Supported Hardware

These sections describe the hardware supported in Release 12.2SX:

> **Note**
> - Use the values in the "Power Required" column to determine the exact power requirements for your configuration to ensure that you are within the power budget.
> - Daughtercard power is shown separately.
> - Enter the **show power** command to display current system power usage.

Flash Memory Device Summary

- **bootflash:** on the RP of all supervisor engines.
- **sup-bootdisk:** on these supervisor engines:
  - Supervisor Engine 720 with a CompactFlash adapter and CompactFlash card.
  - Supervisor Engine 32.
- **sup-bootflash:** on these supervisor engines:
  - Supervisor Engine 720 without a CompactFlash adapter and CompactFlash card.
  - Supervisor Engine 2.
- **disk0:** on these supervisor engines:
  - Supervisor Engine 720.
  - Supervisor Engine 32.
  - Supervisor Engine 2 with a PCMCIA Advanced Technology Attachment (ATA) FlashDisk device.
- **disk1:** on a Supervisor Engine 720.
- **slot0:** on a Supervisor Engine 2 without a PCMCIA Advanced Technology Attachment (ATA) FlashDisk device.

Supervisor Engines

Supervisor Engine 720 (CAT6000-SUP720/MSFC3, 7600-SUP720/MSFC3)

Supervisor Engine 720 Common Features

- Integrated 720-Gbps Switch Fabric
- 64-MB bootflash device or CompactFlash adapter with 512 MB CompactFlash card (WS-CF-UPG=):
  - 64-MB bootflash device (**sup-bootflash:**) supported in all releases
  - WS-CF-UPG= (**sup-bootdisk:**) supported in:
    —Release 12.2(18)SXE5 and later releases
    —Release 12.2(18)SXF and later releases
  - See this publication:
    http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_17277.html
- 2 CompactFlash Type II slots (disk0: and disk1:)

> ✎
> **Note** Some Supervisor Engine 720 Release 12.2SX images are larger than the bootflash device and must be stored on a CompactFlash card (sup-bootdisk: or disk0: or disk1:).

- Two Ethernet uplink ports:
  - 1-MB packet buffer per port
  - Port 1—Gigabit Ethernet SFP
  - Port 2—Configurable as Gigabit Ethernet SFP or 10/100/1000 Mbps RJ-45
- QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t**
- Port grouping:
  - Number of ports: 2
  - Number of port groups: 1
  - Port ranges per port group: 1–2
- Supervisor Engine 720 requires a high-capacity fan tray (see the "Fan Trays" section on page 102)
- Supervisor Engine 720 requires a 2500W or higher power supply (see the "Power Supplies" section on page 103)

Supervisor Engine 720 with PFC3BXL

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version

WS-SUP720-3BXL	7.82 A@42 V	Supervisor Engine 720 with PFC3BXL:
		
		• 1-GB DRAM
		
		• Policy Feature Card 3BXL (PFC3BXL; see the "Policy Feature Cards" section on page 41)
		
		• Multilayer Switch Feature Card 3 (MSFC3):
		
		  – 1-GB DRAM
		
		  – 64-MB bootflash
			12.2(17b)SXA

Note

- There are no memory upgrade options for WS-SUP720-3BXL.

- If you install WS-SUP720-3BXL=, upgrade the memory on any DFC3-equipped switching modules. See this document for DFC3 memory upgrades:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12409.html

Supervisor Engine 720 with PFC3B

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version

WS-SUP720-3B	6.72 A @42 V	Supervisor Engine 720 with PFC3B:
		
		• 512-MB DRAM
		
		• Policy Feature Card 3B (PFC3B; see the "Policy Feature Cards" section on page 41)
		
		• Multilayer Switch Feature Card 3 (MSFC3):
		
		  – 512-MB DRAM
		
		  – 64-MB bootflash
			12.2(17d)SXB1

Note

- See this document for DFC3 memory upgrades:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12409.html

- Use WS-F6K-PFC3BXL= to upgrade a WS-SUP720-3B with a PFC3BXL. WS-F6K-PFC3BXL= includes 1 GB memory upgrades for the Supervisor Engine 720 and the MSFC3.

  – If you install WS-F6K-PFC3BXL=, upgrade the memory on any DFC3-equipped switching modules.

  – See this publication for more information about WS-F6K-PFC3BXL=:

    http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_16220.html

- You can upgrade the WS-SUP720-3B memory to 1-GB DRAM on the Supervisor Engine 720 and 1-GB DRAM on the MSFC3.

  – If you upgrade the memory, upgrade the Supervisor Engine 720, the MSFC3, and any DFC3-equipped switching modules.

  – See this document for Supervisor Engine 720 and MSFC3 memory upgrades:

    http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/OL_20611.html

Supervisor Engine 720 with PFC3A

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version

WS-SUP720	7.50 A@42 V	Supervisor Engine 720 with PFC3A:
		
		• 512-MB DRAM
		
		• Policy Feature Card 3A (PFC3A; see the "Policy Feature Cards" section on page 41)
		
		• Multilayer Switch Feature Card 3 (MSFC3):
		   – 512-MB DRAM
		   – 64-MB bootflash
			12.2(14)SX

Note

• See this document for DFC3 memory upgrades:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12409.html

• Use WS-F6K-PFC3BXL= to upgrade a WS-SUP720 with a PFC3BXL. WS-F6K-PFC3BXL= includes 1 GB memory upgrades for the Supervisor Engine 720 and the MSFC3.

  – If you install WS-F6K-PFC3BXL=, upgrade the memory on any DFC3-equipped switching modules.

  – See this publication for more information about WS-F6K-PFC3BXL=:

    http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_16220.html

• Except with WS-F6K-PFC3BXL=, do not upgrade the memory on WS-SUP720 or on the MSFC3 on WS-SUP720.

Supervisor Engine 32 (CAT6000-SUP32/MSFC2A, 7600-SUP32/MSFC2A)

These sections describe the Supervisor Engine 32:

• Supervisor Engine 32 Restrictions, page 38

• Supervisor Engine 32 Features, page 40

Supervisor Engine 32 Restrictions

• Supervisor Engine 32 requires a high-capacity fan tray (see the "Fan Trays" section on page 102).

• In some chassis, Supervisor Engine 32 requires a high-capacity power supply (see the "Power Supplies" section on page 103).

• Supervisor Engine 32 does not support this hardware:

  – WS-F6K-PFC3A Policy Feature Card 3A (PFC3A)

  – WS-F6K-PFC3BXL Policy Feature Card 3BXL (PFC3BXL)

  – DFCs (installed DFCs do not power up with a Supervisor Engine 32)

  – Switch Fabric Modules

  – These switching modules:
—WS-X6704-10GE 4-port 10-Gigabit Ethernet XENPAK
—WS-X6748-SFP 48-port Gigabit Ethernet SFP

—WS-X6724-SFP 24-port Gigabit Ethernet SFP
—WS-X6816-GBIC 16-port Gigabit Ethernet GBIC
—WS-X6748-GE-TX 48-port 10/100/1000 RJ-45

 – 7600-SIP-600 SPA Interface Processor-600

 – Optical Services Modules (OSMs)

 – WS-X6182-2PA FlexWAN Module (the WS-X6582-2PA Enhanced FlexWAN Module is supported)

 – CISCO7603 3-slot chassis

 – These service modules:
—WS-SVC-WISM-1-K9 Wireless Services Module (WiSM)
—WS-SVC-AON-1-K9 Application-Oriented Networking (AON) Module
—WS-SVC-AGM-1-K9 Anomaly Guard Module
—WS-SVC-ADM-1-K9 Traffic Anomaly Detector Module
—WS-SVC-CSG-1 Content Services Gateway (CSG)
—WS-X6066-SLB-APC Content Switching Module (CSM)
—WS-X6066-SLB-S-K9 Content Switching Module with SSL (CSM-S)
—WS-SVC-PSD-1 Persistent Storage Device (PSD) Module
—WS-SVC-WLAN-1-K9 Wireless LAN service module
—WS-SVC-IPSEC-1 IPsec VPN acceleration services module

• Releases earlier than Release 12.2(18)SXF do not support Cisco IOS SLB with Supervisor Engine 32.

• Supervisor Engine 32 cannot support these software features and commands:

 – Egress multicast replication

 – Multicast replication mode detection

 – All fabric configuration commands

Supervisor Engine 32 Features

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SUP32-10GE-3B	2.39 A @42 V	Supervisor Engine 32: • One 10/100/1000 Mbps RJ-45 port	12.2(18)SXF
WS-SUP32-GE-3B	1.89 A @42 V	• WS-SUP32-10GE—two 10-Gigabit Ethernet ports (requires XENPAKs) • WS-SUP32-GE—eight Gigabit Ethernet SFP ports (requires Gigabit Ethernet SFPs) • QoS port architecture (Rx/Tx): **2q8t/1p3q8t** • 256-MB DRAM with the "IP BASE SSH LAN ONLY" image (does not apply to the "IP BASE SSH LAN ONLY (MODULAR)" image) • 512-MB DRAM with all other images • 256-MB bootflash • Policy Feature Card 3B (PFC3B; see the "Policy Feature Cards" section on page 41) • Multilayer Switch Feature Card 2A (MSFC2A): – 256-MB DRAM with the "IP BASE SSH LAN ONLY" image (does not apply to the "IP BASE SSH LAN ONLY (MODULAR)" image) – 512-MB DRAM with all other images – 64-MB bootflash	

Note See this publication for Supervisor Engine 32 hardware information:

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Module_Installation/Sup_Eng_Guide/supe_gd.html

Supervisor Engine 2 (CAT6000-SUP2/MSFC2, 7600-SUP2/MSFC2)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6K-S2U-MSFC2 **WS-X6K-S2-MSFC2**	3.46 A @42 V	Supervisor Engine 2 with Policy Feature Card 2 (PFC2): - ROMMON version 7.1(1) or later 32-MB bootflash device 256-MB DRAM (minimum) - dual-port 1000BASE-X GBIC uplinks - QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t** - Number of ports: 2 Number of port groups: 1 Port ranges per port group: 1–2 - Multilayer Switch Feature Card 2 (MSFC2) with 256-MB DRAM (minimum)	12.2(17d)SXB

Note

- Some Supervisor Engine 2 Release 12.2SX images are larger than the bootflash device. Supervisor Engine 2 ROMMON version 7.1(1) or later supports the MEM-C6K-ATA-1-64M= (64 MB) PCMCIA ATA FlashDisk device. See this publication:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_13488.html

- To use WS-X6K-S2-MSFC2 with 12.2SX releases, upgrade the memory.
  - MSFC2 DRAM—See this publication:

    http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_6953.html

  - Supervisor Engine 2 DRAM—See this publication:

    http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12693.html

  - Supervisor Engine 2 Bootflash—See this publication:

    http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12667.html

- Supervisor Engine 2 supports all GBICs supported by Release 12.2(17d)SXB and later releases.

Policy Feature Cards

Policy Feature Card Guidelines and Restrictions

- A Supervisor Engine 2 always has a PFC2; there are no PFC options for Supervisor Engine 2.

- The PFC2 supports a theoretical maximum of 128 K MAC addresses (32 K MAC addresses recommended maximum).

- The PFC3 supports a theoretical maximum of 64 K MAC addresses (32 K MAC addresses recommended maximum).

- The PFC3 partitions the hardware FIB table to route IPv4 unicast, IPv4 multicast, MPLS, and IPv6 unicast and multicast traffic in hardware. Traffic for routes that do not have entries in the hardware FIB table are routed by the MSFC in software.

  The defaults for XL mode are:

  - IPv4 unicast and MPLS—512,000 routes

  - IPv4 multicast and IPv6 unicast and multicast—256,000 routes

  The defaults for Non-XL mode are:

  - IPv4 unicast and MPLS—192,000 routes

  - IPv4 multicast and IPv6 unicast and multicast—32,000 routes

  ✎

  Note The size of the global internet routing table plus any local routes might exceed the non-XL mode default partition sizes.

  These are the theoretical maximum numbers of routes for the supported protocols (the maximums are not supported simultaneously):

  - XL mode:

    • IPv4 and MPLS—Up to 1,007,000 routes

    • IPv4 multicast and IPv6 unicast and multicast—Up to 503,000 routes

  - Non-XL mode:

    • IPv4 and MPLS—Up to 239,000 routes

    • IPv4 multicast and IPv6 unicast and multicast—Up to 119,000 routes

  Enter the mls cef maximum-routes command to repartition the hardware FIB table. IPv4 unicast and MPLS require one hardware FIB table entry per route. IPv4 multicast and IPv6 unicast and multicast require two hardware FIB table entries per route. Changing the partition for one protocol makes corresponding changes in the partitions of the other protocols. You must enter the **reload** command to put configuration changes made with the **mls cef maximum-routes** command into effect.

  ✎

  Note With a non-XL-mode system, if your requirements cannot be met by repartitioning the hardware FIB table, upgrade components as necessary to operate in XL mode.

- You cannot use one type of PFC3 (PFC3BXL, PFC3B, or PFC3A) on one supervisor engine and a different type on the other supervisor engine for redundancy. You must use identical policy feature cards for redundancy.

- With Release 12.2(17d)SXB and later releases, enter the **show platform hardware pfc mode** command to display the PFC3 mode.

- With Release 12.2(17b)SXA and Release 12.2(17b)SXA2, enter the **show platform earl-mode** command to display the PFC3 mode.

- PFC3A—These restrictions apply to a configuration with a PFC3A and these DFCs:
  - PFC3A and DFC3A—No restrictions (PFC3A mode).
  - PFC3A and DFC3B—The PFC3A restricts DFC3B functionality: the DFC3B functions as a DFC3A (PFC3A mode).
  - PFC3A and DFC3BXL—The PFC3A restricts DFC3BXL functionality: the DFC3BXL functions as a DFC3A (PFC3A mode).
  - PFC3A and DFC3C—The PFC3A restricts DFC3C functionality: the DFC3C functions as a DFC3A (PFC3A mode).
  - PFC3A and DFC3CXL—The PFC3A restricts DFC3CXL functionality: the DFC3CXL functions as a DFC3A (PFC3A mode).

- PFC3B—These restrictions apply to a configuration with a PFC3B and these DFCs:
  - PFC3B and DFC3A—PFC3B functionality is restricted by the DFC3A: after a reload with a DFC3A-equipped module installed, the PFC3B functions as a PFC3A (PFC3A mode).
  - PFC3B and DFC3B—No restrictions (PFC3B mode).
  - PFC3B and DFC3BXL—The PFC3B restricts DFC3BXL functionality: after a reload with a DFC3BXL-equipped module installed, the DFC3BXL functions as a DFC3B (PFC3B mode).
  - PFC3B and DFC3C—The PFC3B restricts DFC3C functionality: the DFC3C functions as a DFC3B (PFC3B mode).
  - PFC3B and DFC3CXL—The PFC3B restricts DFC3CXL functionality: the DFC3CXL functions as a DFC3B (PFC3B mode).

- PFC3BXL—These restrictions apply to a configuration with a PFC3BXL and these DFCs:
  - PFC3BXL and DFC3A—PFC3BXL functionality is restricted by the DFC3A: after a reload with a DFC3A-equipped module installed, the PFC3BXL functions as a PFC3A (PFC3A mode).
  - PFC3BXL and DFC3B—PFC3BXL functionality is restricted by the DFC3B: after a reload with a DFC3B-equipped module installed, the PFC3BXL functions as a PFC3B (PFC3B mode).
  - PFC3BXL and DFC3BXL—No restrictions (PFC3BXL mode).
  - PFC3BXL and DFC3C—Each restricts the functionality of the other: the PFC3BXL functions as a PFC3B and the DFC3C functions as a DFC3B (PFC3B mode).
  - PFC3BXL and DFC3CXL—The PFC3BXL restricts DFC3CXL functionality: the DFC3CXL functions as a DFC3BXL (PFC3BXL mode).

