Cross-Platform Release Notes for Cisco IOS Release 12.0S

March 22, 2013

Cisco IOS Release 12.0(33)S11

OL-1617-14 Rev. Q0

These release notes for the Cisco 7200 series routers, Cisco 7500 series routers, Cisco 10000 series edge services routers, Cisco 10720 Internet router, and Cisco 12000 series Internet routers support Cisco IOS Release 12.0S, up to and including Release 12.0(33)S11.

Note Cisco IOS Release 12.0(33)S does not support the Cisco 12000 series Internet routers. Cisco IOS Release 12.0(33)S1 and later releases do support the Cisco 12000 series Internet routers.

Note The Cisco 7202, Cisco 7204, and Cisco 7206 routers are no longer supported in Cisco IOS Release 12.0S beginning with Cisco IOS Release 12.0(33)S. Cisco 7204VXR and Cisco 7206VXR routers continue to be supported.

Note Cisco IOS Release 12.0(31)S and later releases do not support the Cisco 10000 series edge services routers.

These release notes are updated as needed to describe new features, memory requirements, hardware support, software platform deferrals, and changes to the microcode and related documents.

Cisco IOS Release 12.0S is based on Cisco IOS Release 12.0 and is tailored for service provider environments. Cisco IOS Release 12.0S is the follow-on release to Cisco IOS Release 11.1CC, which was also targeted to the service provider environment. Additionally, many of the features in Cisco IOS Release 12.0S were first introduced for the Cisco 12000 series routers on Cisco IOS Release 11.2GS and for the Cisco 7000 family on Cisco IOS Release 12.0T. Furthermore, Cisco IOS Release 12.0S incorporates all the features that were introduced in Cisco IOS Release 12.0ST up to and including Release 12.0(21)ST.

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For a list of the software caveats that apply to Cisco IOS Release 12.0S, see the "Caveats" section on page 353 and the *Caveats for Cisco IOS Release 12.0* document. The caveats document is updated for every maintenance release and is located on Cisco.com.

Use these release notes in conjunction with the *Release Notes for Cisco IOS Release 12.0* located on Cisco.com.

We recommend that you view the field notices for this release to see if your software or hardware platforms are affected. If you have an account on Cisco.com, you can find field notices at http://www.cisco.com/warp/customer/tech_tips/index/fn.html. If you do not have a Cisco.com login account, you can find field notices at http://www.cisco.com/warp/public/tech_tips/index/fn.html.

Contents

Introduction

Cisco IOS Release 12.0(5)S was the first public release of this software. Many of the features and hardware supported in this software have previously been released to customers on other software releases.

As of Cisco IOS Release 12.0(22)S, all the features that were introduced in Cisco IOS Release 12.0ST up to and including Release 12.0(21)ST are incorporated in Cisco IOS Release 12.0S.

For information on new features and Cisco IOS commands supported by Release 12.0S, see the "New and Changed Information" section on page 25 and the "Related Documentation" section on page 2393.

System Requirements

This section describes the system requirements for Cisco IOS Release 12.0S and includes the following sections:

Hardware Supported

This section consists of the following subsections:

Supported Platforms

Cisco IOS Release 12.0S supports the following platforms:

- Cisco 7200 series routers (including the Cisco 7202, Cisco 7204, Cisco 7204 VXR, Cisco 7206, and Cisco 7206 VXR)
- Cisco 7000 series routers (including the Cisco 7000 and Cisco 7010) upgraded with the 7000 series Route Switch Processor (RSP7000) and 7000 series Chassis Interface (RSP7000CI)
- Cisco 7500 series routers (including the Cisco 7505, Cisco 7507, Cisco 7513, and Cisco 7576)
- Cisco 10000 series edge services routers (including the Cisco 10005 and Cisco 10008)
- Cisco 10720 Internet router
- Cisco 12000 series Internet routers (including the Cisco 12006, Cisco 12008, Cisco 12010, Cisco 12012, Cisco 12016, Cisco 12404, Cisco 12406, Cisco 12410, Cisco 12416, Cisco 12810, and Cisco 12816.)

For additional information about supported hardware for this platform and release, please see the Hardware/Software Compatibility Matrix in the Cisco Software Advisor at the following location:

http://www.cisco.com/cgi-bin/front.x/Support/HWSWmatrix/hwswmatrix.cgi

Note The Cisco 7202, Cisco 7204, and Cisco 7206 routers are no longer supported in Cisco IOS 12.0S as of Cisco IOS Release 12.0(33)S. The Cisco 7204 VXR, and Cisco 7206 VXR routers continue to be supported.

Note The NPE-100 and NPE-150 Network Process Engines are no longer supported in Cisco IOS 12.0S as of Cisco IOS Release 12.0(28)S.

Note Cisco 10000 Series Edge Services Routers: These routers are supported in Cisco IOS Release 12.0(22)S and later releases.

Note Cisco 10720 Internet Router: This router is supported in Cisco IOS Release 12.0(22)S and later releases.

Note Cisco 12000 Series Internet Routers:

The Cisco 12016 Internet router is supported in Cisco IOS Release 12.0(8)S and later releases.
The Cisco 12416 Internet router is supported in Cisco IOS Release 12.0(15)S and later releases.
The Cisco 12410 Internet router is supported in Cisco IOS Release 12.0(16)S and later releases.
The Cisco 12406 Internet router is supported in Cisco IOS Release 12.0(17)S and later releases.
The Cisco 12404 Internet router is supported in Cisco IOS Release 12.0(21)S and later releases.
The Cisco 12006 Internet router is supported in Cisco IOS Release 12.0(27)S and later releases.
The Cisco 12010 Internet router is supported in Cisco IOS Release 12.0(27)S and later releases.
The Cisco 12810 Internet router is supported in Cisco IOS Release 12.0(31)S and later releases.
The Cisco 12816 Internet router is supported in Cisco IOS Release 12.0(31)S and later releases.

All other Cisco 12000 series Internet routers have been supported from the initial base release of Cisco IOS Release 12.0S onward.

The Cisco 12000 series Internet routers are not supported in Cisco IOS Release 12.0(33)S, but they are supported in Cisco IOS Release 12.0(33)S1 and later releases.

Note In order for Cisco IOS Release 12.0(22)S and later releases to run on the Cisco 10000 series edge services router, the Performance Routing Engine (PRE) installed in the chassis must be the PRE1 version (part number ESR-PRE1). You can verify which PRE is installed in the chassis by using the **show version** command.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 25.

Supported Port Adapters for the Cisco 7200 Series and Cisco 7500/RSP Series Routers

Table 1 lists the port adapters that are supported for the Cisco 7200 series and Cisco 7500/RSP series routers in Cisco IOS Release 12.0S and uses the following conventions:

- Yes—The port adapter is supported in the software image.
- No—The port adapter is not supported in the software image.
- In—The number in the "In" column indicates the Cisco IOS 12.0S release in which the port adapter was introduced. For example, (11) means that a port adapter was introduced in Cisco IOS Release 12.0(11)S. If a cell in this column contains an em dash (—), support for the port adapter was included in the initial base release.

