



Overview: Cisco XR 12000 Series Router SPA Interface Processors

This chapter describes the SPA interface processors (SIPs) that are supported on the Cisco XR 12000 Series Router and contains the following sections:

- [SIP and SPA Compatibility, page 1-1](#)
- [Router Hardware Installation, page 1-2](#)
- [SIP Software and Hardware Compatibility, page 1-4](#)
- [Cisco XR 12000 SIP-600 Overview, page 1-4](#)
- [Cisco XR 12000 SIP-401 Overview, page 1-7](#)
- [Cisco XR 12000 SIP-501 Overview, page 1-11](#)
- [Cisco XR 12000 SIP-601 Overview, page 1-14](#)

SIP and SPA Compatibility

[Table 1-1](#) shows the SPAs that are supported on the Cisco XR 12000 Series Router and the SIPs that support them:

Table 1-1 *SIP and SPA Compatibility on the Cisco XR 12000 Series Router*

SPA	SIP 401	SIP 501	SIP 601	SIP 600
2-Port T3/E3 Serial SPA	X	X	X	
8-Port Channelized T1/E1 SPA	X	X	X	
4-Port Clear Channel T3/E3 SPA	X	X	X	
2-Port Channelized T3 SPA	X	X	X	
4-Port Channelized T3 SPA	X	X	X	
8-Port FastEthernet SPA	X	X	X	
1-Port 10-Gigabit Ethernet SPA			X	X
2-Port Gigabit Ethernet SPA	X	X	X	
5-Port Gigabit Ethernet SPA		X	X	X

Table 1-1 SIP and SPA Compatibility on the Cisco XR 12000 Series Router (continued)

SPA	SIP 401	SIP 501	SIP 601	SIP 600
10-Port Gigabit Ethernet SPA			X	X
2-Port OC48-POS/RPR SPA		X	X	X
2-Port and 4-Port OC-48/STM-16 POS SPA			X	
1-Port OC-192/STM-64 POS/RPR SPA			X	X
4-port OC3/STM1 POS SPA	X	X	X	
8-port OC3/STM1 POS SPA	X	X	X	
2-port OC12/STM4 POS SPA	X	X	X	
4-port OC12/STM4 POS SPA	X	X	X	
8-port OC12/STM4 POS SPA		X	X	
IPSec VPN SPA	X	X	X	
1-Port Clear Channel OC-3 ATM SPA	X	X	X	
3-Port Clear Channel OC-3 ATM SPA	X	X	X	
1-Port Clear Channel OC-12 ATM SPA	X	X	X	
2-Port Channelized T3/E3 ATM CEoP SPA	X	X	X	
1-Port Channelized OC-3/STM-1 SPA	X	X	X	
1-Port Channelized OC-12/STM-4 SPA	X	X	X	
1-Port Channelized OC-48/STM-16 SPA	X	X	X	
2-Port Channelized T3/E3 ATM CEoP SPA	X	X	X	
24-Port Channelized T1/E1/J1 ATM CEoP SPA	X	X	X	
1-Port Channelized OC-3 ATM CEoP SPA	X	X	X	
1-Port 10-Gigabit Ethernet DWDM SPA			X	
1-Port 10-Gigabit Ethernet WAN PHY SPA			X	

Router Hardware Installation

For Cisco XR 12000 Series Router hardware installation and configuration information, refer to the installation and configuration guide for your router. The guide includes information on the router switch fabric and how it affects the operation of SIPs, as well as SIP slot locations, slot width, and other requirements.

**Note**

References to line cards in the router hardware installation and configuration guides apply equally to SIPs.

Supported Platforms

SIPs are supported on all Cisco XR 12000 Series Routers. The 2.5G ISE SIP is supported on the Cisco 12016, 124xx, and 128xx routers. The Cisco XR 12000 SIP-401, the Cisco XR 12000 SIP-501, the Cisco XR 12000 SIP-600, and the Cisco XR 12000 SIP-601 are supported on the Cisco 124xx and 128xx routers.

**Note**

To support the requirements of this line card, the Cisco XR 12000 Series Router must have at least one clock and scheduler card (CSC) installed. For additional information, refer to the installation and configuration guide for your Cisco XR 12000 Series Router.

SIP Summary

Summary descriptions of all SIPs supported on the Cisco XR 12000 Series Router are shown in [Table 1-2](#).

Table 1-2 SIP Summary

SIP	Product Number	Description	Number of Supported SPAs	Engine Type
Cisco XR 12000 SIP-600	12000-SIP-600	10G Engine 5 SPA Interface Processor	2 single-width, double-height 2 single-width, single-height ¹ 1 dual-width, double-height ²	Engine 5
Cisco XR 12000 SIP-401	12000-SIP-401	2.5G Engine 5 SPA Interface Processor	2 single-width, double-height 2 single-width, single-height 1 dual-width, double-height	Engine 5
Cisco XR 12000 SIP-501	12000-SIP-501	5G Engine 5 SPA Interface Processor	2 single-width, double-height 2 single-width, single-height 1 dual-width, double-height	Engine 5
Cisco XR 12000 SIP-601	12000-SIP-601	10G Engine 5 SPA Interface Processor	2 single-width, double-height 4 single-width, single-height 1 dual-width, double-height	Engine 5

1. Requires that a blank module filler plate be installed in the bottom subslot.
2. Requires the removal of the central septum between the SPA subslots.

SIP Software and Hardware Compatibility

For software configuration information, refer to the Cisco IOS XR software configuration and command reference publications for the installed Cisco IOS XR release. Also refer to the Cisco IOS XR software release notes for additional information. [Table 1-3](#) lists the Cisco IOS XR releases that are compatible with supported SIPs.

To ensure compatibility with the software, your SIPs should have a specific hardware revision number. The number is printed on a label affixed to the component side of the card. The hardware revision number can be displayed by using the **show diags slot-number** command. [Table 1-3](#) lists the hardware revision number for all supported SIPs.