- Summary of the PFC modes:
  - PFC3A mode—Operating mode with a PFC3A or any DFC3As
  - PFC3B mode—Operating mode with PFC3B and any DFC3Bs or DFC3BXLs
  - PFC3BXL mode—Operating mode with PFC3BXL and any DFC3BXLs

- The features that require the PFC3BXL or PFC3B are not supported in PFC3A mode.

- With a PFC3BXL or PFC3B and no DFC3A-equipped switching modules installed at bootup, any DFC3A-equipped switching module installed after bootup remain powered down.

- To use DFC3A-equipped switching modules with a PFC3BXL or PFC3B, the DFC3A-equipped switching modules must be installed at bootup.
- To use DFC3B-equipped switching modules with a PFC3BXL, the DFC3B-equipped switching modules must be installed at bootup.

Policy Feature Card 3BXL

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6K-PFC3BXL	2.57 A@42 V	Policy Feature Card 3BXL (PFC3BXL)	
		Supported only with Supervisor Engine 720	12.2(17b)SXA

Note

- There are no memory upgrade options for WS-F6K-PFC3BXL.
- Use WS-F6K-PFC3BXL= to upgrade a WS-SUP720 or WS-SUP720-3B with a PFC3BXL. WS-F6K-PFC3BXL= includes 1 GB memory upgrades for the Supervisor Engine 720 and the MSFC3. See this publication for more information:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_16220.html

Policy Feature Card 3B

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6K-PFC3B	2.25 A@42 V	Policy Feature Card 3B (PFC3B)	
		With Supervisor Engine 720	12.2(17d)SXB1
		With Supervisor Engine 32	12.2(18)SXF

Note

- There are no memory upgrade options for WS-F6K-PFC3B.
- Use WS-F6K-PFC3BXL= to upgrade a WS-SUP720-3B with a PFC3BXL. WS-F6K-PFC3BXL= includes 1 GB memory upgrades for the Supervisor Engine 720 and the MSFC3. See this publication for more information:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_16220.html

Policy Feature Card 3A

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6K-PFC3A	2.25 A @42 V	Policy Feature Card 3A (PFC3A)	
		Supported only with Supervisor Engine 720	12.2(14)SX

Note

- There are no memory upgrade options for WS-F6K-PFC3A.

- WS-F6K-PFC3A is available only on WS-SUP720. It is not orderable.

Distributed and Centralized Forwarding Cards

Note See the "Policy Feature Cards" section on page 41 for Policy Feature Cards (PFC) and Distributed Forwarding Card (DFC) restrictions.

Distributed Forwarding Card 3CXL

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6700-DFC3CXL	2.35 A @42 V	Distributed Forwarding Card 3CXL (DFC3CXL) for use on CEF720 modules	
		Supported only with Supervisor Engine 720 and WS-X6708-10GE	12.2(18)SXF5

Distributed Forwarding Card 3C

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6700-DFC3C	1.65 A @42 V	Distributed Forwarding Card 3C (DFC3C) for use on CEF720 modules	
		Supported only with Supervisor Engine 720 and WS-X6708-10GE	12.2(18)SXF5

Distributed Forwarding Card 3BXL

WS-F6700-DFC3BXL

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6700-DFC3BXL	3.30 A@42 V	Distributed Forwarding Card 3BXL (DFC3BXL) for use on CEF720 modules	
		Supported only with Supervisor Engine 720	12.2(17d)SXB6

Note

- WS-F6700-DFC3BXL uses memory that is installed on the switching module.
- See this publication for information about WS-F6700-DFC3BXL upgrades:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_15893.html

WS-F6K-DFC3BXL

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6K-DFC3BXL	1.47 A@42 V	Distributed Forwarding Card 3BXL (DFC3BXL) for use on dCEF256 and CEF256 modules	
		Supported only with Supervisor Engine 720	12.2(18)SXD3

Note

- See this publication for information about WS-F6K-DFC3BXL memory upgrades:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12409.html

- Supervisor Engine 720 supports a WS-F6K-DFC3BXL on these WS-X6516-GBIC switching module hardware revisions:

  - Lower than 5.0
  - 5.5 and higher

- Supervisor Engine 720 does not support a DFC3 on WS-X6516-GBIC switching module hardware revisions 5.0 through 5.4. With a Supervisor Engine 720 and with a DFC3 installed, WS-X6516-GBIC switching module hardware revisions 5.0 through 5.4 do not power up.

- With a Supervisor Engine 720 but without a DFC3, WS-X6516-GBIC switching module hardware revisions 5.0 through 5.4 operate in bus mode.

- See external field notice 24494 for more information about Supervisor Engine 720 and a DFC3 on WS-X6516-GBIC switching modules:

  http://www.cisco.com/en/US/ts/fn/200/fn24494.html

Distributed Forwarding Card 3B

WS-F6700-DFC3B

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6700-DFC3B	2.70 A@42 V	Distributed Forwarding Card 3B (DFC3B) for use on CEF720 modules	
		Supported only with Supervisor Engine 720	12.2(17d)SXB6

Note

- WS-F6700-DFC3B uses memory that is installed on the switching module.
- See this publication for information about WS-F6700-DFC3B upgrades:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_15893.html

WS-F6K-DFC3B

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6K-DFC3B	1.67 A@42 V	Distributed Forwarding Card 3B (DFC3B) for use on dCEF256 and CEF256 modules	
		Supported only with Supervisor Engine 720	12.2(18)SXD3

Note

- See this publication for information about WS-F6K-DFC3B memory upgrades:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12409.html

- Supervisor Engine 720 supports a WS-F6K-DFC3B on these WS-X6516-GBIC switching module hardware revisions:
  - Lower than 5.0
  - 5.5 and higher

- Supervisor Engine 720 does not support a DFC3 on WS-X6516-GBIC switching module hardware revisions 5.0 through 5.4. With a Supervisor Engine 720 and with a DFC3 installed, WS-X6516-GBIC switching module hardware revisions 5.0 through 5.4 do not power up.

- With a Supervisor Engine 720 but without a DFC3, WS-X6516-GBIC switching module hardware revisions 5.0 through 5.4 operate in bus mode.

- See external field notice 24494 for more information about Supervisor Engine 720 and a DFC3 on WS-X6516-GBIC switching modules:

  http://www.cisco.com/en/US/ts/fn/200/fn24494.html

Distributed Forwarding Card 3A

WS-F6700-DFC3A

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6700-DFC3A	3.00 A@42 V	Distributed Forwarding Card 3A (DFC3A) for use on CEF720 modules	
		Supported only with Supervisor Engine 720	12.2(17a)SX

Note

- WS-F6700-DFC3A uses memory that is installed on the switching module.
- See this publication for information about WS-F6700-DFC3A memory upgrades:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12409.html

WS-F6K-DFC3A

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6K-DFC3A	2.57 A@42 V	Distributed Forwarding Card 3A (DFC3A) for use on dCEF256 and CEF256 modules	
		Supported only with Supervisor Engine 720	12.2(14)SX

Note

- See this publication for information about WS-F6K-DFC3A memory upgrades:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12409.html

- Supervisor Engine 720 supports a WS-F6K-DFC3A on these WS-X6516-GBIC switching module hardware revisions:
  - Lower than 5.0
  - 5.5 and higher

- Supervisor Engine 720 does not support a DFC3 on WS-X6516-GBIC switching module hardware revisions 5.0 through 5.4. With a Supervisor Engine 720 and with a DFC3 installed, WS-X6516-GBIC switching module hardware revisions 5.0 through 5.4 do not power up.

- With a Supervisor Engine 720 but without a DFC3, WS-X6516-GBIC switching module hardware revisions 5.0 through 5.4 operate in bus mode.

- See external field notice 24494 for more information about Supervisor Engine 720 and a DFC3 on WS-X6516-GBIC switching modules:

  http://www.cisco.com/en/US/ts/fn/200/fn24494.html

Distributed Forwarding Card (WS-F6K-DFC)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6K-DFC	2.10 A@42 V	Distributed Forwarding Card (DFC) for use on dCEF256 and CEF256 modules	
		Supported only with Supervisor Engine 2 **Note** Not supported in Release 12.2(18)SXE and Rebuilds	12.2(17d)SXB

Note

- Release 12.2(18)SXE does not support Supervisor Engine 2.
- WS-F6K-DFC requires a Switch Fabric Module.
- See this publication for information about WS-F6K-DFC memory upgrades:

    http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_12409.html

Centralized Forwarding Card (WS-F6700-CFC)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6700-CFC	0.75 A@42 V	Centralized Forwarding Card (CFC) for use on CEF720 modules	
		Supported only with Supervisor Engine 720	12.2(17a)SX

Note There are no memory upgrade options for WS-F6700-CFC.

Switch Fabric Modules

Note
- Switch fabric modules are supported only with Supervisor Engine 2.
- Except in 13-slot chassis, WS-X6500-SFM2 and WS-C6500-SFM can be used together to provide redundancy.
- 3-slot chassis do not support WS-X6500-SFM2 or WS-C6500-SFM.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6500-SFM2	3.09 A@42 V	Switch Fabric Module, version 2, to support dCEF256 modules	
		Supported only with Supervisor Engine 2	12.2(17d)SXB
Note WS-C6500-SFM2 supports all chassis except 3-slot chassis.			
WS-C6500-SFM	2.79 A@42 V	Switch Fabric Module to support dCEF256 modules	
		Supported only with Supervisor Engine 2	12.2(17d)SXB
Note WS-C6500-SFM does not support 13-slot chassis or 3-slot chassis.			

Transceivers

X2 Modules

✎

Note   WS-X6708-10GE does not support X2 modules shipped before the release of the WS-X6708-10GE switching module. The unsupported X2 modules are labeled with a number that ends with -01.

Product ID (append "=" for spares)	Product Description	Minimum Software Version
X2-10GB-LRM	10GBASE-LRM for FDDI-grade multimode fiber (MMF) **Note** Not supported by the **show idprom** command. (CSCsj35671)	12.2(18)SXF8
X2-10GB-CX4	10GBASE for CX4 (copper) cable	12.2(18)SXF5
X2-10GB-ER	10GBASE-ER Serial 1550-nm extended-reach, single-mode fiber (SMF), dispersion-shifted fiber (DSF)	12.2(18)SXF5
X2-10GB-LR	10GBASE-LR Serial 1310-nm long-reach, single-mode fiber (SMF), dispersion-shifted fiber (DSF)	12.2(18)SXF5
X2-10GB-LX4	10GBASE-LX4 Serial 1310-nm multimode (MMF)	12.2(18)SXF5
X2-10GB-SR	10GBASE-SR Serial 850-nm short-reach multimode (MMF)	12.2(18)SXF5

XENPAKs

Product ID (append "=" for spares)	Product Description	Minimum Software Version
XENPAK-10GB-LRM	10GBASE-LRM XENPAK Module for MMF **Note** Not supported by the **show idprom** command. (CSCsl21260)	12.2(18)SXF11
XENPAK-10GB-ZR	10GBASE for any SMF type	12.2(18)SXF
XENPAK-10GB-LW	10GBASE-LW XENPAK Module with WAN PHY for SMF	12.2(18)SXE
	Note XENPAK-10GB-LW operates at an interface speed compatible with SONET/SDH OC-192/STM-64 and supports transmission at a data rate of 9.6Gbps.	
DWDM-XENPAK	10GBASE dense wavelength-division multiplexing (DWDM) 100-GHz ITU grid	12.2(18)SXE
WDM-XENPAK-REC	10GBASE receive-only wavelength division multiplexing (WDM)	12.2(18)SXE
XENPAK-10GB-CX4	10GBASE for CX4 (copper) cable	12.2(17d)SXB1
XENPAK-10GB-SR	10GBASE-SR Serial 850-nm short-reach multimode (MMF)	12.2(17a)SX1
XENPAK-10GB-LX4	10GBASE-LX4 Serial 1310-nm multimode (MMF)	12.2(17a)SX1

Product ID (append "=" for spares)	Product Description	Minimum Software Version
XENPAK-10GB-ER+	10GBASE-ER Serial 1550-nm extended-reach, single-mode fiber (SMF), dispersion-shifted fiber (DSF)	12.2(17a)SX
XENPAK-10GB-ER	10GBASE-ER Serial 1550-nm extended-reach, single-mode fiber (SMF), dispersion-shifted fiber (DSF)	12.2(17a)SX
	Note Release 12.2(17d)SXB1 and later releases do not support XENPAK-10GB-ER units with Part No. 800-24557-01, as described in this external field notice (CSCee47030): http://www.cisco.com/en/US/ts/fn/200/fn29736.html	
XENPAK-10GB-LR	10GBASE-LR Serial 1310-nm long-reach, single-mode fiber (SMF), dispersion-shifted fiber (DSF)	12.2(17a)SX
XENPAK-10GB-LR+	10GBASE-LR Serial 1310-nm long-reach, single-mode fiber (SMF), dispersion-shifted fiber (DSF)	12.2(17a)SX

Small Form-Factor Pluggable (SFP) Modules

These sections describe SFPs:

- Gigabit Ethernet SFPs, page 52
- Fast Ethernet SFPs, page 53

Gigabit Ethernet SFPs

✎
Note   See the "Unsupported Hardware" section on page 114 for information about unsupported DWDM-SFPs.

Product ID (append "=" for spares)	Product Description	Minimum Software Version
DWDM-SFP-6061	1000BASE-DWDM 1560.61 nm SFP (100-GHz ITU grid) SFP module	12.2(18)SXF8
DWDM-SFP-5979	1000BASE-DWDM 1559.79 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-5898	1000BASE-DWDM 1558.98 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-5655	1000BASE-DWDM 1556.55 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-5575	1000BASE-DWDM 1555.75 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-5494	1000BASE-DWDM 1554.94 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-5413	1000BASE-DWDM 1554.13 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-5252	1000BASE-DWDM 1552.52 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-5172	1000BASE-DWDM 1551.72 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-5092	1000BASE-DWDM 1550.92 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-5012	1000BASE-DWDM 1550.12 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-4851	1000BASE-DWDM 1548.51 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-4772	1000BASE-DWDM 1547.72 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-4612	1000BASE-DWDM 1546.12 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-4453	1000BASE-DWDM 1544.53 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-4373	1000BASE-DWDM 1543.73 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-4294	1000BASE-DWDM 1542.94 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-4214	1000BASE-DWDM 1542.14 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-4056	1000BASE-DWDM 1540.56 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3977	1000BASE-DWDM 1539.77 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3898	1000BASE-DWDM 1538.98 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3819	1000BASE-DWDM 1538.19 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3661	1000BASE-DWDM 1536.61 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3582	1000BASE-DWDM 1535.82 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3504	1000BASE-DWDM 1535.04 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3425	1000BASE-DWDM 1534.25 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3268	1000BASE-DWDM 1532.68 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3190	1000BASE-DWDM 1531.90 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3112	1000BASE-DWDM 1531.12 nm SFP (100-GHz ITU grid) SFP module	
DWDM-SFP-3033	1000BASE-DWDM 1530.33 nm SFP (100-GHz ITU grid) SFP module	
GLC-BX-D	1000BASE-BX10 SFP module for single-strand SMF, 1490-nm TX/1310-nm RX wavelength	12.2(18)SXE

Product ID (append "=" for spares)	Product Description	Minimum Software Version
GLC-BX-U	1000BASE-BX10 SFP module for single-strand SMF, 1310-nm TX/1490-nm RX wavelength	12.2(18)SXE
GLC-ZX-SM	1000BASE-ZX SFP module	12.2(17d)SXB1
CWDM-SFP	1000BASE coarse wavelength-division multiplexing (CWDM) SFP module	12.2(17a)SX
GLC-T	1000BASE-T 10/100/1000 SFP module **Note** Supported only at 1000 Mbps in supervisor engines.	12.2(17a)SX
GLC-LH-SMD GLC-LH-SM	1000BASE-LX/LH SFP	12.2(17a)SX
GLC-SX-MMD GLC-SX-MM	1000BASE-SX SFP	12.2(14)SX

Fast Ethernet SFPs

Note Only WS-X6148-FE-SFP supports these Fast Ethernet SFPs.