Table 1 Supported Port Adapters for the Cisco 7200 Series and Cisco 7500/RSP Series Routers

Cisco Product Number[1]	Adapter Description	In	7200 Series	7500/RSP Series
ATM Port Adapters				
PA-A1-OC3SM=	1-port ATM OC-3 single mode (IR)	—	No	Yes

Table 1 Supported Port Adapters for the Cisco 7200 Series and Cisco 7500/RSP Series Routers (continued)

Cisco Product Number[1]	Adapter Description	In	7200 Series	7500/RSP Series
PA-A1-OC3MM=	1-port ATM OC-3 multimode	—	No	Yes
PA-A2-4T1C-OC3SM=	ATM CES, 4T1 CES ports, 1 OC-3 ATM SM port	—	Yes	No
PA-A2-4T1C-T3ATM=	ATM CES, 4T1 CES ports, 1 T3 ATM Port	—	Yes	No
PA-A2-4E1XC-OC3SM=	CES OC-3, 4E1 ports, 120 ohm	—	Yes	No
PA-A2-4E1XC-E3ATM=	CES E3/E1, 120 ohms	—	Yes	No
PA-A3-OC3MM	1-port ATM Enhanced OC-3c/STM-1 multimode	—	Yes	Yes
PA-A3-OC3SMI	1-port ATM Enhanced OC-3c/STM-1 single mode (IR)	—	Yes	Yes
PA-A3-OC3SML	1-port ATM Enhanced OC-3c/STM-1 single mode (LR)	—	Yes	Yes
PA-A3-OC12MM=	1-port ATM Enhanced OC-12/STM-4 multimode	(11)	No	Yes
PA-A3-OC12SMI=	1-port ATM Enhanced OC-12/STM-4 single mode (IR)	(11)	No	Yes
PA-A3-E3	1-port ATM Enhanced E3	—	Yes	Yes
PA-A3-T3	1-port ATM Enhanced DS3	—	Yes	Yes
PA-A3-8E1IMA	8-port ATM Inverse MUX E1, 120 ohm	(11)	Yes	Yes
PA-A3-8T1IMA	8-port ATM Inverse MUX T1	(11)	Yes	Yes
PA-A6-OC3MM	1-port ATM OC-3c/STM-1 multimode, enhanced	(32)	Yes	Yes
PA-A6-OC3SMI	1-port ATM OC-3c/STM-1 single-mode (IR), enhanced	(32)	Yes	Yes
PA-A6-OC3SML	1-port ATM OC-3c/STM-1 single-mode (LR), enhanced	(32)	Yes	Yes
PA-A6-T3	1-port ATM DS3, enhanced	(32)	Yes	Yes
PA-A6-E3	1-port ATM E3, enhanced	(32)	Yes	Yes
Channel Port Adapters				
PA-4C-E=	1-port Enhanced ESCON Channel	—	Yes	Yes
Channelized Port Adapters				
PA-2CE1/PRI-75=	2-port channelized E1/PRI, 75 ohm interface	—	Yes	Yes
PA-2CE1/PRI-120	2-port channelized E1/PRI, 120 ohm interface	(10)	Yes[2]	Yes
PA-2CT1/PRI	2-port channelized T1/PRI	(10)	Yes[2]	Yes
Dynamic Packet Transport (DPT) Port Adapters				
PA-SRP-OC12MM=	DPT-OC-12 multimode (Cisco 7200 series only)	(6)	Yes	No
PA-SRP-OC12SMI=	DPT-OC-12 single mode (IR) (Cisco 7200 series only)	(6)	Yes	No
PA-SRP-OC12SML=	DPT-OC-12 single mode (LR) (Cisco 7200 series only)	(6)	Yes	No
PA-SRP-OC12SMX=	DPT-OC-12 single mode extended reach (Cisco 7200 series only)	(9)	Yes	No
SRPIP-OC12MM=	DPT-OC-12 multimode (Cisco 7500 series only)	(6)	No	Yes
SRPIP-OC12SMI=	DPT-OC-12 single mode (IR) (Cisco 7500 series only)	(6)	No	Yes
SRPIP-OC12SML=	DPT-OC-12 single mode (LR) (Cisco 7500 series only)	(6)	No	Yes
SRPIP-OC12SMX=	DPT-OC-12 single mode extended reach (Cisco 7500 series only)	(9)	No	Yes

Table 1 Supported Port Adapters for the Cisco 7200 Series and Cisco 7500/RSP Series Routers (continued)

Cisco Product Number[1]	Adapter Description	In	7200 Series	7500/RSP Series
Ethernet/Fast Ethernet/Gigabit Ethernet Port Adapters				
PA-4E	4-Port Ethernet 10BASE-T	—	Yes	Yes
PA-4E1G/75	4-port E1 G.703 Serial, 75 ohm/unbalanced	—	Yes	Yes
PA-4E1G/120	4-port E1 G.703 Serial, 120 ohm/balanced	—	Yes	Yes
PA-5EFL=	5-port Ethernet 10BASE-FL	—	Yes	Yes
PA-8E	8-port Ethernet 10BASE-T	—	Yes	Yes
PA-FE-FX=	1-port Fast Ethernet 100BASE-FX	—	Yes	Yes
PA-FE-TX=	1-port Fast Ethernet 100BASE-TX	—	Yes	Yes
PA-2FE-FX	2-port Fast Ethernet 100BASE-FX	(15)	Yes	Yes
PA-2FE-TX	2-port Fast Ethernet 100BASE-TX	(15)	Yes	Yes
PA-GE	1-port Gigabit Ethernet	(7)	Yes	No
Fiber Distributed Data Interface (FDDI) Port Adapters				
PA-F/FD-MM=	1-port FDDI Full Duplex multimode	—	Yes	Yes
PA-F/FD-SM=	1-port FDDI Full Duplex single mode	—	Yes	Yes
High-Speed Serial Port Adapters				
PA-H	1-port High-Speed Serial Interface (HSSI)	—	Yes	Yes
PA-2H	2-port High-Speed Serial Interface (HSSI)	—	Yes	Yes
Multichannel Serial Port Adapters				
PA-MC-T3	1-port multichannel T3	(5)	Yes	Yes
PA-MC-E3	1-port multichannel E3	(5)	Yes	Yes
PA-MC-2T3+	2-port multichannel T3	(6)	Yes	Yes
PA-MC-2T1	2-port multichannel T1, integrated CSU/DSUs	(7)	Yes	Yes
PA-MC-2E1/120	2-port multichannel E1, G.703 120 ohm interface	(7)	Yes	Yes
PA-MC-4T1	4-port multichannel T1, integrated CSU/DSUs	(5)	Yes	Yes
PA-MC-8T1=	8-port multichannel T1, integrated CSU/DSUs	(5)	Yes	Yes
PA-MC-8E1/120=	8-port multichannel E1, G.703 120 ohm interface	(5)	Yes	Yes
PA-MC-8TE1+	8-port multichannel T1/E1 PRI	(22)	Yes	Yes
PA-MC-8DSX1=	8-port multichannel T1 with integrated DSUs	(5)	Yes	Yes
PA-4B-U	4-port BRI, U Interface	—	Yes	No
PA-8B-S/T	8-port BRI, S/T Interface	—	Yes	No
Service Adapters				
SA-ENCRYPT	Encryption Service Adapter	—	Yes	Yes
SA-ISA	Integrated Services Adapter for IPSec or MPPE encryption	—	Yes	No
SA-VAM	VPN Acceleration Module (VAM)	—	Yes	No
SONET Port Adapters				
PA-POS-OC3MM=	1-port Packet-over-SONET OC-3c/STM-1 multimode	—	Yes	Yes

Table 1 Supported Port Adapters for the Cisco 7200 Series and Cisco 7500/RSP Series Routers (continued)