Table 1-3 SIP Hardware and Software Compatibility

SIP	Part Number	Minimum Cisco IOS XR Software Release	Minimum Hardware Revision
Cisco XR 12000 SIP-600	12000-SIP-600	3.2	
Cisco XR 12000 SIP-401	12000-SIP-401	3.3	
Cisco XR 12000 SIP-501	12000-SIP-501	3.3	
Cisco XR 12000 SIP-601	12000-SIP-601	3.3	

The **show version** and **show hardware** commands display the current hardware configuration of the router, including the system software version that is currently loaded and running. For complete descriptions of **show** commands, refer to the *Cisco IOS XR Configuration Fundamentals Configuration Guide* and the *Cisco IOS XR Configuration Fundamentals Command Reference* for the installed Cisco IOS XR release.

Cisco XR 12000 SIP-600 Overview

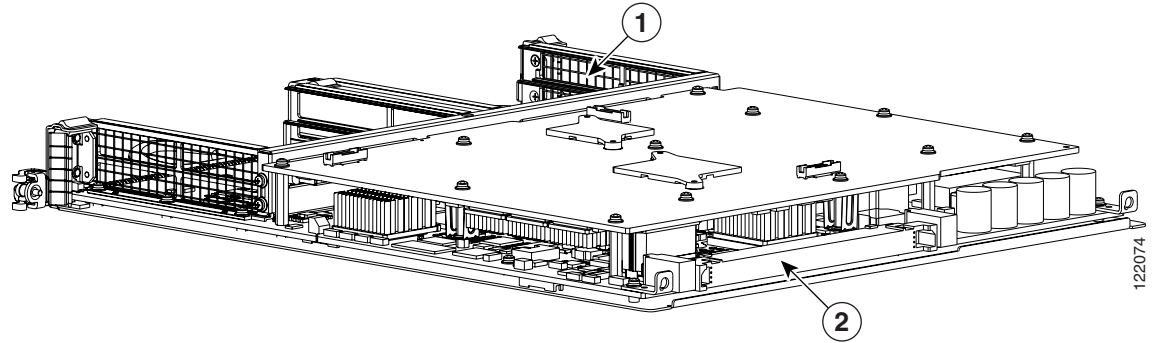
The following sections describe the Cisco XR 12000 SIP-600:

- [Cisco XR 12000 SIP-600 Board Components, page 1-4](#)
- [Cisco XR 12000 SIP-600 LEDs, page 1-5](#)
- [Cisco XR 12000 SIP-600 Physical Specifications, page 1-6](#)
- [SPA Subslot Numbering on the Cisco XR 12000 SIP-600, page 1-6](#)
- [SPA Interface Addresses on the Cisco XR 12000 SIP-600, page 1-6](#)

Cisco XR 12000 SIP-600 Board Components

The main Cisco XR 12000 SIP-600 board components are shown in [Figure 1-1](#).

Figure 1-1 Cisco XR 12000 SIP-600 Board—Rear View

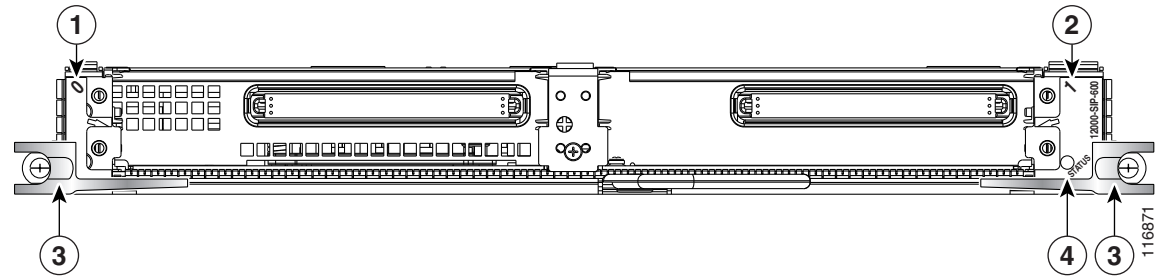


1	SPA enclosure	2	Backplane connector
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Cisco XR 12000 SIP-600 LEDs

The Cisco XR 12000 SIP-600 supports 2 single-width, double-height SPAs, 2 single-width, single-height SPAs, or 1 dual-width, double-height SPA. The Cisco XR 12000 SIP-600 face plate has one Status LED. Figure 1-2 shows the Cisco 12000 SIP-600 face plate with 2 single-width, single-height SPAs.

Figure 1-2 Cisco XR 12000 SIP-600 Face Plate



1	SPA subslot 0	3	Ejector Levers
2	SPA subslot 1	4	Status LED

The Cisco XR 12000 SIP-600 LEDs are described in Table 1-4.

Table 1-4 Cisco XR 12000 SIP-600 LEDs

LED Label	Color	State	Meaning
Status	Yellow	On	SIP is powered and IOS is loading.
	Green	On	SIP is active.

Cisco XR 12000 SIP-600 Physical Specifications

The Cisco XR 12000 SIP-600 physical specifications are shown in the following table.

Table 1-5 Cisco XR 12000 SIP-600 Physical Specifications

Description	Specifications
Physical dimensions	Occupies one line card slot on a Cisco 12000 Series Router
Shipping weight	10kg
Operating temperature	32 to 104°F (0 to 40°C)
Relative humidity	10 to 90 percent, noncondensing
Storage temperature	-4 to 149°F (-20 to 65°C)

SPA Subslot Numbering on the Cisco XR 12000 SIP-600

The Cisco XR 12000 SIP-600 accepts 2 single-width SPAs or 1 dual-width SPA.

Figure 1-3 shows a Cisco XR 12000 SIP-600 with 2 SPAs installed. The left SPA slot is subslot 0 and the right SPA slot is subslot 1. If one dual-width SPA is installed, it is recognized as being in subslot 0.

