Cisco 4000 Series

This chapter provides information on the Cisco 4000 series routers. The information is organized into the following sections:

- Product Overview
- Standard Features
- Hardware Options
- Software Options

Note Documentation for the Cisco 4000 series is available in two forms: on a CD-ROM called Cisco Connection Documentation, Enterprise Series and printed books. A CD and hard-copy installation documentation ship with each chassis, and a configuration note ships with each component ordered. All configuration notes are available on the CD. Additional CDs and a subscription CD update service are also available.

You can also access Cisco technical documentation on the World Wide Web URL http://www.cisco.com. For more information, see the chapter "Documentation" at the end of the catalog.

Product Overview

The Cisco 4000 series consists of the Cisco 4000, Cisco 4000-M, Cisco 4500, Cisco 4500-M, Cisco 4700, and Cisco 4700-M routers. Although the Cisco 4000, Cisco 4500, and Cisco 4700 routers are no longer orderable, they are still supported. The Cisco 4000, Cisco 4500, and Cisco 4700 routers have been replaced by the Cisco 4000-M, Cisco 4500-M, and Cisco 4700-M routers.

Note The Cisco 4700-M includes an additional main-memory option of 64 MB, which significantly increases the routing table sizes needed to support today's larger networks.

The Cisco 4000 series routers run Cisco IOS software, Cisco's industry-leading networking software that provides a variety of feature sets. You can choose a feature set that supports your specific protocol environment. Cisco IOS software assures robust, reliable internetworks by supporting both LAN and WAN protocols, optimizing WAN services, and controlling internetwork access. In addition, Cisco IOS software allows centralized, integrated, and automated installation and management of internetworks.

The Cisco 4000 series routers offer Flash EPROM technology as a standard feature. Flash EPROMs enable you to distribute new software releases from a central location. After the software is distributed, the routers can reboot from programs stored in local Flash memory.

All models provide a configurable modular router platform by using network processor modules (NPMs)—individual removable cards used for external network connections. Because the router's modules support many variations of protocols, line speeds, and transmission media, the Cisco 4000 series can accommodate all types of network computing environments. As Cisco introduces new modules, the Cisco 4000 series can be upgraded to keep pace with technological advances.

A new one-port 100BaseTX Fast Ethernet NPM is now available for the Cisco 4000 series and is introduced in this catalog. See Table 127 for configuration information and Figure 36 for an illustration of this new NPM.

The Cisco 4000 series routers can support combinations of up to three of the following NPMs:

- One-, two-, or six-port Ethernet
- One-port Fast Ethernet (NEW)
- One- or two-port Token Ring
- One-port multimode FDDI (both single and dual attachment station [DAS])
- One-port single-mode FDDI (DAS)
- Two- or four-port synchronous serial
- Four- or eight-port ISDN BRI
- One-port channelized T1/ISDN PRI
- One-port channelized E1/ISDN PRI (balanced or unbalanced)
- Four-port serial G.703 (balanced or unbalanced)
- One-port ATM (single-mode or multimode) OC-3c
- One-port ATM DS-3
- One-port ATM E3

Note See "Hardware Options," later in this chapter, for the maximum number of each type of module and for the minimum Cisco IOS software level for each type of module.

Figure 33 shows the front panel and Figure 34 shows the rear panel of Cisco 4000 series router.

Figure 33 Cisco 4000 Series Front Panel

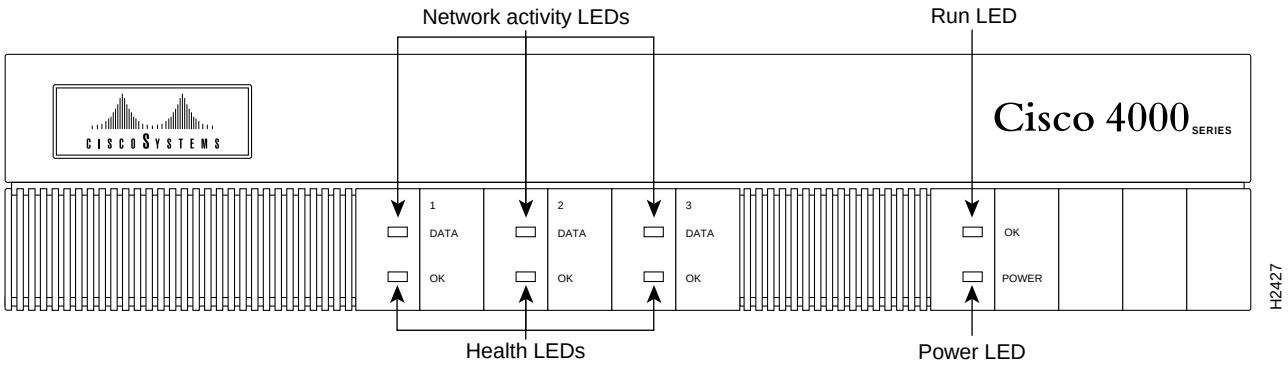


Figure 34 Cisco 4000 Series Rear Panel

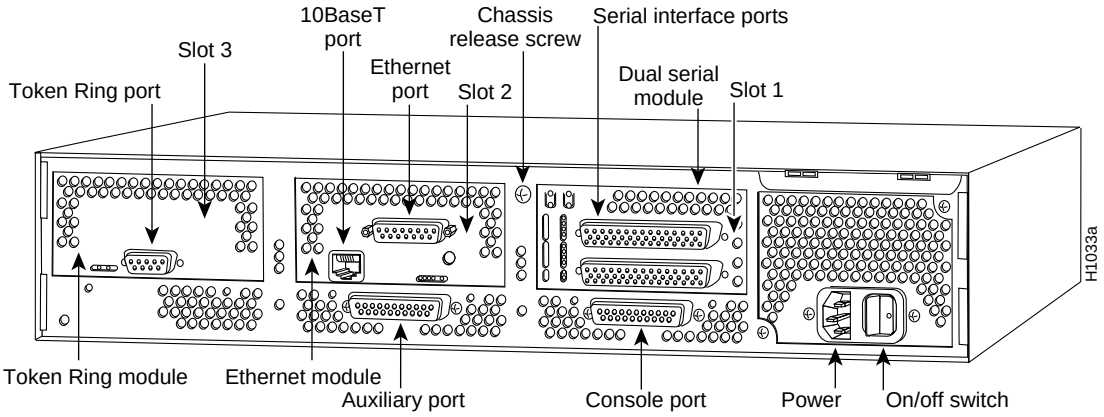


Table 125 Cisco 4000 Series Summary of Features

Characteristic	Cisco 4000-M	Cisco 4500-M	Cisco 4700-M[1]
Supported network interfaces	Ethernet Token Ring FDDI Serial ISDN BRI Channelized E1/T1 ISDN PRI	Ethernet Token Ring FDDI Serial ISDN BRI Channelized E1/T1 ISDN PRI ATM OC-3c ATM DS-3 ATM E3	Ethernet Token Ring FDDI Serial ISDN BRI Channelized E1/T1 ISDN PRI ATM OC-3c ATM DS-3 ATM E3
Slots available for modules	3	3	3
Choice of software feature sets[2]			
Cisco IOS Release 10.2 to 11.1	IP Routing IP Routing with IBM base functionality[3] IP/IPX Routing[3] IP/IPX Routing with IBM base functionality[3] IP/IPX/APPN with IBM base functionality[4] Desktop Desktop with IBM base functionality[3] Enterprise [5] Enterprise/APPN[4]	IP Routing IP Routing with IBM base functionality[3] IP/IPX Routing[3] IP/IPX Routing with IBM base functionality[3] IP/IPX/APPN with IBM base functionality[4] Desktop Desktop with IBM base functionality [3] Enterprise[5] Enterprise/APPN[4]	IP Routing IP Routing with IBM base functionality[3] IP/IPX Routing[3] IP/IPX Routing with IBM base functionality[2] IP/IPX/APPN with IBM base functionality[4] Desktop Desktop with IBM base functionality [3] Enterprise[5] Enterprise/APPN[4]
Cisco IOS Release 11.2	IP IP Plus IP Plus 40 IP Plus 56 Desktop (IP/IPX/Appletalk/DEC) Desktop (IP/IPX/Appletalk/DEC) Plus Desktop (IP/IPX/Appletalk/DEC) Plus 40 Desktop (IP/IPX/Appletalk/DEC) Plus 56 IP/IPX/APPN with IBM base functionality Enterprise Enterprise Plus Enterprise Plus 40 Enterprise Plus 56 Enterprise/APPN Plus Enterprise/APPN Plus 40 Enterprise/APPN Plus 56	IP IP Plus IP Plus 40 IP Plus 56 Desktop (IP/IPX/Appletalk/DEC) Desktop (IP/IPX/Appletalk/DEC) Plus Desktop (IP/IPX/Appletalk/DEC) Plus 40 Desktop (IP/IPX/Appletalk/DEC) Plus 56 IP/IPX/APPN with IBM base functionality Enterprise Enterprise Plus Enterprise Plus 40 Enterprise Plus 56 Enterprise/APPN Plus Enterprise/APPN Plus 40 Enterprise/APPN Plus 56	IP IP Plus IP Plus 40 IP Plus 56 Desktop (IP/IPX/Appletalk/DEC) Desktop (IP/IPX/Appletalk/DEC) Plus Desktop (IP/IPX/Appletalk/DEC) Plus 40 Desktop (IP/IPX/Appletalk/DEC) Plus 56 IP/IPX/APPN with IBM base functionality Enterprise Enterprise Plus Enterprise Plus 40 Enterprise Plus 56 Enterprise/APPN Plus Enterprise/APPN Plus 40 Enterprise/APPN Plus 56
Processor type	40-MHz 68030	100-MHz IDT Orion RISC	133-MHz IDT Orion RISC
Flash memory	4 MB standard, expandable to 8 MB	4 MB standard, expandable to 8 or 16 MB	4 MB standard, expandable to 8 or 16 MB
Main memory	8 MB standard, expandable to 16 or 32 MB	8 MB standard, expandable to 16 or 32 MB	16 MB standard, expandable to 32 or 64 MB

Characteristic	Cisco 4000-M	Cisco 4500-M	Cisco 4700-M[1]
Shared memory	4 MB[6] standard, expandable to 16 MB	4 MB standard, expandable to 8 or 16 MB	4 MB standard, expandable to 8 or 16 MB
Nonvolatile random-access memory (NVRAM)	128 KB	128 KB	128 KB
Dimensions (H x W x D)	3.4 x 17.6 x 17.7" (8.6 x 44.7 x 43.4 cm)	3.4 x 17.6 x 17.7" (8.6 x 44.7 x 43.4 cm)	3.4 x 17.6 x 17.7" (8.6 x 44.7 x 43.4 cm)
Weight (average shipping)	24 lb (10.9 kg)	24 lb (10.9 kg)	24 lb (10.9 kg)
Agency approvals	UL 1950, CSA 22.2, TÜV-GS mark, EN 60950, FCC Class A, Canadian DOC Class A, VDE Class B, EN 55022 Class B, VCCI Class 2	UL 1950, CSA 22.2, TÜV-GS mark, EN 60950, FCC Class A, Canadian DOC Class A, VDE Class B, EN 55022 Class B, VCCI Class 2	UL 1950, CSA 22.2, TÜV-GS mark, EN 60950, FCC Class A, Canadian DOC Class A, VDE Class B, EN 55022 Class B, VCCI Class 2

1. The Cisco 4700-M includes an additional 64-MB main memory option, which was not available for the Cisco 4700. The new 64-MB option significantly increases the routing table sizes that can be supported in the router.
2. The Cisco 4000-M also supports software in traditional packaging (Cisco IOS Release 10.0.x).
3. This feature set is available with Cisco IOS Release 10.2(2) and later releases.
4. This feature set is available with Cisco IOS Release 11.0 and later releases.
5. Includes IBM base functionality. See the section “Software Options” for more information.
6. Cisco 4000 routers and early versions of Cisco 4000-M routers shipped with 1 MB of standard shared memory. Those systems must be upgraded to 4 MB of shared memory when you install an FDDI interface or have more than five physical or virtual interfaces.

