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.

Platform-Specific Information

This section provides the platform-specific information for the Cisco platforms supported by Cisco IOS Release 12.4. Each section includes memory recommendations and supported features. Additional information is provided when applicable.

This information is provided for the platforms described in the following sections:

Cisco SOHO 70 and Cisco SOHO 90 Series Routers

This section contains the following sections with information that is specific to the Cisco SOHO 70 and Cisco SOHO 90 series routers:

Memory Recommendations

For memory recommendations for the Cisco SOHO 70 and SOHO 90 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Note An update to flash memory to 12 MB in Cisco IOS Release 12.4(12) has been made for the following images:

soho91-k9oy6-mz
soho96-k9oy1-mz
soho97-k9oy1-mz

This increase in flash memory was due to the increased image size seen between Cisco IOS Release 12.4(10) and Release 12.4(12).

Supported Hardware

Cisco IOS Release 12.4 supports the Cisco SOHO 78, Cisco SOHO 91, Cisco SOHO 96, and Cisco SOHO 97 routers.

The Cisco SOHO 78 is a symmetrical high-data-rate digital subscriber line (G.SHDSL) router. The Cisco SOHO 90 series is comprised of the Cisco SOHO 91 Ethernet broadband router, the Cisco SOHO 96 ADSL over ISDN secure broadband router, and the Cisco SOHO 97 ADSL broadband router. The Cisco SOHO 91 Ethernet broadband router has an Ethernet WAN port for use with an external DSL or cable modem. The Cisco SOHO 96 router has an integrated ADSL modem that supports ADSL over ISDN lines. An asymmetric digital subscriber line (ADSL) modem is integrated into the Cisco SOHO 97 ADSL broadband routers. The Cisco SOHO 97 router supports ADSL over POTS. The routers also provide the following key hardware features:

- Connection to an ADSL network through an ADSL port
- Ability to be stacked or mounted on a wall
- Locking power connectors and a Kensington-compatible locking slot

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 1 summarizes the interfaces supported on the Cisco SOHO 70 and Cisco SOHO 90 series routers for Cisco IOS Release 12.4.

Table 1 Supported Interfaces for the Cisco SOHO Series Routers

Router	Ethernet Ports	ADSL Ports	Console Ports
Cisco SOHO 78	One 10BASE-T (RJ-45)	RJ-11	RJ-45
Cisco SOHO 91	One 10BASE-T (RJ-45)	RJ-11	RJ-45
Cisco SOHO 96	One 10BASE-T (RJ-45)	RJ-11	RJ-45
Cisco SOHO 97	One 10BASE-T (RJ-45)	RJ-11	RJ-45

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco Small Business 100 Series Routers

This section contains the following sections with information that is specific to the Cisco Small Business 100 series routers:

Introduction

Cisco Small Business Series secure broadband routers are fixed-configuration, small-office routers that support up to five users. They provide the required performance to run basic, secure services in small offices, including firewall and support for Multiprotocol Label Switching (MPLS)-based VPNs. In addition, an easy-to-use configuration tool, Cisco Router and Security Device Manager (SDM), allows nontechnical users to quickly set up the router and its firewall configuration, while remote management capabilities in Cisco IOS software facilitate easy deployment and centralized management for service providers or value-added resellers.

The Cisco Small Business 100 Series of secure broadband routers provides:

- An affordable Cisco router for data-only applications in small businesses offices with up to five users
- Asymmetric DSL (ADSL), ADSL over ISDN, or an Ethernet WAN interface with a 4-port 10/100 switch
- Secure connectivity with integrated stateful firewall
- Simple setup and remote management capabilities of Cisco IOS software

Memory Recommendations

For memory recommendations for the Cisco Small Business 100 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco Small Business 100 series routers:

- Cisco Small Business 101 Secure Broadband Router
- Cisco Small Business 106 Secure ADSL over ISDN Router
- Cisco Small Business 107 Secure ADSL Router

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco VG224 Analog Gateway

This section contains the following sections with information that is specific to the Cisco VG224 analog gateway:

Introduction

The Cisco VG224 series is a family of analog gateways. The Cisco VG224 has a 24-port FXS through an RJ-21 connector and two 10/100BASE-T interfaces.

Memory Recommendations

For memory recommendations for the Cisco VG224 analog gateway in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the Cisco VG224 analog gateway.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco 800 Series Routers

This section contains the following sections with information that is specific to the Cisco 800 series:

Memory Recommendations

For memory recommendations for the Cisco 800 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco 800 series routers:

- Cisco 820 (Cisco 826, Cisco 827, Cisco 827H, Cisco 827-4V, and Cisco 828)
- Cisco 830 (Cisco 831, Cisco 836, and Cisco 837)

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 2 lists the supported interfaces for the Cisco 800 series routers for Cisco IOS Release 12.4.

Table 2 Supported Interfaces for the Cisco 800 Series

Router	Ethernet Ports	ISDN Ports	Serial Ports	ADSL Ports	Telephone Ports	Console Ports
Cisco 826	One 10BASE-T (RJ-45)	—	—	RJ-45	—	RJ-45
Cisco 827	One 10BASE-T (RJ-45)	—	—	RJ-45	—	RJ-45
Cisco 827-4V	One 10BASE-T (RJ-45)	—	—	RJ-45	Four (RJ-11)	RJ-45

Cisco 826 Router

The Cisco 826 router provides the following key hardware features:

- Flash memory: Default is 8 MB, expandable to 16 MB.
- DRAM: Default maximum is 32 MB of DRAM.
- 50-MHz MPC 855T RISC central processing unit.
- Color-coded ports and cables, which reduce the chance of errors being made in cabling.
- Ability to stack or mount routers on a wall.
- Locking power connectors and a Kensington-compatible locking slot.

Cisco 827 and Cisco 827-4V Routers

The Cisco 827 and Cisco 827-4V routers provide the following key hardware features:

- Connection to an ADSL network or telephones and fax machines through an ADSL port.
- Flash memory: Default is 12 MB, expandable to 20 MB. If 12 MB of flash memory is installed, 8 MB is used for the Cisco IOS images and 4 MB hosts the ROMMON and NVRAM. Memory can be added using flash cards.
- Cisco 827 router DRAM: Default maximum is 32 MB of DRAM.
- Cisco 827-4V router DRAM: Default is 24 MB of DRAM, expandable to 32 MB. The Cisco 827-4V router also contains an 8-MB DIMM card.
- 50-MHz MPC 855T RISC central processing unit.
- Color-coded ports and cables, which reduce the chance of errors being made in cabling.
- Ability to stack or mount routers on a wall.
- Locking power connectors and a Kensington-compatible locking slot.

Cisco 827H Routers

The Cisco 827H router provides the following key hardware features:

- Flash memory: Default is 8 MB, expandable to 16 MB.
- DRAM: Default maximum is 32 MB of DRAM.
- 50-MHz MPC 855T RISC central processing unit.
- Color-coded ports and cables, which reduce the chance of errors being made in cabling.
- Ability to stack or mount routers on a wall.
- Locking power connectors and a Kensington-compatible locking slot.

Cisco 828 Routers

The Cisco 828 router provides the following key hardware features:

- Flash memory: Default is 8 MB, expandable to 16 MB.
- DRAM: Default is 16 MB of DRAM, expandable to 32 MB.
- 50-MHz MPC 855T RISC central processing unit.
- Color-coded ports and cables, which reduce the chance of errors being made in cabling.
- Ability to stack or mount routers on a wall.
- Locking power connectors and a Kensington-compatible locking slot.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Additional Notes for the Cisco 800 Series Routers

This section contains important information about using the Cisco 800 series routers with Cisco IOS Release 12.4 software.

caller-id Command

When the **caller-id** command (which appears under "dial-peer" in the configuration commands) is used, the default setting is "off" for Japan and "on" for the United States. This command was introduced in Cisco IOS Release 12.1(2)XF.

DHCP Client Support

To configure the router for DHCP client support, perform the following steps:

Step 1 Configure the Bridge-Group Virtual Interface (BVI) by entering the **ip address dhcp client-id ethernet0** command.

Specifying **client-id ethernet0** causes the MAC address of the Ethernet interface to be used as the client ID when the DHCP request is sent. Otherwise, the MAC address of the BVI is used as the client ID.

Step 2 Configure Network Address Translation (NAT):

- **a.** Configure the BVI by entering the **nat outside** command.
- **b.** Configure the Ethernet interface by entering the **nat inside** command.
- **c.** Create an access list under NAT by entering the **access-list 1 permit** *ip-address* command to match all Ethernet IP addresses.
- **d.** Configure the source list under NAT by entering the **ip nat inside source list 1 interface BVI 1 overload** command.

The following is a sample configuration:

```
Current configuration:
!
version 12.0
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname c827
!
!
ip subnet-zero
ip dhcp excluded-address 10.10.10.1
!
ip dhcp pool SERVER
 network 10.10.10.0 255.255.255.0
 default-router 10.10.10.1
 import all
!
!
!
bridge irb
!
!
!
!
interface Ethernet0
ip address 10.10.10.1 255.255.255.0
no ip directed-broadcast
ip nat inside
```

```
!
interface ATM0
no ip address
no ip directed-broadcast
no atm ilmi-keepalive
bundle-enable
hold-queue 208 in
!
interface ATM0.1 point-to-point
no ip directed-broadcast
pvc 1/100
 encapsulation aal5snap
!
bridge-group 1
!
interface ATM0.2 point-to-point
ip address 5.0.0.2 255.0.0.0
no ip directed-broadcast
pvc 1/101
 protocol ip 5.0.0.1 broadcast
 protocol ip 5.0.0.5 broadcast
 encapsulation aal5snap
!
!
interface BVI1
ip address dhcp client-id Ethernet0
no ip directed-broadcast
ip nat outside
!
ip nat inside source list 1 interface BVI 1 overload
ip classless
ip route 0.0.0.0 0.0.0.0 BVI1
no ip http server
!
access-list 1 permit 10.10.10.0 0.0.0.255
bridge 1 protocol ieee
bridge 1 route ip
!
voice-port 1
timing hookflash-in 0
!
voice-port 2
timing hookflash-in 0
!
voice-port 3
timing hookflash-in 0
!
voice-port 4
timing hookflash-in 0
!
!
line con 0
exec-timeout 0 0
transport input none
stopbits 1
line vty 0 4
password lab
login
!
scheduler max-task-time 5000
end
```

Downloading Images

Delete files in the router flash memory before attempting to download new images.

Caution Use the **delete** command, not the **erase** command, to free up space. Entering the **erase** command removes all files, including the configuration.

Flash Memory

Cisco 800 series routers use 4 MB of flash memory for storing internal information such as the ROM monitor. Only the remainder of the flash memory is available for storing Cisco IOS images; this remaining memory is displayed by using the **show flash** command. For example, if the router reports 8 MB of flash memory, the actual amount of onboard flash memory is 12 MB, even though only 8 MB are displayed and available for Cisco IOS image storage.

Multilink PPP and Interleaving

Multilink PPP fragments large data packets to allow small voice packets to be interleaved between them. However, apart from FIFO queueing, no other kind of output queueing mechanisms are currently supported with PPP over ATM. Consequently, when multilink PPP is configured on the Cisco 800 series routers, large packets are fragmented, but small voice packets are not interleaved between them.

NAT Support for H.323 Signaling

Network Address Translation (NAT) does not support alerting H.225 messages; therefore, NAT communication cannot be established between router endpoints. NAT support for H.323 signaling is limited to the application NetMeeting.

PPP over AAL5SNAP Encapsulation Support

PPP over AAL5SNAP encapsulation is currently not supported, although the context-sensitive help mentions that it can be configured.

Router Clock—CSCdp09409

To run IP Security (IPSec) successfully, the Cisco 800 series router clock must be set accurately. Cisco 800 series router clocks are set and maintained using Simple Network Time Protocol (SNTP). For best results, set up a Network Time Protocol (NTP) server to periodically send time information messages to Cisco 800 series routers. See the SNTP configuration and command reference documentation for configuration instructions. If you do not have an NTP server, you must reset the Cisco 800 series router clock using the **clock set** command each time you restart the router.

Dial Peer Limitation

The **isdn answer1** and **isdn answer2** commands determine which called telephone numbers, for example 555-0100 and 555-0199, a Cisco 800 series router can answer. Using these commands limits a router to using the two dial peers that contain the telephone numbers 555-0100 and 555-0199. (When not using these commands, a router can use up to six dial peers.)

Excessive ISDN Line Activation

The following protocols send updates that can cause an ISDN line to be activated excessively, thereby increasing your monthly ISDN line cost:

- Cisco Discovery Protocol (CDP)
- Internetwork Packet Exchange (IPX)
- IP
- Simple Network Time Protocol (SNTP)
- User Datagram Protocol (UDP)

For information on preventing this situation, see the *Cisco 800 Series Routers Software Configuration Guide*. This guide contains information on setting up extended access lists to prevent IP, UDP, IPX, and SNTP updates from activating the ISDN line. For CDP, ensure that you enter the **no cdp enable** command to disable CDP.

Hanging During Boot

If an illegal console configuration is issued to the router, the console will fail the POST test during boot and cause the router to pause indefinitely. There is no way to recover a unit in this state except by pulling the soldered boot flash and reburning the boot ROM.

This problem has been resolved in TinyROM version 1.0(3), a downloadable ROM upgrade available from Cisco.com. Please contact Cisco to upgrade to this version or later to prevent this problem from occurring.

Phone Mate Model 9200 Answering Machine

A Phone Mate model 9200 answering machine failed to recognize the ringing signal sent by AMD R79 ringing SLIC. This failure was confirmed by testing against Phone Mate model 3750 and the newer 9300 model.

B-Channel Activation

When a call comes in, a B channel is activated. If the amount of traffic on the B channel exceeds a threshold, the other B channel is activated. If the amount of traffic falls below the threshold, one of the B channels is deactivated. The B channel that is initially activated when the call comes in is not necessarily B1, nor is the B channel that is deactivated when the traffic level lessens necessarily B2.

Cisco 1700 Series Routers

This section contains the following sections with information that is specific to the Cisco 1700 series routers:

Memory Recommendations

For memory recommendations for the Cisco 1700 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco 1700 series routers:

- Cisco 1701—Runs data images only.
- Cisco 1710—Runs data images only. Note end-of-sale announcement:

  http://www.cisco.com/en/US/products/hw/routers/ps221/prod_eol_notice09186a00801f0ef2.html
- Cisco 1711—Runs data images only.
- Cisco 1712—Runs data images only.
- Cisco 1720—Runs data images only.
- Cisco 1721—Runs data images only.
- Cisco 1751 and Cisco 1751-V—Run data and data-plus-voice images.
- Cisco 1760—Runs data and data-plus-voice images.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Cisco 1701

The Cisco 1701 ADSL Security Access Router provides secure and reliable Internet and corporate network connectivity to enterprise small branch offices and small and medium-sized businesses and includes the following features:

- Business class DSL.
- High availability.
- Simplified management and ease of deployment.
- Integrated security.
- Advanced QoS.

The Cisco 1701 router has the following hardware components:

- One ADSLoPOTS WAN port.
- One ISDN BRI WAN port.
- One 10/100BASE-TX Fast Ethernet port (RJ-45).
- One auxiliary (AUX) port.
- One console port.
- DRAM memory: 96 MB default, 128 MB maximum.
- Flash memory: 32 MB default, 32 MB maximum.

