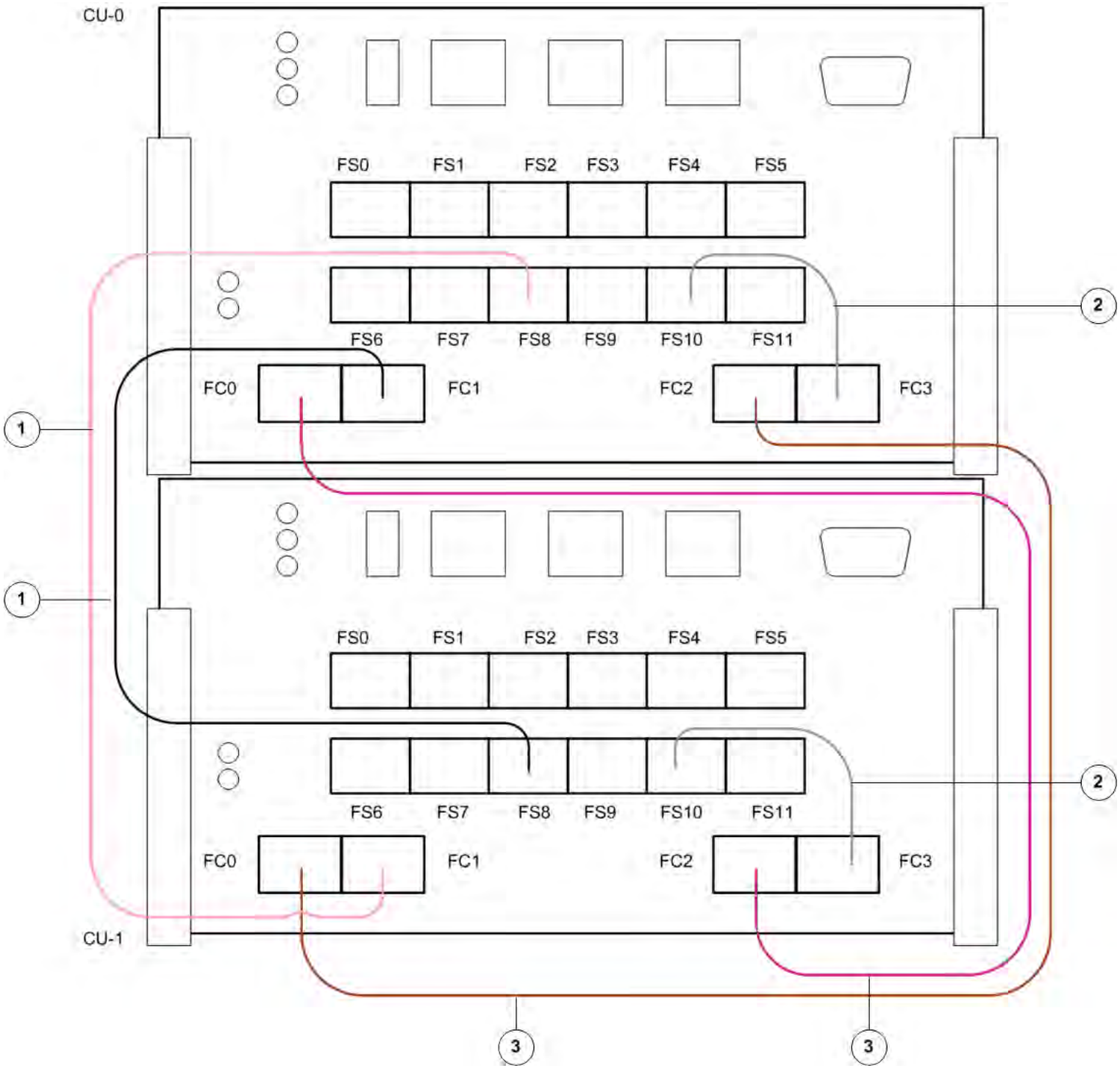
- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.

- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
  - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
    - Version 1 Bricks: 1.64 ft (0.5 m)
    - Version 2 Bricks: 3.28 ft (1.0 m)

Control Unit (CU) Cross Connections for One Slammer

The illustration below depicts version 2 private interconnect modules (PIMs) contained within the CUs of a single Slammer.

Figure 12 Cabling single Slammer CU cross connections



Legend	
	1 Cross connection within Slammer CU's
	2 Connection from the Slammer CU to the fabric switch in the PIM.
	3 Cabling between the two Slammer CUs using 1.64 feet (0.5 m) SFP cables for 2 Gb/s or optical cables for 4 Gb/s.

The cross controller cabling between the Slammer CUs and the fabric switch in the PIM is internally hard wired in version 1 PIMs. In Slammer with version 2 PIMs, ports FC3 and FS10 are externally connected using an SFP to SFP cable.

Caution Do not remove the connection between the Slammer CU to the fabric switch in the PIM, unless advised by Pillar Data Systems. If the connection between the Slammer CU to the fabric switch in the PIM is removed, all Brick ports and Slammer CU ports on the PIM will be brought offline. If the topology check fails for this connection, no further topology checks will be conducted and the Pillar Axiom system will not be able to power up.

SHEET 4

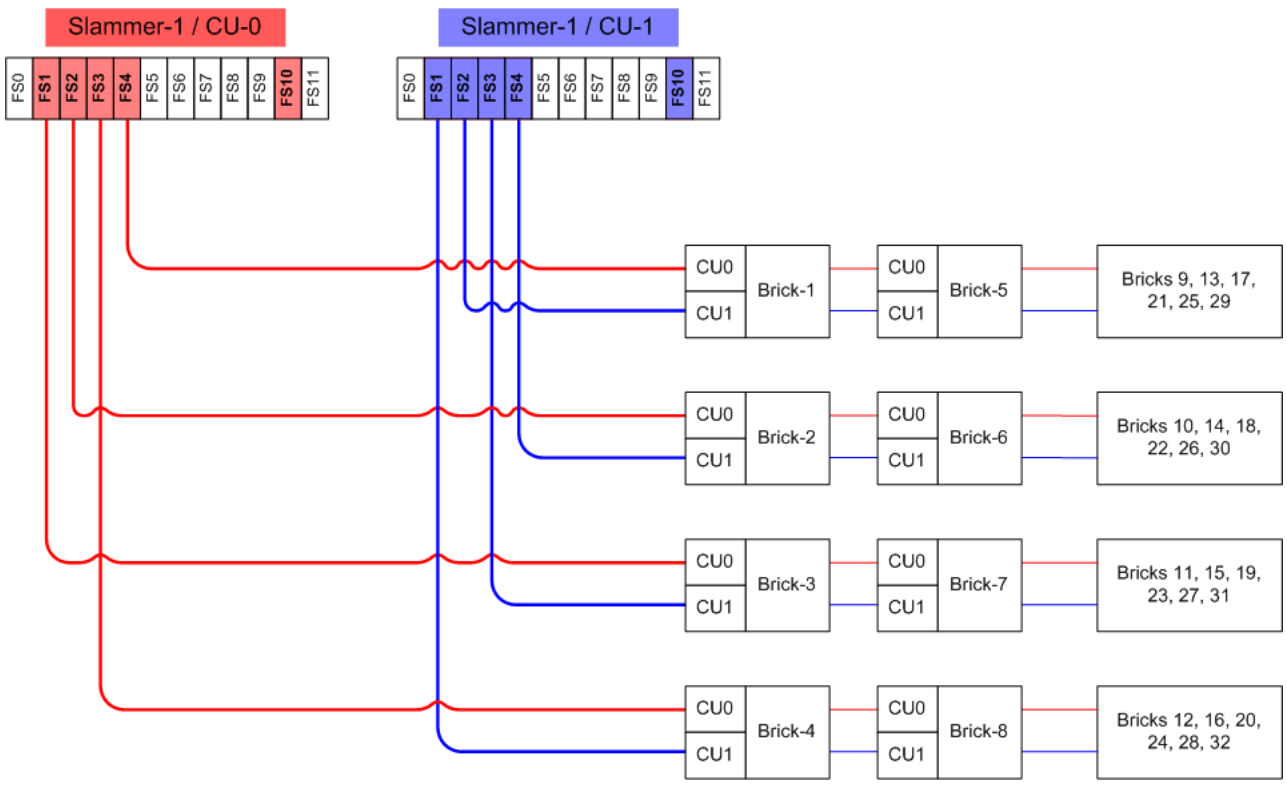
Cabling Block Diagram: A 1-Slammer System

Block Diagram for a 1x32 System Using SATA Bricks

The figure below illustrates the stringing of 32 Bricks in a 1-Slammer Pillar Axiom 600 system. The scheme shown in this figure maps four Brick strings, each string being eight Bricks deep.

Important! The following block diagram is for reference only. Actual cabling information is provided in Table 8.

Figure 13 Cabling block diagram for a 1x32 system (SATA Bricks only)



For information on the cross connections between the two CUs of each Brick, see the FC-0 to FC-3 cross connections specified in Table 8.

Notes on the 1x32 Block Diagram

- Single Slammer systems support a maximum of four Brick strings.
- For the Pillar Axiom 600 system, a string may contain up to eight Bricks.
- The order that Bricks are to be added to a system that has one Slammer storage controller (NAS or SAN) is illustrated in Figure 13.
- The minimum configuration includes BRX-1 and BRX-2. Add subsequent Bricks so that load imbalance between Fibre Channel (FC) switches and FC loops is minimized. Add Bricks to strings so that the number of Bricks in any string differs by no more than two between the longest and the shortest string.
- This reference uses (and Pillar recommends) a Brick scalability strategy that includes the following points:
  - First connect all four Brick strings to the Slammers using one Brick before building onto the end of any string.
  - Add additional Bricks using the connectivity illustrated in Figure 13. The cable connections are defined in the tables beginning with Table 8. See also: Figure 24.
- The cabling scheme illustrated in Figure 13 conforms to the following conventions:

Slammers

- On single Slammer systems, FC-0 on one control unit (CU) connects to FC-2 on the other CU.
- FC-1 on one CU connects to FS-8 on the other CU.
- FS-1, FS-2, FS-3, and FS-4 are used for Brick connections.
- On systems with two or more Slammers, FC-0 connects to FS-7.
- On systems with two or more Slammers, FC-2 connects to FS-9.
- On 3-Slammer systems, FS-4 and FS-5 are reserved for Slammer (FC) to switch connections.

- On 3-Slammer and larger systems, FS-6 is reserved for the cascade (switch-to-switch) connection.

Bricks

- FC-0 is connected to FC-3 of the opposite CU on the same Brick.
- FC-1 connects to FC-2 in the same CU of a downstream Brick.
- FC-2 connects to a Slammer FS port or to FC-1 in the same CU of an upstream Brick.

- The configuration of systems upgraded in the field may differ somewhat from those built in the factory.

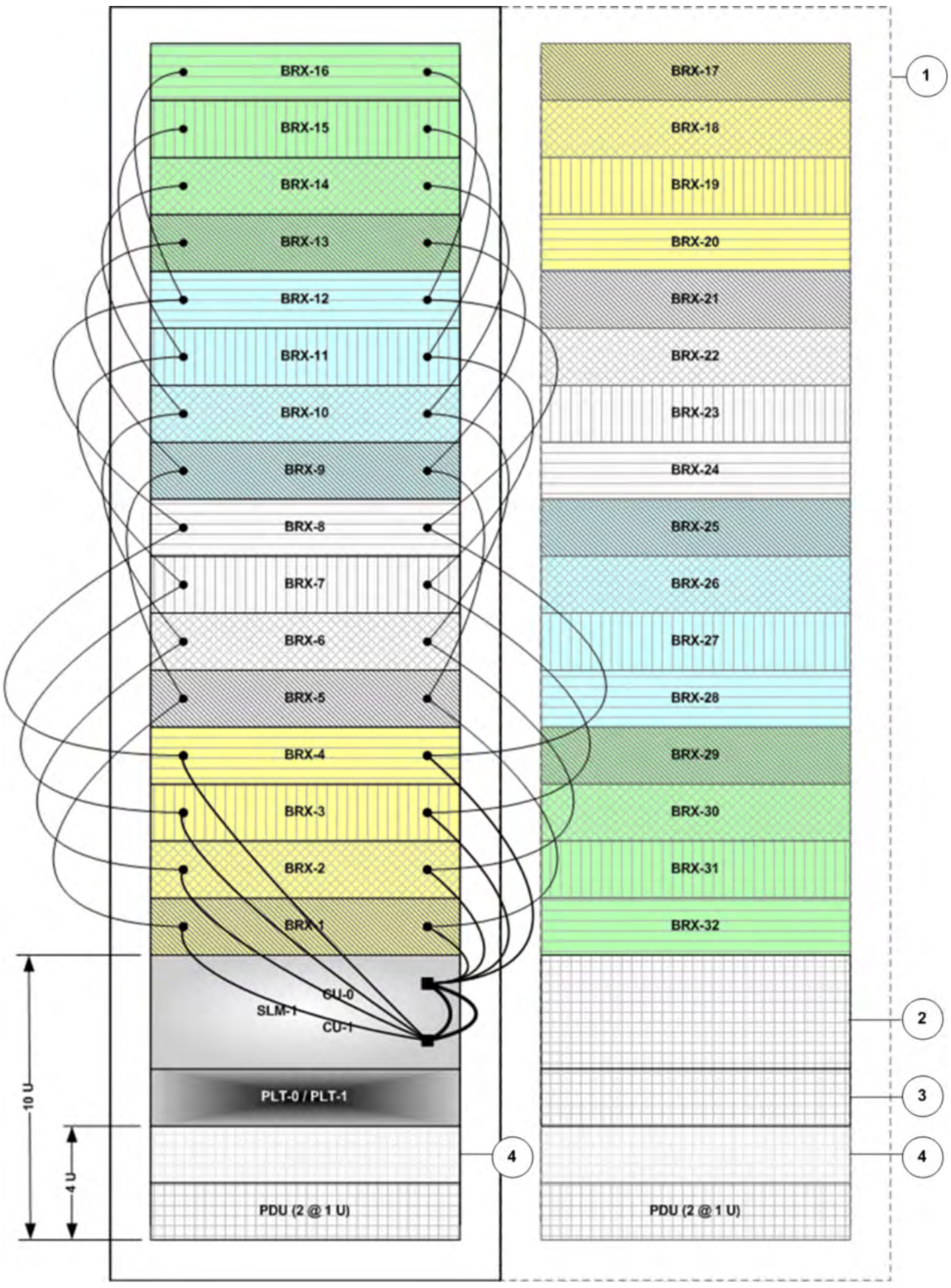
SHEET 5

High Density Rack Configuration Using 230 V, 30 A Power

Hardware Component Mapping in Racks Having 230 V, 30 A PDUs

The figure below illustrates a high-density configuration using 230 VAC, 30 A power distribution units (PDUs).

Figure 14 High-density rack configuration with 230 v, 30 A PDUs (1-Slammer system)



Legend

1	Optional second rack. Cabling is not shown for this rack. To cable this rack, follow the connection specifications in Table 10.
2	Reserved for second Slammer.
3	Reserved.
4	A minimum of 2 U of clear space is needed between the PDU and the Pilot chassis to allow access to and routing of power cords.

Notes on Component Mapping within Racks Having 230 VAC, 30 A PDUs

- This configuration may require disruption to service when expanding the system. For example, to add a second Slammer to the first rack, providing the rack has 12 or fewer Bricks installed, a disruptive upgrade is required. The second Slammer would be installed in place of BRX-1 and BRX-2. Contact the Pillar World Wide Customer Support Center for detailed instructions in such a scenario.
- Two rack units are reserved at the bottom of the rack for PDUs. Running the full rack with two 1 U PDUs requires 230 VAC, 30 A for each circuit. This configuration also requires use of multi-leg power cords, such as a "Y" cord, to utilize the available space efficiently.
- All PDUs mount with the circuit breaker accessible from the back of the rack.
- The cable paths that are shown indicate only internal Storage System Fabric (SSF) Fibre Channel (FC) connectivity. Specific ports are not shown.
- This drawing shows an arrangement of Bricks so that the 6.6 ft (2 m) interconnect cables can be utilized throughout the configuration for all needed connections.

Tip: Dress all SSF cables to the right side of the rack (when viewed from the back) to facilitate FRU replacement with a minimum number of cable disconnections.

Caution Do not place the 6.56 feet (2 m) cables so that they hang from the SFP connector.

Caution Do not rest power or other private interconnect (PI) cables on the Brick cross over cables.

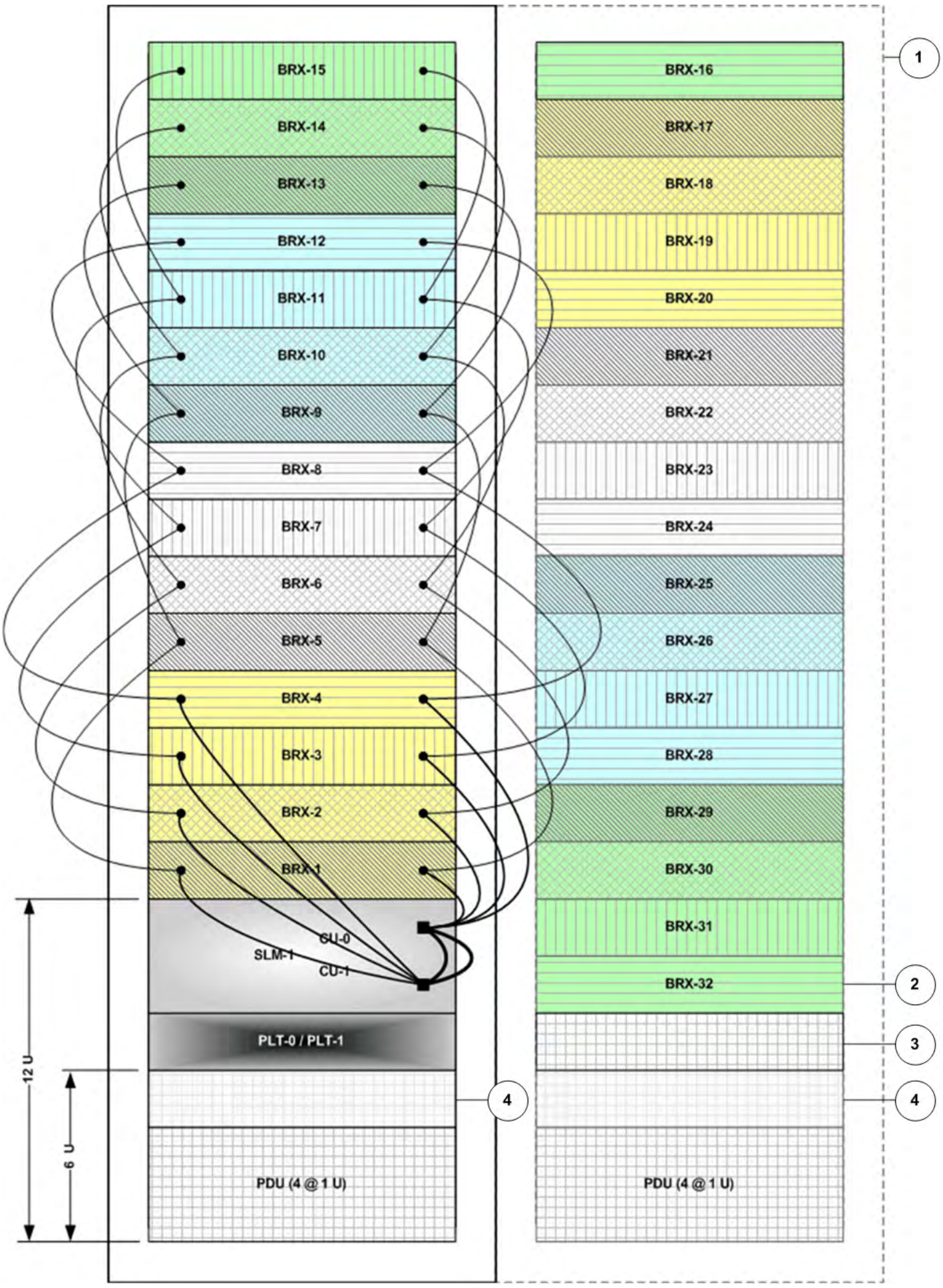
SHEET 6

High Density Rack Configuration Using Four PDUs or 3-Phase Power

Hardware Component Mapping in Racks Having Four PDUs or 3-Phase PDUs

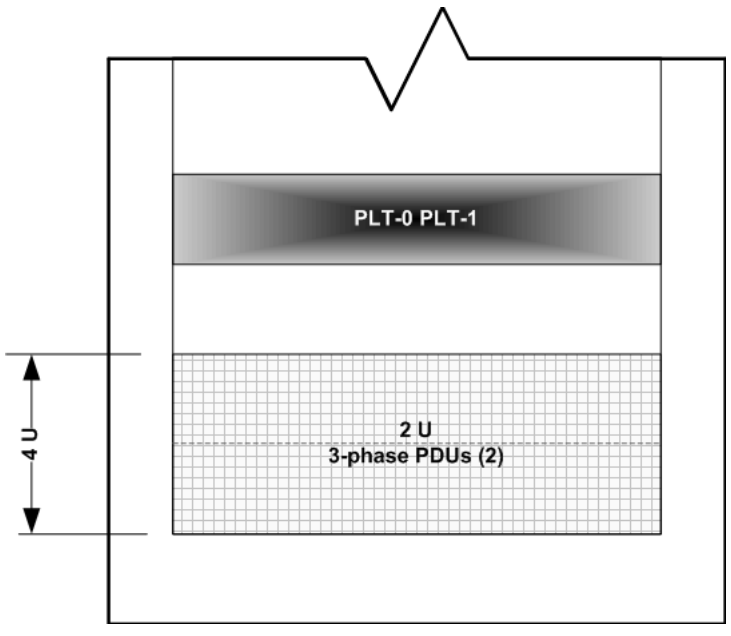
The following two figures illustrate high-density configurations using four power distribution units (PDUs) or 3-phase PDUs.

Figure 15 High-density rack configuration with four PDUs (1-Slammer system)



Legend	
1	Optional second rack. Cabling is not shown for this rack. To cable this rack, follow the connection specifications in Table 8.
2	If you install a second Slammer, install it in place of BRX-32 and the reserved space immediately below.
3	Reserved.
4	A minimum of 2 U of clear space is needed between the PDU and the Pilot chassis to allow access to and routing of power cords.

Figure 16 Alternate high-density rack configuration with 3-phase PDUs



Notes on Component Mapping within Racks Having Four PDUs or 3-Phase PDUs

- 3-phase power distribution units (PDUs) mount with the circuit breaker accessible at the front.
- Four rack units (RU) are reserved at the bottom of the rack for PDUs. These PDUs mount with their circuit breakers accessible from the back of the rack.
- If you add a second Slammer, you may need to re-cable the Bricks. Re-cabling is best done with a disruptive upgrade.

SHEET 7

SSF Cable Connection List (Slammer Plus Bricks 1–8)

Cable the Slammer and SATA Bricks 1–8

The table below specifies all Fibre Channel (FC) cables and their connections for the Slammer and the first and second sets of four SATA Bricks in a 1-Slammer system. All such interconnections are part of the Storage System Fabric (SSF).

Table 8 FC cable connections for the Slammer and the first and second sets of four SATA Bricks

Slammer-to-Slammer Connections

Version 1 PIMs

From: Chassis / CU / Port	To: Chassis / CU / Port
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-0 FC-0	SLM-1 / CU-1 FC-2
SLM-1 / CU-1 FC-0	SLM-1 / CU-0 FC-2

Version 2 PIMs

From: Chassis / CU / Port	To: Chassis / CU / Port
SLM-1 / CU-0 FC-0	SLM-1 / CU-1 FC-2
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-0 FC-3	SLM-1 / CU-0 FS-10
SLM-1 / CU-1 FC-0	SLM-1 / CU-0 FC-2
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-1 FC-3	SLM-1 / CU-1 FS-10

Brick Connections

	From	To	Cable
Cable	Chassis / CU / Port	Chassis / CU / Port	Length
Brick Connections			
For BRX-1:			
CBL-101	SLM-1 / CU-0 FS-4	BRX-1 / CU-0 FC-2	2
CBL-102	SLM-1 / CU-1 FS-2	BRX-1 / CU-1 FC-2	2
	BRX-1 / CU-0 FC-0	BRX-1 / CU-1 FC-3	0.5
	BRX-1 / CU-1 FC-0	BRX-1 / CU-0 FC-3	0.5
For BRX-2:			
CBL-103	SLM-1 / CU-0 FS-2	BRX-2 / CU-0 FC-2	2
CBL-104	SLM-1 / CU-1 FS-4	BRX-2 / CU-1 FC-2	2
	BRX-2 / CU-0 FC-0	BRX-2 / CU-1 FC-3	0.5
	BRX-2 / CU-1 FC-0	BRX-2 / CU-0 FC-3	0.5
For BRX-3:			
CBL-105	SLM-1 / CU-0 FS-1	BRX-3 / CU-0 FC-2	2
CBL-106	SLM-1 / CU-1 FS-3	BRX-3 / CU-1 FC-2	2
	BRX-3 / CU-0 FC-0	BRX-3 / CU-1 FC-3	0.5
	BRX-3 / CU-1 FC-0	BRX-3 / CU-0 FC-3	0.5
For BRX-4:			
CBL-107	SLM-1 / CU-0 FS-3	BRX-4 / CU-0 FC-2	2
CBL-108	SLM-1 / CU-1 FS-1	BRX-4 / CU-1 FC-2	2
	BRX-4 / CU-0 FC-0	BRX-4 / CU-1 FC-3	0.5
	BRX-4 / CU-1 FC-0	BRX-4 / CU-0 FC-3	0.5
The first set of four Bricks is directly connected to Slammer FS ports.			
The second set of four Bricks is connected to the first set.			
For BRX-5:			
CBL-109	BRX-1 / CU-0 FC-1	BRX-5 / CU-0 FC-2	2
CBL-110	BRX-1 / CU-1 FC-1	BRX-5 / CU-1 FC-2	2
	BRX-5 / CU-0 FC-0	BRX-5 / CU-1 FC-3	0.5
	BRX-5 / CU-1 FC-0	BRX-5 / CU-0 FC-3	0.5
For BRX-6:			
CBL-111	BRX-2 / CU-0 FC-1	BRX-6 / CU-0 FC-2	2
CBL-112	BRX-2 / CU-1 FC-1	BRX-6 / CU-1 FC-2	2
	BRX-6 / CU-0 FC-0	BRX-6 / CU-1 FC-3	0.5
	BRX-6 / CU-1 FC-0	BRX-6 / CU-0 FC-3	0.5
For BRX-7:			
CBL-113	BRX-3 / CU-0 FC-1	BRX-7 / CU-0 FC-2	2
CBL-114	BRX-3 / CU-1 FC-1	BRX-7 / CU-1 FC-2	2
	BRX-7 / CU-0 FC-0	BRX-7 / CU-1 FC-3	0.5
	BRX-7 / CU-1 FC-0	BRX-7 / CU-0 FC-3	0.5
For BRX-8:			
CBL-115	BRX-4 / CU-0 FC-1	BRX-8 / CU-0 FC-2	2
CBL-116	BRX-4 / CU-1 FC-1	BRX-8 / CU-1 FC-2	2
	BRX-8 / CU-0 FC-0	BRX-8 / CU-1 FC-3	0.5
	BRX-8 / CU-1 FC-0	BRX-8 / CU-0 FC-3	0.5

Install for a 2 Brick System
Install for an 3 Brick System
Install for a 4 Brick System
Install for a 5 Brick System
Install for a 6 Brick System
Install for a 7 Brick System
Install for an 8 Brick System

Notes on Cabling SATA Bricks 1–8

- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.

- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
  - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
    - Version 1 Bricks: 1.64 ft (0.5 m)
    - Version 2 Bricks: 3.28 ft (1.0 m)
- The Storage System Fabric (SSF) cabling scheme is based on the following conventions:
  - Slammers and Bricks (all chassis) are numbered starting with 1.
  - Designators within Slammer and Brick chassis are numbered from 0 (zero), as in CU-0, FC-0, and so on.
  - The Pilot has two CUs: PLT-0 and PLT-1.
- SSF cabling for 1-Slammer systems is based on the following principles:

  Slammers:
  - FC-0 connects to FC-2 (on the same Slammer, but opposite CU).
  - FC-1 connects to FS-8 (on the same Slammer, but opposite CU).
  - FS-1, FS-2, FS-3, and FS-4 are used for Brick connections.

  Bricks:
  - FC-0 connects to FC-3 of the opposite CU on the same Brick.
  - FC-1 connects to a FC-2 of a downstream Brick.
  - FC-2 connects to a Slammer FS port or to FC-1 of an upstream Brick.
- In addition to the FC cables identified in Table 8, install the private management interface (PMI) cables specified in Table 12.
- To cable additional Bricks into a 1-Slammer system, see Table 9.

SHEET 8

SSF Cable Connection List (Bricks 9–16)

Cable SATA Bricks 9–16

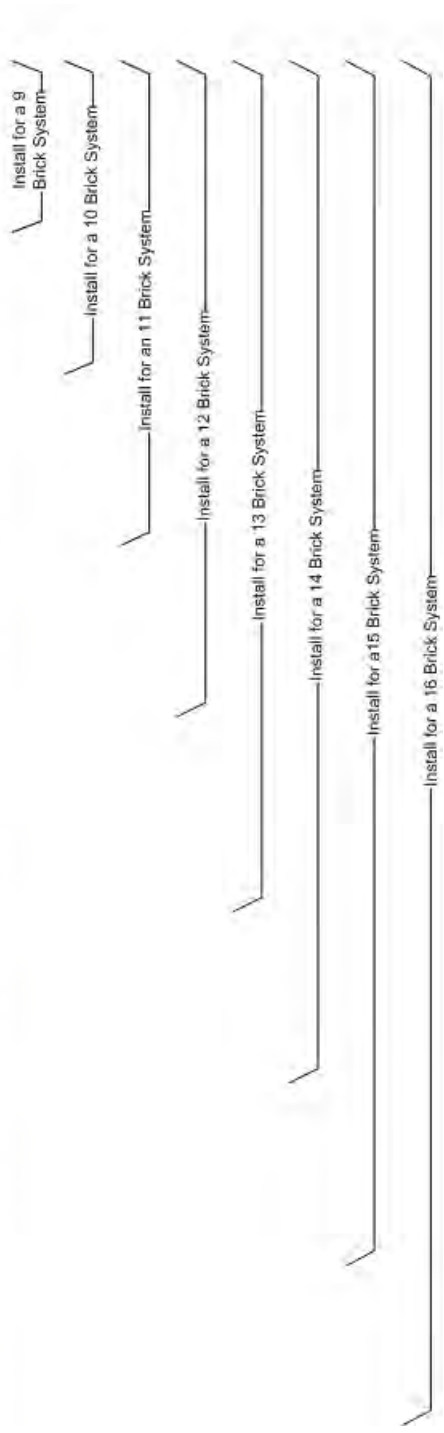
To install these Bricks, install all cables specified in the following tables and in the following order:

1. Table 8: FC cable connections for the Slammer and the first and second sets of four SATA Bricks.
2. Table 9: FC cable connections for the third and fourth sets of four SATA Bricks (1-Slammer system) (depending on the number of Bricks in your configuration).

The table below specifies all Fibre Channel (FC) cables and their connections for the third and fourth sets of four Bricks. These interconnections extend the Storage System Fabric (SSF).

Table 9 FC cable connections for the third and fourth sets of four SATA Bricks (1-Slammer system)

Cable	From Chassis / CU / Port	To Chassis / CU / Port	Cable Length (M)
For BRX-9:			
CBL-117	BRX-5 / CU-0 FC-1	BRX-9 / CU-0 FC-2	2
CBL-118	BRX-5 / CU-1 FC-1	BRX-9 / CU-1 FC-2	2
	BRX-9 / CU-0 FC-0	BRX-9 / CU-1 FC-3	0.5
	BRX-9 / CU-1 FC-0	BRX-9 / CU-0 FC-3	0.5
For BRX-10:			
CBL-119	BRX-6 / CU-0 FC-1	BRX-10 / CU-0 FC-2	2
CBL-120	BRX-6 / CU-1 FC-1	BRX-10 / CU-1 FC-2	2
	BRX-10 / CU-0 FC-0	BRX-10 / CU-1 FC-3	0.5
	BRX-10 / CU-1 FC-0	BRX-10 / CU-0 FC-3	0.5
For BRX-11:			
CBL-121	BRX-7 / CU-0 FC-1	BRX-11 / CU-0 FC-2	2
CBL-122	BRX-7 / CU-1 FC-1	BRX-11 / CU-1 FC-2	2
	BRX-11 / CU-0 FC-0	BRX-11 / CU-1 FC-3	0.5
	BRX-11 / CU-1 FC-0	BRX-11 / CU-0 FC-3	0.5
For BRX-12:			
CBL-123	BRX-8 / CU-0 FC-1	BRX-12 / CU-0 FC-2	2
CBL-124	BRX-8 / CU-1 FC-1	BRX-12 / CU-1 FC-2	2
	BRX-12 / CU-0 FC-0	BRX-12 / CU-1 FC-3	0.5
	BRX-12 / CU-1 FC-0	BRX-12 / CU-0 FC-3	0.5
The fourth set of Bricks is connected to the third set of Bricks:			
For BRX-13:			
CBL-125	BRX-9 / CU-0 FC-1	BRX-13 / CU-0 FC-2	2
CBL-126	BRX-9 / CU-1 FC-1	BRX-13 / CU-1 FC-2	2
	BRX-13 / CU-0 FC-0	BRX-13 / CU-1 FC-3	0.5
	BRX-13 / CU-1 FC-0	BRX-13 / CU-0 FC-3	0.5
For BRX-14:			
CBL-127	BRX-10 / CU-0 FC-1	BRX-14 / CU-0 FC-2	2
CBL-128	BRX-10 / CU-1 FC-1	BRX-14 / CU-1 FC-2	2
	BRX-14 / CU-0 FC-0	BRX-14 / CU-1 FC-3	0.5
	BRX-14 / CU-1 FC-0	BRX-14 / CU-0 FC-3	0.5
For BRX-15:			
CBL-129	BRX-11 / CU-0 FC-1	BRX-15 / CU-0 FC-2	2
CBL-130	BRX-11 / CU-1 FC-1	BRX-15 / CU-1 FC-2	2
	BRX-15 / CU-0 FC-0	BRX-15 / CU-1 FC-3	0.5
	BRX-15 / CU-1 FC-0	BRX-15 / CU-0 FC-3	0.5
For BRX-16:			
CBL-131	BRX-12 / CU-0 FC-1	BRX-16 / CU-0 FC-2	2
CBL-132	BRX-12 / CU-1 FC-1	BRX-16 / CU-1 FC-2	2
	BRX-16 / CU-0 FC-0	BRX-16 / CU-1 FC-3	0.5
	BRX-16 / CU-1 FC-0	BRX-16 / CU-0 FC-3	0.5



Notes on Cabling SATA Bricks 9–16

To cable additional Bricks into a 1-Slammer system, see Table 10.