Table 126 Cisco 4000 Series Environmental Specifications

Description	Specification
Consumption	200W (682 Btu/hour)
Input	100 to 240 VAC
Frequency	47 to 63 Hz
Current rating	3.0A @ 100V; 1.5A @ 240V
Operating temperature range	32 to 104 F (0 to 40 C)
Nonoperating temperature range	–40 to 185 F (–40 to 85 C)
Humidity (noncondensing)	5 to 95%

Standard Features

Cisco 4000 series routers have the following standard features:

- Three slots for NPMs, which can be Ethernet, Token Ring, FDDI, ISDN BRI, ISDN PRI, ATM, or serial network interfaces. See the next section, “Hardware Options,” for configuration information.
- 40-MHz 68030 processor (Cisco 4000-M), 100-MHz IDT Orion RISC (Cisco 4500-M), or 133-MHz IDT Orion RISC (Cisco 4700).
- 8 MB (Cisco 4000-M and Cisco 4500-M) or 16 MB (Cisco 4700-M) of expandable RAM.
- 128 KB of NVRAM.

- 4 MB of expandable Flash memory.
- 4 MB of expandable shared memory.
- AC or DC power supply. (The Cisco 4000-M, Cisco 4500-M, and Cisco 4700-M offer both AC and DC power supplies.)
- Power cord and cable.

Hardware Options

The network processor modules available for the Cisco 4000 series routers and their hardware options are described in the following sections:

- Network Processor Modules
- Memory Options

Network Processor Modules

Cisco 4000 series routers support combinations of up to three network processor modules (NPMs). Table 127 describes the maximum number of each module supported by a specific system and the minimum Cisco IOS software release required for each module.

Table 127 NPM Configurations—Cisco 4000 Series

Type	Cisco 4000 and Cisco 4000-M	Cisco 4500, Cisco 4500-M, and Cisco 4700-M[1]	Minimum Cisco IOS Software Release Required	Product Numbers
1-port 10BaseT Ethernet	3	–	9.14(1)	NP-1E
1-port 100BaseTX Fast Ethernet	–	2	11.1(5)	NP-1FE
2-port 10BaseT Ethernet	3	3	9.14(1)	NP-2E
6-port 10BaseT Ethernet	–	3	10.3(6)	NP-6E
1-port Token Ring	3	3	9.14(5)	NP-1RV2
2-port Token Ring	3	3	9.14(5)	NP-2R
1-port single attachment multimode FDDI	1[2]	2	9.14(1)	NP-1F-S-M
1-port dual attachment multimode FDDI	1[2]	2	9.14(1)	NP-1F-D-MM
1-port dual attachment single-mode FDDI	1[2]	2	9.14(3)	NP-1F-D-SS
2-port serial	3	3	9.14(6)	NP-2T
4-port serial	3	3	10.1	NP-4T
4-port ISDN BRI	2	2	10.2	NP-4B[3]
8-port ISDN BRI	1	2	10.2	NP-8B[3]
1-port channelized T1/ISDN PRI	1	2	10.3(4)	NP-CT1
1-port channelized E1/ISDN PRI, unbalanced	1	2	10.3(4)	NP-CE1U
1-port channelized E1/ISDN PRI, balanced	1	2	10.3(4)	NP-CE1B

Type	Cisco 4000 and Cisco 4000-M	Cisco 4500, Cisco 4500-M, and Cisco 4700-M[1]	Minimum Cisco IOS Software Release Required	Product Numbers
4-port serial E1/G.703, unbalanced	3	3	10.2(4)	NP-4GU
4-port serial E1/G.703, balanced	3	3	10.2(4)	NP-4GB
1-port single-mode ATM OC-3c	–	1	10.3(4)	NP-1A-SM
1-port multimode ATM OC-3c	–	1	10.3(4)	NP-1A-MM
1-port ATM DS-3	–	2	11.0(5)	NP-1A-DS3
1-port ATM E3	–	1	11.0(5)	NP-1A-E3

1. Only two Fast Ethernet interfaces or one Fast Ethernet interface in combination with an ATM or FDDI interface is supported in the Cisco 4700 or the Cisco 4500.
2. On Cisco 4000-M routers, the FDDI modules are not supported on Cisco IOS Release 10.2(2).
3. A maximum of either two NP-4B NPMs or one NP-8B NPM is supported on the Cisco 4000 or Cisco 4000-M routers.

Figure 35 through Figure 53 show the Cisco 4000 series network processor modules.