Cisco Product Number[1]	Adapter Description	In	7200 Series	7500/RSP Series
PA-POS-OC3SMI=	1-port Packet-over-SONET OC-3c/STM-1 single mode (IR)	—	Yes	Yes
PA-POS-OC3SML=	1-port Packet-over-SONET OC-3c/STM-1 single mode (LR)	—	Yes	Yes
PA-POS-1OC3	1-port Packet-over-SONET OC-3/STM-1 POS (with APS)	(30)	Yes	Yes
PA-POS-2OC3	2-port Packet-over-SONET OC-3/STM-1 POS (with APS)	(27)	Yes	Yes
T1/E1 Port Adapters				
PA-4T+	4-port Serial, Enhanced	—	Yes	Yes
PA-8T-V35	8-port Serial, V.35	—	Yes	Yes
PA-8T-X21	8-port Serial, X.21	—	Yes	Yes
PA-8T-232	8-port Serial, 232	—	Yes	Yes
T3/E3 Port Adapters				
PA-T3=	1-port T3 Serial, T3 DSUs	—	Yes	Yes
PA-T3+	1-port T3 Serial, Enhanced	—	Yes	Yes
PA-2T3=	2-port T3 Serial, T3 DSUs	—	Yes	Yes
PA-2T3+	2-port T3 Serial, Enhanced	—	Yes	Yes
PA-E3	1-port E3 Serial, E3 DSUs	—	Yes	Yes
PA-2E3	2-port E3 Serial, E3 DSUs	—	Yes	Yes
Token Ring Port Adapters				
PA-4R-DTR	4-port Dedicated Token Ring, 4/16-Mbps, HDX/FDX	—	Yes	Yes

1. For a spare product number, append an equal sign (=) to the product number. If a product number is listed as a spare product, only a spare product is available. For End-of-Sale (EOS) and End-of-Life (EOL) information about port adapters, refer to the Cisco product bulletins at the following locations:

   Cisco 7200 series: http://www.cisco.com/en/US/products/hw/routers/ps341/prod_eol_notices_list.html
   Cisco 7500 series: http://www.cisco.com/en/US/products/hw/routers/ps359/prod_eol_notices_list.html

2. Support on the Cisco 7200 series was introduced in Cisco IOS Release 12.0(14)S.

Supported Line Cards for the 10000 Series Routers

Table 2 lists the line cards that are supported for the Cisco 10000 series routers in Cisco IOS Release 12.0S. The number in the "In" column indicates the Cisco IOS 12.0S release in which the line card was introduced. For example, (22) means that a line card was introduced in Cisco IOS Release 12.0(22)S.

Table 2 Supported Line Cards for the Cisco 10000 Edge Services Router

Common Abbreviation	Cisco Product Number[1]	Line Card Description	In
ATM Line Cards			
1-Port OC-12 ATM	ESR-1OC-12-ATM[2]	1-port OC-12 ATM	(22)
4-Port OC-3 ATM	ESR-4OC3-ATM-SM	4-port OC-3/STM-1 ATM, single mode	(22)

Table 2 Supported Line Cards for the Cisco 10000 Edge Services Router (continued)

Common Abbreviation	Cisco Product Number[1]	Line Card Description	In
Ethernet Line Cards			
1-Port GE	ESR-1GE	1-port Gigabit Ethernet	(22)
1-Port GE Half-Height	ESR-HH-1GE	1-port Gigabit Ethernet half-height	(23)
8-Port FE Half-Height	ESR-HH-8FE-TX	8-port Fast Ethernet half-height	(23)
Half-Height Carrier	ESR-HH-CARRIER	Full-length base carrier for half-height line card	(23)
Channelized Line Cards			
1-Port Channelized OC-12/STM-4	ESR-1COC-12/STM-4-SMI[3]	1-port channelized OC-12/STM-4 (STS-12), single mode, intermediate reach	(22)
	ESR-1COC-12/STM-4-SML	1-port channelized OC-12/STM-4 (STS-12), single mode, long reach	(22)
4-Port Channelized STM-1/OC-3	ESR-4OC3-ChSTM-1/OC-3	4-port channelized OC-3/STM-1 SDH, single mode	(22)
6-Port Channelized T3	ESR-6CT3	6-port channelized T3	(22)
24-Port T1/E1	ESR-24CT1/E1	24-port channelized E1/T1	(22)
Electrical Interface Line Card			
8-Port Unchannelized E3/T3	ESR-8E3/DS3	8-port clear channel E3/DS3 line card	(22)
Packet over SONET (POS)/Synchronous Digital Hierarchy (SDH) Line Cards			
1-Port OC-12/STM-4 POS	ESR-1OC-12/P-SMI	1-port OC-12/STS-12c/STM-4 POS/SDH, single mode, intermediate reach	(22)
	ESR-1OC-12/P-SML	1-port OC-12/STS-12c/STM-4 POS, single mode, long reach	(22)
6-Port OC-3c/STM-1 POS	ESR-6OC3/P-SMI	6-port OC-3c/STS-3c/STM-1 POS/SDH, single mode, intermediate reach	(22)
	ESR-6OC3/P-SML	6-port OC-3c/STS-3c/STM-1 POS/SDH, single mode, long reach	(22)

1. For a spare product number, append an equal sign (=) to the product number. For End-of-Sale (EOS) and End-of-Life (EOL) information about line cards, refer to the Cisco product bulletins at the following location:

   http://www.cisco.com/en/US/products/hw/routers/ps133/prod_eol_notices_list.html
2. The old part number for this line card is ESR-1OC12ATM-SM.
3. The old part number for this line card is ESR-1COC12-SMI.

For troubleshooting and alerts information about port adapters, see the Cisco documents at the following location:

http://www.cisco.com/en/US/products/hw/modules/ps2033/tsd_products_support_troubleshoot_and_alerts.html

Supported Modules for the 10720 Router

Table 3 lists the modules (also referred to as cards) that are supported for the Cisco 10720 in Cisco IOS Release 12.0S. The number in the "In" column indicates the Cisco IOS 12.0S release in which the module was introduced. For example, (22) means that a module was introduced in Cisco IOS Release 12.0(22)S. Note that, before their introduction in Cisco IOS Release 12.0S, most of these modules were introduced in Cisco IOS Release 12.0SP.

Table 3 Supported Line Cards for the Cisco 10720 Internet Router

Common Abbreviation	Cisco Product Number[1]	Module Description	In
Fast Ethernet (FE) an Gigabit Ethernet (GE) Modules			
24-Port Fast Ethernet	10720-FE-TX	24-port 10/100 Ethernet access module	(22)
	10720-FE-FX-MM	24-port 100 Mbps fiber Ethernet access module, multimode, 2 km	(22)
	10720-FE-FX-SM	24-port 100 Mbps fiber Ethernet access module, single mode, 15 km	(22)
4-Port Gigabit Ethernet + 8-Port Fast Ethernet	10720-GE-FE-TX	Combined 4-port Gigabit Ethernet 8-port 10/100 Ethernet TX access module	(22)
	10720-GE-FE-TX-B	Combined 4-port Gigabit Ethernet 8-port 10/100 Ethernet TX access module, Revision B	(25)
Gigabit Ethernet (GE) Small-Form-Factor Pluggable (SFP) Modules			
GE SFP	10720-GE-SFP-SX	GE SFP module—short reach (550 m)	(22)
	10720-GE-SFP-LH	GE SFP module—intermediate reach (10 km)	(22)
	GLC-ZX-SM	GE SFP module—long reach (70 km)	(23)
	SFP-GE-T	GE SFP module—1000BaseT	(31)
	SFP-GE-S	GE SFP module—short reach (550 m), extended temperature	(31)
	SFP-GE-L	GE SFP module—intermediate reach (10 km), extended temperature	(31)

Table 3 Supported Line Cards for the Cisco 10720 Internet Router (continued)

