



SIP and SPA Product Overview

This chapter provides an introduction to SPA interface processors (SIPs) and shared port adapters (SPAs). It includes the following sections:

- [Introduction to SIPs and SPAs, page 1-1](#)
- [SIP, SSC, and SPA Compatibility, page 1-3](#)
- [Modular Optics Compatibility, page 1-6](#)
- [Power Management, page 1-13](#)

For software details for the specific SIPs and SPAs that are supported on the Cisco 7600 series routers, refer to the companion publication, Cisco 7600 Series Router SIP, SSC, and SPA Software Configuration Guide.

Introduction to SIPs and SPAs

SIPs, SSCs, and SPAs are a new carrier card and port adapter architecture to increase modularity, flexibility, and density across Cisco Systems routers for network connectivity. This section describes the SIPs, SSCs, and SPAs and provides some guidelines for their use.

SPA Interface Processors

The following list describes some of the general characteristics of a SIP:

- A SIP is a carrier card that inserts into a router slot like a line card. It provides no network connectivity on its own.
- A SIP contains one or more subslots, which are used to house one or more SPAs. The SPA provides interface ports for network connectivity.
- During normal operation the SIP should reside in the router fully populated either with functional SPAs in all subslots, or with a blank filler plate (SPA-BLANK=) inserted in all empty subslots.
- SIPs support online insertion and removal (OIR) with SPAs inserted in their subslots. SPAs also support OIR and can be inserted or removed independently from the SIP.

SPA Services Cards

The following list describes some of the general characteristics of an SSC:

- An SSC is a carrier card that inserts into a router slot like a line card. It provides no network connectivity.
- An SSC provides one or more subslots, which are used to house one or more SPAs. The supported SPAs do not provide interface ports for network connectivity, but provide certain services.
- During normal operation the SSC should reside in the router fully populated either with functional SPAs in all subslots, or with a blank filler plate (SPA-BLANK=) inserted in all empty subslots.
- SSCs support online insertion and removal (OIR) with SPAs inserted in their subslots. SPAs also support OIR and can be inserted or removed independently from the SSC.
- Cisco IOS Release 12.2(33) SRE adds support for Route Switch Processor 720 10GE to the Cisco 7600 SSC-400.

Shared Port Adapters

The following list describes some of the general characteristics of a SPA:

- A SPA is a modular type of port adapter that inserts into a subslot of a compatible SIP carrier card to provide network connectivity and increased interface port density. A SIP can hold one or more SPAs, depending on the SIP type.
- Some SPAs provide services rather than network connectivity, and insert into subslots of compatible SSCs. For example, the IPsec VPN SPA provides services such as IP Security (IPsec) encryption/decryption, generic routing encapsulation (GRE), and Internet Key Exchange (IKE) key generation.
- SPAs are available in the following sizes, as shown in [Figure 1-1](#) and [Figure 1-2](#):
 - Single-height SPA—Inserts into one SIP subslot.
 - Double-height SPA—Inserts into two single, vertically aligned SIP subslots.

Figure 1-1 *Single-Height and Double-Height SPA Sizes*

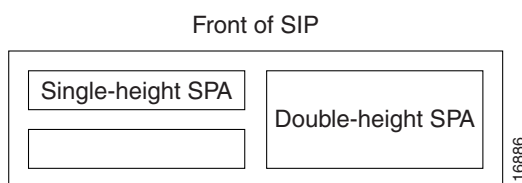
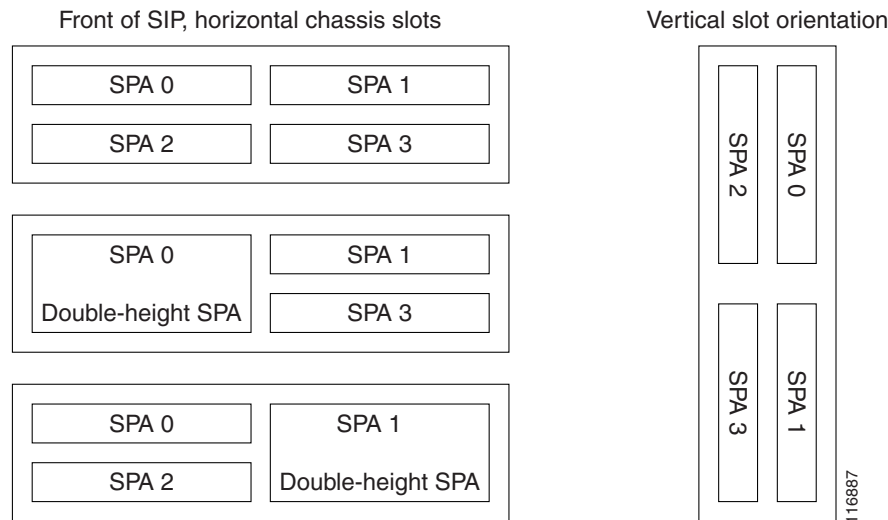