Cisco 1710

The Cisco 1710 router provides Internet and intranet access and includes the following features:

- Support for virtual private networking.
- Modular architecture.
- Network device integration.

The Cisco 1710 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available).
- One Ethernet (10BASE-T) port, which operates in full- or half-duplex mode.
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial).
- One console port.
- Motorola MPC855T PowerQUICC at 48 MHz. The hardware encryption module offloads the processor for encryption and decryption.
- One internal expansion slot for support of hardware-assisted services such as encryption (up to T1/E1) and compression.
- DRAM memory: 64 MB default, expandable to 96 MB.
- Flash memory: 16 MB default, 16 MB maximum.
- One security slot that supports Kensington or similar lockdown equipment.
- Desktop form factor.

Cisco 1711

The Cisco 1711 router provides Internet and intranet access and includes the following features:

- Support for virtual private networking.
- Fixed architecture.
- Network device integration.

The Cisco 1711 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available).
- One 4-port 10/100BASE-T switch, which operates in full- or half-duplex mode (with manual override available).

- One V.90 analog modem port.
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial).
- One console port.
- VPN Hardware Encryption Module.
- Motorola MPC862P PowerQUICC at 100 MHz. The hardware encryption module offloads the processor for encryption and decryption.
- One internal expansion slot for support of hardware-assisted services such as encryption (up to T1/E1) and compression.
- DRAM memory: 96 MB default, expandable to 128 MB.
- Flash memory: 32 MB default, 32 MB maximum.
- One security slot that supports Kensington or similar lockdown equipment.
- Desktop form factor.

Cisco 1712

The Cisco 1712 router provides Internet and intranet access and includes the following features:

- Support for virtual private networking.
- Fixed architecture.
- Network device integration.

The Cisco 1712 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available).
- One 4-port 10/100BASE-T switch, which operates in full- or half-duplex mode (with manual override available).
- One ISDN BRI S/T port.
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial).
- One console port.
- VPN Hardware Encryption Module.
- Motorola MPC862P PowerQUICC at 100 MHz. The hardware encryption module offloads the processor for encryption and decryption.
- One internal expansion slot for support of hardware-assisted services such as encryption (up to T1/E1) and compression.
- DRAM memory: 96 MB default, expandable to 128 MB.
- Flash memory: 32 MB default, 32 MB maximum.
- One security slot that supports Kensington or similar lockdown equipment.
- Desktop form factor.

Cisco 1720

The Cisco 1720 router provides Internet and intranet access and includes the following features:

- Support for virtual private networking.
- Modular architecture.
- Network device integration.

The Cisco 1720 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available).
- Two WAN interface card slots.
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial).
- One console port.
- RISC processor for high-performance encryption.
- One internal expansion slot for support of hardware-assisted services such as encryption (up to T1/E1) and compression.
- DRAM memory: 32 MB default, expandable to 48 MB.
- Flash memory: 8 MB default, expandable to 16 MB.
- Desktop form factor.

The Cisco 1720 router supports any combination of one or two of the following WAN interface cards (WICs), which are shared with the Cisco 1600, Cisco 2600, and Cisco 3600 series routers:

- WIC-1T: One-port high-speed serial (synchronous/asynchronous).
- WIC-2T: Two-port high-speed serial (synchronous/asynchronous).
- WIC-2A/S: Two-port low-speed serial (synchronous/asynchronous) (up to 128 kbps).
- WIC-1ADSL: One-port ADSL.
- WIC-1B-S/T: One-port ISDN BRI S/T.
- BRI WIC: One-port ISDN BRI U (BRI WIC replaces WIC-1B-U in Cisco IOS Release 12.3).
- WIC-1DSU-56K4: One-port integrated 56/64-kbps 4-wire DSU/CSU.
- WIC-1DSU-T1: One-port integrated T1/fractional T1 DSU/CSU.
- WIC-1ENET: One-port 10BASE-T Ethernet.

Cisco 1721

The Cisco 1721 router provides Internet and intranet access and includes the following features:

- Support for virtual private networking.
- Modular architecture.
- Network device integration.

The Cisco 1721 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available) and supports IEEE 802.1Q VLAN.
- Two WAN interface card slots.
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial).

- One console port.
- RISC processor for high-performance encryption.
- One internal expansion slot for support of hardware-assisted services such as encryption (up to T1/E1).
- DRAM memory: 64 MB (onboard default), 1 DIMM slot for a total DRAM maximum of 128 MB.
- Flash memory: 32 MB default, not expandable.
- Desktop form factor.

The Cisco 1721 router supports any combination of one or two of the following WAN interface cards (WICs) or Multiflex Voice/WAN interface cards (VWICs) (data only), which are shared with the Cisco 1700, Cisco 2600, and Cisco 3600 series routers:

- WIC-1T: One-port high-speed serial (synchronous/asynchronous).
- WIC-2T: Two-port high-speed serial (synchronous/asynchronous).
- WIC-2A/S: Two-port low-speed serial (synchronous/asynchronous) (up to 128 kbps).
- WIC-1ADSL: One-port ADSL.
- WIC-1ADSL-I-DG: One-port ADSLoISDN WAN interface card.
- WIC-1ADSL-DG: One-port ADSLoPOTS WIC with Dying Gasp.
- WIC-1B-S/T: One-port ISDN BRI S/T.
- WIC-1B-S/T-V3: One-port ISDN WAN interface card (dial and leased line).
- WIC-1B-U-V2: One-port ISDN BRI NT-1 WIC for Cisco 1700, 2600, 3600, and 3700 series.
- WIC-1B-U: One-port ISDN BRI U (WIC-1B-U-V2 replaces WIC-1B-U in Cisco IOS Release 12.3).
- WIC-1DSU-56K4: One-port integrated 56/64-kbps 4-wire DSU/CSU.
- WIC-1DSU-T1: One-port integrated T1/fractional T1 DSU/CSU.
- WIC-1DSU-T1-V2: Updated one-port T1/fractional T1 DSU/CSU WAN interface card.
- WIC-1ENET: One-port 10BASE-T Ethernet.
- WIC-1SHDSL: One-port G.SHDSL.
- WIC-1SHDSL-V3: One-port G.SHDSL WIC with 4-wire support.
- WIC-1AM: One-port analog modem.
- WIC-2AM: Two-port analog modem.
- WIC-4ESW: Four-port Ethernet switch WIC.

The following T1/E1 Multiflex Voice/WAN interface cards (VWICs) are also supported on the Cisco 1721 for data applications only:

- VWIC-1MFT-E1: One-port RJ-48 multiflex trunk (E1).
- VWIC-2MFT-E1: Two-port RJ-48 multiflex trunk (E1).
- VWIC-1MFT-G703: One-port RJ-48 multiflex trunk (G.703).
- VWIC-2MFT-G703: Two-port RJ-48 multiflex trunk (G.703).
- VWIC-1MFT-T1: One-port RJ-48 multiflex trunk (T1).
- VWIC-2MFT-T1: Two-port RJ-48 multiflex trunk (T1).

- VWIC-2MFT-E1-DI: Two-port RJ-48 multiflex trunk (E1) (with Drop and Insert).
- VWIC-2MFT-T1-DI: Two-port RJ-48 multiflex trunk (T1) (with Drop and Insert).

Cisco 1751

The voice-and-data capable Cisco 1751 router comes in two models, the Cisco 1751 and the Cisco 1751-V. These models provide global Internet and company intranet access and include the following features:

- Voice-over-IP (VoIP) voice-and-data functionality; the router can carry voice traffic (for example, telephone calls and faxes) over an IP network.
- Support for Cisco IOS Firewall, Intrusion Detection Systems, and IPSec Virtual Private Networks.
- Modular architecture.
- Network device integration.

The Cisco 1751 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available).
- One voice-only interface card slot—Supports a single voice interface card with two ports per card.
- Two WAN/VIC slots for either WAN interface cards (WICs) or voice interface cards (VICs).
- Synchronous serial interfaces on serial WICs.
- Asynchronous serial interfaces on serial WICs.
- ISDN WICs—ISDN dialup and ISDN leased line (IDSL) at 144 kbps. Encapsulation over ISDN leased line: Frame Relay and PPP.
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial).
- One console port.
- One internal expansion slot—Supports hardware-assisted services such as encryption (up to T1/E1) and compression.
- RISC processor—Motorola MPC860T PowerQUICC at 48 MHz.
- One security slot that supports Kensington or similar lockdown equipment.
- DRAM memory—Cisco 1751: 64 MB (onboard default), 1 DIMM slot for a total DRAM maximum of 128 MB; Cisco 1751-V: 96 MB (onboard default 64 MB DRAM and 32 MB in the 1 DIMM slot), maximum of 128 MB.
- Flash memory—Cisco 1751: 32 MB default and maximum; Cisco 1751-V: 32 MB default and maximum.
- Desktop form factor.

The Cisco 1751 router also supports any combination of one or two of the following WAN interface cards (WICs), which are shared with the Cisco 1600 series, Cisco 1720, Cisco 2600 series, and Cisco 3600 series routers:

- WIC-1T: One-port high-speed serial (synchronous/asynchronous) (T1/E1).
- WIC-2T: Two-port high-speed serial (synchronous/asynchronous) (T1/E1).
- WIC-2A/S: Two-port low-speed serial (synchronous/asynchronous) (up to 128 kbps).
- WIC-1ADSL: One-port ADSL WAN interface card.
- WIC-1ADSL-I-DG: One-port ADSLoISDN WAN interface card.

- WIC-1ADSL-DG: One-port ADSLoPOTS WIC with Dying Gasp.
- WIC-1B-S/T: One-port ISDN BRI S/T interface card.
- WIC-1B-S/T-V3: One-port ISDN WAN interface card (dial and leased line).
- WIC-1B-U: One-port ISDN BRI U with integrated NT-1 (WIC-1B-U-V2 replaces WIC-1B-U in Cisco IOS Release 12.3).
- WIC-1B-U-V2: One-port ISDN BRI NT-1 WIC for Cisco 1700, 2600, 3600, and 3700 series.
- WIC-1DSU-56K4: One-port integrated 56/64-kbps 4-wire DSU/CSU.
- WIC-1DSU-T1: One-port integrated T1/fractional T1 DSU/CSU.
- WIC-1DSU-T1-V2: Updated one-port T1/fractional T1 DSU/CSU WAN interface card.
- WIC-1ENET: One-port 10BASE-T Ethernet.
- WIC-1SHDSL: One-port G.SHDSL WAN interface card.
- WIC-1SHDSL-V3: One-port G.SHDSL WIC with 4-wire support.
- WIC-1AM: One-port analog modem.
- WIC-2AM: Two-port analog modem.
- WIC-4ESW: Four-port Ethernet switch WIC.

The following T1/E1 Multiflex Voice/WAN interface cards (VWICs) are also supported on the Cisco 1751 (and shared with the Cisco 2600 and Cisco 3600 series routers) and can be used for both channelized data and voice applications:

- VWIC-1MFT-E1: One-port RJ-48 multiflex trunk (E1).
- VWIC-2MFT-E1: Two-port RJ-48 multiflex trunk (E1).
- VWIC-1MFT-G703: One-port RJ-48 multiflex trunk (G.703).
- VWIC-2MFT-G703: Two-port RJ-48 multiflex trunk (G.703).
- VWIC-1MFT-T1: One-port RJ-48 multiflex trunk (T1).
- VWIC-2MFT-T1: Two-port RJ-48 multiflex trunk (T1).
- VWIC-2MFT-E1-DI: Two-port RJ-48 multiflex trunk (E1) (with Drop and Insert).
- VWIC-2MFT-T1-DI: Two-port RJ-48 multiflex trunk (T1) (with Drop and Insert).

The Cisco 1751 router supports any combination of one or two of the following voice interface cards (VICs), which are shared with the Cisco 2600 and Cisco 3600 series routers:

- VIC-2FXS: Two-port Foreign Exchange Station (FXS) voice/fax interface card for voice/fax network module.
- VIC-2FXO: Two-port Foreign Exchange Office (FXO) voice/fax interface card for voice/fax network module.
- VIC-2FXO-EU: Two-port FXO voice/fax interface card for Europe.
- VIC-2E/M: Two-port Ear-and-Mouth (E&M) voice/fax interface card for voice/fax network module.
- VIC-2BRI-NT/TE: Two-port voice interface card - BRI (NT and TE).
- VIC-2FXO-M3: Two-port FXO voice/fax interface card for Australia.
- VIC-2FXO-M1: Two-port FXO voice/fax interface card with battery reversal (for North America).
- VIC-2FXO-M2: Two-port FXO voice/fax interface card with battery reversal (for Europe).

- VIC-2DID: Two-port Direct Inward Dial voice/fax interface card.
- VIC-4FXS/DID: Four-port FXS or DID VIC.
- VIC2-2FXS: Two-port voice interface card, FXS.
- VIC2-2FXO: Two-port voice interface card, FXO (universal).
- VIC2-2E/M: Two-port voice interface card, E&M.
- VIC2-4FXO: Four-port voice interface card, FXO (universal).
- VIC2-2BRI-NT/TE: Two-port voice interface card, BRI (NT and TE).

Cisco 1760

The voice-and-data capable Cisco 1760 router provides global Internet and company intranet access and includes the following features:

- Voice-over-IP (VoIP) voice-and-data functionality; the router can carry voice traffic (for example, telephone calls and faxes) over an IP network.
- Support for Cisco IOS Firewall, Intrusion Detection Systems, and IPSec Virtual Private Networks.
- Modular architecture.
- Network device integration.

The Cisco 1760 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available).
- Two voice-only interface card slots—Supports a single voice interface card with two ports per card.
- Two WAN/VIC slots for either WAN interface cards (WICs) or voice interface cards (VICs).
- Synchronous serial interfaces on serial WICs.
- Asynchronous serial interfaces on serial WICs.
- ISDN WICs—ISDN dialup and ISDN leased line (IDSL) at 144 kbps. Encapsulation over ISDN leased line: Frame Relay and PPP.
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial).
- One console port.
- One internal expansion slot—Supports hardware-assisted services such as encryption (up to T1/E1) and compression.
- RISC processor—Motorola MPC860T PowerQUICC at 80 MHz.
- One security slot that supports Kensington or similar lockdown equipment.
- DRAM memory—Cisco 1760: 64 MB (onboard default); 1 DIMM slot for a total DRAM maximum of 128 MB. Cisco 1760-V: 96 MB (onboard default 64 MB DRAM and 32 MB in the 1 DIMM slot); maximum of 128 MB.
- Flash memory—Cisco 1760: 32 MB default, 1 slot for a total flash memory maximum of 64 MB; expandable to 32 MB. Cisco 1760-V: 32 MB default, 1 slot for a total flash memory maximum of 64 MB.
- Rackmount form factor.