Product ID (append "=" for spares)	Product Description	Minimum Software Version
GLC-FE-100BX-U	100BASE-BX10-U SFP	12.2(18)SXF2
GLC-FE-100BX-D	100BASE-BX10-D SFP	12.2(18)SXF2
GLC-FE-100EX	100BASEEX SFP	12.2(18)SXF
GLC-FE-100ZX	100BASEZX SFP	12.2(18)SXF
GLC-FE-100FX	100BASEFX SFP	12.2(18)SXF
GLC-FE-100LX	100BASELX SFP	12.2(18)SXF

Gigabit Interface Converters (GBICs)

Note The support listed in this section applies to all modules that use GBICs, including OSM LAN ports and OSM Gigabit Ethernet WAN ports, except as noted.

Product ID (append "=" for spares)	Product Description	Minimum Software Version
WDM-GBIC-REC	Receive-only wavelength division multiplexing (WDM) GBIC	12.2(18)SXE
DWDM-GBIC	Dense wavelength division multiplexing (DWDM) GBIC	12.2(17a)SX

Product ID (append "=" for spares)	Product Description	Minimum Software Version
CWDM-GBIC-1470	Cisco 1000BASE-CWDM GBIC, 1470 nm (Gray)	12.2(17a)SX
CWDM-GBIC-1490	Cisco 1000BASE-CWDM GBIC, 1490 nm (Violet)	
CWDM-GBIC-1510	Cisco 1000BASE-CWDM GBIC, 1510 nm (Blue)	
CWDM-GBIC-1530	Cisco 1000BASE-CWDM GBIC, 1530 nm (Green)	
CWDM-GBIC-1550	Cisco 1000BASE-CWDM GBIC, 1550 nm (Yellow)	
CWDM-GBIC-1570	Cisco 1000BASE-CWDM GBIC, 1570 nm (Orange)	
CWDM-GBIC-1590	Cisco 1000BASE-CWDM GBIC, 1590 nm (Red)	
CWDM-GBIC-1610	Cisco 1000BASE-CWDM GBIC, 1610 nm (Brown)	
WS-G5483	1000BASET GBIC **Note** 1000BASET GBIC transceivers are not supported on OSM LAN ports and OSM Gigabit Ethernet WAN ports.	12.2(14)SX
WS-G5484	Short wavelength, 1000BASE-SX	12.2(14)SX
WS-G5486	Long wavelength/long haul, 1000BASE-LX/LH	12.2(14)SX
WS-G5487	Extended distance, 1000BASE-ZX	12.2(14)SX

10-Gigabit Ethernet Switching Modules

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6708-10G-3C (**WS-X6708-10GE** with WS-F6700-DFC3C)	10.58A @42 V	8-port 10-Gigabit Ethernet X2module	
WS-X6708-10G-3CXL (**WS-X6708-10GE** with WS-F6700-DFC3CXL**)**	11.28A @ 42V	• dCEF720 • Supports egress multicast replication • QoS port architecture (Rx/Tx): **8q4t/1p7q4t** • Dual switch-fabric connections Fabric Channel #1: Ports 2, 3, 6, 8 Fabric Channel #2: Ports 1, 4, 5, 7 • Number of ports: 8 Number of port groups: 8 Port ranges per port group: 1 port in each group	
		Supported only with Supervisor Engine 720	12.2(18)SXF5

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version

Note

- To use Cisco IOS Software Modularity images with 6700 series switching modules, ensure that the 6700 series switching modules have switching module ROMMON version 12.2(18r)S1 or later. To display the switching module ROMMON version, enter the **remote command module** *module_slot_number* **show version | include ROM** command. To upgrade the switching module ROMMON, see this document:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/rommon/OL_6143.html

- WS-X6708-10G-3C and WS-X6708-10G-3CXL are the orderable product IDs.

- The front panel is labeled WS-X6708-10GE.

- Cisco IOS software commands display WS-X6708-10GE with either WS-F6700-DFC3C or WS-F6700-DFC3CXL.

- To configure WS-X6708-10GE port oversubscription, refer to the **hw-module oversubscription** command in the command reference at this URL:

  http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-f1.html#GUID-B5F8BEA0-B5DD-47BE-82F5-183765DF0F64

- In these chassis, operation of a WS-X6708-10GE switching module without over-temperature alarms is supported only with operating temperatures up to 40° C:

  - WS-C6513
  - CISCO7613
  - WS-C6509
  - WS-C6509-NEB
  - OSR-7609
  - WS-C6506
  - CISCO7606

  Full NEBS-compliance requires support for operating temperatures up to 55° C, which is available in all other chassis that support WS-X6708-10GE.

  ✎
  Note   All E-Series chassis provide NEBS compliance.

- Support in the WS-C6509-NEB-A chassis requires two FAN-MOD-09 modules.

- WS-X6708-10GE ports do not support VACL capture. (CSCsb59015)

- WS-X6708-10GE is not supported in the WS-C6503 and CISCO7603 chassis.

- In a 13-slot chassis, WS-X6708-10GE is supported only in slots 9 through 13 and does not power up in other slots.

- On WS-X6708-10GE ports, STP BPDUs are not exempt from Traffic Storm Control multicast suppression. Do not configure multicast suppression on STP-protected WS-X6708-10GE ports that interconnect network devices. (CSCsg86315)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6704-10GE	6.28 A@42 V	4-port 10-Gigabit Ethernet XENPAK	
		• CEF720 with WS-F6700-CFC (adds 0.75 A@42 V)	
		• dCEF720 with WS-F6700-DFC3BXL (adds 3.30 A@42 V)	
		• dCEF720 with WS-F6700-DFC3B (adds 2.70 A@42 V)	
		• dCEF720 with WS-F6700-DFC3A (adds 3.00 A@42 V)	
		• Supports egress multicast replication	
		• QoS port architecture (Rx/Tx):	
		– With DFC3: **8q8t/1p7q8t**	
		– With CFC: **1q8t/1p7q8t**	
		• Dual switch-fabric connections Fabric Channel #1: Ports 3 and 4 Fabric Channel #2: Ports 1 and 2	
		• Number of ports: 4 Number of port groups: 4 Port ranges per port group: 1 port in each group	
		Supported only with Supervisor Engine 720	12.2(17a)SX

Note

- To use Cisco IOS Software Modularity images with 6700 series switching modules, ensure that the 6700 series switching modules have switching module ROMMON version 12.2(18r)S1 or later. To display the switching module ROMMON version, enter the **remote command module** *module_slot_number* **show version | include ROM** command. To upgrade the switching module ROMMON, see this document:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/rommon/OL_6143.html

- WS-X6704-10GE requires one of the following:

  - WS-F6700-DFC3BXL (3.30 A@42 V)

  - WS-F6700-DFC3B (2.70 A@42 V)

  - WS-F6700-DFC3A (3.00 A@42 V)

  - WS-F6700-CFC (0.75 A@42 V)

- WS-X6704-10GE ships with WS-F6700-CFC installed unless ordered with WS-F6700-DFC3BXL, WS-F6700-DFC3B, or WS-F6700-DFC3A.

- WS-X6704-10GE is supported in the WS-C6503-E chassis.

- WS-X6704-10GE is not supported in the WS-C6503 and CISCO7603 chassis.

- In a 13-slot chassis, WS-X6704-10GE is supported only in slots 9 through 13 and does not power up in other slots.

- On WS-X6704-10GE ports, STP BPDUs are not exempt from Traffic Storm Control multicast suppression. Do not configure multicast suppression on STP-protected WS-X6704-10GE ports that interconnect network devices. (CSCsg86315)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6502-10GE	3.30 A @42 V	1-port 10-Gigabit Ethernet	
		• With Supervisor Engine 720:	
		– dCEF256 with WS-F6K-DFC3BXL (adds 1.47 A @42 V)	
		– dCEF256 with WS-F6K-DFC3B (adds 1.67 A @42 V)	
		– dCEF256 with WS-F6K-DFC3A (adds 2.57 A @42 V)	
		• With Supervisor Engine 2, dCEF256 with WS-F6K-DFC (adds 2.10 A @42 V)	
		• QoS port architecture (Rx/Tx): **1p1q8t/1p2q1t**	
		• Number of ports: 1 Number of port groups: 1 Port ranges per port group: 1 port in 1 group	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Note WS-X6502-10GE does not support ISL encapsulation.

Optical Interface Module (OIM) for WS-X6502-10GE

WS-G6488	10GBASE-LR serial 1310 nm long-reach OIM	12.2(14)SX
WS-G6483	10GBASE-ER serial 1550 nm extended-reach OIM	12.2(14)SX

Gigabit Ethernet Switching Modules

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6748-SFP	5.32 A@42 V	48-port Gigabit Ethernet SFP	
		• CEF720 with WS-F6700-CFC (adds 0.75 A@42 V)	
		• dCEF720 with WS-F6700-DFC3BXL (adds 3.30 A@42 V)	
		• dCEF720 with WS-F6700-DFC3B (adds 2.70 A@42 V)	
		• dCEF720 with WS-F6700-DFC3A (adds 3.00 A@42 V)	
		• Supports egress multicast replication	
		• QoS architecture:	
		– With DFC3: **2q8t/1p3q8t**	
		– With CFC: **1q8t/1p3q8t**	
		• Dual switch-fabric connections Fabric Channel #1: Ports 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48 Fabric Channel #2: Ports 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47	
		• Number of ports: 48 Number of port groups: 4 Port ranges per port group: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48	
		Supported only with Supervisor Engine 720	12.2(17d)SXB

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version

Note

- To use Cisco IOS Software Modularity images with 6700 series switching modules, ensure that the 6700 series switching modules have switching module ROMMON version 12.2(18r)S1 or later. To display the switching module ROMMON version, enter the **remote command module** *module_slot_number* **show version | include ROM** command. To upgrade the switching module ROMMON, see this document:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/rommon/OL_6143.html

- WS-X6748-SFP requires one of the following:

  - WS-F6700-DFC3BXL (3.30 A@42 V)

  - WS-F6700-DFC3B (2.70 A@42 V)

  - WS-F6700-DFC3A (3.00 A@42 V)

  - WS-F6700-CFC (0.75 A@42 V)

- WS-X6748-SFP ships with WS-F6700-CFC installed unless ordered with WS-F6700-DFC3BXL, WS-F6700-DFC3B, or WS-F6700-DFC3A.

- WS-X6748-SFP is supported in the WS-C6503-E chassis.

- WS-X6748-SFP is not supported in the WS-C6503 and CISCO7603 chassis.

- In a 13-slot chassis, WS-X6748-SFP is supported only in slots 9 through 13 and does not power up in other slots.

- On WS-X6748-SFP ports, STP BPDUs are not exempt from Traffic Storm Control multicast suppression. Do not configure multicast suppression on STP-protected WS-X6748-SFP ports that interconnect network devices. (CSCsg86315)

- See the "Small Form-Factor Pluggable (SFP) Modules" section on page 51.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version

WS-X6724-SFP	2.23 A@42 V	24-port Gigabit Ethernet SFP
		
		• CEF720 with WS-F6700-CFC (adds 0.75 A@42 V)
		• dCEF720 with WS-F6700-DFC3BXL (adds 3.30 A@42 V)
		• dCEF720 with WS-F6700-DFC3B (adds 2.70 A@42 V)
		• dCEF720 with WS-F6700-DFC3A (adds 3.00 A@42 V)
		• Supports egress multicast replication
		• QoS architecture:
		  – With DFC3: **2q8t/1p3q8t**
		  – With CFC: **1q8t/1p3q8t**
		• Number of ports: 24
		Number of port groups: 2
		Port ranges per port group: 1–12, 13–24	

		Supported only with Supervisor Engine 720	12.2(17a)SX
		WS-X6724-SFP HW rev 2.3 or later (supported only with Supervisor Engine 720)	12.2(17d)SXB1

Note

- To use Cisco IOS Software Modularity images with 6700 series switching modules, ensure that the 6700 series switching modules have switching module ROMMON version 12.2(18r)S1 or later. To display the switching module ROMMON version, enter the **remote command module** *module_slot_number* **show version | include ROM** command. To upgrade the switching module ROMMON, see this document:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/rommon/OL_6143.html

- WS-X6724-SFP requires one of the following:
  - WS-F6700-DFC3BXL (3.30 A@42 V)
  - WS-F6700-DFC3B (2.70 A@42 V)
  - WS-F6700-DFC3A (3.00 A@42 V)
  - WS-F6700-CFC (0.75 A@42 V)

- WS-X6724-SFP ships with WS-F6700-CFC installed unless ordered with WS-F6700-DFC3BXL, WS-F6700-DFC3B, or WS-F6700-DFC3A.

- WS-X6724-SFP is supported in the WS-C6503-E chassis.

- WS-X6724-SFP is not supported in the WS-C6503 and CISCO7603 chassis.

- WS-X6724-SFP is supported in all slots of a 13-slot chassis.

- On WS-X6724-SFP ports, STP BPDUs are not exempt from Traffic Storm Control multicast suppression. Do not configure multicast suppression on STP-protected WS-X6724-SFP ports that interconnect network devices. (CSCsg86315)

- See the "Small Form-Factor Pluggable (SFP) Modules" section on page 51.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version

WS-X6816-GBIC		16-port Gigabit Ethernet GBIC
		
		• dCEF256
		
		• QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t**
		
		• Dual switch-fabric connections
		  Fabric Channel #1: Ports 1–8
		  Fabric Channel #2: Ports 9–16
		
		• Number of ports: 16
		  Number of port groups: 2
		  Port ranges per port group: 1–8, 9–16	

	3.84 A@42 V	With Supervisor Engine 720	12.2(14)SX
	5.94 A@42 V	With Supervisor Engine 2	12.2(17d)SXB

Note

- WS-X6816-GBIC requires one of these for use with Supervisor Engine 720:
    - WS-F6K-DFC3BXL (adds 1.47 A@42 V)
    - WS-F6K-DFC3B (adds 1.67 A@42 V)
    - WS-F6K-DFC3A (adds 2.57 A@42 V)
- WS-X6816-GBIC requires WS-F6K-DFC for use with Supervisor Engine 2.
- In a 13-slot chassis, WS-X6816-GBIC is supported only in slots 9 through 13 and does not power up in other slots.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version

WS-X6516A-GBIC	3.62 A@42 V	16-port Gigabit Ethernet GBIC
		
		• CEF256
		
		• With Supervisor Engine 720:
		    – dCEF256 with WS-F6K-DFC3BXL (adds 1.47 A@42 V)
		    – dCEF256 with WS-F6K-DFC3B (adds 1.67 A@42 V)
		    – dCEF256 with WS-F6K-DFC3A (adds 2.57 A@42 V)
		
		• With Supervisor Engine 2, dCEF256 with WS-F6K-DFC (adds 2.10 A@42 V)
		
		• 1-MB per-port packet buffers
		
		• Supports egress multicast replication
		
		• QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t**
		
		• Number of ports: 16
		  Number of port groups: 2
		  Port ranges per port group: 1–8, 9–16	