Figure 35 One-Port 10BaseT Ethernet

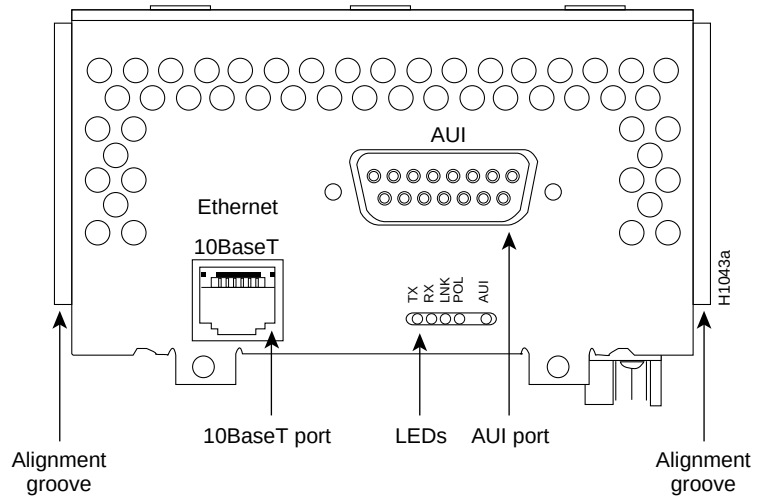


Figure 36 One-Port 100BaseTX Fast Ethernet

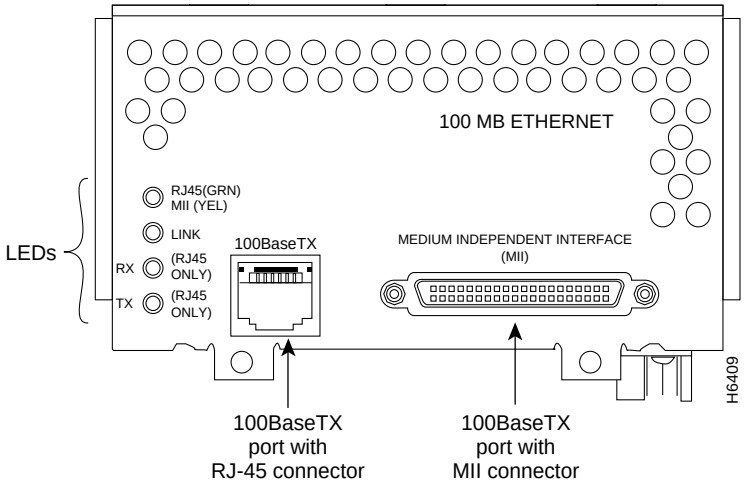


Figure 37 Two-Port 10BaseT Ethernet

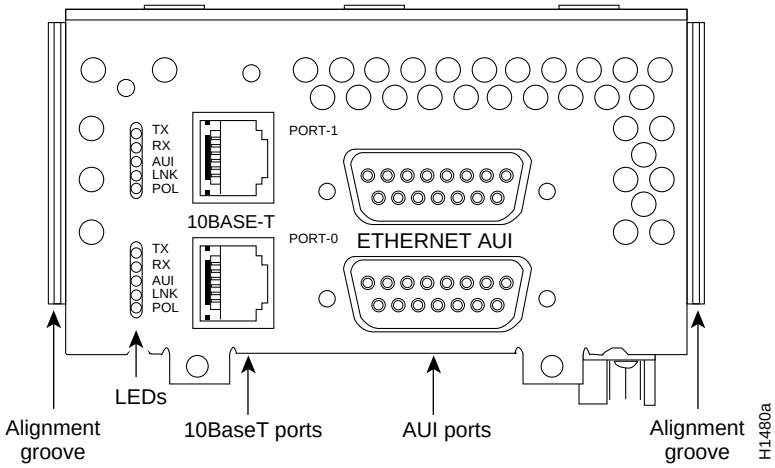


Figure 38 Six-Port 10BaseT Ethernet

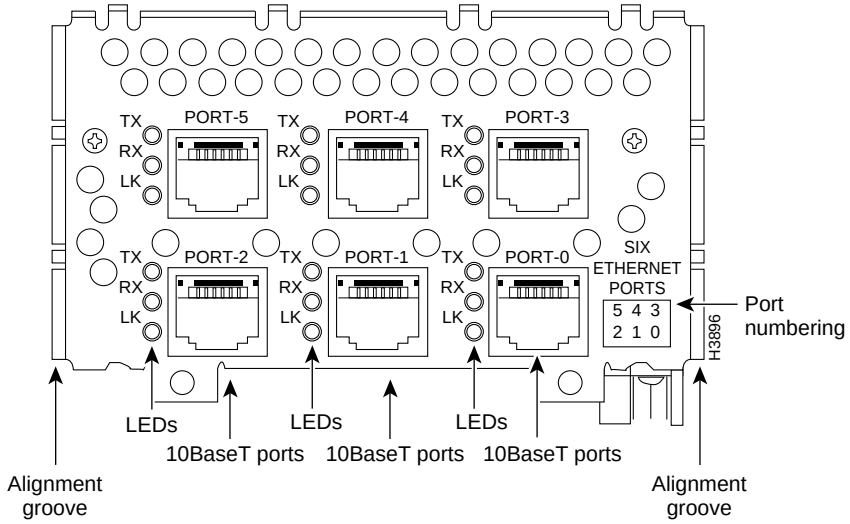


Figure 39 One-Port Token Ring

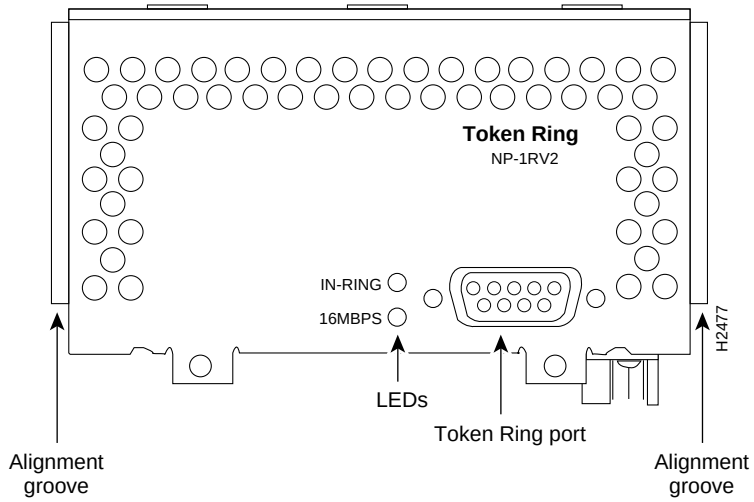


Figure 40 Two-Port Token Ring

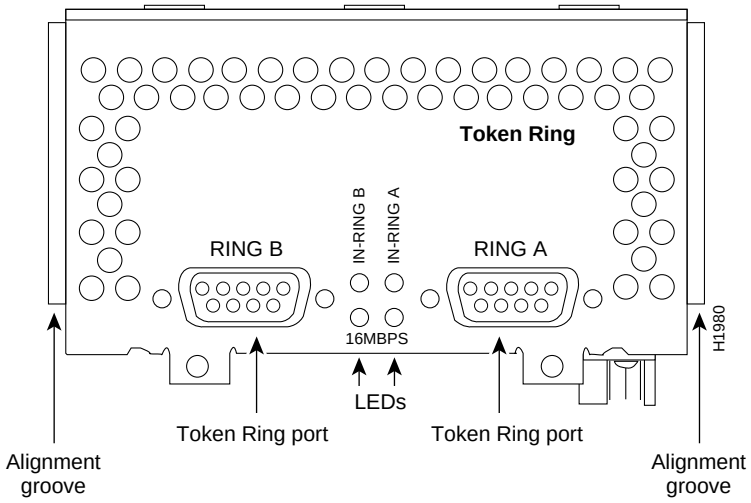


Figure 41 One-Port Single Attachment Multimode FDDI

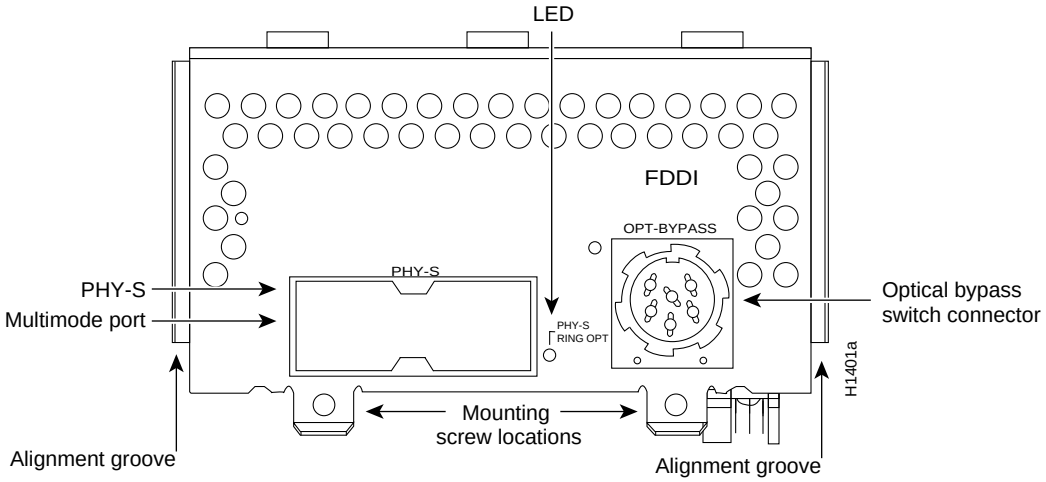


Figure 42 One-Port Dual Attachment Multimode FDDI

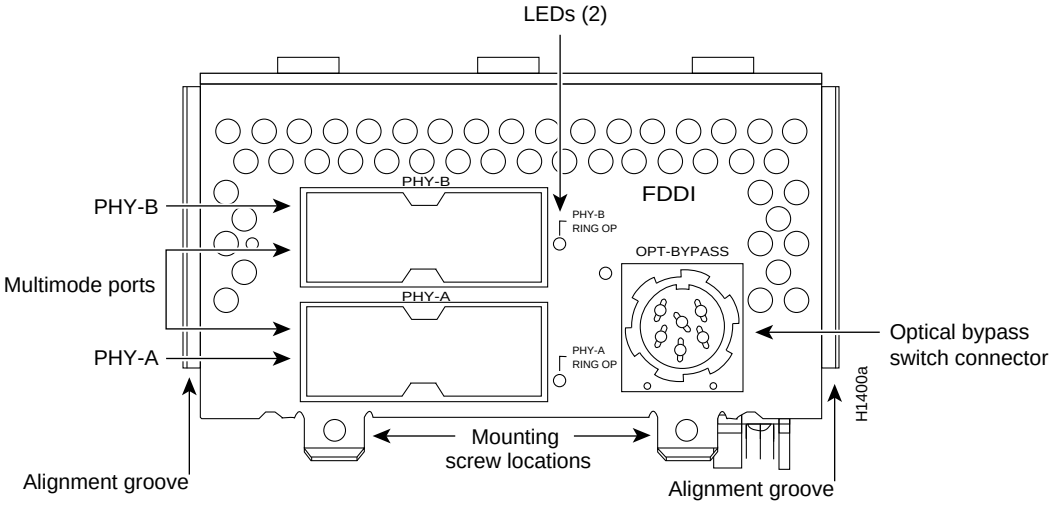


Figure 43 One-Port Dual Attachment Single-Mode FDDI

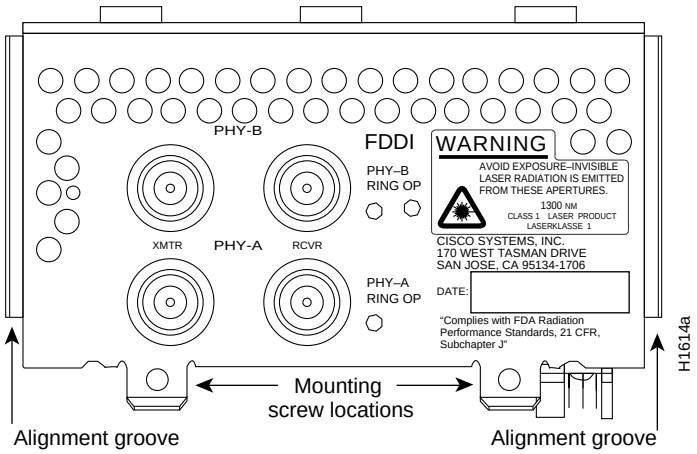


Figure 44 Two-Port Serial

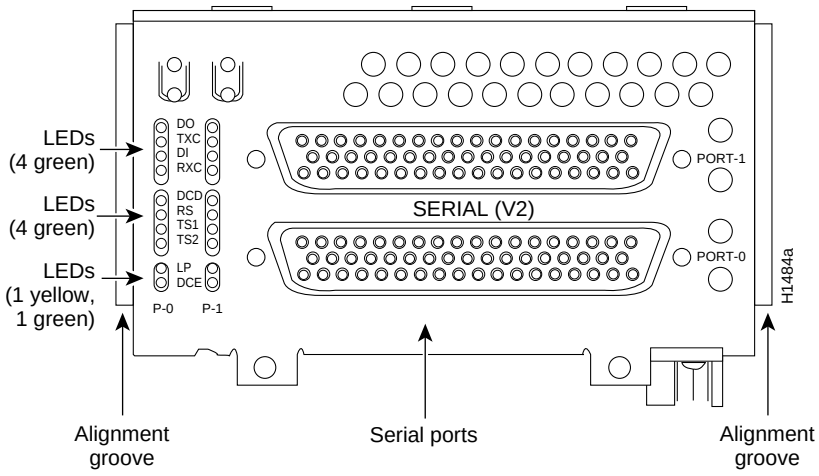


Figure 45 Four-Port Serial

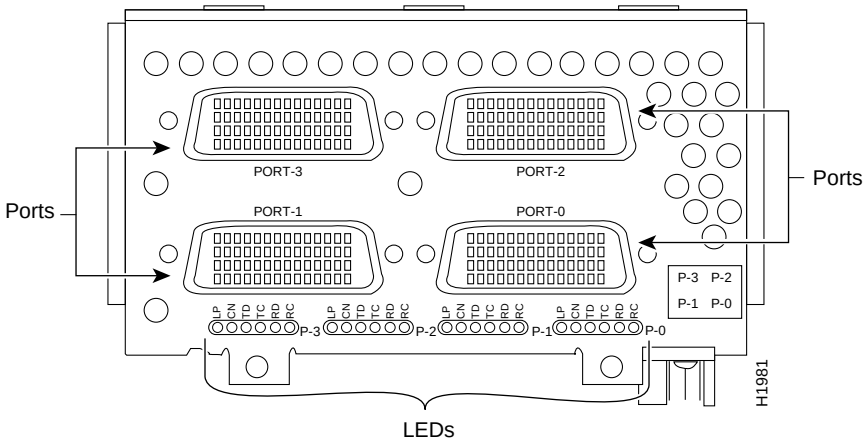


Figure 46 Four-Port ISDN BRI

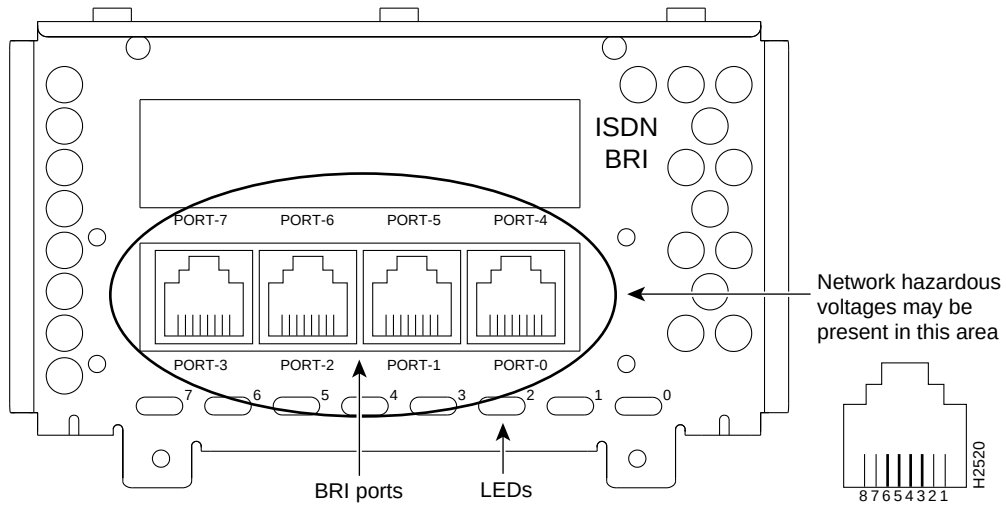


Figure 47 Eight-Port ISDN BRI

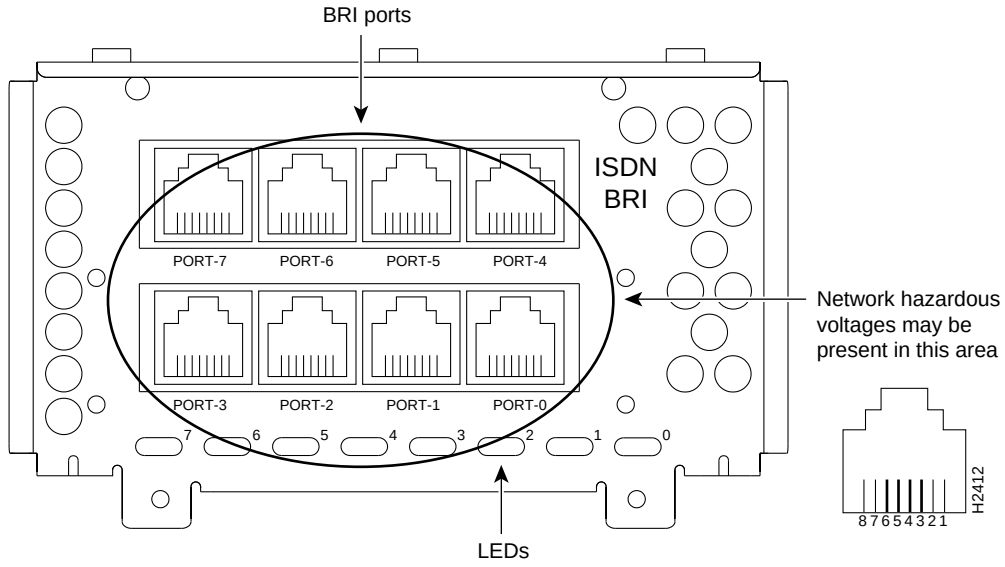


Figure 48 One-Port Channelized T1/ISDN PRI

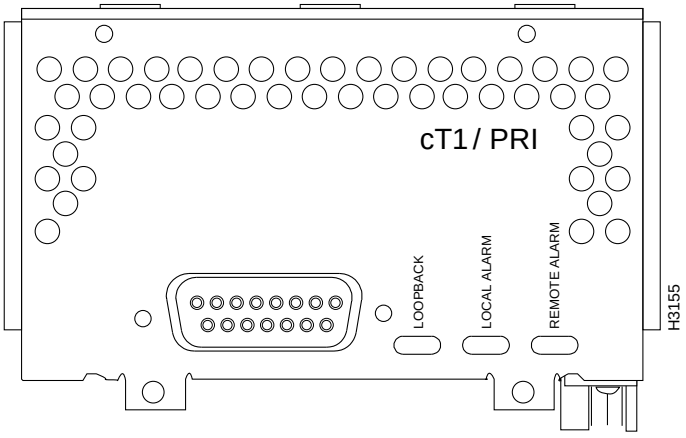


Figure 49 One-Port Channelized E1/ISDN PRI Balanced/Unbalanced

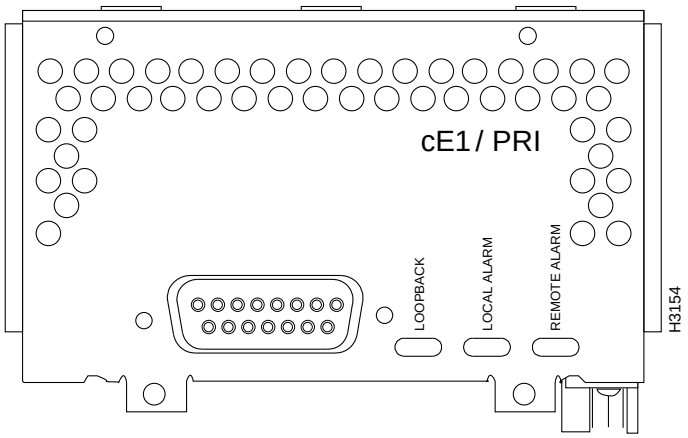


Figure 50 Four-Port Serial E1/G.703 Balanced/Unbalanced

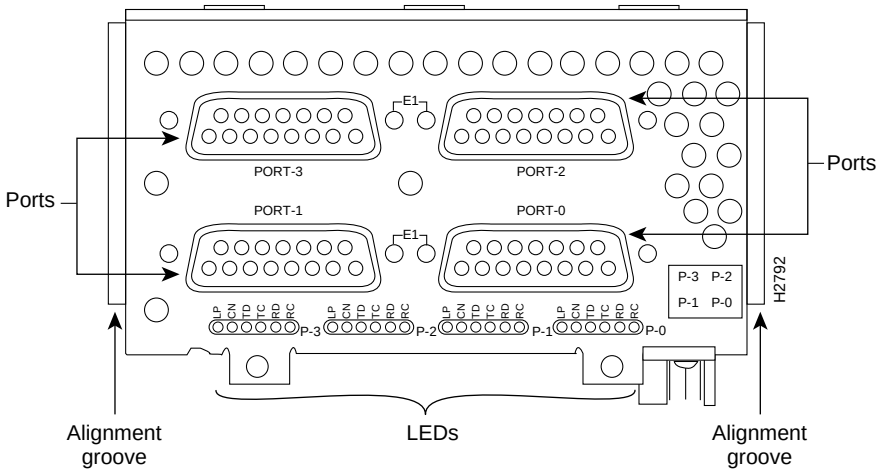


Figure 51 One-Port Single-Mode ATM OC-3c

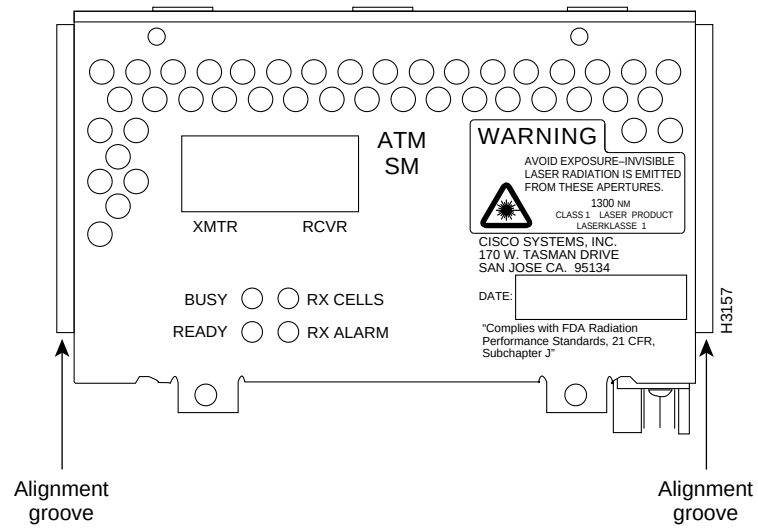


Figure 52 One-Port Multimode ATM OC-3c

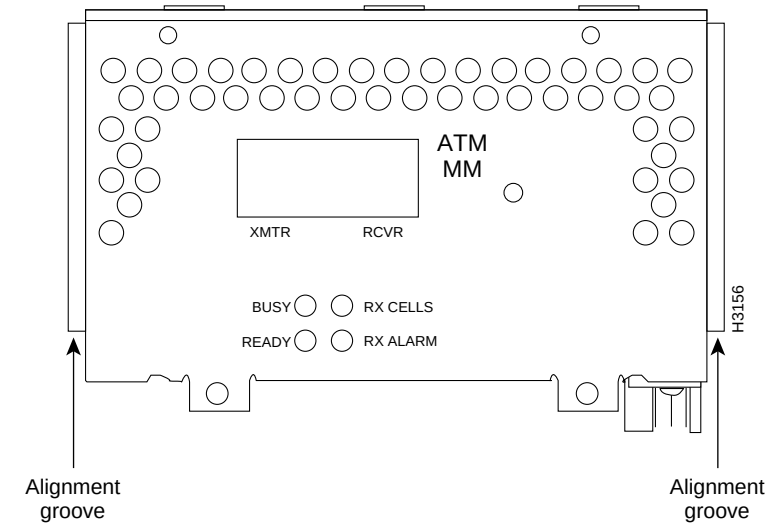
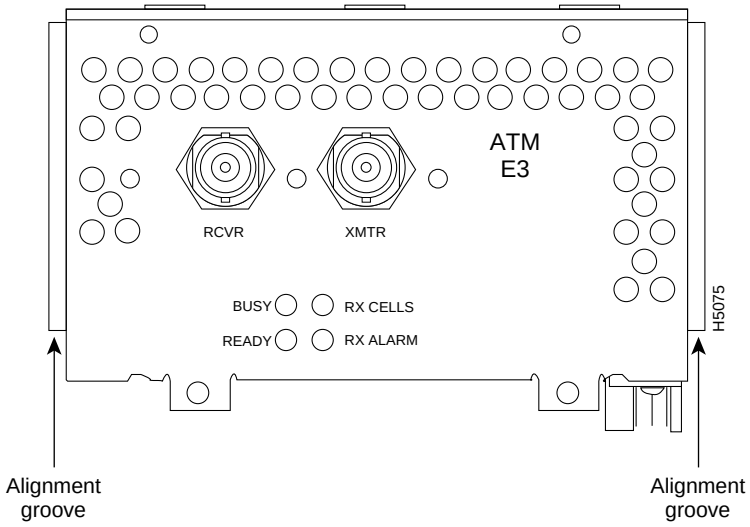


Figure 53 One-Port ATM DS-3/E3



Memory Options

All Cisco 4000 series routers share the same physical design. Each router offers three slots for LAN or WAN connectivity and uses the same optional NPMs and software features for compatibility and investment protection. Three different types of memory are available for the Cisco 4000 series—main memory, shared memory, and system Flash memory. Each type of memory serves a different purpose in routing the packet from one interface to another. The benefit of this architecture is that the system can read program instructions or routing table data from main memory at the same time as it is moving packets between interfaces (using shared memory), thus increasing overall system performance and lowering network latency.

Factors That Affect Memory Requirements

You can change memory configurations in the Cisco 4000 series to accommodate internetworking demands. The memory requirements are driven by the following three factors:

- Main Memory—can be upgraded to allow for network expansion, the use of additional protocols or Cisco IOS services, or newer Cisco IOS software releases.
- Shared DRAM memory—can be upgraded to improve I/O performance or to use higher densities or more physical or virtual interfaces.
- Flash memory—can be upgraded to hold several Cisco IOS software images for easy management.

This section provides basic guidelines for selecting memory options.

Main DRAM Memory