The Cisco 1760 router also supports any combination of one or two of the following WAN interface cards (WICs), which are shared with the Cisco 1600 series, Cisco 1720, Cisco 2600 series, and Cisco 3600 series routers:

- WIC-1T: One-port high-speed serial (synchronous/asynchronous) (T1/E1).
- WIC-2T: Two-port high-speed serial (synchronous/asynchronous) (T1/E1).
- WIC-2A/S: Two-port low-speed serial (synchronous/asynchronous) (up to 128 kbps).
- WIC-1DSU-56K4: One-port 4-wire 56-kbps DSU/CSU WAN interface card.
- WIC-1ADSL: One-port ADSL WAN interface card.
- WIC-1ADSL-I-DG: One-port ADSLoISDN WAN interface card.
- WIC-1ADSL-DG: One-port ADSLoPOTS WIC with Dying Gasp.
- WIC-1B-S/T: One-port ISDN BRI S/T.
- WIC-1B-S/T-V3: One-port ISDN WAN interface card (dial and leased line).
- WIC-1B-U: One-port ISDN BRI U with integrated NT-1 (WIC-1B-U-V2 replaces WIC-1B-U in Cisco IOS Release 12.3).
- WIC-1B-U-V2: One-port ISDN BRI NT-1 WIC for Cisco 1700, 2600, 3600, and 3700 series.
- WIC-1DSU-56K4: One-port integrated 56/64-kbps 4-wire DSU/CSU.
- WIC-1DSU-T1: One-port integrated T1/fractional T1 DSU/CSU.
- WIC-1DSU-T1-V2: Updated one-port T1/fractional T1 DSU/CSU WAN interface card.
- WIC-1ENET: One-port 10BASE-T Ethernet.
- WIC-1SHDSL: One-port G.SHDSL WAN interface card.
- WIC-1SHDSL-V3: One-port G.SHDSL WIC with 4-wire support.
- WIC-1AM: One-port analog modem.
- WIC-2AM: Two-port analog modem.
- WIC-4ESW: Four-port Ethernet switch WIC.

The following T1/E1 Multiflex Voice/WAN interface cards (VWICs) are also supported on the Cisco 1760 (and shared with the Cisco 2600 and Cisco 3600 series routers) and can be used for both channelized data and voice applications:

- VWIC-1MFT-E1: One-port RJ-48 multiflex trunk (E1).
- VWIC-2MFT-E1: Two-port RJ-48 multiflex trunk (E1).
- VWIC-1MFT-G703: One-port RJ-48 multiflex trunk (G.703).
- VWIC-2MFT-G703: Two-port RJ-48 multiflex trunk (G.703).
- VWIC-1MFT-T1: One-port RJ-48 multiflex trunk (T1).
- VWIC-2MFT-T1: Two-port RJ-48 multiflex trunk (T1).
- VWIC-2MFT-E1-DI: Two-port RJ-48 multiflex trunk (E1) (with Drop and Insert).
- VWIC-2MFT-T1-DI: Two-port RJ-48 multiflex trunk (T1) (with Drop and Insert).

The Cisco 1760 router supports any combination of one or two of the following voice interface cards (VICs), which are shared with the Cisco 2600 and Cisco 3600 series routers:

- VIC-2FXS: Two-port Foreign Exchange Station (FXS) voice/fax interface card for voice/fax network module.
- VIC-2FXO: Two-port Foreign Exchange Office (FXO) voice/fax interface card for voice/fax network module.
- VIC-2FXO-EU: Two-port FXO voice/fax interface card for Europe.
- VIC-2E/M: Two-port Ear-and-Mouth (E&M) voice/fax interface card for voice/fax network module.
- VIC2-2BRI-NT/TE: Two-port voice interface card, BRI (NT and TE).
- VIC-2FXO-M3: Two-port FXO voice/fax interface card for Australia.
- VIC-2FXO-M1: Two-port FXO voice/fax interface card with battery reversal (for North America).
- VIC-2FXO-M2: Two-port FXO voice/fax interface card with battery reversal (for Europe).
- VIC-2DID: Two-port Direct Inward Dial voice/fax interface card.
- VIC-4FXS/DID: Four-port FXS or DID VIC.
- VIC2-2FXS: Two-port voice interface card, FXS.
- VIC2-2FXO: Two-port voice interface card, FXO (universal).
- VIC2-4FXO: Four-port voice interface card, FXO (universal).
- VIC-2BRI-NT/TE: Two-port voice/fax interface card (BRI [NT and TE]).

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Additional Notes for the Cisco 1700 Series Routers

This section contains important information about using the Cisco 1700 series routers with Cisco IOS Release 12.4 software.

SmartInit

The following points must be observed while using SmartInit:

- If the user has configured the **no memory-size iomem** command from a pre-SmartInit image (old image) and a SmartInit image is loaded on the router, the router will boot with SmartInit enabled. The running configuration will not display any **memory-size iomem** command-line interface (CLI) commands.
- If the user has configured the **memory-size iomem 10** command from a pre-SmartInit image and a SmartInit image is loaded on the router, the router will boot with SmartInit enabled. Consequently, the I/O memory size may not be 10 percent (as expected on a pre-SmartInit image).
- If the user configures the **memory-size iomem 10** command on a SmartInit image, it will be displayed in the running and startup configurations. This is different from the pre-SmartInit that does not display the **memory-size iomem 10** command because 10 percent is the default I/O memory size.

- If the user-configured I/O memory size is too low or too high, the I/O memory size calculated by the SmartInit image will be different from the configured value, but the running configuration will still display the configured value only. The user can get the actual I/O memory size using the **show version** or **show memory** commands.

Using the boot flash or boot system flash Commands

Booting a Cisco 1700 series router with the **boot flash** or **boot system flash** commands results in unpredictable behavior. To work around this problem, be sure to enter a colon (:) following both commands (for example, **boot flash:** or **boot system flash:**).

Fan Operation in Cisco 1700 Series Routers

Be advised that the fans in the Cisco 1700 series routers stay off until thermally activated (45°C/115°F).

Multipartition Flash Defaults

When using a multipartition flash card, the various flash partitions are referred to as “flash:1:”, “flash:2:”, and so on. If you specify only “flash” in a multipartition flash, the parser assumes “flash:1:”. For example, if you enter the **show flash all** command, the parser defaults to “show flash:1: all”, and only the flash information for the first partition displays. To display information for all flash partitions, enter the **show flash ?** command, which will list all of the valid partitions. Then enter the **show flash:***number***: all** command on each valid partition.

Cisco 1800 Series Routers (Modular)

This section contains the following sections with information that is specific to the Cisco 1800 series routers (modular):

Introduction

Cisco IOS Release 12.3(8)T4 introduces and supports the Cisco 1800 series routers (modular). The Cisco 1800 series routers are modular routers with LAN and WAN connections that can be configured by means of interchangeable interface cards and advanced integration modules (AIMs). The Cisco 1800 series routers (modular) include the Cisco 1841 in Cisco IOS Release 12.4(1).

The Cisco 1841 router is a data-only router with two HWIC/WIC/VWIC slots, capable of supporting single-wide High-Speed WAN Interface Cards (HWICs) and one AIM slot. It can be placed on a desktop or wall-mounted. The Cisco 1841 does not provide inline power support.

Although you can use voice/WAN interface cards (VWICs) in the Cisco 1841 router, they will function only in data modes. Voice interfaces are not supported.

Memory Recommendations

For memory recommendations for the Cisco 1800 series routers (modular) in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the Cisco 1841 integrated services router.

The Cisco 1841 router supports any combination of one or two of the following WAN interface cards (WICs) or Multiflex Voice/WAN interface cards (VWICs) (data only), which are shared with the Cisco 1700, Cisco 2600, and Cisco 3600 series routers:

- WIC-1T: One-port high-speed serial (synchronous/asynchronous).
- WIC-2T: Two-port high-speed serial (synchronous/asynchronous).
- WIC-2A/S: Two-port low-speed serial (synchronous/asynchronous) (up to 128 kbps).
- WIC-1ADSL: One-port ADSL.
- WIC-1ADSL-I-DG: One-port ADSLoISDN Wan interface card.
- WIC-1ADSL-DG: One-port ADSLoPOTS WIC with Dying Gasp.
- WIC-1B-S/T-V3: One-port ISDN WAN interface card (dial and leased line).
- WIC-1B-U-V2: One-port ISDN BRI NT-1 WIC for Cisco 1700, 1800, 2600, 3600, and 3700 series.
- WIC-1DSU-56K4: One-port integrated 56/64-kbps 4-wire DSU/CSU.
- WIC-1DSU-T1-V2: Updated one-port T1/fractional T1 DSU/CSU WAN interface card.
- WIC-1SHDSL: One-port G.SHDSL.

- WIC-1SHDSL-V3: One-port G.SHDSL WIC with 4-wire support.
- WIC-1AM: One-port analog modem.
- WIC-2AM: Two-port analog modem.
- HWIC-4A/S: Four low-speed synchronous/asynchronous serial ports.
- HWIC-4ESW: Four-port 10/100 Ethernet switch interface card.
- HWIC-4T: Four-port serial high-speed WAN interface card.
- HWIC-8A/S-232: Eight low-speed synchronous/asynchronous serial ports, EIA-232 only.
- HWIC-8A: Eight asynchronous EIA-232 serial ports.
- HWIC-16A: Sixteen-port asynchronous high-speed WAN interface card, EIA-232 only.

The following T1/E1 Multiflex Voice/WAN interface cards (VWICs) are also supported on the Cisco 1841 for data applications only:

- VWIC-1MFT-E1: One-port RJ-48 multiflex trunk (E1).
- VWIC-2MFT-E1: Two-port RJ-48 multiflex trunk (E1).
- VWIC-1MFT-G703: One-port RJ-48 multiflex trunk (G.703).
- VWIC-2MFT-G703: Two-port RJ-48 multiflex trunk (G.703).
- VWIC-1MFT-T1: One-port RJ-48 multiflex trunk (T1).
- VWIC-2MFT-T1: Two-port RJ-48 multiflex trunk (T1).
- VWIC-2MFT-E1-DI: Two-port RJ-48 multiflex trunk (E1) (with Drop and Insert).
- VWIC-2MFT-T1-DI: Two-port RJ-48 multiflex trunk (T1) (with Drop and Insert).

The AIM-VPN/BPII-PLUS: DES/3DES/AES VPN Encryption/Compression card is also supported on the Cisco 1841.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco MWR 1900 Series Routers

This section contains the following sections with information that is specific to the Cisco 1900 series routers:

Introduction

The Cisco MWR 1900 series of routers consists of the Cisco MWR 1941-DC Mobile Wireless Edge Router, which is a networking platform that is optimized for use in mobile wireless networks. Cisco IOS Release 12.4 supports the Cisco MWR 1941-DC router for use at a cell site edge as a part of an IP Radio Access Network (IP-RAN).

Note Future releases of Cisco IOS Release 12.4 may support the Cisco MWR 1941-DC router for use at a cell site edge as a part of a cell site Data Communications Network (DCN).

The Cisco MWR 1941-DC router offers high performance at a low cost while meeting the critical requirements for deployment in cell sites, including small size, high availability, and DC input power flexibility.

The Cisco MWR 1941-DC router provides two fixed LAN 10/100 BASE-T Ethernet ports and three WIC/VIC expansion slots (however, the third slot is supported in a DCN implementation only, as is the single network module slot).

For detailed information about the Cisco MWR 1900 series of routers, see the documents at the following location:

http://www.cisco.com/univercd/cc/td/doc/product/wireless/ipran/2_0/1941/index.htm

Memory Recommendations

For memory recommendations for the Cisco MWR 1900 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

The Cisco MWR 1941-DC router supports the following Voice/WAN interface cards (VWICs) in Cisco IOS Release 12.4:

- 2-port E1/Fractional E1 Drop and Insert Multiflex Trunk Interface Card (VWIC-2MFT-E1-DIR)
- 2-port T1/Fractional T1 Drop and Insert Multiflex Trunk Interface Card (VWIC-2MFT-T1-DIR)

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco IAD2430 Series Integrated Access Devices

Introduction

The Cisco IAD2430 is the next generation integrated voice and data services platform for service providers, building on the industry leading Cisco IAD2420 series IAD. The Cisco IAD2430 series offers a major leap forward in price performance and enhanced software functionality, such as MGCP SRST used to accelerate the migration from TDM to VoIP cost efficiently. The Cisco IAD2430 series harnesses the maturity of the Cisco IAD2420 series software and enhances functionality by providing more capabilities, such as denser interfaces (up to 24 FXS or up to 2 voice and 2 data T1s), encryption, and DC power backup while maintaining 1-RU form factor for space saving service provider managed services deployment.

Memory Recommendations

For memory recommendations for the Cisco IAD2430 series integrated access devices in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco IAD2430 series integrated access devices:

- Cisco 2430-24FXS IAD
- Cisco 2431-8FXS IAD
- Cisco 2431-16FXS IAD
- Cisco 2431-1T1E1 IAD
- Cisco 2432-24FXS IAD

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

Each Cisco IAD2430 series router is preconfigured for one WAN port. The WAN port can be FE or T1/E1. When the platform has two T1/E1 ports, one can be used as a DSU port and the other can be used as a digital voice port for connection to a PBX.

Table 3 lists the supported interfaces for the Cisco IAD2430 series IAD for Cisco IOS Release 12.4.

Table 3 Supported Interfaces on the Cisco IAD2430 Series Integrated Access Devices

Interface and Port	Product Description	Supported IAD2430 Models
10/100BASE-T Fast Ethernet Port	All Cisco IAD2430 series models have two 10/100BASE-T Fast Ethernet ports except for the Cisco 2431-8FXS IAD, which has one.	All
Console and Auxiliary Ports	One EIA/TIA-32 asynchronous serial port for connection to a console. One EIA/TIA-32 asynchronous serial port for connection to a modem.	All
Analog FXS Voice Ports over RJ-21 Connector	One 8-line or 16-line analog or 24-line FXS interface (loop-start or ground-start) for connection to analog phones, key systems, or PBXs.	• IAD2430-24FXS: 24 ports • IAD2431-8FXS: 8 ports • IAD2431-16FXS: 16 ports • IAD2432-24FXS: 24 ports
VIC2-4FX0	All models support one VIC slot, except for the Cisco IAD2430-24FXS IAD, which supports none.	• IAD2431-8FXS • IAD2431-16FXS • IAD2431-1T1E1 • IAD2432-24FXS
T1/E1 Port	One or two T1 ports for WAN connection or with channel-associated signaling (CAS) for connection to a digital PBX, except for the Cisco IAD2430-24FXS IAD, which supports none. E1 ports are currently not supported.	• IAD2431-8FXS: 1 port • IAD2431-16FXS: 1 port • IAD2431-1T1E1: 2 ports • IAD2432-24FXS: 2 ports
WIC-2T	All models support one WIC slot, except for the Cisco IAD2430-24FXS IAD, which supports none. The supported WICs are WIC-2T and WIC-1DSU-T1. One 2T port (balanced, per ANSI T1.403) for connection to a WAN or carrier network or for a serial connection.	• IAD2431-8FXS • IAD2431-16FXS • IAD2431-1T1E1 • IAD2432-24FXS
WIC-1DSU-T1	One DSU port for connection to a WAN or carrier network.	• IAD2431-8FXS • IAD2431-16FXS • IAD2431-1T1E1 • IAD2432-24FXS
External Compact Flash Card	An external compact flash card is supported on all models.	All

The supported WAN interface cards (WICs) and voice interface cards (VICs) are:

- VIC2-2FXO
- VIC2-2FXS
- VIC-4FXS/DID

- VIC2-2BRI-NT/TE
- WIC-1T
- WIC-1ADSL
- WIC-1SHDSL
- WIC-1ADSL-DG
- WIC-1SHDSL-V2
- VWIC-2MFT-T1
- VWIC-2MFT-E1

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco 2600XM Series and Cisco 2691 Modular Access Routers

This section contains the following sections with information that is specific to the Cisco 2600XM series and Cisco 2691 modular access routers:

Introduction

The latest additions to the Cisco 2600 series family of modular routers include the Cisco 2600XM models and the Cisco 2691. These new models deliver extended performance, higher density, enhanced security performance, and increased concurrent application support to meet the growing demands of branch offices.