		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6516-GBIC	3.40 A@42 V	16-port Gigabit Ethernet GBIC	
		• CEF256	
		• With Supervisor Engine 720:	
		– dCEF256 with WS-F6K-DFC3BXL (adds 1.47 A@42 V)	
		– dCEF256 with WS-F6K-DFC3B (adds 1.67 A@42 V)	
		– dCEF256 with WS-F6K-DFC3A (adds 2.57 A@42 V)	
		• With Supervisor Engine 2, dCEF256 with WS-F6K-DFC (adds 2.10 A@42 V)	
		• 512-KB per-port packet buffers	
		• QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t**	
		• Number of ports: 16 Number of port groups: 2 Port ranges per port group: 1–8, 9–16	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Note

- Supervisor Engine 720 supports a DFC3 on these WS-X6516-GBIC hardware revisions:
    - Lower than 5.0
    - 5.5 and higher
- Supervisor Engine 720 does not support a DFC3 on WS-X6516-GBIC hardware revisions 5.0 through 5.4. With a Supervisor Engine 720 and with a DFC3 installed, WS-X6516-GBIC hardware revisions 5.0 through 5.4 do not power up.
- With a Supervisor Engine 720 but without a DFC3, WS-X6516-GBIC hardware revisions 5.0 through 5.4 operate in bus mode.
- See external field notice 24494 for more information:

    http://www.cisco.com/en/US/ts/fn/200/fn24494.html

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6416-GBIC	2.81 A@42 V	16-port Gigabit Ethernet GBIC	
		• QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t**	
		• Number of ports: 16 Number of port groups: 2 Port ranges per port group: 1–8, 9–16	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Product ID (append "=" for spares)	Power Required	Product Description		Minimum Software Version
WS-X6416-GE-MT	2.50 A @42 V	16-Port Gigabit Ethernet MT-RJ		
		• QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t**		
		• Number of ports: 16 Number of port groups: 2 Port ranges per port group: 1–8, 9–16		
			With Supervisor Engine 720	12.2(14)SX
			With Supervisor Engine 32	12.2(18)SXF
			With Supervisor Engine 2	12.2(17d)SXB
WS-X6316-GE-TX	5.15 A @42 V	16-port Gigabit Ethernet RJ-45		
		• QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t**		
		• Number of ports: 16 Number of port groups: 2 Port ranges per port group: 1–8, 9–16		
			With Supervisor Engine 720	12.2(14)SX
			With Supervisor Engine 32	12.2(18)SXF
			With Supervisor Engine 2	12.2(17d)SXB
WS-X6408A-GBIC	2.00 A @42 V	8-port Gigabit Ethernet GBIC		
		• QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t**		
		• Number of ports: 8 Number of port groups: 1 Port ranges per port group: 1–8		
			With Supervisor Engine 720	12.2(14)SX
			With Supervisor Engine 32	12.2(18)SXF
			With Supervisor Engine 2	12.2(17d)SXB
WS-X6408-GBIC	2.00 A @42 V	8-port Gigabit Ethernet GBIC		
		• QoS port architecture (Rx/Tx): **1q4t/2q2t**		
		• Number of ports: 8 Number of port groups: 1 Port ranges per port group: 1–8		
			With Supervisor Engine 720	12.2(14)SX
			With Supervisor Engine 32	12.2(18)SXF
			With Supervisor Engine 2	12.2(17d)SXB

Note

• Caveat CSCec65943 prevents support of the WS-X6408-GBIC switching module in Release 12.2(17a)SX.

• Caveat CSCec65943 is resolved in Release 12.2(17a)SX1 and later releases.

Power over Ethernet Daughtercards

Note The power over Ethernet (PoE) daughtercard "Power Required" values do not include the power drawn by phones.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-F6K-FE48X2-AF	0.42 A@42 V	IEEE 802.3af PoE daughtercard for WS-X6148X2-RJ-45 and WS-X6196-RJ-21.	
		With Supervisor Engine 720	12.2(18)SXF
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(18)SXF2
WS-F6K-GE48-AF **WS-F6K-48-AF**	0.18 A@42 V	IEEE 802.3af PoE daughtercard for: • WS-X6548-GE-TX • WS-X6148-GE-TX • WS-X6148A-GE-TX • WS-X6148A-RJ-45 **Note** WS-F6K-GE48-AF and WS-F6K-48-AF are not FRUs for these switching modules: • WS-X6148-RJ-45 or WS-X6148-RJ-45V (replace with WS-X6148-45AF-UG=). • WS-X6148-RJ-21 or WS-X6148-RJ-21V (replace with WS-X6148-21AF-UG=).	
		With Supervisor Engine 720	12.2(17d)SXB
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB
WS-F6K-VPWR-GE	0.42 A@42 V	PoE daughtercard for WS-X6548-GE-TX and WS-X6148-GE-TX	
		With Supervisor Engine 720	12.2(17a)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB
WS-F6K-VPWR	None	PoE daughtercard for: • WS-X6348-RJ-45 • WS-X6348-RJ-21V • WS-X6148-RJ-45 • WS-X6148-RJ-21	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

10/100/1000 Ethernet Switching Modules

Product ID (append "=" for spares)	Power Required	Product Description		Minimum Software Version
WS-X6748-GE-TX	7.00 A@42 V	48-port 10/100/1000 RJ-45		
		• CEF720 with WS-F6700-CFC (adds 0.75 A@42 V)		
		• dCEF720 with WS-F6700-DFC3BXL (adds 3.30 A@42 V)		
		• dCEF720 with WS-F6700-DFC3B (adds 2.70 A@42 V)		
		• dCEF720 with WS-F6700-DFC3A (adds 3.00 A@42 V)		
		• Supports egress multicast replication		
		• QoS architecture:		
		– With DFC3: **2q8t/1p3q8t**		
		– With CFC: **1q8t/1p3q8t**		
		• Dual switch-fabric connections Fabric Channel #1: Ports 25–48 Fabric Channel #2: Ports 1–24		
		• Number of ports: 48 Number of port groups: 4 Port ranges per port group: 1–12, 13–24, 25–36, 37–48		
		Supported only with Supervisor Engine 720		12.2(17a)SX

Note

- To use Cisco IOS Software Modularity images with 6700 series switching modules, ensure that the 6700 series switching modules have switching module ROMMON version 12.2(18r)S1 or later. To display the switching module ROMMON version, enter the **remote command module** *module_slot_number* **show version | include ROM** command. To upgrade the switching module ROMMON, see this document:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/rommon/OL_6143.html

- WS-X6748-GE-TX requires one of the following:

  - WS-F6700-DFC3BXL (3.30 A@42 V)

  - WS-F6700-DFC3B (2.70 A@42 V)

  - WS-F6700-DFC3A (3.00 A@42 V)

  - WS-F6700-CFC (0.75 A@42 V)

- WS-X6748-GE-TX ships with WS-F6700-CFC installed unless ordered with WS-F6700-DFC3BXL, WS-F6700-DFC3B, or WS-F6700-DFC3A.

- WS-X6748-GE-TX is supported in the WS-C6503-E chassis.

- WS-X6748-GE-TX is not supported in the WS-C6503 and CISCO7603 chassis.

- In a 13-slot chassis, WS-X6748-GE-TX is supported only in slots 9 through 13 and does not power up in other slots.

- On WS-X6748-GE-TX ports, STP BPDUs are not exempt from Traffic Storm Control multicast suppression. Do not configure multicast suppression on STP-protected WS-X6748-GE-TX ports that interconnect network devices. (CSCsg86315)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6548-GE-TX	2.98 A @42 V	48-port 10/100/1000 Mbps	
WS-X6548V-GE-TX	3.40 A @42 V	• RJ-45	
WS-X6548-GE-45AF	3.16 A @42 V	• CEF256	
		• WS-X6548-GE-TX supports:	
		– WS-F6K-VPWR-GE	
		– WS-F6K-GE48-AF	
		– WS-F6K-48-AF	
		• WS-X6548V-GE-TX has WS-F6K-VPWR-GE	
		• WS-X6548-GE-45AF has WS-F6K-GE48-AF or WS-F6K-48-AF	
		• QoS port architecture (Rx/Tx): **1q2t/1p2q2t**	
		• Number of ports: 48 Number of port groups: 2 Port ranges per port group: 1–24, 25–48	
		• The aggregate bandwidth of each set of 8 ports (1–8, 9–16, 17–24, 25–32, 33–40, and 41–48) is 1 Gbps.	
		With Supervisor Engine 720 (except WS-F6K-GE48-AF or WS-F6K-48-AF)	12.2(17a)SX
		WS-F6K-GE48-AF or WS-F6K-48-AF with Supervisor Engine 720	12.2(17d)SXB
		With Supervisor Engine 32	12.2(18)SXF
		WS-F6K-GE48-AF or WS-F6K-48-AF with Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB
		WS-F6K-GE48-AF or WS-F6K-48-AF with Supervisor Engine 2	12.2(17d)SXB

Note

- Release 12.2(17b)SXA and later releases provide support for more than 1 Gbps of traffic per EtherChannel on the WS-X6548-GE-TX (and voice-power daughtercard equipped) switching modules.

- WS-X6548-GE-TX and WS-X6548V-GE-TX do not support these features:
  - With Release 12.2(17a)SX and Release 12.2(17a)SX1, more than 1 Gbps of traffic per EtherChannel
  - DFCs
  - ISL trunking
  - Jumbo frames
  - 802.1Q tunneling
  - Traffic storm control

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6148A-GE-TX	2.50 A @42 V	48-port 10/100/1000 Mbps	
WS-X6148A-GE-45AF	2.68 A @42 V	• RJ-45	
		• WS-X6148A-GE-TX supports WS-F6K-GE48-AF or WS-F6K-48-AF	
		• WS-X6148A-GE-45AF has WS-F6K-GE48-AF or WS-F6K-48-AF	
		• QoS port architecture (Rx/Tx): **1q2t/1p3q8t**	
		• Number of ports: 48 Number of port groups: 6 Port ranges per port group: 1–8, 9–16, 17–24, 25–32, 33–40, 41–48	
		• The aggregate bandwidth of each port group is 1 Gbps.	
		With Supervisor Engine 720	12.2(18)SXF
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(18)SXF2

Note WS-X6148A-GE-TX and WS-X6148A-GE-45AF do not support these features:

• WS-F6K-DFC3A, WS-F6K-DFC3B, or WS-F6K-DFC3BXL

• Traffic storm control

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6148-GE-TX	2.47 A @42 V	48-port 10/100/1000 Mbps	
WS-X6148V-GE-TX	2.89 A @42 V	• RJ-45	
WS-X6148-GE-45AF	2.65 A @42 V	• WS-X6148-GE-TX supports:	

48-port 10/100/1000 Mbps

- RJ-45
- WS-X6148-GE-TX supports:
    - WS-F6K-VPWR-GE
    - WS-F6K-GE48-AF
    - WS-F6K-48-AF
- WS-X6148V-GE-TX has WS-F6K-VPWR-GE
- WS-X6148-GE-45AF has WS-F6K-GE48-AF or WS-F6K-48-AF
- QoS port architecture (Rx/Tx): **1q2t/1p2q2t**
- Number of ports: 48
  Number of port groups: 2
  Port ranges per port group: 1–24, 25–48
- The aggregate bandwidth of each set of 8 ports (1–8, 9–16, 17–24, 25–32, 33–40, and 41–48) is 1 Gbps.

Product Description	Minimum Software Version
With Supervisor Engine 720 (except WS-F6K-GE48-AF or WS-F6K-48-AF)	12.2(17a)SX
WS-F6K-GE48-AF or WS-F6K-48-AF with Supervisor Engine 720	12.2(17d)SXB
With Supervisor Engine 32	12.2(18)SXF
WS-F6K-GE48-AF or WS-F6K-48-AF with Supervisor Engine 32	12.2(18)SXF
With Supervisor Engine 2	12.2(17d)SXB
WS-F6K-GE48-AF or WS-F6K-48-AF with Supervisor Engine 2	12.2(17d)SXB

Note WS-X6148-GE-TX, WS-X6148V-GE-TX, and WS-X6148-GE-45AF do not support these features:

- More than 1 Gbps of traffic per EtherChannel
- WS-F6K-DFC3A, WS-F6K-DFC3B, or WS-F6K-DFC3BXL
- ISL trunking
- Jumbo frames
- 802.1Q tunneling
- Traffic storm control

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6516-GE-TX	3.45 A@42 V	16-port 10/100/1000BASE-T	
		• CEF256	
		• With Supervisor Engine 720:	
		– dCEF256 with WS-F6K-DFC3BXL (adds 1.47 A@42 V)	
		– dCEF256 with WS-F6K-DFC3B (adds 1.67 A@42 V)	
		– dCEF256 with WS-F6K-DFC3A (adds 2.57 A@42 V)	
		• With Supervisor Engine 2, dCEF256 with WS-F6K-DFC (adds 2.10 A@42 V)	
		• QoS port architecture (Rx/Tx): **1p1q4t/1p2q2t**	
		• Number of ports: 16 Number of port groups: 2 Port ranges per port group: 1–8, 9–16	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Fast Ethernet Switching Modules

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6148-FE-SFP	2.30 A@42 V	48-port 100BASE-FX	
		• Requires Fast Ethernet SFPs	
		• QoS port architecture (Rx/Tx): **1p1q4t/1p3q8t**	
		• Number of ports: 48 Number of port groups: 3 Port ranges per port group: 1–16, 17–32, and 33–48	
		With Supervisor Engine 720	12.2(18)SXF
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(18)SXF2

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6524-100FX-MM	1.90 A@42 V	24-port 100FX Ethernet multimode	
		• CEF256	
		• With Supervisor Engine 720:	
		– dCEF256 with WS-F6K-DFC3BXL (adds 1.47 A@42 V)	
		– dCEF256 with WS-F6K-DFC3B (adds 1.67 A@42 V)	
		– dCEF256 with WS-F6K-DFC3A (adds 2.57 A@42 V)	
		• With Supervisor Engine 2, dCEF256 with WS-F6K-DFC (adds 2.10 A@42 V)	
		• QoS port architecture (Rx/Tx): **1p1q0t/1p3q1t**	
		• Number of ports: 24 Number of port groups: 1 Port ranges per port group: 1–24	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB
WS-X6324-100FX-SM	1.52 A@42 V	24-port 100FX Ethernet	
WS-X6324-100FX-MM	1.52 A@42 V	• Single mode and multimode MT-RJ	
		• 128-KB per-port packet buffers	
		• QoS port architecture (Rx/Tx): **1q4t/2q2t**	
		• Number of ports: 24 Number of port groups: 2 Port ranges per port group: 1–12, 13–24	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB
WS-X6224-100FX-MT	1.90 A@42 V	24-port 100FX Ethernet Multimode MT-RJ	
		• QoS port architecture (Rx/Tx): **1q4t/2q2t**	
		• Number of ports: 24 Number of port groups: 2 Port ranges per port group: 1–12, 13–24	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Ethernet/Fast Ethernet (10/100) Switching Modules