Figure 1-2 Horizontal and Vertical Chassis Slot Orientation for SPAs

- Each SPA provides a certain number of connectors, or ports, that are the interfaces to one or more networks. These interfaces can be individually configured using the Cisco IOS command-line interface (CLI).
- Either a blank filler plate or a functional SPA should reside in every subslot of an SIP during normal operation to maintain cooling integrity. Blank filler plates are available in single-height form only.
- SPAs support online insertion and removal (OIR). They can be inserted or removed independently from the SIP. SIPs also support online insertion and removal (OIR) with SPAs inserted in their subslots.

SIP, SSC, and SPA Compatibility

The following tables show SIP and SPA compatibility by SPA technology area on the Cisco 7600 series router.



Note

For more information about the introduction of support for different SIPs and SPAs, refer to the “Release History” sections in the overview chapters of the Cisco 7600 Series Router SIP, SSC, and SPA Software Configuration Guide.

Table 1-1 SIP and SPA Compatibility Table for ATM SPAs

SPA	Product ID	SIP Type			
		Cisco 7600 SIP-200	Cisco 7600 SIP-400	Cisco 7600 SIP-600	Cisco 7600 SSC-400
1-Port, 2-Port and 4-Port OC-3c/STM-1 ATM SPA	SPA-1xOC3-ATM-v2 SPA-2XOC3-ATM SPA-4XOC3-ATM SPA-3xOC3-ATM-v2	Yes	Yes	No	No
1-Port OC-12c/STM-4 ATM SPA	SPA-1XOC12-ATM	No	Yes	No	No
1-Port OC-48c/STM-16 ATM SPA	SPA-1XOC48-ATM	No	Yes	No	No

**Note**

All ATM SPAs are Full Height SPA and hence occupy 2 bays (top and bottom) on one side of the SPA. For example, two 1-Port OC-12c/STM-4 ATM SPAs can be inserted in a SIP-400

Table 1-2 SIP and SPA Compatibility Table for Ethernet SPAs

SPA	Product ID	SIP Type			
		Cisco 7600 SIP-200	Cisco 7600 SIP-400	Cisco 7600 SIP-600	Cisco 7600 SSC-400
1-Port 10-Gigabit Ethernet SPA	SPA-1XTENGE-XENPK SPA-1XTENGE-XFP	No	No	Yes	No
	SPA-1X10GE-L-V2	No	Yes	Yes	No
2-Port Gigabit Ethernet SPA	SPA-2X1GE, SPA-2X1GE-V2	No	Yes	No	No
5-Port Gigabit Ethernet SPA	SPA-5X1GE	No	No	Yes	No
	SPA-5X1GE-V2	No	Yes	Yes	No
10-Port Gigabit Ethernet SPA	SPA-10X1GE SPA-10X1GE-V2	No	No	Yes	No
4-Port and 8-Port Fast Ethernet SPA	SPA-4X1FE-TX-V2 SPA-8X1FE-TX-V2	Yes	Yes	No	No

**Note**

You cannot use a SPA-5X1GE and two SPA-8x1FE on the same SIP-400. That would overrun the SIP-400 SPI port limit and the last SPA inserted would be powered down.

Table 1-3 SIP and SPA Compatibility Table for the IPsec VPN SPA

SPA	Product ID	SIP Type			
		Cisco 7600 SIP-200	Cisco 7600 SIP-400	Cisco 7600 SIP-600	Cisco 7600 SSC-400
IPSec VPN SPA	SPA-IPSEC-2G	No	No	No	Yes