Memory Recommendations

For memory recommendations for the Cisco 2600XM series and Cisco 2691 modular access routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco 2600 series routers:

- Cisco 2610XM and Cisco 2611XM
- Cisco 2620XM and Cisco 2621XM
- Cisco 2650XM and Cisco 2651XM
- Cisco 2691

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

Table 4 lists the supported interfaces for the Cisco 2600 series routers for Cisco IOS Release 12.4.

Table 4 Supported Interfaces for the Cisco 2600 Series Routers

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
LAN Interfaces	1- or 2-port 10/100-Mbps Fast Ethernet	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
LAN Network Modules	1-port Ethernet	All Cisco 2600 series platforms
	4-port Ethernet	All Cisco 2600 series platforms
Fast Ethernet Network Module	1-port Fast Ethernet network module (10/100BASE fiber only) (NM-1FE-FX-V2)	Cisco 2691 platform only
	16-port Ethernet Switch Module for the Cisco 2600 or Cisco 3600 series (NM-16ESW)	All Cisco 2600 and Cisco 3600 series platforms
Serial Network Modules	16- or 32-port asynchronous serial low speed (134 kbps max)	All Cisco 2600 series platforms
	32-port high density asynchronous network module	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	4- or 8-port asynchronous/synchronous serial low speed (128 kbps max)	All Cisco 2600 series platforms
	16-port asynchronous/synchronous serial low speed (128 kbps max)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	4-port serial (NM-4T)	Cisco 2691
	1-port T3/E3 (NM-1T3/E3)	Cisco 2691
ATM Network Modules[1]	4-port T1 ATM network module with IMA (NM-4T1-IMA)	All Cisco 2600 series platforms
	4-port E1 ATM network module with IMA (NM-4E1-IMA)	All Cisco 2600 series platforms
	8-port T1 ATM network module with IMA (NM-8T1-IMA)	All Cisco 2600 series platforms
	8-port E1 ATM network module with IMA (NM-8E1-IMA)	All Cisco 2600 series platforms
	1-port ATM T3 network module (NM-1A-T3)	All Cisco 2600 series platforms
	1-port ATM E3 network module (NM-1A-E3)	All Cisco 2600 series platforms
	1-port ATM-25 RJ-45 interface	All Cisco 2600 series platforms
	Single-port ATM OC-3 single-mode and multimode intermediate-reach network module	Cisco 2691

Table 4 Supported Interfaces for the Cisco 2600 Series Routers (continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
Digital T1 Packet Voice Trunk Network Modules and Spare Components	1-port 24-channel T1 voice/fax module supports 24 channels of medium-complexity codecs (G.729a/b, G.726, G.711, and fax) or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, two PVDM-12s, and one VWIC-1MFT-T1.[2] Part number: NM-HDV-1T1-24.	All Cisco 2600 series platforms
	1-port enhanced 24-channel T1 voice/fax module supports 24 channels of high- and medium-complexity codecs (G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax). Consists of one NM-HDV, four PVDM-12s, and one VWIC-1MFT-T1.[2] Part number: NM-HDV-1T1-24E.	All Cisco 2600 series platforms
	2-port 48-channel T1 voice/fax module supports add/drop multiplexing (drop and insert); 48 channels of medium-complexity codecs (G.729a/b, G.726, G.711, and fax) or 24 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, four PVDM-12s, and one VWIC-2MFT-T1-DI.[2] Part number: NM-HDV-2T1-48.	All Cisco 2600 series platforms
	High-density voice/fax network module spare (NM-HDV)	All Cisco 2600 series platforms
	12-channel packet voice DSP module upgrade spare (PVDM-12)	All Cisco 2600 series platforms
	1-port RJ-48 multiflex trunk—T1 (VWIC-1MFT-T1)[2]	All Cisco 2600 series platforms
	2-port RJ-48 multiflex trunk—T1 (VWIC-2MFT-T1)[2]	All Cisco 2600 series platforms
	2-port RJ-48 multiflex trunk with drop and insert—T1 (VWIC-2MFT-T1-DI)[2]	All Cisco 2600 series platforms
Digital E1 Packet Voice Network Modules	1-port 30-channel E1 high-density voice network module (NM-HDV-1E1-30)	All Cisco 2600 series platforms
	1-port enhanced 30-channel E1 high-density voice network module (NM-HDV-1E130E)	All Cisco 2600 series platforms
	2-port 60-channel high-density voice network module (NM-HDV-2E1-60)	All Cisco 2600 series platforms
	1-port 12-channel E1 voice and fax	All Cisco 2600 series platforms

Table 4 Supported Interfaces for the Cisco 2600 Series Routers (continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
Dial, ISDN, and Channelized Serial Network Modules	1-port High-Speed Serial Interface (HSSI) network module	Cisco 2691
	1- or 2-port channelized T1/ISDN PRI (NM-1CT1, NM-2CT1)	All Cisco 2600 series platforms
	1- or 2-port channelized T1/ISDN PRI with CSU (NM-1CT1-CSU, NM-2CT1-CSU)	All Cisco 2600 series platforms
	1- or 2-port channelized E1/ISDN PRI balanced (NM1CE1B, NM-2CE1B)	All Cisco 2600 series platforms
	1- or 2-port channelized E1/ISDN PRI unbalanced (NM1CE1U, NM-2CE1U)	All Cisco 2600 series platforms
	1- or 2-port channelized E1/T1/ISDN-PRI network modules (NM-1CE1T1-PRI and NM-2CE1T1-PRI)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	4- or 8-port ISDN BRI S/T interface (NM-4B-S/T, NM-8B-S/T)	All Cisco 2600 series platforms
	4- or 8-port ISDN BRI U (NT-1) interface (NM-4B-U, NM-8B-U)	All Cisco 2600 series platforms
	8- or 16-port analog modems (NM-8AM, NM-8AM-V2, NM-16AM, NM-16AM-V2)	All Cisco 2600 series platforms
EtherSwitch Service Modules	One 16-port 10/100 Cisco EtherSwitch service module w/802.3af, one 10/100/1000 port, and IP Base (NME-16ES-1G-P)	Cisco 2691
	One 16-port 10/100 Cisco EtherSwitch service module, one 10/100/1000 port, and IP Base (NME-16ES-1G)	Cisco 2691

Table 4 Supported Interfaces for the Cisco 2600 Series Routers (continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
T1/E1 Multiflex Voice/WAN Interface Cards[3]	1-port T1 multiflex trunk interface (VWIC-1MFT-T1)	All Cisco 2600 series platforms
	1-port E1 multiflex trunk interface (VWIC-1MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface (VWIC-2MFT-T1)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface (VWIC-2MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface with drop and insert (VWIC-2MFT-T1-DI)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface with drop and insert (VWIC-2MFT-E1-DI)	All Cisco 2600 series platforms
	1-port T1/E1 multiflex trunk voice/WAN interface card (VWIC2-1MFT-T1/E1)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	2-port T1/E1 multiflex trunk voice/WAN interface card (VWIC2-2MFT-T1/E1)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	1-port G.703 multiflex trunk voice/WAN interface card (VWIC2-1MFT-G703)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	2-port G.703 multiflex trunk voice/WAN interface card (VWIC2-2MFT-G703)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	32-channel multiflex trunk dedicated echo cancellation module (ECAN Modules) (EC-MFT-32)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	64-channel multiflex trunk dedicated echo cancellation module (ECAN Modules) (EC-MFT-64)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
Other Network Modules	Contact Closure Network Module (NM-AIC-64)	All Cisco 2600 and Cisco 3600 series platforms

Table 4 Supported Interfaces for the Cisco 2600 Series Routers (continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
Voice/Fax Interface Cards	1- or 2-port voice/fax network module (NM-1V, NM-2V, NM-HD-1V, NM-HD-2V, NM-HD-2VE)	All Cisco 2600 series platforms
	Cisco Unity Express voice mail network module (NM-CUE)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	1-slot high-density T1/E1 voice interface card slots[4]	All Cisco 2600 series platforms
	2-port FXS voice/fax interface card (VIC-2FXS)[5]	All Cisco 2600 series platforms with NM-1V or NM-2V network modules
	2-port FXS voice/fax interface card (VIC2-2FXS)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network modules
	2-port E&M voice/fax interface card (VIC-2E/M)[5]	All Cisco 2600 series platforms with NM-1V or NM-2V network modules
	2-port E&M voice/fax interface card (VIC2-2E/M)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network modules
	2-port FXO voice/fax interface card (VIC-2FXO, VIC-2FXO-M3, and VIC-2FXO-EU)[5]	All Cisco 2600 series platforms with NM-1V or NM-2V network modules
	2-port universal FXO voice/fax interface card (VIC-2FXO)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network modules
	4-port FXS/DID voice/fax interface card (VIC2-4FXS/DID)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network modules
	4-port universal FXO voice/fax interface card (VIC2-4FXO)	All Cisco 2600 series platforms with NM-HD-1V, NM-HD-2V, or NM-HD-2VE network modules
WAN Interface Cards	1-port ADSL WAN interface card (WIC-1ADSL)	All Cisco 2600 series platforms
	1-port ADSL over ISDN WAN interface card (WIC-1ADSL-I-DG)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691

Table 4 Supported Interfaces for the Cisco 2600 Series Routers (continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
	1-port ADSL over POTS with dying gasp (WIC-1ADSL-DG)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	1-port G.SHDSL WAN interface card (WIC-1SHDSL)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	1-port G.SHDSL with 4-wire support WAN interface card (WIC-1SHDSL-V2)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	1-port G.SHDSL with 4-wire support WAN interface card (WIC-1SHDSL-V3)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM, Cisco 2691
	1-port ISDN BRI S/T interface (requires external NT-1) (WIC-1B-S/T, WIC-1B-S/T-V3)	All Cisco 2600 series platforms
	1-port ISDN BRI (NT-1) U (WIC-1B-U, WIC-1B-U-V2)	All Cisco 2600 series platforms
	1-port 56/64-kbps DSU/CSU	All Cisco 2600 series platforms
	1-port T1/fractional T1 with DSU/CSU WAN interface card (WIC-1DSU-T1, WIC-1DSU-T1-V2)	All Cisco 2600 series platforms
	1-port high-speed serial (up to 2.048 Mbps) (WIC-1T)	All Cisco 2600 series platforms
	2-port dual high-speed serial (up to 8 Mbps; asynchronous/synchronous support) (WIC-2T)	All Cisco 2600 series platforms
	2-port asynchronous/synchronous (up to 128 kbps) (WIC-2A/S)	All Cisco 2600 series platforms

Table 4 Supported Interfaces for the Cisco 2600 Series Routers (continued)

Interface, Network Module, or Data Rate[1]	Product Description	Supported Platforms
Advanced Integration Module	Data compression AIM (up to 8.192 Mbps) (AIM-COMPR2 and AIM-COMPR2-V2)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM
	Data compression AIM (up to 16.384 Mbps) (AIM-COMPR4)	Cisco 2691
	DES/3DES/AES VPN encryption and compression module (AIM-VPN/BPii-PLUS)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM
	Enhanced Performance Hardware encryption AIM (AIM-VPN/EP, AIM-VPN/EPII, AIM-VPN/EPII-PLUS)	Cisco 2691
	Hardware encryption AIM (AIM-VPN/BP, AIM-VPN/BPII, AIM-VPN/BPII-PLUS)	Cisco 2610XM, Cisco 2611XM, Cisco 2620XM, Cisco 2621XM, Cisco 2650XM, Cisco 2651XM
Content Engine Network Modules	NM-CE-BP-40G-K9, Content Engine NM-Basic Perf-40GB	All Cisco 2600 series platforms
	NM-CE-BP-80G-K9, Content Engine NM-Basic Perf-80GB	All Cisco 2600 series platforms
	NM-CE-BP-SCSI-K9, Content Engine NM-Basic Perf-SCSI	All Cisco 2600 series platforms

1. The voice/fax and ATM network modules require Cisco IOS Plus feature sets.
2. See T1/E1 multiflex voice/WAN interface cards in this table.
3. T1 and E1 multiflex voice/WAN interface cards can be used in a chassis slot or installed in a high-density voice network module.
4. Uses the VWIC-MFT T1/E1 interface cards.
5. Requires the NM-1V or NM-2V network module.

Other Firmware Code

The latest version of analog modem firmware for the Cisco 2600 series supports the internal analog modems (both NM-16AM and NM-8AM) in a wide range of countries, starting with Cisco IOS Release 11.3(5)T. The latest firmware (version 1.2.0) also supports dial-out and fax-out.

Additional information can be found on Cisco.com:

Technical Documents: Documentation Home Page: Access Servers and Access Routers: Modular Access Routers: Cisco 2600 Series Routers: Analog Modem Firmware

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco 2800 Series Routers

This section contains the following sections with information that is specific to the Cisco 2800 series routers:

Introduction

Cisco IOS Release 12.3(8)T4 introduces and supports the Cisco 2800 series integrated services routers.

The Cisco 2800 series integrated services routers include the Cisco 2801, Cisco 2811, Cisco 2821, and Cisco 2851 routers. These routers differ as follows:

- Cisco 2801 routers support two HWIC/WIC/VIC/VWIC slots capable of supporting double-wide HWICs, one WIC/VWIC/VIC slot, one VWIC/VIC (voice only) slot, two advanced integration modules (AIMs), two packet voice data modules (PVDMs), two Fast Ethernet connections, and 16 ports of IP phone power output.
- Cisco 2811 routers support one single network module enhanced (NME), four single or two double high-speed WAN interface cards (HWICs), two AIMs, two PVDMs, two Fast Ethernet connections, and 24 ports of IP phone power output.
- In Cisco 2821 routers, the network module slot adds support for a single network module enhanced extended (NME-X), and an additional slot supports an extension voice module (EVM); three PVDMs are supported; the LAN ports support two Gigabit Ethernet ports; and 36 ports of IP phone power output are available.
- In Cisco 2851 routers, the network module slot adds support for network module double-wide (NMDs) and network module enhanced extended double-wide (NME-XDs), and the IP phone power output is increased to 48 ports.

A High Density Extension Module (HDEM) operates in the EVM slot on the Cisco 2821 and Cisco 2851 routers. The EVM slot supports additional voice services and density without consuming the network module slot on those routers.

Memory Recommendations

For memory recommendations for the Cisco 2800 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco 2800 series routers:

- Cisco 2801
- Cisco 2811
- Cisco 2821
- Cisco 2851

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

Table 5 lists the supported interfaces for the Cisco 2800 series routers for Cisco IOS Release 12.4.