Common Abbreviation	Cisco Product Number[1]	Module Description	In
Cisco Wavelength Division Multiplexing (CDWM) Small-Form-Factor Pluggable (SFP) Transceiver Modules			
CWDM SFP	CWDM-SFP-1470	CWDM SFP module—longwave 1470 nm laser, single mode, gray	(31)
	CWDM-SFP-1490	CWDM SFP module—longwave 1490 nm laser, single mode, violet	(31)
	CWDM-SFP-1510	CWDM SFP module—longwave 1510 nm laser, single mode, blue	(31)
	CWDM-SFP-1530	CWDM SFP module—longwave 1530 nm laser, single mode, green	(31)
	CWDM-SFP-1550	CWDM SFP module—longwave 1550 nm laser, single mode, yellow	(31)
	CWDM-SFP-1570	CWDM SFP module—longwave 1570 nm laser, single mode, orange	(31)
	CWDM-SFP-1590	CWDM SFP module—longwave 1590 nm laser, single mode, red	(31)
	CWDM-SFP-1610	CWDM SFP module—longwave 1610 nm laser, single mode, brown	(31)
Packet over SONET (POS)/Synchronous Digital Hierarchy (SDH) Modules			
2-Port OC-48/STM-16 POS	10720-SR-LC-POS	2-port OC-48c/STM-16c POS/SDH uplink module, short reach (2 km)	(23)
	10720-IR-LC-POS=	2-port OC-48c/STM-16c POS/SDH uplink module, intermediate reach (15 km)	(23)
	10720-LR1-LC-POS	2-port OC-48c/STM-16c POS/SDH uplink module, long reach (40 km)	(23)
	10720-LR2-LC-POS	2-port OC-48c/STM-16c POS/SDH uplink module, (extra) long reach (80 km)	(23)
Dynamic Packet Transport (DPT) Modules[2]			
2-Port OC-48/STM-16 SRP	10720-SR-LC	2-port OC-48c/STM-16c SRP uplink module, short reach (2 km)	(22)
	10720-IR-LC	2-port OC-48c/STM-16c SRP uplink module, intermediate reach (15 km)	(22)
	10720-LR1-LC	2-port OC-48c/STM-16c SRP uplink module, long reach (40 km)	(22)
	10720-LR2-LC	2-port OC-48c/STM-16c SRP uplink module, (extra) long reach (80 km)	(22)
Other Modules			
Console/Auxiliary	10720-CON-AUX=	10720 console/auxiliary module	(22)
RPR/SRP	10720-RPR-SFP=	Dual-Mode IEEE 802.17 RPR/SRP uplink module	(30)

1. For a spare product number, append an equal sign (=) to the product number. For End-of-Sale (EOS) and End-of-Life (EOL) information about modules, refer to the Cisco product bulletins at the following location:

   http://www.cisco.com/en/US/products/hw/routers/ps147/prod_eol_notices_list.html

2. DPT modules are also referred to as Spatial Reuse Protocol (SRP) modules.

Supported Line Cards for the 12000 Series Routers

Table 4 lists the line cards that are supported for the Cisco 12000 series routers in Cisco IOS Release 12.0S and uses the following conventions:

- Yes—The line card is supported in the software image.
- No—The line card is not supported in the software image.
- In—The number in the "In" column indicates the Cisco IOS 12.0S release in which the line card was introduced. For example, (11) means a that line card was introduced in Cisco IOS Release 12.0(11)S. If a cell in this column contains an em dash (—), support for the line card was included in the initial base release.

Note Line cards with less than 128 MB of memory will not be able to complete the boot process when attempting to upgrade to Cisco IOS Release 12.0(27)S. If a memory upgrade is required, 256 MB is the next recommended configuration, with 128 MB as the minimum configuration requirement.

Table 4 Supported Line Cards for the Cisco 12000 Series Routers

Common Abbreviation	Cisco Product Number[1]	Engine Type[2]	Line Card Description	In	Chassis		
					2.5 Gbps[3]	10 Gbps[4]	40 Gbps[5]
Core Line Cards—Packet over SONET (POS)							
1-Port OC-48 POS[6]	OC48E/POS-SR-SC-B	2	1-port OC-48c/STM-16c POS/SDH short reach	(10)	Yes	Yes	Yes
	OC48E/POS-LR-SC-B	2	1-port OC-48c/STM-16c POS/SDH long reach	(10)	Yes	Yes	Yes
1-Port OC-48 POS ISE	OC48X/POS-SR-SC	3	1-port OC-48c/STM-16c POS/SDH ISE short reach	(21)	Yes	Yes	Yes
	OC48X/POS-LR-SC	3	1-port OC-48c/STM -16c POS/SDH ISE long reach	(21)	Yes	Yes	Yes
4-Port[7] OC-48 POS ES[8]	4OC48E/POS-SR-SC[9]	4+	4-port OC-48c/STM-16c POS/SDH ES short reach	(15)	No	Yes	Yes
	4OC48E/POS-LR-SC[10]	4+	4-port OC-48c/STM-16c POS/SDH ES long reach	(15)	No	Yes	Yes
8-Port OC-48 POS[11]	8OC48/POS-SFP	6	8-port OC-48c/STM-16c POS/SDH Small Form-Factor Plugable (SFP)	(27)	No	Yes	Yes
1-Port OC-192 POS	OC192R0/POS-SR-SC	2	1-port OC-192c/STM-64c POS Enabler short reach	(10)	Yes	Yes	Yes
	OC192R0/POS-IR-SC	2	1-port OC-192c/STM-64c POS Enabler intermediate reach	(10)	Yes	Yes	Yes

Table 4 Supported Line Cards for the Cisco 12000 Series Routers (continued)

Common Abbreviation	Cisco Product Number[1]	Engine Type[2]	Line Card Description	In	Chassis		
					2.5 Gbps[3]	10 Gbps[4]	40 Gbps[5]
1-Port OC-192 POS ES[8]	OC192E/POS-VSR	4+	1-port OC-192c/STM-64c POS/SDH ES very short reach	(21)	No	Yes	Yes
	OC192E/POS-SR-SC	4+	1-port OC-192c/STM-64c POS/SDH ES short reach	(21)	No	Yes	Yes
	OC192E/POS-IR-SC	4+	1-port OC-192c/STM-64c POS/SDH ES intermediate reach	(21)	No	Yes	Yes
	OC192E/POS-LR-SC	4+	1-port OC-192c/STM-64c POS/SDH ES long reach	(24)	No	Yes	Yes
2-Port OC-192 POS[11]	2OC192/POS-VSR	6	2-port OC-192c/STM-64c POS/SDH very short reach	(27)	No	Yes	Yes
	2OC192/POS-SR-SC	6	2-port OC-192c/STM-64c POS/SDH short reach	(27)	No	Yes	Yes
	2OC192/POS-IR-SC	6	2-port OC-192c/STM-64c POS/SDH intermediate reach	(27)	No	Yes	Yes
Edge Line Cards—DS3, E3, and Packet over SONET (POS)							
6-Port DS3[12]	6DS3-SMB-B	0	6-port DS3 with ECC	(10)	Yes	Yes	Yes
12-Port DS3[12]	12DS3-SMB-B	0	12-port DS3 with ECC	(10)	Yes	Yes	Yes
6-Port E3[12]	6E3-SMB	0	6-port E3 with ECC	(15)	Yes	Yes	Yes
12-Port E3[12]	12E3-SMB	0	12-port E3 with ECC	(15)	Yes	Yes	Yes
8-Port OC-3 POS	8OC3/POS-SM	2	8-port OC-3c/STM-1c POS/SDH single mode	(10)	Yes	Yes	Yes
	8OC3/POS-MM	2	8-port OC-3c/STM-1c POS/SDH multimode	(10)	Yes	Yes	Yes
16-Port OC-3 POS	16OC3/POS-SM	2	16-port OC-3c/STM-1c POS/SDH single mode	(10)	Yes	Yes	Yes
	16OC3/POS-MM	2	16-port OC-3c/STM-1c POS/SDH multimode	(10)	Yes	Yes	Yes
4-Port[7] OC-3 POS	LC-4OC3/POS-SM	0	4-port OC-3c/STM-1c POS/SDH single mode	(5)	Yes	Yes	Yes
	LC-4OC3/POS-MM	0	4-port OC-3c/STM-1c POS/SDH multimode	(5)	Yes	Yes	Yes
	4OC3/POS-LR-SC	0	4-port OC-3c/STM-1c POS/SDH long reach	(5)	Yes	Yes	Yes
4-Port[7] OC-3 POS ISE	4OC3X/POS-MM-MJ-B	3	4-port OC-3c/STM-1c POS/SDH ISE multimode	(22)	Yes	Yes	Yes
	4OC3X/POS-IR-LC-B	3	4-port OC-3c/STM-1c POS/SDH ISE intermediate reach	(22)	Yes	Yes	Yes
	4OC3X/POS-LR-LC-B	3	4-port OC-3c/STM-1c POS/SDH ISE long reach	(22)	Yes	Yes	Yes