The Cisco 4000 series runs from an image stored in main DRAM. This memory is also used by the system for tables and stacks. The amount of main memory required is determined by the size of the image and by the configuration of the internetwork. Cisco regularly publishes product bulletins that detail what memory is required for any particular Cisco IOS feature subset, and also releases documentation that specifies what memory is needed.

Shared DRAM Memory

The Cisco 4000 series routers use shared DRAM (also known as packet memory) for handling user data. The recommended amount of shared memory is determined by the type and number of physical or virtual interfaces supported by the router. Other factors that impact the amount of required shared memory are the type of routing selected and the degree of throughput to the various interfaces.

Flash Memory

The Cisco 4000 series software images are stored and compressed in Flash memory. Flash memory is more reliable than traditional diskette-resident system software and provides maximum availability and easy software upgrades and maintenance. The Cisco 4000 series products are shipped with 4 MB of system Flash, which leaves room for future image growth. If you want to store two images in a single router, you should upgrade to the 8-MB option. In this way, the router is used as a TFTP server for other Cisco routers.

The following types of memory are also used in the Cisco 4000 series, but they are not critical components that drive the minimum memory requirements for the system.

System Boot Flash

The Cisco 4500, Cisco 4500-M, and Cisco 4700 store their Boot images in the system Flash memory. The standard configuration of 4 MB is sufficient for use on these platforms. Currently no upgrades are offered.

XBoot Flash

The Cisco 4500, Cisco 4500-M, and Cisco 4700 store a small software image in XBoot Flash memory. This software image is used to boot the Cisco IOS software across a network. However, it is used as a last resort in case the system Boot Flash fails. XBoot Flash memory is also used for updating the existing image in the system boot Flash. You cannot configure the amount of XBoot Flash memory.

Boot EPROM

The Boot image is stored in ROM on the Cisco 4000 and Cisco 4000-M routers. The XBoot Flash equivalent for the Cisco 4000 is called RXBoot, which resides within the Boot EPROM (as opposed to residing in different modules on the Cisco 4500 and Cisco 4700 routers). The Cisco 4000 and Cisco 4000-M Boot EPROMs are 2 MB.

The Cisco 4500 and Cisco 4700 simplify the process of upgrading software images. Rather than changing the EPROMs when you want to load a new image, you can simply download a new image using TFTP into the onboard Flash memory.

ROMMON

The ROMMON performs initialization tasks in the Cisco 4000 series. It performs power diagnostics and sets variables after checking memory sizes. After this is completed, the main image is booted (as a default) from system Boot Flash (for the Cisco 4500 and the Cisco 4700) and from the Boot EPROM (for the Cisco 4000). If you have configured you system to boot from XBoot, ROMMON boots from the secondary image. You cannot configure the amount of ROMMON memory available.