Table 5 Supported Modules and Interface Cards for the Cisco 2800 Series Routers

Network Module/ Interface Card	Product Description	Supported Platforms
Ethernet Switching Network Modules		
NM-16ESW	16-port 10/100 Cisco EtherSwitch Network Module	Cisco 2811, Cisco 2821, Cisco 2851
NM-16ESW-1GIG	16-port 10/100 Cisco EtherSwitch Network Module with one Gigabit Ethernet (1000BASE-T) port	Cisco 2811, Cisco 2821, Cisco 2851
NM-16ESW-PWR	16-port 10/100 Cisco EtherSwitch Network Module with in-line power support	Cisco 2811, Cisco 2821, Cisco 2851
NM-16ESW-PWR-1GIG	16-port 10/100 Cisco EtherSwitch Network Module with in-line power and Gigabit Ethernet	Cisco 2811, Cisco 2821, Cisco 2851
NMD-36ESW	36-port 10/100 Cisco EtherSwitch High-Density Services Module (HDSM)	Cisco 2851
NMD-36ESW-2GIG	36-port 10/100 Cisco EtherSwitch HDSM with 1 Gigabit Ethernet (1000BASE-T) port	Cisco 2851
NMD-36ESW-PWR	36-port 10/100 Cisco EtherSwitch HDSM with in-line power support	Cisco 2851
NMD-36ESW-PWR-2G	36-port 10/100 Cisco EtherSwitch HDSM with in-line power and Gigabit Ethernet	Cisco 2851
NME-16ES-1G	One 16-port 10/100 Cisco EtherSwitch service, one 10/100/1000 port, and IP Base	Cisco 2811, Cisco 2821, Cisco 2851
NME-16ES-1G-P	One 16-port 10/100 Cisco EtherSwitch service module with 802.3af, one 10/100/1000 port, and IP Base	Cisco 2811, Cisco 2821, Cisco 2851
NME-X-23ES-1G	One 23-port 10/100 Cisco EtherSwitch service module, one 10/100/1000 port w/ 802.3af, and IP Base	Cisco 2821, Cisco 2851
NME-X-23ES-1G-P	One 23-port 10/100 Cisco EtherSwitch service module with 802.3af, one 10/100/1000 port w/ 802.3af, and IP Base	Cisco 2821, Cisco 2851
NME-XD-24ES-1S-P	One 24-port 10/100 Cisco EtherSwitch service module with 802.3af, one SFP, Cisco StackWise connectors, and IP Base	Cisco 2851
NME-XD-48ES-2S-P	One 48-port 10/100 Cisco EtherSwitch service module with 802.3af, two SFPs, and IP Base	Cisco 2851
Serial Connectivity Network Modules		
NM-1T3/E3	1-port clear-channel T3/E3 network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-1HSSI	1-port High-Speed Serial Interface (HSSI) network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-4A/S	4-port asynchronous/synchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851

Table 5 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (continued)

Network Module/ Interface Card	Product Description	Supported Platforms
NM-8A/S	8-port asynchronous/synchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-16A/S	16-port asynchronous/synchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-16A	16-port asynchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-32A	32-port asynchronous serial network module	Cisco 2811, Cisco 2821, Cisco 2851
Channelized T1/E1 and ISDN Network Modules		
NM-1CE1T1-PRI	1-port Channelized E1/T1/ISDN PRI network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-2CE1T1-PRI	2-port Channelized E1/T1/ISDN PRI network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-4B-S/T	4-port ISDN BRI network module (S/T interface)	Cisco 2811, Cisco 2821, Cisco 2851
NM-4B-U	4-port ISDN BRI network module with integrated Network Termination 1 (NT1) (U interface)	Cisco 2811, Cisco 2821, Cisco 2851
NM-8B-S/T	8-port ISDN BRI network module (S/T interface)	Cisco 2811, Cisco 2821, Cisco 2851
NM-8B-U	8-port ISDN BRI network module with integrated NT1 (U interface)	Cisco 2811, Cisco 2821, Cisco 2851
ATM Network Modules		
NM-1A-T3	1-port DS-3 ATM network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-1A-E3	1-port E3 ATM network module	Cisco 2811, Cisco 2821, Cisco 2851
Analog Dialup and Remote Access Network Modules		
NM-8AM-V2	8-port analog modem network module with V.92	Cisco 2811, Cisco 2821, Cisco 2851
NM-16AM-V2	16-port analog modem network module with V.92	Cisco 2811, Cisco 2821, Cisco 2851
Voice Network Modules and Accessories		
NM-HD-1V	1-slot IP Communications voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HD-2V	2-slot IP Communications enhanced voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HD-2VE	2-slot IP Communications enhanced voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDA-4FXS	High-density analog voice and fax network module with four FXS slots	Cisco 2811, Cisco 2821, Cisco 2851

Table 5 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (continued)

Network Module/ Interface Card	Product Description	Supported Platforms
NM-HDV2	IP Communications high-density voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV2-1T1/E1	1-port T1/E1 IP Communications high-density voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV2-2T1/E1	2-port T1/E1 IP Communications high-density voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV=	High-Density Voice/Fax Network Module (Single VIC Slot)	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1T1-12	1-port 12-channel T1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1T1-24	1-port 24-channel T1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1T1-24E	Single-port 24 enhanced channel T1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-2T1-48	2-port 48-channel T1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1E1-12	1-port 12-channel E1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1E1-30	1-port 30-channel E1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1E1-30E	1-port 30-enhanced-channel E1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-2E1-60	2-port 60-channel E1 voice and fax network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1J1-30	1-port 30-channel J1 high-density voice network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-1J1-30E	1-port 30-enhanced-channel J1 high-density voice network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-FARM-C36	36-port transcoding and conferencing DSP farm	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-FARM-C54	54-port transcoding and conferencing DSP farm	Cisco 2811, Cisco 2821, Cisco 2851
NM-HDV-FARM-C90	90-port transcoding and conferencing DSP farm	Cisco 2811, Cisco 2821, Cisco 2851
Application Network Modules		
NM-CE-BP-40G-K9	Cisco Content Engine Network Module basic performance, 40-GB IDE hard disk	Cisco 2811, Cisco 2821, Cisco 2851
NM-CE-BP-80G-K9	Cisco Content Engine Network Module basic performance, 80-GB IDE hard disk	Cisco 2811, Cisco 2821, Cisco 2851
NM-CE-BP-SCSI-K9	Cisco Content Engine Network Module basic performance, Small Computer System Interface (SCSI) controller	Cisco 2811, Cisco 2821, Cisco 2851

Table 5 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (continued)

Network Module/ Interface Card	Product Description	Supported Platforms
NM-CIDS-K9	Cisco IDS Network Module	Cisco 2811, Cisco 2821, Cisco 2851
NM-CUE	Cisco Unity Express Voice-Mail Network Module	Cisco 2811, Cisco 2821, Cisco 2851
NM-NAM	Cisco 2600, 3660, 3700 series network analysis module	Cisco 2811, Cisco 2821, Cisco 2851
Alarm Monitoring and Control Network Modules and Accessories		
NM-AIC-64	Alarm monitoring and control network module	Cisco 2811, Cisco 2821, Cisco 2851
Circuit Emulation over IP (CEoIP) Network Modules		
NM-CEM-4SER	4-port serial Circuit Emulation over IP (CEoIP) network module	Cisco 2811, Cisco 2821, Cisco 2851
NM-CEM-T4E1	4-port T1/E1 Circuit Emulation over IP (CEoIP) network module	Cisco 2811, Cisco 2821, Cisco 2851
Extension Voice Module		
EM-4BRI-NT/TE	4-port voice and fax expansion module, BRI (NT and TE)	Cisco 2821, Cisco 2851
EM-HDA-3FXS/4FXO	7-port voice and fax expansion module, 3FXS/4FXO	Cisco 2821, Cisco 2851
EM-HDA-6FXO	6-port voice and fax expansion module, FXO	Cisco 2821, Cisco 2851
EM-HDA-8FXS	8-port voice and fax expansion module, FXS	Cisco 2821, Cisco 2851
EVM-HD-8FXS/DID	High-density voice/fax extension module, 8FXS/DID	Cisco 2821, Cisco 2851
Ethernet Switching HWICs		
HWIC-4ESW	4-port single-wide 10/100BASE-T Ethernet switch HWIC	All Cisco 2800 series platforms
HWIC-D-9ESW	9-port double-wide 10/100BASE-T Ethernet switch HWIC	All Cisco 2800 series platforms
HWIC-4ESW-POE	4-port Ethernet switch HWIC, Power over Ethernet capable	All Cisco 2800 series platforms
HWIC-D-9-ESW-POE	9-port Ethernet switch HWIC, Power over Ethernet capable	All Cisco 2800 series platforms
Gigabit Ethernet HWICs		
HWIC-1GE-SFP		Cisco 2811, Cisco 2821, Cisco 2851
Serial WICs and HWICs		
WIC-1T	1-port high-speed serial WIC	All Cisco 2800 series platforms
WIC-2T	2-port high-speed serial WIC	All Cisco 2800 series platforms
WIC-2A/S	2-port asynchronous/synchronous serial WIC	All Cisco 2800 series platforms
HWIC-4T	Four high-speed serial ports	All Cisco 2800 series platforms
HWIC-4A/S	Four low-speed asynchronous/synchronous serial ports	All Cisco 2800 series platforms
HWIC-8A/S-232	Eight low-speed asynchronous/synchronous serial ports, EIA-232 only	All Cisco 2800 series platforms
HWIC-8A	Eight asynchronous EIA-232 serial ports	All Cisco 2800 series platforms
HWIC-16A	Sixteen asynchronous EIA-232 serial ports	All Cisco 2800 series platforms

Table 5 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (continued)

Network Module/ Interface Card	Product Description	Supported Platforms
CSU/DSU WICs		
WIC-1DSU-T1-V2	1-port T1/Fractional-T1 DSU/CSU WIC	All Cisco 2800 series platforms
WIC-1DSU-56K4	1-port 4-wire 56/64-kbps CSU/DSU WIC	All Cisco 2800 series platforms
ISDN BRI WICs		
WIC-1B-U-V2	1-port ISDN BRI with integrated NT1 (U interface)	All Cisco 2800 series platforms
WIC-1B-S/T-V3	1-port ISDN BRI with S/T interface	All Cisco 2800 series platforms
DSL WAN Interface Cards		
WIC-1ADSL	1-port asymmetric DSL (ADSL) over POTS service WIC	All Cisco 2800 series platforms
WIC-1ADSL-DG	1-port ADSL over basic telephone service with dying-gasp WIC	All Cisco 2800 series platforms
WIC-1ADSL-1-DG	1-port ADSL over ISDN with dying-gasp WIC	All Cisco 2800 series platforms
WIC-1SHDSL	1-port G.SHDSL WIC (two wire only)	All Cisco 2800 series platforms
WIC-1SHDSL-V2	1-port G.SHDSL WIC (two- or four-wire)	All Cisco 2800 series platforms
WIC-1SHDSL-V3	1-port G.SHDSL WIC (4-wire)	All Cisco 2800 series platforms
Analog Modem WICs		
WIC-1AM	1-port analog modem WIC	All Cisco 2800 series platforms
WIC-2AM	2-port analog modem WIC	All Cisco 2800 series platforms
T1, E1, and G.703 Multiflex Trunk Voice Cards and WICs		
VWIC-1MFT-T1	1-port RJ-48 multiflex trunk-T1	All Cisco 2800 series platforms
VWIC-2MFT-T1	2-port RJ-48 multiflex trunk-T1	All Cisco 2800 series platforms
VWIC-2MFT-T1-DI	2-port RJ-48 multiflex trunk-T1with drop and insert	All Cisco 2800 series platforms
VWIC-1MFT-E1	1-port RJ-48 multiflex trunk-E1	All Cisco 2800 series platforms
VWIC-1MFT-G703	1-port RJ-48 multiflex trunk-G.703	All Cisco 2800 series platforms
VWIC-2MFT-E1	2-port RJ-48 multiflex trunk-E1	All Cisco 2800 series platforms
VWIC-2MFT-E1-DI	2-port RJ-48 multiflex trunk-E1 with drop and insert	All Cisco 2800 series platforms
VWIC-2MFT-G703	2-port RJ-48 multiflex trunk-G.703	All Cisco 2800 series platforms
VWIC2-1MFT-T1/E1	1-port T1/E1 multiflex trunk voice/WAN interface card	All Cisco 2800 series platforms
VWIC2-2MFT-T1/E1	2-port T1/E1 multiflex trunk voice/WAN interface card	All Cisco 2800 series platforms
VWIC2-1MFT-G703	1-port G.703 multiflex trunk voice/WAN interface card	All Cisco 2800 series platforms
VWIC2-2MFT-G703	2-port G.703 multiflex trunk voice/WAN interface card	All Cisco 2800 series platforms
EC-MFT-32	32-channel multiflex trunk dedicated echo cancellation module (ECAN modules)	All Cisco 2800 series platforms
EC-MFT-64	64-channel multiflex trunk dedicated echo cancellation module (ECAN modules)	All Cisco 2800 series platforms
VICs		
VIC-2DID	2-port DID voice and fax interface card	All Cisco 2800 series platforms

Table 5 Supported Modules and Interface Cards for the Cisco 2800 Series Routers (continued)

Network Module/ Interface Card	Product Description	Supported Platforms
VIC-1J1	1-port digital VIC 1J1 for Japan	Cisco 2811, Cisco 2821, Cisco 2851
VIC-4FXS/DID	4-port FXS or DID VIC	All Cisco 2800 series platforms
VIC2-2FXS	2-port FXS—VIC	All Cisco 2800 series platforms
Interface-Card Support		
VIC2-2FXO	2-port VIC-FXO (universal)	All Cisco 2800 series platforms
VIC2-4FXO	4-port VIC-FXO (universal)	All Cisco 2800 series platforms
VIC2-2E/M	2-port VIC-E&M	All Cisco 2800 series platforms
VIC2-2BRI-NT/TE	2-port VIC card-BRI (NT and TE)	All Cisco 2800 series platforms
Advanced Integration Modules		
AIM-ATM	High-performance ATM SAR AIM	Cisco 2811, Cisco 2821, Cisco 2851
AIM-COMPR2-V2	Data compression AIM	Cisco 2811, Cisco 2821, Cisco 2851
AIM-CUE	Cisco Unity Express Voice-Mail AIM	All Cisco 2800 series platforms
AIM-VPN/EPII-PLUS	Enhanced-performance DES, 3DES, AES, and compression VPN encryption AIM	All Cisco 2800 series platforms
DSP (PVDM) Support on Motherboard Slots		
PVDM2-8	8-channel fax and voice DSP module	All Cisco 2800 series platforms
PVDM2-16	16-channel fax and voice DSP module	All Cisco 2800 series platforms
PVDM2-32	32-channel fax and voice DSP module	All Cisco 2800 series platforms
PVDM2-48	48-channel fax and voice DSP module	All Cisco 2800 series platforms
PVDM2-64	64-channel fax and voice DSP module	All Cisco 2800 series platforms

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Additional Notes for the Cisco 2800 Series Routers

This section contains important information about using the Cisco 2800 series routers with Cisco IOS Release 12.4 software.

CRC Errors Reported on Onboard Gigabit Ethernet Interfaces (CSCsb64900)

On a Cisco 2800 series router with an onboard Gigabit Ethernet interface, when the GE port is configured for half duplex and is connected to a hub (not a switch), then, under load, the interface may report collisions as Cyclic Redundancy Check (CRC) errors. These reported errors are cosmetic and are not associated with packet loss. This problem does not affect other platforms.

Cisco 3200 Series Mobile Access Routers

This section contains the following sections with information that is specific to the Cisco 3200 series routers:

Introduction

The Cisco 3200 series of wireless and mobile access routers offer secure data, voice, and video communications across a wide range of different wireless and wired networks. These routers deliver *always on* IP connectivity for networks in motion. They support Cisco IOS Mobile Networks, and enable these networks to *hide* the IP roaming from the local IP nodes. This, in turn, enables IP hosts on a mobile network to connect transparently to the parent network while a router is in motion. The Cisco 3200 series routers are highly ruggedized, can be installed in harsh environments with the proper enclosure, and are intended to be mounted in a vehicle.