Table 1-4 SIP and SPA Compatibility Table for POS SPAs

SPA	Product ID	SIP Type			
		Cisco 7600 SIP-200	Cisco 7600 SIP-400	Cisco 7600 SIP-600	Cisco 7600 SSC-400
2-Port and 4-Port OC-3c/STM-1 POS SPA	SPA-2XOC3-POS SPA-4XOC3-POS	Yes	Yes	No	No
1-Port OC-12c/STM-4 POS SPA	SPA-1XOC12-POS	No	Yes	No	No
1-Port OC-48c/STM-16 POS SPA	SPA-1XOC48-POS/RPR	No	Yes	No	No
2-Port and 4-Port OC-48c/STM-16 POS SPA	SPA-2XOC48-POS/RPR SPA-4XOC48-POS/RPR	No	No	Yes	No
1-Port OC-192c/STM-64 POS/RPR SPA	SPA-OC192POS-LR SPA-OC192POS-VSR SPA-OC192POS-XFP	No	No	Yes	No

Table 1-5 SIP and SPA Compatibility Table for Serial SPAs

SPA	Product ID	SIP Type			
		Cisco 7600 SIP-200	Cisco 7600 SIP-400	Cisco 7600 SIP-600	Cisco 7600 SSC-400
1-Port Channelized OC-3/STM-1 SPA	SPA-1XCHSTM1/OC3	Yes	Yes	No	No
2-Port and 4-Port Channelized T3 SPA	SPA-2XCT3/DS0 SPA-4XCT3/DS0	Yes	Yes	No	No
2-Port and 4-Port Clear Channel T3/E3 SPA	SPA-2XT3/E3 SPA-4XT3/E3	Yes	Yes	No	No
8-Port Channelized T1/E1 SPA	SPA-8XCHT1/E1	Yes	Yes	No	No
1-Port Channelized OC-12/STM-4 SPA	SPA-1XCHSTM4/OC12	No	Yes	No	No

Table 1-6 SIP and SPA Compatibility Table for CEoP SPAs

SPA	Product ID	SIP Type			
		Cisco 7600 SIP-200	Cisco 7600 SIP-400	Cisco 7600 SIP-600	Cisco 7600 SSC-400
1-Port Channelized OC-3 STM1 ATM CEoP SPA	SPA-1CHOC3-CE-ATM	No	Yes	No	No
24-Port Channelized T1/E1 ATM CEoP SPA	SPA-24CHT1-CE-ATM	No	Yes	No	No
2-Port Channelized T3/E3 ATM CEoP SPA	SPA-2CHT3-CE-ATM	No	Yes	No	No

**Note**

E3 support is not available on the 2-Port Channelized T3/E3 ATM CEoP SPA on SIP-400 of the Cisco Series Router 7600

Modular Optics Compatibility

Some SPAs implement small form-factor pluggable (SFP) optical transceivers to provide network connectivity. An SFP module is a transceiver device that mounts into the front panel to provide network connectivity.

Cisco Systems qualifies the SFP modules that can be used with SPAs.


Note

The SPAs will only accept the SFP modules listed as supported in this document. An SFP check is run every time an SFP module is inserted into a SPA and only SFP modules that pass this check will be usable.

Table 1-7 shows the types of optics modules that have been qualified for use with a SPA:

Table 1-7 SPA Optics Compatibility

SPA	Qualified Optics Modules (Cisco Part Numbers)
1-Port, 2-Port, 3-Port and 4-Port OC-3c/STM-1 ATM SPA - v2	<ul style="list-style-type: none"> • SFP-OC3-MM • SFP-OC3-SR • SFP-OC3-IR1 • SFP-OC3-LR1 • SFP-OC3-LR2 • ONS-SC-155-EL
1-Port OC-12c/STM-4 ATM SPA	<ul style="list-style-type: none"> • SFP-OC12-MM • SFP-OC12-SR • SFP-OC12-IR1 • SFP-OC12-LR1 • SFP-OC12-LR2
1-Port OC-48c/STM-16 ATM SPA	<ul style="list-style-type: none"> • SFP-OC48-IR1 • SFP-OC48-SR • SFP-OC48-LR2
1-Port 10-Gigabit Ethernet SPA	<ul style="list-style-type: none"> • XFP-10GLR-OC192SR • XFP-10GER-OC192IR • XFP-10GZR-OC192LR • XFP-10F-MM-SR (Supported only on SIP-400 and SIP-600 from Cisco IOS release 12.2(33)SRE) • X2-DWDM on RSP720 • X2-10GB-LRM/ZR on RSP720
2-Port Gigabit Ethernet SPA	<ul style="list-style-type: none"> • SFP-GE-S • SFP-GE-L • SFP-GE-Z • SFP-GE-T