Table 4 Supported Line Cards for the Cisco 12000 Series Routers (continued)

Common Abbreviation	Cisco Product Number[1]	Engine Type[2]	Line Card Description	In	Chassis		
					2.5 Gbps[3]	10 Gbps[4]	40 Gbps[5]
8-Port OC-3 POS ISE	8OC3X/POS-MM-MJ-B	3	8-port OC-3c/STM-1c POS/SDH ISE multimode	(22)	Yes	Yes	Yes
	8OC3X/POS-IR-LC-B	3	8-port OC-3c/STM-1c POS/SDH ISE intermediate reach	(22)	Yes	Yes	Yes
16-Port OC-3 POS ISE	16OC3X/POS-M-MJ-B	3	16-port OC-3c/STM-1c POS/SDH ISE multimode	(22)	Yes	Yes	Yes
	16OC3X/POS-I-LC-B	3	16-port OC-3c/STM-1c POS/SDH ISE intermediate reach	(21)	Yes	Yes	Yes
1-Port OC-12 POS	LC-1OC12/POS-SM[13]	0	1-port OC-12c/STM-4c POS/SDH single mode	(10)	Yes	Yes	Yes
	LC-1OC12/POS-MM[14]	0	1-port OC-12c/STM-4c POS/SDH multimode	(10)	Yes	Yes	Yes
4-Port[7] OC-12 POS[6]	4OC12/POS-IR-SC-B	2	4-port OC-12c/STM-4c POS/SDH single mode	(8)	Yes	Yes	Yes
	4OC12/POS-MM-SC-B	2	4-port OC-12c/STM-4c POS/SDH multimode	(8)	Yes	Yes	Yes
4-Port[7] OC-12 POS ISE	4OC12X/POS-I-SC-B	3	4-port OC-12c/STM-4c POS/SDH ISE single mode	(21)	Yes	Yes	Yes
	4OC12X/POS-M-SC-B	3	4-port OC-12c/STM-4c POS/SDH ISE multimode	(21)	Yes	Yes	Yes
Channelized Edge Line Cards—Optical Carrier (OC) and T3							
2-Port CHOC-3, DS1/E1	2CHOC3/STM1-IR-SC	0	2-port channelized OC-3/STM-1 (DS1/E1)	(17)	Yes	Yes	Yes
1-Port CHOC-12, DS3	LC-OC12-DS3	0	1-port channelized OC-12 (DS3)	(5)	Yes	Yes	Yes
1-Port CHOC-12, OC-3	CHOC12/STS3-IR-SC	0	1-port channelized OC-12/STM-4 (OC-3/STM-1)	(5)	Yes	Yes	Yes
1-Port CHOC-12, OC-3 ISE[11]	CHOC12/DS1-IR-SC	3	1-port channelized OC-12/STM-4 (DS1/E1) ISE	(27)	Yes	Yes	Yes
4-Port[7] CHOC-12 ISE	4CHOC12/DS3-I-SCB	3	4-port channelized OC-12/STM-4 (DS3/E3, OC-3c/STM-1c) POS/SDH ISE	(21)	Yes	Yes	Yes
1-Port CHOC-48 ISE	CHOC48/DS3-SR-SC	3	1-port channelized OC-48/STM-16 (DS3/E3, OC-3c/STM-1c, OC-12c/STM-4c) POS/SDH ISE	(21)	Yes	Yes	Yes
6-Port Ch T3	6CT3-SMB	0	6-port channelized T3 (T1)	(14)	Yes	Yes	Yes

Table 4 Supported Line Cards for the Cisco 12000 Series Routers (continued)

Common Abbreviation	Cisco Product Number[1]	Engine Type[2]	Line Card Description	In	Chassis		
					2.5 Gbps[3]	10 Gbps[4]	40 Gbps[5]
ATM Line Cards							
4-Port[7] OC-3 ATM	4OC3/ATM-IR-SC	0	4-port OC-3c/STM-1c ATM single mode	(5)[15]	Yes	Yes	Yes
	4OC3/ATM-MM-SC	0	4-port OC-3c/STM-1c ATM multimode	(5)[15]	Yes	Yes	Yes
4-Port OC-3 ATM ISE[11]	4OC3X/ATM-IR-SC	3	4-port OC-3/STM-1 ATM ISE single mode	(27)	Yes	Yes	Yes
	4OC3X/ATM-MM-SC	3	4-port OC-3/STM-1 ATM ISE multimode	(27)	Yes	Yes	Yes
8-Port OC-3 ATM	8OC03/ATM/TS-IR-B	2	8-port OC-3c/STM-1c ATM single mode	(22)	Yes	Yes	Yes
	8OC03/ATM/TS-MM-B	2	8-port OC-3c/STM-1c ATM multimode	(22)	Yes	Yes	Yes
1-Port OC-12 ATM	LC-1OC12/ATM-SM	0	1-port OC-12c/STM-4c ATM single mode	(5)[15]	Yes	Yes	Yes
	LC-1OC12/ATM-MM	0	1-port OC-12c/STM-4c ATM multimode	(5)[15]	Yes	Yes	Yes
4-Port[7] OC-12 ATM	4OC12/ATM-IR-SC	2	4-port OC-12c/STM-4c ATM single mode	(13)	Yes	Yes	Yes
	4OC12/ATM-MM-SC	2	4-port OC-12c/STM-4c ATM multimode	(13)	Yes	Yes	Yes
4-Port[7] OC-12 ATM ISE	4OC12X/ATM-IR-SC	3	4-Port OC-12c/STM-4c ATM ISE single mode	(25)	Yes	Yes	Yes
	4OC12X/ATM-MM-SC	3	4-Port OC-12c/STM-4c ATM ISE multimode	(25)	Yes	Yes	Yes
Fast Ethernet (FE) and Gigabit Ethernet (GE) Line Cards							
1-Port GE	GE-GBIC-SC-B	1	1-port Gigabit Ethernet with ECC	(5)	Yes	Yes	Yes
10-Port GE	10x1GE-SFP-LC-B	4	10-port Gigabit Ethernet	(19)	Yes	Yes	Yes
8-Port FE[12]	8FE-FX-SC-B	1	8-port Fast Ethernet, 100BASE-FX, with ECC memory	(10)	Yes	Yes	Yes
	8FE-TX-RJ45-B	1	8-port Fast Ethernet, 100BASE-TX, with ECC memory	(10)	Yes	Yes	Yes
3-Port GE	3GE-GBIC-SC	2	3-port Gigabit Ethernet	(11)	Yes	Yes	Yes
4-Port[7] GE ISE	4GE-SFP-LC	3	4-port Gigabit Ethernet ISE	(25)	Yes	Yes	Yes
1-Port 10-GbE	1X10GE-LR-SC	4+	1-port 10-Gigabit Ethernet long reach	(23)	No	Yes	Yes
	1X10GE-ER-SC	4+	1-port 10-Gigabit Ethernet extended reach	(23)	No	Yes	Yes