SHEET 9

SSF Cable Connection List (Bricks 17–24)

Cable SATA Bricks 17–24

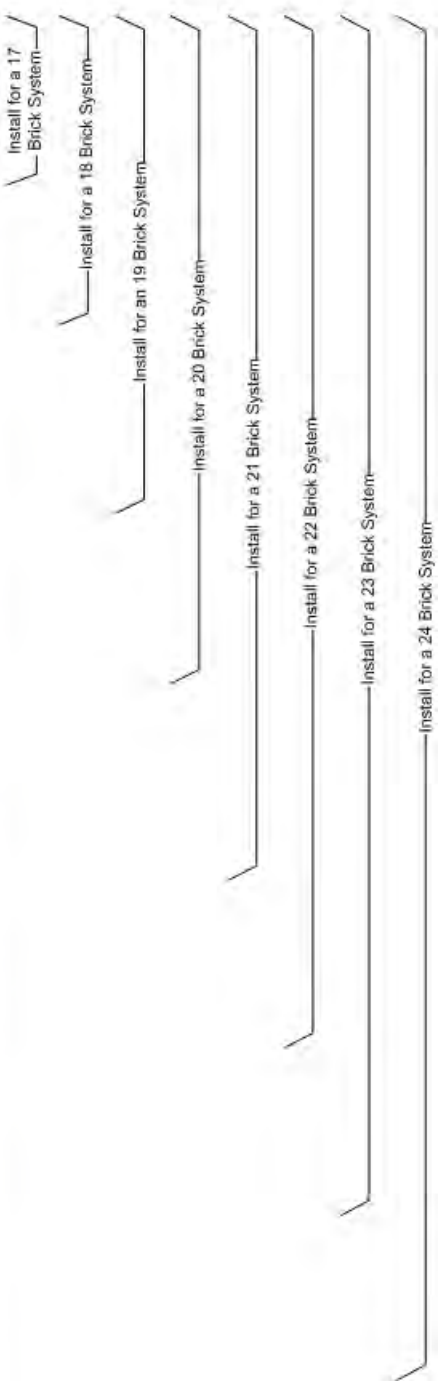
To install these Bricks, install all cables specified in the following tables and in the following order:

1. Table 8: FC cable connections for the Slammer and the first and second sets of four SATA Bricks.
2. Table 9: FC cable connections for the third and fourth sets of four SATA Bricks (1-Slammer system).
3. The appropriate cables in the table below (depending on the number of Bricks in your configuration).

The table below specifies all Fibre Channel (FC) cables and their connections for the fifth and sixth set of four Bricks. These interconnections extend the Storage System Fabric (SSF).

Table 10 FC cable connections for the fifth and sixth sets of four SATA Bricks (1-Slammer system)

	From	To	Cable
Cable	Chassis / CU / Port	Chassis / CU / Port	Length (M)
For BRX-17:			
CBL-133	BRX-13 / CU-0 FC-1	BRX-17 / CU-0 FC-2	2
CBL-134	BRX-13 / CU-1 FC-1	BRX-17 / CU-1 FC-2	2
	BRX-17 / CU-0 FC-0	BRX-17 / CU-1 FC-3	0.5
	BRX-17 / CU-1 FC-0	BRX-17 / CU-0 FC-3	0.5
For BRX-18:			
CBL-135	BRX-14 / CU-0 FC-1	BRX-18 / CU-0 FC-2	2
CBL-136	BRX-14 / CU-1 FC-1	BRX-18 / CU-1 FC-2	2
	BRX-18 / CU-0 FC-0	BRX-18 / CU-1 FC-3	0.5
	BRX-18 / CU-1 FC-0	BRX-18 / CU-0 FC-3	0.5
For BRX-19:			
CBL-137	BRX-15 / CU-0 FC-1	BRX-19 / CU-0 FC-2	2
CBL-138	BRX-15 / CU-1 FC-1	BRX-19 / CU-1 FC-2	2
	BRX-19 / CU-0 FC-0	BRX-19 / CU-1 FC-3	0.5
	BRX-19 / CU-1 FC-0	BRX-19 / CU-0 FC-3	0.5
For BRX-20:			
CBL-139	BRX-16 / CU-0 FC-1	BRX-20 / CU-0 FC-2	2
CBL-140	BRX-16 / CU-1 FC-1	BRX-20 / CU-1 FC-2	2
	BRX-20 / CU-0 FC-0	BRX-20 / CU-1 FC-3	0.5
	BRX-20 / CU-1 FC-0	BRX-20 / CU-0 FC-3	0.5
The sixth set of Bricks is connected to the fifth set of Bricks:			
For BRX-21:			
CBL-141	BRX-17 / CU-0 FC-1	BRX-21 / CU-0 FC-2	2
CBL-142	BRX-17 / CU-1 FC-1	BRX-21 / CU-1 FC-2	2
	BRX-21 / CU-0 FC-0	BRX-21 / CU-1 FC-3	0.5
	BRX-21 / CU-1 FC-0	BRX-21 / CU-0 FC-3	0.5
For BRX-22:			
CBL-143	BRX-18 / CU-0 FC-1	BRX-22 / CU-0 FC-2	2
CBL-144	BRX-18 / CU-1 FC-1	BRX-22 / CU-1 FC-2	2
	BRX-22 / CU-0 FC-0	BRX-22 / CU-1 FC-3	0.5
	BRX-22 / CU-1 FC-0	BRX-22 / CU-0 FC-3	0.5
For BRX-23:			
CBL-145	BRX-19 / CU-0 FC-1	BRX-23 / CU-0 FC-2	2
CBL-146	BRX-19 / CU-1 FC-1	BRX-23 / CU-1 FC-2	2
	BRX-23 / CU-0 FC-0	BRX-23 / CU-1 FC-3	0.5
	BRX-23 / CU-1 FC-0	BRX-23 / CU-0 FC-3	0.5
For BRX-24:			
CBL-147	BRX-20 / CU-0 FC-1	BRX-24 / CU-0 FC-2	2
CBL-148	BRX-20 / CU-1 FC-1	BRX-24 / CU-1 FC-2	2
	BRX-24 / CU-0 FC-0	BRX-24 / CU-1 FC-3	0.5
	BRX-24 / CU-1 FC-0	BRX-24 / CU-0 FC-3	0.5



Notes on Cabling SATA Bricks 17–24

To cable additional Bricks into a 1-Slammer system, see Table 11.

SHEET 10

SSF Cable Connection List (Bricks 25–32)

Cable SATA Bricks 25–32

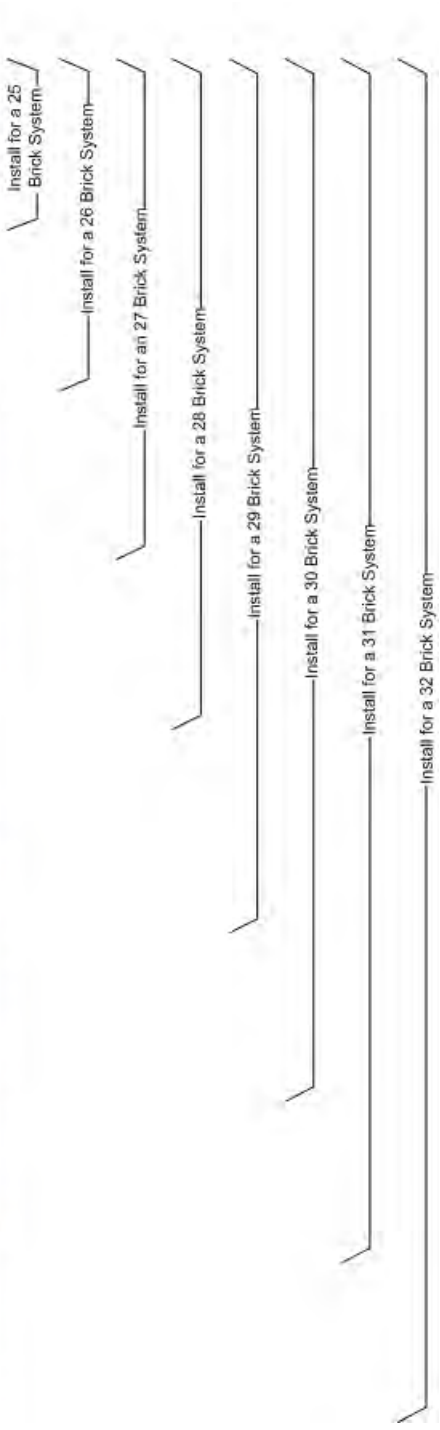
To install these Bricks, install all cables specified in the following tables and in the following order:

1. Table 8: FC cable connections for the Slammer and the first and second sets of four SATA Bricks.
2. Table 9: FC cable connections for the third and fourth sets of four SATA Bricks (1-Slammer system).
3. Table 10: FC cable connections for the fifth and sixth sets of four SATA Bricks (1-Slammer system).
4. The appropriate cables in the table below (depending on the number of Bricks in your configuration).

The table below specifies all Fibre Channel (FC) cables and their connections for the seventh and eighth set of four Bricks. These interconnections extend the Storage System Fabric (SSF).

Table 11 FC cable connections for the seventh and eighth sets of four SATA Bricks (1-Slammer system)

Cable	From Chassis / CU / Port	To Chassis / CU / Port	Cable Length (M)
For BRX-25:			
CBL-149	BRX-21 / CU-0 FC-1	BRX-25 / CU-0 FC-2	2
CBL-150	BRX-21 / CU-1 FC-1	BRX-25 / CU-1 FC-2	2
	BRX-25 / CU-0 FC-0	BRX-25 / CU-1 FC-3	0.5
	BRX-25 / CU-1 FC-0	BRX-25 / CU-0 FC-3	0.5
For BRX-26:			
CBL-151	BRX-22 / CU-0 FC-1	BRX-26 / CU-0 FC-2	2
CBL-152	BRX-22 / CU-1 FC-1	BRX-26 / CU-1 FC-2	2
	BRX-26 / CU-0 FC-0	BRX-26 / CU-1 FC-3	0.5
	BRX-26 / CU-1 FC-0	BRX-26 / CU-0 FC-3	0.5
For BRX-27:			
CBL-153	BRX-23 / CU-0 FC-1	BRX-27 / CU-0 FC-2	2
CBL-154	BRX-23 / CU-1 FC-1	BRX-27 / CU-1 FC-2	2
	BRX-27 / CU-0 FC-0	BRX-27 / CU-1 FC-3	0.5
	BRX-27 / CU-1 FC-0	BRX-27 / CU-0 FC-3	0.5
For BRX-28:			
CBL-155	BRX-24 / CU-0 FC-1	BRX-28 / CU-0 FC-2	2
CBL-156	BRX-24 / CU-1 FC-1	BRX-28 / CU-1 FC-2	2
	BRX-28 / CU-0 FC-0	BRX-28 / CU-1 FC-3	0.5
	BRX-28 / CU-1 FC-0	BRX-28 / CU-0 FC-3	0.5
The eighth set of Bricks is connected to the seventh set of Bricks:			
For BRX-29:			
CBL-157	BRX-25 / CU-0 FC-1	BRX-29 / CU-0 FC-2	2
CBL-158	BRX-25 / CU-1 FC-1	BRX-29 / CU-1 FC-2	2
	BRX-29 / CU-0 FC-0	BRX-29 / CU-1 FC-3	0.5
	BRX-29 / CU-1 FC-0	BRX-29 / CU-0 FC-3	0.5
For BRX-30:			
CBL-159	BRX-26 / CU-0 FC-1	BRX-30 / CU-0 FC-2	2
CBL-160	BRX-26 / CU-1 FC-1	BRX-30 / CU-1 FC-2	2
	BRX-30 / CU-0 FC-0	BRX-30 / CU-1 FC-3	0.5
	BRX-30 / CU-1 FC-0	BRX-30 / CU-0 FC-3	0.5
For BRX-31:			
CBL-161	BRX-27 / CU-0 FC-1	BRX-31 / CU-0 FC-2	2
CBL-162	BRX-27 / CU-1 FC-1	BRX-31 / CU-1 FC-2	2
	BRX-31 / CU-0 FC-0	BRX-31 / CU-1 FC-3	0.5
	BRX-31 / CU-1 FC-0	BRX-31 / CU-0 FC-3	0.5
For BRX-32:			
CBL-163	BRX-28 / CU-0 FC-1	BRX-32 / CU-0 FC-2	2
CBL-164	BRX-28 / CU-1 FC-1	BRX-32 / CU-1 FC-2	2
	BRX-32 / CU-0 FC-0	BRX-32 / CU-1 FC-3	0.5
	BRX-32 / CU-1 FC-0	BRX-32 / CU-0 FC-3	0.5



Notes on Cabling SATA Bricks 25–32

1–Slammer systems do not support more than 32 Bricks.

SHEET 11

PMI Cable Connection List and Schematic

Private Management Interface (PMI) Connections in a 1-Slammer System

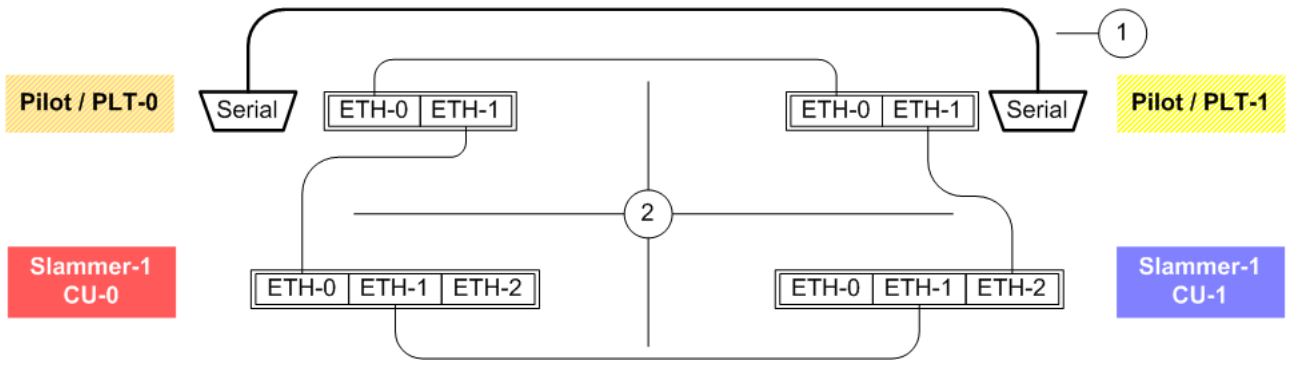
The table below specifies all the Ethernet cables and their connections for the PMI in all 1-Slammer systems, regardless of how many Bricks are configured. The PMI also requires a null modem cable connection between the serial ports of each Pilot CU.

Table 12 Cable connections for the PMI (1-Slammer system)

Cable	Chassis / CU / Port			Chassis / CU / Port	
CBL-60	PLT-0	ETH-0		PLT-1	ETH-0
CBL-61	PLT-0	ETH-1		SLM-1 / CU-0	ETH-0
CBL-63	PLT-1	ETH-1		SLM-1 / CU-1	ETH-2
CBL-65	SLM-1 / CU-0	ETH-1		SLM-1 / CU-1	ETH-1

The schematic below illustrates the Ethernet and null modem connections for the PMI in a 1-Slammer system.

Figure 17 PMI Ethernet schematic (1-Slammer system)



Legend	
1	Serial null modem cable.
2	Cat-5 Ethernet cables.

Schematic of PMI Ethernet Connections in a 1-Slammer System

PMI (Private Message Interface) cabling refers to the fast Ethernet network between the Pilot and the Slammers and the heartbeat connection between the two control units (CUs) of the Pilot.

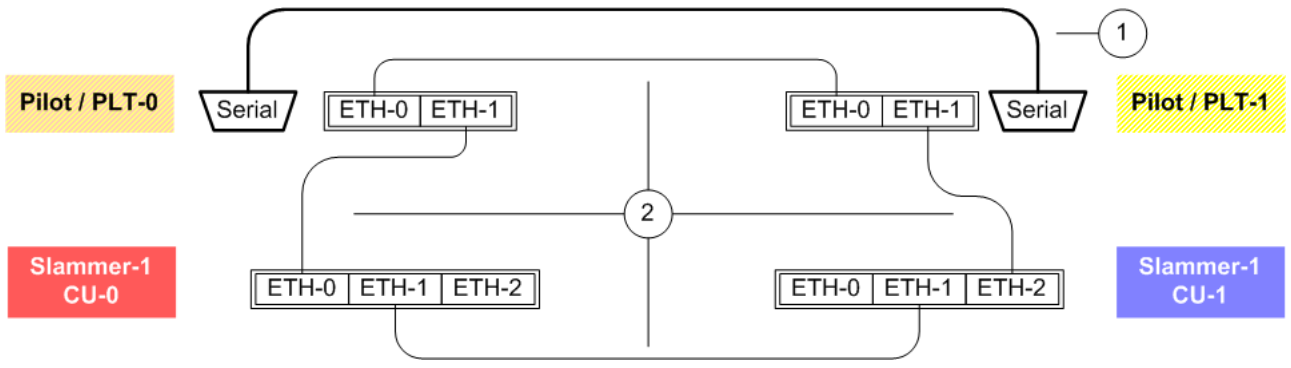
PMI cabling includes the following connections:

- Intra-Pilot cabling for a heartbeat between the two CUs of the Pilot using the serial null modem cable.
- Intra-Pilot cabling between the ETH-0 port on both CUs of the Pilot using 1.64 feet (0.5 m) Cat-5 Ethernet cables.
- PMI cabling connections between the Slammer and the Pilot, where the Ethernet ports on the Pilot CUs connect to the Ethernet ports on the Slammer CUs using 6.56 feet (2 m) Cat-5 Ethernet cables.
- Intra-Slammer PMI cabling connections between the Slammer CUs, where the Ethernet ports within the CUs of the Slammer are connected.

Note: The PMI cabling connections remain the same, regardless of whether the Slammer is a SAN Slammer or a NAS Slammer. The PMI cabling connections remain the same, irrespective of whether the Slammer is a 1-Slammer or a multi-Slammer configuration.

The schematic below illustrates the Ethernet connections for the PMI in a 1-Slammer system.

Figure 18 PMI Ethernet schematic (1-Slammer system)



Legend	
1	Serial null modem cable.
2	Cat-5 Ethernet cables.

For more information on connecting the CUs of a Pilot, refer to the *Pillar Axiom 600 Hardware Installation Guide*.

Part III: Cabling Pillar Axiom 600 Systems Using Two Slammers and SATA Bricks Only

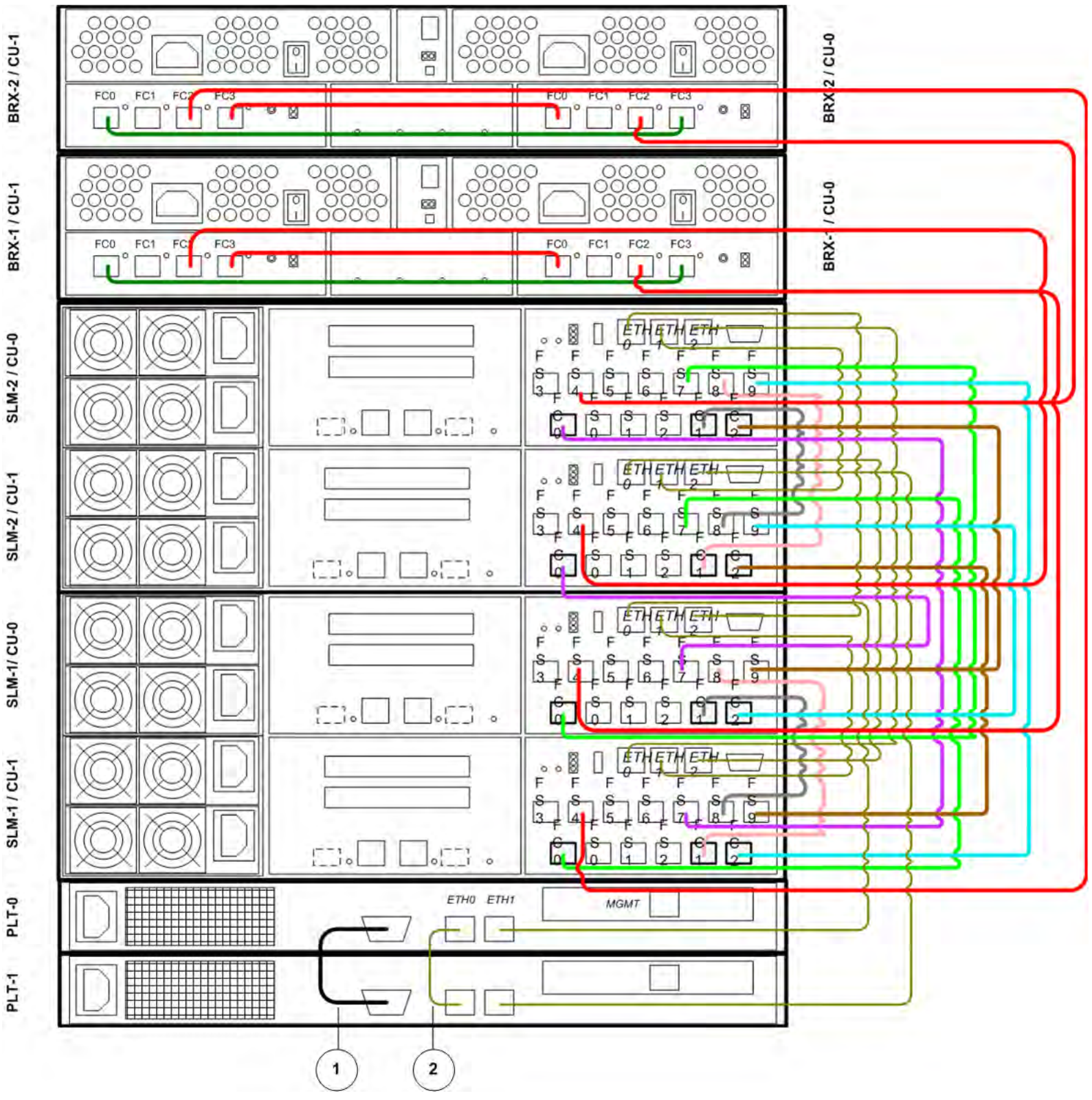
SHEET 12

Cabling Example: 2-Slammer System Using SATA Bricks

Sample Wiring Diagram for a 2x2 System Using SATA Bricks

The figure below is a conceptual example of cabling a 2-Slammer Pillar Axiom 600 system. The scheme shown is for a hardware configuration of two version 1 Slammers and two version 1 SATA Bricks.

Figure 19 Sample cabling for a 2-Slammer system (SATA Bricks only)



Legend	
1	Serial null modem cable.
2	Cross connect on the port that supports the Intelligent Platform Management Interface (IPMI). These ports are labeled ETH-0.
	Note: The location of these ports on your Pilot control units may differ from this illustration.

Note:

This diagram shows the logical connections, not the physical layout of the cables.

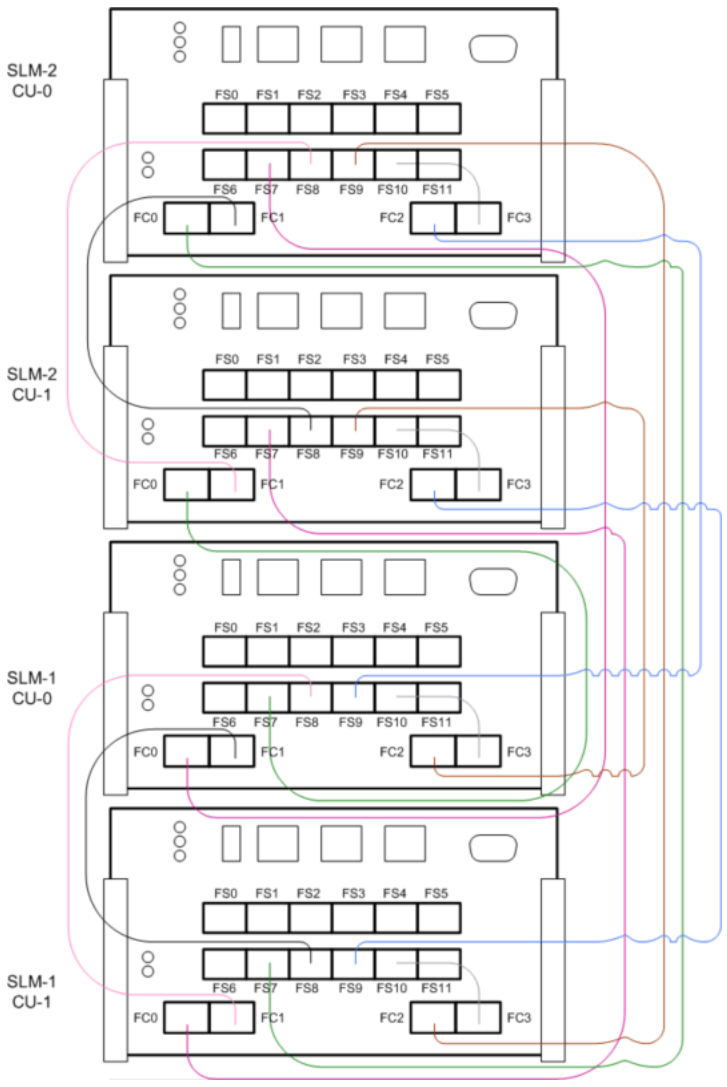
Notes on the 2x2 Wiring Diagram for SATA Bricks

- Cabling of the Storage System Fabric (SSF) is the same for NAS and SAN Slammers. The Slammers depicted in Figure 19 are NAS Slammers.
- The system configuration shown in Figure 19 uses version 1 private interconnect modules (PIMs) and version 1 SATA RAID controllers. Version 2 SATA controllers are cabled using the same port connections. For the cross connections for a version 2 PIM, see Table 8.
- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
  - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
    - Version 1 Bricks: 1.64 ft (0.5 m)
    - Version 2 Bricks: 3.28 ft (1.0 m)
- Color codes of the Fibre Channel (FC) cables in Figure 19 are determined as follows:
  - Slammer FC-*x* to FS-*y* cable color coding follows the lowest SLM-*a*, CU-*b* port color.
  - The illustration shows a Pilot, two Slammers, and two Bricks.
  - This drawing shows only the internal cabling among the units included in the illustration. A working Pillar Axiom system would have additional connections for the following components:
    - Power
    - Customer host system (up to 32, depending on the type of network interface module used and the number of Slammers)
    - Management Ethernet connections to customer equipment (two)
    - Brick FC connections (up to 64) to support the Storage System Fabric (SSF)

Control Unit (CU) Cross Connections for Two Slammers

The illustration below depicts version 2 private interconnect modules (PIMs) contained within the CUs of two Slammers.

Figure 20 Cabling CU cross connections for two version 2 Slammers



- Ports FC0, FC2, FS7, and FS9 connect the two Slammers together.
- The Fibre Channel (FC) ports connect the Fibre Channel ASIC to the Fibre Channel Switch through the FS ports.
- Port FC0 connects to port FS7 on the opposite Slammer:
  - SLM-1 CU-0 FC0 connects to SLM-2 CU-0 FS7
  - SLM-1 CU-1 FC0 connects to SLM-2 CU-1 FS7
  - SLM-1 CU-0 FS7 connects to SLM-2 CU-1 FC0
  - SLM-1 CU-1 FS7 connects to SLM-2 CU-0 FC0
- Port FC2 connects to FS9 on the opposite CU of the other Slammer:
  - SLM-1 CU-0 FC2 connects to SLM-2 CU-1 FS9
  - SLM-1 CU-1 FC2 connects to SLM-2 CU-0 FS9
  - SLM-1 CU-0 FS9 connects to SLM-2 CU-0 FC2
  - SLM-1 CU-1 FS9 connects to SLM-2 CU-1 FC2

SHEET 13

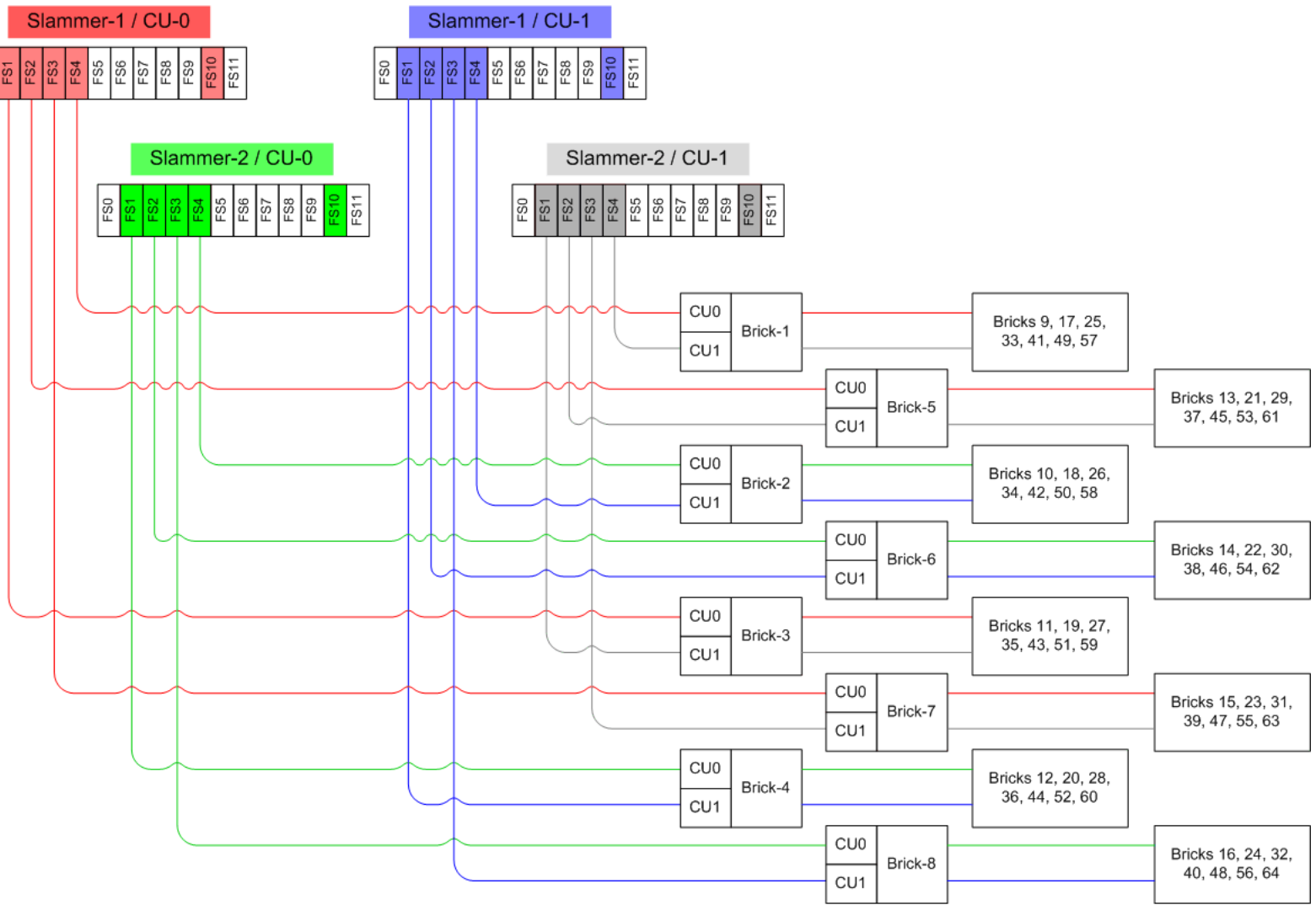
Cabling Block Diagram: A 2-Slammer System

Block Diagram for a 2x64 System Using SATA Bricks

The figure below illustrates the stringing of 64 Bricks in a 2-Slammer Pillar Axiom 600 system. The stringing scheme maps eight Brick strings, each string being eight Bricks deep.

Important! This illustration is for reference only. Actual cabling information begins with Table 15.

Figure 21 Cabling block diagram for 2x64 systems (SATA Bricks only)



For information regarding the cross connections between the two control units of each Brick, see the FC-0 to FC-3 cross connections specified in Table 15.

Notes on the 2x64 Block Diagram for SATA Bricks

- Two Slammer systems contain at most eight Brick strings. For the Pillar Axiom 600, a string may contain up to eight Bricks.
- Add Bricks to strings so that the number of Bricks in any string differs by no more than two between the longest and the shortest string.
- Figure 21, shows the order that Bricks are to be added to a system that has two Slammer storage controllers (NAS or SAN) and up to 64 Bricks.
- The entire Storage System Fabric (SSF) uses 2 Gb/s Fibre Channel (FC) patch cables throughout.
- Large two Slammer systems require up to four racks.

  Note: Contact Pillar World Wide Customer Support Center to clarify the PDU requirements for the various configurations of Brick types and Brick numbers.
  Here are two examples:

Table 13 Rack space requirements for a 16-Brick system: 54 U (two racks)

Component	Height (rack units)	Quantity	Rack space
Pilot	2	1	2
Slammer	4	2	8

Table 13 Rack space requirements for a 16-Brick system: 54 U (two racks) (continued)

Component	Height (rack units)	Quantity	Rack space
Brick	2	16	32
PDU	1	8	8
Clearance	2	2	4

Table 14 Rack space requirements for a 32-Brick system: 92 U (three racks)

Component	Height (rack units)	Quantity	Rack space
Pilot	2	1	2
Slammer	4	2	8
Brick	2	32	64
PDU	1	12	12
Clearance	2	3	6

- Pillar Data Systems recommends a Brick scalability strategy that includes the following points:
  - First connect all eight Brick strings to the Slammers with one Brick before building onto the end of any string.
  - Add additional Bricks using the connectivity illustrated in Figure 21 and defined in the tables beginning with Table 15.

    See also: Figure 24: Generalized cascade of three SATA Bricks.
- This arrangement of Slammer-to-Bricks connections satisfies the following criteria:
  - Each Brick has one connection to the first Slammer and one connection to the second Slammer.
  - Brick CU-0 ports are connected to Slammer CU-0 ports. Brick CU-1 ports are connected to Slammer CU-1 ports.
  - For each Brick, the two Slammer connections use the same Slammer port number but on opposite CUs.
  - Load across Slammer CUs is balanced as Bricks are added to the system.
- The configuration of systems upgraded in the field may differ somewhat from those built in the factory.

SHEET 14

Cable Connection List (Slammers Plus Bricks 1–8)

Cable the Slammers and SATA Bricks 1–8

The table below specifies all Fibre Channel (FC) cables and their connections for the two Slammers and the first set of eight Bricks. All such interconnections are part of the Storage System Fabric (SSF).