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6548-RJ-45	2.90 A@42 V	48-port 10/100TX RJ-45	
		• CEF256	
		• With Supervisor Engine 720:	
		– dCEF256 with WS-F6K-DFC3BXL (adds 1.47 A@42 V)	
		– dCEF256 with WS-F6K-DFC3B (adds 1.67 A@42 V)	
		– dCEF256 with WS-F6K-DFC3A (adds 2.57 A@42 V)	
		• With Supervisor Engine 2, dCEF256 with WS-F6K-DFC (adds 2.10 A@42 V)	
		• QoS port architecture (Rx/Tx): **1p1q0t/1p3q1t**	
		• Number of ports: 48 Number of port groups: 1 Port ranges per port group: 1–48	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB
WS-X6548-RJ-21	2.90 A@42 V	48-port 10/100TX RJ-21	
		• CEF256	
		• With Supervisor Engine 720:	
		– dCEF256 with WS-F6K-DFC3BXL (adds 1.47 A@42 V)	
		– dCEF256 with WS-F6K-DFC3B (adds 1.67 A@42 V)	
		– dCEF256 with WS-F6K-DFC3A (adds 2.57 A@42 V)	
		• With Supervisor Engine 2, dCEF256 with WS-F6K-DFC (adds 2.10 A@42 V)	
		• QoS port architecture (Rx/Tx): **1p1q0t/1p3q1t**	
		• Number of ports: 48 Number of port groups: 1 Port ranges per port group: 1–48	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Product ID (append "=" for spares)	Power Required	Product Description		Minimum Software Version
WS-X6148X2-RJ-45	2.65 A @42 V	96-port 10/100TX RJ-45		
WS-X6148X2-45AF	3.07 A @42 V	• QoS port architecture (Rx/Tx): **1p1q0t/1p3q1t**		
		• WS-X6148X2-RJ-45 supports WS-F6K-FE48X2-AF		
		• WS-X6148X2-45AF has WS-F6K-FE48X2-AF		
		With Supervisor Engine 720		12.2(18)SXF3
		With Supervisor Engine 32		12.2(18)SXF3
		With Supervisor Engine 2		12.2(18)SXF3
WS-X6196-RJ-21	2.74 A @42 V	96-port 10/100TX RJ-21		
WS-X6196-21AF	3.16 A @42 V	• QoS port architecture (Rx/Tx): **1p1q0t/1p3q1t**		
		• WS-X6196-RJ-21 supports WS-F6K-FE48X2-AF		
		• WS-X6196-21AF has WS-F6K-FE48X2-AF		
		With Supervisor Engine 720		12.2(18)SXF3
		With Supervisor Engine 32		12.2(18)SXF3
		With Supervisor Engine 2		12.2(18)SXF3
WS-X6348-RJ-45	2.39 A @42 V	48-port 10/100TX RJ-45		
WS-X6348-RJ-45V	2.39 A @42 V	• 128-KB per-port packet buffers		
		• QoS port architecture (Rx/Tx): **1q4t/2q2t**		
		• WS-X6348-RJ-45 supports WS-F6K-VPWR		
		• WS-X6348-RJ-45V has WS-F6K-VPWR		
		• Number of ports: 48 Number of port groups: 4 Port ranges per port group: 1–12, 13–24, 25–36, 37–48		
		With Supervisor Engine 720		12.2(14)SX
		With Supervisor Engine 32		12.2(18)SXF
		With Supervisor Engine 2		12.2(17d)SXB
WS-X6348-RJ-21V	2.39 A @42 V	48-port 10/100TX RJ-21		
		• 128-KB per-port packet buffers		
		• QoS port architecture (Rx/Tx): **1q4t/2q2t**		
		• Has WS-F6K-VPWR		
		• Number of ports: 48 Number of port groups: 4 Port ranges per port group: 1–12, 13–24, 25–36, 37–48		
		With Supervisor Engine 720		12.2(14)SX
		With Supervisor Engine 32		12.2(18)SXF
		With Supervisor Engine 2		12.2(17d)SXB

Product ID (append "=" for spares)	Power Required	Product Description		Minimum Software Version
WS-X6248-RJ-45	2.69 A @ 42 V	48-port 10/100TX RJ-45 • QoS port architecture (Rx/Tx): **1q4t/2q2t** • Number of ports: 48 Number of port groups: 4 Port ranges per port group: 1–12, 13–24, 25–36, 37–48		
			With Supervisor Engine 720	12.2(14)SX
			With Supervisor Engine 32	12.2(18)SXF
			With Supervisor Engine 2	12.2(17d)SXB
WS-X6248A-TEL	2.69 A @ 42 V	48-port 10/100TX RJ-21 • 128-KB per-port packet buffers • QoS port architecture (Rx/Tx): **1q4t/2q2t** • Number of ports: 48 Number of port groups: 4 Port ranges per port group: 1–12, 13–24, 25–36, 37–48		
			With Supervisor Engine 720	12.2(14)SX
			With Supervisor Engine 32	12.2(18)SXF
			With Supervisor Engine 2	12.2(17d)SXB
WS-X6248-TEL	2.69 A @ 42 V	48-port 10/100TX RJ-21 • QoS port architecture (Rx/Tx): **1q4t/2q2t** • Number of ports: 48 Number of port groups: 4 Port ranges per port group: 1–12, 13–24, 25–36, 37–48		
			With Supervisor Engine 720	12.2(14)SX
			With Supervisor Engine 32	12.2(18)SXF
			With Supervisor Engine 2	12.2(17d)SXB
WS-X6148A-RJ-45	1.00 A @ 42 V	48-port 10/100TX RJ-45		
WS-X6148A-45AF	2.57 A @ 42 V	• 5.3-MB per-port packet buffers • QoS port architecture (Rx/Tx): **1p1q4t/1p3q8t** • WS-X6148A-RJ-45 supports WS-F6K-GE48-AF or WS-F6K-48-AF • WS-X6148A-45AF has WS-F6K-GE48-AF or WS-F6K-48-AF • Number of ports: 48 Number of port groups: 6 Port ranges per port group: 1–8, 9–16, 17–24, 25–32, 33–40, 41–48		
			With Supervisor Engine 720	12.2(18)SXF
			With Supervisor Engine 32	12.2(18)SXF
			With Supervisor Engine 2	12.2(18)SXF2

Product ID (append "=" for spares)	Power Required	Product Description		Minimum Software Version
WS-X6148-RJ-45	2.39 A @42 V	48-port 10/100TX RJ-45		
WS-X6148-RJ45V	2.39 A @42 V	• 128-KB per-port packet buffers		
WS-X6148-45AF	2.57 A @42 V	• QoS port architecture (Rx/Tx): **1q4t/2q2t**		
		• WS-X6148-RJ-45 supports WS-F6K-VPWR		
		• WS-X6148-RJ-45V has WS-F6K-VPWR		
		• WS-X6148-45AF has WS-F6K-48-AF		
		• Number of ports: 48 Number of port groups: 4 Port ranges per port group: 1–12, 13–24, 25–36, 37–48		
			With Supervisor Engine 720 (except with WS-F6K-48-AF)	12.2(14)SX
			WS-F6K-48-AF with Supervisor Engine 720	12.2(17d)SXB
			With Supervisor Engine 32	12.2(18)SXF
			WS-F6K-48-AF with Supervisor Engine 32	
			With Supervisor Engine 2	12.2(17d)SXB
			WS-F6K-48-AF with Supervisor Engine 2	
WS-X6148-RJ-21	2.39 A @42 V	48-port 10/100TX RJ-21		
WS-X6148-RJ21V	2.39 A @42 V	• 128-KB per-port packet buffers		
WS-X6148-21AF	2.57 A @42 V	• QoS port architecture (Rx/Tx): **1q4t/2q2t**		
		• WS-X6148-RJ-21 supports WS-F6K-VPWR		
		• WS-X6148-RJ-21V has WS-F6K-VPWR		
		• WS-X6148-21AF has WS-F6K-48-AF		
		• Number of ports: 48 Number of port groups: 4 Port ranges per port group: 1–12, 13–24, 25–36, 37–48		
			With Supervisor Engine 720 (except with WS-F6K-48-AF)	12.2(14)SX
			WS-F6K-48-AF with Supervisor Engine 720	12.2(17d)SXB
			With Supervisor Engine 32	12.2(18)SXF
			WS-F6K-48-AF with Supervisor Engine 32	
			With Supervisor Engine 2	12.2(17d)SXB
			WS-F6K-48-AF with Supervisor Engine 2	

Ethernet Switching Modules

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6024-10FL-MT	1.52 A @ 42 V	24-port 10BASE-FL MT-RJ • QoS port architecture (Rx/Tx): **1q4t/2q2t** • Number of ports: 24 Number of port groups: 2 Port ranges per port group: 1–12, 13–24	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Optical Services Modules (OSMs)

OSM Guidelines and Restrictions

- Cisco IOS Software modularity does not support OSMs.

- Supervisor Engine 32 does not support OSMs.

- With Release 12.2(18)SXD and later releases, OSMs require a minimum of 128 MB of dynamic random-access memory (SDRAM)—See this publication for memory upgrade procedures:

  http://www.cisco.com/en/US/docs/routers/7600/Hardware/Module_and_Line_Card_Installation_Guides/7600_Series_Router_Module_Installation_Guide/osmodule.html

- OSMs are CEF256 modules.

- OSM WAN port numbering starts with 1.

- On OSMs with Gigabit Ethernet GBIC Layer 2 LAN ports:

  – OSM LAN port numbering starts with 1.

  – The LAN ports are in a single port group.

- In releases earlier than Release 12.2(18)SXD1, WS-SVC-WLAN-1-K9 has not been tested with OSMs.

- The OSM-2+4GE-WAN+ and the OC-12 Packet-over-SONET OSMs have been tested with the service modules and WS-SUP720.

- In releases earlier than Release 12.2(18)SXD1, except for the OSM-2+4GE-WAN+ and the OC-12 Packet-over-SONET OSMs, the following service modules have not been tested with other OSMs:
  - WS-X6066-SLB-APC content switching module (CSM)
  - WS-SVC-IDSM2-K9 intrusion detection system module
  - WS-SVC-NAM-2 and WS-SVC-NAM-1 network analysis modules (NAMs)
  - WS-SVC-SSL-1 SSL services module

Gigabit Ethernet WAN

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
OSM-4GE-WAN-GBIC	3.59 A@42 V	4-port Gigabit Ethernet WAN (GBIC); CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-2+4GE-WAN+	5.08 A@42 V	4-port Gigabit Ethernet WAN (GBIC) with two Layer 2 LAN ports; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB

OC-48 Packet over SONET

✎
Note   Also has four Layer 2 LAN ports.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
OSM-1OC48-POS-SS **OSM-1OC48-POS-SI** **OSM-1OC48-POS-SL**	4.25 A@42 V	1-port OC-48/STM-16 SONET/SDH OSM, SM-SR; CEF256 1-port OC-48/STM-16 SONET/SDH OSM, SM-IR; CEF256 1-port OC-48/STM-16 SONET/SDH OSM, SM-LR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-1OC48-POS-SI+ **OSM-1OC48-POS-SL+** **OSM-1OC48-POS-SS+**	3.90 A@42 V	Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-IR; CEF256 Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-LR; CEF256 Enhanced 1-port OC-48/STM-16 SONET/SDH OSM, SM-SR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB

OC-48 DPT/Packet over SONET

> ✎
> **Note**   Also has four Layer 2 LAN ports.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
OSM-2OC48/1DPT-SS OSM-2OC48/1DPT-SI OSM-2OC48/1DPT-SL	5.75 A @ 42 V	2-port OC-48 DPT/POS, SM-SR; CEF256 2-port OC-48 DPT/POS, SM-IR; CEF256 2-port OC-48 DPT/POS, SM-LR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB

OC-12 Packet over SONET

> ✎
> **Note**   Also has four Layer 2 LAN ports.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
OSM-4OC12-POS-MM OSM-4OC12-POS-SI OSM-4OC12-POS-SL	4.78 A @ 42 V	4-port OC-12c/STM-4c POS, MM; CEF256 4-port OC-12c/STM-4c POS, SM-IR; CEF256 4-port OC-12c/STM-4c POS, SM-LR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-4OC12-POS-SI+	4.55 A @ 42 V	Enhanced 4-port OC-12c/STM-4c POS, SM-IR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-2OC12-POS-MM+ OSM-2OC12-POS-MM OSM-2OC12-POS-SI OSM-2OC12-POS-SL	3.36 A @ 42 V	2-port OC-12c/STM-4c POS, MM; CEF256 2-port OC-12c/STM-4c POS, MM; CEF256 2-port OC-12c/STM-4c POS, SM-IR; CEF256 2-port OC-12c/STM-4c POS, SM-LR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-2OC12-POS-SI+	3.36 A @ 42 V	Enhanced 2-port OC-12c/STM-4c POS, SM-IR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB

OC-3 Packet over SONET

> **Note** Also has four Layer 2 LAN ports.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
OSM-16OC3-POS-MM **OSM-16OC3-POS-SI** **OSM-16OC3-POS-SL**	5.09 A@42 V	16-port OC-3c/STM-1c POS, MM; CEF256 16-port OC-3c/STM-1c POS, SM-IR; CEF256 16-port OC-3c/STM-1c POS, SM-LR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-16OC3-POS-SI+	4.80 A@42 V	Enhanced 16-port OC-3c/STM-1c POS, SM-IR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-8OC3-POS-MM **OSM-8OC3-POS-SI** **OSM-8OC3-POS-SL**	3.57 A@42 V	8-port OC-3c/STM-1c POS, MM; CEF256 8-port OC-3c/STM-1c POS, SM-IR; CEF256 8-port OC-3c/STM-1c POS, SM-LR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-8OC3-POS-SI+ **OSM-8OC3-POS-SL+**	3.57 A@42 V	Enhanced 8-port OC-3c/STM-1c POS, SM-IR; CEF256 Enhanced 8-port OC-3c/STM-1c POS, SM-LR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-4OC3-POS-SI	2.44 A@42 V	4-port OC-3c/STM-1c POS, SM-IR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-4OC3-POS-SI+	2.44 A@42 V	Enhanced 4-port OC-3c/STM-1c POS, SM-IR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB

OC-12 Channelized

> **Note** Also has four Layer 2 LAN ports.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
OSM-1CHOC12/T3-SI **OSM-1CHOC12/T1-SI**	4.40 A@42 V 2.80 A@42 V	1-port channelized OC-12, SM-IR; CEF256 1-port channelized OC-12, SM-IR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB

CT3/T1 Channelized/Unchannelized

✎
Note OSM-12CT3/T1 has mini-SMB connectors for use with 75-Ohm copper coax cable.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
OSM-12CT3/T1	2.80 A@42 V	12-port channelized/unchannelized CT3/T1; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB

OC-12 ATM

✎
Note Also has four Layer 2 LAN ports.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
OSM-2OC12-ATM-MM **OSM-2OC12-ATM-SI**	3.62 A@42 V	2-port OC-12/STM-4 ATM OSM, MM; CEF256 2-port OC-12/STM-4 ATM OSM, SM-IR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB
OSM-2OC12-ATM-MM+ **OSM-2OC12-ATM-SI+**	4.00 A@42 V	Enhanced 2-port OC-12/STM-4 ATM OSM, MM; CEF256 Enhanced 2-port OC-12/STM-4 ATM OSM, SM-IR; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB

Shared Port Adapter (SPA) Interface Processors (SIPs)

> **Note**
> - See the "FPD Image Packages" section on page 12 for information about additional procedures required to support SIPs with Release 12.2(18)SXE and later releases.
> - 7600-SIP-400 and 7600-SIP-600 are not supported in PFC3A mode.
> - With releases earlier than Release 12.2(18)SXF7, Cisco IOS Software modularity does not support SIPs.
> - In Release 12.2(18)SXF7 and later releases, Cisco IOS Software Modularity supports 7600-SIP-400 and 7600-SIP-200.

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
7600-SIP-600	8.14 A@42 V	SPA Interface Processor-600 (not supported in PFC3A mode)	
		Note 7600-SIP-600 has a WS-F6700-DFC3BXL.	
		Supported only with Supervisor Engine 720	12.2(18)SXF

Note

- Supervisor Engine 32 does not support 7600-SIP-600.
- 7600-SIP-600 is not supported when a 7600-SSC-400 and SPA-IPSEC-2G are installed.
- 7600-SIP-600 is not supported in Release 12.2(33)SXH and rebuilds.