Table 4 Supported Line Cards for the Cisco 12000 Series Routers (continued)

Common Abbreviation	Cisco Product Number[1]	Engine Type[2]	Line Card Description	In	Chassis		
					2.5 Gbps[3]	10 Gbps[4]	40 Gbps[5]
Modular GbE	EPA-GE/FE-BBRD and EPA-3GE-SX/LH-LC	4+	Modular Gigabit Ethernet: Gigabit Ethernet modular baseboard and 3-port Gigabit Ethernet port adapter	(23)	No	Yes	Yes
Dynamic Packet Transport (DPT) Line Cards							
2-Port OC-12 DPT[12]	OC12/SRP-IR-SC-B	1	2-port OC-12c/STM-4c DPT with ECC single mode intermediate reach	(10)	Yes	Yes	Yes
	OC12/SRP-LR-SC-B	1	2-port OC-12c/STM-4c DPT with ECC single mode long reach	(10)	Yes	Yes	Yes
	OC12/SRP-XR-SC	1	2-port OC-12c/STM-4c DPT with ECC single mode extra long reach	(10)	Yes	Yes	Yes
	OC12/SRP-MM-SC-B	1	2-port OC-12c/STM-4c DPT with ECC multimode	(10)	Yes	Yes	Yes
4-Port[7] OC-12 DPT ISE	4OC12X/SRP-IR-LC	3	4-port OC-12c/STM-4c DPT ISE intermediate reach	(24)	Yes	Yes	Yes
	4OC12X/SRP-XR-LC	3	4-port OC-12c/STM-4c DPT ISE extended long reach	(24)	Yes	Yes	Yes
1-Port OC-48 DPT[6]	OC48/SRP-SR-SC-B[16]	2	1-port OC-48c/STM-16c DPT single mode short reach	(15)	Yes	Yes	Yes
	OC48/SRP-LR-SC-B[17]	2	1-port OC-48c/STM-16c DPT single mode long reach	(15)	Yes	Yes	Yes
4-Port[7] OC-48 DPT	4OC48/SRP-SFP	4+	4-port OC-48c/STM-16c DPT	(23)	No	Yes	Yes
1-Port OC-192 DPT	OC192/SRP-VSR	4+	1-port OC-192c/STM-64c DPT very short reach	(23)	No	Yes	Yes
	OC192/SRP-SR-SC	4+	1-port OC-192c/STM-64c DPT short reach	(23)	No	Yes	Yes
	OC192/SRP-IR-SC	4+	1-port OC-192c/STM-64c DPT intermediate reach	(23)	No	Yes	Yes
Shared Port Adapters (SPAs)							
2-Port T3/E3 Serial	SPA-2XT3/E3	3	2-port clear channel T3/E3	(31)	Yes	Yes	Yes
4-Port T3/E3 Serial	SPA-4XT3/E3	3	4-port clear channel T3/E3	(31)	Yes	Yes	Yes
2-Port CT3	SPA-2XCT3/DS0	3	2-port channelized T3 to DS0	(31)	Yes	Yes	Yes
4-Port CT3	SPA-4XCT3/DS0	3	4-port channelized T3 to DS0	(31)	Yes	Yes	Yes
1-Port CHOC-3	SPA-1XCHSTM1/OC3	5	1-port channelized STM-1/OC-3	(32)	No	Yes	Yes
8-Port Ch T1/E1	SPA-8XCHT1/E1	5	8-port channelized T1/E1	(32)	No	Yes	Yes
8-Port FE	SPA-8XFE	5	8-port Fast Ethernet	(32)	No	Yes	Yes
1-Port 10GE	SPA-1XTENGE-XFP	5	1-port 10-Gigabit Ethernet	(31)	No	Yes	Yes

Table 4 Supported Line Cards for the Cisco 12000 Series Routers (continued)

Common Abbreviation	Cisco Product Number[1]	Engine Type[2]	Line Card Description	In	Chassis		
					2.5 Gbps[3]	10 Gbps[4]	40 Gbps[5]
2-Port GE	SPA-2X1GE	5	2-port Gigabit Ethernet SPA	(32)	No	Yes	Yes
5-Port GE	SPA-5X1GE	5	5-port Gigabit Ethernet	(31)	No	Yes	Yes
10-Port GE	SPA-10X1GE	5	10-port Gigabit Ethernet	(31)	No	Yes	Yes
2-Port OC-48 POS	SPA-2XOC48c	5	2-port OC-48 POS/RPR	(31)S2	No	Yes	Yes
1-Port OC-192 POS/RPR VSR	SPA-OC192POS-VSR	5	1-port OC192/STM64 POS/RPR VSR Optics	(32)	No	Yes	Yes
1-Port OC-192 POS/RPR	SPA-OC192POS-LR	5	1-port OC192/STM64 POS/RPR SMLR Optics	(31)	No	Yes	Yes
1-Port OC192 POS/RPR XFP	SPA-OC192POS-XFP	5	1-port OC192/STM64 POS/RPR XFP Optics	(31)	No	Yes	Yes
SPA Interface Processors (SIPs)							
SIP-400	12000-SIP-400	3	2.5G ISE SPA Interface Processor.	(31)	Yes	Yes	Yes
SIP-600	12000-SIP-600	5	10G Engine 5 SPA Interface Processor.	(31)	No	Yes	Yes
SIP-401	12000-SIP-401	5	2.5G Multiservice Engine SPA Interface Processor.	(32)	Yes	Yes	Yes
SIP-501	12000-SIP-501	5	5G Multiservice Engine SPA Interface Processor.	(32)	No	Yes	Yes
SIP-601	12000-SIP-601	5	10G Multiservice Engine SPA Interface Processor.	(32)	No	Yes	Yes

1. For a spare product number, append an equal sign (=) to the product number. For End-of-Sale (EOS) and End-of-Life (EOL) information about line cards, refer to the Cisco product bulletins at the following location:

   http://www.cisco.com/en/US/partner/products/hw/routers/ps167/prod_eol_notices_list.html
2. Engine 3 (E3) is commonly referred to as IP Services Engine (ISE); Engine 4 plus (E4+) is commonly referred to as Enhanced Services (ES) engine.
3. Cisco 12006, Cisco 12008, Cisco 12010, Cisco 12012, and Cisco 12016 routers. SIPs and SPAs are only supported on the current chassis models. None of the SIP cards and SPAs are supported in either the Cisco 12008 or the Cisco 12012 routers.
4. Cisco 12404, Cisco 12406, Cisco 12410, and Cisco 12416.
5. Cisco 12810, and Cisco 12816.
6. This revision B version replaces the initial version.
7. A 4-port line card is also referred to as a “Quad” line card.
8. This Engine 4+ version replaces the initial Engine 4 version.
9. The part number may also be referred to as 4OC-48E/POS-SR-SC.
10. The part number may also be referred to as 4OC-48E/POS-LR-SC.
11. This line card was actually released in Cisco IOS Release 12.0(27)S1.
12. This version with ECC memory replaces the initial version without ECC memory.
13. The part number may also be referred to as LC-1OC12-POS-SM.
14. The part number may also be referred to as LC-1OC12-POS-MM.
15. Cisco IOS Release 12.0(10)S is recommended.
16. The part number may also be referred to as OC-48/SRP-SR-SC-B.
17. The part number may also be referred to as OC-48/SRP-LR-SC-B.