The standard configuration for shared DRAM is 4 MB for the Cisco 4000 series. This is sufficient for most configurations with fewer than 24 physical or virtual interfaces. For routers with 24 or more interfaces or B channels (for example, NP-9B, CT1, and CE1), upgrading to a minimum of 8 MB of shared memory is recommended

Table 128 and Table 129 list the minimum shared memory requirements for NPMs used in Cisco 4000, Cisco 4500, and Cisco 4700 series routers.

Table 128 Minimum Shared Memory Required—Cisco 4000

Network Processor Module	Minimum Shared Memory
1E, 2E, 2T, 2R	0.1 MB
2E, 2T	0.2 MB
2R, 4T, 4B	0.4 MB
8B, 1P	1.0 MB
1F	2.0 MB

Table 129 Minimum Shared Memory Required—Cisco 4500 and Cisco 4700

Network Processor Module	Minimum Shared Memory
1E	0.2 MB
2E, 2T	0.4 MB
2R, 4T, 4B, 4G	0.6 MB
6E	1.2 MB
8B, 1P	1.2 MB
1F, 1A	2 MB
21F	3 MB (2 FDDI NPMs in one Cisco 4500 or Cisco 4700)
FE	1.5 MB

The Cisco 4000 series offers the hardware and power supply options listed in Table 130 and Table 131. If a product number ends with an equal sign (=), the item can be ordered only as a spare. If a product number does not end with an equal sign, the item can be ordered as a spare or as a configurable part of a system order.

Table 130 Cisco 4000 Series Hardware Options

Description	Product Number
Network Processor Modules (NPMs)	See Table 127.
Cisco 4000 Memory	
Boot ROM upgrade	BOOT-4000=
Additional 4-MB Flash memory field upgrade	MEM-4000-4F=
8-MB Flash memory field upgrade	MEM-4000-8F=
16-MB Flash memory field upgrade	MEM-4000-16F=
4-MB shared memory field upgrade	MEM-4000-4S=
16-MB main memory field upgrade	MEM-4000-16D=
Cisco 4000-M Memory	
Boot ROM upgrade	BOOT-4000=
4- to 8-MB Flash memory factory upgrade	MEM-4000M-4U8F
Additional 4-MB Flash memory	MEM-4000M-4F=
4- to 16-MB shared memory factory upgrade	MEM-4000M-4U16S
16-MB shared memory field upgrade	MEM-4000M-16S=
8- to 16-MB shared memory factory upgrade	MEM-4000M-8U16D
16-MB main memory field upgrade	MEM-4000M-16D=
8- to 32-MB main memory factory upgrade	MEM-4000M-8U32D
32-MB main memory field upgrade	MEM-4000M-32D=
Cisco 4500 Memory	
Boot ROM upgrade	BOOT-4000=
Additional 4-MB Flash memory field upgrade	MEM-4500-4F=
16-MB shared memory field upgrade	MEM-4500-16S=
32-MB main memory field upgrade	MEM-4500-32D=
Cisco 4500-M Memory	
Boot ROM upgrade	BOOT-4000=
4- to 8-MB Flash memory factory upgrade	MEM-4500M-4U8F
8-MB Flash memory field upgrade	MEM-4500M-8F=
4- to 16-MB Flash memory factory upgrade	MEM-4500M-4U16F
16-MB Flash memory field upgrade	MEM-4500M-16F=
4- to 8-MB shared memory factory upgrade	MEM-4500M-4U8S
8-MB shared memory field upgrade	MEM-4500M-8S=
4- to 16-MB shared memory factory upgrade	MEM-4500M-4U16S
16-MB shared memory field upgrade	MEM-4500M-16S=
16- to 32-MB main memory factory upgrade	MEM-4500M-16U32D
32-MB main memory field upgrade	MEM-4500M-32D=

Description	Product Number
Cisco 4700 Memory	
Boot ROM upgrade	BOOT-4000=
8-MB Flash memory field upgrade	MEM-4700-8F=
16-MB Flash memory field upgrade	MEM-4700-16F=
8-MB shared memory field upgrade	MEM-4700-8S=
16-MB shared memory field upgrade	MEM-4700-16S=
32-MB main memory field upgrade	MEM-4700-32D=
Cisco 4700-M Memory	
Boot ROM upgrade	BOOT-4000=
4- to 8-MB Flash memory factory upgrade	MEM-4700M-4U8F
8-MB Flash memory field upgrade	MEM-4700M-8F=
4- to 16-MB Flash memory factory upgrade	MEM-4700M-4U16F
16-MB Flash memory field upgrade	MEM-4700M-16F=
4- to 8-MB shared memory factory upgrade	MEM-4700M-4U8S
8-MB shared memory field upgrade	MEM-4700M-8S=
4- to 16-MB shared memory factory upgrade	MEM-4700M-4U16S
16-MB shared memory field upgrade	MEM-4700M-16S=
16- to 32-MB main memory factory upgrade	MEM-4700M-16U32D
32-MB main memory field upgrade	MEM-4700M-32D=
16- to 64-MB main memory factory upgrade	MEM-4700M-16U64D
64-MB main memory field upgrade	MEM-4700M-64D=
Kits	
Blank NPM filler card	ACS-NPPN=
Telco/wall-mount kit	ACS-NPWM
19" rack-mount kit	ACS-NPRM

Table 131 Cisco 4000 Series Power Supply Options

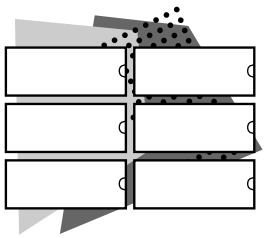
Model	Description	Product Number
Cisco 4000-M	AC power supply	CISCO4000-M
Cisco 4000-DC-M	–48 VDC power supply	CISCO4000-DC-M
Cisco 4500-M	AC power supply	CISCO4500-M
Cisco 4500-DC-M	–48 VDC power supply	CISCO4500-DC-M
Cisco 4700-M	AC power supply	CISCO4700-M
Cisco 4700-DC-M	–48 VDC power supply	CISCO4700-DC-M

Table 132 lists the cables you can use with the NPMs. For cable illustrations, refer to the sections “Specifications” and “ATM Cable Specifications” in the chapter “Cables and Transceivers” later in this catalog.

Note For options that apply to most systems, refer to the chapters “Cables and Transceivers” or “Power Cords” in Part 7.

Table 132 Cisco 4000 Series Cables

Description	Product Number
Serial Cables for One-Port Channelized T1/E1/PRI NPM	
MIP-CT1: DSX1 to CSU DB-15 straight-through cable	CAB-7KCT1DB15
MIP-CT1: DSX1 to CSU DB-15 null modem cable	CAB-7KCT1NULL
E1 for 75-ohm, unbalanced connections (with BNC connectors)	CAB-E1-BNC
E1 for 120-ohm, balanced connections (with DB-15 connector)	CAB-E1-DB15
E1 for 120-ohm, balanced connections (with Twinax connector)	CAB-E1-TWINAX
E1 ISDN PRI cable, 10' (3 m)	CAB-E1-PRI
Serial Cables for Two-Port Serial NPM	
EIA/TIA-232 male DTE interface, 10' (3 m)	CAB-NP232T
EIA/TIA-232 female DCE interface, 10' (3 m)	CAB-NP232C
EIA/TIA-449 male DTE interface, 10' (3 m)	CAB-NP449T
EIA/TIA-449 female DCE interface, 10' (3 m)	CAB-NP449C
EIA/530 male DTE interface, 10' (3 m)	CAB-NP530
X.21 male DTE interface, 10' (3 m)	CAB-NPX21T
X.21 female DCE interface, 10' (3 m)	CAB-NPX21C
V.35 male DTE interface, 10' (3 m)	CAB-NPV35TV2
V.35 female DCE interface, 10' (3 m)	CAB-NPV35CV2
Serial Cables for Four-Port Serial NPM	
EIA/TIA-232 male DTE interface, 10' (3 m)	CAB-232MT
EIA/TIA-232 female DCE interface, 10' (3 m)	CAB-232FC
EIA/TIA-449 male DTE interface, 10' (3 m)	CAB-449MT
EIA/TIA-449 female DCE interface, 10' (3 m)	CAB-449FC
EIA/530 male DTE interface, 10' (3 m)	CAB-530MT
X.21 male DTE interface, 10' (3 m)	CAB-X21MT
X.21 female DCE interface, 10' (3 m)	CAB-X21FC
V.35 male DTE interface, 10' (3 m)	CAB-V35MT
V.35 female DCE interface, 10' (3 m)	CAB-V35FC
Cables for Four-Port E1/G.703 NPM	
E1 cable, BNC E1, 75 ohm, unbalanced, 10' (3 m)	CAB-E1-BNC-3M
E1 cable, Twinax 120 ohm, balanced, 10' (3 m)	CAB-E1-TWINAX-3M
ATM Cables	
RG-59 coaxial cable with BNC connectors	CAB-ATM-DS3/E3



Software Options

The Cisco IOS software available for the Cisco 4000 series router is described in the following sections:

- Cisco IOS Feature Sets
- Software Product Numbers and Minimum Memory Requirements for Cisco IOS
- Cisco IOS Feature Set Upgrades

Cisco IOS Feature Sets

The Cisco 4000 series routers support the following software releases:

- Cisco IOS Release 11.2, 11.1, 11.0, 10.3, and 10.2 feature sets (see Table 133)
- The Cisco 4000 and Cisco 4000-M routers also support Cisco IOS Release 10.0. Traditional packaging for Cisco IOS Release 10.0 is listed in Table 136.

Note For all Cisco 4000 series routers, software must be ordered separately from the chassis. Traditional software packaging is no longer included in the base price of the system.

The Cisco 4000, Cisco 4500, and Cisco 4700 routers are no longer orderable, but Cisco IOS Releases 11.2, 11.1, 11.0, 10.3, 10.2, and 10.0 are supported on these routers. The Cisco 4000, Cisco 4500, and Cisco 4700 routers have been replaced by the Cisco 4000-M, Cisco 4500-M, and Cisco 4700-M routers.

Traditional software packaging is no longer included in the base price of the Cisco 4000 series. Cisco IOS Release 10.0 it is still orderable for the Cisco 4000 and Cisco 4000-M routers. Table 136 lists the product numbers for traditional software packaging for Cisco IOS Release 10.0. (Product numbers beginning with SF- are not orderable for the Cisco 4000 and Cisco 4000-M routers. For these routers, you can only order software as spares.) Table 137 describes the contents of each traditional software feature license.

With the introduction of Cisco IOS Release 11.2, feature sets have been updated to make it easier to select the exact feature sets you need. Feature sets names are simplified and are more consistent across Cisco hardware platforms. In addition, you can add options to the standard feature set offerings. These options provide additional features and value based on the hardware platform selected. Cisco also continues to offer specialized feature sets for key applications.

The Cisco 4000 series offers the following types of feature sets:

- Basic. The basic feature set.
- Plus. The basic feature set plus additional features.
- Plus 40. The basic feature set, plus features, and 40-bit data encryption.
- Plus 56. The basic feature set, plus features, and 56-bit data encryption.

Cisco IOS images with 40-bit Data Encryption Standard (DES) support may legally be distributed to any party eligible to receive Cisco IOS software. 40-bit DES is not a cryptographically strong solution and should not be used to protect sensitive data.

Cisco IOS images with 56-bit DES are subject to International Traffic in Arms Regulations (ITAR) controls and have a limited distribution. Images to be installed outside the U.S. require an export license. Orders may be denied or subject to delays due to U.S. Government regulations. Please contact your sales representative or distributor for more information, or send e-mail to export@cisco.com.