Product ID	Power	Product Description	Minimum
7600-SIP-400	6.31 A@42 V	SPA Interface Processor-400 (not supported in PFC3A mode)	
		With Supervisor Engine 720	12.2(18)SXE
		With Supervisor Engine 32	12.2(18)SXF
7600-SIP-200	5.72 A@42 V	SPA Interface Processor-200	
		With Supervisor Engine 720	12.2(18)SXE
		With Supervisor Engine 32	12.2(18)SXF

Shared Port Adapters (SPAs)

These sections describe SPAs:

> **Note**
> - With releases earlier than Release 12.2(18)SXF7, Cisco IOS Software modularity does not support SIPs.
> - In Release 12.2(18)SXF7 and later releases, Cisco IOS Software Modularity supports 7600-SIP-400 and 7600-SIP-200.

Ethernet SPAs

These sections describe Ethernet SPAs:

- 10-Gigabit Ethernet SPAs, page 86
- Gigabit Ethernet SPAs, page 86

10-Gigabit Ethernet SPAs

Product ID (append "=" for spares)	SIP Support	Product Description	Minimum Software Version
SPA-1XTENGE-XFP	7600-SIP-600	1-port 10-Gigabit Ethernet SPA, LANPHY XFP Optics	12.2(18)SXF
XFP Modules Supported in SPA-1XTENGE-XFP			
XFP-10GLR-OC192LR	10-Gigabit Ethernet LR (10 km)		

Gigabit Ethernet SPAs

Product ID (append "=" for spares)	SIP Support	Product Description	Minimum Software Version
SPA-10X1GE	7600-SIP-600	10-port Gigabit Ethernet SPA, SFP Optics	12.2(18)SXF
SPA-5X1GE	7600-SIP-600	5-port Gigabit Ethernet SPA, SFP Optics	12.2(18)SXF
SPA-2X1GE	7600-SIP-400	2-port Gigabit Ethernet SPA, SFP Optics	12.2(18)SXF
SFPs Supported in Gigabit Ethernet SPAs			
SFP-GE-S	Extended Temperature SX SFP		
SFP-GE-L	Extended Temperature LX/LH SFP		
SFP-GE-Z	Extended Temperature ZX SFP		

POS SPAs

Product ID (append "=" for spares)	SIP Support	Product Description	Minimum Software Version
SPA-1XOC48POS/RPR	7600-SIP-400	1-Port OC-48 POS/RPR SPA **Note** Requires SFPs.	12.2(18)SXF10
SPA-OC192POS-VSR	7600-SIP-600	1-port OC-192c/STM-64 POS/RPR SPA, VSR-1	12.2(18)SXF2

Product ID (append "=" for spares)	SIP Support	Product Description	Minimum Software Version
SPA-2XOC3-POS	7600-SIP-200 7600-SIP-400	2-port OC-3c/STM-1c POS SPA **Note** Requires SFPs.	12.2(18)SXE
SPA-4XOC3-POS	7600-SIP-200 7600-SIP-400	4-port OC-3c/STM-1c POS SPA **Note** Requires SFPs.	12.2(18)SXE
SPA-1XOC12-POS	7600-SIP-400	1-port OC-12c/STM-4c POS SPA **Note** Requires an SFP.	12.2(18)SXE
SPA-OC192POS-LR	7600-SIP-600	1-port OC-192c/STM-64 POS/RPR SPA, SM-LR	12.2(18)SXF
SPA-OC192POS-XFP	7600-SIP-600	1-port OC-192c/STM-64 POS/RPR SPA, XFP Optics	12.2(18)SXF
		XFP Modules Supported in SPA-OC192POS-XFP	
		XFP-10GLR-OC192SR Single-Mode (SM) Short Reach (SR)	
		XFP-10GER-OC192IR Single-Mode (SM) Intermediate Reach (IR-2)	
SPA-OC192POS-VSR	7600-SIP-600	1-port OC-192c/STM-64 POS/RPR SPA, VSR-1	12.2(18)SXF1

ATM SPAs

Product ID (append "=" for spares)	SIP Support	Product Description	Minimum Software Version
SPA-2XOC3-ATM	7600-SIP-200 7600-SIP-400	2-port OC-3c/STM-1c ATM SPA **Note** Requires SFPs.	12.2(18)SXE
SPA-4XOC3-ATM	7600-SIP-200 7600-SIP-400	4-port OC-3c/STM-1c ATM SPA **Note** Requires SFPs.	12.2(18)SXE
SPA-1XOC12-ATM	7600-SIP-400	1-Port OC-12c/STM-4c ATM SPA **Note** Requires an SFP.	12.2(18)SXE
SPA-1XOC48-ATM	7600-SIP-400	1 port OC-48c/STM-16 ATM SPA	12.2(18)SXF

SFPs for OC3 and OC12 POS and ATM SPAs

Product ID (append "=" for spares)	Product Description
SFP-OC3-MM	OC-3/STM-1 pluggable short-reach (2 km) transceiver module, 1310-nm wavelength, MMF, LC connector
SFP-OC3-SR	OC-3/STM-1 pluggable short-reach (2 km) transceiver module, 1310-nm wavelength, LC connector
SFP-OC3-IR1	OC-3/STM-1 pluggable intermediate-reach (15 km) transceiver module, 1310-nm wavelength, LC connector
SFP-OC3-LR1	OC-3/STM-1 pluggable long-reach (40 km) transceiver module, 1310-nm wavelength, LC connector

Product ID (append "=" for spares)	Product Description
SFP-OC3-LR2	OC-3/STM-1 pluggable long-reach (80 km) transceiver module, 1550-nm wavelength, LC connector
SFP-OC12-MM	OC-12/STM-4 pluggable short-reach (2 km) transceiver module, 1310-nm wavelength, MMF, LC connector
SFP-OC12-SR	OC-12/STM-4 pluggable short-reach (2 km) transceiver module, 1310-nm wavelength, LC connector
SFP-OC12-IR1	OC-12/STM-4 pluggable intermediate-reach (15 km) transceiver module, 1310-nm wavelength
SFP-OC12-LR1	OC-12/STM-4 pluggable long-reach (40 km) transceiver module, 1310-nm wavelength, LC connector
SFP-OC12-LR2	OC-12/STM-4 pluggable long-reach (80 km) transceiver module, 1550-nm wavelength, LC connector

Serial SPAs

Product ID (append "=" for spares)	SIP Support	Product Description	Minimum Software Version
SPA-8XCHT1/E1	7600-SIP-200	8-Port Channelized T1/E1 SPA	12.2(18)SXE
SPA-2XT3/E3	7600-SIP-200	2-port Clear Channel T3/E3 SPA	12.2(18)SXE
SPA-4XT3/E3	7600-SIP-200	4-port Clear Channel T3/E3 SPA	12.2(18)SXE
SPA-2XCT3/DS0	7600-SIP-200	2-port Channelized T3 to DS0 SPA	12.2(18)SXE
SPA-4XCT3/DS0	7600-SIP-200	4-port Channelized T3 to DS0 SPA	12.2(18)SXE

Services SPA Carrier (SSC)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
7600-SSC-400	5.43 A@42 V	Services SPA Carrier (SSC)	
		With Supervisor Engine 720	12.2(18)SXE2
		With Supervisor Engine 32	12.2(18)SXF2

Note

- 7600-SSC-400 does not maintain state when an NSF with SSO redundancy mode switchover occurs.
- 7600-SSC-400 is not supported when a 7600-SIP-600 is installed.

Services SPAs

> **Note** See the "FPD Image Packages" section on page 12 for information about additional procedures required to support SPA-IPSEC-2G with Release 12.2(18)SXE and later releases.

Product ID (append "=" for spares)	Carrier	Product Description	Minimum Software Version
SPA-IPSEC-2G	7600-SSC-400	IPsec SPA	12.2(18)SXE2

Note SPA-IPSEC-2G does not support TACACS+ authentication for IPsec. (CSCee33200)

FlexWAN and Enhanced FlexWAN Modules

> **Note**
> - In releases earlier than Release 12.2(18)SXD1, WS-SVC-WLAN-1-K9 has not been tested with the FlexWAN or Enhanced FlexWAN modules.
> - The following service modules have not been tested with the Enhanced FlexWAN module and Release 12.2(17b)SXA, Release 12.2(17b)SXA2, or Release 12.2(17d)SXB:
>   - WS-X6066-SLB-APC content switching module (CSM)
>   - WS-SVC-IDSM2-K9 intrusion detection system module
>   - WS-SVC-NAM-2 and WS-SVC-NAM-1 network analysis modules (NAMs)
>   - WS-SVC-SSL-1 SSL services module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6582-2PA	2.50 A@42 V	Enhanced FlexWAN Module; CEF256	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Note See the "FPD Image Packages" section on page 12 for information about additional procedures required to support WS-X6582-2PA with Release 12.2(18)SXE and later releases.

Product ID	Power	Product Description	Minimum Software Version
WS-X6182-2PA	2.38 A@42 V	FlexWAN Module	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 2	12.2(17d)SXB

Note

- Support for WS-X6182-2PA was unintentionally disabled in Release 12.2(18)SXF7 Cisco IOS Software modularity images. (CSCsg97079)
- Supervisor Engine 32 does not support WS-X6182-2PA.

FlexWAN and Enhanced FlexWAN Module Port Adapters

Product ID (append "=" for spares)	Product Description	Minimum Software Version
PA-2FE	2-port Fast Ethernet Port Adapter (supported only in WS-X6582-2PA)	12.2(18)SXE
PA-1FE	1-port Fast Ethernet Port Adapter (supported only in WS-X6582-2PA)	12.2(18)SXE
PA-POS-1OC3	1-port Packet over SONET OC3c/STM1 Port Adapter	12.2(18)SXE
PA-POS-2OC3	2-port POS OC3c/STM1	12.2(17b)SXA
SFPs for PA-POS-2OC3		
SFP-OC3-MM	Short range, multimode fiber	12.2(17b)SXA
SFP-OC3-IR1	Intermediate range, single-mode fiber	12.2(17b)SXA
SFP-OC3-LR1	Long range, single-mode fiber	12.2(17b)SXA
PA-POS-OC3MM **PA-POS-OC3SMI** **PA-POS-OC3SML**	Packet over SONET (OC-3)	12.2(14)SX
PA-A6-OC3MM	1-port ATM OC-3c/STM-1 multimode port adapter, enhanced	12.2(14)SX
PA-A6-OC3SMI	1-port ATM OC-3c/STM-1 single-mode (IR) port adapter, enhanced	12.2(14)SX
PA-A6-OC3SML	1-port ATM OC-3c/STM-1 single-mode (LR) port adapter, enhanced	12.2(14)SX
PA-A6-T3	1-port ATM DS3 port adapter, enhanced	12.2(14)SX
PA-A6-E3	1-port ATM E3 port adapter, enhanced	12.2(14)SX
PA-A3-OC3MM **PA-A3-OC3SMI** **PA-A3-T3** **PA-A3-OC3SML** **PA-A3-E3** **PA-A3-8T1IMA** **PA-A3-8E1IMA**	ATM with traffic shaping **Note** These port adapters do not support LANE when installed in the FlexWAN module.	12.2(14)SX
PA-T3 **PA-T3+** **PA-2T3** **PA-2T3+** **PA-E3** **PA-2E3** **PA-MC-T3** **PA-MC-E3** **PA-MC-2T3+**	T3/E3 (clear-channel and channelized)	12.2(14)SX
PA-4T+ **PA-8T-V35** **PA-8T-X21** **PA-8T-232** **PA-MC-2E1/120** **PA-MC-8T1** **PA-MC-8E1/120** **PA-MC-2T1** **PA-MC-4T1**	T1/E1	12.2(14)SX
PA-4E1G/75 **PA-4E1G/120**	T1/E1	12.2(17)SX

Product ID (append "=" for spares)	Product Description	Minimum Software Version
PA-MC-8TE1+	Multichannel T1/E1 8PRI **Note** This port adapter does not support ISDN PRI when installed in the FlexWAN module.	12.2(14)SX
PA-H **PA-2H**	HSSI	12.2(14)SX
PA-MC-STM-1	Multichannel STM-1	12.2(14)SX

Service Modules

Note
- For any service modules that runs its own software, see the service module software release notes for information about the minimum required service module software version.
- With SPAN configured to include a port-channel interface to support a service module, be aware of CSCth03423 and CSCsx46323.

Application Control Engine (ACE) Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Versions
ACE10-6500-K9 **ACE20-MOD-K9**	5.23 A@42 V	Application Control Engine (ACE) module	
		With Supervisor Engine 720	12.2(18)SXF4

The ACE module runs its own software—See these publications:

http://www.cisco.com/en/US/products/ps6906/tsd_products_support_model_home.html

See the ACE software release notes for information about the minimum required ACE software version.

Note

- Cisco IOS Software modularity does not support ACE10-6500-K9 or ACE20-MOD-K9.
- Supervisor Engine 32 does not support ACE10-6500-K9 or ACE20-MOD-K9.
- Supervisor Engine 2 does not support ACE10-6500-K9 or ACE20-MOD-K9.

Wireless Services Module (WiSM)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Versions
WS-SVC-WISM-1-K9	6.07 A@42 V	Wireless Services Module (WiSM)	
		With Supervisor Engine 720	12.2(18)SXF2

WS-SVC-WISM-1-K9 runs its own software—See these publications:

http://www.cisco.com/en/US/products/ps6526/tsd_products_support_eol_model_home.html

See the WS-SVC-WISM-1-K9 software release notes for information about the minimum required WS-SVC-WISM-1-K9 software version.

Note

- In Release 12.2(18)SXF4, Cisco IOS Software modularity does not support WS-SVC-WISM-1-K9.
- In Release 12.2(18)SXF5 and later releases, Cisco IOS Software modularity supports WS-SVC-WISM-1-K9.
- Supervisor Engine 32 does not support WS-SVC-WISM-1-K9.
- Supervisor Engine 2 does not support WS-SVC-WISM-1-K9.
- In a 13-slot chassis, WS-SVC-WISM-1-K9 is supported only in slots 9 through 13 and does not power up in other slots.

Application-Oriented Networking Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Versions
WS-SVC-AON-1-K9	4.00 A@42 V	Application-Oriented Networking (AON) Module	
		With Supervisor Engine 720	12.2(18)SXE1

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Versions

WS-SVC-AON-1-K9 runs its own software—See these publications:

http://www.cisco.com/en/US/products/ps6480/prod_release_notes_list.html

See the WS-SVC-AON-1-K9 software release notes for information about the minimum required WS-SVC-AON-1-K9 software version.

Note

- Cisco IOS Software modularity does not support WS-SVC-AON-1-K9.
- Supervisor Engine 32 does not support WS-SVC-AON-1-K9.
- Supervisor Engine 2 does not support WS-SVC-AON-1-K9.

WebVPN Services Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Versions
WS-SVC-WEBVPN-K9	2.94 A @ 42 V	WebVPN Services Module	
		With Supervisor Engine 720	12.2(18)SXE2 12.2(17d)SXB7
		With Supervisor Engine 32	12.2(18)SXF

WS-SVC-WEBVPN-K9 runs its own software—See these publications:

http://www.cisco.com/en/US/products/hw/switches/ps708/prod_release_notes_list.html#anchor24

See the WS-SVC-WEBVPN-K software release notes for information about the minimum required WS-SVC-WEBVPN-K software version.

Note

- Cisco IOS Software modularity does not support WS-SVC-WEBVPN-K9.
- Supervisor Engine 2 does not support WS-SVC-WEBVPN-K9.

Anomaly Guard Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-AGM-1-K9	4.00 A@42 V	Anomaly Guard Module	
		With Supervisor Engine 720	12.2(18)SXD3
		With Supervisor Engine 2	12.2(18)SXD3

WS-SVC-AGM-1-K9 runs its own software—See these publications:

http://www.cisco.com/en/US/products/ps6236/tsd_products_support_model_home.html

See the WS-SVC-AGM-1-K9 software release notes for information about the minimum required WS-SVC-AGM-1-K9 software version.