Figure 1-3 Subslot Locations for the 1-Port 10-Gigabit Ethernet SPA

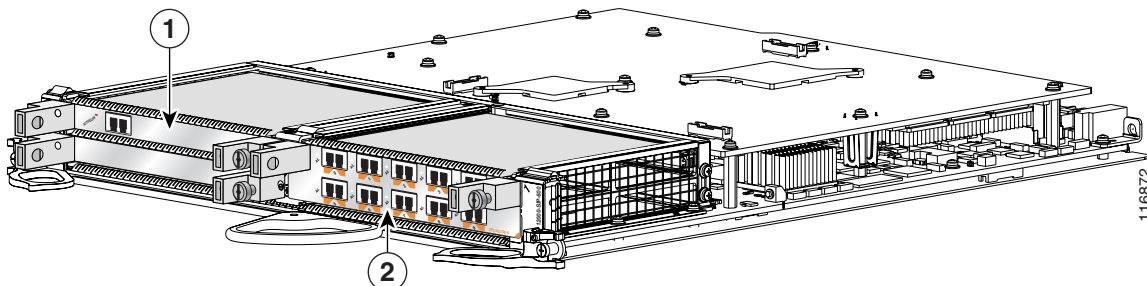


Table 1-6 Subslot Locations for the 1-Port 10-Gigabit Ethernet SPA

Call Out Number	Description
1	Subslot 0
2	Subslot 1

SPA Interface Addresses on the Cisco XR 12000 SIP-600

A Cisco 12000 Series Router identifies a SPA interface address by its SIP slot number, SPA subslot, and port number on the SPA, in the format *slot/subslot/port*. Subslots and ports are numbered starting from 0, so each Cisco XR 12000 SIP-600 has two subslots 0 (left) and 1 (right). For example, the interface address of a 1-port SPA located in the second SIP subslot, where the SIP is inserted into router line card slot 3 is 3/1/0. Figure 1-4 shows the slot, subslot, and port locations for the 1-Port 10-Gigabit Ethernet SPA and the 10-Port Gigabit Ethernet SPA.

Figure 1-4 Slot, Subslot, and Port Locations for the 1-Port 10-Gigabit Ethernet SPA and the 10-Port Gigabit Ethernet SPA.

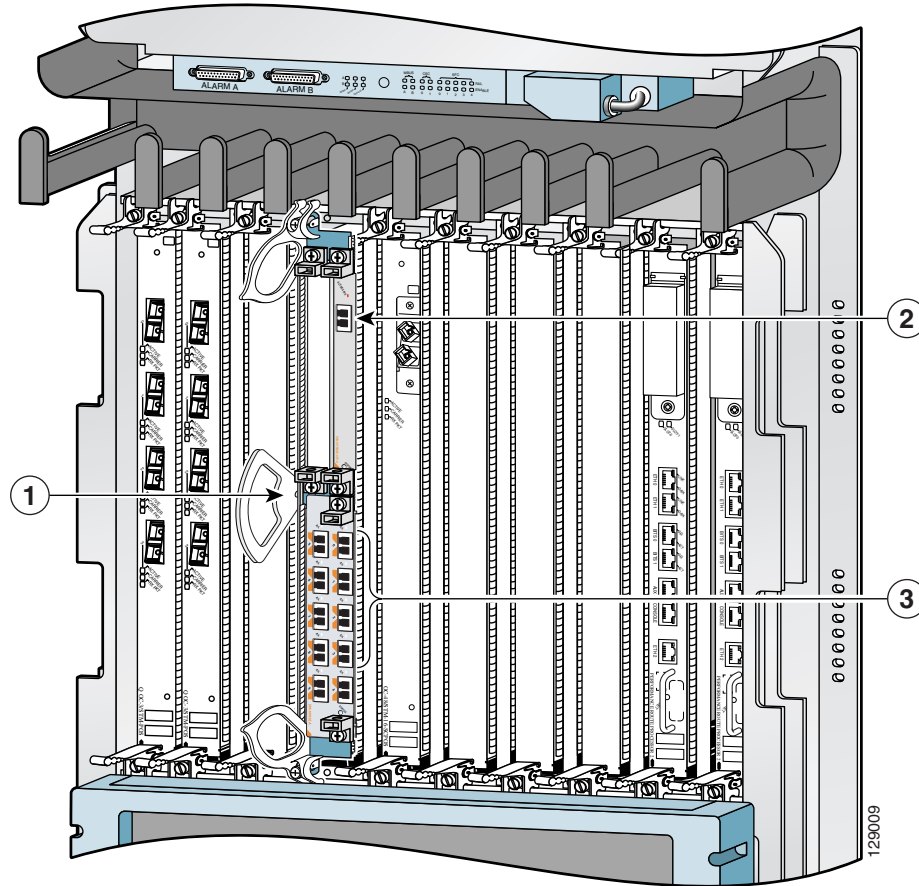


Table 1-7 Slot and Port Locations for the 1-Port 10-Gigabit Ethernet SPA

Call Out Number	Description
1	Slot 3
2	Subslot 0, Port 3/0/0
3	Subslot 1, Ports 3/1/0 to 3/1/9

Cisco XR 12000 SIP-401 Overview

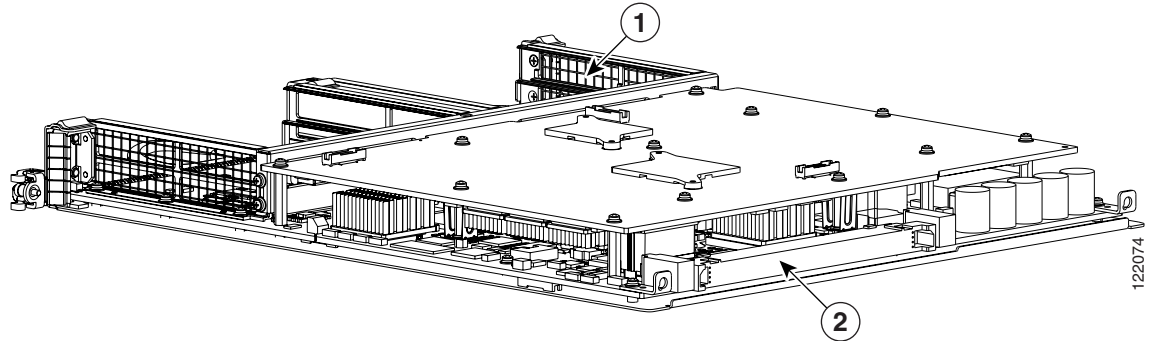
The following sections describe the Cisco XR 12000 SIP-401:

- [Cisco XR 12000 SIP-401 Board Components, page 1-8](#)
- [Cisco XR 12000 SIP-401 LEDs, page 1-8](#)
- [Cisco XR 12000 SIP-401 Physical Specifications, page 1-9](#)
- [SPA Slot Numbering on the Cisco XR 12000 SIP-401, page 1-9](#)
- [SPA Interface Addresses on the Cisco XR 12000 SIP-401, page 1-10](#)

Cisco XR 12000 SIP-401 Board Components

The main Cisco XR 12000 SIP-401 board components are shown in [Figure 1-5](#).