The new feature set tables use the following conventions to identify features:

- : the feature is offered in the basic feature set
- – : the feature is not offered in the feature set
- Plus: the feature is offered in the Plus feature sets
- Encrypt: the feature is offered in the Encryption feature sets

Table 133 Cisco IOS Release 11.2, 11.1, 11.0, 10.3, and 10.2 Feature Sets—Cisco 4000, Cisco 4500, and Cisco 4700

	Cisco 4000, Cisco 4500 and Cisco 4700 Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
LAN Support																				
Apollo Domain	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
AppleTalk 1 and 2[4]	–	–	–	–	–	–	–	–	–	–										
Banyan VINES	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Concurrent routing and bridging				–	–				–	–				–	–				–	–
DECnet IV	–	–	–	–	–	–	–	–	–	–										
DECnet V	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
GRE																				
Integrated routing and bridging (IRB)[5]		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
IP																				
LAN extension host																				
Multiring					–					–					–					–
Novell IPX[6]	–	–	–	–	–															
OSI	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Source-route bridging[7]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
Transparent and translational bridging[7]																				
XNS	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
WAN Services																				
ATM LAN emulation: DECnet routing and Banyan VINES support (Cisco 4500 and 4700 only)[8]	Plus	–	–	–	–	–	–	–	–	–	Plus	–	–	–	–	Plus	–	–	–	–
ATM LAN emulation: Hot Standby Router Protocol (HSRP) and Simple Server Redundancy Protocol (SSRP) (Cisco 4500 and 4700 only)	Plus	–	–	–	–	–	–	–	–	–	Plus	–	–	–	–	Plus	–	–	–	–
ATM LAN emulation: Rate queues for SVC per subinterface	Plus	–	–	–	–	–	–	–	–	–	Plus	–	–	–	–	Plus	–	–	–	–

	Cisco 4000, Cisco 4500 and Cisco 4700 Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
ATM LAN emulation: UNI 3.1 signaling for ATM (Cisco 4500 and 4700 only)	Plus	–	–	–	–	–	–	–	–	–	Plus	–	–	–	–	Plus	–	–	–	–
Combinet Packet Protocol (CPP)		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
Dialer profiles		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
Frame Relay																				
Frame Relay SVC Support (DTE)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–
Frame Relay traffic shaping	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–
Half bridge/half router for CPP and PPP		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
HDLC																				
IPXWAN 2.0	–	–	–	–	–															
ISDN[9]																				
Multichassis Multilink PPP (MMP)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–
PPP[10]																				
SMDS																				
Switched 56																				
Virtual Private Dial-up Network (VPDN)	–	–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
X.25[11]																				
WAN Optimization																				
Bandwidth-on-demand																				
Custom and priority queuing																				
Dial backup																				
Dial-on-demand																				
Header[12], link and payload compression[13]																				
Snapshot routing																				
Weighted fair queuing				–	–				–	–				–	–				–	–

	Cisco 4000, Cisco 4500 and Cisco 4700 Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
IP Routing																				
BGP																				
BGP4[14]		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
EGP																				
Enhanced IGRP																				
Enhanced IGRP Optimizations		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
ES-IS	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
IGRP																				
IS-IS	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Named IP Access Control List		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
Network Address Translation (NAT)	Plus	–	–	–	–	–	–	–	–	–	Plus	–	–	–	–	Plus	–	–	–	–
NHRP					–		–			–					–					–
On Demand Routing (ODR)		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
OSPF																				
OSPF Not-So-Stubby-Areas (NSSA)		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
OSPF On Demand Circuit (RFC 1793)		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
PIM																				
Policy-based routing				–	–				–	–				–	–					
RIP																				
RIP Version 2			–	–	–			–	–	–			–	–	–			–	–	–
Other Routing																				
AURP	–	–	–	–	–	–	–	–	–	–										
IPX RIP	–	–	–	–	–															
NLSP[15]	–	–	–	–	–					–					–					–
RTMP	–	–	–	–	–	–	–	–	–	–										
SMRP	–	–	–	–	–	–	–	–	–	–				–	–				–	–
SRTP	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					

	Cisco 4000, Cisco 4500 and Cisco 4700 Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
Multimedia and Quality of Service																				
Generic traffic shaping		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
Random Early Detection (RED)		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
Resource Reservation Protocol (RSVP)		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
Management																				
AutoInstall																				
Automatic modem configuration[16]			–	–	–			–	–	–			–	–	–			–	–	–
HTTP Server		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
RMON events and alarms	Plus		–	–	–			–	–	–	Plus		–	–	–	Plus		–	–	–
SNMP																				
Telnet																				
Security																				
Access lists																				
Access security																				
Extended access lists																				
Kerberized login	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–			–	–	–
Kerberos V client support	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–
Lock and key		–	–	–	–	–	–	–	–	–	–	–	–	–	–			–	–	–
MD5 routing authentication				–	–				–	–				–	–				–	–
Network layer encryption (export controlled 40-bit and 56-bit DES)[17]	Encrypt	–	–	–	–	–	–	–	–	–	Encrypt	–	–	–	–	Encrypt	–	–	–	–
RADIUS			–	–	–			–	–	–			–	–	–			–	–	–
Router authentication	Encrypt	–	–	–	–	–	–	–	–	–	Encrypt	–	–	–	–	Encrypt	–	–	–	–
TACACS+[18]																				
IBM Support (Optional)																				
APPN (optional)[3]	–	–	–	–	–				–	–	–	–	–	–	–				–	–
BAN for SNA Frame Relay support	Plus			–	–				–	–	Plus			–	–				–	–
Bisync[19]	Plus			–	–				–	–	Plus			–	–				–	–

	Cisco 4000, Cisco 4500 and Cisco 4700 Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
Caching and filtering	Plus										Plus									
DLSw+ [20]	Plus				–					–	Plus				–					–
Downstream PU concentration (DSPU)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				–	–
Frame Relay SNA support (RFC 1490)	Plus										Plus									
Native Client Interface Architecture (NCIA) Server	Plus	–	–	–	–		–	–	–	–	Plus	–	–	–	–		–	–	–	–
NetView Native Service Point	Plus			–	–				–	–	Plus			–	–				–	–
QLLC[19]	Plus			–	–				–	–	Plus			–	–					
Response Time Reporter (RTR)	Plus	–	–	–	–		–	–	–	–	Plus	–	–	–	–		–	–	–	–
SDLC integration	Plus				–					–	Plus				–					
SDLC transport (STUN)	Plus				–					–	Plus				–					
SDLC-to-LAN conversion (SDLLC)	Plus				–					–	Plus				–					
SNA and NetBIOS WAN optimization via local acknowledgment	Plus										Plus									
SRB/RSRB[21, 22]	Plus									–	Plus									–
SRT	Plus				–					–	Plus				–					–
TG/COS	–	–	–	–	–	–	–	–	–	–	–	–	–		–					
TN3270	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Protocol Translation																				
LAT	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Rlogin	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Remote Node[23]																				
ARAP 1.0/2.0	–	–	–	–	–	–	–	–	–	–										
Asynchronous master interfaces				–	–				–	–				–	–				–	–
ATCP[24]	–	–	–	–	–	–	–	–	–	–					–					–
CPPP																				
CSLIP																				

	Cisco 4000, Cisco 4500 and Cisco 4700 Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
DHCP					–					–					–					–
IP pooling				–	–				–	–				–	–				–	–
IPX and ARAP on virtual asynch interfaces	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				–	–
IPXCP[12]	–	–	–	–	–															
MacIP	–	–	–	–	–	–	–	–	–	–										
NASI[25]	–	–	–	–	–			–	–	–				–	–				–	–
NetBEUI over PPP				–	–			–	–	–				–	–				–	–
PPP																				
SLIP																				

	Cisco 4000, Cisco 4500 and Cisco 4700 Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
Terminal Services[23]																				
LAT[26]	–	–	–			–	–	–	–	–	–	–	–	–	–					
Rlogin																				
Telnet																				
TN3270	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
X.25 PAD																				
Xremote	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					

1. IP/IPX/IBM/APPN is a new feature set in Cisco IOS Release 11.2. This feature set has no additional options. It offers a low-end APPN solution for this set of hardware platforms.
2. The IP/IPX feature set was discontinued in Cisco IOS Release 11.2. All features in this feature set prior to Cisco IOS Release 11.2 are now available in the Desktop/IBM feature set, including APPN.
3. Enterprise is available with APPN in a separate feature set. Use the product numbers that specify APPN. In Cisco IOS Release 11.2, APPN includes APPN Central Registration (CRR) and APPN over DLSw+.
4. AppleTalk load balancing is available in Cisco IOS Release 11.2.
5. IRB supports IP, IPX, and AppleTalk; it is supported for transparent bridging, but not for SRB; it is supported on all media-type interfaces except X.25 and ISDN bridged interfaces; and IRB and concurrent routing and bridging (CRB) cannot operate at the same time.
6. In Cisco IOS Release 11.2, the Novell IPX feature includes display SAP by name, IPX Access Control List violation logging, and plain-English IPX access lists.
7. See the feature category “IBM Support” for information about source-route bridging (SRB) in Cisco IOS Release 10.3 and later releases.
In Cisco IOS Release 11.2, translational bridging is fast switched by default, but can be disabled.
8. ATM LAN emulation for Banyan VINES is only supported in Enterprise.
9. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features.
10. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, and PPP compression. Multilink PPP is available in Cisco IOS Release 11.0(4) and later releases.
11. X.25 includes X.25 switching.
12. IPX header compression (RFC 1553) is available in the feature sets that support IPX in Cisco IOS Release 11.1(1) and later releases.
13. X.25 payload compression is supported in Cisco IOS Release 10.2 and later releases. X.25 and Frame Relay payload compression are supported in Cisco IOS Release 11.0(4) and later releases.
14. BGP4 includes soft configuration, multipath support, and prefix filtering with inbound route maps.
15. NLSP is supported with the Desktop option in Cisco IOS Release 10.3(2) and later releases.
16. Automatic modem configuration is available for all features sets in Cisco IOS Release 11.1(2) and later releases. For the Enterprise feature set, automatic modem configuration is available in Cisco IOS Release 11.1(1) and later releases.
17. For more details, see the description of the new data encryption options in the section “Cisco IOS Feature Sets” earlier in this chapter,
18. With Cisco IOS Release 11.2, TACACS+ Single Connection, and TACACS+ SENDAUTH enhancements are supported.
19. QLLC and Bisync are available in IP/IBM in Cisco IOS Release 11.0(3) and later releases, and in IP/IPX/IBM and Desktop/IBM base in Cisco IOS Release 11.0(2) and later releases.
20. Cisco IOS Release 11.2 introduces several DLSw+ enhancements available in the Plus, Plus 40, and Plus 56 feature sets. See the section “IBM Support” in the chapter “Cisco IOS Software” for more details.
21. In Cisco IOS Release 10.2, RSRB was supported in all feature sets. In Cisco IOS Release 10.3 and later releases, SRB/RSRB is supported in all feature sets.
22. With Cisco IOS Release 11.2, SRB/RSRB is fast switched. This enhancement is on by default, but can be disabled.
23. Supported on access severs (with limited support on router auxiliary ports).
24. ATCP and DHCP proxy client is supported in Cisco IOS Release 10.3(3) and later releases.
25. NASI is supported in Cisco IOS Release 11.1(2) and later releases.
26. Use of LAT requires terminal license (FR-L8-10.X= for an 8-user license or FR-L16-10.X= for a 16-user license).

Software Product Numbers and Minimum Memory Requirements for Cisco IOS

Adding a feature set may require you to purchase additional memory. Table 134 lists the software feature set product numbers and minimum memory requirements for Cisco IOS Release 11.2. Table 135 lists the software feature set product numbers and minimum memory requirements for Cisco IOS Release 11.1, 11.0, 10.3, and 10.2. The minimum memory requirements listed were chosen for typical branch and remote office applications. If your network is very large, using complex routing protocols, or using RMON, you may need more memory. Configuration analysis and testing are encouraged.