Determining Your Software Release

To determine the version of Cisco IOS software running on your Cisco router, log in to the router and enter the **show version** EXEC command:

```
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-P-M), Version 12.0(32)S, RELEASE SOFTWARE
```

Upgrading to a New Software Release

For information about selecting a new Cisco IOS software release, please see *How to Choose a Cisco IOS Software Release* at:

http://www.cisco.com/warp/public/130/choosing_ios.shtml

For information about upgrading to a new software release, see the appropriate platform-specific document:

- Cisco 7200 Series, 7300 Series, 7400 Series, and 7500 Series Routers

  http://www.cisco.com/en/US/products/hw/routers/ps133/products_tech_note09186a0080094c07.shtml

- Cisco 10000 Series Routers

  http://www.cisco.com/en/US/products/hw/routers/ps133/products_tech_note09186a0080094c07.shtml

- Cisco 10700 Series Routers

  http://www.cisco.com/en/US/products/hw/routers/ps133/products_tech_note09186a0080094c07.shtml

- Cisco 12000 Series Routers

  http://www.cisco.com/en/US/products/hw/routers/ps133/products_tech_note09186a0080094c07.shtml

For Cisco IOS upgrade ordering instructions, see the document at the following location:

http://www.cisco.com/warp/public/cc/pd/iosw/prodlit/957_pp.htm

To choose a new Cisco IOS software release by comparing feature support or memory requirements, use Cisco Feature Navigator. Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS and Catalyst OS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or by feature set (software image). Under the release section, you can compare Cisco IOS software releases side by side to display both the features unique to each software release and the features that the releases have in common.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

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

To choose a new Cisco IOS software release based on information about defects that affect that software, use Bug Toolkit at the following URL:

http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl

Upgrading Software on Redundant PREs

When you upgrade software on redundant Cisco 10000 series Performance Routing Engines (PREs), the active PRE must be in the correct slot, and software must be downloaded to both the active PRE and the standby PRE before you reload both PREs. For more information, see the "Upgrading Software on Redundant PREs" section in the "System Startup and Basic Configuration Tasks" of the *Cisco 10000 Series ESR Software Configuration Guide* at the following location:

http://www.cisco.com/univercd/cc/td/doc/product/aggr/10000/10ksw/startos.htm

Microcode Software

This section consists of the following subsections:

Microcode Software for the Cisco 7500/RSP Series

Table 5 lists the current microcode versions for the Cisco 7500/RSP series. This series includes the Cisco 7000 equipped with the RSP7000 processor, the Cisco 7010 equipped with the RSP7000 processor, and the Cisco 7500 series routers. Note that microcode software images are bundled with the system software image, with the exception of the Channel Interface Processor (CIP) microcode (all system software images) and Versatile Interface Processor (VIP) microcode (certain system software images). Bundling eliminates the need to store separate microcode images. When the router starts, the system software unpacks the microcode software bundle and loads the proper software on all the interface processor boards. VIP and VIP2 microcode is bundled into all Cisco 7500 series feature sets listed in Table 5.

For further information about the CIP microcode, see the Cisco document *Channel Interface Processor Microcode Release Note and Microcode Upgrade Instructions*.

Note The Cisco 7000 series previously included the Cisco 7000 and 7010 routers. These products are not supported in Cisco IOS Release 12.0 S. The Cisco 7000 series now includes the Cisco 7000 equipped with the RSP7000 processor and the Cisco 7010 equipped with the RSP7000 processor.

Table 5 Cisco 7500/RSP Series Routers Microcode Versions

Processor or Module	Current Microcode Version	Minimum Version Required
AIP (ATM Interface Processor)	20.18	20.13
CIP/CIP2 (Channel Interface Processor)	26.19	26.2
EIP (Ethernet Interface Processor)	20.6	20.3
FEIP (Fast Ethernet Interface Processor)	20.8	20.7
FIP (FDDI Interface Processor)	20.4	20.4
FSIP (Fast Serial Interface Processor)	20.9	20.9
HIP (HSSI Interface Processor)	20.2	20.2
MIP (MultiChannel Interface Processor)	22.3	22.3

Table 5 Cisco 7500/RSP Series Routers Microcode Versions (continued)

Processor or Module	Current Microcode Version	Minimum Version Required
TRIP (Token Ring Interface Processor)	20.2	20.2
VIP2/VIP2C (Versatile Interface Processor)	22.20	22.20

Shared Port Adapter FPD Image Packages for the Cisco 12000 Series

Field-Programmable Device (FPD) image packages are used to update Shared Port Adapter (SPA) FPD images. If a discrepancy exists between an SPA FPD image and the Cisco IOS image that is running on the router, the SPA will be deactivated until this discrepancy is resolved. For additional information on FPDs, including the upgrade process, see the "Upgrading Field-Programmable Devices" section of the *Cisco 12000 Series Router SIP and SPA Software Configuration Guide*.

Note The maximum time to upgrade the FPD image(s) on one SPA is 2 minutes. The total FPD upgrade time depends on the number of SPAs.

Shared Port Adapter FPD Image Package for Cisco IOS Release 12.0(32)S

The FPD image package that is used to upgrade SPAs on a router that runs Cisco IOS Release 12.0(32)S is the c12k-fpd-pkg.120-32.S.pkg file. This SPA FPD image package file is accessible from the page where you downloaded your specific Cisco IOS image in the Software Center on Cisco.com and contains the components that are listed in Table 6.

Table 6 Cisco 12000 Series FPD Image Package Contents for Release 12.0(32)S

Supported SPAs	FPD ID	FPD Component Name	FPD Component Version	Minimum Required Hardware Version
2-Port T3/E3 Serial SPA	1	T3E3 SPA ROMMON	2.12	0.0
	2	T3E3 SPA I/O FPGA	0.24	0.0
	3	T3E3 SPA E3 FPGA	1.0	0.0
	4	T3E3 SPA T3 FPGA	1.0	0.0
4-Port T3/E3 Serial SPA	1	T3E3 SPA ROMMON	2.12	0.0
	2	T3E3 SPA I/O FPGA	0.24	0.0
	3	T3E3 SPA E3 FPGA	1.0	0.0
	4	T3E3 SPA T3 FPGA	1.0	0.0
2-Port Channelized T3 SPA	1	CT3 SPA ROMMON	2.12	0.100
	2	CT3 SPA I/O FPGA	2.2	0.100
	3	CT3 SPA T3 FPGA R1	0.11	0.100
	3	CT3 SPA T3 FPGA R2	0.15	0.200

Table 6 Cisco 12000 Series FPD Image Package Contents for Release 12.0(32)S (continued)