Figure 1-5 Cisco XR 12000 SIP-401 Board—Rear View

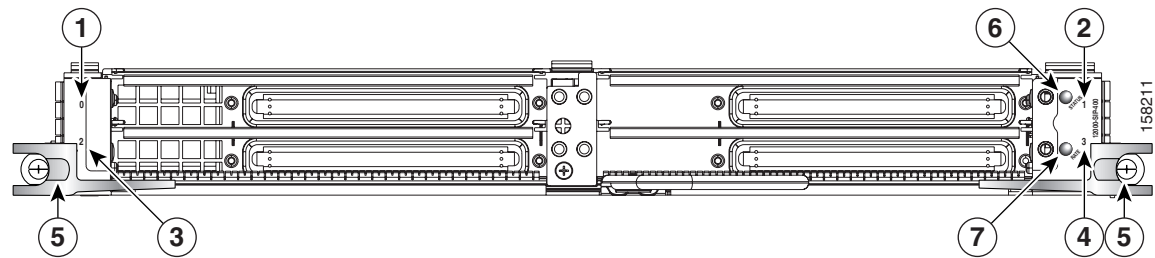


1	SPA enclosure	2	Backplane connector
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Cisco XR 12000 SIP-401 LEDs

The Cisco XR 12000 SIP-401 has two LEDs, as shown in [Figure 1-6](#).

Figure 1-6 Cisco XR 12000 SIP-401 Face Plate



1	SPA subslot 0	5	Ejector Levers
2	SPA subslot 1	6	Status LED
3	SPA subslot 2	7	Rate LED
4	SPA subslot 3		

The Cisco XR 12000 SIP-401 LEDs are described in [Table 1-8](#).

Table 1-8 Cisco XR 12000 SIP-401 LED

LED Label	Color	State	Meaning
Status	Yellow	On	IOS is loaded and SIP is ready to be enabled.
	Green	On	SIP is active.

Table 1-8 Cisco XR 12000 SIP-401 LED

LED Label	Color	State	Meaning
Rate	Off	Off	SIP is SIP-401 or SIP-501.
	Green	On	SIP is SIP-601.

Cisco XR 12000 SIP-401 Physical Specifications

The Cisco XR 12000 SIP-401 physical specifications are shown in the following table.

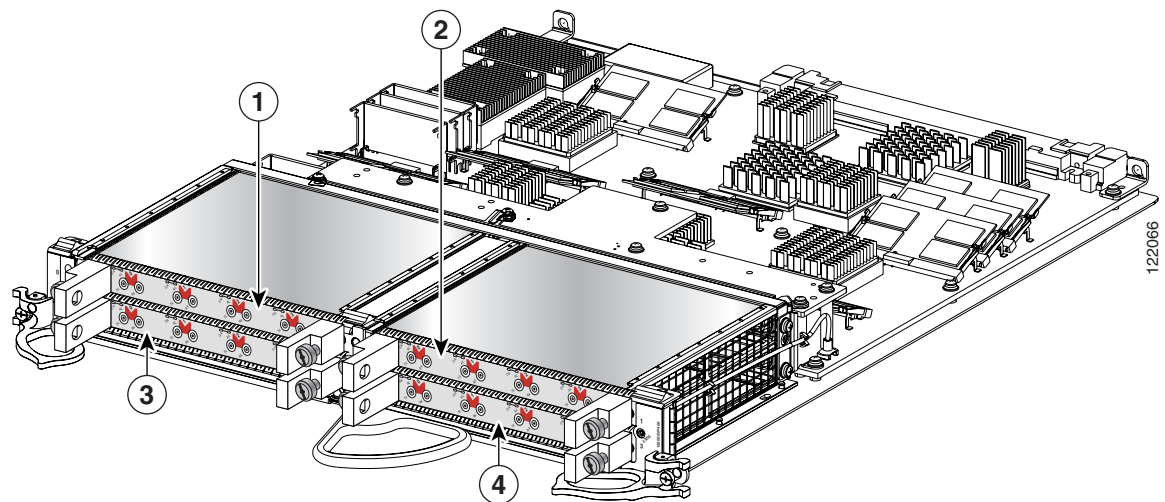
Table 1-9 Cisco XR 12000 SIP-401 Physical Specifications

Description	Specifications
Physical dimensions	Occupies one line card slot on a Cisco 12000 Series Router
Shipping weight	10 kg
Operating temperature	32 to 104°F (0 to 40°C)
Relative humidity	10 to 90 percent, noncondensing
Storage temperature	-4 to 149°F (-20 to 65°C)

SPA Slot Numbering on the Cisco XR 12000 SIP-401

The Cisco XR 12000 SIP-401 accepts 4 single-width, single-height SPAs.

[Figure 1-7](#) shows a Cisco XR 12000 SIP-401 with 4 SPAs installed. The top leftmost SPA slot is subslot 0; the top rightmost SPA slot is subslot 1; the bottom leftmost SPA slot is subslot 2; the bottom rightmost SPA slot is subslot 3.