Table 134 Cisco IOS Software Product Numbers and Minimum Memory Requirements for Cisco IOS Release 11.2—Cisco 4000 Series

	Product Numbers and Minimum Memory Requirements				
			Cisco IOS Release 11.2		
Feature Set	Product Number	Cisco 4000 Series Model	Flash	Main DRAM	Shared DRAM
IP	SF4C-11.2.1 SW4C-11.2.1=	Cisco 4000	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB
	SF45C-11.2.1 SW45C-11.2.1=	Cisco 4500	4 MB	8 MB	4 MB
		Cisco 4500-M	4 MB	8 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB
IP Plus	SF4CP-11.2.1 SW4CP-11.2.1=	Cisco 4000	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB
	SF45CP-11.2.1 SW45CP-11.2.1=	Cisco 4500	4 MB	32 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB
IP Plus 40	SF4CW-11.2.1 SW4CW-11.2.1=	Cisco 4000	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB
	SF45CW-11.2.1 SW45CW-11.2.1	Cisco 4500	4 MB	8 MB	4 MB
		Cisco 4500-M	4 MB	8 MB	4 MB
		Cisco 4700	4 MB	16 MB	1 MB
		Cisco 4700-M	4 MB	16 MB	1 MB
IP Plus 56	SF4CY-11.2.1 SW4CY-11.2.1=	Cisco 4000	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB
	SF45CY-11.2.1 SW45CY-11.2.1=	Cisco 4500	4 MB	32 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB

	Product Numbers and Minimum Memory Requirements				
			Cisco IOS Release 11.2		
Feature Set	**Product Number**	**Cisco 4000 Series Model**	**Flash**	**Main DRAM**	**Shared DRAM**
Desktop	SF4B-11.2.1 SW4B-11.2.1=	Cisco 4000	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB
	SF45B-11.2.1 SW45B-11.2.1=	Cisco 4500	4 MB	32 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB
Desktop Plus	SF4BP-11.2.1 SW4BP-11.2.1=	Cisco 4000	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB
	SF45BP-11.2.1 SW45BP-11.2.1=	Cisco 4500	4 MB	32 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB
Desktop Plus 40	SF4BW-11.2.1 SW4BW-11.2.1=	Cisco 4000	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB
	SF45BW-11.2.1 SW45BW-11.2.1=	Cisco 4500	4 MB	32 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB
Desktop Plus 56	SF4BY-11.2.1 SW4BY-11.2.1=	Cisco 4000	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB
	SF45BY-11.2.1 SW45BY-11.2.1=	Cisco 4500	4 MB	32 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB
IP/IPX/IBM and APPN[1]	SF4DSN-11.2.1 SW4DSN-11.2.1=	Cisco 4000	4 MB	32 MB	4 MB
		Cisco 4000-M	4 MB	32 MB	4 MB
	SF45DSN-11.2.1 SW45DSN-11.2.1=	Cisco 4500	8 MB	32 MB	16 MB
		Cisco 4500-M	8 MB	32 MB	8 MB
		Cisco 4700	8 MB	32 MB	8 MB
		Cisco 4700-M	8 MB	32 MB	8 MB

	Product Numbers and Minimum Memory Requirements				
			Cisco IOS Release 11.2		
Feature Set	**Product Number**	**Cisco 4000 Series Model**	**Flash**	**Main DRAM**	**Shared DRAM**
Enterprise	SF4A-11.2.1 SW4A-11.2.1=	Cisco 4000	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	16 MB	4 MB
	SF45A-11.2.1 SW45A-11.2.1=	Cisco 4500	8 MB	32 MB	4 MB
		Cisco 4500-M	8 MB	16 MB	4 MB
		Cisco 4700	8 MB	16 MB	4 MB
		Cisco 4700-M	8 MB	16 MB	4 MB
Enterprise Plus	SF4AP-11.2.1 SW4AP-11.2.1=	Cisco 4000	8 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	16 MB	4 MB
	SF45AP-11.2.1 SW45AP-11.2.1=	Cisco 4500	4 MB	32 MB	4 MB
		Cisco 4500-M	8 MB	16 MB	4 MB
		Cisco 4700	8 MB	16 MB	4 MB
		Cisco 4700-M	8 MB	16 MB	4 MB
Enterprise Plus 40	SF4AW-11.2.1 SW4AW-11.2.1=	Cisco 4000	8 MB	16 MB	1 MB
		Cisco 4000-M	8 MB	16 MB	4 MB
	SF45AW-11.2. SW45AW-11.2.1=	Cisco 4500	8 MB	32 MB	4 MB
		Cisco 4500-M	8 MB	16 MB	4 MB
		Cisco 4700	8 MB	16 MB	4 MB
		Cisco 4700-M	8 MB	16 MB	4 MB
Enterprise Plus 56	SF4AY-11.2.1 SW4AY-11.2.1=	Cisco 4000	8 MB	16 MB	1 MB
		Cisco 4000-M	8 MB	16 MB	4 MB
	SF45AY-11.2.1 SW45AY-11.2.1=	Cisco 4500	8 MB	32 MB	4 MB
		Cisco 4500-M	8 MB	16 MB	4 MB
		Cisco 4700	8 MB	16 MB	4 MB
		Cisco 4700-M	8 MB	16 MB	4 MB
Enterprise/APPN Plus	SF4ANP-11.2.1 SW4ANP-11.2.1=	Cisco 4000	8 MB	16 MB	4 MB
		Cisco 4000-M	8 MB	16 MB	4 MB
	SF45ANP-11.2.1 SW45ANP-11.2.1=	Cisco 4500	8 MB	32 MB	16 MB
		Cisco 4500-M	8 MB	16 MB	8 MB
		Cisco 4700	8 MB	16 MB	8 MB
		Cisco 4700-M	8 MB	16 MB	8 MB

	Product Numbers and Minimum Memory Requirements				
			Cisco IOS Release 11.2		
Feature Set	**Product Number**	**Cisco 4000 Series Model**	**Flash**	**Main DRAM**	**Shared DRAM**
Enterprise/APPN Plus 40	SF4ANW-11.2.1 SW4ANW-11.2.1=	Cisco 4000	8 MB	16 MB	4 MB
		Cisco 4000-M	8 MB	16 MB	4 MB
	SF45ANW-11.2.1 SW45ANW-11.2.1=	Cisco 4500	8 MB	32 MB	16 MB
		Cisco 4500-M	8 MB	16 MB	8 MB
		Cisco 4700	8 MB	16 MB	8 MB
		Cisco 4700-M	8 MB	16 MB	8 MB
Enterprise/APPN Plus 56	SF4ANY-11.2.1 SW4ANY-11.2.1	Cisco 4000	8 MB	16 MB	4 MB
		Cisco 4000-M	8 MB	16 MB	4 MB
	SF45ANY-11.2.1 SW45ANY-11.2.1=	Cisco 4500	8 MB	32 MB	16 MB
		Cisco 4500-M	8 MB	16 MB	8 MB
		Cisco 4700	8 MB	16 MB	8 MB
		Cisco 4700-M	8 MB	16 MB	8 MB

1. Memory requirements were not available for some new Cisco IOS Release 11.2 feature sets at the time this catalog went to print. Please contact your local Cisco representative for details as they become available.

Table 135 Cisco IOS Software Product Numbers and Minimum Memory Requirements for Cisco IOS Releases 11.1, 11.0, 10.3, and 10.2—Cisco 4000 Series

	Product Numbers and Minimum Memory Requirements													
			Cisco IOS Releases											
			11.1			11.0			10.3			10.2		
Feature Set	**Product Number**	**Cisco 4000 Series Model**	**Flash**	**Main DRAM**	**Shared DRAM**	**Flash**	**Main DRAM**	**Shared DRAM**	**Flash**	**Main DRAM**	**Shared DRAM**	**Flash**	**Main DRAM**	**Shared DRAM**
IP	SF-G4C-xx.x.x SW-G4C-xx.x.x=	Cisco 4000	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
	SF-G45C-xx.x.x SW-G45C-xx.x.x=	Cisco 4500	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4500-M	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
IP with IBM base	SF-G4CS-xx.x.x SW-G4CS-xx.x.x=	Cisco 4000	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
	SF-G45CS-xx.x.x SW-G45CS-xx.x.x=	Cisco 4500	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	4 MB	16 MB	–	–	–
IP/IPX	SF-G4D-xx.x.x SW-G4D-xx.x.x=	Cisco 4000	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
	SF-G45D-xx.x.x SW-G45D-xx.x.x=	Cisco 4500	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4500-M	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4700	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
		Cisco 4700-M	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	–	–	–
IP/IPX with IBM base	SF-G4DS-xx.x.x SW-G4DS-xx.x.x=	Cisco 4000	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
	SF-G45DS-xx.x.x= SW-G45DS-xx.x.x=	Cisco 4500	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–

	Product Numbers and Minimum Memory Requirements													
			Cisco IOS Releases											
			11.1			11.0			10.3			10.2		
Feature Set	**Product Number**	**Cisco 4000 Series Model**	**Flash**	**Main DRAM**	**Shared DRAM**	**Flash**	**Main DRAM**	**Shared DRAM**	**Flash**	**Main DRAM**	**Shared DRAM**	**Flash**	**Main DRAM**	**Shared DRAM**
IP/IPX with IBM base and APPN	SF-G4DSN-xx.x.x SW-G4DSN-xx.x.x=	Cisco 4000	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–	–	–	–
		Cisco 4000-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–	–	–	–
	SF-G45DSN-xx.x.x SW-G45DSN-xx.x.x=	Cisco 4500	4 MB	32 MB	16 MB	4 MB	32 MB	16 MB	–	–	–	–	–	–
		Cisco 4500-M	4 MB	16 MB	8 MB	4 MB	16 MB	8 MB	–	–	–	–	–	–
		Cisco 4700	4 MB	16 MB	8 MB	4 MB	16 MB	8 MB	–	–	–	–	–	–
		Cisco 4700-M	4 MB	16 MB	8 MB	4 MB	16 MB	8 MB	–	–	–	–	–	–
Desktop	SF-G4B-xx.x.x SW-G4B-xx.x.x=	Cisco 4000	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	–	–	–	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	–	–	–	4 MB	8 MB	4 MB
	SF-G45B-xx.x.x SW-G45B-xx.x.x=	Cisco 4500	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
Desktop with IBM base	SF-G4BS-xx.x.x SW-G4BS-xx.x.x=	Cisco 4000	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
	SF-G45BS-xx.x.x SW-G45BS-xx.x.x=	Cisco 4500	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–

	Product Numbers and Minimum Memory Requirements													
			Cisco IOS Releases											
			11.1			11.0			10.3			10.2		
Feature Set	**Product Number**	**Cisco 4000 Series Model**	**Flash**	**Main DRAM**	**Shared DRAM**	**Flash**	**Main DRAM**	**Shared DRAM**	**Flash**	**Main DRAM**	**Shared DRAM**	**Flash**	**Main DRAM**	**Shared DRAM**
Enterprise	SF-G4A-xx.x.x SW-G4A-xx.x.x=	Cisco 4000	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
		Cisco 4000-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
	SF-G45A-xx.x.x SW-G45A-xx.x.x=	Cisco 4500	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB
		Cisco 4500-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
		Cisco 4700	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
		Cisco 4700-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
Enterprise with APPN	SF-G4AN-xx.x.x SW-G4AN-xx.x.x=	Cisco 4000	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–	–	–	–
		Cisco 4000-M	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–	–	–	–
	SF-G45AN-xx.x.x SW-G45AN-xx.x.x=	Cisco 4500	8 MB	32 MB	16 MB	4 MB	32 MB	16 MB	–	–	–	–	–	–
		Cisco 4500-M	8 MB	16 MB	8 MB	4 MB	16 MB	8 MB	–	–	–	–	–	–
		Cisco 4700	8 MB	16 MB	8 MB	4 MB	16 MB	8 MB	–	–	–	–	–	–
		Cisco 4700-M	8 MB	16 MB	8 MB	4 MB	16 MB	8 MB	–	–	–	–	–	–

Table 136 Traditional Software Product Numbers—Cisco 4000 and Cisco 4000-M

Description	Product Numbers Cisco IOS Release 10.0[1]
Router software	SF-G4-10.0.x SW-G4-10.0.x= SF-G4P-10.0.x SW-G4P-10.0.x=
Feature: standard	FR-S4-10.0.X FR-S4-10.0.X=
Feature: bridging	FR-B4-10.0.X=
Feature: packet switching[2]	FR-X4-10.0.X=
Feature: protocol translation	FR-P4-10.0.X

1. The Cisco 4000 requires a minimum of 4 MB of Flash memory, 16 MB of main DRAM, and 1 MB of shared DRAM for Cisco IOS Release 10.0(4) and later releases. The Cisco 4000-M requires a minimum of 4 MB of Flash memory, 8 MB of main DRAM, and 4 MB of shared DRAM.
2. Includes the Defense Data Network (DDN) X.25 option.