Note

- Cisco IOS Software modularity does not support WS-SVC-AGM-1-K9.

- Supervisor Engine 32 does not support WS-SVC-AGM-1-K9.

- In Release 12.2(18)SXD3 and rebuilds, WS-SVC-AGM-1-K9 has not been tested with OSMs or FlexWAN modules.

Traffic Anomaly Detector Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-ADM-1-K9	4.00 A@42 V	Traffic Anomaly Detector Module	
		With Supervisor Engine 720	12.2(18)SXD3
		With Supervisor Engine 2	12.2(18)SXD3

WS-SVC-ADM-1-K9 runs its own software—See these publications:

http://www.cisco.com/en/US/products/ps6236/tsd_products_support_model_home.html

See the WS-SVC-ADM-1-K9 software release notes for information about the minimum required WS-SVC-ADM-1-K9 software version.

Note

- Cisco IOS Software modularity does not support WS-SVC-ADM-1-K9.

- Supervisor Engine 32 does not support WS-SVC-ADM-1-K9.

- In Release 12.2(18)SXD3 and rebuilds, WS-SVC-ADM-1-K9 has not been tested with OSMs or FlexWAN modules.

Wireless LAN Service Module (WLSM)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-WLAN-1-K9	3.10 A@42 V	Wireless LAN service module	
		With Supervisor Engine 720	12.2(18)SXD

WS-SVC-WLAN-1-K9 runs its own software—See these publications:

http://www.cisco.com/en/US/products/ps5865/tsd_products_support_eol_model_home.html

See the WS-SVC-WLAN-1-K9 software release notes for information about the minimum required WS-SVC-WLAN-1-K9 software version.

Note

- Cisco IOS Software modularity does not support WS-SVC-WLAN-1-K9.
- Supervisor Engine 32 does not support WS-SVC-WLAN-1-K9.
- Supervisor Engine 2 does not support WS-SVC-WLAN-1-K9.
- In releases earlier than Release 12.2(18)SXD1, WS-SVC-WLAN-1-K9 has not been tested with OSMs or FlexWAN modules.

Persistent Storage Device (PSD) Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-PSD-1	4.00 A@42 V	Persistent Storage Device Module	
		With Supervisor Engine 720	12.2(18)SXD1
		With Supervisor Engine 32	12.2(18)SXF7
		With Supervisor Engine 2	12.2(17d)SXB

WS-SVC-PSD-1 runs its own software—See these publications:

http://www.cisco.com/en/US/products/hw/switches/ps708/prod_release_notes_list.html#anchor21

See the WS-SVC-PSD-1 software release notes for information about the minimum required WS-SVC-PSD-1 software version.

Note

- Cisco IOS Software modularity does not support WS-SVC-PSD-1.
- With Release 12.2(18)SXD1 and later, WS-SVC-PSD-1 maintains state when an NSF with SSO redundancy mode switchover occurs.

Multi-Processor WAN Application Module (MWAM)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-MWAM-1	3.57 A @ 42 V	Multi-Processor WAN Application Module	
		With Supervisor Engine 720	12.2(18)SXD1
		With Supervisor Engine 32	12.2(18)SXF5
		With Supervisor Engine 2	12.2(17d)SXB

WS-SVC-MWAM-1 runs its own software—See these publications:

http://www.cisco.com/en/US/docs/wireless/pdsn/12.28zb/mwan_install_config/mwamhwrn.html

See the WS-SVC-MWAM-1 software release notes for information about the minimum required WS-SVC-MWAM-1 software version.

Note

- Cisco IOS Software modularity does not support WS-SVC-MWAM-1.

- With Release 12.2(18)SXD1 and later releases, WS-SVC-MWAM-1 maintains state when an NSF with SSO redundancy mode switchover occurs.

- With Releases earlier than Release 12.2(18)SXD1, WS-SVC-MWAM-1 does not maintain state when an NSF with SSO redundancy mode switchover occurs.

Content Services Gateway (CSG) Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-CSG-1	3.00 A @ 42 V	Content Services Gateway (CSG) Module	
		With Supervisor Engine 720	12.2(18)SXD1
		With Supervisor Engine 2	12.2(17d)SXB

WS-SVC-CSG-1 runs its own software—See these publications:

http://www.cisco.com/en/US/products/sw/wirelssw/ps779/tsd_products_support_series_home.html

See the WS-SVC-CSG-1 software release notes for information about the minimum required WS-SVC-CSG-1 software version.

Note

- Cisco IOS Software modularity does not support WS-SVC-CSG-1.

- Supervisor Engine 32 does not support WS-SVC-CSG-1.

Communication Media Module (CMM)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-CMM	6.00 A @42 V	Communication Media Module	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

WS-SVC-CMM runs its own software—See these publications:

http://www.cisco.com/en/US/docs/interfaces_modules/services_modules/cmm/release/notes/OL_4847.html

See the WS-SVC-CMM software release notes for information about the minimum required WS-SVC-CMM software version.

Note Cisco IOS Software modularity does not support WS-SVC-CMM.

Communication Media Module Port Adapters

WS-SVC-CMM-6E1		6-Port E1 Interface Port Adapter	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 2	12.2(17d)SXB
WS-SVC-CMM-6T1		6-Port T1 Interface Port Adapter	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 2	12.2(17d)SXB
WS-SVC-CMM-ACT		Adhoc Conferencing and Transcoding Port Adapter	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 2	12.2(17d)SXB
WS-SVC-CMM-24FXS		24-Port FXS Interface Port Adapter	
		With Supervisor Engine 720	12.2(14)SX
		With Supervisor Engine 2	12.2(17d)SXB

IPsec VPN Acceleration Services Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-IPSEC-1	1.89 A @42 V	IPsec VPN Acceleration Services Module	
		With Supervisor Engine 720	12.2(17b)SXA
		With Supervisor Engine 2	12.2(17d)SXB

WS-SVC-IPSEC-1 uses the Cisco IOS software that is running on the switch.

Note

- Cisco IOS Software modularity does not support WS-SVC-IPSEC-1.

- Supervisor Engine 32 does not support WS-SVC-IPSEC-1.

- With Release 12.2(18)SXE and later releases, WS-SVC-IPSEC-1 requires an advanced services image (see the "Feature Sets" section on page 115).

- With releases earlier than Release 12.2(18)SXE, WS-SVC-IPSEC-1 requires a k9 image (see the "Feature Sets" section on page 115).

- WS-SVC-IPSEC-1 does not support TACACS+ authentication for IPsec. (CSCee33200)

- WS-SVC-IPSEC-1 does not maintain state when an NSF with SSO redundancy mode switchover occurs.

- WS-SVC-IPSEC-1 does not maintain state when a single router mode with stateful switchover (SRM with SSO) redundancy mode switchover occurs.

- In releases earlier than Release 12.2(18)SXD1, WS-SVC-IPSEC-1 has not been tested with OSM-1CHOC12/T1-SI or OSM-12CT3/T1.

- To avoid reloads with software releases where caveat CSCed17605 is not resolved (CSCed17605 is resolved in Release 12.2(17d)SXB and later releases), do not configure the single router mode with stateful switchover (SRM with SSO) redundancy mode with a WS-SVC-IPSEC-1 module installed. In software releases where caveat CSCed17605 is not resolved, the WS-SVC-IPSEC-1 module does not maintain state when an SRM with SSO redundancy mode switchover occurs.

Content Switching Module with SSL (CSM-S)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6066-SLB-S-K9	2.15 A@42 V	Content Switching Module with SSL (CSM-S)	
		With Supervisor Engine 720	12.2(18)SXE
		With Supervisor Engine 2	12.2(18)SXD

WS-X6066-SLB-S-K9 runs its own software—See these publications:

http://www.cisco.com/en/US/products/hw/modules/ps2706/ps780/tsd_products_support_model_home.html

See the WS-X6066-SLB-S-K9 software release notes for information about the minimum required WS-X6066-SLB-S-K9 software version.

Note

- Cisco IOS Software modularity does not support WS-X6066-SLB-S-K9.

- Supervisor Engine 32 does not support WS-X6066-SLB-S-K9.

- With Release 12.2(18)SXD1 and later releases, WS-X6066-SLB-S-K9 maintains state when an NSF with SSO redundancy mode switchover occurs.

- WS-X6066-SLB-S-K9 does not maintain state when a single router mode with stateful switchover (SRM with SSO) redundancy mode switchover occurs.

- The OSM-2+4GE-WAN+ and the OC-12 Packet-over-SONET OSMs have been tested with the WS-X6066-SLB-S-K9 content switching module.

- In releases earlier than Release 12.2(18)SXD1, the WS-X6066-SLB-S-K9 content switching module has not been tested with other OSMs or the Enhanced FlexWAN module.

Content Switching Module (CSM)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-X6066-SLB-APC	3.00 A @ 42 V	Content Switching Module	
		With Supervisor Engine 720	12.2(14)SX1
		With Supervisor Engine 2	12.2(17d)SXB

WS-X6066-SLB-APC runs its own software—See these publications:

http://www.cisco.com/en/US/products/hw/modules/ps2706/ps780/tsd_products_support_model_home.html

See the WS-X6066-SLB-APC software release notes for information about the minimum required WS-X6066-SLB-APC software version.

Note

- Supervisor Engine 32 does not support WS-X6066-SLB-APC.

- With Release 12.2(18)SXD1 and later releases, WS-X6066-SLB-APC maintains state when an NSF with SSO redundancy mode switchover occurs.

- WS-X6066-SLB-APC does not maintain state when a single router mode with stateful switchover (SRM with SSO) redundancy mode switchover occurs.

- The OSM-2+4GE-WAN+ and the OC-12 Packet-over-SONET OSMs have been tested with the WS-X6066-SLB-APC content switching module and WS-SUP720.

- In releases earlier than Release 12.2(18)SXD1, WS-X6066-SLB-APC has not been tested with other OSMs or the Enhanced FlexWAN module.

Firewall Services Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-FWM-1-K9	4.09 A @ 42 V	Firewall Services Module; CEF256	
		With Supervisor Engine 720	12.2(14)SX1
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

WS-SVC-FWM-1-K9 runs its own software—See these publications:

http://www.cisco.com/en/US/products/hw/modules/ps2706/ps4452/tsd_products_support_model_home.html

See the WS-SVC-FWM-1-K9 software release notes for information about the minimum required WS-SVC-FWM-1-K9 software version.

Note

- With Release 12.2(18)SXD3 and later Cisco IOS releases and with Firewall Services Module Software Release 2.3(1), WS-SVC-FWM-1-K9 maintains state when an NSF with SSO redundancy mode switchover occurs.

- WS-SVC-FWM-1-K9 does not maintain state when a single router mode with stateful switchover (SRM with SSO) redundancy mode switchover occurs.

Intrusion Detection System Modules (IDSMs)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-IDSM2-K9	2.50 A @ 42 V	Intrusion Detection System Module 2; CEF256	
		With Supervisor Engine 720	12.2(14)SX1
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

WS-SVC-IDSM2-K9 runs its own software—See these publications:

http://www.cisco.com/en/US/products/hw/modules/ps2706/ps5058/tsd_products_support_model_home.html

See the WS-SVC-IDSM2-K9 software release notes for information about the minimum required WS-SVC-IDSM2-K9 software version.

Note

- WS-SVC-IDSM2-K9 has been tested with OSM-2+4GE-WAN+ and the OC-12 Packet-over-SONET OSMs.

- In releases earlier than Release 12.2(18)SXD1, WS-SVC-IDSM2-K9 has not been tested with other OSMs or the Enhanced FlexWAN module.

Network Analysis Modules (NAMs)

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-NAM-2	3.47 A @ 42 V	Network Analysis Module 2; CEF256	
WS-SVC-NAM-1	2.89 A @ 42 V	Network Analysis Module 1; CEF256	
		With Supervisor Engine 720	12.2(14)SX1
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

WS-SVC-NAM-2 and WS-SVC-NAM-1 run their own software—See this publication for more information:

http://www.cisco.com/en/US/products/hw/modules/ps2706/ps5025/tsd_products_support_model_home.html

See the WS-SVC-NAM-2 and WS-SVC-NAM-1 software release notes for information about the minimum required WS-SVC-NAM-2 and WS-SVC-NAM-1 software version.

Note

- With Release 12.2(17b)SXA and rebuilds and Release 12.2(17d)SXB and rebuilds, WS-SVC-NAM-2 and WS-SVC-NAM-1 support single router mode with stateful switchover (SRM with SSO) redundancy mode.

- WS-SVC-NAM-2 and WS-SVC-NAM-1 have been tested with OSM-2+4GE-WAN+ and the OC-12 Packet-over-SONET OSMs.

- In releases earlier than Release 12.2(18)SXD1, WS-SVC-NAM-2 and WS-SVC-NAM-1 have not been tested with other OSMs or the Enhanced FlexWAN module.

Secure Sockets Layer (SSL) Services Module

Product ID (append "=" for spares)	Power Required	Product Description	Minimum Software Version
WS-SVC-SSL-1	2.94 A@42 V	Secure Sockets Layer (SSL) Services Module	
		With Supervisor Engine 720	12.2(14)SX1
		With Supervisor Engine 32	12.2(18)SXF
		With Supervisor Engine 2	12.2(17d)SXB

Note

- Cisco IOS Software modularity does not support WS-SVC-SSL-1.

- WS-SVC-SSL-1 does not maintain state when an NSF with SSO redundancy mode switchover occurs.

- WS-SVC-SSL-1 does not maintain state when a single router mode with stateful switchover (SRM with SSO) redundancy mode switchover occurs.

- WS-SVC-SSL-1 has been tested with OSM-2+4GE-WAN+ and the OC-12 Packet-over-SONET OSMs.

- In releases earlier than Release 12.2(18)SXD1, WS-SVC-SSL-1 has not been tested with other OSMs or the Enhanced FlexWAN module.

Fan Trays

Note
- Enter the **show environment status | include fan** command or the **show environment cooling** command to display information about the installed fan trays.

- To use a high-capacity fan tray with a Supervisor Engine 2, you must enter the **hw-module fan-tray version 2** command and then remove and quickly reinsert the fan tray.

High-Capacity Fan Trays

These high-capacity fan trays support both all supervisor engines and require at least a 2,500 W power supply.

Product ID (append "=" for spares)	Power Allocated at 42 V	Product Description	Minimum Software Version
WS-C6503-E-FAN	1.37 A@42 V	High-capacity fan tray for WS-C6503-E chassis	12.2(14)SX
	Note In releases earlier than Release 12.2(18)SXD, WS-C6503-E-FAN requires the same power as FAN-MOD-3HS.		
FAN-MOD-3HS	2.98 A@42 V	High-capacity fan tray for WS-C6503 and CISCO7603 chassis	12.2(14)SX
FAN-MOD-6HS	4.29 A@42 V	High-capacity fan tray for CISCO7606 chassis	12.2(14)SX
WS-C6506-E-FAN	2.35 A@42 V	High-capacity fan tray for WS-C6506-E chassis	12.2(14)SX
WS-C6K-6SLOT-FAN2	12 V fan	High-capacity fan tray for WS-C6506 chassis	12.2(14)SX
FAN-MOD-09	5.75 A@42 V	High-capacity fan tray for WS-C6509-NEB-A and CISCO7609 chassis	12.2(14)SX
WS-C6509-V-E-FAN	5.75 A@42 V	High-capacity fan tray for WS-C6509-V-E chassis	12.2(18)SXF10
WS-C6509-E-FAN	3.58 A@42 V	High-capacity fan tray for WS-C6509-E chassis	12.2(14)SX
WS-C6K-9SLOT-FAN2	12 V fan	High-capacity fan tray for WS-C6509 chassis	12.2(14)SX
WS-C6K-13SLT-FAN2	7.10 A@42 V	High-capacity fan tray for WS-C6513 and CISCO7613 chassis	12.2(14)SX

Standard-Capacity Fan Trays

These standard-capacity fan trays support only Supervisor Engine 2.