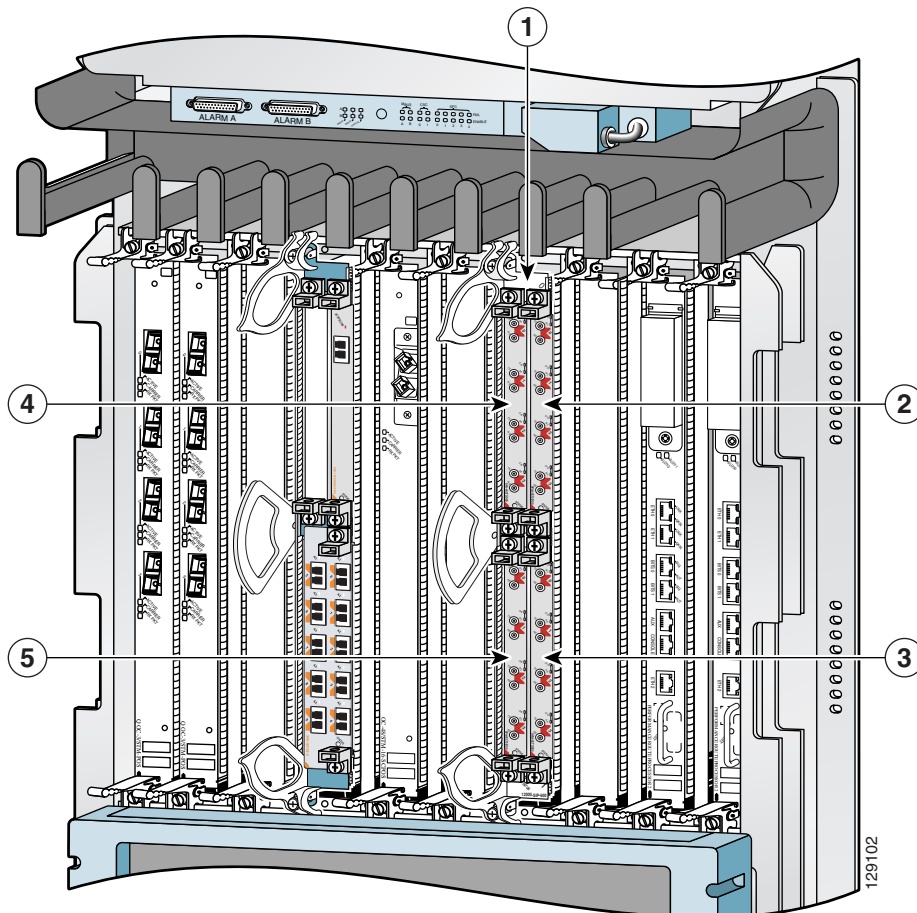
Figure 1-7 Cisco XR 12000 SIP-401 with SPAs Installed

1	SPA subslot 0	3	SPA subslot 2
2	SPA subslot 1	4	SPA subslot 3

SPA Interface Addresses on the Cisco XR 12000 SIP-401

A Cisco 12000 Series Router identifies a SPA interface address by its SIP slot number, SPA subslot, and port number on the SPA, in the format *slot/subslot/port*. Subslots and ports are numbered starting from 0, so each Cisco XR 12000 SIP-401 has four subslots. A 4-port SPA would have ports 0 to 3. For example, the interface address of the second port on a 4-port SPA located in the first SIP subslot, where the SIP is inserted into router line card slot 6 is 6/0/1.

Figure 1-8 Cisco 12000 Series Router with Cisco XR 12000 SIP-401 Installed



1	Router slot number 6	4	SPA subslot 2 with ports 6/2/0 to 6/2/3
2	SPA subslot 0 with ports 6/0/0 to 6/0/3	5	SPA subslot 3 with ports 6/3/0 to 6/3/3
3	SPA subslot 1 with ports 6/1/0 to 6/1/3		

Cisco XR 12000 SIP-501 Overview

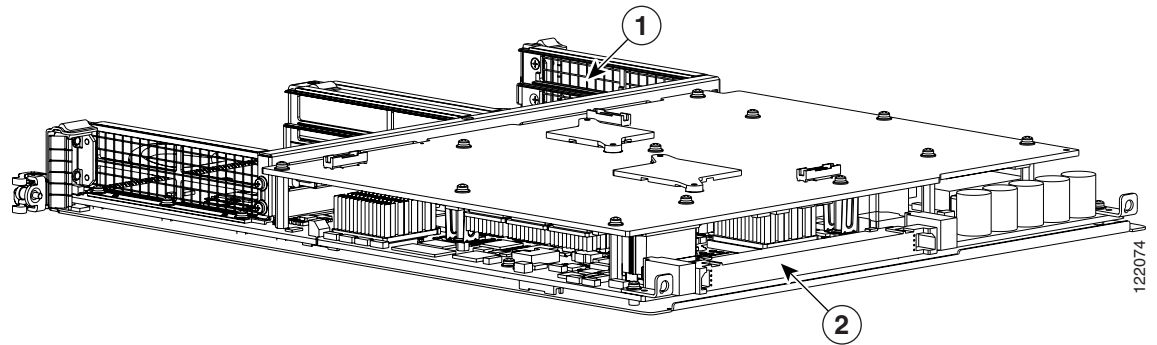
The following sections describe the Cisco XR 12000 SIP-501:

- [Cisco XR 12000 SIP-501 Board Components](#), page 1-11
- [Cisco XR 12000 SIP-501 LEDs](#), page 1-11
- [Cisco XR 12000 SIP-501 Physical Specifications](#), page 1-12
- [SPA Subslot Numbering on the Cisco XR 12000 SIP-501](#), page 1-12
- [SPA Interface Addresses on the Cisco XR 12000 SIP-501](#), page 1-13

Cisco XR 12000 SIP-501 Board Components

The main Cisco XR 12000 SIP-501 board components are shown in [Figure 1-9](#).