Table 137 Cisco IOS Software Release 10.0 Traditional Software Description—Cisco 4000 and Cisco 4000-M

Category	Protocols/Features	Feature License
LAN support	IP, Novell IPX, AppleTalk I and II, DECnet IV and V, OSI, XNS, Banyan VINES, Apollo Domain, GRE	Standard
	Transparent, translational, and source-route bridging, multiring	Bridging option
WAN services	HDLC, PPP[1], ISDN[2], IPXWAN, Switched 56	Standard
	X.25, Frame Relay, SMDS	Packet-switching option
WAN optimization	Header and link compression, dial-on-demand, dial backup, bandwidth-on-demand, custom and priority queuing	Standard
IP routing	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, ES-IS, IS-IS	Standard
Other routing	IPX RIP, RTMP, SRTP	Standard
IBM support	RSRB, SNA and NetBIOS WAN optimization via local acknowledgment, SDLC Integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), TG/COS	Bridging option
Management	AutoInstall, SNMP, Telnet	Standard
Security	Access lists, access security, TACACS	Standard
Protocol translation	Telnet, LAT, rlogin, TN3270, X.25	Protocol translation option
Remote node[3]	SLIP, CSLIP, PPP, CPPP, IPXCP, MacIP	Standard
Terminal services[3]	Telnet, rlogin	Standard
	X.25 PAD, LAT	Protocol translation option

1. PPP includes support for LAN protocols supported by the feature set, PAP and CHAP authentication, and PPP compression.
2. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features.
3. Supported on the router auxiliary port.

Cisco IOS Feature Set Upgrades

Cisco IOS Release 11.2 for the Cisco 4000 series allows software upgrades that cross multiple feature sets. This will require you to order multiple feature set licenses. The following is an example:

You have a Cisco 4500-M router running the Cisco IOS Release 11.2 IP Routing (basic) feature set. You want to upgrade to the Cisco IOS Release 11.2 Enterprise/APPN Plus 56 feature set. You are crossing three feature sets: one to get from IP to Enterprise, one to add APPN, and one to add Plus 56 (basic to plus). To complete the upgrade, use the following guidelines:

- If you subscribe to SMARTnet Maintenance, you need to do the following:
  - Order FL45-CA= (IP to Enterprise upgrade license, charged item)
  - Order FL45-APPN= (APPN upgrade license, charged item)
  - Order FL45-Y= (Plus 56 upgrade license, charged item)
  - Order additional DRAM and Flash card memory (if you do not have the minimum required DRAM and Flash card memory for the new feature set)
  - Download the new software feature set from CCO
- If you do not subscribe to SMARTnet Maintenance, you need do the following:
  - Order FL45-CA= (IP to Enterprise upgrade license, charged item)
  - Order FL45-APPN= (APPN upgrade license, charged item)
  - Order FL45-Y= (Plus 56 upgrade license, charged item)
  - Order additional DRAM and Flash card memory (if you do not have the minimum required DRAM and Flash card memory for the new feature set)
  - Order SW45ANY-11.2.1= (Cisco IOS 4500/4700 Enterprise/APPN Plus 56 software on diskette, charged item)

Table 138 lists Cisco IOS Software upgrade product numbers for the Cisco 4000 series.

Table 138 Cisco IOS Software Upgrades for Cisco IOS Release 11.2—Cisco 4000 Series

Feature Set Upgrade[1]	Cisco 4000 and Cisco 4000-M Product Numbers	Cisco 4500, Cisco 4500-M, and Cisco 4700-M Product Numbers
Plus	FL4-P=	FL45-P=
Plus 40	FL4-W=	FL45-W=
Plus 56	FL4-Y=	FL45-Y=
APPN	FL4-APPN=	FL45-APPN=
IP to Desktop (IP/IPX/Appletalk/DEC)	FL4-CB=	FL45-CB=
IP to Enterprise	FL4-CA=	FL45-CA=
Desktop (IP/IPX/Appletalk/DEC) to Enterprise	FL4-BA=	FL45-BA=
IP/IPX to Desktop (IP/IPX/Appletalk/DEC)	FL4-DB=	FL45-DB=
IP/IPX to Enterprise	FL4-DA=	FL45-DA=

1. Use the example above to determine if you also need to order Cisco IOS Release 11.2 feature set software on diskette.

Feature sets for Cisco IOS Releases 11.1, 11.0, 10.3, and 10.2 can be upgraded as described in Table 139. To order an upgrade, you must use two product numbers; one represents the upgrade license, and the other represents the software. For example, to upgrade from an IP feature set to an IP feature set with IBM base functionality, order product number FR-G4X-CCS= (the upgrade license) and SW-G4CS-xx.x.x= (the software for a Cisco 4000-M). To upgrade to a feature set with APPN, you must first purchase the upgrade license for the desired feature set and then purchase the upgrade license and upgrade software for the APPN feature set.

Table 139 Cisco IOS Software Upgrades for Cisco IOS Releases 11.1, 11.0, 10.3, and 10.2—Cisco 4000 Series

Feature Set Upgrade	Cisco 4000 and Cisco 4000-M Product Numbers[1]	Cisco 4500, Cisco 4500-M, and Cisco 4700-M Product Numbers[1]
IP to IP with IBM base functionality	FR-G4X-CCS= and SW-G4CS-xx.x.x=	FR-G4X-CCS= and SW-G45CS-xx.x.x=
IP to IP/IPX	FR-G4X-CD= and SW-G4D-xx.x.x=	FR-G4X-CD= and SW-G45D-xx.x.x=
IP to IP/IPX with IBM base functionality	FR-G4X-CDS= and SW-G4DS-xx.x.x=	FR-G4X-CDS= and SW-G45DS-xx.x.x=
IP to IP/IPX with IBM base functionality and APPN	FR-G4X-CDS=, FR-G4X-APPN=, and SW-G4DSN-xx.x.x=	FR-G4X-CDS=, FR-G4X-APPN=, and SW-G45DSN-xx.x.x=
IP to Desktop	FR-G4X-CB= and SW-G4B-xx.x.x=	FR-G4X-CB= and SW-G45B-xx.x.x=
IP to Desktop with IBM base functionality	FR-G4X-CBS= and SW-G4BS-xx.x.x=	FR-G4X-CBS= and SW-G45BS-xx.x.x=
IP to Enterprise	FR-G4X-CA= and SW-G4A-xx.x.x=	FR-G4X-CA= and SW-G45A-xx.x.x=
IP to Enterprise and APPN	FR-G4X-CA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-CA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=
IP with IBM base to IP/IPX with IBM base functionality	FR-G4X-CSDS= and SW-G4DS-xx.x.x=	FR-G4X-CSDS= and SW-G45DS-xx.x.x=
IP with IBM base to IP/IPX with IBM base functionality and APPN	FR-G4X-CSDS=, FR-G4X-APPN=, and SW-G4DSN-xx.x.x=	FR-G4X-CSDS=, FR-G4X-APPN=, and SW-G45DSN-xx.x.x=
IP with IBM base to Desktop with IBM base functionality	FR-G4X-CSBS= and SW-G4BS-xx.x.x=	FR-G4X-CSBS= and SW-G45BS-xx.x.x=
IP with IBM base functionality to Enterprise	FR-G4X-CSA= and SW-G4A-xx.x.x=	FR-G4X-CSA= and SW-G45A-xx.x.x=
IP with IBM base functionality to Enterprise and APPN	FR-G4X-CSA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-CSA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=
IP/IPX to IP/IPX with IBM base functionality	FR-G4X-DDS= and SW-G4DS-xx.x.x=	FR-G4X-DDS= and SW-G45DS-xx.x.x=
IP/IPX to IP/IPX with IBM base functionality and APPN	FR-G4X-DDS=, FR-G4X-APPN=, and SW-G4DSN-xx.x.x=	FR-G4X-DDS=, FR-G4X-APPN=, and SW-G45DSN-xx.x.x=
IP/IPX to Desktop	FR-G4X-DB= and SW-G4B-xx.x.x=	FR-G4X-DB= and SW-G45B-xx.x.x=
IP/IPX to Desktop with IBM base functionality	FR-G4X-DBS= and SW-G4BS-xx.x.x=	FR-G4X-DBS= and SW-G45BS-xx.x.x=
IP/IPX to Enterprise	FR-G4X-DA= and SW-G4A-xx.x.x=	FR-G4X-DA= and SW-G45A-xx.x.x=
IP/IPX to Enterprise and APPN	FR-G4X-DA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-DA=, FR-G4X-APPN=, SW-G45AN-xx.x.x=
IP/IPX with IBM base to Desktop with IBM base	FR-G4X-DSBS= and SW-G4BS-xx.x.x=	FR-G4X-DSBS= and SW-G45BS-xx.x.x=
IP/IPX with IBM base to IP/IPX with IBM base functionality and APPN	FR-G4X-APPN= and SW-G4DSN-xx.x.x=	FR-G4X-APPN= and SW-G45DSN-xx.x.x=
IP/IPX with IBM base to Enterprise	FR-G4X-DSA= and SW-G4A-xx.x.x=	FR-G4X-DSA= and SW-G45A-xx.x.x=

Feature Set Upgrade	Cisco 4000 and Cisco 4000-M Product Numbers[1]	Cisco 4500, Cisco 4500-M, and Cisco 4700-M Product Numbers[1]
IP/IPX with IBM base to Enterprise and APPN	FR-G4X-DSA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-DSA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=
Desktop to Desktop with IBM base	FR-G4X-BBS= and SW-G4BS-xx.x.x=	FR-G4X-BBS= and SW-G45BS-xx.x.x=
Desktop to Enterprise	FR-G4X-BA= and SW-G4A-xx.x.x=	FR-G4X-BA= and SW-G45A-xx.x.x=
Desktop to Enterprise and APPN	FR-G4X-BA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-BA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=
Desktop with IBM base to Enterprise	FR-G4X-BSA= and SW-G4A-xx.x.x=	FR-G4X-BSA= and SW-G45A-xx.x.x=
Desktop with IBM base to Enterprise and APPN	FR-G4X-BSA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-BSA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=

1. For Cisco IOS Release 11.1, 11.0, 10.3, and 10.2 upgrades, substitute the release number for xx.x.x in the product number (for example, SW-G4CS-11.1.1=).