Table 15 FC cable connections for two Slammers and the first set of eight SATA Bricks

Slammer-to-Slammer Connections

Version 1 PIMs

From: Chassis / CU / Port	To: Chassis / CU / Port
SLM-1 / CU-0 FC-0	SLM-2 / CU-0 FS-7
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-0 FC-2	SLM-2 / CU-1 FS-9
SLM-1 / CU-1 FC-0	SLM-2 / CU-1 FS-7
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-1 FC-2	SLM-2 / CU-0 FS-9
SLM-2 / CU-0 FC-0	SLM-1 / CU-1 FS-7
SLM-2 / CU-0 FC-1	SLM-2 / CU-1 FS-8
SLM-2 / CU-0 FC-2	SLM-1 / CU-0 FS-9
SLM-2 / CU-1 FC-0	SLM-1 / CU-0 FS-7
SLM-2 / CU-1 FC-1	SLM-2 / CU-0 FS-8
SLM-2 / CU-1 FC-2	SLM-1 / CU-1 FS-9

Version 2 PIMs

From: Chassis / CU / Port	To: Chassis / CU / Port
SLM-1 / CU-0 FC-0	SLM-2 / CU-0 FS-7
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-0 FC-2	SLM-2 / CU-1 FS-9
SLM-1 / CU-0 FC-3	SLM-1 / CU-0 FS-10
SLM-1 / CU-1 FC-0	SLM-2 / CU-1 FS-7
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-1 FC-2	SLM-2 / CU-0 FS-9
SLM-1 / CU-1 FC-3	SLM-1 / CU-1 FS-10
SLM-2 / CU-0 FC-0	SLM-1 / CU-1 FS-7
SLM-2 / CU-0 FC-1	SLM-2 / CU-1 FS-8
SLM-2 / CU-0 FC-2	SLM-1 / CU-0 FS-9
SLM-2 / CU-0 FC-3	SLM-2 / CU-0 FS-10
SLM-2 / CU-1 FC-0	SLM-1 / CU-0 FS-7
SLM-2 / CU-1 FC-1	SLM-2 / CU-0 FS-8
SLM-2 / CU-1 FC-2	SLM-1 / CU-1 FS-9
SLM-2 / CU-1 FC-3	SLM-2 / CU-1 FS-10

Brick Connections

	From: Chassis / CU / Port	To: Chassis / CU / Port
For BRX-1:		
	SLM-1 / CU-0 FS-4	BRX-1 / CU-0 FC-2
	SLM-2 / CU-1 FS-4	BRX-1 / CU-1 FC-2
	BRX-1 / CU-0 FC-0	BRX-1 / CU-1 FC-3
	BRX-1 / CU-1 FC-0	BRX-1 / CU-0 FC-3
For BRX-2:		
	SLM-2 / CU-0 FS-4	BRX-2 / CU-0 FC-2
	SLM-1 / CU-1 FS-4	BRX-2 / CU-1 FC-2
	BRX-2 / CU-0 FC-0	BRX-2 / CU-1 FC-3
	BRX-2 / CU-1 FC-0	BRX-2 / CU-0 FC-3
For BRX-3:		
	SLM-1 / CU-0 FS-1	BRX-3 / CU-0 FC-2
	SLM-2 / CU-1 FS-1	BRX-3 / CU-1 FC-2
	BRX-3 / CU-0 FC-0	BRX-3 / CU-1 FC-3
	BRX-3 / CU-1 FC-0	BRX-3 / CU-0 FC-3
For BRX-4:		
	SLM-2 / CU-0 FS-1	BRX-4 / CU-0 FC-2
	SLM-1 / CU-1 FS-1	BRX-4 / CU-1 FC-2
	BRX-4 / CU-0 FC-0	BRX-4 / CU-1 FC-3
	BRX-4 / CU-1 FC-0	BRX-4 / CU-0 FC-3
For BRX-5:		
	SLM-1 / CU-0 FS-2	BRX-5 / CU-0 FC-2
	SLM-2 / CU-1 FS-2	BRX-5 / CU-1 FC-2
	BRX-5 / CU-0 FC-0	BRX-5 / CU-1 FC-3
	BRX-5 / CU-1 FC-0	BRX-5 / CU-0 FC-3
For BRX-6:		
	SLM-2 / CU-0 FS-2	BRX-6 / CU-0 FC-2
	SLM-1 / CU-1 FS-2	BRX-6 / CU-1 FC-2
	BRX-6 / CU-0 FC-0	BRX-6 / CU-1 FC-3
	BRX-6 / CU-1 FC-0	BRX-6 / CU-0 FC-3
For BRX-7:		
	SLM-1 / CU-0 FS-3	BRX-7 / CU-0 FC-2
	SLM-2 / CU-1 FS-3	BRX-7 / CU-1 FC-2
	BRX-7 / CU-0 FC-0	BRX-7 / CU-1 FC-3
	BRX-7 / CU-1 FC-0	BRX-7 / CU-0 FC-3
For BRX-8:		
	SLM-2 / CU-0 FS-3	BRX-8 / CU-0 FC-2
	SLM-1 / CU-1 FS-3	BRX-8 / CU-1 FC-2
	BRX-8 / CU-0 FC-0	BRX-8 / CU-1 FC-3
	BRX-8 / CU-1 FC-0	BRX-8 / CU-0 FC-3

Install for a 2 Brick System

Install for an 3 Brick System

Install for a 4 Brick System

Install for a 5 Brick System

Install for a 6 Brick System

Install for a 7 Brick System

Install for an 8 Brick System

Notes on Cabling SATA Bricks 1–8

- Install all cables specified, depending on the number of Bricks in the system.
- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).

    - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
        - Version 1 Bricks: 1.64 ft (0.5 m)
        - Version 2 Bricks: 3.28 ft (1.0 m)

- The Storage System Fabric (SSF) cabling scheme is based on the following conventions:
    - Slammers and Bricks (all chassis) are numbered starting with 1.
    - Designators within Slammer and Brick chassis are numbered starting from 0 (zero), as in CU-0, FC-0, and so on.
    - The Pilot has two control units (CUs): PLT-0 and PLT-1.
- SSF cabling in 2-Slammer systems is based on the following principles:
    - Slammers:
        - FC-0 in one Slammer connects to FS-7 in the other Slammer. See Table 15.
        - For systems with one Slammer containing version 1 private interconnect modules (PIMs) and the other containing version 2 PIMs, the FC-0 to FS-7 connection is made with an HSSDC2-to-SFP adapter cable.
        - FC-1 connects to FS-8 in the opposite CU in the same Slammer.
        - FC-2 in one Slammer connects to FS-9 in the other Slammer. See Table 15.

          Note: For systems with one Slammer containing version 1 PIMs and the other containing version 2 PIMs, the FC-2 to FS-9 connection is made with an HSSDC2-to-SFP adapter cable.
        - For version 2 Slammers, FC-3 connects to FS-10.
        - FS-1, FS-2, FS-3, and FS-4 are used for Brick connections.
        - The following connections are reserved for configurations of more than two Slammers:
            - FS-4 and FS-5 are reserved for Slammer FC-to-switch connections in 3- and 5-Slammer configurations.
            - FS-6 is reserved for the cascade (switch-to-switch) connection in 3-Slammer and larger configurations.
    - Bricks:
        - FC-0 connects to FC-3 of the opposite CU in the same Brick.
        - FC-1 connects to FC-2 in the same CU of a downstream Brick.
        - FC-2 connects to a Slammer FS port or to FC-1 in the same CU of an upstream Brick.
- In addition to the FC cables identified in Table 15, install the private management interface (PMI) Ethernet cables specified in Table 20.
- To cable additional Bricks into a 2-Slammer system, see Table 16.

SHEET 15

SSF Cable Connection List (Bricks 9–16)

Cable SATA Bricks 9–16

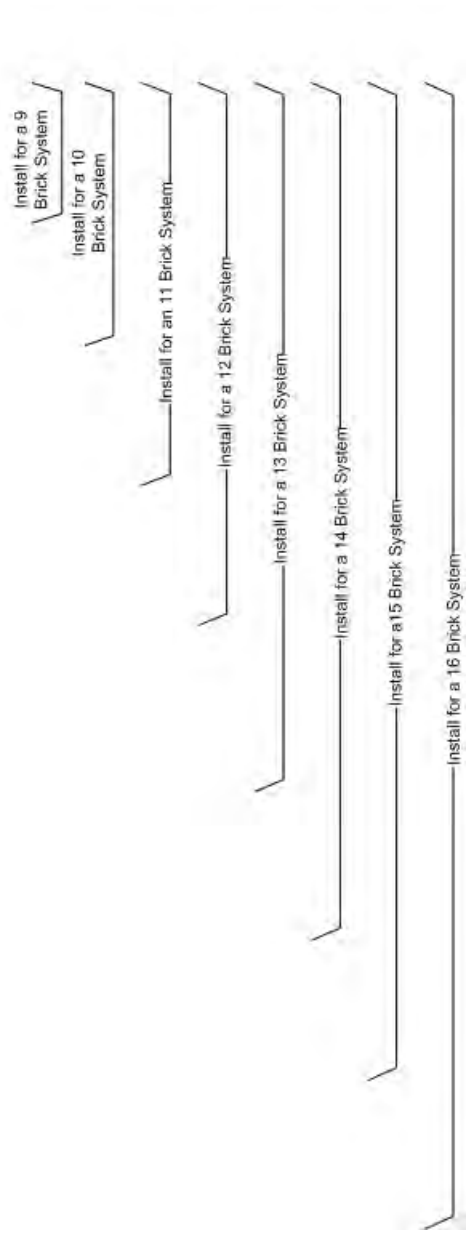
To install these Bricks, install all cables specified in the following tables and in the indicated order:

1. Table 15: FC cable connections for two Slammers and the first set of eight SATA Bricks.
2. The appropriate cables in the table below (depending on the number of Bricks in your configuration).

The table below specifies all Fibre Channel (FC) cables and their connections for the second set of eight Bricks. All such interconnections are part of the Storage System Fabric (SSF).

Table 16 FC cable connections for the second set of eight SATA Bricks (2-Slammer system)

	From	To	
	Chassis / CU / Port	Chassis / CU / Port	
For BRX-9:			
	BRX-1 / CU-0 FC-1	BRX-9 / CU-0 FC-2	2
	BRX-1 / CU-1 FC-1	BRX-9 / CU-1 FC-2	2
	BRX-9 / CU-0 FC-0	BRX-9 / CU-1 FC-3	0.5
	BRX-9 / CU-1 FC-0	BRX-9 / CU-0 FC-3	0.5
For BRX-10:			
	BRX-2 / CU-0 FC-1	BRX-10 / CU-0 FC-2	2
	BRX-2 / CU-1 FC-1	BRX-10 / CU-1 FC-2	2
	BRX-10 / CU-0 FC-0	BRX-10 / CU-1 FC-3	0.5
	BRX-10 / CU-1 FC-0	BRX-10 / CU-0 FC-3	0.5
For BRX-11:			
	BRX-3 / CU-0 FC-1	BRX-11 / CU-0 FC-2	2
	BRX-3 / CU-1 FC-1	BRX-11 / CU-1 FC-2	2
	BRX-11 / CU-0 FC-0	BRX-11 / CU-1 FC-3	0.5
	BRX-11 / CU-1 FC-0	BRX-11 / CU-0 FC-3	0.5
For BRX-12:			
	BRX-4 / CU-0 FC-1	BRX-12 / CU-0 FC-2	2
	BRX-4 / CU-1 FC-1	BRX-12 / CU-1 FC-2	2
	BRX-12 / CU-0 FC-0	BRX-12 / CU-1 FC-3	0.5
	BRX-12 / CU-1 FC-0	BRX-12 / CU-0 FC-3	0.5
For BRX-13:			
	BRX-5 / CU-0 FC-1	BRX-13 / CU-0 FC-2	2
	BRX-5 / CU-1 FC-1	BRX-13 / CU-1 FC-2	2
	BRX-13 / CU-0 FC-0	BRX-13 / CU-1 FC-3	0.5
	BRX-13 / CU-1 FC-0	BRX-13 / CU-0 FC-3	0.5
For BRX-14:			
	BRX-6 / CU-0 FC-1	BRX-14 / CU-0 FC-2	2
	BRX-6 / CU-1 FC-1	BRX-14 / CU-1 FC-2	2
	BRX-14 / CU-0 FC-0	BRX-14 / CU-1 FC-3	0.5
	BRX-14 / CU-1 FC-0	BRX-14 / CU-0 FC-3	0.5
For BRX-15:			
	BRX-7 / CU-0 FC-1	BRX-15 / CU-0 FC-2	2
	BRX-7 / CU-1 FC-1	BRX-15 / CU-1 FC-2	2
	BRX-15 / CU-0 FC-0	BRX-15 / CU-1 FC-3	0.5
	BRX-15 / CU-1 FC-0	BRX-15 / CU-0 FC-3	0.5
For BRX-16:			
	BRX-8 / CU-0 FC-1	BRX-16 / CU-0 FC-2	2
	BRX-8 / CU-1 FC-1	BRX-16 / CU-1 FC-2	2
	BRX-16 / CU-0 FC-0	BRX-16 / CU-1 FC-3	0.5
	BRX-16 / CU-1 FC-0	BRX-16 / CU-0 FC-3	0.5



Notes on Cabling SATA Bricks 9–16

To cable additional Bricks into a 2-Slammer system, see Table 17.

SHEET 16

Cable Connection List (Bricks 17–24)

Cable SATA Bricks 17–24

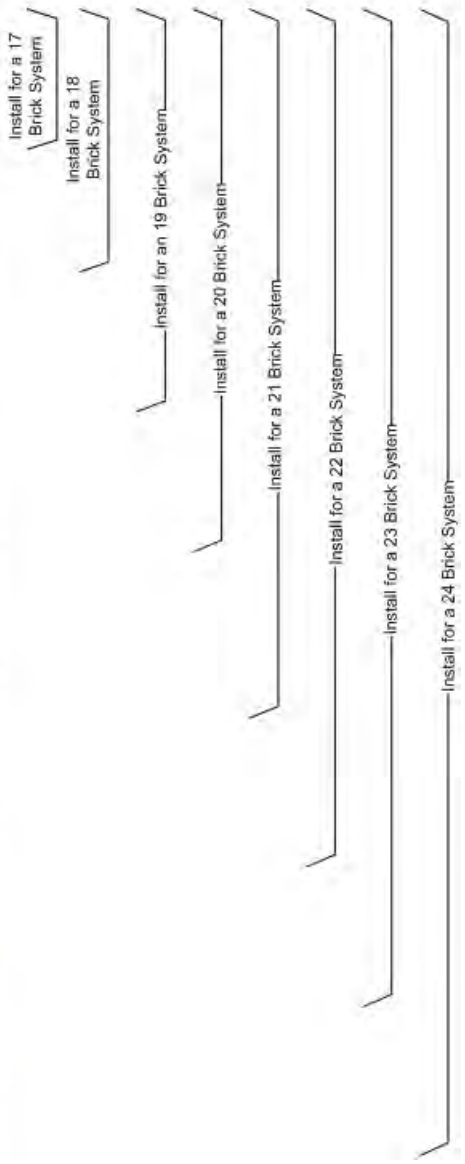
To install these Bricks, install all cables specified in the following tables and in the indicated order:

1. Table 15: FC cable connections for two Slammers and the first set of eight SATA Bricks.
2. Table 16: FC cable connections for the second set of eight SATA Bricks (2-Slammer system).
3. Depending on the number of Bricks in your configuration, the appropriate cables in the table below.

The table below specifies all Fibre Channel (FC) cables and their connections for the third set of eight Bricks. All such interconnections are part of the Storage System Fabric (SSF).

Table 17 FC cable connections for the third set of eight SATA Bricks (2-Slammer system)

	From	To	
	Chassis / CU / Port	Chassis / CU / Port	
For BRX-17:			
	BRX-9 / CU-0 FC-1	BRX-17 / CU-0 FC-2	2
	BRX-9 / CU-1 FC-1	BRX-17 / CU-1 FC-2	2
	BRX-17 / CU-0 FC-0	BRX-17 / CU-1 FC-3	0.5
	BRX-17 / CU-1 FC-0	BRX-17 / CU-0 FC-3	0.5
For BRX-18:			
	BRX-10 / CU-0 FC-1	BRX-18 / CU-0 FC-2	2
	BRX-10 / CU-1 FC-1	BRX-18 / CU-1 FC-2	2
	BRX-18 / CU-0 FC-0	BRX-18 / CU-1 FC-3	0.5
	BRX-18 / CU-1 FC-0	BRX-18 / CU-0 FC-3	0.5
For BRX-19:			
	BRX-11 / CU-0 FC-1	BRX-19 / CU-0 FC-2	2
	BRX-11 / CU-1 FC-1	BRX-19 / CU-1 FC-2	2
	BRX-19 / CU-0 FC-0	BRX-19 / CU-1 FC-3	0.5
	BRX-19 / CU-1 FC-0	BRX-19 / CU-0 FC-3	0.5
For BRX-20:			
	BRX-12 / CU-0 FC-1	BRX-20 / CU-0 FC-2	2
	BRX-12 / CU-1 FC-1	BRX-20 / CU-1 FC-2	2
	BRX-20 / CU-0 FC-0	BRX-20 / CU-1 FC-3	0.5
	BRX-20 / CU-1 FC-0	BRX-20 / CU-0 FC-3	0.5
For BRX-21:			
	BRX-13 / CU-0 FC-1	BRX-21 / CU-0 FC-2	2
	BRX-13 / CU-1 FC-1	BRX-21 / CU-1 FC-2	2
	BRX-21 / CU-0 FC-0	BRX-21 / CU-1 FC-3	0.5
	BRX-21 / CU-1 FC-0	BRX-21 / CU-0 FC-3	0.5
For BRX-22:			
	BRX-14 / CU-0 FC-1	BRX-22 / CU-0 FC-2	2
	BRX-14 / CU-1 FC-1	BRX-22 / CU-1 FC-2	2
	BRX-22 / CU-0 FC-0	BRX-22 / CU-1 FC-3	0.5
	BRX-22 / CU-1 FC-0	BRX-22 / CU-0 FC-3	0.5
For BRX-23:			
	BRX-15 / CU-0 FC-1	BRX-23 / CU-0 FC-2	2
	BRX-15 / CU-1 FC-1	BRX-23 / CU-1 FC-2	2
	BRX-23 / CU-0 FC-0	BRX-23 / CU-1 FC-3	0.5
	BRX-23 / CU-1 FC-0	BRX-23 / CU-0 FC-3	0.5
For BRX-24:			
	BRX-16 / CU-0 FC-1	BRX-24 / CU-0 FC-2	2
	BRX-16 / CU-1 FC-1	BRX-24 / CU-1 FC-2	2
	BRX-24 / CU-0 FC-0	BRX-24 / CU-1 FC-3	0.5
	BRX-24 / CU-1 FC-0	BRX-24 / CU-0 FC-3	0.5



Notes on Cabling SATA Bricks 17–24

To cable additional SATA Bricks into a 2-Slammer system, see Table 18.

SHEET 17

Cable Connection List (Bricks 25 and Up)

Cable SATA Bricks 25–32

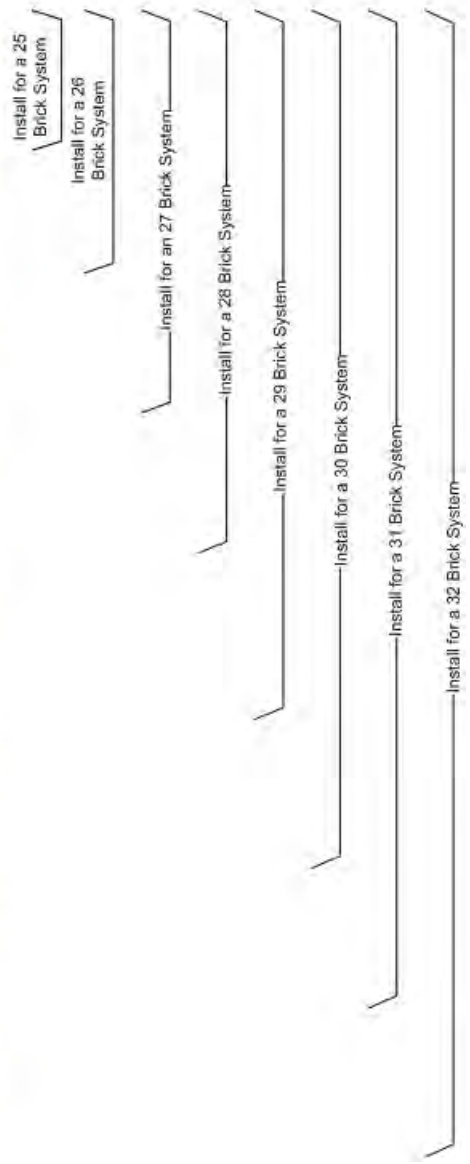
To install these Bricks, install all cables specified in the following tables and in the indicated order:

1. Table 15: FC cable connections for two Slammers and the first set of eight SATA Bricks.
2. Table 16: FC cable connections for the second set of eight SATA Bricks (2-Slammer system).
3. Table 17: FC cable connections for the third set of eight SATA Bricks (2-Slammer system).
4. Depending on the number of Bricks in your configuration, the appropriate cables in the table below.

The table below specifies all Fibre Channel (FC) cables and their connections for the fourth set of eight SATA Bricks. All such interconnections are part of the Storage System Fabric (SSF).

Table 18 FC cable connections for the fourth set of eight SATA Bricks (2-Slammer system)

	From Chassis / CU / Port	To Chassis / CU / Port	
For BRX-25:			
	BRX-17 / CU-0 FC-1	BRX-25 / CU-0 FC-2	2
	BRX-17 / CU-1 FC-1	BRX-25 / CU-1 FC-2	2
	BRX-25 / CU-0 FC-0	BRX-25 / CU-1 FC-3	0.5
	BRX-25 / CU-1 FC-0	BRX-25 / CU-0 FC-3	0.5
For BRX-26:			
	BRX-18 / CU-0 FC-1	BRX-26 / CU-0 FC-2	2
	BRX-18 / CU-1 FC-1	BRX-26 / CU-1 FC-2	2
	BRX-26 / CU-0 FC-0	BRX-26 / CU-1 FC-3	0.5
	BRX-26 / CU-1 FC-0	BRX-26 / CU-0 FC-3	0.5
For BRX-27:			
	BRX-19 / CU-0 FC-1	BRX-27 / CU-0 FC-2	2
	BRX-19 / CU-1 FC-1	BRX-27 / CU-1 FC-2	2
	BRX-27 / CU-0 FC-0	BRX-27 / CU-1 FC-3	0.5
	BRX-27 / CU-1 FC-0	BRX-27 / CU-0 FC-3	0.5
For BRX-28:			
	BRX-20 / CU-0 FC-1	BRX-28 / CU-0 FC-2	2
	BRX-20 / CU-1 FC-1	BRX-28 / CU-1 FC-2	2
	BRX-28 / CU-0 FC-0	BRX-28 / CU-1 FC-3	0.5
	BRX-28 / CU-1 FC-0	BRX-28 / CU-0 FC-3	0.5
For BRX-29:			
	BRX-21 / CU-0 FC-1	BRX-29 / CU-0 FC-2	2
	BRX-21 / CU-1 FC-1	BRX-29 / CU-1 FC-2	2
	BRX-29 / CU-0 FC-0	BRX-29 / CU-1 FC-3	0.5
	BRX-29 / CU-1 FC-0	BRX-29 / CU-0 FC-3	0.5
For BRX-30:			
	BRX-22 / CU-0 FC-1	BRX-30 / CU-0 FC-2	2
	BRX-22 / CU-1 FC-1	BRX-30 / CU-1 FC-2	2
	BRX-30 / CU-0 FC-0	BRX-30 / CU-1 FC-3	0.5
	BRX-30 / CU-1 FC-0	BRX-30 / CU-0 FC-3	0.5
For BRX-31:			
	BRX-23 / CU-0 FC-1	BRX-31 / CU-0 FC-2	2
	BRX-23 / CU-1 FC-1	BRX-31 / CU-1 FC-2	2
	BRX-31 / CU-0 FC-0	BRX-31 / CU-1 FC-3	0.5
	BRX-31 / CU-1 FC-0	BRX-31 / CU-0 FC-3	0.5
For BRX-32:			
	BRX-24 / CU-0 FC-1	BRX-32 / CU-0 FC-2	2
	BRX-24 / CU-1 FC-1	BRX-32 / CU-1 FC-2	2
	BRX-32 / CU-0 FC-0	BRX-32 / CU-1 FC-3	0.5
	BRX-32 / CU-1 FC-0	BRX-32 / CU-0 FC-3	0.5



Notes on Cabling SATA Bricks 25–32

2-Slammer systems support configurations of up to 64 Bricks. To cable additional SATA Bricks into a 2-Slammer system, continue cabling them using the pattern illustrated in Table 19.

Cabling Configurations of More Than 32 SATA Bricks

Table 19 Cabling configurations having more than 32 SATA Bricks

To cable this Brick...	Connect it to this Brick...	To cable this Brick...	Connect it to this Brick...
BRX-33	BRX-25	BRX-49	BRX-41

Table 19 Cabling configurations having more than 32 SATA Bricks (continued)

To cable this Brick...	Connect it to this Brick...	To cable this Brick...	Connect it to this Brick...
BRX-34	BRX-26	BRX-50	BRX-42
BRX-35	BRX-27	BRX-51	BRX-43
BRX-36	BRX-28	BRX-52	BRX-44
BRX-37	BRX-29	BRX-53	BRX-45
BRX-38	BRX-30	BRX-54	BRX-46
BRX-39	BRX-31	BRX-55	BRX-47
BRX-40	BRX-32	BRX-56	BRX-48
BRX-41	BRX-33	BRX-57	BRX-49
BRX-42	BRX-34	BRX-58	BRX-50
BRX-43	BRX-35	BRX-59	BRX-51
BRX-44	BRX-36	BRX-60	BRX-52
BRX-45	BRX-37	BRX-61	BRX-53
BRX-46	BRX-38	BRX-62	BRX-54
BRX-47	BRX-39	BRX-63	BRX-55
BRX-48	BRX-40	BRX-64	BRX-56

See also:

Figure 21: Cabling block diagram for 2x64 systems (SATA Bricks only).

Figure 24: Generalized cascade of three SATA Bricks.

SHEET 18

PMI Cable Connection List and Schematic

Private Management Interface (PMI) Connections in a 2-Slammer System

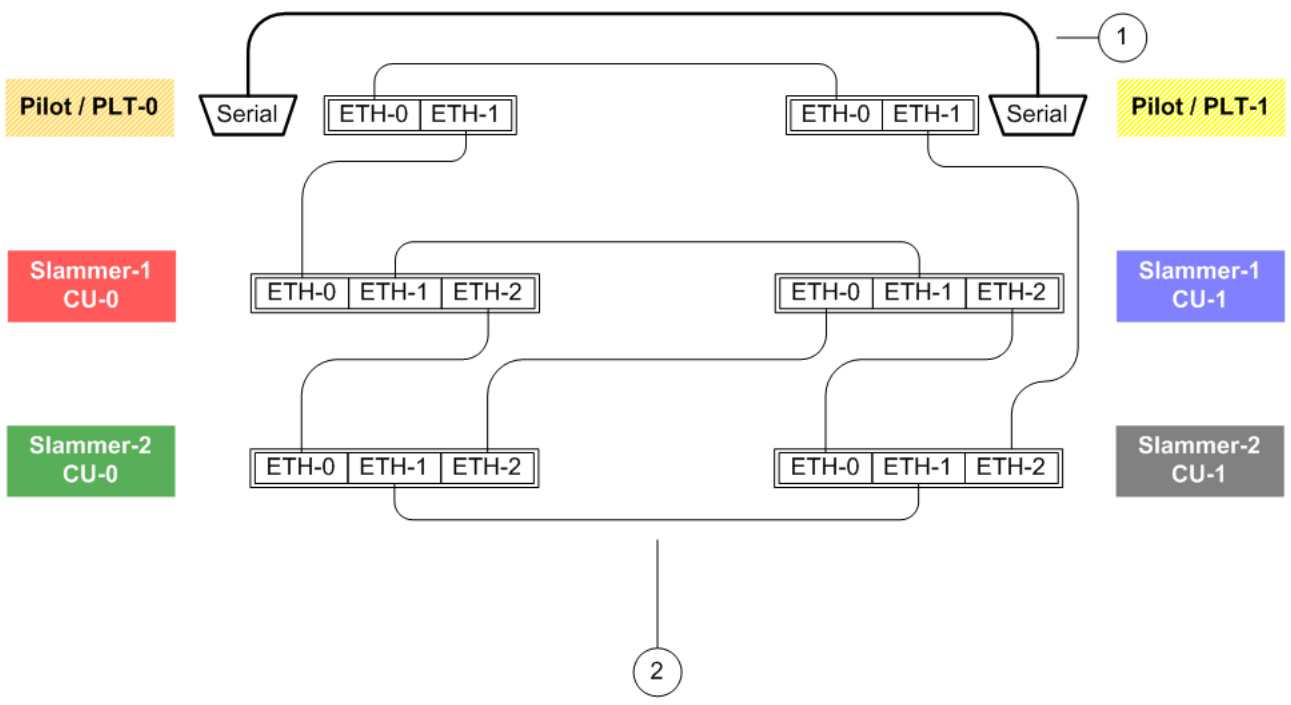
The table below specifies all Ethernet cables and their connections for the PMI in all 2-Slammer systems, regardless of how many Bricks are configured.

Table 20 Ethernet cable connections for PMI (2-Slammer system)

From chassis / CU / port	To chassis / CU / port
PLT-0 ETH0	PLT-1 ETH0
PLT-0 ETH1	SLM-1 / CU-0 / ETH0
PLT-1 ETH1	SLM-2 / CU-1 / ETH2
SLM-1 / CU-0 / ETH1	SLM-1 / CU-1 / ETH1
SLM-1 / CU-0 / ETH2	SLM-2 / CU-0 / ETH0
SLM-1 / CU-1 / ETH2	SLM-2 / CU-1 / ETH0
SLM-2 / CU-0 / ETH1	SLM-2 / CU-1 / ETH1
SLM-2 / CU-0 / ETH2	SLM-1 / CU-1 / ETH0

The schematic below illustrates the Ethernet connections for the PMI in a 2-Slammer system.

Figure 22 PMI Ethernet schematic (2-Slammer system)



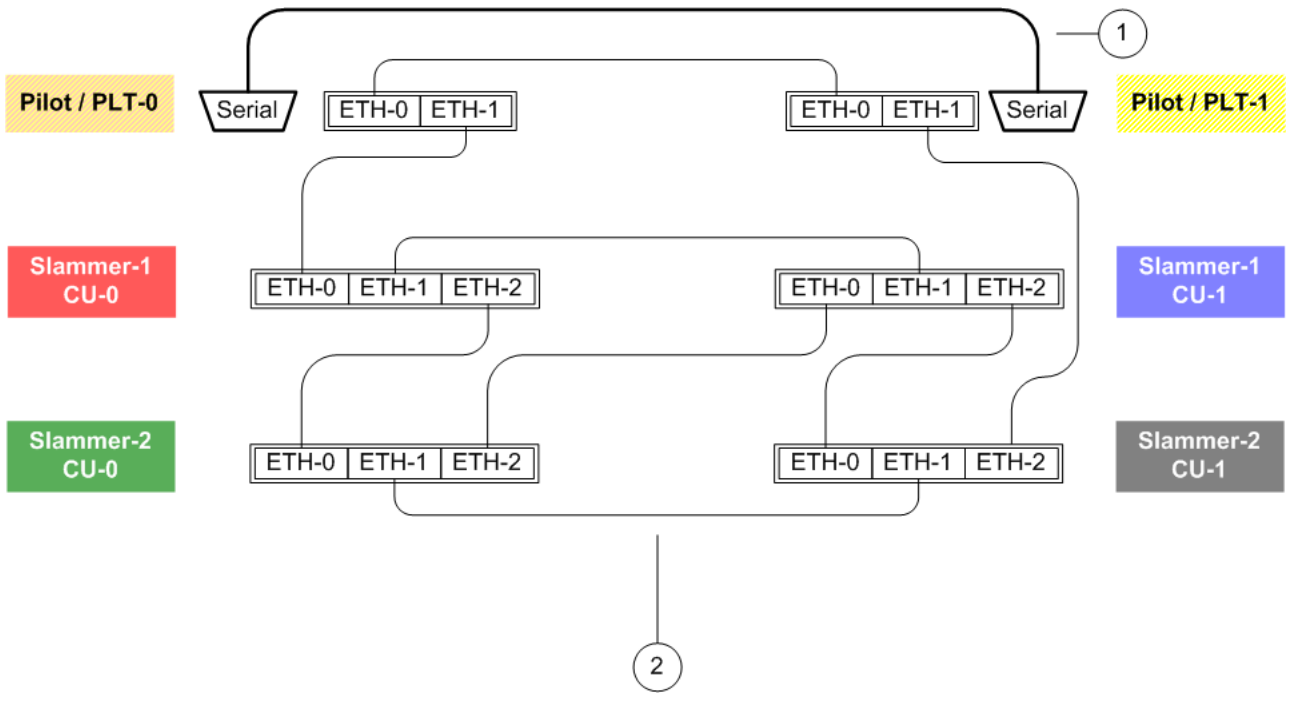
Legend	
1	Serial null modem cable.
2	Cat-5 Ethernet cables.

In addition to the Ethernet cables, PMI requires a null modem cable connection between the serial ports of each Pilot control unit.

Schematic of PMI Ethernet Connections in a 2-Slammer System

The schematic below illustrates the Ethernet connections for the private management interface (PMI) in a 2-Slammer system.

Figure 23 PMI Ethernet schematic (2-Slammer system)



Legend	
1	Serial null modem cable.
2	Cat-5 Ethernet cables.