Table 1-7 SPA Optics Compatibility (continued)

SPA	Qualified Optics Modules (Cisco Part Numbers)
5-Port Gigabit Ethernet SPA	<ul style="list-style-type: none"> • SFP-GE-S • SFP-GE-L • SFP-GE-Z • SFP-GE-T
10-Port Gigabit Ethernet SPA	<ul style="list-style-type: none"> • SFP-GE-S • SFP-GE-L • SFP-GE-Z • SFP-GE-T
2-Port and 4-Port OC-3c/STM-1 POS SPA	<ul style="list-style-type: none"> • SFP-OC3-MM • SFP-OC3-SR • SFP-OC3-IR1 • SFP-OC3-LR1 • SFP-OC3-LR2 • ONS-SC-155-EL
1-Port OC-12c/STM-4 POS SPA	<ul style="list-style-type: none"> • SFP-OC12-MM • SFP-OC12-SR • SFP-OC12-IR1 • SFP-OC12-LR1 • SFP-OC12-LR2
1-Port OC-48c/STM-16 POS SPA	<ul style="list-style-type: none"> • SFP-OC48-SR • SFP-OC48-IR1 • SFP-OC48-LR2
2-Port and 4-Port OC-48c/STM-16 POS SPA	<ul style="list-style-type: none"> • SFP-OC48-SR • SFP-OC48-IR1 • SFP-OC48-LR2
1-Port OC-192c/STM-64 POS/RPR XFP SPA	<ul style="list-style-type: none"> • XFP-10GLR-OC192SR • XFP-10GER-OC192IR • XFP-10GZR-OC192LR
1-Port Channelized OC-3/STM-1 SPA	<ul style="list-style-type: none"> • SFP-OC3-MM • SFP-OC3-SR • SFP-OC3-IR1 • SFP-OC3-LR1 • SFP-OC3-LR2 • ONS-SC-155-EL • STM1E-SFP

Table 1-7 SPA Optics Compatibility (continued)

SPA	Qualified Optics Modules (Cisco Part Numbers)
1-Port Channelized OC-3 STM1 ATM CEoP SPA	<ul style="list-style-type: none"> • SFP-OC3-MM • SFP-OC3-SR • SFP-OC3-IR1 • SFP-OC3-LR1 • SFP-OC3-LR2 • ONS-SC-155-EL
1-Port Channelized STM-4/OC-12 SPA (Supported on SIP-400 from 12.2(33)SRD 1)	<ul style="list-style-type: none"> • SFP-OC12-MM • SFP-OC12-SR • SFP-OC12-IR1 • SFP-OC12-LR1 • SFP-OC12-LR2

Supported DWDM-XFP Modules

Table 1-7 lists the pluggable DWDM-XFP modules supported on Cisco 7600-SIP400/600-10GE line cards.


Note

DWDM-XFP optics are only supported on the SIP600/SPA-1X10GE-L-V2 in SRB 3.

Table 1-8 Supported XFP Modules

Product ID (append "=" for spares)	Product Description	Version
DWDM-XFP-30.33	DWDM XFP 1530.33 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-31.12	DWDM XFP 1531.12 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-31.90	DWDM XFP 1531.90 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-32.68	DWDM XFP 1532.68 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-34.25	DWDM XFP 1534.25 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-35.04	DWDM XFP 1535.04 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-35.82	DWDM XFP 1535.82 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-36.61	DWDM XFP 1536.61 nm XFP (100 GHz ITU grid)	12.2(33)SRC

Table 1-8 Supported XFP Modules

Product ID (append "=" for spares)	Product Description	Version
DWDM-XFP-38.19	DWDM XFP 1538.19 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-38.98	DWDM XFP 1538.98 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-39.77	DWDM XFP 1539.77 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM- XFP-40.56	DWDM XFP 1540.56 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-42.14	DWDM XFP 1542.14 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-42.94	DWDM XFP 1542.94 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-43.73	DWDM XFP 1543.73 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM- XFP-44.53	DWDM XFP 1544.53 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-46.12	DWDM XFP 1546.12 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-46.92	DWDM XFP 1546.92 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-47.72	DWDM XFP 1547.72 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-48.51	DWDM XFP 1548.51 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-50.12	DWDM XFP 1550.12 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-50.92	DWDM XFP 1550.92 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-51.72	DWDM XFP 1551.72 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-52.52	DWDM XFP 1552.52 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM- XFP-54.13	DWDM XFP 1554.13 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-54.94	DWDM XFP 1554.94 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-55.75	DWDM XFP 1555.75 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-56.55	DWDM XFP 1556.55 nm XFP (100 GHz ITU grid)	12.2(33)SRC