Figure 1-9 Cisco XR 12000 SIP-501 Board—Rear View

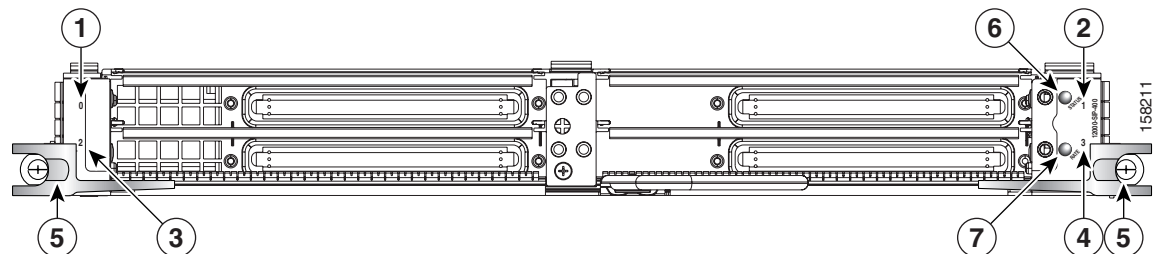


1	SPA enclosure	2	Backplane connector
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Cisco XR 12000 SIP-501 LEDs

The Cisco XR 12000 SIP-501 supports 2 single-width, double-height SPAs, 2 single-width, single-height SPAs, or 1 dual-width, double-height SPA. The Cisco XR 12000 SIP-501 face plate has one Status LED. [Figure 1-10](#) shows the Cisco XR 12000 SIP-501 face plate with 4 single-width, single-height SPAs.

Figure 1-10 Cisco XR 12000 SIP-501 Face Plate



1	SPA subslot 0	4	SPA subslot 3
2	SPA subslot 1	5	Ejector Levers
3	SPA subslot 2	6	Status LED

The Cisco XR 12000 SIP-501 LEDs are described in [Table 1-10](#).

Table 1-10 Cisco XR 12000 SIP-501 LEDs

LED Label	Color	State	Meaning
Status	Yellow	On	IOS is loaded and SIP is ready to be enabled.
	Green	On	SIP is active.
Rate	Off	Off	SIP is SIP-401 or SIP-501.
	Green	On	SIP is SIP-601.

Cisco XR 12000 SIP-501 Physical Specifications

The Cisco XR 12000 SIP-501 physical specifications are shown in the following table.

Table 1-11 Cisco XR 12000 SIP-501 Physical Specifications

Description	Specifications
Physical dimensions	Occupies one line card slot on a Cisco 12000 Series Router
Shipping weight	10kg
Operating temperature	32 to 104°F (0 to 40°C)
Relative humidity	10 to 90 percent, noncondensing
Storage temperature	-4 to 149°F (-20 to 65°C)

SPA Subslot Numbering on the Cisco XR 12000 SIP-501

The Cisco XR 12000 SIP-501 accepts up to 4 single-width SPAs or 1 dual-width SPA.

[Figure 1-11](#) shows a Cisco XR 12000 SIP-501 with 2 SPAs installed. The left SPA slot is subslot 0 and the right SPA slot is subslot 1. If one dual-width SPA is installed, it is recognized as being in subslot 0.

Figure 1-11 Subslot Locations for the 1-Port 10-Gigabit Ethernet SPA

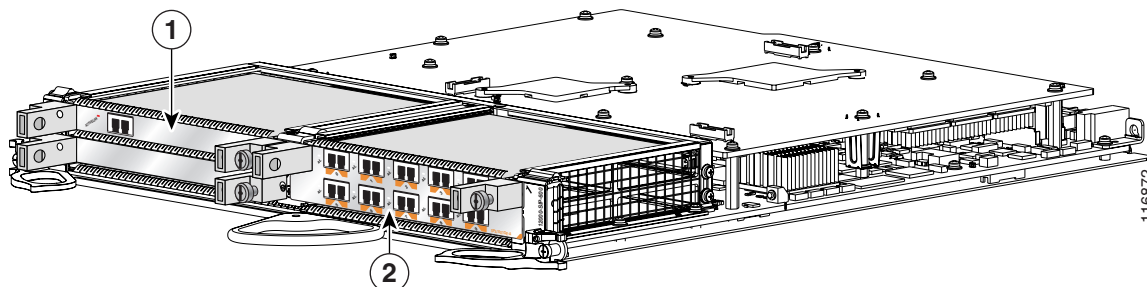


Table 1-12 Subslot Locations for the 1-Port 10-Gigabit Ethernet SPA

Call Out Number	Description
1	Subslot 0
2	Subslot 1

SPA Interface Addresses on the Cisco XR 12000 SIP-501

A Cisco 12000 Series Router identifies a SPA interface address by its SIP slot number, SPA subslot, and port number on the SPA, in the format *slot/subslot/port*. Subslots and ports are numbered starting from 0, so each Cisco XR 12000 SIP-601 has two subslots 0 (left) and 1 (right). For example, the interface address of a 1-port SPA located in the second SIP subslot, where the SIP is inserted into router line card slot 3 is 3/1/0. [Figure 1-12](#) shows the slot, subslot, and port locations for the 1-Port 10-Gigabit Ethernet SPA and the 10-Port Gigabit Ethernet SPA.

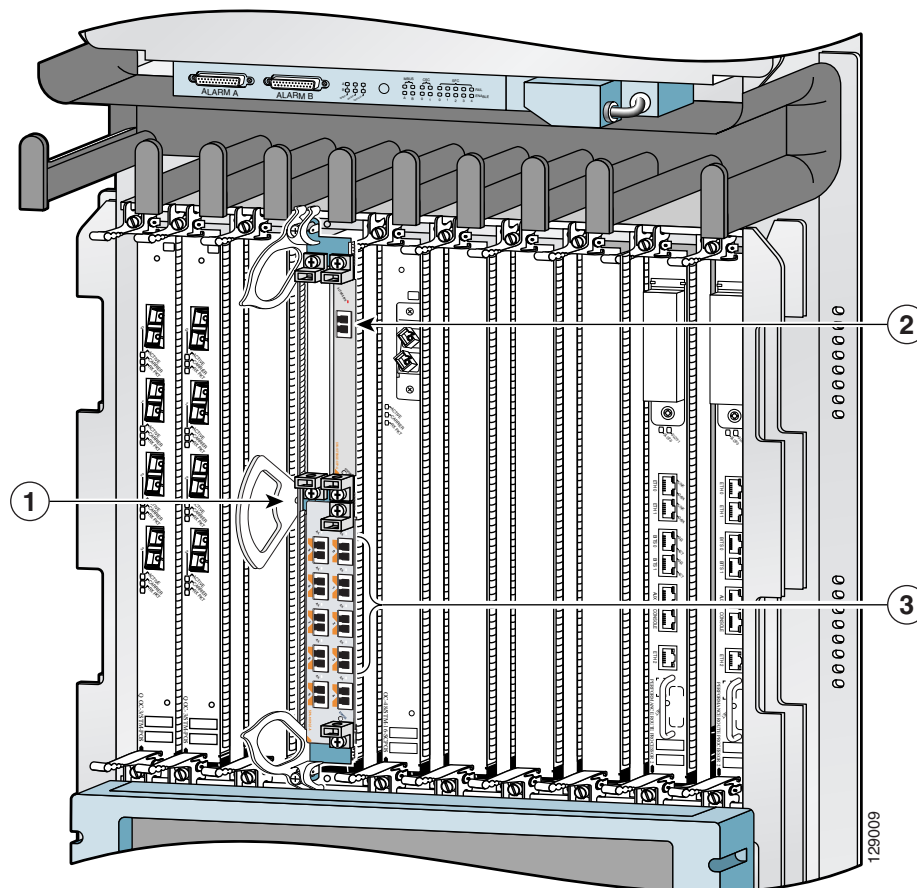
Figure 1-12 Slot, Subslot, and Port Locations for the 1-Port 10-Gigabit Ethernet SPA and the 10-Port Gigabit Ethernet SPA.