For detailed information about the Cisco 3200 series routers, see the documents at the following location:

http://www.cisco.com/univercd/cc/td/doc/product/access/mar_3200/index.htm

Memory Recommendations

For memory recommendations for the Cisco 3200 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco 3200 series routers:

- Cisco 3220

  The Cisco 3220 is a preconfigured model designed for volume deployments in public safety and transportation with one WMIC as an optional bundle.

- Cisco 3250

  The Cisco 3250 is a fully configurable model designed for defense customers and command and control vehicles with interface card combinations that allow for more numerous serial or FE port combinations.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

The following Cisco cards are supported on the Cisco 3200 series routers:

- The Mobile Access Router Card (MARC), which includes the host processor, memory, one 10/100 Ethernet port, one console port, and one auxiliary port.
- The Serial Mobile Interface Card (SMIC), which supports either two or four synchronous/asynchronous serial ports.
- The Fast Ethernet Switch Mobile Interface Card (FESMIC), which supports either two or four autosensing switched ports and LEDs.
- The Wireless Mobile Interface Card (WMIC), which provides one autosensing 10/100 Ethernet port, an 802.11g radio, and connectors for tri-color LEDs.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco 3600 Series Routers

This section contains the following sections with information that is specific to the Cisco 3600 series routers:

Introduction

The Cisco 3600 series includes the Cisco 3631, Cisco 3640, Cisco 3640A, and Cisco 3660 routers. As modular solutions, the Cisco 3600 series routers enable corporations to increase dialup density and take advantage of current and emerging WAN technologies and networking capabilities. The Cisco 3600 series routers are fully supported by Cisco IOS software, which includes dialup connectivity, LAN-to-LAN routing, data and access security, WAN optimization, and multimedia features.

Memory Recommendations

For memory recommendations for the Cisco 3600 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Note An update to Flash memory to 64MB in Cisco IOS Release 12.4(12) has been made for the following images:

c3660-ix-mz
c3660-bino3s-mz

This increase in Flash memory was due to the increased image size seen between Cisco IOS Release 12.4(10) and Release 12.4(12).

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco 3600 series routers:

- Cisco 3631
- Cisco 3640 and Cisco 3640A
- Cisco 3660 (Cisco 3661 and Cisco 3662)

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 6 lists the supported interfaces for the Cisco 3600 series routers for Cisco IOS Release 12.4.

Table 6 Supported Interfaces for the Cisco 3600 Series Routers

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
Dial Access Network Modules	16- and 32-port asynchronous (NM-16A and NM-32A)	All Cisco 3600 series platforms
	4- and 8-port synchronous/asynchronous (NM-4A/S and NM-8A/S)	All Cisco 3600 series platforms
	6- to 30-port integrated digital modems network modules (NM-6DM, NM-12-DM, NM-18DM, NM-24DM, NM-30DM)	All Cisco 3600 series platforms except the Cisco 3631
	6 digital modem upgrade (MICA-6MOD)	All Cisco 3600 series platforms except the Cisco 3631
	8- or 16-port integrated analog network modules (NM-8AM and NM-16AM)	All Cisco 3600 series platforms except the Cisco 3631
LAN Interfaces	1- and 4-port Ethernet (AUI and 10BASE-T, NM-1E, and NM-4E)	All Cisco 3600 series platforms except the Cisco 3631
	1-port Fast Ethernet (100BASE-TX and 100BASE-FX, NM-1FE-TX, NM-1FE-FX, and NM-1FE-FX-V2)[1]	All Cisco 3600 series platforms except the Cisco 3631
	Gigabit Ethernet network module (NM-1GE) with 1 GBIC slot	Cisco 3660 only
Fast Ethernet Switch Network Modules	16-port Ethernet Switch Module for 2600 or 3600 (NM-16ESW)	All Cisco 3600 series platforms except the Cisco 3631
	36-port Ethernet Switch Module (NM-36ESW)	Cisco 3660 only

Table 6 Supported Interfaces for the Cisco 3600 Series Routers (continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
Mixed Media Network Modules	1-port 10/100BASE-TX with 1-port channelized/PRI/E1 balanced mode (NM-1FE1CE1B)	All Cisco 3600 series platforms except the Cisco 3631
	1-port 10/100BASE-TX with 1-port channelized/PRI/E1 unbalanced mode (NM-1FE1CE1U)	All Cisco 3600 series platforms except the Cisco 3631
	1-port 10/100BASE-TX with 1-port channelized/PRI/T1 (NM-1FE1CT1)	All Cisco 3600 series platforms except the Cisco 3631
	1-port 10/100BASE-TX with 1-port channelized/PRI/T1 with CSU (NM-1FE1CT1-CSU)	All Cisco 3600 series platforms except the Cisco 3631
	1-port 10/100BASE-TX with 2-port channelized/PRI/E1 balanced mode (NM-1FE2CE1B)	All Cisco 3600 series platforms except the Cisco 3631
	1-port 10/100BASE-TX with 2-port channelized/PRI/E1 unbalanced mode (NM-1FE2CE1U)	All Cisco 3600 series platforms except the Cisco 3631
	1-port 10/100BASE-TX with 2-port channelized/PRI/T1 (NM-1FE2CT1)	All Cisco 3600 series platforms except the Cisco 3631
	1-port 10/100BASE-TX with 2-port channelized/PRI/T1 with CSU (NM-1FE2CT1-CSU)	All Cisco 3600 series platforms except the Cisco 3631
	1 Ethernet and 2 WAN card slots (NM-1E2W)	All Cisco 3600 series platforms except the Cisco 3631
	1 Ethernet, 1 Token Ring, and 2 WAN card slots (NM-1E1R2W)	All Cisco 3600 series platforms except the Cisco 3631
	2 Ethernet and 2 WAN card slots (NM-2E2W)	All Cisco 3600 series platforms except the Cisco 3631
	1-port Fast Ethernet, 1-port Token Ring with 2 WAN card slots (NM-1FE1R2W)	All Cisco 3600 series platforms except the Cisco 3631
	1-port Fast Ethernet with 2 WAN card slots (NM-1FE2W and NM-1F2W-V2)	All Cisco 3600 series platforms
	2-port Fast Ethernet with 2 WAN card slots (NM-2FE2W and NM-2FE2W-V2)	All Cisco 3600 series platforms
	2 WAN card slots (NM-2W)	All Cisco 3600 series platforms

Table 6 Supported Interfaces for the Cisco 3600 Series Routers (continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
ATM Network Modules[2]	1-port ATM-25 network module (NM-1ATM-25)	All Cisco 3600 series platforms except the Cisco 3631
	1-port ATM T3 network module (NM-1A-T3)	All Cisco 3600 series platforms except the Cisco 3631
	4-port T1 ATM network module with IMA (NM-4T1-IMA)	All Cisco 3600 series platforms
	4-port E1 ATM network module with IMA (NM-4E1-IMA)	All Cisco 3600 series platforms
	8-port T1 ATM network module with IMA (NM-8T1-IMA)	All Cisco 3600 series platforms
	8-port E1 ATM network module with IMA (NM-8E1-IMA)	All Cisco 3600 series platforms
	1-port ATM E3 network module (NM-1A-E3)	All Cisco 3600 series platforms except the Cisco 3631
	1-port ATM OC-3 network module with multimode fiber (NM-1A-OC3MM)	All Cisco 3600 series platforms except the Cisco 3631
	1-port ATM OC-3 network module with single-mode intermediate reach fiber (NM-1A-OC3SMI)	All Cisco 3600 series platforms except the Cisco 3631
	1-port ATM OC-3 network module with single-mode long reach fiber (NM-1A-OC3SML)	All Cisco 3600 series platforms except the Cisco 3631
	1-port ATM OC-3 multimode network module and circuit emulation service (NM-1A-OC3MM-1V)[3]	All Cisco 3600 series platforms except the Cisco 3631
	1-port ATM OC-3 single-mode, intermediate reach network module and circuit emulation service (NM-1A-OC3SMI-1V)[3]	All Cisco 3600 series platforms except the Cisco 3631
	1-port ATM OC-3 single-mode, long reach network module and circuit emulation service (NM-1A-OC3SML-1V)[3]	All Cisco 3600 series platforms except the Cisco 3631

Table 6 Supported Interfaces for the Cisco 3600 Series Routers (continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
Digital T1/E1 Packet Voice Trunk Network Modules and Spare Components	1-port 24-channel T1 voice/fax module supports 24 channels of medium-complexity codecs (G.729a/b, G.726, G.711, and fax) or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, two PVDM-12s, and one VWIC-1MFT-T1.[4] Part number: NM-HDV-1T1-24.	All Cisco 3600 series platforms except the Cisco 3631
	1-port enhanced 24-channel T1 voice/fax module supports 24 channels of high- and medium-complexity codecs: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax. Consists of one NM-HDV, four PVDM-12s, and one VWIC-1MFT-T1.[3] Part number: NM-HDV-1T1-24E.	All Cisco 3600 series platforms except the Cisco 3631
	2-port 48-channel T1 voice/fax module supports add/drop multiplexing (drop and insert); 48 channels of medium-complexity codecs (G.729a/b, G.726, G.711, and fax) or 24 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, four PVDM-12s, and one VWIC-2MFT-T1-DI.[3] Part number: NM-HDV-2T1-48.	All Cisco 3600 series platforms except the Cisco 3631
	1-port 30-channel E1 voice/fax module supports 30 channels of G.729a/b, G.726, G.711, and fax or 18 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, three PVDM-12s, and one VWIC-1MFT-E1.[4] Part number: NM-HDV-1E1-30(=).	All Cisco 3600 series platforms except the Cisco 3631
	1-port enhanced 30-channel E1 voice/fax module supports 30 channels of G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax. Consists of one NM-HDV, five PVDM-12s, and one VWIC-1MFT-E1.[4] Part number: NM-HDV-1E1-30E(=).	All Cisco 3600 series platforms except the Cisco 3631
	2-port, 60-channel E1 voice/fax module supports add/drop multiplexing (drop and insert); 60 channels of G.729a/b, G.726, G.711, and fax; or 30 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax. Consists of one NM-HDV, five PVDM-12s, and one VWIC-2MFT-E1-D1.[4] Part number: NM-HDV-2E1-60(=).	All Cisco 3600 series platforms except the Cisco 3631
	High-density voice/fax network module spare. Part number: NM-HDV.	Digital T1 packet voice trunk network modules spare component
	12-channel packet voice DSP module upgrade spare. Part number: PVDM-12=.	Digital T1 packet voice trunk network modules spare component
	1-port RJ-48 multiflex trunk—T1 (VWIC-1MFT-T1).[3]	Digital T1 packet voice trunk network modules spare component
	2-port RJ-48 multiflex trunk—T1 (VWIC-2MFT-T1).[3]	Digital T1 packet voice trunk network modules spare component
	2-port RJ-48 multiflex trunk with drop and insert—T1 (VWIC-2MFT-T1-DI(=)).[3]	Digital T1 packet voice trunk network modules spare component

Table 6 Supported Interfaces for the Cisco 3600 Series Routers (continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
T1/E1 Multiflex Voice/WAN Interface Cards	1-port T1 multiflex trunk interface (VWIC-1MFT-T1)	All Cisco 3600 series platforms
	1-port E1 multiflex trunk interface (VWIC-1MFT-E1)	All Cisco 3600 series platforms
	2-port T1 multiflex trunk interface (VWIC-2MFT-T1)	All Cisco 3600 series platforms
	2-port T1 multiflex trunk interface with drop and insert (VWIC-2MFT-T1-DI)[5]	All Cisco 3600 series platforms
	2-port E1 multiflex trunk interface with drop and insert (VWIC-2MFT-E1-DI)	All Cisco 3600 series platforms
Voice/Fax Interfaces and Network Modules[3]	1- and 2-port voice/fax network module (NM-1V and NM-2V)	All Cisco 3600 series platforms except the Cisco 3631
	2-port E&M voice interface card (VIC-2E/M)	All Cisco 3600 series platforms with voice/fax network module except the Cisco 3631
	2-port FXO voice interface card (VIC-2FXO, VIC-2FXO-M3, and VIC-2FXO-EU)	All Cisco 3600 series platforms with voice/fax network module except the Cisco 3631
	2-port FXS voice interface card	All Cisco 3600 series platforms with voice/fax network module except the Cisco 3631
	2-port BRI voice interface card (VIC-2BRI-S/T-TE)	Cisco 3640 and Cisco 3640A platforms with voice/fax network module
WAN Data Rates	48/56/64 kbps	All Cisco 3600 series platforms except the Cisco 3631
	1.544/2.048 Mbps	All Cisco 3600 series platforms except the Cisco 3631
	Up to 8 Mbps on 4-port serial network module	All Cisco 3600 series platforms except the Cisco 3631
	52 Mbps max using HSSI network module	All Cisco 3600 series platforms except the Cisco 3631
	Up to 100 Mbps on ATM OC3 network modules	All Cisco 3600 series platforms except the Cisco 3631

Table 6 Supported Interfaces for the Cisco 3600 Series Routers (continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
ISDN Channelized and Serial Network Modules	1- and 2-port channelized T1 modules without CSUs (NM-1CT1 and NM-2CT1)	All Cisco 3600 series platforms
	1- and 2-port channelized T1 network modules with CSUs (NM-1CT1-CSU and NM-2CT1-CSU)	All Cisco 3600 series platforms
	1- and 2-port E1 network modules unbalanced mode (NM-1CE1U and NM-2CE1U)	All Cisco 3600 series platforms
	1- and 2-port E1 network modules balanced mode (NM-1CE1B and NM-2CE1B)	All Cisco 3600 series platforms
	1-port high-speed serial interface (HSSI) network module	All Cisco 3600 series platforms
	1-port T3/E3 network module (NM-1T3/E3)	Cisco 3660 only
	4- and 8-port BRI network module with NT-1 (NM-4B-U and NM-8B-U)	All Cisco 3600 series platforms
	4- and 8-port BRI network module with S/T interface (NM-4B-S/T and NM-8B-S/T)	All Cisco 3600 series platforms
	4-port serial (NM-4T)	All Cisco 3600 series platforms
Other Network Modules	Compression network module (NM-COMPR)	Cisco 3640 and Cisco 3640A series platforms
	4 E1 data compression Advanced Integration Module (AIM-COMPR4)	Cisco 3660 series platforms
	Hardware encryption network module	All Cisco 3640 and Cisco 3640A series platforms
	Hardware encryption Advanced Integration Module, High Performance (AIM-VPN/HP and AIM-VPN/HPII)	Cisco 3660 platforms only
	Hardware encryption Advanced Integration Module, Extended Performance (AIM-VPN/EPII)	Cisco 3631 only
WAN Interface Cards	1-port ADSL WAN interface card	All Cisco 3600 series platforms except the Cisco 3631
	1-port T1/fractional T1/DSU/CSU WAN interface card (WIC-1DSU-T1)	All Cisco 3600 series platforms except the Cisco 3631
	1-port T1/fractional T1 56/64-kbps DSU/CSU WAN interface card (WIC-1DSU-56K4)	All Cisco 3600 series platforms
	1-port ISDN with NT-1 WAN interface card (BRI WIC)[6]	All Cisco 3600 series platforms
	1-port ISDN WAN interface card (WIC-1B-S/T)	All Cisco 3600 series platforms
	1-port serial WAN interface card (WIC-1T)	All Cisco 3600 series platforms except the Cisco 3631
	2-port serial (WIC-2T)[7]	All Cisco 3600 series platforms
	2-port asynchronous/synchronous (WIC-2A/S)	All Cisco 3600 series platforms