Table 1-8 Supported XFP Modules

Product ID (append "=" for spares)	Product Description	Version
DWDM- XFP-58.17	DWDM XFP 1558.17 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-58.98	DWDM XFP 1558.98 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM-XFP-59.79	DWDM XFP 1559.79 nm XFP (100 GHz ITU grid)	12.2(33)SRC
DWDM- XFP-60.61	DWDM XFP 1560.61 nm XFP (100 GHz ITU grid)	12.2(33)SRC

Supported DWDM-SFP Modules

Table 1-9 lists the pluggable DWDM-SFP modules supported on Cisco 7600-400/600-1GE line cards.

Table 1-9 Supported DWDM-SFP Modules

Product ID (append "=" for spares)	Product Description	Version
DWDM-SFP-6061=	DWDM SFP 1530.33 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5979=	DWDM SFP 1531.12 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5898=	DWDM SFP 1531.90 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5817=	DWDM SFP 1532.68 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5655=	DWDM SFP 1535.25 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5575=	DWDM SFP 1535.04 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5494=	DWDM SFP 1535.82 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5413=	DWDM SFP 1536.61 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5252=	DWDM SFP 1538.19 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5172=	DWDM SFP 1538.98 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5092=	DWDM SFP 1539.77 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-5012=	DWDM SFP 1540.56 nm SFP (100 GHz ITU grid)	12.2(33)SRD

Table 1-9 Supported DWDM-SFP Modules

Product ID (append "=" for spares)	Product Description	Version
DWDM-SFP-4851=	DWDM SFP 1542.14 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-4772=	DWDM SFP 1542.94 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-4692=	DWDM SFP 1543.73 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-4612=	DWDM SFP 1544.53 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-4453=	DWDM SFP 1546.12 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-4373=	DWDM SFP 1546.92 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-4294=	DWDM SFP 1547.72 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-4214=	DWDM SFP 1548.51 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-4056=	DWDM SFP 1550.12 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3033	DWDM SFP 1530.33 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3112	DWDM SFP 1531.12 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3190	DWDM SFP 1531.90 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3268	DWDM SFP 1532.68 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3425	DWDM SFP 1534.25 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3504	DWDM SFP 1535.04 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3582	DWDM SFP 1535.82 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3661	DWDM SFP 1536.61 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3819	DWDM SFP 1538.19 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3898	DWDM SFP 1538.98 nm SFP (100 GHz ITU grid)	12.2(33)SRD
DWDM-SFP-3977	DWDM SFP 1539.77 nm SFP (100 GHz ITU grid)	12.2(33)SRD

Supported CWDM-SFP Modules

Table 1-10 lists the pluggable CWDM-SFP modules supported on Cisco 7600-400/600-1GE line cards.

Table 1-10 Supported CWDM-SFP Modules

Product ID (append "=" for spares)	Product Description	Version
CWDM-SFP-1470	Cisco CWDM SFP 1470 nm; Gigabit Ethernet and 1G/2G FC	12.2(33)SRD
CWDM-SFP-1490	Cisco CWDM SFP 1490 nm; Gigabit Ethernet and 1G/2G FC	12.2(33)SRD
CWDM-SFP-1510	Cisco CWDM SFP 1510 nm; Gigabit Ethernet and 1G/2G FC	12.2(33)SRD
CWDM-SFP-1530	Cisco CWDM SFP 1530 nm; Gigabit Ethernet and 1G/2G FC	12.2(33)SRD
CWDM-SFP-1550	Cisco CWDM SFP 1550 nm; Gigabit Ethernet and 1G/2G FC	12.2(33)SRD
CWDM-SFP-1570	Cisco CWDM SFP 1570 nm; Gigabit Ethernet and 1G/2G FC	12.2(33)SRD
CWDM-SFP-1590	Cisco CWDM SFP 1590 nm; Gigabit Ethernet and 1G/2G FC	12.2(33)SRD
CWDM-SFP-1610=	Cisco CWDM SFP 1610 nm; Gigabit Ethernet and 1G/2G FC	12.2(33)SRD

Supported BX SFP Modules

Table 1-11 lists the pluggable BX SFP modules supported on Cisco 7600-200/400/600-1GE line cards.