Table 1-13 Slot and Port Locations for the 1-Port 10-Gigabit Ethernet SPA

Call Out Number	Description
1	Slot 3
2	Subslot 0, Port 3/0/0
3	Subslot 1, Ports 3/1/0 to 3/1/9

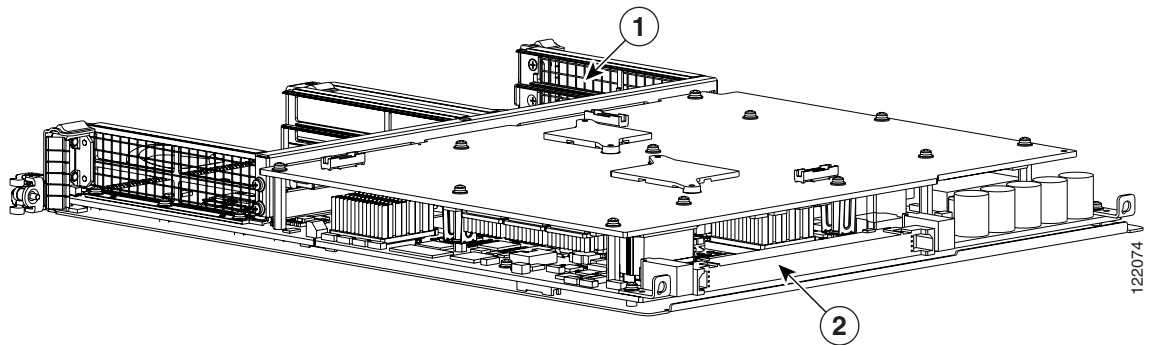
Cisco XR 12000 SIP-601 Overview

The following sections describe the Cisco XR 12000 SIP-601:

- [Cisco XR 12000 SIP-601 Board Components, page 1-14](#)
- [Cisco XR 12000 SIP-601 LEDs, page 1-14](#)
- [Cisco XR 12000 SIP-601 Physical Specifications, page 1-15](#)
- [SPA Subslot Numbering on the Cisco XR 12000 SIP-601, page 1-15](#)
- [SPA Interface Addresses on the Cisco XR 12000 SIP-601, page 1-16](#)

Cisco XR 12000 SIP-601 Board Components

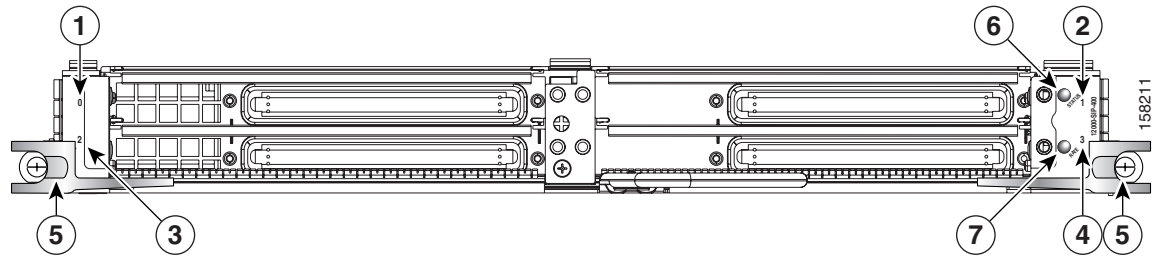
The main Cisco XR 12000 SIP-601 board components are shown in [Figure 1-13](#).

Figure 1-13 Cisco XR 12000 SIP-601 Board—Rear View

1	SPA enclosure	2	Backplane connector
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Cisco XR 12000 SIP-601 LEDs

The Cisco XR 12000 SIP-601 supports 4 single-height SPAs (the aggregate throughput should not exceed 2 full-rate SPAs); 2 double-height SPAs; 1 dual-width, double-height SPA, or a combination of single-height and double-height SPAs. The Cisco XR 12000 SIP-601 face plate has one Status LED. [Figure 1-14](#) shows the Cisco XR 12000 SIP-601 face plate with 4 single-width, single-height SPAs.

Figure 1-14 Cisco XR 12000 SIP-601 Face Plate

1	SPA subslot 0	5	Ejector Levers
2	SPA subslot 1	6	Status LED
3	SPA subslot 2	7	Rate LED
4	SPA subslot 3		

The Cisco XR 12000 SIP-601 LEDs are described in [Table 1-14](#).

Table 1-14 Cisco XR 12000 SIP-601 LEDs

LED Label	Color	State	Meaning
Status	Yellow	On	IOS is loaded and SIP is ready to be enabled.
	Green	On	SIP is active.
Rate	Off	Off	SIP is SIP-401 or SIP-501.
	Green	On	SIP is SIP-601.

Cisco XR 12000 SIP-601 Physical Specifications

The Cisco XR 12000 SIP-601 physical specifications are shown in the following table.