Product ID (append "=" for spares)	Power Allocated at 42 V	Product Description	Minimum Software Version
FAN-MOD-3	None	Standard-capacity fan tray for WS-C6503 and CISCO7603 chassis	12.2(17d)SXB
FAN-MOD-6	None	Standard-capacity fan tray for CISCO7606 chassis	12.2(17d)SXB
WS-C6K-6SLOT-FAN	12 V fan	Standard-capacity fan tray for WS-C6506 chassis	12.2(17d)SXB
WS-C6509-NEB-FAN	12 V fan	Standard fan tray for WS-C6509-NEB chassis	12.2(17d)SXB
WS-C6K-9SLOT-FAN	12 V fan	Standard-capacity fan tray for WS-C6509 chassis	12.2(17d)SXB
WS-C6K-13SLT-FAN	12 V fan	Standard-capacity fan tray for WS-C6513 and CISCO7613 chassis	12.2(17d)SXB

Power Supplies

- CISCO7606 Power Supplies, page 104
- WS-C6504-E and CISCO7604 Power Supplies, page 104
- WS-C6503, WS-C6503-E, and CISCO7603 Power Supplies, page 104
- All Other Power Supplies, page 104

CISCO7606 Power Supplies

Product ID (append "=" for spares)	Product Description	Minimum Software Version
PWR-2700-AC	2700 W AC power supply	12.2(18)SXE
PWR-2700-DC	2700 W DC power supply	12.2(18)SXE

WS-C6504-E and CISCO7604 Power Supplies

Product ID (append "=" for spares)	Product Description	Minimum Software Version
PWR-2700-AC/4	2700 W AC power supply	12.2(18)SXE
PWR-2700-DC/4	2700 W DC power supply	12.2(18)SXE

WS-C6503, WS-C6503-E, and CISCO7603 Power Supplies

Product ID (append "=" for spares)	Product Description	Minimum Software Version
PWR-1400-AC	1,400 W AC power supply	12.2(17a)SX
PWR-950-AC	950 W AC power supply	12.2(14)SX
PWR-950-DC	950 W DC power supply	12.2(14)SX

All Other Power Supplies

Note The power supplies in this section are not supported in these chassis:

- Catalyst 6503
- Catalyst 6503-E
- CISCO7603
- Catalyst 6504-E
- CISCO7604

Product ID (append "=" for spares)	Product Description	Minimum Software Version
WS-CAC-8700W-E	8,700 W AC power supply	12.2(18)SXF8

	Note
	
	• Limited to 6,000 W in the WS-C6513 and CISCO7613 chassis.
	• Limited to 4,500 W in the WS-C6509-NEB-A chassis.
	• Limited to 4,000 W in these chassis:
	   – WS-C6509
	   – WS-C6506
	   – WS-C6509-NEB
	• WS-CAC-8700W-E supports a remote power cycling feature.
	• See this publication for more information:
	http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Chassis_Installation/Cat6500/6500_ins.html	

PWR-6000-DC	6,000 W DC power supply	12.2(18)SXF13

	Note
	
	• Limited to 4,500 W in the WS-C6509-NEB-A chassis.
	• Limited to 4,000 W in these chassis:
	   – WS-C6509
	   – WS-C6506
	   – WS-C6509-NEB	

WS-CAC-6000W	6,000 W AC power supply	12.2(18)SXD

	Note
	
	• Limited to 4,500 W in the WS-C6509-NEB-A chassis.
	• Limited to 4,000 W in these chassis:
	   – WS-C6509
	   – WS-C6506
	   – WS-C6509-NEB
	• With releases earlier than Release 12.2(18)SXD, limited to 4,000 W in the WS-C6506-E and WS-C6509-E chassis.	

Product ID (append "=" for spares)	Product Description	Minimum Software Version
PWR-4000-DC	4,000 W DC power supply	12.2(14)SX
WS-CAC-4000W	4,000 W AC power supply	12.2(14)SX
+WS-CAC-3000W	3,000 W AC power supply	12.2(17a)SX
	Note • Required with Supervisor Engine 720 in WS-C6509-NEB or OSR7609 chassis. • Included in the WS-6509-NEB-UPGRD= upgrade kit.	
WS-CAC-3000W	3,000 W AC power supply	12.2(14)SX
WS-CAC-2500W	2,500 W AC power supply	12.2(14)SX
WS-CDC-2500W	2,500 W DC power supply	12.2(14)SX

Chassis

13-Slot Chassis

Product ID (append "=" for spare)	Product Description	Minimum Software Version

WS-C6513-E	Catalyst 6513-E chassis:
	 • 13 slots
	 • 64 chassis MAC addresses
	 • Does not support these modules:
	   – Supervisor Engine 2
	   – WS-C6500-SFM
	 • These modules are supported only in slots 9 through 13 and do not power up in other slots:
	   – WS-X6700 series switching modules except WS-X6724-SFP
	   – WS-X6816-GBIC switching modules
	   – WS-SVC-WISM-1-K9	

	With Supervisor Engine 720	12.2(18)SXF14
	With Supervisor Engine 32	12.2(18)SXF14

Product ID (append "=" for spare)	Product Description	Minimum Software Version

WS-C6513	Catalyst 6513 chassis:
	
	• 13 slots
	
	• 64 chassis MAC addresses
	
	• Use with Supervisor Engine 720 requires WS-C6K-13SLT-FAN2
	
	• Does not support WS-C6500-SFM
	
	• These modules are supported only in slots 9 through 13 and do not power up in other slots:
	
	   – WS-X6708-10GE
	   – WS-X6704-10GE
	   – WS-X6748-SFP
	   – WS-X6748-GE-TX
	   – WS-X6816-GBIC
	   – WS-SVC-WISM-1-K9	

	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB

CISCO7613	Cisco 7613 chassis:
	
	• 13 slots
	
	• 64 chassis MAC addresses
	
	• Use with Supervisor Engine 720 requires WS-C6K-13SLT-FAN2
	
	• Does not support WS-C6500-SFM
	
	• These modules are supported only in slots 9 through 13 and do not power up in other slots:
	
	   – WS-X6708-10GE
	   – WS-X6704-10GE
	   – WS-X6748-SFP
	   – WS-X6816-GBIC
	   – WS-X6748-GE-TX
	   – WS-SVC-WISM-1-K9	

	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB

9-Slot Chassis

Product ID (append "=" for spare)	Product Description	Minimum Software Version
WS-C6509-V-E	Catalyst 6509-V-E chassis: • 9 vertical slots • 64 chassis MAC addresses • Requires WS-C6509-V-E-FAN • Required power supply: – 2,500 W DC or higher – 3,000 W AC or higher • Supervisor Engine 2 is not supported in WS-C6509-V-E.	
	With Supervisor Engine 720	12.2(18)SXF10
	With Supervisor Engine 32	12.2(18)SXF10
WS-C6509-E	Catalyst 6509-E chassis: • 9 horizontal slots • Chassis MAC addresses: – Before April 2009—1024 chassis MAC addresses – Starting in April 2009—64 chassis MAC addresses **Note** Chassis with 64 MAC addresses automatically enable the Extended System ID feature, which is enabled with the spanning-tree extend system-id command. You cannot disable the extended-system ID in chassis that support 64 MAC addresses. The Extended System ID feature might already be enabled in your network, because it is required to support both extended-range VLANs and any chassis with 64 MAC addresses. **Enabling the extended system ID feature for the first time updates the bridge IDs of all active STP instances, which might change the spanning tree topology.** • Requires WS-C6509-E-FAN • Requires 2,500 W or higher power supply • With releases earlier than Release 12.2(18)SXD, WS-CAC-6000W is limited to 4,000 W in WS-C6509-E	
	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB

Product ID (append "=" for spare)	Product Description	Minimum Software Version
WS-C6509	Catalyst 6509 chassis: • 9 horizontal slots • 1024 chassis MAC addresses • Use with Supervisor Engine 720 or Supervisor Engine 32 requires WS-C6K-9SLOT-FAN2 • WS-CAC-6000W is limited to 4,000 W in WS-C6509	
	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB
WS-C6509-NEB-A	Catalyst 6509-NEB chassis • 9 vertical slots • 64 chassis MAC addresses • No fan tray upgrade required for use with Supervisor Engine 720	
	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB
WS-C6509-NEB	Catalyst 6509-NEB chassis: • 9 vertical slots • 1024 chassis MAC addresses • Use with Supervisor Engine 720 or Supervisor Engine 32 requires the WS-6509-NEB-UPGRD= upgrade kit—refer to this publication: http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_16162.html	
	With Supervisor Engine 720	12.2(17a)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB
CISCO7609	Cisco 7609 chassis • 9 vertical slots • 64 chassis MAC addresses • No fan tray upgrade required for use with Supervisor Engine 720	
	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB

Product ID (append "=" for spare)	Product Description	Minimum Software Version
OSR-7609	Cisco 7609 chassis: • 9 vertical slots • 1024 chassis MAC addresses • Use with Supervisor Engine 720 or Supervisor Engine 32 requires the WS-6509-NEB-UPGRD= upgrade kit—refer to this publication: http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/hardware/Config_Notes/78_16162.html	
	With Supervisor Engine 720	12.2(17a)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB

6-Slot Chassis

Product ID (append "=" for spare)	Product Description	Minimum Software Version

WS-C6506-E	Catalyst 6506-E chassis:
	
	• 6 slots
	
	• Chassis MAC addresses:
	
	  – Before April 2009—1024 chassis MAC addresses
	
	  – Starting in April 2009—64 chassis MAC addresses
	
	Note Chassis with 64 MAC addresses automatically enable the Extended System ID feature, which is enabled with the spanning-tree extend system-id command. You cannot disable the extended-system ID in chassis that support 64 MAC addresses. The Extended System ID feature might already be enabled in your network, because it is required to support both extended-range VLANs and any chassis with 64 MAC addresses. **Enabling the extended system ID feature for the first time updates the bridge IDs of all active STP instances, which might change the spanning tree topology.**
	
	• Requires WS-C6506-E-FAN
	
	• Requires 2,500 W or higher power supply
	
	• With releases earlier than Release 12.2(18)SXD, WS-CAC-6000W is limited to 4,000 W in WS-C6506-E	

	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB

Product ID (append "=" for spare)	Product Description	Minimum Software Version
WS-C6506	Catalyst 6506 chassis: • 6 slots • 1024 chassis MAC addresses • Use with Supervisor Engine 720 or Supervisor Engine 32 requires WS-C6K-6SLOT-FAN2 • WS-CAC-6000W limited to 4,000 W in WS-C6506	
	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB
CISCO7606	Cisco 7606 chassis: • 6 slots • 64 chassis MAC addresses • Use with Supervisor Engine 720 or Supervisor Engine 32 requires FAN-MOD-6HS	
	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB

4-Slot Chassis

Product ID (append "=" for spare)	Product Description	Minimum Software Version

WS-C6504-E	Catalyst 6504-E chassis:
	
	 • 4 slots
	
	 • 64 chassis MAC addresses
	
	 • Does not support:
	
	   – Supervisor Engine 2
	
	   – WS-X6500-SFM2
	
	   – WS-C6500-SFM
	
	   – WS-F6K-DFC	

	With Supervisor Engine 720	12.2(18)SXE
	With Supervisor Engine 32	12.2(18)SXF

Product ID (append "=" for spare)	Product Description	Minimum Software Version
CISCO7604	Cisco 7604 chassis: • 4 slots • 64 chassis MAC addresses • Does not support: – Supervisor Engine 2 – WS-X6500-SFM2 – WS-C6500-SFM – WS-F6K-DFC	
	With Supervisor Engine 720:	12.2(18)SXE
	With Supervisor Engine 32	12.2(18)SXF

3-Slot Chassis

Product ID (append "=" for spare)	Product Description	Minimum Software Version
WS-C6503-E	• 3 slots • 64 chassis MAC addresses • Use with Supervisor Engine 720 requires WS-C6503-E-FAN • With Release 12.2(18)SXD and later releases, WS-C6503-E supports: – WS-X6704-10GE – WS-X6748-SFP – WS-X6724-SFP – WS-X6748-GE-TX • With releases earlier than Release 12.2(18)SXD, WS-C6503-E has the same support restrictions as WS-C6503. • WS-C6503-E does not support: – WS-X6500-SFM2 – WS-C6500-SFM – WS-F6K-DFC	
	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB

Product ID (append "=" for spare)	Product Description	Minimum Software Version
WS-C6503	Catalyst 6503 chassis: • 3 slots • 64 chassis MAC addresses • Use with Supervisor Engine 720 or Supervisor Engine 32 requires FAN-MOD-3HS • Does not support: – WS-X6708-10GE – WS-X6704-10GE – WS-X6748-SFP – WS-X6724-SFP – WS-X6748-GE-TX – WS-X6500-SFM2 – WS-C6500-SFM – WS-F6K-DFC	
	With Supervisor Engine 720	12.2(14)SX
	With Supervisor Engine 32	12.2(18)SXF
	With Supervisor Engine 2	12.2(17d)SXB
CISCO7603	Cisco 7603 chassis: • 3 slots • 64 chassis MAC addresses • Use with Supervisor Engine 720 requires FAN-MOD-3HS • Does not support: – WS-X6708-10GE – WS-X6704-10GE – WS-X6748-SFP – WS-X6724-SFP – WS-X6748-GE-TX – WS-X6500-SFM2 – WS-C6500-SFM – WS-F6K-DFC	
	With Supervisor Engine 720:	12.2(14)SX
	With Supervisor Engine 2	12.2(17d)SXB

Note Supervisor Engine 32 is not supported in CISCO7603.

Unsupported Hardware

The following hardware is not supported:

- DWDM-SFP-5817—1000BASE-DWDM 1558.17 nm SFP (100-GHz ITU grid) SFP module

- DWDM-SFP-4692—1000BASE-DWDM 1546.92 nm SFP (100-GHz ITU grid) SFP module

- See the "Supervisor Engine 32 (CAT6000-SUP32/MSFC2A, 7600-SUP32/MSFC2A)" section on page 38 for information about hardware that is not supported with the Supervisor Engine 32.

- With a Supervisor Engine 720, WS-X6516-GBIC hardware revisions 5.0 through 5.4 with a DFC3 installed.

  Supervisor Engine 720 supports a DFC3 on these WS-X6516-GBIC hardware revisions:

  – Lower than 5.0

  – 5.5 and higher

  With a Supervisor Engine 720 and a DFC3 installed, WS-X6516-GBIC hardware revisions 5.0 through 5.3 do not power up. Without a DFC3, WS-X6516-GBIC hardware revisions 5.0 through 5.4 operate in bus mode.

  See external field notice 24494 for more information:

  http://www.cisco.com/en/US/ts/fn/200/fn24494.html

- These service modules:

  – WS-X6381-IDS Intrusion Detection System (IDS) Module

  – WS-X6380-NAM Network Analysis Module (NAM)

- Supervisor Engine 1 (WS-X6K-S1A-MSFC2, WS-X6K-SUP1A-MSFC)

- WS-X6624-FXS, WS-X6608-T1, and WS-X6608-E1 voice modules

- WS-X6101-OC12-MMF and WS-X6101-OC12-SMF ATM LANE modules

- WS-X6302-MSM Multilayer Switch Module

- Catalyst 6000 series chassis

- These power supplies cannot support high-capacity fan trays:

  – WS-CAC-1300W

  – WS-CDC-1300W

  – WS-CAC-1000W

Unsupported modules remain powered down if detected and do not affect system behavior.