Table 1-11 Supported BX SFP Modules

Product ID (append "=" for spares)	Product Description	Supported on	Version
GLC-BX-D	1000BASE-BX10-D downstream bidirectional single fiber; with DOM	SIP 400 and SIP 600	12.2(33)SRD
GLC-BX-U	1000BASE-BX10-U upstream bidirectional single fiber; with DOM	SIP 400 and SIP 600	12.2(33)SRD

Power Management

SPAs and SIPs consume chassis power, and, you must make sure the chassis is within the power budget on Cisco 7600 series routers.

Table 1-12 SIP and SPA Power Consumption

SIP	Power Consumption (Maximum in Watts)
Cisco 7600 SIP-200	240 ¹
Cisco 7600 SIP-400	265 ¹
SPA	
1-Port Channelized STM-1/OC-3 SPA	15.14
1-Port Channelized STM-4/OC-12 SPA	15.14
2-Port Channelized T3 SPA	11.24
4-Port Channelized T3 SPA	13.14
8-Port Channelized T1/E1 SPA	9.4
2-Port OC-3c/STM-1 ATM SPA	24.6
4-Port OC-3c/STM-1 ATM SPA	24.8
1-Port OC-12c/STM-4 ATM SPA	25.1
1-Port OC-192c/STM-64 POS/RPR SPA	23.8 ²
1-Port OC-192c/STM-64 POS/RPR XFP SPA	11 ³
1-Port OC-192c/STM-64 POS/RPR VSR Optics SPA	11
2-Port OC-3c/STM-1 POS SPA	13.07
4-Port OC-3c/STM-1 POS SPA	13.82
1-Port OC-12c/STM-4 POS SPA	12.75
1-Port OC-48c/STM-16 ATM SPA	38
1-Port OC-48c/STM-16 POS SPA	10.5
2-Port OC-48c/STM-16 POS SPA	13.21
4-Port OC-48c/STM-16 POS SPA	15.19
2-Port Clear Channel T3/E3 SPA	7.8
4-Port Clear Channel T3/E3 SPA	8.5
IPSec VPN SPA	40
1-Port 10-Gigabit Ethernet SPA	17.4 ³
2-Port Gigabit Ethernet SPA	12.9
5-Port Gigabit Ethernet SPA	13.1 ³
10-Port Gigabit Ethernet SPA	15 ³
4-Port and 8-Port Fast Ethernet SPA	16.2

Table 1-12 SIP and SPA Power Consumption

SIP	Power Consumption (Maximum in Watts)
1-Port Channelized OC-3 STM1 ATM CEOp SPA	19 ⁴
4-Port and 8-Port Fast Ethernet SPA	16.2
24-Port Channelized T1/E1 ATM CEOp SPA	20
2-Port Channelized T3/E3 ATM CEOp SPA	20

1. Maximum with four SPAs installed
2. Includes LR optics as they are fixed on the board
3. In addition to SFP or XFP optics power
4. SFP consumes 1 Watt

If the power limit is exceeded, the SIP and SPA is not powered up and an error message is displayed.

```
Router#%C7KPWR-SP-4-POWERDENIED:insufficient power, module in slot 3 power denied.
```

On a Cisco 7600 series router, use the **show power** command on the Route Processor to determine how much power you have available in the chassis and how much is being used or reserved by line cards, supervisor engines, and fan trays.

The following example shows the **show power** command on a Cisco 7600 series router:

```
Router# show power

system power redundancy mode = combined
system power redundancy operationally = non-redundant
system power total = 1869.42 Watts (44.51 Amps @ 42V)
system power used = 1302.42 Watts (31.01 Amps @ 42V)
system power available = 567.00 Watts (13.50 Amps @ 42V)
Power-Capacity PS-Fan Output Oper
PS Type Watts A @42V Status Status State
-----
1 PWR-1900-AC/6 1869.42 44.51 OK OK on
2 none
Pwr-Allocated Oper
Fan Type Watts A @42V State
-----
1 FAN-MOD-6HS 180.18 4.29 OK
Pwr-Requested Pwr-Allocated Admin Oper
Slot Card-Type Watts A @42V Watts A @42V State State
-----
3 7600-SIP-400 265.02 6.31 265.02 6.31 on on
4 7600-SIP-200 200.34 4.77 200.34 4.77 on on
5 unknown 328.44 7.82 328.44 7.82 on on
```