Table 6 Supported Interfaces for the Cisco 3600 Series Routers (continued)

Interface, Network Module, or Data Rate	Product Description	Supported Platforms
Content Engine Network Modules	NM-CE-BP-20G-K9, Content Engine NM-Basic Perf-20GB	All Cisco 3600 series platforms except the Cisco 3631
	NM-CE-BP-40G-K9, Content Engine NM-Basic Perf-40GB	All Cisco 3600 series platforms except the Cisco 3631
	NM-CE-BP-SCSI-K9, Content Engine NM-Basic Perf-SCSI	All Cisco 3600 series platforms except the Cisco 3631

1. The NM-1FE-FX network module is end of life. A replacement part, the NM-1FE-FX-V2, will be supported along with the NM-1FE-FX.
2. Requires the Cisco IOS Plus feature sets.
3. For the Cisco 3660 series only, online insertion and removal (OIR) is now supported in Cisco IOS Release 12.4.
4. See T1/E1 multiflex voice/WAN interface cards in this table.
5. For the Cisco 3660 series, only supported in T1/E1 digital packet voice trunk network modules and new Fast Ethernet mixed media network modules: NM-1FE2W, NM-2FE2W, NM-1FE1R2W, NM-2W. For the Cisco 3640, supported in T1/E1 digital packet voice trunk network modules or in 1- or 2-port Ethernet and Fast Ethernet network modules (NM-1E2W, NM-2E2W, NM-1E1R2W, NM-1FE2W, NM-2FE2W, NM-1FE1R2W, NM-2W).
6. The BRI WIC replaces the WIC-1B-U in Cisco IOS Release 12.3T.
7. Supported in Fast Ethernet mixed media network modules: NM-1FE2W, NM-1FE2W-V2, NM-2FE2W, NM-2FE2W-V2, NM-1FE1R2W, NM-2W.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco 3700 Series Routers

This section contains the following sections with information that is specific to the Cisco 3700 series routers:

Memory Recommendations

For memory recommendations for the Cisco 3700 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Note An update to Flash memory to 64MB in Cisco IOS Release 12.4(12) has been made for the following images:

c3725-ipvoice_ivs-mz
c3725-ipvoicek9-mz
c3725-ipvoice-mz
c3725-spservicesk9-mz
c3745-ipvoice_ivs-mz
c3745-ipvoicek9-mz
c3745-ipvoice-mz

This increase in Flash memory was due to the increased image size seen between Cisco IOS Release 12.4(10) and Release 12.4(12).

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco 3700 series routers:

- Cisco 3725 Application Service Router
- Cisco 3745 Application Service Router

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 7 lists the supported interfaces for the Cisco 3700 series routers for Cisco IOS Release 12.4.

Table 7 Supported Interfaces for the Cisco 3700 Series Routers

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
Serial Network Modules		
NM-4A/S	4-port asynchronous/synchronous serial network module	All Cisco 3700 series platforms

Table 7 Supported Interfaces for the Cisco 3700 Series Routers (continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
NM-4T	4-port serial	All Cisco 3700 series platforms
NM-8A/S	8-port asynchronous/synchronous serial network module	All Cisco 3700 series platforms
NM-16A	16-port asynchronous	All Cisco 3700 series platforms
NM-16A/S	16-port asynchronous/synchronous serial network module	All Cisco 3700 series platforms
NM-32A	32-port asynchronous	All Cisco 3700 series platforms
NM-1HSS1	1-port high-speed serial interface module	All Cisco 3700 series platforms
NM-1T3/E3	1-port T3/E3 network module	All Cisco 3700 series platforms
LAN Network Modules and Mixed-Media LAN and WAN		
NM-2W	2 WAN Card Slot Network Module (No LAN)	All Cisco 3700 series platforms
NM-1FE2W, NM-1FE2W-V2	1 10/100 Ethernet 2 WAN Card Slot Network Module	All Cisco 3700 series platforms
NM-1FE1R2W	1 10/100 Ethernet 1 4/16 Token Ring 2 WAN Card Slot Network Module	All Cisco 3700 series platforms
NM-2FE2W, NM-2FE2W-V2	2 10/100 Ethernet 2 WAN Card Slot Network Module	All Cisco 3700 series platforms
NM-1FE-FX	1-port Fast Ethernet Network Module (10/100BASE Fiber only)	All Cisco 3700 series platforms
NM-1FE-FX-V2	1-port Fast Ethernet, revision 2, (100BASE FX interface)	All Cisco 3700 series platforms
NM-1FE-SMF	100BASE-FX Single Mode Fiber Network Module	All Cisco 3700 series platforms
NM-1GE	1-port Gigabit Ethernet Network Module	All Cisco 3700 series platforms
LAN Switching Network Modules		
NM-16ESW	16-port 10/100 Cisco EtherSwitch Network Module	All Cisco 3700 series platforms
NM-16ESW-1GIG	16-port 10/100 Cisco EtherSwitch Network Module with 1 Gigabit Ethernet (1000BASE-T) port	All Cisco 3700 series platforms
NM-16ESW-PWR	16-port 10/100 Cisco EtherSwitch Network Module with in-line power support	All Cisco 3700 series platforms
NM-16ESW-PWR-1GIG	16-port 10/100 Cisco EtherSwitch Network Module with in-line power and Gigabit Ethernet	All Cisco 3700 series platforms
NMD-36-ESW	36-port 10/100 Cisco EtherSwitch High-Density Services Module (HDSM)	All Cisco 3700 series platforms
NMD-36-ESW-2GIG	36-port 10/100 Cisco EtherSwitch HDSM with 1 Gigabit Ethernet (1000BASE-T) port	All Cisco 3700 series platforms
NMD-36-ESW-PWR	36-port 10/100 Cisco EtherSwitch HDSM with in-line power support	All Cisco 3700 series platforms
NMD-36-ESW-PWR-2G	36-port 10/100 Cisco EtherSwitch HDSM with in-line power and Gigabit Ethernet	All Cisco 3700 series platforms
NME-16ES-1G	One 16-port 10/100 Cisco EtherSwitch service module, one 10/100/1000 port, and IP Base	All Cisco 3700 series platforms

Table 7 Supported Interfaces for the Cisco 3700 Series Routers (continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
NME-16ES-1G-P	One 16-port 10/100 Cisco EtherSwitch service module w/802.3af, one 10/100/1000 port, and IP Base	All Cisco 3700 series platforms
Digital Packet Voice and Fax Trunk Network Modules		
NM-HDV-1T1-12	High Density Voice Network Module with 1 VWIC-1MFT-T1 and 1 PVDM-12.	All Cisco 3700 series platforms
NM-HDV-1E1-12	High Density Voice Network Module with 1 VWIC-1MFT-E1 and 1 PVDM-12.	All Cisco 3700 series platforms
NM-HDV-1E1-30	Single-port, 30-channel E1 voice/fax Network Module (supports 30 channels of medium complexity VoCoders: G.729a/b, G.726, G.711, and fax or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax).	All Cisco 3700 series platforms
NM-HDV-1E1-30E	Single-port, enhanced 30-channel E1 voice/fax Network Module (supports 30 channels of high- and medium-complexity VoCoders: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax).	All Cisco 3700 series platforms
NM-HDV-2E1-60	Dual-port, 60-channel E1 voice/fax Network Module (supports 60 channels of medium-complexity VoCoders: G.729a/b, G.726, G.711, and fax or 30 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax). Supports add/drop multiplexing (drop and insert).	All Cisco 3700 series platforms
NM-HDV-1T1-24	Single-port, 24-channel T1 voice/fax Network Module (supports 24 channels of medium-complexity VoCoders: G.729a/b, G.726, G.711, and fax or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax).	All Cisco 3700 series platforms
NM-HDV-1T1-24E	Single-port, enhanced 24-channel T1 voice/fax Network Module (supports 24 channels of high- and medium-complexity VoCoders: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax).	All Cisco 3700 series platforms
NM-HDV-2T1-48	Dual-port, 48-channel T1 voice/fax Network Module (supports 48 channels of medium-complexity VoCoders: G.729a/b, G.726, G.711, and fax or 24 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax). Supports add/drop multiplexing (drop and insert).	All Cisco 3700 series platforms
NM-HDV2	IP Communications High-Density Digital Voice Network Module	All Cisco 3700 series platforms
NM-HDV2-1T1/E1	IP Communications High-Density Digital Voice NM with 1 T1/E1	All Cisco 3700 series platforms
NM-HDV2-2T1/E1	IP Communications High-Density Digital Voice NM with 2 T1/E1	All Cisco 3700 series platforms
Advanced Integration Module (AIM)		
AIM-COMPR4	Data Compression AIM for 3660 series (4 E1 performance)	All Cisco 3700 series platforms
AIM-VPN/HP	DES/3DES VPN Encryption AIM for 3660, High Performance	Cisco 3745 only

Table 7 Supported Interfaces for the Cisco 3700 Series Routers (continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
AIM-VPN/EP	DES/3DES VPN Encryption AIM for 2600, Enhanced Performance	All Cisco 3700 series platforms
AIM-VPN/HPII	DES/3DES VPN Encryption AIM High Performance	Cisco 3745 only
AIM-VPN/EPII	DES/3DES VPN Encryption AIM Extended Performance	Cisco 3725 only
AIM-VPN/HPII-PLUS	DES/3DES/AES VPN Encryption/Compression	Cisco 3745 only
AIM-VPN/EPII-PLUS	DES/3DES/AES VPN Encryption/Compression	Cisco 3725 only
AIM-ATM	ATM SAR AIM	All Cisco 3700 series platforms
AIM-VOICE-30	30-channel DSP AIM	All Cisco 3700 series platforms
AIM-ATM-VOICE-30	ATM SAR with 30-channel DSP AIM	All Cisco 3700 series platforms
Analog Packet Voice and Fax Trunk		
NM-1V	1-slot voice and fax network module	All Cisco 3700 series platforms
NM-2V	2-slot voice and fax network module	All Cisco 3700 series platforms
NM-HD-1V	1-slot voice and fax network module	All Cisco 3700 series platforms
NM-HD-2V	2-slot voice and fax network module	All Cisco 3700 series platforms
NM-HD-2VE	2-slot voice and fax network module	All Cisco 3700 series platforms
NM-HDA	High density analog module	All Cisco 3700 series platforms
Voice Interface Cards		
VIC-2CAMA	2-port CAMA trunk interface card	All Cisco 3700 series platforms
VIC-2FXS	2-port voice interface card—FXS	All Cisco 3700 series platforms
VIC-2FXO	2-port voice interface card—FXO	All Cisco 3700 series platforms
VIC-2FXO-EU	2-port voice interface card—FXO (for Europe)	All Cisco 3700 series platforms
VIC-2FXO-M1	2-port voice interface card—FXO (with battery reversal, for North America)	All Cisco 3700 series platforms
VIC-2FXO-M2	2-port voice interface card—FXO (with battery reversal, for Europe)	All Cisco 3700 series platforms
VIC-2FXO-M3	2-port voice interface card—FXO (for Australia)	All Cisco 3700 series platforms
VIC2-2FXO	2-port universal FXO card with battery reversal for M1, M2, and M3 modes of operation	All Cisco 3700 series platforms
VIC2-4FXO	4-port universal FXO card with battery reversal for M1, M2, and M3 modes of operation	All Cisco 3700 series platforms
VIC2-2FXS	2-port FXS voice/fax interface card	All Cisco 3700 series platforms
VIC-4FXS	4-port FXS voice/fax interface card	All Cisco 3700 series platforms
VIC-2/EM	2-port voice interface card—E&M	All Cisco 3700 series platforms
VIC2-2/EM	2-port voice interface card—E&M	All Cisco 3700 series platforms
VIC-2DID	2-port voice interface card—Direct Inward Dial (DID)	All Cisco 3700 series platforms
VIC-2BRI-S/T-TE	2-port voice interface card—BRI (terminal side)	All Cisco 3700 series platforms
VIC-2BRI-NT/TE	2-port voice interface card—BRI (network side)	All Cisco 3700 series platforms

Table 7 Supported Interfaces for the Cisco 3700 Series Routers (continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
VIC2-2BRI-NT/TE	2-port voice interface card—BRI (network side)	All Cisco 3700 series platforms
ATM Network Modules		
NM-4T1-IMA	4-port T1 ATM network module with Inverse Multiplexing over ATM (IMA)	All Cisco 3700 series platforms
NM-4E1-IMA	4-port E1 ATM network module with IMA	All Cisco 3700 series platforms
NM-8T1-IMA	8-port T1 ATM network module with IMA	All Cisco 3700 series platforms
NM-8E1-IMA	8-port E1 ATM network module with IMA	All Cisco 3700 series platforms
NM-1A-T3	1-port DS3 ATM network module	All Cisco 3700 series platforms
NM-1A-E3	1-port E3 ATM network module	All Cisco 3700 series platforms
NM-1A-OC3-MM	1-port ATM OC-3 network module with multimode fiber	Cisco 3725 only
NM-1A-OC3-SMI	1-port ATM OC-3 network module with single-mode intermediate reach fiber	Cisco 3725 only
NM-1A-OC3-SML	1-port ATM OC-3 network module with single-mode long reach fiber	Cisco 3725 only
NM-1A-OC3-MM-EP	1-port ATM OC-3 network module with multimode fiber Extended Performance	Cisco 3745 only
NM-1A-OC3-SMI-EP	1-port ATM OC-3 network module with single-mode intermediate reach fiber Extended Performance	Cisco 3745 only
NM-1A-OC3-SML-EP	1-port ATM OC-3 network module with single-mode long reach fiber Extended Performance	Cisco 3745 only
Serial WAN Interface Cards		
WIC-1T	1-port serial	All Cisco 3700 series platforms
WIC-2T	2-port serial	All Cisco 3700 series platforms
WIC-2A/S	2-port synchronous/asynchronous (max. speed 128 kbps)	All Cisco 3700 series platforms
WIC-1DSU-56K4	1-port, four-wire 56/64-kbps with CSU/DSU	All Cisco 3700 series platforms
WIC-1DSU-T1	1-port T1 CSU/DSU	All Cisco 3700 series platforms
WIC-1DSU-T1-V2	1-port T1 CSU/DSU	All Cisco 3700 series platforms
Digital Voice/WAN Interface Cards		
VWIC-1MFT-T1	1-port RJ-48 MultiFlex Trunk—T1	All Cisco 3700 series platforms
VWIC-2MFT-T1	2-port RJ-48 MultiFlex Trunk—T1	All Cisco 3700 series platforms
VWIC-2MFT-T1-DI	2-port RJ-48 MultiFlex Trunk—T1 with Drop and Insert	All Cisco 3700 series platforms
VWIC-1MFT-E1	1-port RJ-48 MultiFlex Trunk—E1	All Cisco 3700 series platforms
VWIC-2MFT-E1	2-port RJ-48 MultiFlex Trunk—E1	All Cisco 3700 series platforms
VWIC-2MFT-E1-DI	2-port RJ-48 MultiFlex Trunk—E1 with Drop and Insert	All Cisco 3700 series platforms
VWIC-1MFT-G703	1-port RJ-48 MultiFlex Trunk—E1 unstructured	All Cisco 3700 series platforms
VWIC-2MFT-G703	2-port RJ-48 MultiFlex Trunk—E1 unstructured	All Cisco 3700 series platforms
VWIC2-1MFT-T1/E1	1-port T1/E1 Multiflex Trunk Voice/WAN interface card	All Cisco 3700 series platforms

