Preface

This preface describes the objectives and organization of this document and explains how to find additional information on related products and services. This preface contains the following sections:

Document Change History

Table 1 provides a list of the changes to this document.

Table 1   Document Change History Table

Release No.	Revision	Date	Change Summary
3.2	Release 3.2, OL-9177-01 Rev. A1, January 6, 2006	May 10, 2005	Initial Release and 1st publication. Provided the IOS XR commands and configuration procedures for the following SPAs when they are installed in a Cisco 12000 SIP-600: • 1-Port 10-Gigabit Ethernet SPA • 5-Port Gigabit Ethernet SPA • 10-Port Gigabit Ethernet SPA • 1-Port OC-192c/STM-64 POS/RPR XFP SPA

Objectives

This document describes the configuration and troubleshooting of SPA interface processors (SIPs) and shared port adapters (SPAs) that are supported on a Cisco XR 12000 Series Router.

Organization

This document contains the following chapters:

Chapter	Title	Description
Chapter 1	SIP and SPA Product Overview	Provides a brief introduction to the SIP and SPA architecture on Cisco 12000 Series Routers.
Chapter 2	Overview of the Cisco XR 12000 Series Router SIPs	Provides an overview of the release history, and feature and Management Information Base (MIB) support for the SIPs supported on Cisco 12000 Series Routers.
Part 1	Gigabit Ethernet Shared Port Adapters	Gigabit Ethernet Section
Chapter 3	Overview of the Gigabit Ethernet SPAs	Provides an overview of the Gigabit Ethernet SPAs.
Chapter 4	Configuring Ethernet SPAs on Cisco IOS XR Software	Provides information about configuring the Cisco 1-port 10 Gigabit Ethernet SPA and Cisco 10-port Gigabit Ethernet SPA on Cisco XR 12000 Series Routers.
Part 2	Packet over SONET Shared Port Adapters	Packet over SONET (POS) Section
Chapter 5	Overview of Packet over SONET SPAs	Provides an overview of the POS SPAs
Chapter 6	Configuring POS SPAs on Cisco IOS XR Software	Provides information about configuring POS SPAs on Cisco XR 12000 Series Routers running Cisco IOS XR software.
Part 3	Field-Programmable Devices	Field-Programmable Devices (FPD) Section
Chapter 7	Upgrading Field-Programmable Devices	Provides information about upgrading the Field-Programmable Gate Array (FPGA) on Cisco XR 12000 Series Routers.
Part 4	Shared Port Adapter Command Reference	Command Reference Section
Chapter 8	Command Summary for the Gigabit Ethernet SPA	Provides an alphabetical list of some of the related commands to configure, monitor, and maintain Gigabit Ethernet SPAs.
Chapter 9	Command Summary for the POS SPAs	Provides an alphabetical list of some of the related commands to configure, monitor, and maintain POS SPAs.
Chapter 10	Command Reference	Describes Cisco IOS-XR software command reference information including syntax, usage guidelines, and examples for all new and modified commands for SPAs on Cisco XR 12000 Series Routers.

Related Documentation

This section refers you to other documentation that also might be useful as you configure your Cisco XR 12000 Series Router. The documentation listed below is available online.

- *Cisco 12000 Series Router SIP and SPA Hardware Installation Guide*
- *Cisco 12000 Series Router SIP and SPA Software Configuration Guide (Cisco IOS)*
- *Cisco XR 12000 Series Router SIP and SPA Software Configuration Guide*
- *Cisco IOS Release Release Notes for Cisco 12000 Series Routers*
- *Regulatory Compliance and Safety Information for Cisco 12000 Series Routers*
- *Cisco IOS XR Getting Started Guide*

Cisco XR 12000 Series Router Documentation

As you configure SIPs and SPAs on your Cisco XR 12000 Series Router, you should also refer to the following companion publication for important hardware installation information:

- *Cisco 12000 Series Router SIP and SPA Hardware Installation Guide*

Some of the other Cisco XR 12000 Series Router publications might be useful to you as you configure your Cisco XR 12000 Series Router. The following URL provides a wide range of documentation for the various Cisco XR 12000 Series Routers and their accompanying field replaceable units (FRUs):

http://www.cisco.com/univercd/cc/td/doc/product/core/cis12000/

Several other publications are also related to the Cisco XR 12000 Series Router. For a complete reference of related documentation, refer to the various roadmap documents located at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/core/cis12000/roadmap/