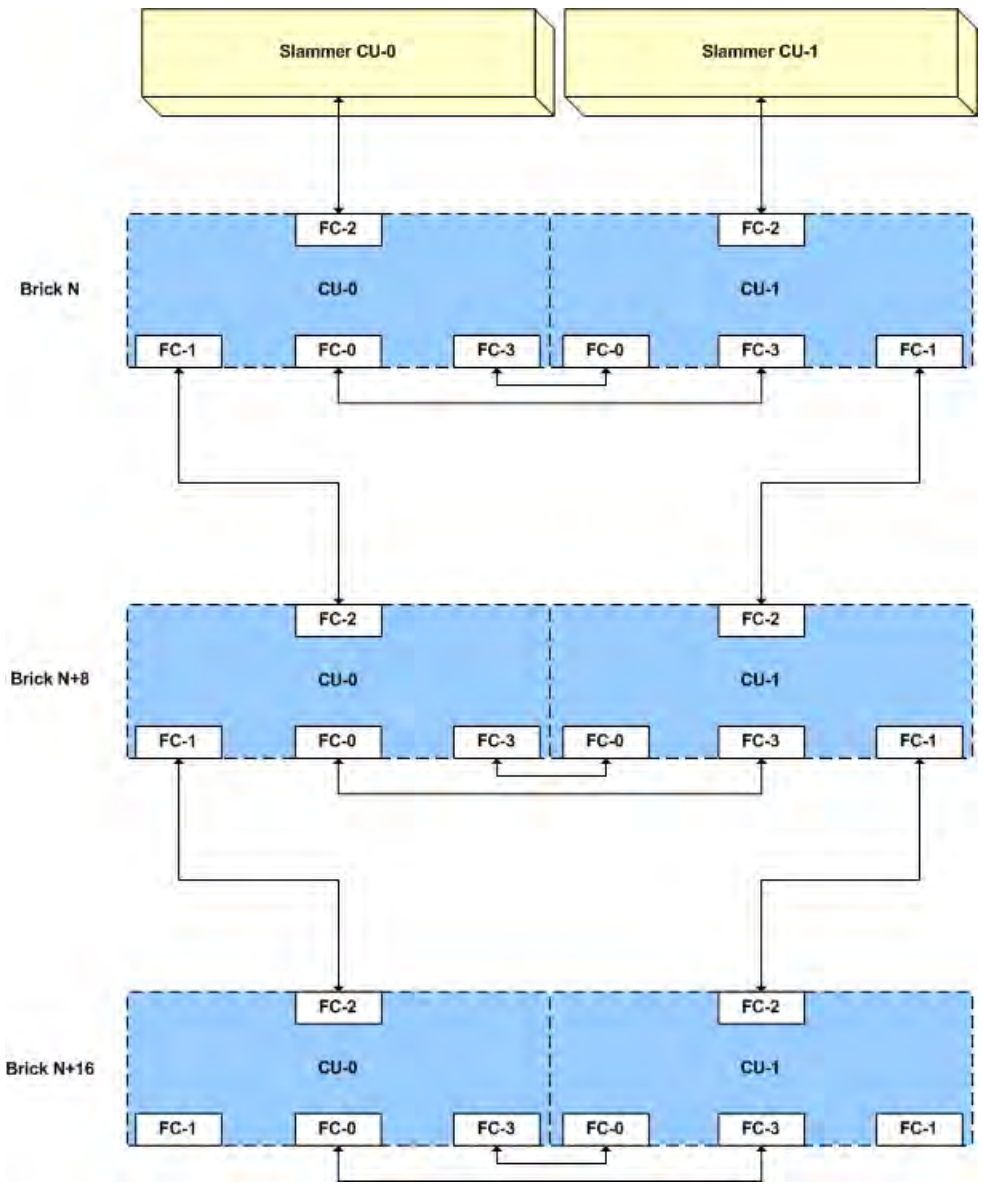
SHEET 19

Schematic of a SATA Brick Cascade (String)

Diagram of Stringing SATA Bricks

The figure below illustrates the general scheme to cascade (or string) SATA Bricks (*N* can have a value from 1 to 8).

Figure 24 Generalized cascade of three SATA Bricks



Notes on Stringing Bricks

This schematic applies *only* to SATA Bricks. For a schematic showing an intermix of SATA and Fibre Channel (FC) Bricks, see:

- Figure 25: Sample cabling for 1X2 Pillar Axiom system with FC Bricks.
- Figure 29: Sample cabling for an FC RAID Brick, an FC Expansion Brick, and two SATA Bricks.

Part IV: Cabling Pillar Axiom 600 Systems Using One or Two Slammers and FC Bricks

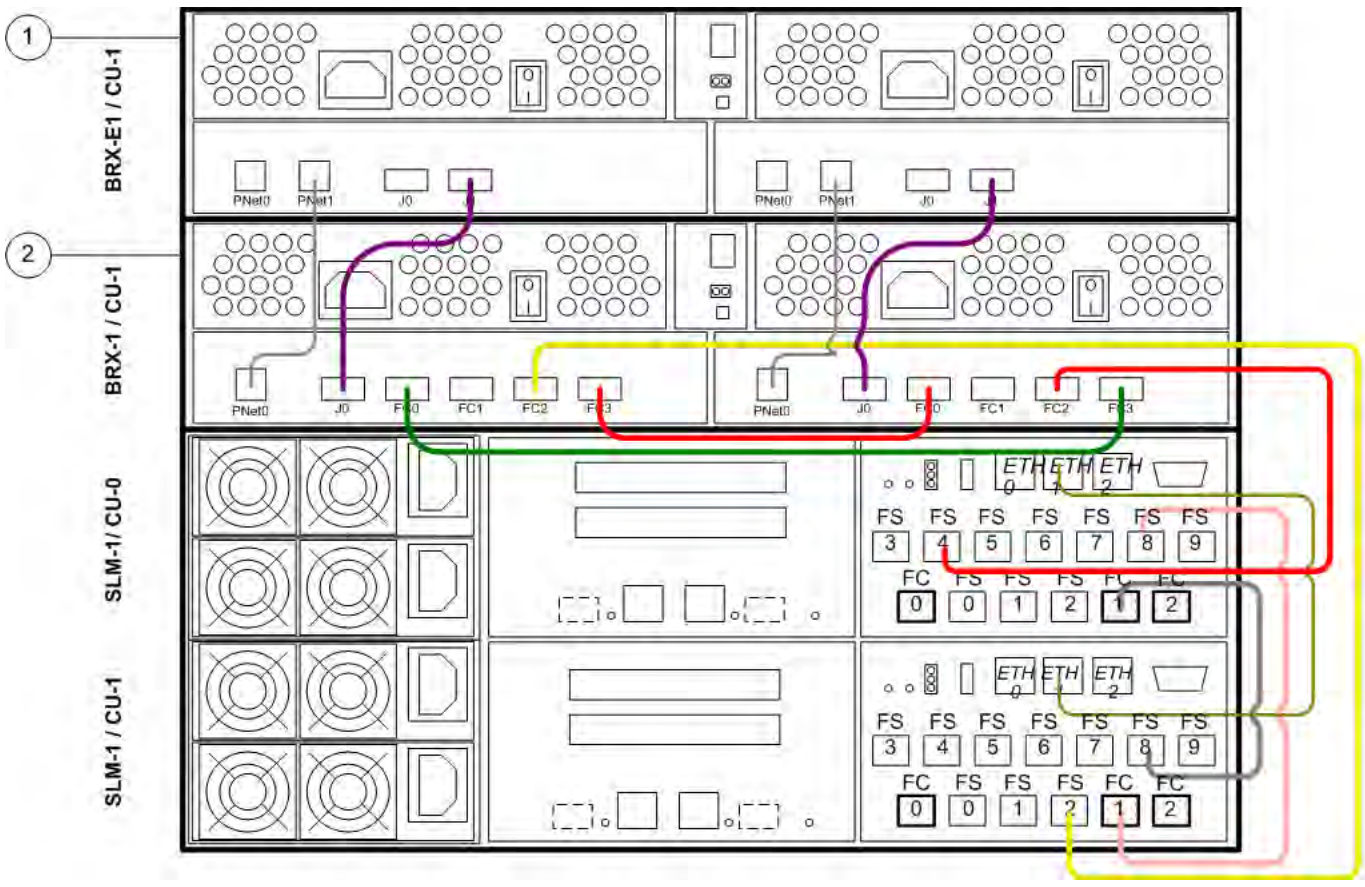
SHEET 20

Cabling Example: 1-Slammer System Using FC Bricks

Sample Wiring Diagram for a 1x2 System Using FC Bricks

The figure illustrates the cabling of a Pillar Axiom system with a configuration of one Slammer and two Bricks. The scheme shown is for version 1 private interconnect modules (PIMs) and a NAS Slammer. It defines the Slammer-to-Brick connections and the Brick-to-Brick connections required to connect Fibre Channel (FC) Bricks to a Slammer.

Figure 25 Sample cabling for 1X2 Pillar Axiom system with FC Bricks



Legend	
1	Typical FC Expansion Brick.
2	Typical FC RAID Brick.

Note: The above diagram shows the logical connections, not the physical layout of the cables.

Notes on the 1x2 Wiring Diagram for FC Bricks

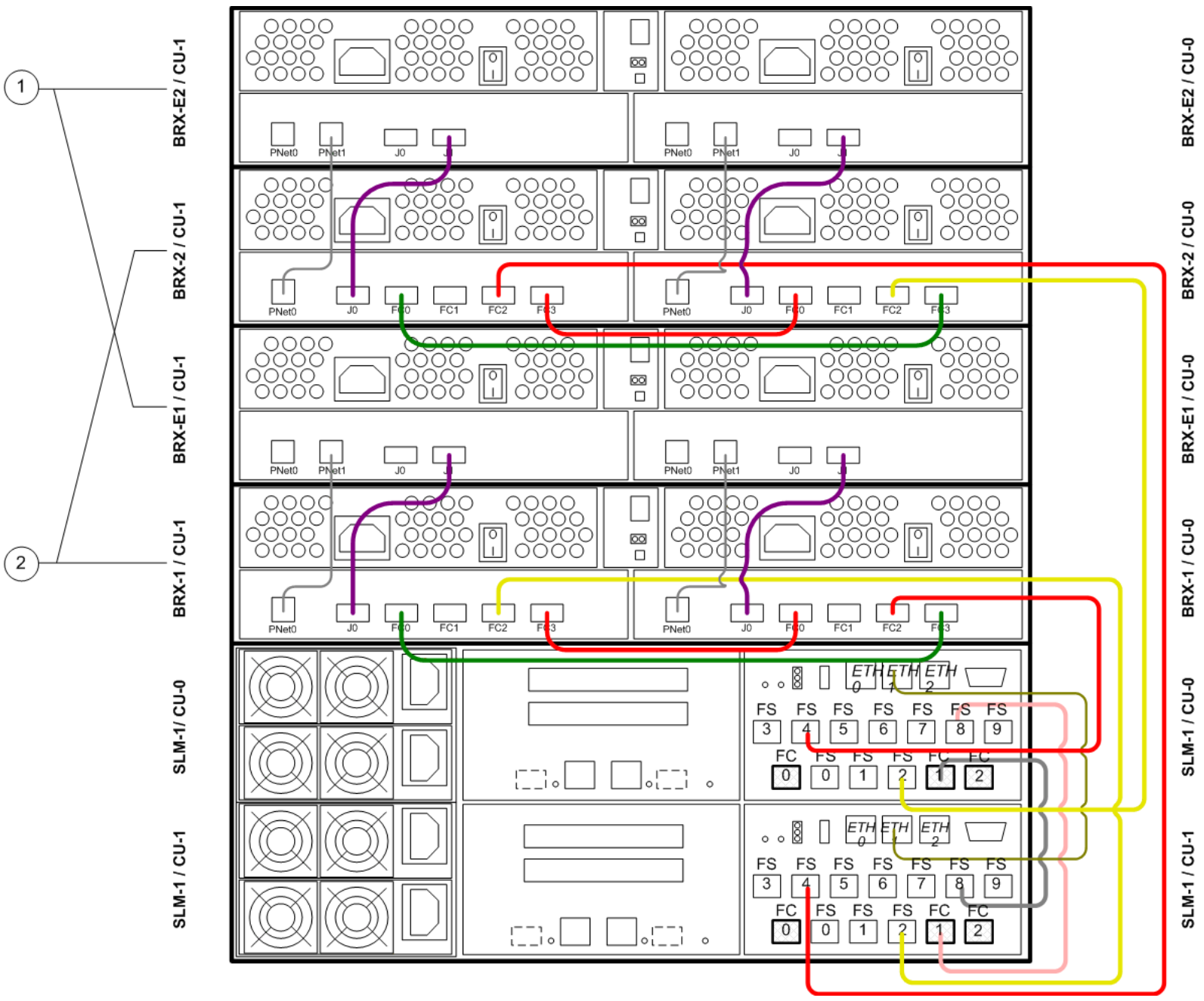
- The diagram shows only the internal cabling among the units included in the illustration. A working Pillar Axiom system would have additional connections for the following components:
  - Power.
  - Customer host system.
  - Private management interface (PMI) Ethernet connections to the Pilot.
  - Management Ethernet connections to customer equipment.
  - Additional Brick connections to support the Storage System Fabric (SSF).
- SSF cabling is the same for NAS and SAN Slammers. Also, a Pilot management controller is not shown but is needed to complete the Pillar Axiom system.
- Brick strings consist of SATA Bricks, Fibre Channel (FC) Bricks, solid state drive (SSD) Bricks, or a combination of these. An FC RAID Brick can be paired with one FC Expansion Brick.
- FC RAID Bricks are identified with a tag such as BRX-*n*. The *n* value indicates the order of adding this FC Brick to the system, when counting all FC RAID and SATA Bricks on the system.

- FC Expansion Bricks are designated as BRX-E*n*. The *n* value indicates the order of adding the Brick to the system, when counting all Expansion Bricks on the system.
- Color codes of the FC cables in the diagram are defined as follows:
  - Slammer FC-*x* to FS-*y* cable color coding follows the lowest SLM-*a*, CU-*b* port color.
  - PNet cables are gray.

Sample Wiring Diagram for a 1x4 System Using FC Bricks

The figure below is a conceptual example of cabling Fibre Channel (FC) Brick storage enclosures. It defines the Slammer-to-Brick connections and the Brick-to-Brick connections required to connect FC Bricks to a Slammer. This principle applies regardless how many Slammers comprise the Pillar Axiom system.

Figure 26 Sample cabling for 1x4 systems with FC Bricks



Legend	
1	Typical FC Expansion Brick.
2	Typical FC RAID Brick.

Notes on the 1x4 Wiring Diagram for FC Bricks

- Figure 25 shows the logical connections, not the physical layout of the cables.
- Figure 25 includes version 1 private interconnect modules.
- The Slammer depicted in Figure 25 is a NAS Slammer. Storage System Fabric (SSF) cabling is the same for NAS and SAN Slammers. Also, a Pilot management controller is not shown but is needed to complete the Pillar Axiom system.
- Brick strings consist of SATA Bricks, FC Bricks, or a combination of the two. FC RAID Bricks can exist alone or be paired with one FC Expansion Brick.
- FC RAID Bricks are identified with a tag such as BRX-*n*. The *n* value indicates the order of adding this FC Brick to the system, when counting all FC RAID and SATA Bricks on the system.

- FC Expansion Bricks are designated as BRX-E*n*. The *n* value indicates the order of adding the Brick to the system, when counting all Expansion Bricks on the system.
- Color codes of the FC cables in Figure 25 are defined as follows:
  - Slammer FC-*x* to FS-*y* cable color coding follows the lowest SLM-*a*, CU-*b* port color.
  - PNet cables are gray.
- Figure 25 shows only the internal cabling among the units included in the illustration. A working Pillar Axiom system would have additional connections for the following components:
  - Power.
  - Customer host system.
  - Private management interface (PMI) Ethernet connections to the Pilot.
  - Management Ethernet connections to customer equipment.
  - Additional Brick FC connections to support the Storage System Fabric (SSF).
- Slammer-to-Slammer and Slammer-to-Pilot connections are defined beginning in the following sections:
  - Cabling Example: 1-Slammer System Using SATA Bricks.
  - Cabling Example: 2-Slammer System Using SATA Bricks.

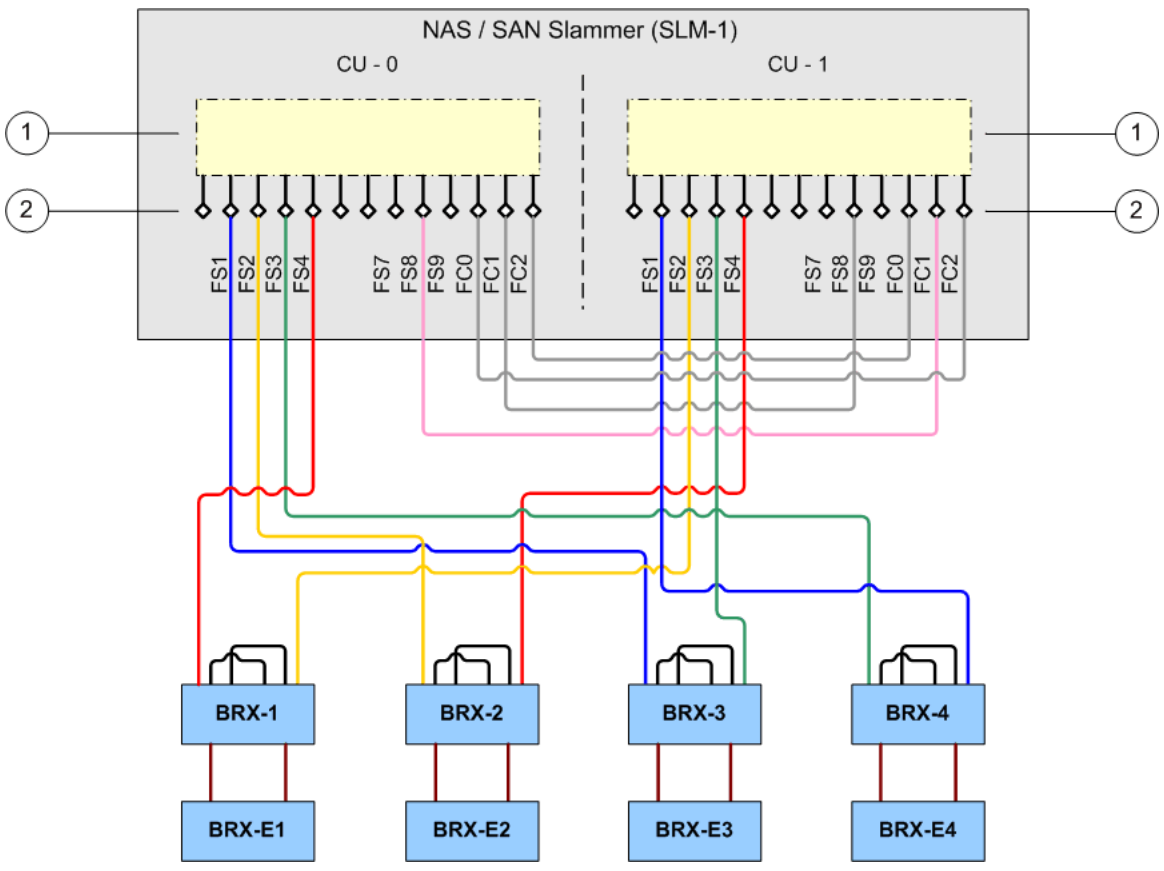
SHEET 21

Cabling Block Diagram: A 1-Slammer System Using FC Bricks

Block Diagram for a 1x8 System Using FC Bricks

The figure below illustrates the stringing of eight Fibre Channel (FC) Bricks in a 1-Slammer Pillar Axiom 600 system. The stringing scheme maps four Brick strings, each being two Bricks deep.

Figure 27 Cabling block diagram for 1-Slammer systems with FC Bricks



Legend		
	1 Private interconnect module (PIM) (version 1).	2 Ports (◊) on the PIM.

Important! This illustration is for reference only and does not show the RJ-45 cables that interconnect the FC RAID and FC Expansion Brick pairs. The PIM connections represent those for a version 1 PIM. For the cross connections for a version 2 PIM, see Table 8.

Notes on the 1x8 Block Diagram for FC Bricks

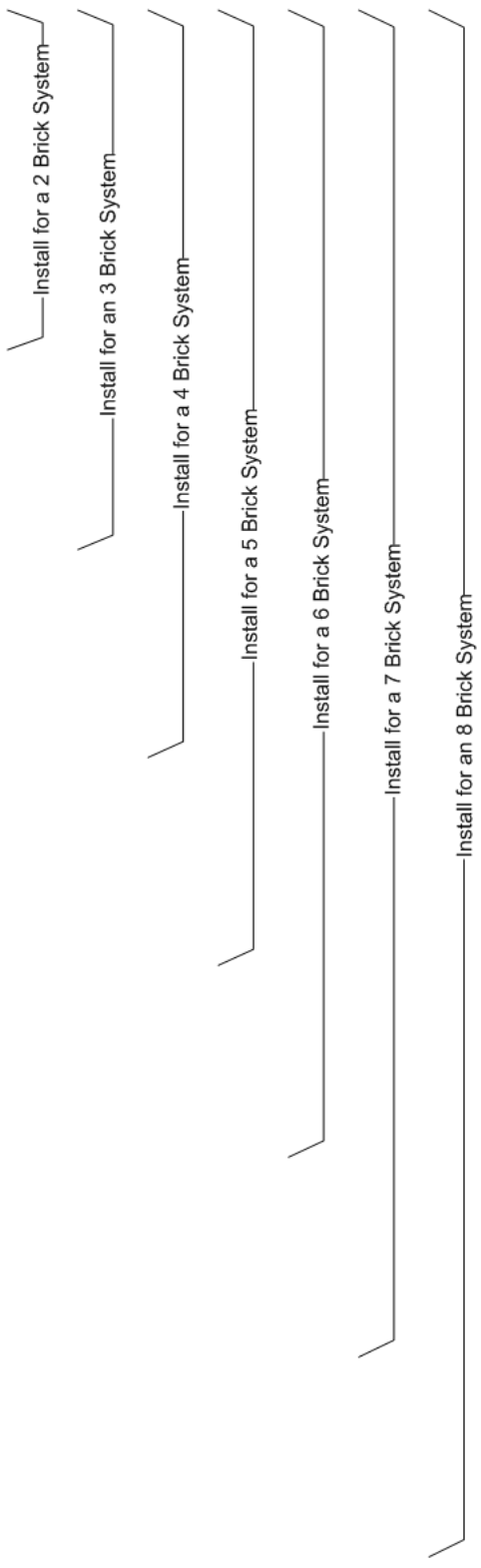
- In Figure 27, FC RAID Bricks are at the head of the string (first row). FC Expansion Bricks are in the second row.
- Figure 27 shows the order that Bricks are to be added to a system.
- 1-Slammer systems contain at most four Brick strings.
- An FC Brick string is limited to four FC Bricks (zero or one FC Expansion Brick for each FC RAID Brick).
- SATA Bricks containing hard drives (HDDs) or solid state drive (SSDs) can be added to an FC Brick string.
- A string may contain at most one SSD Brick and the SSD Brick must be at the beginning of the Brick string.
- Install all FC and Ethernet cables for Slammer-to-Slammer and Slammer-to-Pilot connections. For 1-Slammer systems, see:
  - Table 8: FC cable connections for the Slammer and the first and second sets of four SATA Bricks.
  - Table 12: Cable connections for the PMI (1-Slammer system).
- Install Slammer-to-Brick and Brick-to-Brick connections according to the specifications in Table 21.
- FC Bricks use 2 Gb FC patch cables.

Cable the Slammer and FC Bricks

The table below specifies all FC cables and their connections for the Slammer and the eight FC Bricks (four FC RAID Bricks and four FC Expansion Bricks). All such interconnections are part of the Storage System Fabric (SSF).

Table 21 FC cable connections for one Slammer and eight FC Bricks

Case 1:	Single Slammer -- all FC Bricks		
	From	To	
	Chassis / CU / Port	Chassis / CU / Port	
For BRX-1:			
	SLM-1 / CU-0 FS-4	BRX-1 / CU-0 FC-2	
	SLM-1 / CU-1 FS-2	BRX-1 / CU-1 FC-2	
	BRX-1 / CU-0 FC-0	BRX-1 / CU-1 FC-3	
	BRX-1 / CU-1 FC-0	BRX-1 / CU-0 FC-3	
For BRX-E1:			
	BRX-1 / CU-0 J0	BRX-E1 / CU-0 J1	
	BRX-1 / CU-1 J0	BRX-E1 / CU-1 J1	
	BRX-1 / CU-0 PNet-0	BRX-E1 / CU-0 PNet-1	RJ-45 cable
	BRX-1 / CU-1 PNet-0	BRX-E1 / CU-1 PNet-1	RJ-45 cable
For BRX-2:			
	SLM-1 / CU-0 FS-2	BRX-2 / CU-0 FC-2	
	SLM-1 / CU-1 FS-4	BRX-2 / CU-1 FC-2	
	BRX-2 / CU-0 FC-0	BRX-2 / CU-1 FC-3	
	BRX-2 / CU-1 FC-0	BRX-2 / CU-0 FC-3	
For BRX-E2:			
	BRX-2 / CU-0 J0	BRX-E2 / CU-0 J1	
	BRX-2 / CU-1 J0	BRX-E2 / CU-1 J1	
	BRX-2 / CU-0 PNet-0	BRX-E2 / CU-0 PNet-1	RJ-45 cable
	BRX-2 / CU-1 PNet-0	BRX-E2 / CU-1 PNet-1	RJ-45 cable
For BRX-3:			
	SLM-1 / CU-0 FS-1	BRX-3 / CU-0 FC-2	
	SLM-1 / CU-1 FS-3	BRX-3 / CU-1 FC-2	
	BRX-3 / CU-0 FC-0	BRX-3 / CU-1 FC-3	
	BRX-3 / CU-1 FC-0	BRX-3 / CU-0 FC-3	
For BRX-E3:			
	BRX-3 / CU-0 J0	BRX-E3 / CU-0 J1	
	BRX-3 / CU-1 J0	BRX-E3 / CU-1 J1	
	BRX-3 / CU-0 PNet-0	BRX-E3 / CU-0 PNet-1	RJ-45 cable
	BRX-3 / CU-1 PNet-0	BRX-E3 / CU-1 PNet-1	RJ-45 cable
For BRX-4:			
	SLM-1 / CU-0 FS-3	BRX-4 / CU-0 FC-2	
	SLM-1 / CU-1 FS-1	BRX-4 / CU-1 FC-2	
	BRX-4 / CU-0 FC-0	BRX-4 / CU-1 FC-3	
	BRX-4 / CU-1 FC-0	BRX-4 / CU-0 FC-3	
For BRX-E4:			
	BRX-4 / CU-0 J0	BRX-E4 / CU-0 J1	
	BRX-4 / CU-1 J0	BRX-E4 / CU-1 J1	
	BRX-4 / CU-0 PNet-0	BRX-E4 / CU-0 PNet-1	RJ-45 cable
	BRX-4 / CU-1 PNet-0	BRX-E4 / CU-1 PNet-1	RJ-45 cable



When cabling the fabric, be aware of the following facts:

- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
  - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:

- Version 1 Bricks: 1.64 ft (0.5 m)
- Version 2 Bricks: 3.28 ft (1.0 m)

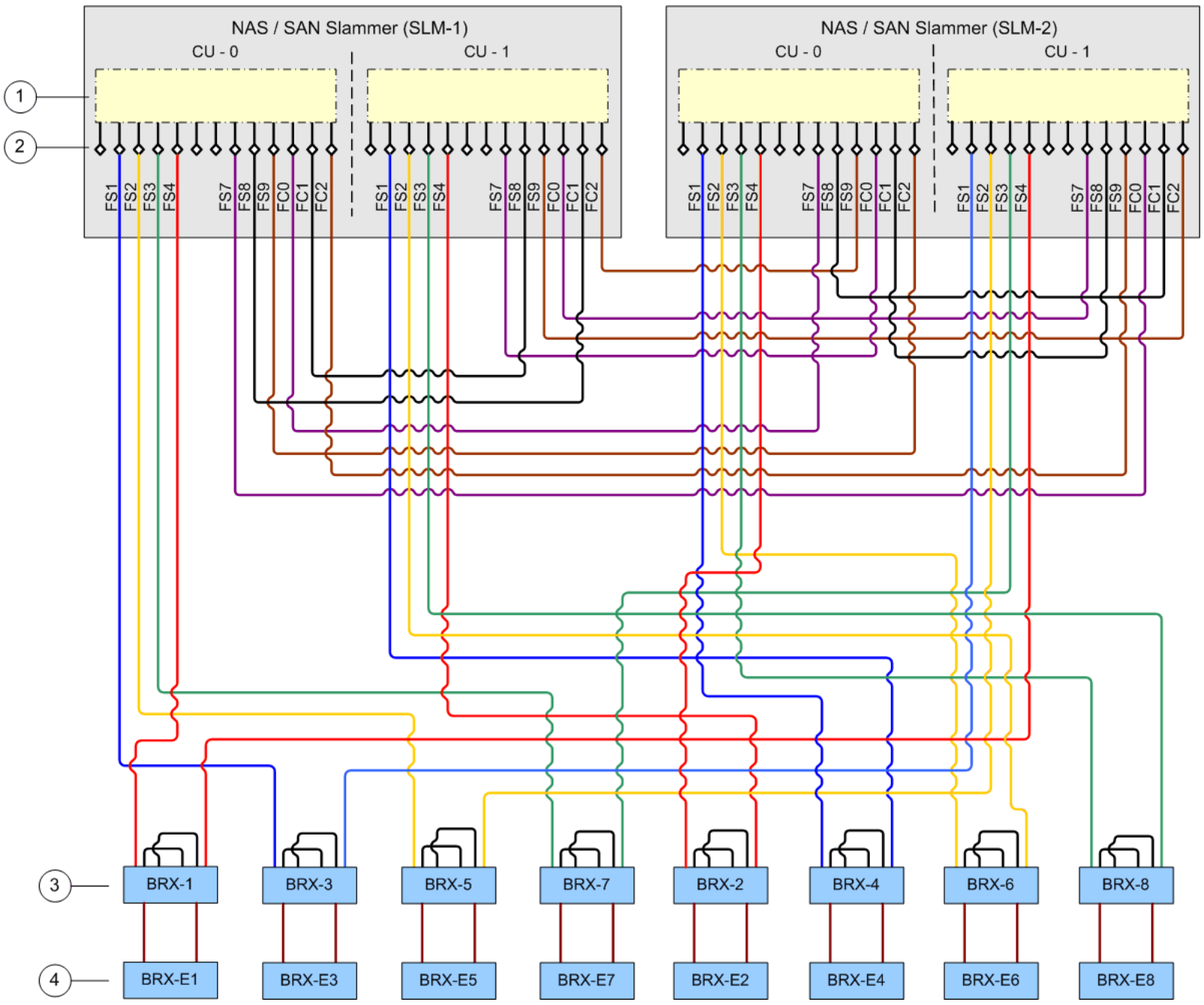
SHEET 22

Cabling Block Diagram: A 2-Slammer System Using FC Bricks

Block Diagram for a 2x16 System Using FC Bricks

The figure below illustrates the stringing of 16 Fibre Channel (FC) Bricks in a 2-Slammer Pillar Axiom 600 system that uses version 1 private interconnect modules (PIMs). The stringing scheme maps eight Brick strings, each being two Bricks deep.

Figure 28 Cabling block diagram for 2-Slammer systems with FC Bricks



Legend		
	1 Private interconnect module (PIM) (version 1).	3 FC RAID Bricks.
	2 Ports (◊) on the PIM.	4 FC Expansion Bricks.

Important! This illustration is for reference only.

Notes on the 2x16 Wiring Diagram for FC Bricks

- 2-Slammer systems contain at most eight Brick strings.
- A 2x16 system consisting entirely of Fibre Channel (FC) Bricks requires two 42 U racks. Because FC Bricks require slightly more power than do SATA Bricks, a single rack (containing a Pilot and two Slammers) can support only 13 FC Bricks.
- A FC Brick string is limited to four FC RAID Bricks.
- A FC Expansion Brick must connect to a FC RAID Brick.
- Install all FC and Ethernet cables for Slammer-to-Slammer and Slammer-to-Pilot connections. For 2-Slammer systems, see:

  - Table 15: FC cable connections for two Slammers and the first set of eight SATA Bricks.
  - Table 20: Ethernet cable connections for PMI (2-Slammer system).
- Install Slammer-to-Brick and Brick-to-Brick connections according to the drawing in Figure 28.
- FC RAID Bricks are at the head of the string (first row) in both figures. FC Expansion Bricks are in the second row.
- Figure 28 shows the order that Bricks are to be added to a system.
- The entire Storage System Fabric (SSF) uses 2 Gbs FC patch cables throughout.

Cable the Slammers and FC Bricks

The table below specifies all FC cables and their connections for two Slammers and the 16 FC Bricks (eight FC RAID Bricks and eight FC Expansion Bricks). All such interconnections are part of the Storage System Fabric (SSF).

Table 22 FC cable connections for two Slammers and 16 FC Bricks

Case 2:	Two Slammers—all FC Bricks		
	From	To	
	Chassis / CU / Port	Chassis / CU / Port	
For BRX-1:			
	SLM-1 / CU-0 FS-4	BRX-1 / CU-0 FC-2	
	SLM-2 / CU-1 FS-4	BRX-1 / CU-1 FC-2	
	BRX-1 / CU-0 FC-0	BRX-1 / CU-1 FC-3	
	BRX-1 / CU-1 FC-0	BRX-1 / CU-0 FC-3	
For BRX-E1:			
	BRX-1 CU-0 J0	BRX-E1 / CU-0 J1	
	BRX-1 CU-1 J0	BRX-E1 / CU-1 J1	
	BRX-1 CU-0 Pnet-0	BRX-E1 / CU-0 Pnet-1	RJ-45 cable
	BRX-1 CU-1 Pnet-0	BRX-E1 / CU-1 Pnet-1	RJ-45 cable
For BRX-2:			
	SLM-2 / CU-0 FS-4	BRX-2 / CU-0 FC-2	
	SLM-1 / CU-1 FS-4	BRX-2 / CU-1 FC-2	
	BRX-2 / CU-0 FC-0	BRX-2 / CU-1 FC-3	
	BRX-2 / CU-1 FC-0	BRX-2 / CU-0 FC-3	
For BRX-E2:			
	BRX-2 CU-0 J0	BRX-E2 / CU-0 J1	
	BRX-2 CU-1 J0	BRX-E2 / CU-1 J1	
	BRX-2 CU-0 Pnet-0	BRX-E2 / CU-0 Pnet-1	RJ-45 cable
	BRX-2 CU-1 Pnet-0	BRX-E2 / CU-1 Pnet-1	RJ-45 cable
For BRX-3:			
	SLM-1 / CU-0 FS-1	BRX-3 / CU-0 FC-2	
	SLM-2 / CU-1 FS-1	BRX-3 / CU-1 FC-2	
	BRX-3 / CU-0 FC-0	BRX-3 / CU-1 FC-3	
	BRX-3 / CU-1 FC-0	BRX-3 / CU-0 FC-3	
For BRX-E3:			
	BRX-3 CU-0 J0	BRX-E3 / CU-0 J1	
	BRX-3 CU-1 J0	BRX-E3 / CU-1 J1	
	BRX-3 CU-0 Pnet-0	BRX-E3 / CU-0 Pnet-1	RJ-45 cable
	BRX-3 CU-1 Pnet-0	BRX-E3 / CU-1 Pnet-1	RJ-45 cable
For BRX-4:			
	SLM-2 / CU-0 FS-1	BRX-4 / CU-0 FC-2	
	SLM-1 / CU-1 FS-1	BRX-4 / CU-1 FC-2	
	BRX-4 / CU-0 FC-0	BRX-4 / CU-1 FC-3	
	BRX-4 / CU-1 FC-0	BRX-4 / CU-0 FC-3	
For BRX-E4:			
	BRX-4 CU-0 J0	BRX-E4 / CU-0 J1	
	BRX-4 CU-1 J0	BRX-E4 / CU-1 J1	
	BRX-4 CU-0 Pnet-0	BRX-E4 / CU-0 Pnet-1	RJ-45 cable
	BRX-4 CU-1 Pnet-0	BRX-E4 / CU-1 Pnet-1	RJ-45 cable

	From	To	
	Chassis / CU / Port	Chassis / CU / Port	
For BRX-5:			
	SLM-1 / CU-0 FS-2	BRX-5 / CU-0 FC-2	
	SLM-2 / CU-1 FS-2	BRX-5 / CU-1 FC-2	
	BRX-5 / CU-0 FC-0	BRX-5 / CU-1 FC-3	
	BRX-5 / CU-1 FC-0	BRX-5 / CU-0 FC-3	
For BRX-E5:			
	BRX-5 CU-0 J0	BRX-E5 / CU-0 J1	
	BRX-5 CU-1 J0	BRX-E5 / CU-1 J1	
	BRX-5 CU-0 Pnet-0	BRX-E5 / CU-0 Pnet-1	RJ-45 cable
	BRX-5 CU-1 Pnet-0	BRX-E5 / CU-1 Pnet-1	RJ-45 cable
For BRX-6:			
	SLM-2 / CU-0 FS-2	BRX-6 / CU-0 FC-2	
	SLM-1/ CU-1 FS-2	BRX-6 / CU-1 FC-2	
	BRX-6 / CU-0 FC-0	BRX-6 / CU-1 FC-3	
	BRX-6 / CU-1 FC-0	BRX-6 / CU-0 FC-3	
For BRX-E6:			
	BRX-6 CU-0 J0	BRX-E6 / CU-0 J1	
	BRX-6 CU-1 J0	BRX-E6 / CU-1 J1	
	BRX-6 CU-0 Pnet-0	BRX-E6 / CU-0 Pnet-1	RJ-45 cable
	BRX-6 CU-1 Pnet-0	BRX-E6 / CU-1 Pnet-1	RJ-45 cable
For BRX-7:			
	SLM-1 / CU-0 FS-3	BRX-7 / CU-0 FC-2	
	SLM-2 / CU-1 FS-3	BRX-7 / CU-1 FC-2	
	BRX-7 / CU-0 FC-0	BRX-7 / CU-1 FC-3	
	BRX-7 / CU-1 FC-0	BRX-7 / CU-0 FC-3	
For BRX-E7:			
	BRX-7 CU-0 J0	BRX-E7 / CU-0 J1	
	BRX-7 CU-1 J0	BRX-E7 / CU-1 J1	
	BRX-7 CU-0 Pnet-0	BRX-E7 / CU-0 Pnet-1	RJ-45 cable
	BRX-7 CU-1 Pnet-0	BRX-E7 / CU-1 Pnet-1	RJ-45 cable
For BRX-8:			
	SLM-2/ CU-0 FS-3	BRX-8 / CU-0 FC-2	
	SLM-1 / CU-1 FS-3	BRX-8 / CU-1 FC-2	
	BRX-8 / CU-0 FC-0	BRX-8 / CU-1 FC-3	
	BRX-8 / CU-1 FC-0	BRX-8 / CU-0 FC-3	
For BRX-E8:			
	BRX-8 CU-0 J0	BRX-E8 / CU-0 J1	
	BRX-8 CU-1 J0	BRX-E8 / CU-1 J1	
	BRX-8 CU-0 Pnet-0	BRX-E8 / CU-0 Pnet-1	RJ-45 cable
	BRX-8 CU-1 Pnet-0	BRX-E8 / CU-1 Pnet-1	RJ-45 cable

When cabling the fabric, be aware of the following facts:

- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).

- Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
  - Version 1 Bricks: 1.64 ft (0.5 m)
  - Version 2 Bricks: 3.28 ft (1.0 m)

SHEET 23

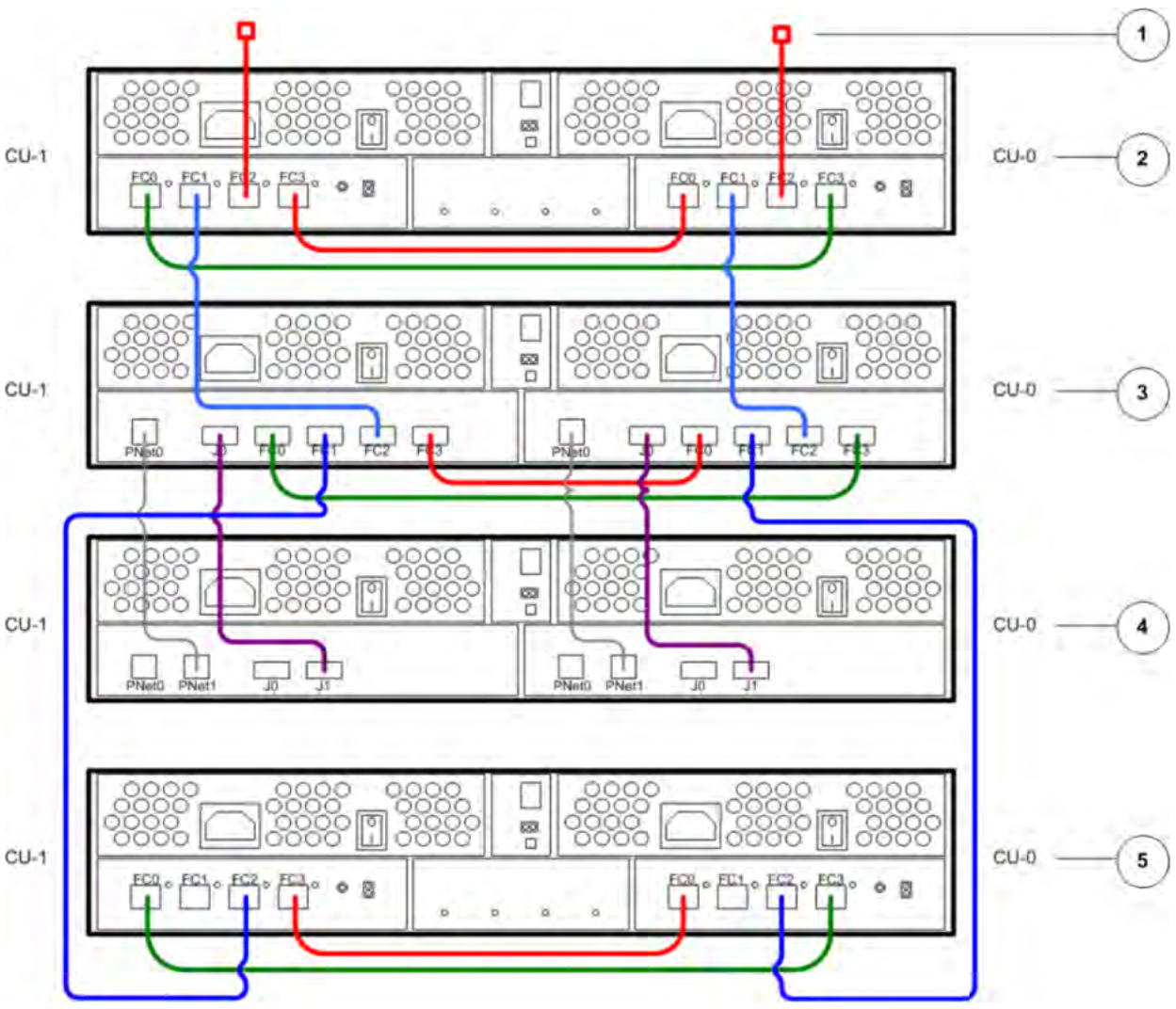
Cabling Example: Mix of FC and SATA Bricks

Sample Wiring Diagram for a Mix of Brick Types

The figure below is a conceptual example of cabling a mix of Fibre Channel (FC) and version 1 SATA Brick storage enclosures. This figure defines the Brick-to-Brick connections required to connect such a mix.

Caution Before you mix FC and SATA Bricks, contact the Pillar World Wide Customer Support Center for the best practice approach.

Figure 29 Sample cabling for an FC RAID Brick, an FC Expansion Brick, and two SATA Bricks



Legend	
1	Connection to a Slammer or an upstream Brick.
2	Upstream SATA Brick (version 1).
3	FC RAID Brick.
4	FC Expansion Brick.
5	Downstream SATA Brick (version 1).

Important! This illustration is for reference only.

Notes on the Wiring Diagram for a Mix of Brick Types

- Note the relative load factor of the various Brick types, when balancing mixed storage across Brick strings.
- An FC RAID Brick or an FC Expansion Brick is approximately equivalent of two SATA Bricks *version 2*. Therefore, there can be a maximum of four Fibre Channel (FC) Bricks in a string compared to eight SATA Bricks in the string.
- A string may contain at most one SSD Brick and the SSD Brick must be at the beginning of the Brick string.
- The cabling of version 2 SATA Bricks is the same as the cabling shown in Figure 29.
- Figure 29 shows a single FC RAID Brick fully connected:
  - Downstream to a SATA Brick.

    - Upstream to an FC Expansion Brick.
    - Downstream to another SATA Brick.

- When adding Bricks to systems in the field, FC Bricks may be added onto SATA Brick strings and SATA Bricks may be added onto FC Brick strings. Figure 29 illustrates how to cable for both scenarios.

SHEET 24

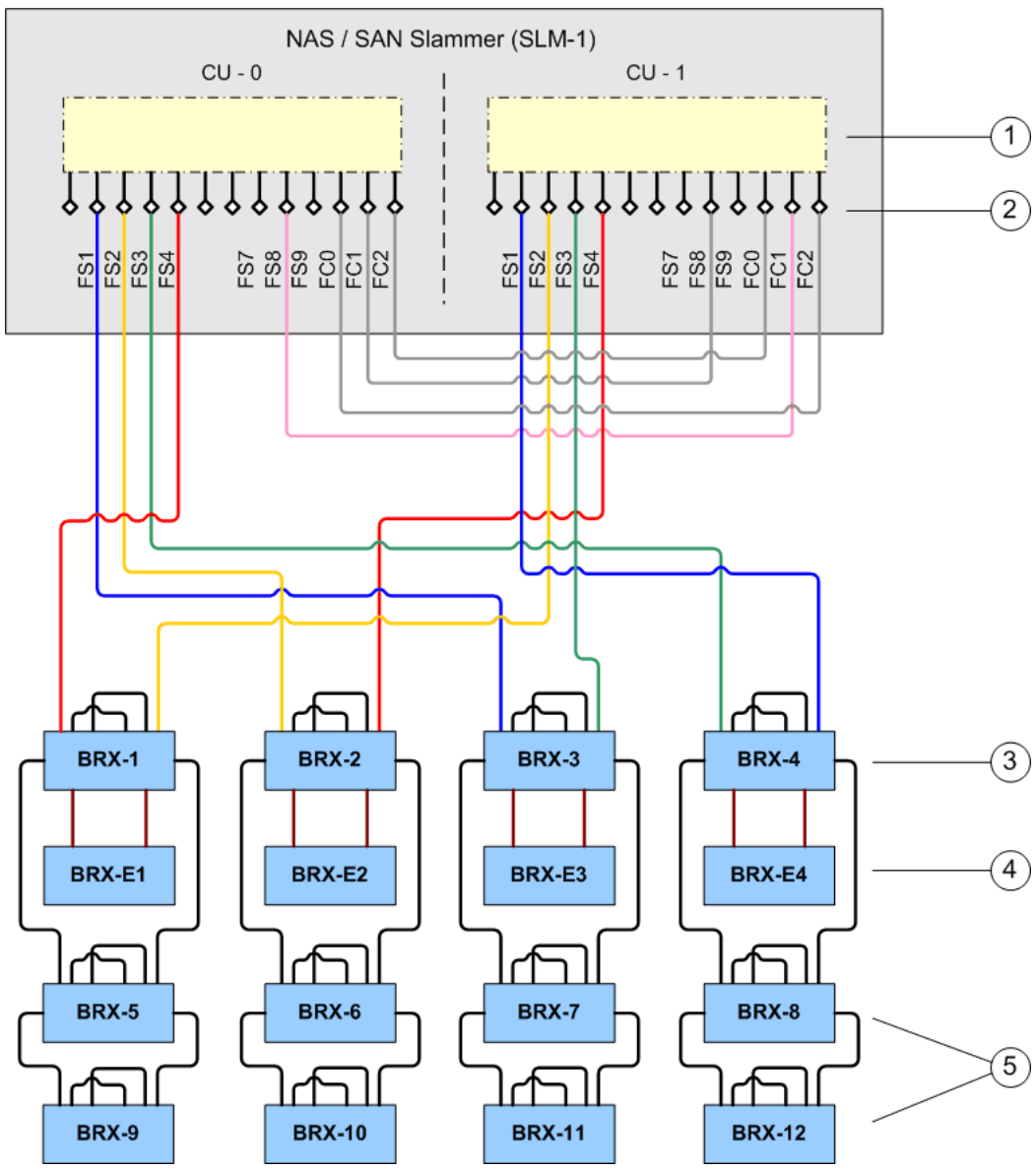
Cabling Block Diagram: A 1-Slammer System Using FC and SATA Bricks

Block Diagram for a 1x16 System Using FC and SATA Bricks

The figure below illustrates the stringing of a full complement of eight Fibre Channel (FC) Bricks and eight SATA Bricks in a 1-Slammer Pillar Axiom system that uses version 1 private interconnect modules (PIMs). The stringing scheme maps four Brick strings, each being four Bricks deep.

Caution Before you mix FC and SATA Bricks, contact the Pillar World Wide Customer Support Center for the best practice approach.

Figure 30 Cabling block diagram for 1-Slammer systems with FC and SATA Bricks



Legend

1 Private interconnect module (PIM) (version 1).	4 FC Expansion Bricks.
2 A port (◊) on the private interconnect module.	5 SATA Bricks containing hard drives (HDDs).
3 FC RAID Bricks.	

Important! This illustration is for reference only.

Notes on the 1x16 Block Diagram for FC and SATA Bricks

- SATA Bricks containing solid-state drives (SSDs) or hard drives (HDDs) can be mixed with Fibre Channel (FC) Bricks.
- A string may contain at most one SSD Brick and the SSD Brick must be at the beginning of the Brick string.
- Figure 30 represents how a mix of FC and HDD-based SATA Bricks would be built in manufacturing.
- The control unit (CU) cross connections for version 2 Slammer private interconnect modules (PIMs) are different. For the cross connections for a version 2 PIM, see Table 8..
- A 1x16 system consisting entirely of FC Bricks requires two 42 U racks. Because FC Bricks require slightly more power than do SATA Bricks, a single rack can support only 15 FC Bricks.

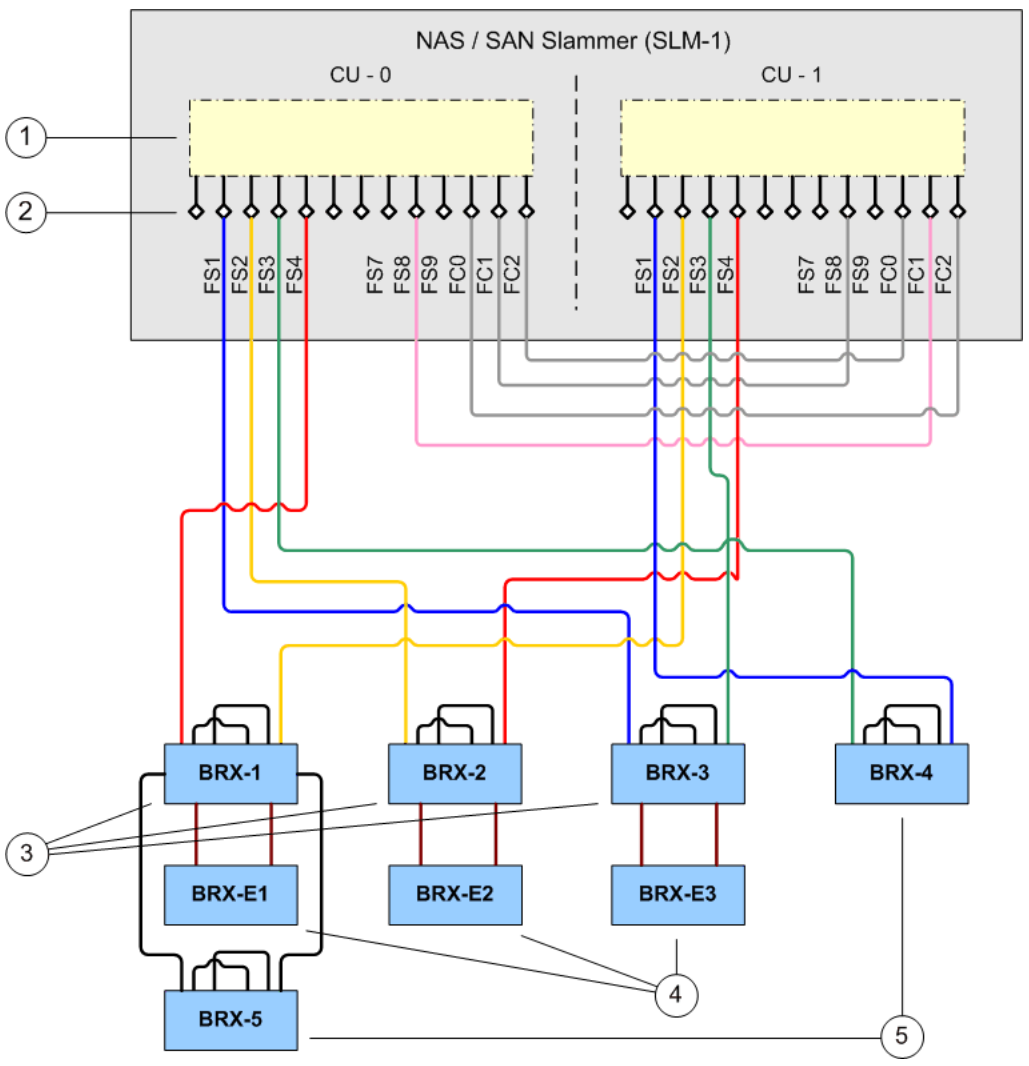
- Bricks should be added to strings so that the number of Bricks in any string differs by no more than two between the longest and the shortest string.
- For the Pillar Axiom 600, a string may contain up to eight Bricks.
- A FC Brick string is limited to four FC RAID Bricks.
- A FC Expansion Brick must connect to a FC RAID Brick.
- The ports used for adding FC RAID Bricks and SATA Bricks progress in the same sequence. Doing so allows a consistent connection pattern for both FC and SATA Bricks.
- Install all FC and Ethernet cables for Slammer cross connections and Slammer-to-Pilot connections:
  - Table 8: FC cable connections for the Slammer and the first and second sets of four SATA Bricks.
  - Table 12: Cable connections for the PMI (1-Slammer system).
- Install Slammer-to-Brick and Brick-to-Brick connections, in this order:
  - First, FC Brick connections, which are defined in Table 21.
  - Then, SATA Brick connections, which are defined in Table 8.
- As shown in Figure 30, FC RAID Bricks are in the first row while FC Expansion Bricks are in the second row.
- The entire Storage System Fabric (SSF) uses 2 Gb FC patch cables throughout.
- The configuration of systems upgraded in the field may differ somewhat from those built in the factory.

Block Diagram for Expanding an Initial Configuration of FC Bricks

The figure below illustrates how to expand an initial configuration of Fibre Channel (FC) Bricks using SATA Bricks. This example shows the result of a system that has an initial configuration of three FC Bricks, which is then expanded by adding two SATA Bricks.

Note: An acceptable alternate configuration for the SATA addition would connect BRX-5 to BRX-4 to improve balance across the Slammer ports.

Figure 31 Cabling block diagram for expanding 1-Slammer systems with SATA Bricks



Legend		
	1 Private interconnect module (PIM) (version 1).	4 FC Expansion Bricks.
	2 Ports (◊) on the private interconnect module.	5 SATA Bricks.
	3 FC RAID Bricks.	

Important! This illustration is for reference only. It shows version 1 PIMs in the Slammer. For the cross connections for a version 2 PIM, see Table 8.

Notes for Adding SATA Bricks to a Set of FC Bricks

- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
  - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
    - Version 1 Bricks: 1.64 ft (0.5 m)
    - Version 2 Bricks: 3.28 ft (1.0 m)
- The total number of Bricks supported in a system is specified in the *Pillar Axiom Customer Release Notes*.
- The total number of Bricks (both FC and SATA) in any string is limited to eight.

SHEET 25

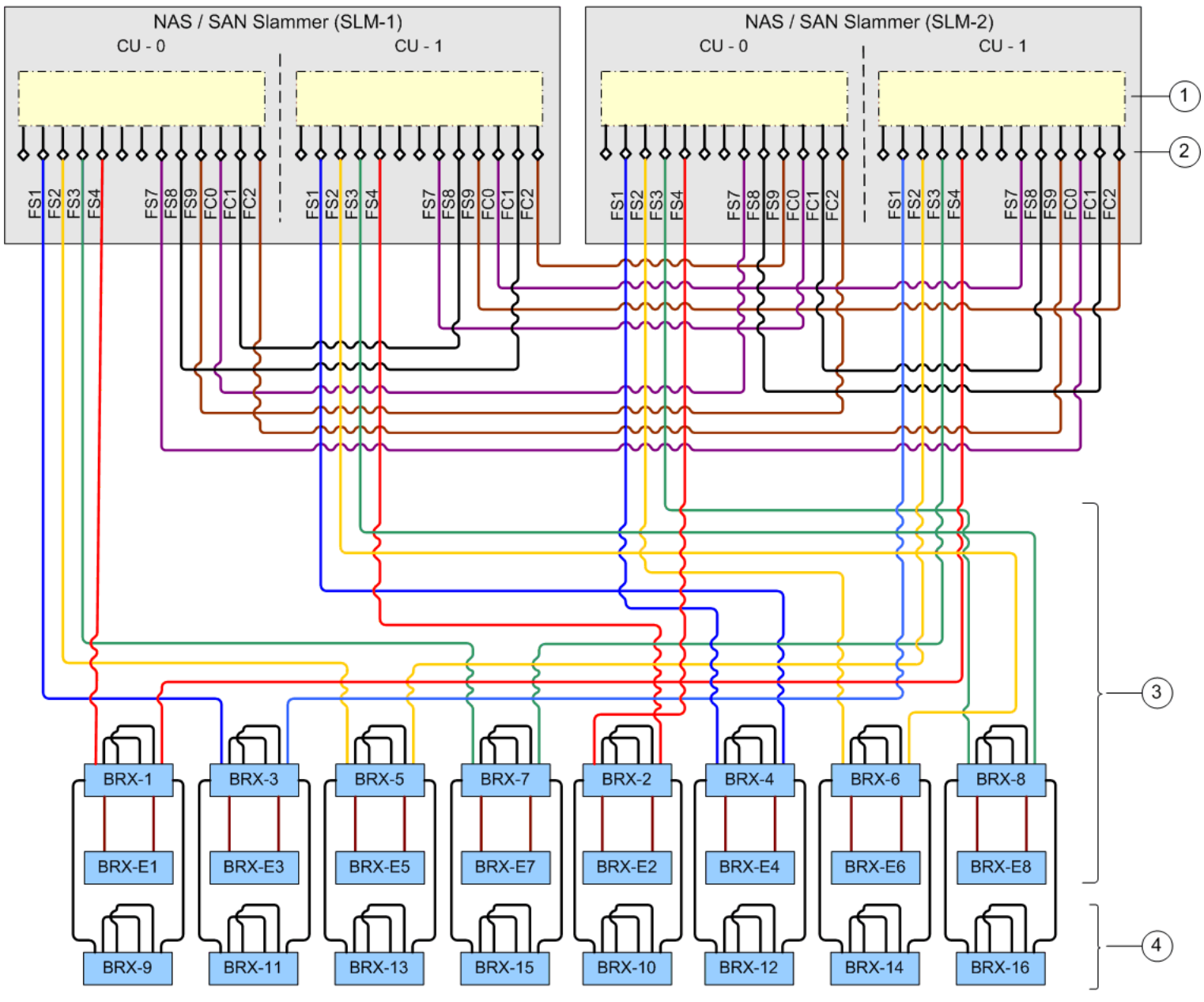
Cabling Block Diagram: A 2-Slammer System Using FC and SATA Bricks

Block Diagram for a 2x24 System Using FC and SATA Bricks

The figure below illustrates the stringing of a full complement of eight Fibre Channel (FC) Brick pairs (one RAID Brick plus one Expansion Brick) to eight SATA Bricks in a 2-Slammer Pillar Axiom 600 system. The stringing scheme maps eight Brick strings, each being three Bricks deep.

Caution Before you mix FC and SATA Bricks, contact the Pillar World Wide Customer Support Center for the best practice approach.

Figure 32 Cabling block diagram for 2-Slammer systems with full complement of FC Bricks and eight SATA Bricks



Legend		
	1 Private interconnect module (PIM) (version 1).	3 FC RAID Brick and Expansion Brick pair connections (closest to the Slammers).
	2 Ports (◊) on the PIM.	4 SATA Brick connections.

Important! This illustration is for reference only. It shows version 1 PIMs in the two Slammers. For the cross connections for a version 2 PIM, see Table 8.

Notes on the 2x24 Block Diagram for FC and SATA Bricks

- Bricks should be added to strings so that the number of Bricks in any string differs by no more than two between the longest and the shortest string.
- For the Pillar Axiom 600 system, a string may contain up to eight SATA Bricks.
- A FC Brick string is limited to four FC RAID Bricks.
- A FC Expansion Brick must connect to a FC RAID Brick.

- Figure 32 illustrates a 2x24 system that includes just eight SATA Bricks. A 2-Slammer system can support up to 64 Bricks (a combination of SATA and FC).
- The entire Storage System Fabric (SSF) uses 2 Gb FC patch cables throughout.
- The configuration of systems upgraded in the field may differ somewhat from those built in the factory.
- For complete information on cabling rules, see Summary of Cabling Rules.

Cable the SATA and FC Bricks

When cabling the fabric, be aware of the following:

- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
  - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
    - Version 1 Bricks: 1.64 ft (0.5 m)
    - Version 2 Bricks: 3.28 ft (1.0 m)

1 Install all Ethernet cables for Slammer-to-Pilot connections.

  See Table 20.

2 Install all FC cables for Slammer control unit (CU) cross connections.

  The cross connecting of Slammer CUs depends on the version of private interconnect module used in the Slammers. See Table 15.

3 Install all Slammer-to-SATA Brick connections.

  See Table 15.

4 If any of the SATA Bricks identified in the first row of Figure 32 (BRX-1 through BRX-8) are not installed, connect the corresponding FC RAID Brick to the Slammer ports.

  To determine which Slammer ports to use, see Table 22.

5 Install the FC Expansion Bricks.

  See Table 22.

Part V: Cabling Pillar Axiom 600 Systems Using Three Slammers

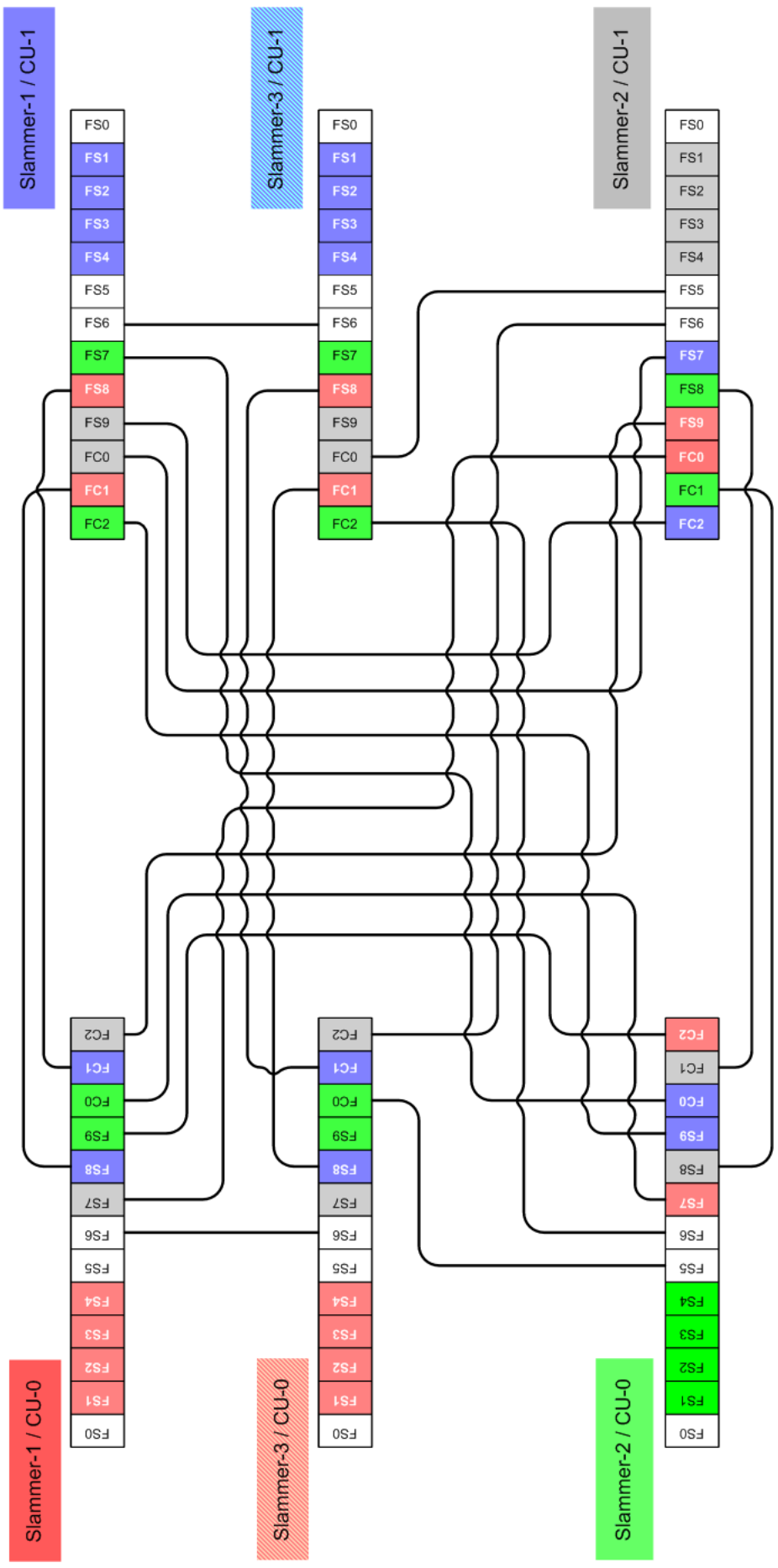
SHEET 26

Cross Connections for 3-Slammer Systems

Control Unit (CU) Cross Connections for Three Version 1 Slammers

This block diagram illustrates how to cable the Slammer cross connections in a 3-Slammer configuration that uses all version 1 private interconnect modules (PIMs).

Figure 33 Cabling CU cross connections for a 3-Slammer configuration (version 1 PIMs)



The following table defines, cable by cable, the cross connections among the version 1 PIMs that are contained in the three Slammers.

Table 23 3-Slammer cross connection configuration (version 1 PIMs)

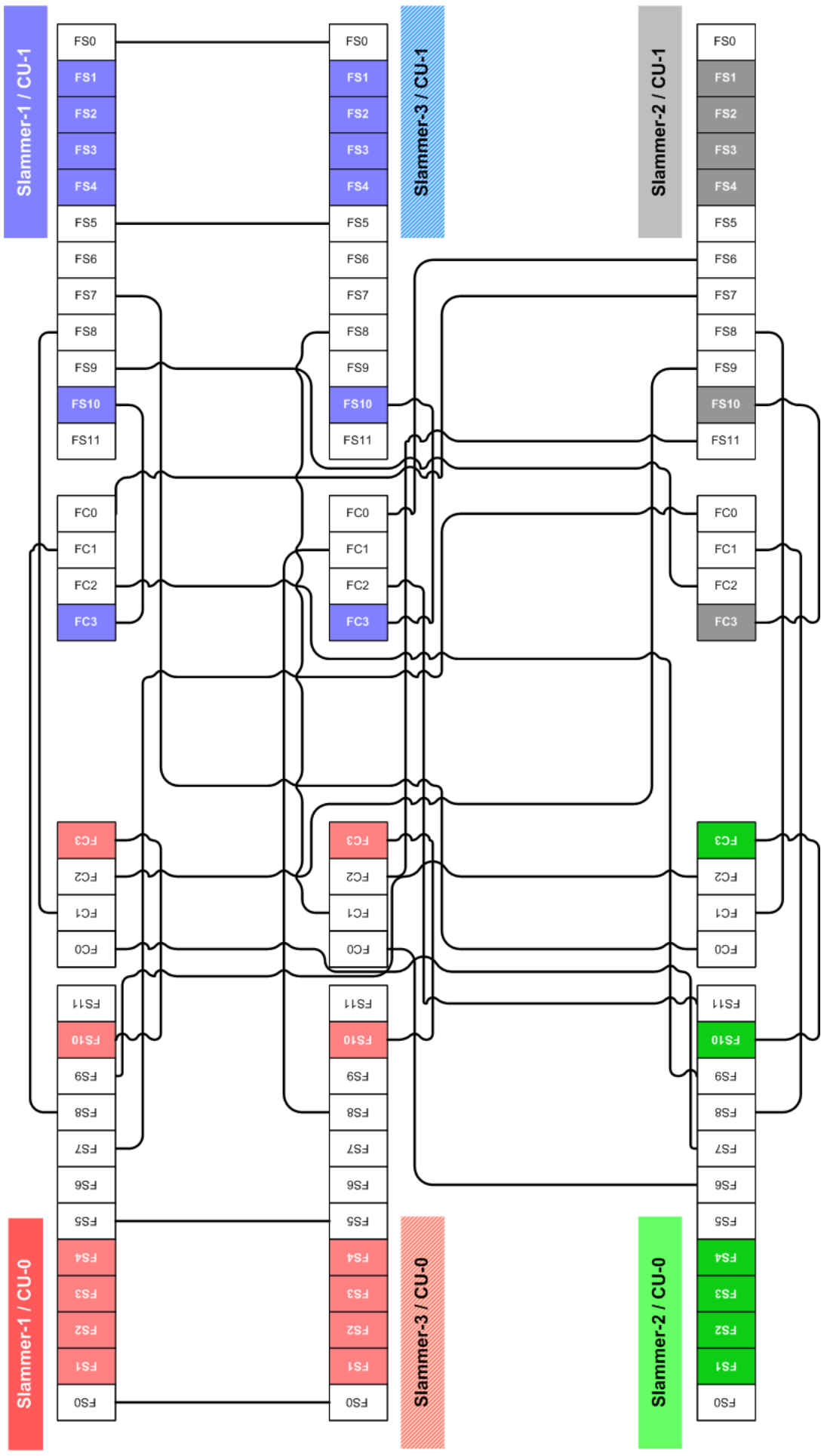
From Chassis / CU / Port	To Chassis / CU / Port
SLM-1 / CU-0 FC-0	SLM-2 / CU-0 FS-7
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-0 FC-2	SLM-2 / CU-1 FS-9
SLM-1 / CU-1 FC-0	SLM-2 / CU-1 FS-7
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-1 FC-2	SLM-2 / CU-0 FS-9
SLM-2 / CU-0 FC-0	SLM-1 / CU-1 FS-7
SLM-2 / CU-0 FC-1	SLM-2 / CU-1 FS-8
SLM-2 / CU-0 FC-2	SLM-1 / CU-0 FS-9
SLM-2 / CU-1 FC-0	SLM-1 / CU-0 FS-7
SLM-2 / CU-1 FC-1	SLM-2 / CU-0 FS-8
SLM-2 / CU-1 FC-2	SLM-1 / CU-1 FS-9
SLM-3 / CU-0 FC-0	SLM-2 / CU-0 FS-5
SLM-3 / CU-0 FC-1	SLM-3 / CU-1 FS-8
SLM-3 / CU-0 FC-2	SLM-2 / CU-1 FS-6
SLM-3 / CU-0 FS-6	SLM-1 / CU-0 FS-6
SLM-3 / CU-1 FC-0	SLM-2 / CU-1 FS-5
SLM-3 / CU-1 FC-1	SLM-3 / CU-0 FS-8
SLM-3 / CU-1 FC-2	SLM-2 / CU-0 FS-6
SLM-3 / CU-1 FS-6	SLM-1 / CU-1 FS-6

- Ports FC0, FC2, and FS6 are used to connect the third Slammer to the first and second Slammer.
- The Fibre Channel (FC) ports connect the Fibre Channel ASIC to the Fibre Channel Switch through the FS ports:
  - SLM-3 CU-0 FC0 connects to SLM-2 CU-0 FS5
  - SLM-3 CU-1 FC0 connects to SLM-2 CU-1 FS5
  - SLM-3 CU-0 FC2 connects to SLM-2 CU-1 FS6
  - SLM-3 CU-1 FC2 connects to SLM-2 CU-0 FS6
  - SLM-3 CU-0 FS6 connects to SLM-1 CU-0 FS6
  - SLM-3 CU-1 FS6 connects to SLM-1 CU-1 FS6

Control Unit (CU) Cross Connections for Three Version 2 Slammers

This block diagram illustrates how to cable the Slammer cross connections in a 3-Slammer configuration that uses all version 2 private interconnect modules (PIMs).