Table 1-15 Cisco XR 12000 SIP-601 Physical Specifications

Description	Specifications
Physical dimensions	Occupies one line card slot on a Cisco 12000 Series Router
Shipping weight	10kg
Operating temperature	32 to 104°F (0 to 40°C)
Relative humidity	10 to 90 percent, noncondensing
Storage temperature	-4 to 149°F (-20 to 65°C)

SPA Subslot Numbering on the Cisco XR 12000 SIP-601

The Cisco XR 12000 SIP-601 accepts 4 single-height SPAs (the aggregate throughput should not exceed 2 full-rate SPAs); 2 double-height SPAs; 1 dual-width, double-height SPA, or a combination of single-height and double-height SPAs.

Figure 1-15 shows a Cisco XR 12000 SIP-601 with 2 SPAs installed. The left SPA slot is subslot 0 and the right SPA slot is subslot 1. If one dual-width SPA is installed, it is recognized as being in subslot 0.

Figure 1-15 Subslot Locations for the 1-Port 10-Gigabit Ethernet SPA

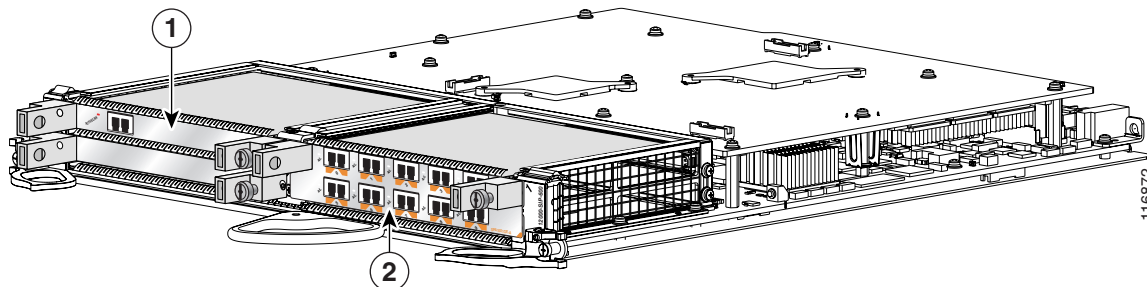


Table 1-16 Subslot Locations for the 1-Port 10-Gigabit Ethernet SPA

Call Out Number	Description
1	Subslot 0
2	Subslot 1

SPA Interface Addresses on the Cisco XR 12000 SIP-601

A Cisco 12000 Series Router identifies a SPA interface address by its SIP slot number, SPA subslot, and port number on the SPA, in the format *slot/subslot/port*. Subslots and ports are numbered starting from 0, so each Cisco XR 12000 SIP-601 has two subslots 0 (left) and 1 (right). For example, the interface address of a 1-port SPA located in the second SIP subslot, where the SIP is inserted into router line card slot 3 is 3/1/0. Figure 1-16 shows the slot, subslot, and port locations for the 1-Port 10-Gigabit Ethernet SPA and the 10-Port Gigabit Ethernet SPA.

Figure 1-16 Slot, Subslot, and Port Locations for the 1-Port 10-Gigabit Ethernet SPA and the 10-Port Gigabit Ethernet SPA.

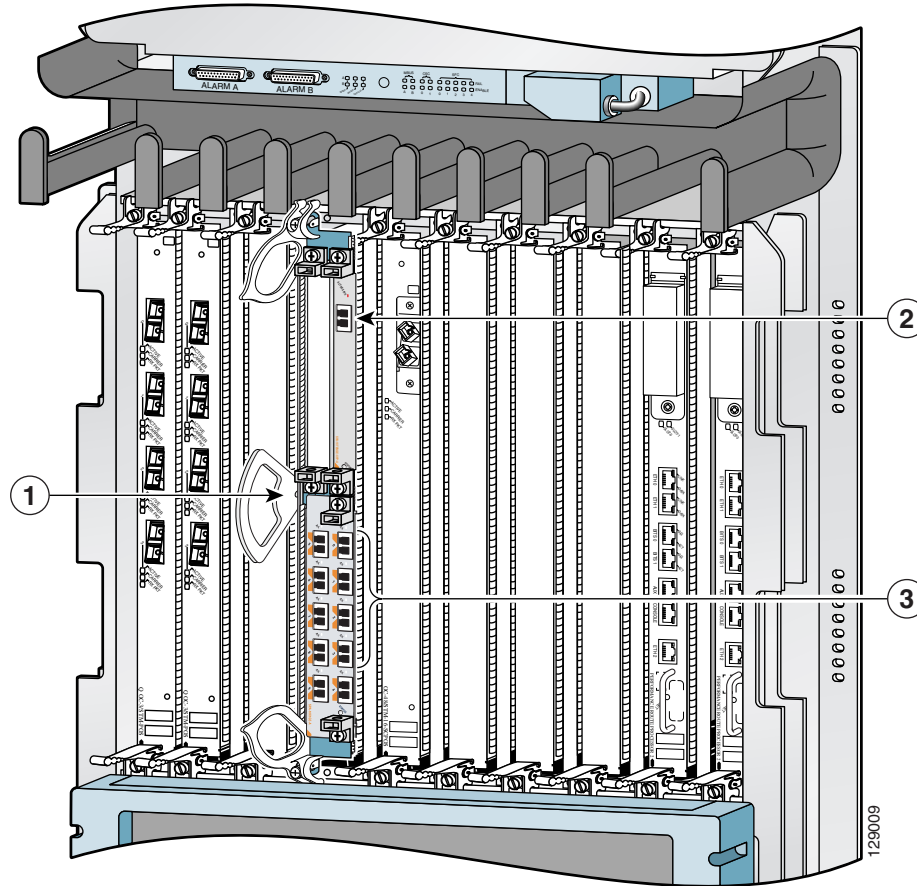


Table 1-17 Slot and Port Locations for the 1-Port 10-Gigabit Ethernet SPA

Call Out Number	Description
1	Slot 3
2	Subslot 0, Port 3/0/0
3	Subslot 1, Ports 3/1/0 to 3/1/9