Cisco IOS-XR Software Publications

Your router, switch, or gateway and the Cisco IOS-XR software running on it contain extensive features. You can find documentation for Cisco IOS-XR software features at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/software/

Cisco IOS-XR Release 3.2.0 Software Publications

Documentation for Cisco IOS-XR Release 3.2.0, including release notes and system error messages, can be found at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/software/iosxr3/index.htm

Document Conventions

Within the SIP and SPA software configuration guides, the term *router* is generally used to refer to a variety of Cisco products (for example, routers, access servers, and switches). Routers, access servers, and other networking devices that support Cisco IOS-XR software are shown interchangeably within examples. These products are used only for illustrative purposes; that is, an example that shows one product does not necessarily indicate that other products are not supported.

This documentation uses the following conventions:

Convention	Description
^ or Ctrl	The ^ and Ctrl symbols represent the Control key. For example, the key combination ^D or Ctrl-D means hold down the Control key while you press the D key. Keys are indicated in capital letters but are not case sensitive.
string	A string is a nonquoted set of characters shown in italics. For example, when setting an SNMP *community* string to *public*, do not use quotation marks around the string or the string will include the quotation marks.

Command syntax descriptions use the following conventions:

Convention	Description
bold	Bold text indicates commands and keywords that you enter literally as shown.
italics	Italic text indicates arguments for which you supply values.
[x]	Square brackets enclose an optional element (keyword or argument).
|	A vertical line indicates a choice within an optional or required set of keywords or arguments.
[x | y]	Square brackets enclosing keywords or arguments separated by a vertical line indicate an optional choice.
{x | y}	Braces enclosing keywords or arguments separated by a vertical line indicate a required choice.

Nested sets of square brackets or braces indicate optional or required choices within optional or required elements. For example:

Convention	Description
[x {y | z}]	Braces and a vertical line within square brackets indicate a required choice within an optional element.

Examples use the following conventions:

Convention	Description
screen	Examples of information displayed on the screen are set in Courier font.
bold screen	Examples of text that you must enter are set in Courier bold font.
< >	Angle brackets enclose text that is not printed to the screen, such as passwords.

Convention	Description
!	An exclamation point at the beginning of a line indicates a comment line. (Exclamation points are also displayed by the Cisco IOS-XR software for certain processes.)
[ ]	Square brackets enclose default responses to system prompts.

The following conventions are used to attract the attention of the reader:

Caution   Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Note   Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/univercd/home/home.htm

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation DVD

Cisco documentation and additional literature are available in a Documentation DVD package, which may have shipped with your product. The Documentation DVD is updated regularly and may be more current than printed documentation. The Documentation DVD package is available as a single unit.

Registered Cisco.com users (Cisco direct customers) can order a Cisco Documentation DVD (product number DOC-DOCDVD=) from the Ordering tool or Cisco Marketplace.

Cisco Ordering tool:

http://www.cisco.com/en/US/partner/ordering/

Cisco Marketplace:

http://www.cisco.com/go/marketplace/

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

    http://www.cisco.com/en/US/partner/ordering/

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 1 800 553-NETS (6387).

Documentation Feedback

You can send comments about technical documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you can perform these tasks:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.

A current list of security advisories and notices for Cisco products is available at this URL:

http://www.cisco.com/go/psirt

If you prefer to see advisories and notices as they are updated in real time, you can access a Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed from this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you might have identified a vulnerability in a Cisco product, contact PSIRT:

- Emergencies — security-alert@cisco.com

- Nonemergencies — psirt@cisco.com

Tip We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.*x* through 8.*x*.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one that has the most recent creation date in this public key server list:

http://pgp.mit.edu:11371/pks/lookup?search=psirt%40cisco.com&op=index&exact=on

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302

- 1 408 525-6532

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year, at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support Website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID

or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is "down," or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

  http://www.cisco.com/packet

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

  http://www.cisco.com/go/iqmagazine

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html