Figure 34 Cabling CU cross connections for a 3-Slammer configuration (version 2 PIMs)



The following table defines the CU cross connections among the version 2 PIMs that are contained in the three Slammers, cable by cable.

Table 24 3-Slammer cross connection configuration (version 2 PIMs)

From	To
Chassis / CU / Port	Chassis / CU / Port
SLM-1 / CU-0 FC-0	SLM-2 / CU-0 FS-7
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-0 FC-2	SLM-2 / CU-1 FS-9
SLM-1 / CU-0 FC-3	SLM-1 / CU-0 FS-10
SLM-1 / CU-1 FC-0	SLM-2 / CU-1 FS-7
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-1 FC-2	SLM-2 / CU-0 FS-9
SLM-1 / CU-1 FC-3	SLM-1 / CU-1 FS-10
SLM-2 / CU-0 FC-0	SLM-1 / CU-1 FS-7
SLM-2 / CU-0 FC-1	SLM-2 / CU-1 FS-8
SLM-2 / CU-0 FC-2	SLM-1 / CU-0 FS-9
SLM-2 / CU-0 FC-3	SLM-2 / CU-0 FS-10
SLM-2 / CU-1 FC-0	SLM-1 / CU-0 FS-7
SLM-2 / CU-1 FC-1	SLM-2 / CU-0 FS-8
SLM-2 / CU-1 FC-2	SLM-1 / CU-1 FS-9
SLM-2 / CU-1 FC-3	SLM-2 / CU-1 FS-10
SLM-3 / CU-0 FC-0	SLM-2 / CU-0 FS-6
SLM-3 / CU-0 FC-1	SLM-3 / CU-1 FS-8
SLM-3 / CU-0 FC-2	SLM-2 / CU-1 FS-11
SLM-3 / CU-0 FC-3	SLM-3 / CU-0 FS-10
SLM-3 / CU-0 FS-0	SLM-1 / CU-0 FS-0
SLM-3 / CU-0 FS-5	SLM-1 / CU-0 FS-5
SLM-3 / CU-1 FC-0	SLM-2 / CU-1 FS-6
SLM-3 / CU-1 FC-1	SLM-3 / CU-0 FS-8
SLM-3 / CU-1 FC-2	SLM-2 / CU-0 FS-11
SLM-3 / CU-1 FC-3	SLM-3 / CU-1 FS-10
SLM-3 / CU-1 FS-0	SLM-1 / CU-1 FS-0
SLM-3 / CU-1 FS-5	SLM-1 / CU-1 FS-5

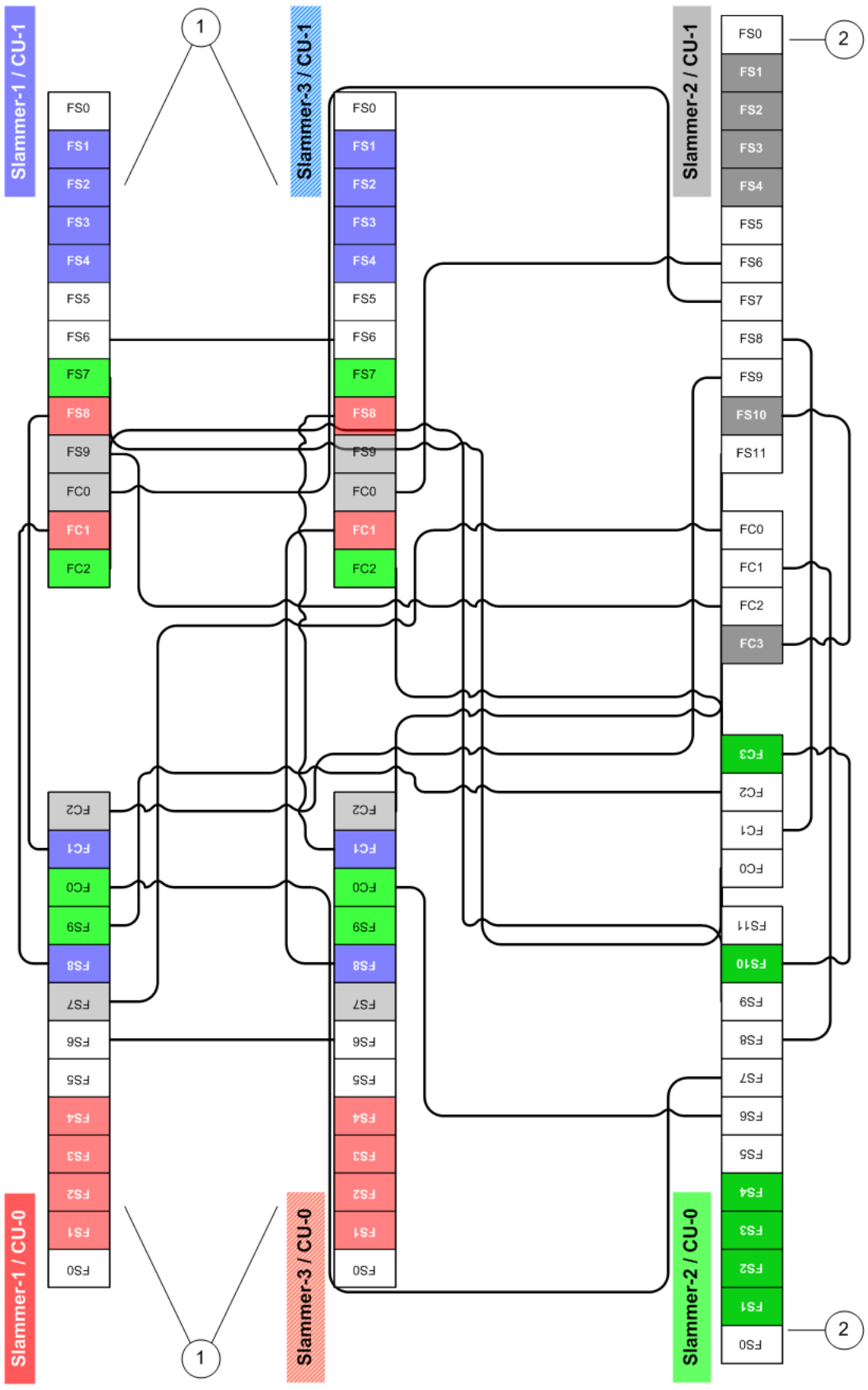
- Ports FC0, FC2, and FS6 are used to connect the third Slammer to the first and second Slammer.
- The Fibre Channel (FC) ports connect the Fibre Channel ASIC to the Fibre Channel Switch through the FS ports:
  - SLM-3 CU-0 FC0 connects to SLM-2 CU-0 FS5
  - SLM-3 CU-1 FC0 connects to SLM-2 CU-1 FS5
  - SLM-3 CU-0 FC2 connects to SLM-2 CU-1 FS6
  - SLM-3 CU-1 FC2 connects to SLM-2 CU-0 FS6
  - SLM-3 CU-0 FS6 connects to SLM-1 CU-0 FS6
  - SLM-3 CU-1 FS6 connects to SLM-1 CU-1 FS6

Control Unit (CU) Cross Connections for Three Mixed Version Slammers

This block diagram illustrates how to cable the Slammer cross connections in a 3-Slammer configuration that uses both version 1 and version 2 private interconnect modules (PIMs).

Note: A particular Slammer cannot contain a version 1 private interconnect module (PIM) in one control unit (CU) and a version 2 PIM in the other CU. Both CUs must contain the same version of PIM.

Figure 35 Cabling CU cross connections for a 3-Slammer configuration (mixed PIM versions)



Legend		
	1 Slammers with version 1 PIMs.	2 Slammer with version 2 PIMs.

Tip: As noted above, Slammer-1 and Slammer-3 contain version 1 PIMs and Slammer-2 contains version 2 PIMs. This configuration is the only one that is supported for a 3-Slammer system. Furthermore, when you add a version 2 Slammer to an existing 2-Slammer configuration that contains version 1 PIMs, you must re-cable the previous `Slammer-2` so that it becomes Slammer-3.

Important! When upgrading to this mixed configuration from a 2-Slammer system that uses version 1 PIMs only, the upgrade is disruptive. A disruptive upgrade means that you must shut down and restart the system. The restart needs to occur because the version 1 Slammer that was previously cabled to the Bricks as Slammer-2 is now cabled as Slammer-3.

The following table defines the CU cross connections, cable by cable, among two version 1 Slammers and one version 2 Slammer.

Table 25 3-Slammer cross connection configuration (mixed PIM versions)

From	To
Chassis / CU / Port	Chassis / CU / Port
SLM-1 / CU-0 FC-0	SLM-2 / CU-0 FS-7
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-0 FC-2	SLM-2 / CU-1 FS-9
SLM-1 / CU-1 FC-0	SLM-2 / CU-1 FS-7
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-1 FC-2	SLM-2 / CU-0 FS-9
SLM-2 / CU-0 FC-0	SLM-1 / CU-1 FS-7
SLM-2 / CU-0 FC-1	SLM-2 / CU-1 FS-8
SLM-2 / CU-0 FC-2	SLM-1 / CU-0 FS-9
SLM-2 / CU-0 FC-3	SLM-2 / CU-0 FS-10
SLM-2 / CU-1 FC-0	SLM-1 / CU-0 FS-7
SLM-2 / CU-1 FC-1	SLM-2 / CU-0 FS-8
SLM-2 / CU-1 FC-2	SLM-1 / CU-1 FS-9
SLM-2 / CU-1 FC-3	SLM-2 / CU-1 FS-10
SLM-3 / CU-0 FC-0	SLM-2 / CU-0 FS-6
SLM-3 / CU-0 FC-1	SLM-3 / CU-1 FS-8
SLM-3 / CU-0 FC-2	SLM-2 / CU-1 FS-11
SLM-3 / CU-0 FS-6	SLM-1 / CU-0 FS-6
SLM-3 / CU-1 FC-0	SLM-2 / CU-1 FS-6
SLM-3 / CU-1 FC-1	SLM-3 / CU-0 FS-8
SLM-3 / CU-1 FC-2	SLM-2 / CU-0 FS-11
SLM-3 / CU-1 FS-6	SLM-1 / CU-1 FS-6

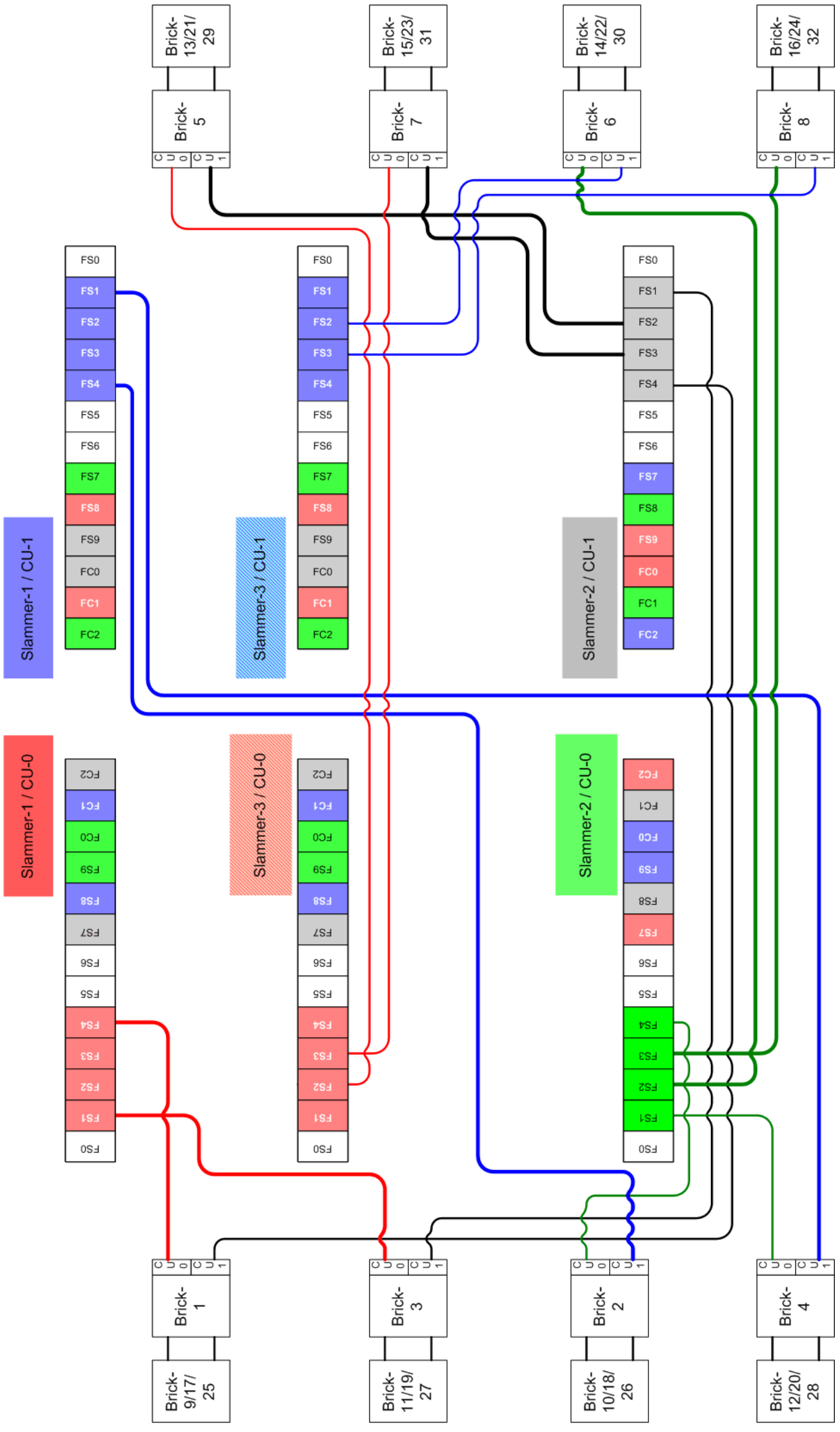
SHEET 27

Brick Connections for 3-Slammer Systems

Block Diagram: Connecting Bricks to Three Slammers

This diagram illustrates how to connect Brick strings to the Slammers and Bricks to Bricks in a 3-Slammer, 32-Brick (8-string) configuration.

Figure 36 Connecting a 3-Slammer configuration to 32 Bricks



Cable the Slammers and Bricks

These tables define the Brick connections in 3-Slammer configurations, cable by cable.

The Slammer-to-Brick and Brick-to-Brick connections identified below correspond to Figure 36.

Table 26 Cable connections for three Slammers and 16 Bricks

BRX-1:		
	SLM-1 / CU-0 FS-4	BRX-1 / CU-0 FC-2
	SLM-2 / CU-1 FS-4	BRX-1 / CU-1 FC-2
	BRX-1 / CU-0 FC-0	BRX-1 / CU-1 FC-3
	BRX-1 / CU-1 FC-0	BRX-1 / CU-0 FC-3
BRX-2:		
	SLM-2 / CU-0 FS-4	BRX-2 / CU-0 FC-2
	SLM-1 / CU-1 FS-4	BRX-2 / CU-1 FC-2
	BRX-2 / CU-0 FC-0	BRX-2 / CU-1 FC-3
	BRX-2 / CU-1 FC-0	BRX-2 / CU-0 FC-3
BRX-3:		
	SLM-1 / CU-0 FS-1	BRX-3 / CU-0 FC-2
	SLM-2 / CU-1 FS-1	BRX-3 / CU-1 FC-2
	BRX-3 / CU-0 FC-0	BRX-3 / CU-1 FC-3
	BRX-3 / CU-1 FC-0	BRX-3 / CU-0 FC-3
BRX-4:		
	SLM-2 / CU-0 FS-1	BRX-4 / CU-0 FC-2
	SLM-1 / CU-1 FS-1	BRX-4 / CU-1 FC-2
	BRX-4 / CU-0 FC-0	BRX-4 / CU-1 FC-3
	BRX-4 / CU-1 FC-0	BRX-4 / CU-0 FC-3
BRX-5:		
	SLM-3 / CU-0 FS-2	BRX-5 / CU-0 FC-2
	SLM-2 / CU-1 FS-2	BRX-5 / CU-1 FC-2
	BRX-5 / CU-0 FC-0	BRX-5 / CU-1 FC-3
	BRX-5 / CU-1 FC-0	BRX-5 / CU-0 FC-3
BRX-6:		
	SLM-2 / CU-0 FS-2	BRX-6 / CU-0 FC-2
	SLM-3 / CU-1 FS-2	BRX-6 / CU-1 FC-2
	BRX-6 / CU-0 FC-0	BRX-6 / CU-1 FC-3
	BRX-6 / CU-1 FC-0	BRX-6 / CU-0 FC-3
BRX-7:		
	SLM-3 / CU-0 FS-3	BRX-7 / CU-0 FC-2
	SLM-2 / CU-1 FS-3	BRX-7 / CU-1 FC-2
	BRX-7 / CU-0 FC-0	BRX-7 / CU-1 FC-3
	BRX-7 / CU-1 FC-0	BRX-7 / CU-0 FC-3
BRX-8:		
	SLM-2 / CU-0 FS-3	BRX-8 / CU-0 FC-2
	SLM-3 / CU-1 FS-3	BRX-8 / CU-1 FC-2
	BRX-8 / CU-0 FC-0	BRX-8 / CU-1 FC-3
	BRX-8 / CU-1 FC-0	BRX-8 / CU-0 FC-3

BRX-9:		
	BRX-1 / CU-0 FC-1	BRX-9 / CU-0 FC-2
	BRX-1 / CU-1 FC-1	BRX-9 / CU-1 FC-2
	BRX-9 / CU-0 FC-0	BRX-9 / CU-1 FC-3
	BRX-9 / CU-1 FC-0	BRX-9 / CU-0 FC-3
BRX-10:		
	BRX-2 / CU-0 FC-1	BRX-10 / CU-0 FC-2
	BRX-2 / CU-1 FC-1	BRX-10 / CU-1 FC-2
	BRX-10 / CU-0 FC-0	BRX-10 / CU-1 FC-3
	BRX-10 / CU-1 FC-0	BRX-10 / CU-0 FC-3
BRX-11:		
	BRX-3 / CU-0 FC-1	BRX-11 / CU-0 FC-2
	BRX-3 / CU-1 FC-1	BRX-11 / CU-1 FC-2
	BRX-11 / CU-0 FC-0	BRX-11 / CU-1 FC-3
	BRX-11 / CU-1 FC-0	BRX-11 / CU-0 FC-3
BRX-12:		
	BRX-4 / CU-0 FC-1	BRX-12 / CU-0 FC-2
	BRX-4 / CU-1 FC-1	BRX-12 / CU-1 FC-2
	BRX-12 / CU-0 FC-0	BRX-12 / CU-1 FC-3
	BRX-12 / CU-1 FC-0	BRX-12 / CU-0 FC-3
BRX-13:		
	BRX-5 / CU-0 FC-1	BRX-13 / CU-0 FC-2
	BRX-5 / CU-1 FC-1	BRX-13 / CU-1 FC-2
	BRX-13 / CU-0 FC-0	BRX-13 / CU-1 FC-3
	BRX-13 / CU-1 FC-0	BRX-13 / CU-0 FC-3
BRX-14:		
	BRX-6 / CU-0 FC-1	BRX-14 / CU-0 FC-2
	BRX-6 / CU-1 FC-1	BRX-14 / CU-1 FC-2
	BRX-14 / CU-0 FC-0	BRX-14 / CU-1 FC-3
	BRX-14 / CU-1 FC-0	BRX-14 / CU-0 FC-3
BRX-15:		
	BRX-7 / CU-0 FC-1	BRX-15 / CU-0 FC-2
	BRX-7 / CU-1 FC-1	BRX-15 / CU-1 FC-2
	BRX-15 / CU-0 FC-0	BRX-15 / CU-1 FC-3
	BRX-15 / CU-1 FC-0	BRX-15 / CU-0 FC-3
BRX-16:		
	BRX-8 / CU-0 FC-1	BRX-16 / CU-0 FC-2
	BRX-8 / CU-1 FC-1	BRX-16 / CU-1 FC-2
	BRX-16 / CU-0 FC-0	BRX-16 / CU-1 FC-3
	BRX-16 / CU-1 FC-0	BRX-16 / CU-0 FC-3

The following notes will help you successfully cable the system:

- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
  - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
    - Version 1 Bricks: 1.64 ft (0.5 m)
    - Version 2 Bricks: 3.28 ft (1.0 m)

Connect additional Bricks beyond the 16 explicitly defined in the preceding table by following the pattern shown for Bricks 9 through 16. The Brick numbers in each string are shown in Figure 36 and in the following table:

Table 27 Connections for additional Bricks

Head of string	Second Brick	Third Brick	Fourth Brick
BRX-1	BRX-9	BRX-17	BRX-25
BRX-2	BRX-10	BRX-18	BRX-26
BRX-3	BRX-11	BRX-19	BRX-27
BRX-4	BRX-12	BRX-20	BRX-28
BRX-5	BRX-13	BRX-21	BRX-29
BRX-6	BRX-14	BRX-22	BRX-30
BRX-7	BRX-15	BRX-23	BRX-31
BRX-8	BRX-16	BRX-24	BRX-32

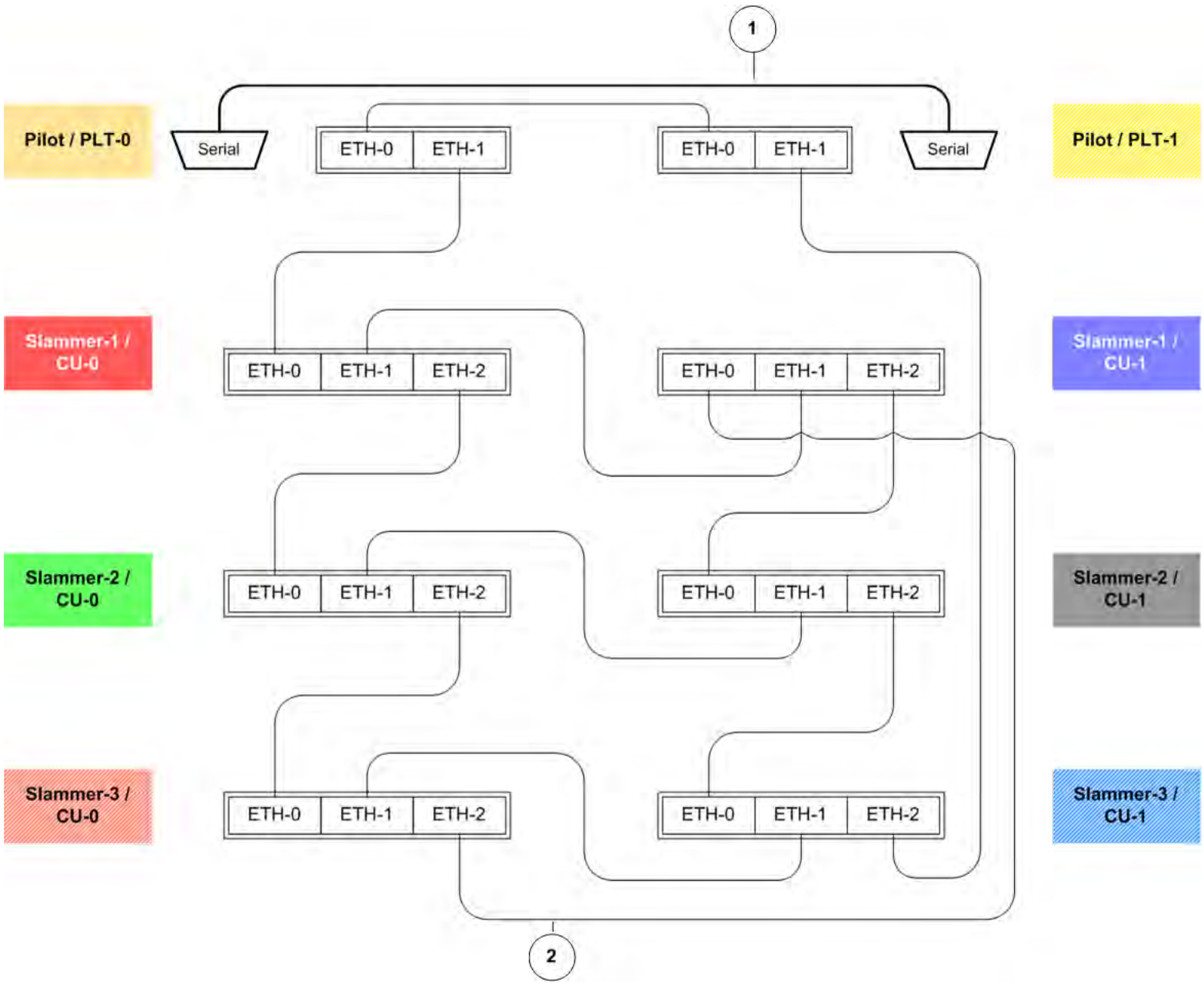
SHEET 28

PMI Connections for 3-Slammer Systems

Schematic of PMI Ethernet Connections in a 3-Slammer System

This schematic illustrates the Pilot-to-Slammer and Slammer-to-Slammer connections comprising the private management interface (PMI) in a 3-Slammer system.

Figure 37 PMI Ethernet schematic (3-Slammer system)



Legend

1 Null modem cable.

2 Cat-5 Ethernet cables.

Private Management Interface (PMI) Connections in a 3-Slammer System

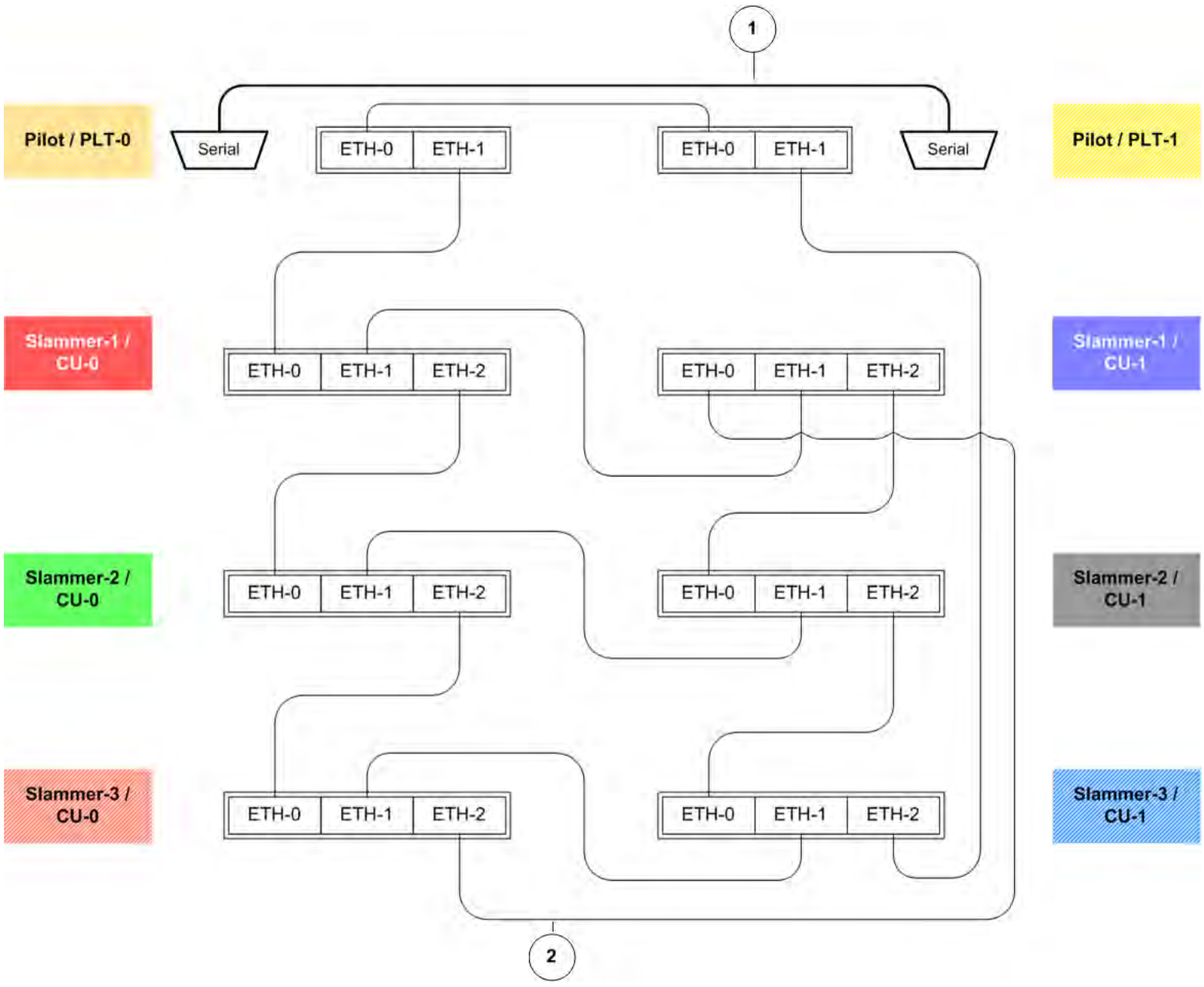
This table defines how to connect the Cat-5 Ethernet cables between the Pilot and the Slammers and among the Slammers themselves in a 3-Slammer system.

Table 28 Ethernet cable connections for PMI (3-Slammer system)

	From	To
	Chassis / CU / Port	Chassis / CU / Port
	PLT-0 ETH0	PLT-1 ETH0
	PLT-0 ETH1	SLM-1 / CU-0 ETH0
	PLT-1 ETH1	SLM-3 / CU-1 ETH2
	SLM-1 / CU-0 ETH1	SLM-1 / CU-1 ETH1
	SLM-1 / CU-0 ETH2	SLM-2 / CU-0 ETH0
	SLM-1 / CU-1 ETH2	SLM-2 / CU-1 ETH0
	SLM-2 / CU-0 ETH1	SLM-2 / CU-1 ETH1
	SLM-2 / CU-0 ETH2	SLM-3 / CU-0 ETH0
	SLM-2 / CU-1 ETH2	SLM-3 / CU-1 ETH0
	SLM-3 / CU-0 ETH1	SLM-3 / CU-1 ETH1
	SLM-3 / CU-0 ETH2	SLM-1 / CU-1 ETH0

This schematic illustrates the Pilot-to-Slammer and Slammer-to-Slammer connections comprising the PMI in a 3-Slammer system.

Figure 38 PMI Ethernet schematic (3-Slammer system)



Legend	
1	Null modem cable.
2	Cat-5 Ethernet cables.

In addition to the Ethernet cables, PMI requires a null modem cable connection between the serial ports of each Pilot CU.

Part VI: Cabling Pillar Axiom 600 Systems Using Four Slammers

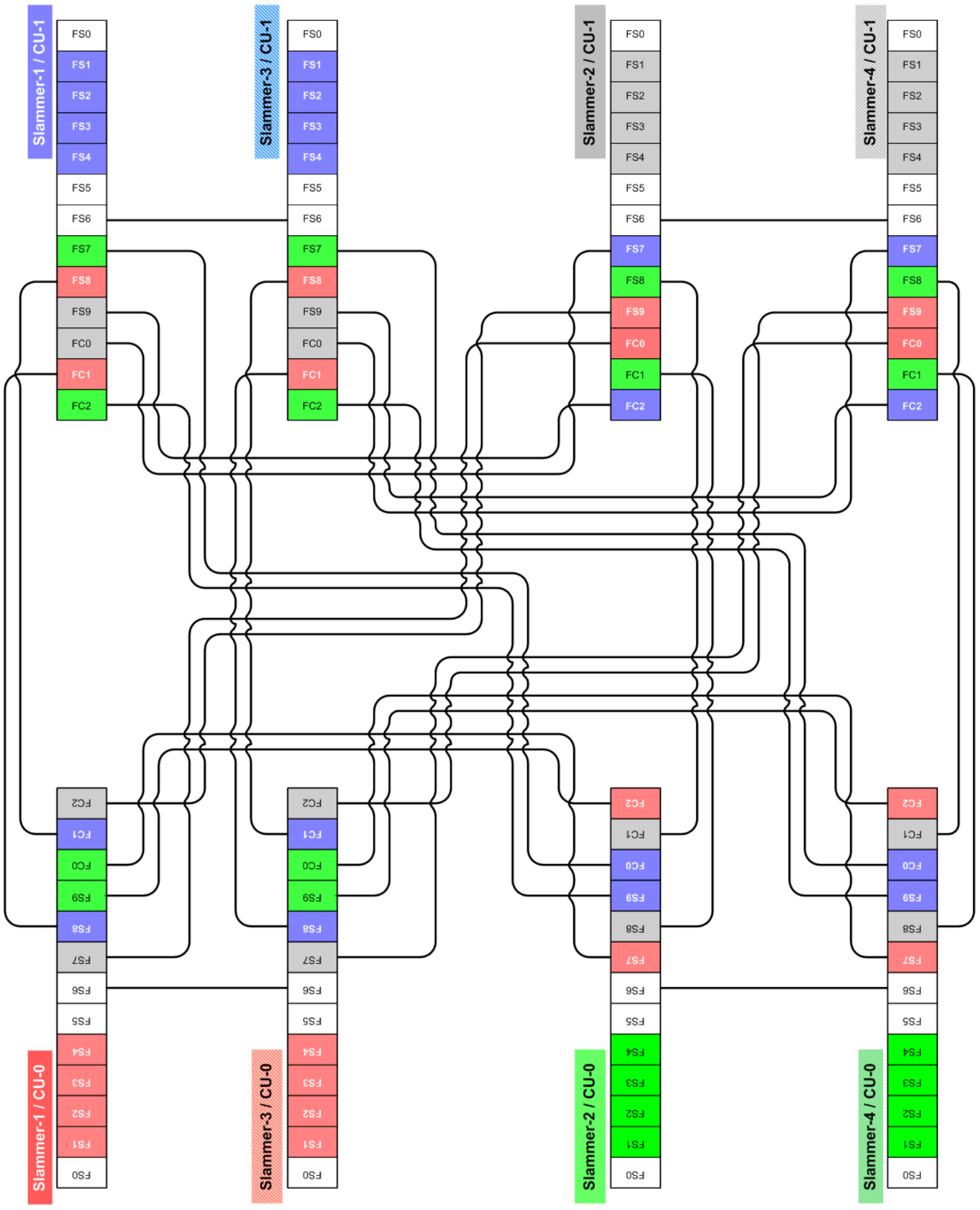
SHEET 29

Cross Connections for Four Slammers

Control Unit (CU) Cross Connections for Four Version 1 Slammers

This diagram illustrates how to cable the Slammer cross-connections in a 4-Slammer configuration that uses version 1 private interconnect modules (PIMs) only.