Supported SPAs	FPD ID	FPD Component Name	FPD Component Version	Minimum Required Hardware Version
4-Port Channelized T3 SPA	1	CT3 SPA ROMMON	2.12	0.100
	2	CT3 SPA I/O FPGA	2.2	0.100
	3	CT3 SPA T3 FPGA R1	0.11	0.100
	3	CT3 SPA T3 FPGA R2	0.15	0.200
1-Port Channelized STM-1/OC-3 SPA	1	STM1/OC3 SPA ROMMON	2.12	0.0
	2	STM1/OC3 SPA I/O FPGA	1.2	0.0
	3	STM1/OC3 SPA ET3 FPGA	1.1	0.0
8-Port Channelized T1/E1 SPA	1	CTE1 SPA ROMMON	2.12	0.14
	1	CTE1 SPA ROMMON NP	2.12	0.0
	2	CTE1 SPA I/O FPGA	2.1	0.0
8-Port FE SPA	1	FE SPA FPGA	1.0	0.0
1-Port 10GE SPA	1	10GE SPA FPGA	1.7	0.0
2-Port GE SPA	1	GE SPA FPGA	1.8	0.0
5-Port GE SPA	1	GE SPA FPGA	1.8	0.0
10-Port GE SPA	1	GE SPA FPGA	1.8	0.0
2-Port OC-48 POS/SRP HH SPA	1	Multi-Port OC48 POS/RPR SPA FPD	1.0	0.0
1-Port OC-192 POS/SRP FH SPA	1	1-Port POS/RPR SPA IOFPGA P1	1.2	0.0
	1	1-Port POS/RPR SPA IOFPGA P3	1.3	5.0
1-Port OC-192 POS/SRP HH SPA	1	1-Port POS/RPR SPA IOFPGA P1	1.2	0.0
	1	1-Port POS/RPR SPA IOFPGA P2	1.2	2.0

Shared Port Adapter FPD Image Package for Cisco IOS Release 12.0(31)S

The FPD image package that is used to upgrade SPAs on a router that runs Cisco IOS Release 12.0(31)S is the c12k-fpd-pkg.120-31.S.pkg file. This SPA FPD image package file is accessible from the page where you downloaded your specific Cisco IOS image in the Software Center on Cisco.com and contains the components that are listed in Table 7.

Table 7 Cisco 12000 Series FPD Image Package Contents for Release 12.0(31)S

Supported SPAs	FPD ID	FPD Component Name	FPD Component Version	Minimum Required Hardware Version
2-Port T3/E3 Serial SPA	1	T3E3 SPA ROMMON	2.12	0.0
	2	T3E3 SPA I/O FPGA	0.24	0.0
	3	T3E3 SPA E3 FPGA	0.6	0.0
	4	T3E3 SPA T3 FPGA	0.14	0.0
4-Port T3/E3 Serial SPA	1	T3E3 SPA ROMMON	2.12	0.0
	2	T3E3 SPA I/O FPGA	0.24	0.0
	3	T3E3 SPA E3 FPGA	0.6	0.0
	4	T3E3 SPA T3 FPGA	0.14	0.0
2-Port Channelized T3 SPA	1	CT3 SPA ROMMON	2.12	0.100
	2	CT3 SPA I/O FPGA	1.4	0.100
	3	CT3 SPA T3 FPGA R1	0.11	0.100
	3	CT3 SPA T3 FPGA R2	0.15	0.200
4-Port Channelized T3 SPA	1	CT3 SPA ROMMON	2.12	0.100
	2	CT3 SPA I/O FPGA	1.4	0.100
	3	CT3 SPA T3 FPGA R1	0.11	0.100
	3	CT3 SPA T3 FPGA R2	0.15	0.200
1-Port OC-192 POS/SRP FH SPA	1	1-Port POS/RPR SPA IOFPGA	1.2	0.0
1-Port OC-192 POS/SRP HH SPA	1	1-Port POS/RPR SPA IOFPGA	1.2	0.0
	1	1-Port POS/RPR SPA IOFPGA	1.2	2.0
5-Port GE SPA	1	GE SPA FPGA	1.6	0.0
10-Port GE SPA	1	GE SPA FPGA	1.6	0.0
1-Port 10GE SPA	1	10GE SPA FPGA	1.6	0.0

Feature Support

Cisco IOS software is packaged in feature sets that consist of software images that support specific platforms. The feature sets available for a specific platform depend on which Cisco IOS software images are included in a release. Each feature set contains specific Cisco IOS features.

Caution Cisco IOS images with strong encryption (including, but not limited to 168-bit [3DES] data encryption feature sets) are subject to U.S. government export controls and have limited distribution. Strong encryption images to be installed outside the United States are likely to require an export license. Customer orders may be denied or subject to delay because of U.S. government regulations. When applicable, the purchaser/user must obtain local import and use authorizations for all encryption strengths. Please contact your sales representative or distributor for more information, or send an e-mail to export@cisco.com.

Feature-to-image mapping is available through Cisco Feature Navigator. Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or by feature set (software image). You can compare Cisco IOS software releases side-by-side to display both the features unique to each software release and the features that the releases have in common.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

www.cisco.com/go/cfn

For help with Cisco Feature Navigator, see the help information at the following URL:

http://www.cisco.com/web/applicat/CFNTOOLS/Help_Docs/help/cfn_support.html

Determining the Software Images (Feature Sets) That Support a Specific Feature

To determine which software images (feature sets) in a Cisco IOS release support a specific feature, go to the Cisco Feature Navigator home page and perform the following steps.

Step 1 From the Cisco Feature Navigator home page, click **Research Features**.

Step 2 Select your software type or leave the field as "All".

Step 3 To find a feature, you can search by either Feature or Technology (select the appropriate button). If you select Search by Feature, you can further filter your search by using the Filter By text box.

Step 4 Choose a feature from the Available Features text box, and click the **Add** button to add the feature to the Selected Features text box.

Note To learn more about a feature in the list, click the **View Desc** button in the Available Features text box.

Repeat this step to add features. A maximum of 20 features can be chosen for a single search.

Step 5 Click **Continue** when you are finished choosing features.

Step 6 In the Release/Platform Tree area, select either your release (from the Train-Release list) or your platform (from the Platform list).

Step 7 The "Search Result" table will list all the software images (feature sets) that support the features that you chose.

Note You can download your results into an Excel spreadsheet by clicking on the Download Excel button.

Determining the Features Supported in a Specific Software Image (Feature Set)

To determine which features are supported in a specific software image (feature set), go to the Cisco Feature Navigator home page and perform the following steps.

Step 1 From the Cisco Feature Navigator home page, click **Research Software**.

Step 2 Select your software type from the drop-down list and chose the **Release** button in the "Search By" area.

Step 3 From the Major Release drop-down list, chose the appropriate major release.

Step 4 From the Release drop-down list, choose the appropriate maintenance release.

Step 5 From the Platform drop-down list, choose the appropriate hardware platform.

Step 6 From the Feature Set drop-down list, choose the appropriate feature set. The Image Details area will provide details on the specific image. The Available Features area will list all the features that are supported by the feature set (software image) that you chose.

Note To learn more about a feature in the list, click the **View Desc** button in the Available Features text box.

Memory Recommendations

To determine memory recommendations for software images (feature sets) in your Cisco IOS release, go to the Cisco Feature Navigator home page and perform the following steps.

Step 1 From the Cisco Feature Navigator home page, click **Research Software**.

Step 2 Select your software type from the drop-down list and choose the **Release** button in the "Search By" area.

Step 3 From the Major Release drop-down list, choose the appropriate major release.

Step 4 From the Release drop-down list, choose the appropriate maintenance release.

Step 5 From the Platform drop-down list, choose the appropriate hardware platform.

Step 6 From the Feature Set drop-down list, choose the appropriate feature set.

Step 7 The Image Details area will provide details on the specific image including the DRAM and flash memory recommendations for each image. The Available Features area will list all the features that are supported by the feature set (software image) that you chose.

Note The Lawful Interface functionality is only available in the following software images:
- Service Provider Secure Shell 3DES (k4p-mz)
- Service Provider Secure Shell 56 (k3p-mz)