Figure 39 Cabling CU cross connections for a 4-Slammer configuration (version 1 PIMs)



The following table defines the CU cross connections among four version 1 Slammers, cable by cable.

Table 29 4-Slammer cross connection configuration

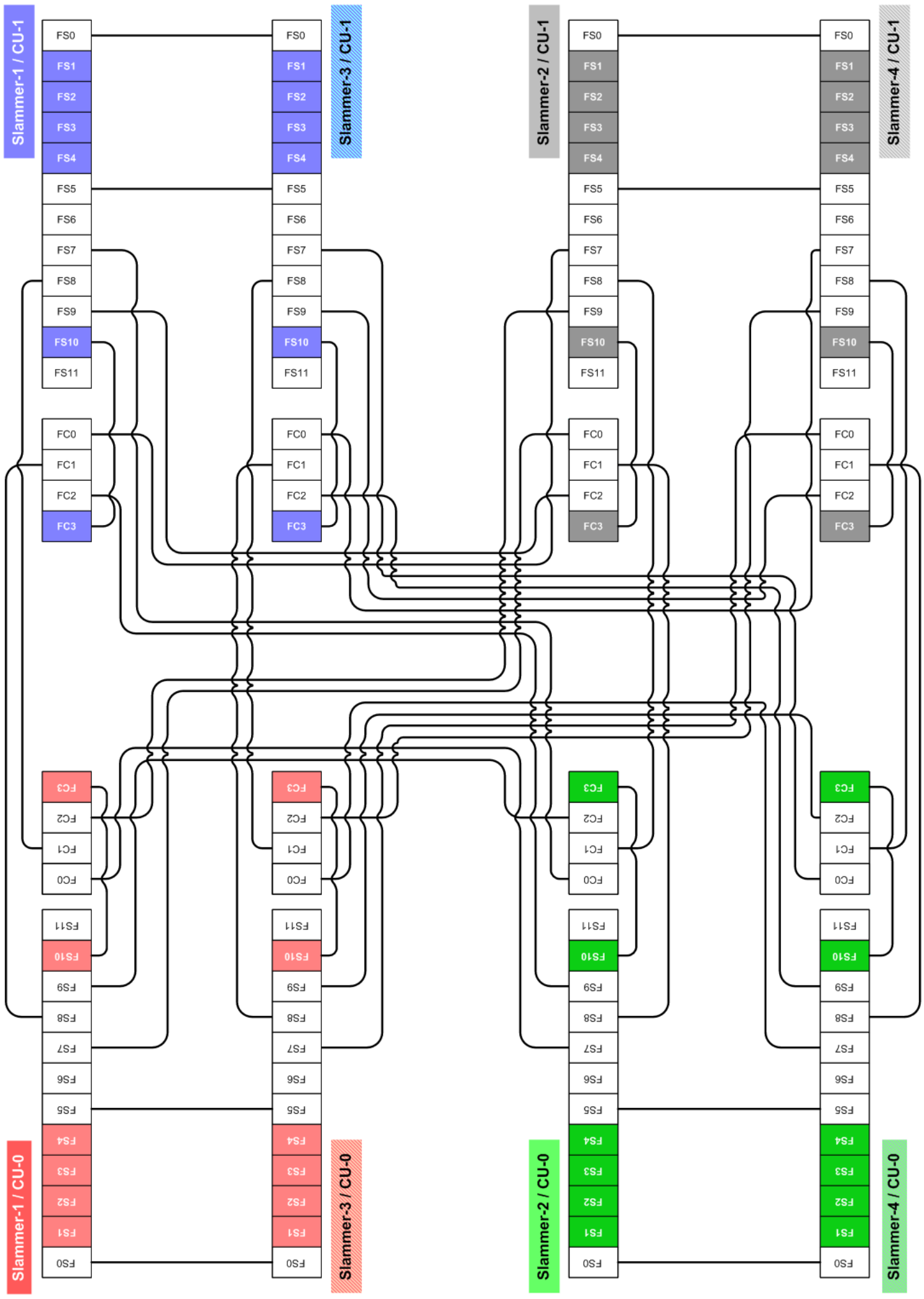
Chassis / CU / Port	Chassis / CU / Port
SLM-1 / CU-0 FC-0	SLM-2 / CU-0 FS-7
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-0 FC-2	SLM-2 / CU-1 FS-9
SLM-1 / CU-1 FC-0	SLM-2 / CU-1 FS-7
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-1 FC-2	SLM-2 / CU-0 FS-9
SLM-2 / CU-0 FC-0	SLM-1 / CU-1 FS-7
SLM-2 / CU-0 FC-1	SLM-2 / CU-1 FS-8
SLM-2 / CU-0 FC-2	SLM-1 / CU-0 FS-9
SLM-2 / CU-1 FC-0	SLM-1 / CU-0 FS-7
SLM-2 / CU-1 FC-1	SLM-2 / CU-0 FS-8
SLM-2 / CU-1 FC-2	SLM-1 / CU-1 FS-9
SLM-3 / CU-0 FC-0	SLM-4 / CU-0 FS-7
SLM-3 / CU-0 FC-1	SLM-3 / CU-1 FS-8
SLM-3 / CU-0 FC-2	SLM-4 / CU-1 FS-9
SLM-3 / CU-0 FS-6	SLM-1 / CU-0 FS-6
SLM-3 / CU-1 FC-0	SLM-4 / CU-1 FS-7
SLM-3 / CU-1 FC-1	SLM-3 / CU-0 FS-8
SLM-3 / CU-1 FC-2	SLM-4 / CU-0 FS-9
SLM-3 / CU-1 FS-6	SLM-1 / CU-1 FS-6
SLM-4 / CU-0 FC-0	SLM-3 / CU-1 FS-7
SLM-4 / CU-0 FC-1	SLM-4 / CU-1 FS-8
SLM-4 / CU-0 FC-2	SLM-3 / CU-0 FS-9
SLM-4 / CU-0 FS-6	SLM-2 / CU-0 FS-6
SLM-4 / CU-1 FC-0	SLM-3 / CU-0 FS-7
SLM-4 / CU-1 FC-1	SLM-4 / CU-0 FS-8
SLM-4 / CU-1 FC-2	SLM-3 / CU-1 FS-9
SLM-4 / CU-1 FS-6	SLM-2 / CU-1 FS-6

- Ports FC0, FC2, FS6, FS7, and FS9 are used to connect the fourth Slammer to the first, second, and the third Slammer.
- The Fibre Channel (FC) ports connect the Fibre Channel ASIC to the Fibre Channel switch through the FS ports
  - SLM-4 CU-0 FC0 connects to SLM-3 CU-1 FS7
  - SLM-4 CU-1 FC0 connects to SLM-3 CU-0 FS7
  - SLM-4 CU-0 FC2 connects to SLM-3 CU-0 FS9
  - SLM-4 CU-1 FC2 connects to SLM-3 CU-1 FS9
  - SLM-4 CU-0 FS6 connects to SLM-2 CU-0 FS6
  - SLM-4 CU-1 FS6 connects to SLM-2 CU-1 FS6
  - SLM-4 CU-0 FS7 connects to SLM-3 CU-0 FC0
  - SLM-4 CU-1 FS7 connects to SLM-3 CU-1 FC0
  - SLM-4 CU-0 FS9 connects to SLM-3 CU-1 FC2
  - SLM-4 CU-1 FS9 connects to SLM-3 CU-0 FC2

Control Unit (CU) Cross Connections for Four Version 2 Slammers

This diagram illustrates how to cable the Slammer cross-connections in a 4-Slammer configuration that uses version 2 private interconnect modules (PIMs) only.

Figure 40 Cabling CU cross connections for a 4-Slammer configuration (version 2 PIMs)



The following table defines the CU cross connections among the version 2 PIMs that are contained in the four Slammers, cable by cable.

Table 30 Slammer cross connection configuration for a 4-Slammer configuration (version 2 PIMs)

From	To
Chassis / CU / Port	Chassis / CU / Port
SLM-1 / CU-0 FC-0	SLM-2 / CU-0 FS-7
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-0 FC-2	SLM-2 / CU-1 FS-9
SLM-1 / CU-0 FC-3	SLM-1 / CU-0 FS-10
SLM-1 / CU-1 FC-0	SLM-2 / CU-1 FS-7
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-1 FC-2	SLM-2 / CU-0 FS-9
SLM-1 / CU-1 FC-3	SLM-1 / CU-1 FS-10
SLM-2 / CU-0 FC-0	SLM-1 / CU-1 FS-7
SLM-2 / CU-0 FC-1	SLM-2 / CU-1 FS-8
SLM-2 / CU-0 FC-2	SLM-1 / CU-0 FS-9
SLM-2 / CU-0 FC-3	SLM-2 / CU-0 FS-10
SLM-2 / CU-1 FC-0	SLM-1 / CU-0 FS-7
SLM-2 / CU-1 FC-1	SLM-2 / CU-0 FS-8
SLM-2 / CU-1 FC-2	SLM-1 / CU-1 FS-9
SLM-2 / CU-1 FC-3	SLM-2 / CU-1 FS-10
SLM-3 / CU-0 FC-0	SLM-4 / CU-0 FS-7
SLM-3 / CU-0 FC-1	SLM-3 / CU-1 FS-8
SLM-3 / CU-0 FC-2	SLM-4 / CU-1 FS-9
SLM-3 / CU-0 FC-3	SLM-3 / CU-0 FS-10
SLM-3 / CU-0 FS-0	SLM-1 / CU-0 FS-0
SLM-3 / CU-0 FS-5	SLM-1 / CU-0 FS-5
SLM-3 / CU-1 FC-0	SLM-4 / CU-1 FS-7
SLM-3 / CU-1 FC-1	SLM-3 / CU-0 FS-8
SLM-3 / CU-1 FC-2	SLM-4 / CU-0 FS-9
SLM-3 / CU-1 FC-3	SLM-3 / CU-1 FS-10
SLM-3 / CU-1 FS-0	SLM-1 / CU-1 FS-0
SLM-3 / CU-1 FS-5	SLM-1 / CU-1 FS-5
SLM-4 / CU-0 FC-0	SLM-3 / CU-1 FS-7
SLM-4 / CU-0 FC-1	SLM-4 / CU-1 FS-8
SLM-4 / CU-0 FC-2	SLM-3 / CU-0 FS-9
SLM-4 / CU-0 FC-3	SLM-4 / CU-0 FS-10
SLM-4 / CU-0 FS-0	SLM-2 / CU-0 FS-0
SLM-4 / CU-0 FS-5	SLM-2 / CU-0 FS-5
SLM-4 / CU-1 FC-0	SLM-3 / CU-0 FS-7
SLM-4 / CU-1 FC-1	SLM-4 / CU-0 FS-8
SLM-4 / CU-1 FC-2	SLM-3 / CU-1 FS-9
SLM-4 / CU-1 FC-3	SLM-4 / CU-1 FS-10
SLM-4 / CU-1 FS-0	SLM-2 / CU-1 FS-0
SLM-4 / CU-1 FS-5	SLM-2 / CU-1 FS-5

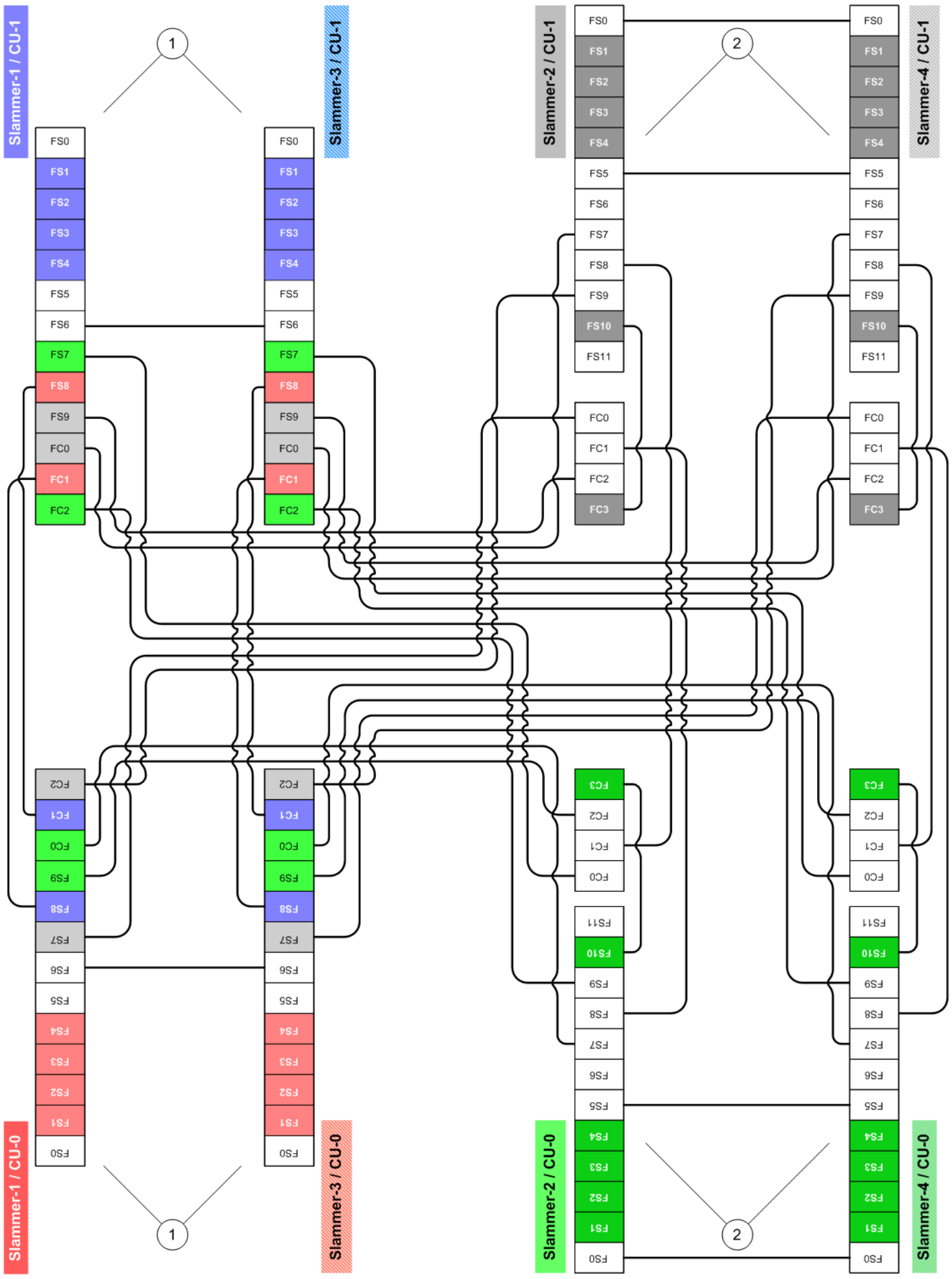
- Ports FC0, FC2, FS6, FS7, and FS9 connect the fourth Slammer to the first, second, and the third Slammer.
- The Fibre Channel (FC) ports connect the FC ASIC to the FC switch through the FS ports
  - SLM-4 CU-0 FC0 connects to SLM-3 CU-1 FS7
  - SLM-4 CU-1 FC0 connects to SLM-3 CU-0 FS7
  - SLM-4 CU-0 FC2 connects to SLM-3 CU-0 FS9
  - SLM-4 CU-1 FC2 connects to SLM-3 CU-1 FS9
  - SLM-4 CU-0 FS6 connects to SLM-2 CU-0 FS6
  - SLM-4 CU-1 FS6 connects to SLM-2 CU-1 FS6
  - SLM-4 CU-0 FS7 connects to SLM-3 CU-0 FC0
  - SLM-4 CU-1 FS7 connects to SLM-3 CU-1 FC0
  - SLM-4 CU-0 FS9 connects to SLM-3 CU-1 FC2
  - SLM-4 CU-1 FS9 connects to SLM-3 CU-0 FC2

Control Unit (CU) Cross Connections for Four Mixed Version Slammers

This block diagram illustrates how to cable the Slammer cross-connections in a 4-Slammer configuration that uses Slammers that contain both version 1 and version 2 private interconnect modules (PIMs).

Note: A particular Slammer cannot contain a version 1 PIM in one CU and a version 2 PIM in the other CU. Both CUs must contain the same version of PIM.

Figure 41 Cabling CU cross connections for a 4-Slammer configuration (mixed PIM versions)



Legend	1 Slammers with version 1 PIMs.	2 Slammers with version 2 PIMs.

Tip: As noted above, Slammer-1 and Slammer-3 contain version 1 PIMs and Slammer-2 and Slammer-4 contain version 2 PIMs. This configuration is the only one that is supported for a mixed 4-Slammer system.

The following table defines the control unit (CU) cross connections, cable by cable, among two version 1 and two version 2 Slammers.

Table 31 Slammer cross connection configuration for a 4-Slammer configuration (mixed version PIMs)

From	To
Chassis / CU / Port	Chassis / CU / Port
SLM-1 / CU-0 FC-0	SLM-2 / CU-0 FS-7
SLM-1 / CU-0 FC-1	SLM-1 / CU-1 FS-8
SLM-1 / CU-0 FC-2	SLM-2 / CU-1 FS-9
SLM-1 / CU-1 FC-0	SLM-2 / CU-1 FS-7
SLM-1 / CU-1 FC-1	SLM-1 / CU-0 FS-8
SLM-1 / CU-1 FC-2	SLM-2 / CU-0 FS-9
SLM-2 / CU-0 FC-0	SLM-1 / CU-1 FS-7
SLM-2 / CU-0 FC-1	SLM-2 / CU-1 FS-8
SLM-2 / CU-0 FC-2	SLM-1 / CU-0 FS-9
SLM-2 / CU-0 FC-3	SLM-2 / CU-0 FS-10
SLM-2 / CU-1 FC-0	SLM-1 / CU-0 FS-7
SLM-2 / CU-1 FC-1	SLM-2 / CU-0 FS-8
SLM-2 / CU-1 FC-2	SLM-1 / CU-1 FS-9
SLM-2 / CU-1 FC-3	SLM-2 / CU-1 FS-10
SLM-3 / CU-0 FC-0	SLM-4 / CU-0 FS-7
SLM-3 / CU-0 FC-1	SLM-3 / CU-1 FS-8
SLM-3 / CU-0 FC-2	SLM-4 / CU-1 FS-9
SLM-3 / CU-0 FS-6	SLM-1 / CU-0 FS-6
SLM-3 / CU-1 FC-0	SLM-4 / CU-1 FS-7
SLM-3 / CU-1 FC-1	SLM-3 / CU-0 FS-8
SLM-3 / CU-1 FC-2	SLM-4 / CU-0 FS-9
SLM-3 / CU-1 FS-6	SLM-1 / CU-1 FS-6
SLM-4 / CU-0 FC-0	SLM-3 / CU-1 FS-7
SLM-4 / CU-0 FC-1	SLM-4 / CU-1 FS-8
SLM-4 / CU-0 FC-2	SLM-3 / CU-0 FS-9
SLM-4 / CU-0 FC-3	SLM-4 / CU-0 FS-10
SLM-4 / CU-0 FS-0	SLM-2 / CU-0 FS-0
SLM-4 / CU-0 FS-5	SLM-2 / CU-0 FS-5
SLM-4 / CU-1 FC-0	SLM-3 / CU-0 FS-7
SLM-4 / CU-1 FC-1	SLM-4 / CU-0 FS-8
SLM-4 / CU-1 FC-2	SLM-3 / CU-1 FS-9
SLM-4 / CU-1 FC-3	SLM-4 / CU-1 FS-10
SLM-4 / CU-1 FS-0	SLM-2 / CU-1 FS-0
SLM-4 / CU-1 FS-5	SLM-2 / CU-1 FS-5

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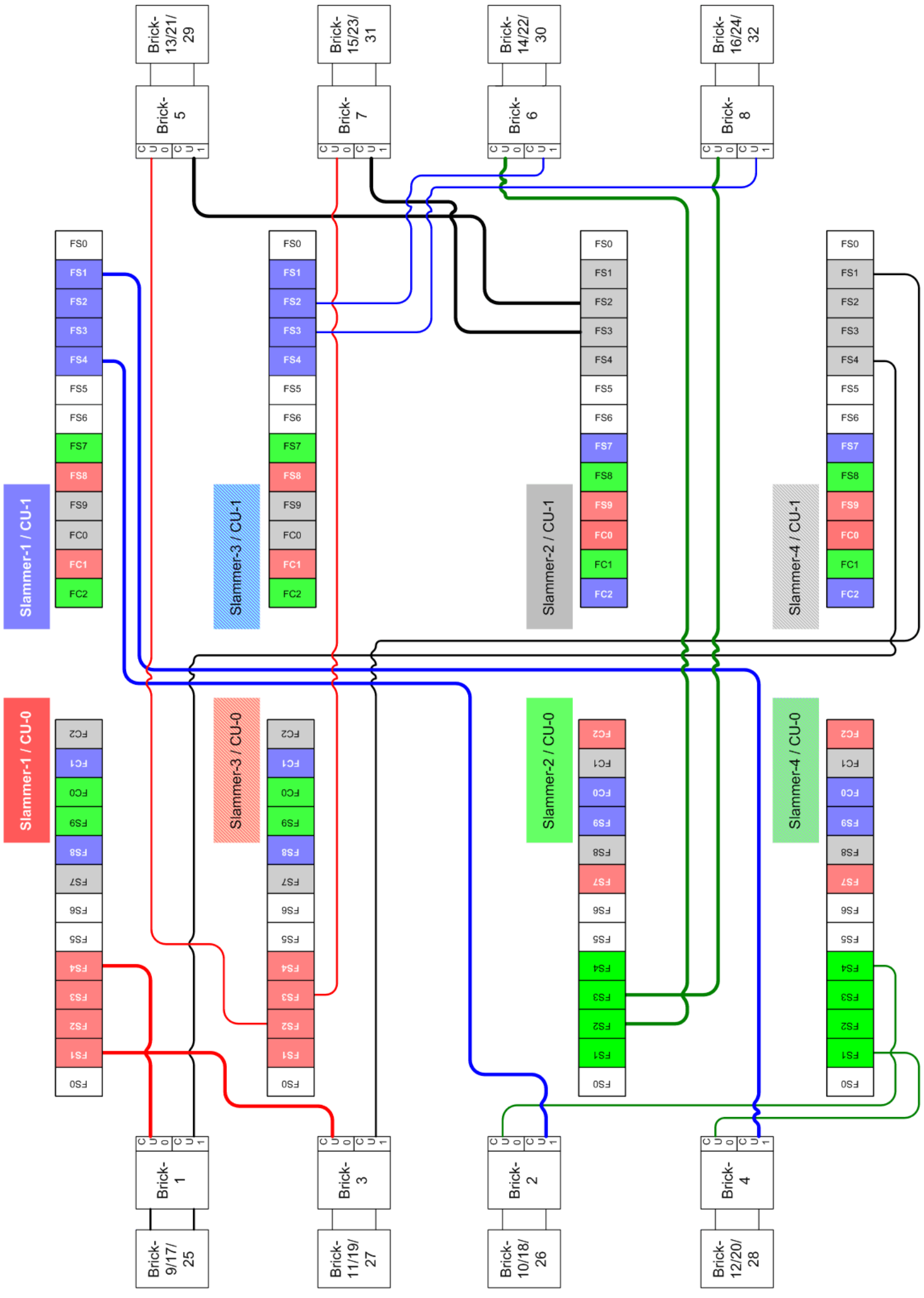
Connections for 32 Bricks in 4-Slammer Systems

Block Diagram: Connecting Four Slammers to 32 Bricks

This diagram illustrates the connection of Brick strings to the Slammers and Bricks to Bricks in a 4-Slammer, 32-Brick (8-string) configuration.

Figure 42 Connecting a 4-Slammer configuration to 32 Bricks



Note: Eight strings is recommended for configurations of up to 16 Bricks but is optional for larger systems.

Important! This illustration is for reference only. Although the illustration shows version 1 PIMs, the Brick cabling for version 2 PIMs uses the same ports.

Cable 32 Bricks to Four Slammers

These tables specify, cable by cable, how to connect Brick strings to the Slammers and Bricks to Bricks in a 4-Slammer, 32 Brick (8-string) configuration.

These SSF cabling tables correspond to the diagram in Figure 42.

Table 32 Cable connections for four Slammers and 16 Bricks

BRX-1:		
	SLM-1 / CU-0 FS-4	BRX-1 / CU-0 FC-2
	SLM-4 / CU-1 FS-4	BRX-1 / CU-1 FC-2
	BRX-1 / CU-0 FC-0	BRX-1 / CU-1 FC-3
	BRX-1 / CU-1 FC-0	BRX-1 / CU-0 FC-3
BRX-2:		
	SLM-4 / CU-0 FS-4	BRX-2 / CU-0 FC-2
	SLM-1 / CU-1 FS-4	BRX-2 / CU-1 FC-2
	BRX-2 / CU-0 FC-0	BRX-2 / CU-1 FC-3
	BRX-2 / CU-1 FC-0	BRX-2 / CU-0 FC-3
BRX-3:		
	SLM-1 / CU-0 FS-1	BRX-3 / CU-0 FC-2
	SLM-4 / CU-1 FS-1	BRX-3 / CU-1 FC-2
	BRX-3 / CU-0 FC-0	BRX-3 / CU-1 FC-3
	BRX-3 / CU-1 FC-0	BRX-3 / CU-0 FC-3
BRX-4:		
	SLM-4 / CU-0 FS-1	BRX-4 / CU-0 FC-2
	SLM-1 / CU-1 FS-1	BRX-4 / CU-1 FC-2
	BRX-4 / CU-0 FC-0	BRX-4 / CU-1 FC-3
	BRX-4 / CU-1 FC-0	BRX-4 / CU-0 FC-3
BRX-5:		
	SLM-3 / CU-0 FS-2	BRX-5 / CU-0 FC-2
	SLM-2 / CU-1 FS-2	BRX-5 / CU-1 FC-2
	BRX-5 / CU-0 FC-0	BRX-5 / CU-1 FC-3
	BRX-5 / CU-1 FC-0	BRX-5 / CU-0 FC-3
BRX-6:		
	SLM-2 / CU-0 FS-2	BRX-6 / CU-0 FC-2
	SLM-3 / CU-1 FS-2	BRX-6 / CU-1 FC-2
	BRX-6 / CU-0 FC-0	BRX-6 / CU-1 FC-3
	BRX-6 / CU-1 FC-0	BRX-6 / CU-0 FC-3
BRX-7:		
	SLM-3 / CU-0 FS-3	BRX-7 / CU-0 FC-2
	SLM-2 / CU-1 FS-3	BRX-7 / CU-1 FC-2
	BRX-7 / CU-0 FC-0	BRX-7 / CU-1 FC-3
	BRX-7 / CU-1 FC-0	BRX-7 / CU-0 FC-3
BRX-8:		
	SLM-2 / CU-0 FS-3	BRX-8 / CU-0 FC-2
	SLM-3 / CU-1 FS-3	BRX-8 / CU-1 FC-2
	BRX-8 / CU-0 FC-0	BRX-8 / CU-1 FC-3
	BRX-8 / CU-1 FC-0	BRX-8 / CU-0 FC-3

BRX-9:		
	BRX-1 / CU-0 FC-1	BRX-9 / CU-0 FC-2
	BRX-1 / CU-1 FC-1	BRX-9 / CU-1 FC-2
	BRX-9 / CU-0 FC-0	BRX-9 / CU-1 FC-3
	BRX-9 / CU-1 FC-0	BRX-9 / CU-0 FC-3
BRX-10:		
	BRX-2 / CU-0 FC-1	BRX-10 / CU-0 FC-2
	BRX-2 / CU-1 FC-1	BRX-10 / CU-1 FC-2
	BRX-10 / CU-0 FC-0	BRX-10 / CU-1 FC-3
	BRX-10 / CU-1 FC-0	BRX-10 / CU-0 FC-3
BRX-11:		
	BRX-3 / CU-0 FC-1	BRX-11 / CU-0 FC-2
	BRX-3 / CU-1 FC-1	BRX-11 / CU-1 FC-2
	BRX-11 / CU-0 FC-0	BRX-11 / CU-1 FC-3
	BRX-11 / CU-1 FC-0	BRX-11 / CU-0 FC-3
BRX-12:		
	BRX-4 / CU-0 FC-1	BRX-12 / CU-0 FC-2
	BRX-4 / CU-1 FC-1	BRX-12 / CU-1 FC-2
	BRX-12 / CU-0 FC-0	BRX-12 / CU-1 FC-3
	BRX-12 / CU-1 FC-0	BRX-12 / CU-0 FC-3
BRX-13:		
	BRX-5 / CU-0 FC-1	BRX-13 / CU-0 FC-2
	BRX-5 / CU-1 FC-1	BRX-13 / CU-1 FC-2
	BRX-13 / CU-0 FC-0	BRX-13 / CU-1 FC-3
	BRX-13 / CU-1 FC-0	BRX-13 / CU-0 FC-3
BRX-14:		
	BRX-6 / CU-0 FC-1	BRX-14 / CU-0 FC-2
	BRX-6 / CU-1 FC-1	BRX-14 / CU-1 FC-2
	BRX-14 / CU-0 FC-0	BRX-14 / CU-1 FC-3
	BRX-14 / CU-1 FC-0	BRX-14 / CU-0 FC-3
BRX-15:		
	BRX-7 / CU-0 FC-1	BRX-15 / CU-0 FC-2
	BRX-7 / CU-1 FC-1	BRX-15 / CU-1 FC-2
	BRX-15 / CU-0 FC-0	BRX-15 / CU-1 FC-3
	BRX-15 / CU-1 FC-0	BRX-15 / CU-0 FC-3
BRX-16:		
	BRX-8 / CU-0 FC-1	BRX-16 / CU-0 FC-2
	BRX-8 / CU-1 FC-1	BRX-16 / CU-1 FC-2
	BRX-16 / CU-0 FC-0	BRX-16 / CU-1 FC-3
	BRX-16 / CU-1 FC-0	BRX-16 / CU-0 FC-3

The following notes will help you successfully cable the system:

- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
  - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
    - Version 1 Bricks: 1.64 ft (0.5 m)
    - Version 2 Bricks: 3.28 ft (1.0 m)

Additional Bricks beyond the 16 explicitly defined above are to be connected following the pattern for Bricks 9 through 16 above. The Brick numbers in each string are shown in the following figure, which corresponds to the diagram in Figure 42.

Figure 43 Connecting Bricks 17 through 32 to the existing strings

Brx-	1	9	17	25
Brx-	2	10	18	26
Brx-	3	11	19	27
Brx-	4	12	20	28
Brx-	5	13	21	29
Brx-	6	14	22	30
Brx-	7	15	23	31
Brx-	8	16	24	32

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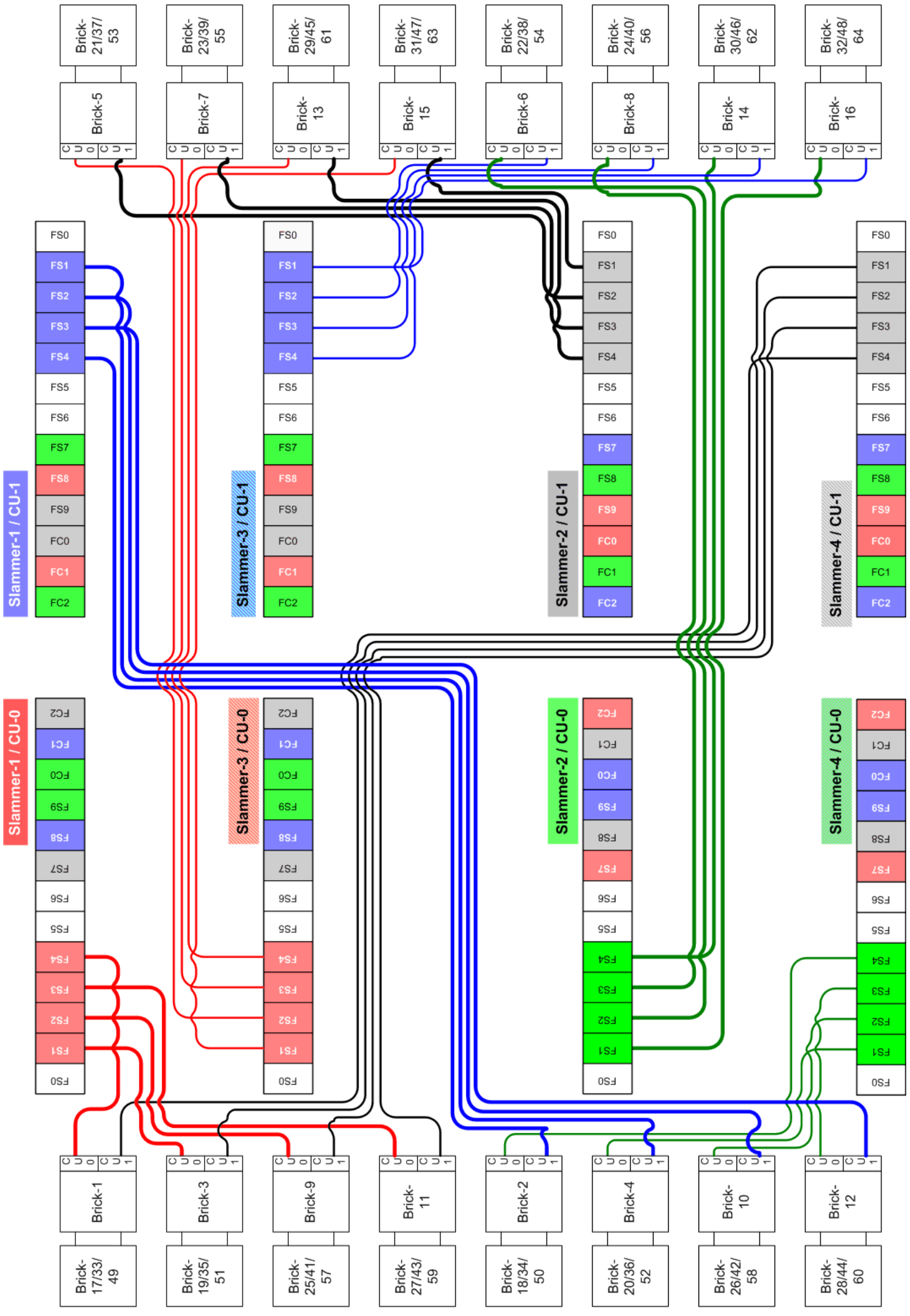
Connections for 64 Bricks in a 4-Slammer System

Block Diagram: Connecting Four Slammers to 64 Bricks

This diagram illustrates how to connect Brick strings to the Slammers and Bricks to Bricks in a 4-Slammer, 64 Brick (16-string) configuration.

Figure 44 Connecting a 4-Slammer configuration to 64 Bricks



Note: Using 16 strings is optional but recommended for configurations above 32 Bricks.

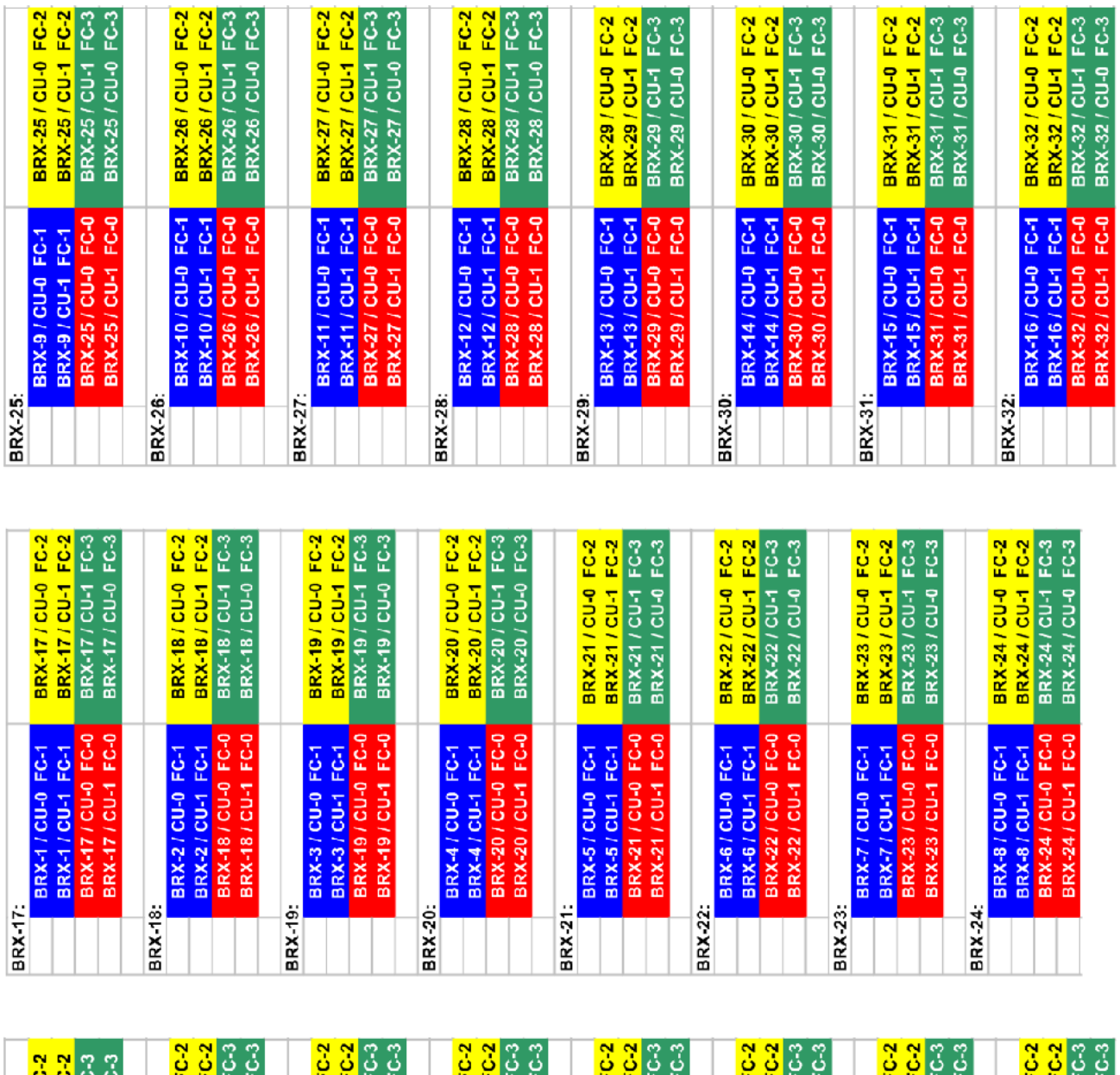
Important! This illustration is for reference only. Although the illustration shows version 1 PIMs, the Brick cabling for version 2 PIMs uses the same ports.

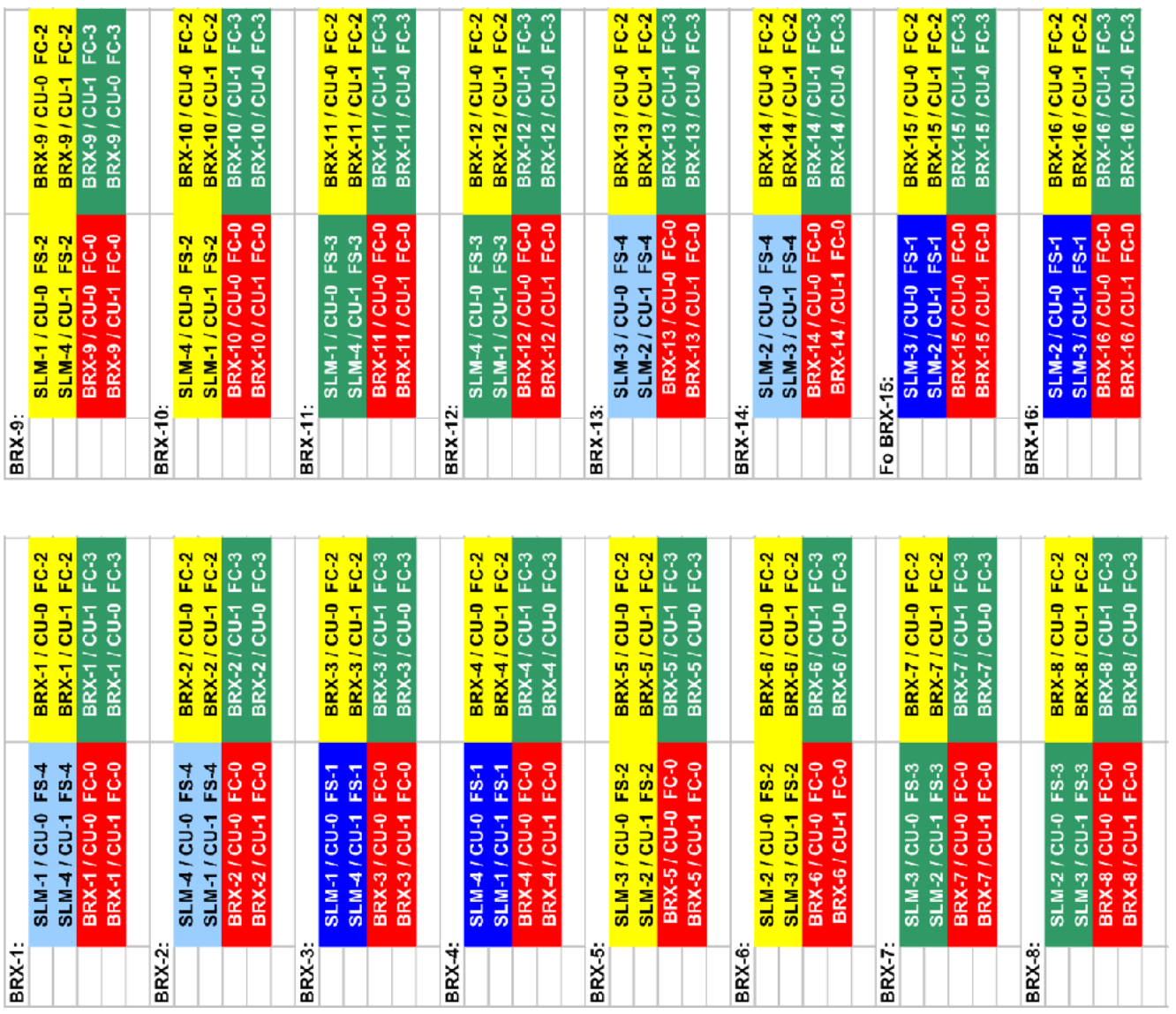
Cable 64 Bricks to Four Slammers

These tables specify, cable by cable, how to connect Brick strings to the Slammers and Bricks to Bricks in a 4-Slammer, 32-Brick (8-string) configuration.

These SSF cabling figures correspond to the diagram in Figure 42.

Table 33 Cable connections for four Slammers and 32 Bricks





The following notes will help you successfully cable the system:

- Private interconnect module (PIM) and SATA RAID controller connections:
  - Version 1 PIMs and SATA RAID controllers both use HSSDC2 (high-speed serial data connection) type connections.
  - Version 2 PIMs and SATA RAID controllers both use SFP (small form-factor pluggable) type connections.
  - When connecting a version 1 component to a version 2 component, use a hybrid HSSDC2-to-SFP adapter cable.
- Cable lengths:
  - The cable lengths for Slammer-to-Brick connections are 6.56 ft (2.0 m).
  - Cable lengths for Brick-to-Brick (FC-1 to FC-2) connections are also 6.56 ft (2.0 m).
  - Cable lengths for cross connections (FC-0 to FC-3) between Brick control units (CUs) depend on the Brick type:
    - Version 1 Bricks: 1.64 ft (0.5 m)
    - Version 2 Bricks: 3.28 ft (1.0 m)

Note: Additional Bricks beyond the 32 explicitly defined above are to be connected following the pattern shown for Bricks 17 through 32. The Brick numbers in each string are shown in the diagram in Figure 44.

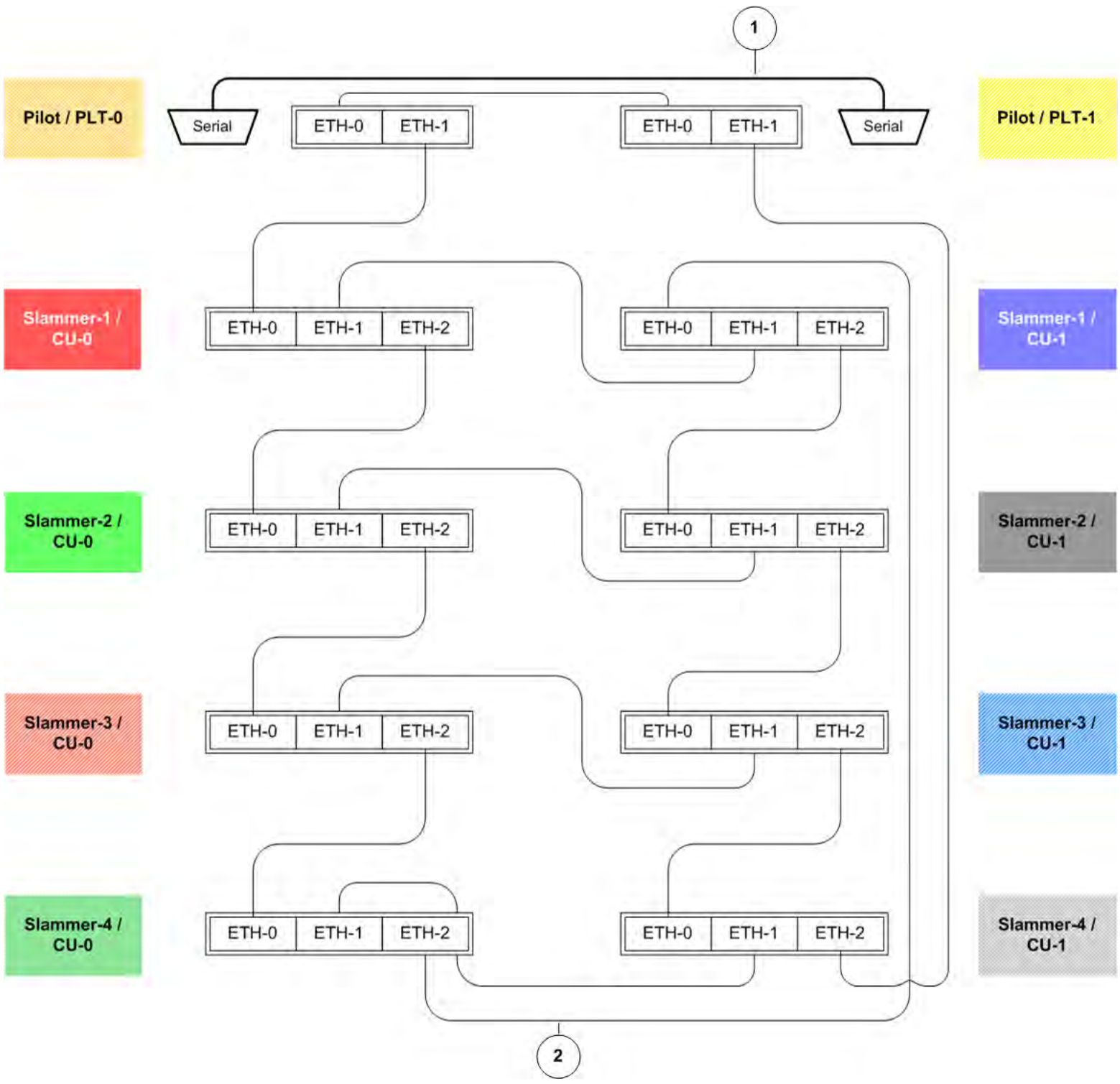
SHEET 32

PMI Connections for 4-Slammer Systems

Schematic of PMI Ethernet Connections in a 4-Slammer System

This schematic illustrates the Pilot-to-Slammer and Slammer-to-Slammer connections comprising the private management interface in a 4-Slammer system.

Figure 45 PMI Ethernet schematic (4-Slammer system)



Legend	
1	Null modem cable.
2	Cat-5 Ethernet cables.

Private management interface (PMI) Connections in a 4-Slammer System

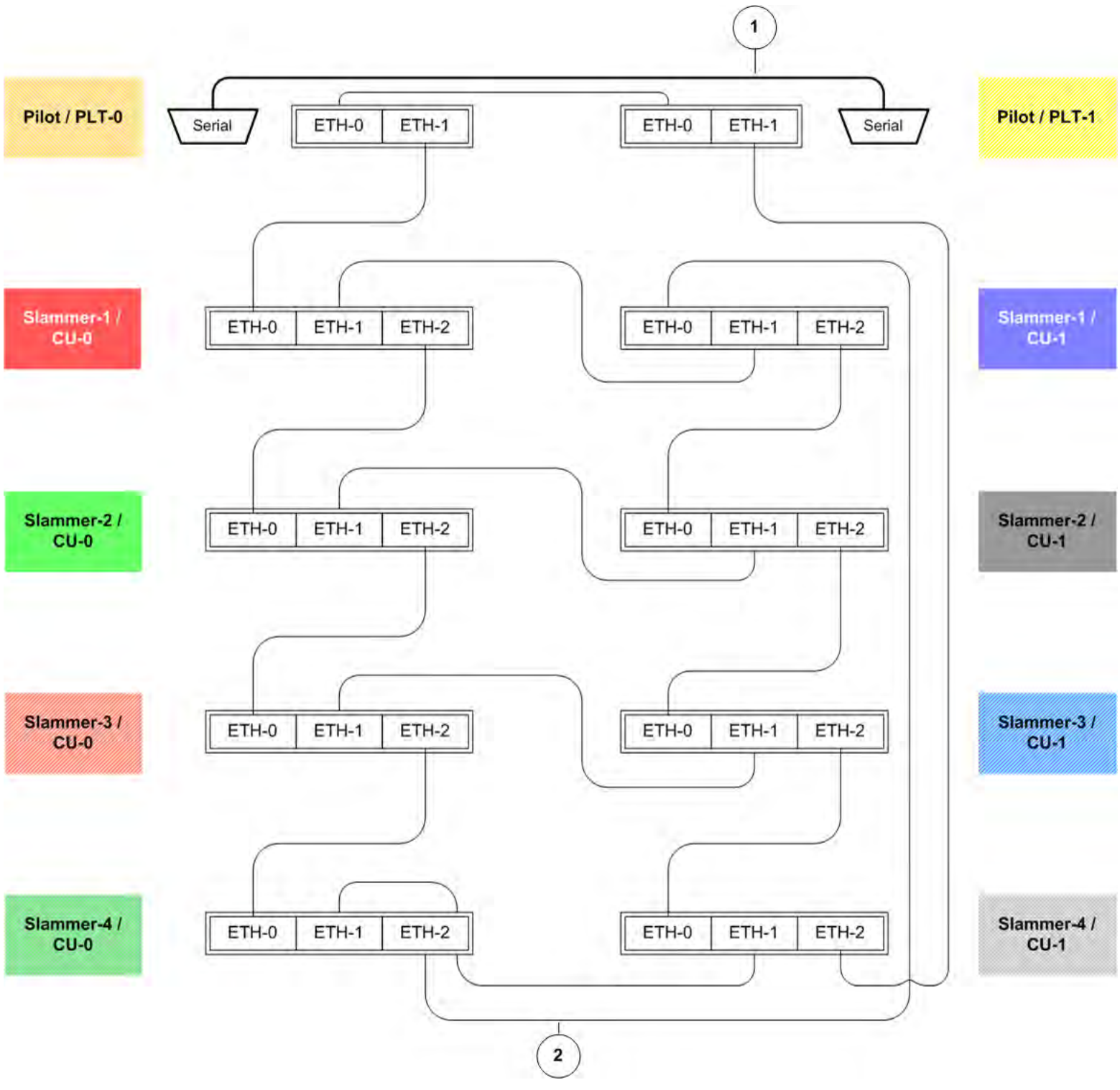
This table defines how to connect the Cat-5 Ethernet cables between the Pilot and the Slammers and among the Slammers themselves in a 4-Slammer system.

Table 34 Ethernet cable connections for PMI (4-Slammer system)

	From	To
	Chassis / CU / Port	Chassis / CU / Port
	PLT-0 ETH0	PLT-1 ETH0
	PLT-0 ETH1	SLM-1 / CU-0 ETH0
	PLT-1 ETH1	SLM-4 / CU-1 ETH2
	SLM-1 / CU-0 ETH1	SLM-1 / CU-1 ETH1
	SLM-1 / CU-0 ETH2	SLM-2 / CU-0 ETH0
	SLM-1 / CU-1 ETH2	SLM-2 / CU-1 ETH0
	SLM-2 / CU-0 ETH1	SLM-2 / CU-1 ETH1
	SLM-2 / CU-0 ETH2	SLM-3 / CU-0 ETH0
	SLM-2 / CU-1 ETH2	SLM-3 / CU-1 ETH0
	SLM-3 / CU-0 ETH1	SLM-3 / CU-1 ETH1
	SLM-3 / CU-0 ETH2	SLM-4 / CU-0 ETH0
	SLM-3 / CU-1 ETH2	SLM-4 / CU-1 ETH0
	SLM-4 / CU-0 ETH1	SLM-4 / CU-1 ETH1
	SLM-4 / CU-0 ETH2	SLM-1 / CU-1 ETH0

This schematic illustrates the Pilot-to-Slammer and Slammer-to-Slammer connections comprising the PMI in a 4-Slammer system.

Figure 46 PMI Ethernet schematic (4-Slammer system)



Legend	
1	Null modem cable.
2	Cat-5 Ethernet cables.

In addition to the Ethernet cables, PMI requires a null modem cable connection between the serial ports of each Pilot CU.

Part VII: Appendixes

APPENDIX A

Swapping SSF Cables When Expanding a System

When adding an additional Slammer to a Pillar Axiom 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 35 Swapping Slammer cables that cross connect version 1 PIMs

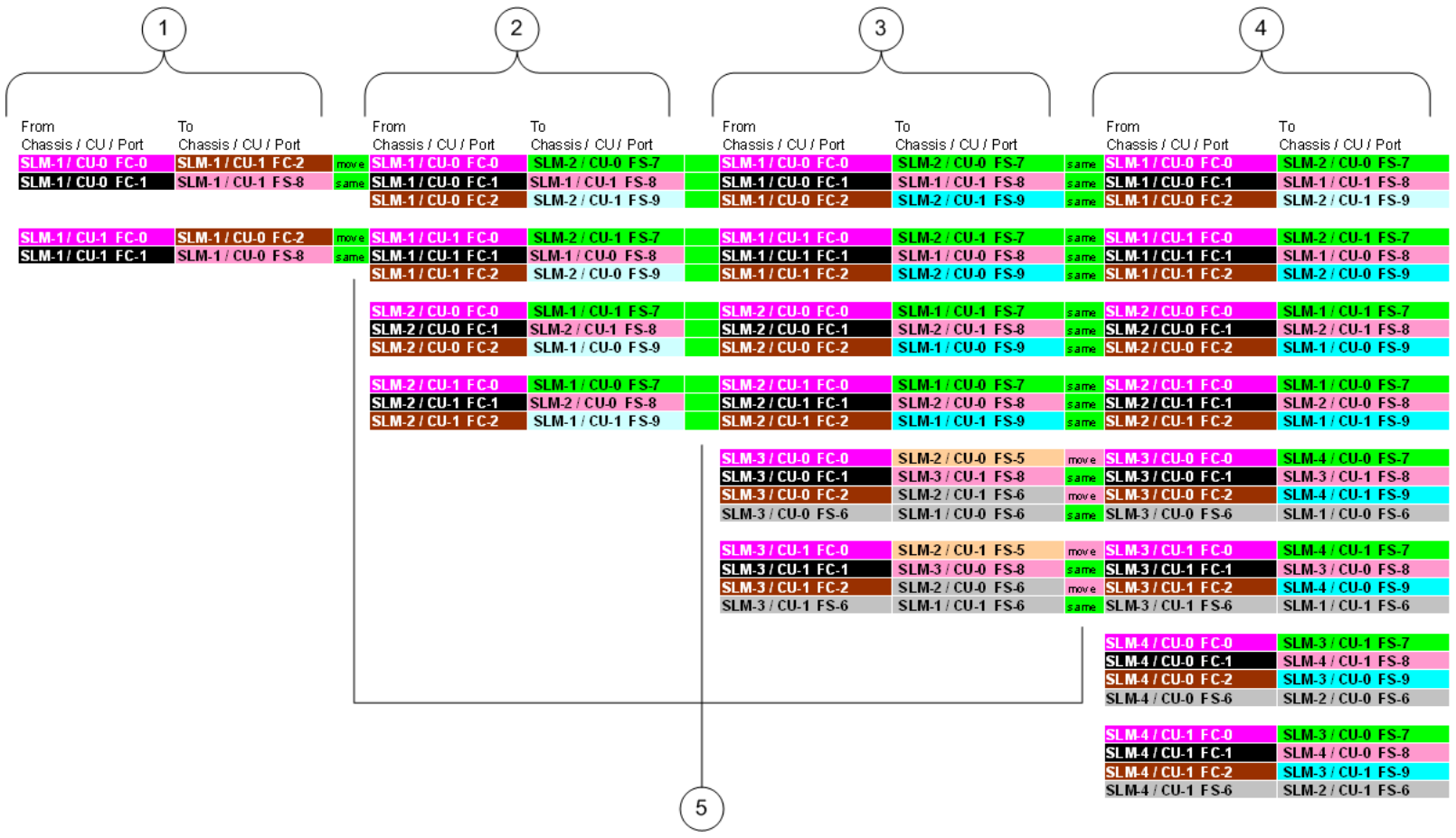
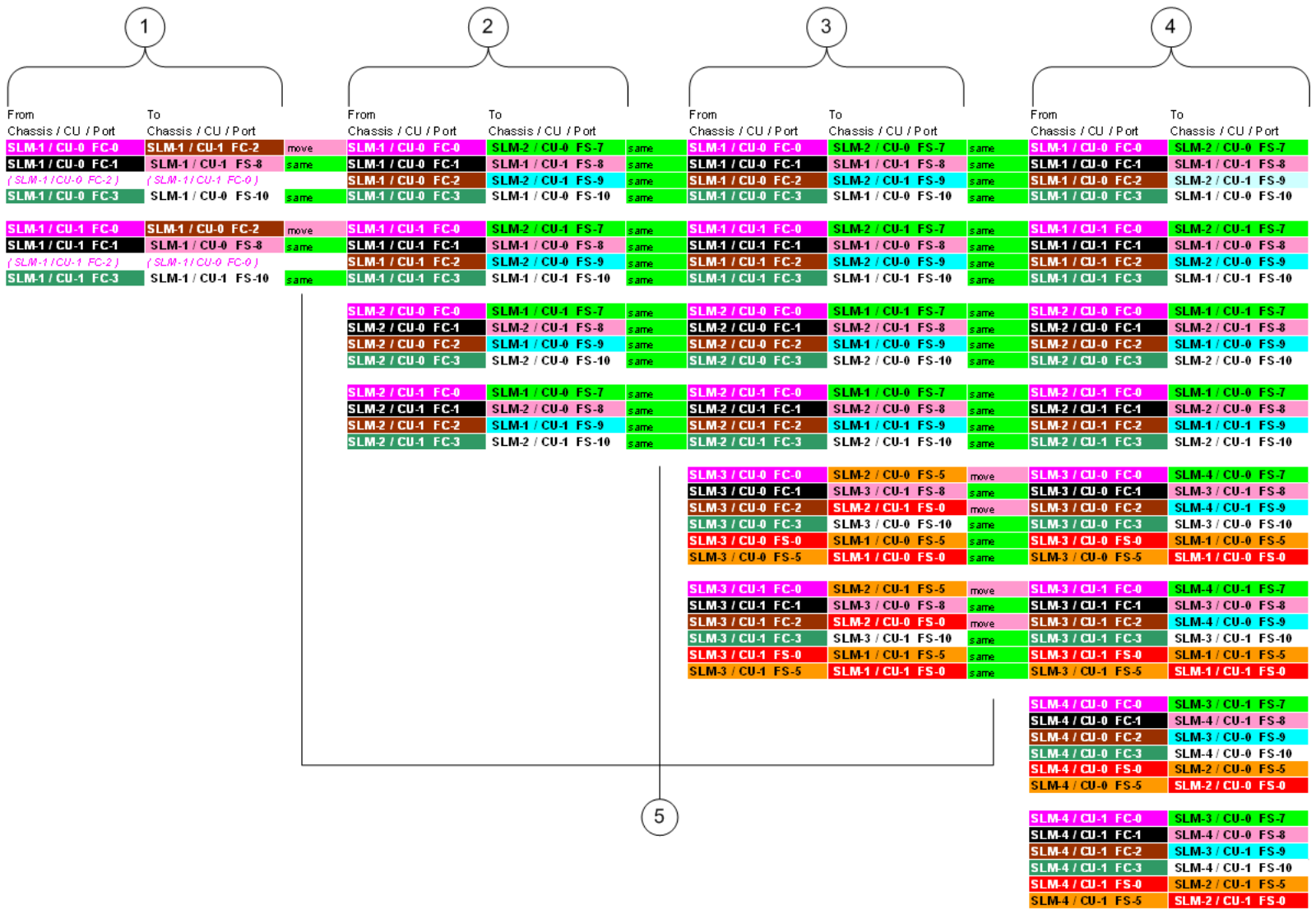
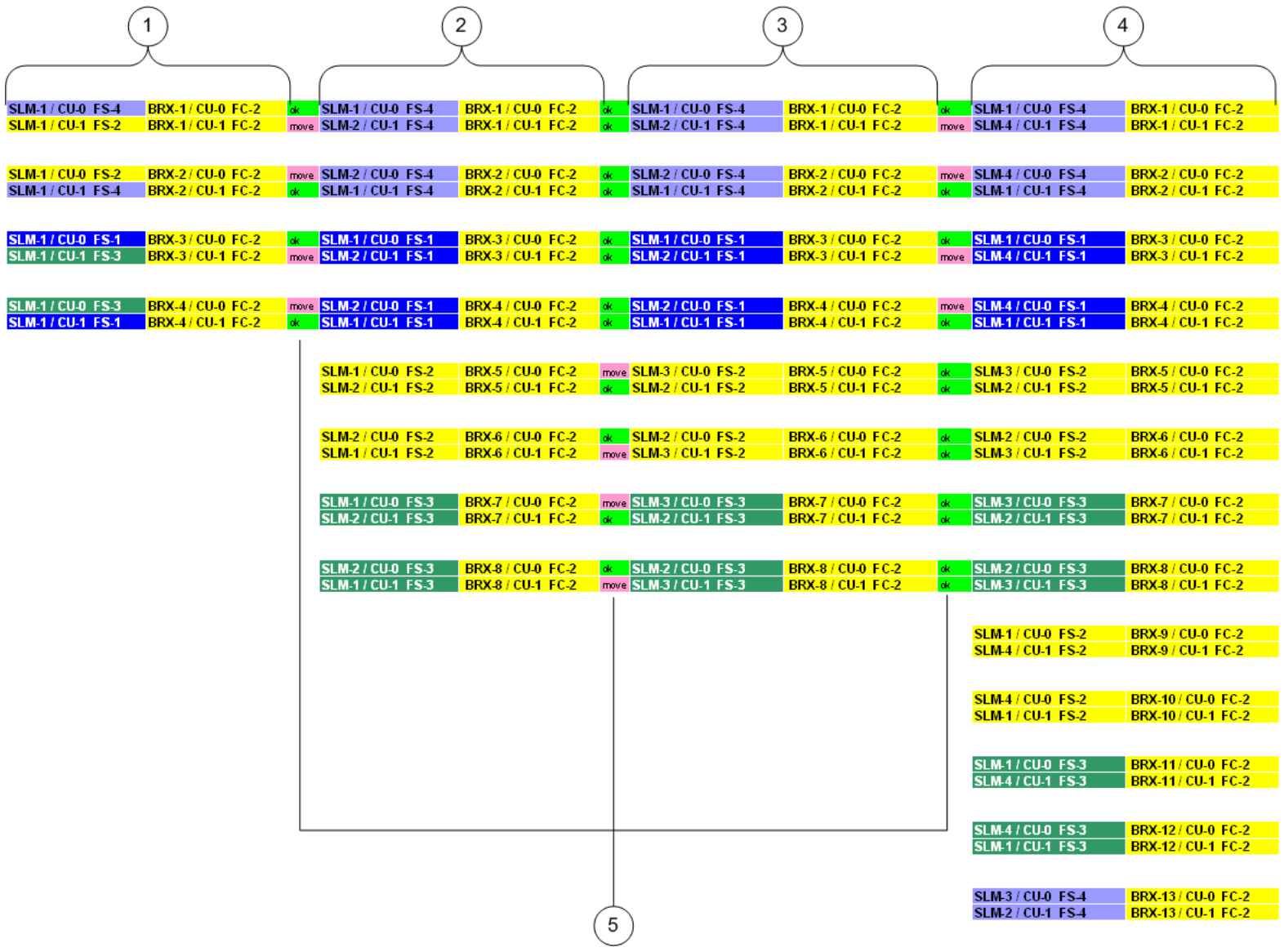


Table 36 Swapping Slammer cables that cross connect version 2 PIMs



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

Table 37 Swapping head-of-string Brick cables



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

APPENDIX B

Summary of Cabling Rules

These cabling rules describe fundamental principles that need to be applied when cabling FC, SATA, and SSD Bricks in a Pillar Axiom system.

Brick Strings

- A string is a collection of Bricks connected together. The head of the string connects to two Slammer ports. Each of the other Bricks in the string are connected to the previous Brick in the string.
- Strings contain combinations of FC RAID Bricks, FC Expansion Bricks, SATA Bricks, and SSD Bricks.
- A string may contain up to eight Bricks in any combination of FC RAID, SATA and SSD Bricks. FC Expansion Bricks may be part of the string in addition to the eight Bricks.
- A string may contain up to four FC RAID Bricks. Best practice recommendation: FC RAID Bricks should be placed upstream from SATA Bricks within a string, or preferably placed in an FC-only Brick string. If possible, do not mix version 1 legacy SATA Bricks with other types of Bricks in a string.
- A string may contain at most one SSD Brick and the SSD Brick should be at the beginning of the Brick string.
- 1-Slammer systems have at most four strings. 2 and 3-Slammer systems have at most eight strings. 4-Slammer systems have at most 16 strings.
- Systems that have been upgraded by adding an additional Slammer can run with the number of strings appropriate to the prior configuration. However, if Bricks are added later, a re-cabling may be necessary to ensure that there are only a maximum of eight Bricks in a string.

Adding Bricks to Strings

- Add Bricks to strings so that the number of Bricks in any string differs by no more than two between the longest and the shortest strings.
- When adding SATA or FC RAID Bricks to a string, attach them to the last SATA or FC RAID Brick on that string.
- When adding SATA Bricks to a Pillar Axiom system that previously had only FC Bricks, add all the SATA Bricks before you respond to the **Media Placement Recommendations** Administrator Action item.

Connecting Bricks to Slammers

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

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

  Tip: Version 2 SATA and FC RAID controllers can connect to version 2 PIMs optically. The Version 2 SATA and FC RAID controllers and the version 2 PIMs need the Pillar-supplied small form factor pluggable (SFP) modules with the appropriate optical cables that accompany it.
- SSD Bricks, FC RAID Bricks, and SATA Bricks can also be connected to other Bricks, which directly or indirectly connect to Slammer ports.
- FC RAID Bricks and SSD Bricks use Slammer ports in the same order as the scheme for connecting SATA Bricks. This scheme fosters balance among the strings while maintaining predictable assignment of Bricks to strings. A given Brick will always be on a particular string with particular Slammer ports. The same cable labels are used for SSD, SATA, and FC RAID Bricks.

Use of Brick Network Ports

- Brick CU-0 upstream ports are connected to Slammer CU-0 ports or the CU-0 downstream ports of another Brick; likewise, Brick CU-1 ports are connected to Slammer CU-1 ports or Brick CU-1 ports.
- FC Expansion Bricks are connected to FC RAID Bricks using the J0, J1, and Pnet ports. The current release restricts FC Brick deployment to zero or one FC Expansion Brick on each FC RAID Brick.

FC Brick Connections

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

- FC RAID Bricks, including pairs of RAID and Expansion Bricks, may be added to a running system as long as they are cabled within the rack, powered on, and have completed initialization prior to connecting them to the existing configuration.

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

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

Multi-Slammer Brick Connections

- In 2 Slammer configurations, the Bricks at the head of the string are connected to Slammer 1 *and* Slammer 2.
- In 3 and 4 Slammer configurations, each Brick must connect to the Slammers as follows:
  - 3-Slammer configuration: Connect to Slammer 1 or Slammer 3 *and* to Slammer 2.
  - 4-Slammer configuration: Connect to Slammer 1 or Slammer 2 *and* to Slammer 3 or Slammer 4.

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

Factory Configurations

- Systems upgraded in the field may have a configuration different from those built in the factory.
- For systems built at the factory, strings that mix SATA Bricks and FC Bricks will have the FC RAID Bricks closest to the Slammer. Field upgrades may differ—newly added Bricks can be connected to the last FC RAID or SATA Brick at the end of existing strings.

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