Table 7 Supported Interfaces for the Cisco 3700 Series Routers (continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
VWIC2-2MFT-T1/E1	2-port T1/E1 Multiflex Trunk Voice/WAN interface card	All Cisco 3700 series platforms
VWIC2-1MFT-G703	1-port G.703 Multiflex Trunk Voice/WAN interface card	All Cisco 3700 series platforms
VWIC2-2MFT-G703	2-port G.703 Multiflex Trunk Voice/WAN interface card	All Cisco 3700 series platforms
Note Voice/WAN interface cards (VWICs) plug into the voice slots in the High Density Voice Network Module, into the WAN slots on the Fast Ethernet mixed-media LAN/WAN network modules, or into the WAN slots on the Cisco 3700 series motherboard.		
ISDN WAN Interface Cards		
WIC-1B-S/T	1-port ISDN BRI	All Cisco 3700 series platforms
WIC-1B-S/T-V3	1-port ISDN BRI	All Cisco 3700 series platforms
WIC-1B-U	1-port ISDN BRI with NT1	All Cisco 3700 series platforms
WIC-1B-U-V2	1-port ISDN BRI with NT1	All Cisco 3700 series platforms
Note WAN interface cards plug into the mixed-media LAN/WAN network modules or into the WAN slots of the Cisco 3700 series motherboard.		
ISDN and Channelized Serial Network Modules		
NM-1CT1	1-port channelized T1/ISDN PRI network module	All Cisco 3700 series platforms
NM-1CT1-CSU	1-port channelized T1/ISDN PRI with CSU network module	All Cisco 3700 series platforms
NM-2CT1	2-port channelized T1/ISDN PRI network module	All Cisco 3700 series platforms
NM-2CT1-CSU	2-port channelized T1/ISDN PRI with CSU network module	All Cisco 3700 series platforms
NM-1CE1B	1-port channelized E1/ISDN PRI balanced network module	All Cisco 3700 series platforms
NM-1CE1T1-PRI	1-port channelized T1/ISDN PRI network module	All Cisco 3700 series platforms
NM-1CE1U	1-port channelized E1/ISDN PRI unbalanced network module	All Cisco 3700 series platforms
NM-2CE1B	2-port channelized E1/ISDN PRI balanced network module	All Cisco 3700 series platforms
NM-2CE1T1-PRI	2-port channelized T1/ISDN PRI network module	All Cisco 3700 series platforms
NM-2CE1U	2-port channelized E1/ISDN PRI unbalanced network module	All Cisco 3700 series platforms
NM-4B-S/T	4-port ISDN BRI network module	All Cisco 3700 series platforms
NM-4B-U	4-port ISDN BRI with NT1 network module	All Cisco 3700 series platforms
NM-8B-S/T	8-port ISDN BRI network module (S/T interface)	All Cisco 3700 series platforms
NM-8B-U	8-port ISDN BRI with NT1 network module (U interface)	All Cisco 3700 series platforms
Modem Modules		
WIC-1AM	1-port analog modem WAN interface card (WIC)	All Cisco 3700 series platforms
WIC-2AM	2-port analog modem WAN interface card (WIC)	All Cisco 3700 series platforms
NM-6DM	6-port digital modem network module	All Cisco 3700 series platforms
NM-12DM	12-port digital modem network module	All Cisco 3700 series platforms
NM-18DM	18-port digital modem network module	All Cisco 3700 series platforms
NM-24DM	24-port digital modem network module	All Cisco 3700 series platforms

Table 7 Supported Interfaces for the Cisco 3700 Series Routers (continued)

Network Modules, VICs, and AIMs	Product Description	Supported Platforms
NM-30DM	30-port digital modem network module	All Cisco 3700 series platforms
NM-8AM, NM-8AM-V2	8-port analog modem network module	All Cisco 3700 series platforms
NM-16AM, NM-16AM-V2	16-port analog modem network module	All Cisco 3700 series platforms
Digital Subscriber Line (DSL)		
WIC-1ADSL	1-port ADSL WAN interface card	All Cisco 3700 series platforms
WIC-1ADSL-DG	1-port ADSL with dying gasp WAN interface card	All Cisco 3700 series platforms
WIC-1ADSL-I-DG	1-port ADSL over ISDN WAN interface card	All Cisco 3700 series platforms
WIC-1SHDSL	1-port SHDSL WAN interface card	All Cisco 3700 series platforms
WIC-1SHDSL-V2	1-port SHDSL with 4-wire support WAN interface card	All Cisco 3700 series platforms
WIC-1SHDSL-V3	1-port G.SHDSL with 4-wire support WAN interface card	All Cisco 3700 series platforms
Ethernet Switch		
NM-16ESW	16-port Ethernet Switch Network Module	All Cisco 3700 series platforms
NMD-36-ESW	36-port Ethernet Switch High Density Network Module	All Cisco 3700 series platforms
Content Engine Network Modules		
NM-CE-BP-20G-K9	Content Engine NM-Basic Perf-20-GB disk	All Cisco 3700 series platforms
NM-CE-BP-40G-K9	Content Engine NM-Basic Perf-40-GB disk	All Cisco 3700 series platforms
NM-CE-BP-80G-K9	Content Engine NM-Basic Perf-80-GB disk	All Cisco 3700 series platforms
NM-CE-BP-SCSI-K9	Content Engine NM-Basic Perf-SCSI	All Cisco 3700 series platforms
Intrusion Detection System Modules		
NM-CIDS-K9	Cisco IDS Network Module, 20-GB IDE hard disk	All Cisco 3700 series platforms
Cisco Unity Express Modules		
NM-CUE	Cisco Unity Express Network Module	All Cisco 3700 series platforms
AIM-CUE	Cisco Unity Express AIM—price includes 12 mailboxes	All Cisco 3700 series platforms
Circuit Emulation over IP Network Modules		
NM-CEM-4TE1	4-port T1/E1 Circuit Emulation over IP NM	All Cisco 3700 series platforms
NM-CEM-4SER	4-port Serial Circuit Emulation over IP NM	All Cisco 3700 series platforms

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco 3800 Series Routers

This section contains the following sections with information that is specific to the Cisco 3800 series routers:

Introduction

Cisco 3800 series integrated services routers are part of a new generation of routers that incorporate high-performance integrated data, voice, video, and virtual private network (VPN) capability. They are designed for branch office installations that need integrated low-density switching, security, voice, IP telephony, video, content networking, and concurrent applications.

There are two routers in the Cisco 3800 series—the Cisco 3825 router and the Cisco 3845 router. Their features include:

- Two built-in 1000BASE-T Gigabit Ethernet ports with RJ-45 connectors for shielded twisted pair. One of these ports provides a slot for an optional small-form-factor pluggable (SFP) module.
- Hardware-based VPN encryption acceleration.
- Modular design that enables you to add a wide variety of LAN and WAN ports with interchangeable network modules and interface cards.

The Cisco 3825 router provides two slots for network modules. The lower network module slot of this router can hold a single-wide or extended single-wide network module. The upper slot of the Cisco 3825 router can hold a single-wide, extended single-wide, double-wide, or extended double-wide network module.

The Cisco 3845 router provides four slots for network modules. Each slot can hold a single-wide or extended single-wide network module. Slots can be combined in pairs to hold a double-wide or extended double-wide network module.

The Cisco 3825 router and the Cisco 3845 router each provide four interface card slots. Each slot can hold a single-wide WAN interface card (WIC), voice interface card (VIC), voice/data T1/E1 WAN interface card (VWIC), or high-speed WAN interface card (HWIC). Slots can be combined in pairs to hold a double-wide HWIC.

Advanced integration modules (AIMs) and packet voice data modules (PVDMs) install into connectors on the router motherboard. AIMs provide hardware-based support for additional features. PVDMs are digital signal processor (DSP) SIMMs that provide voice support. The Cisco 3825 router and the Cisco 3845 router can each accommodate two AIMs and four PVDMs.

For detailed information about the Cisco 3800 series of routers, see the documents at the following location:

http://www.cisco.com/en/US/products/ps5855/index.html

Memory Recommendations

For memory recommendations for the Cisco 3800 series routers in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco 3800 series routers:

- Cisco 3825
- Cisco 3845

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 8 summarizes some typical WAN, LAN, and voice connections for the Cisco 3800 series routers for Cisco IOS Release 12.4.

Table 8 WAN, LAN, and Voice Connections for the Cisco 3800 Series Routers

Port or Connection	Port Type	Connected To
Ethernet	RJ-45	Ethernet switch
T1/E1 WAN xCE1T1-PRI	RJ-48C RJ-48S	T1 or E1 network External T1 CSU or other T1 equipment
T3/DS3/E3 WAN	BNC connector	T3 network, CSU/DSU, or other T3/DS3 equipment
Cisco serial	60-pin D-sub	CSU/DSU and serial network or equipment
Cisco Smart serial	Cisco Smart compact connector	CSU/DSU and serial network or equipment
ADSL	RJ-11C/CA11A	Network demarcation device for service provider's DSL interface
SHDSL	RJ-11C/CA11A RJ-14	Network demarcation device for service provider's DSL interface
T1/E1 digital voice	RJ-48C/CA81A	Digital PBX, ISDN network, CSU/DSU
Analog voice FXS	RJ-11	Telephone, fax
Analog voice FXO	RJ-11	Central office, analog PBX
Analog voice E&M	RJ-45	Analog PBX
BRI S/T WAN (external NT1)	RJ-45/CB-1D	NT1 device or private integrated network exchange (PINX)
BRI U WAN (built-in NT1)	RJ-49C/CA-A11	ISDN network
BRI NT/TE (built-in NT1)	RJ-45	ISDN terminal equipment and ISDN network
56/64-kbps CSU/DSU	8-pin modular	RJ-48S interface in subrate device or network
T1/FT1 CSU/DSU	8-pin modular	RJ-48C interface
Gigabit Ethernet SFP, optical	LC	1000BASE-SX, -LX, -LH, -ZX, -CWDM

Table 9 lists the supported interfaces for the Cisco 3800 series routers for Cisco IOS Release 12.4.

Table 9 Supported Interfaces for the Cisco 3800 Series Routers

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
Ethernet Switching and LAN Modules		All Cisco 3800 series platforms
NM-16ESW	16-port 10/100 Cisco EtherSwitch Network Module	All Cisco 3800 series platforms
NM-16ESW-1GIG	16-port 10/100 Cisco EtherSwitch Network Module with 1 Gigabit Ethernet (1000BASE-T) port	All Cisco 3800 series platforms
NM-16ESW-PWR	16-port 10/100 Cisco EtherSwitch Network Module with in-line power support	All Cisco 3800 series platforms
NM-16ESW-PWR-1GIG	16-port 10/100 Cisco EtherSwitch Network Module with in-line power and Gigabit Ethernet	All Cisco 3800 series platforms
NMD-36ESW	36-port 10/100 Cisco EtherSwitch High-Density Services Module (HDSM)	All Cisco 3800 series platforms
NMD-36ESW-2GIG	36-port 10/100 Cisco EtherSwitch HDSM with 1 Gigabit Ethernet (1000BASE-T) port	All Cisco 3800 series platforms
NMD-36ESW-PWR	36-port 10/100 Cisco EtherSwitch HDSM with in-line power support	All Cisco 3800 series platforms
NMD-36ESW-PWR-2G	36-port 10/100 Cisco EtherSwitch HDSM with in-line power and Gigabit Ethernet	All Cisco 3800 series platforms
NME-16ES-1G	One 16-port 10/100 Cisco EtherSwitch service module, one 10/100/1000 port, and IP Base	All Cisco 3800 series platforms
NME-16ES-1G-P	One 16-port 10/100 Cisco EtherSwitch service module w/802.3af, 1 10/100/1000 port, and IP Base	All Cisco 3800 series platforms
NME-X-23ES-1G	One 23-port 10/100 Cisco EtherSwitch service module, one 10/100/1000 port w/ 802.3af, and IP Base	All Cisco 3800 series platforms
NME-X-23ES-1G-P	One 23-port 10/100 Cisco EtherSwitch service module w/802.3af, 1 10/100/1000 port w/ 802.3af, and IP Base	All Cisco 3800 series platforms
NME-XD-24ES-1S-P	One 24-port 10/100 Cisco EtherSwitch service module w/802.3af, 1 SFP, Cisco StackWise connectors, and IP Base	All Cisco 3800 series platforms
NME-XD-48ES-2S-P	One 48-port 10/100 Cisco EtherSwitch service module w/ 802.3af, 2 SFPs, and IP Base	All Cisco 3800 series platforms
HWIC-4ESW	4-port single-wide 10/100BASE-T Ethernet switch HWIC	All Cisco 3800 series platforms
HWIC-D-9ESW	(8+1)-port double-wide 10/100BASE-T Ethernet switch HWIC	All Cisco 3800 series platforms
HWIC-4ESW-POE	4-port single-wide 10/100BASE-T Ethernet switch HWIC with integrated in-line power daughter card (802.3af capable)	All Cisco 3800 series platforms
HWIC-D-9ESW-POE	(8+1)-port double-wide 10/100BASE-T Ethernet switch HWIC with integrated in-line power daughter card (802.3af capable)	All Cisco 3800 series platforms
ILPM4	In-line power daughter card for the HWIC-4ESW with 802.3af capability	All Cisco 3800 series platforms
ILPM8	In-line power daughter card for the HWIC-9ESW with 802.3af capability	All Cisco 3800 series platforms

Table 9 Supported Interfaces for the Cisco 3800 Series Routers (continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
LAN and WIC Combination Network Modules		
NM-1FE1R2W	1 10/100 Ethernet network module with 1 4/16 Token-Ring 2 WAN card slot	All Cisco 3800 series platforms
NM-1FE2W	1 10/100 Ethernet network module with 2 WAN card slots	All Cisco 3800 series platforms
NM-1FE2W-V2	1 10/100 Ethernet network module with 2 WAN card slots	All Cisco 3800 series platforms
NM-2FE2W	2 10/100 Ethernet network modules with 2 WAN card slots	All Cisco 3800 series platforms
NM-2FE2W-V2	2-port 10/100 Ethernet network module with 2 WAN card slots	All Cisco 3800 series platforms
NM-2W	Network module with 2 WAN card slots (no LAN)	All Cisco 3800 series platforms
Serial Connectivity Network Modules		
NM-1T3/E3	1-port clear-channel T3/E3 network module	All Cisco 3800 series platforms
NM-1HSSI	1-port High-Speed Serial Interface (HSSI) network module	All Cisco 3800 series platforms
NM-4A/S	4-port asynchronous/synchronous serial network module	All Cisco 3800 series platforms
NM-8A/S	8-port asynchronous/synchronous serial network module	All Cisco 3800 series platforms
NM-16A/S	16-port asynchronous/synchronous serial network module	All Cisco 3800 series platforms
NM-16A	16-port asynchronous serial network module	All Cisco 3800 series platforms
NM-32A	32-port asynchronous serial network module	All Cisco 3800 series platforms
Channelized T1/E1 and ISDN Network Modules		
NM-1CE1T1-PRI	1-port Channelized E1/T1/ISDN PRI network module	All Cisco 3800 series platforms
NM-2CE1T1-PRI	2-port Channelized E1/T1/ISDN PRI network module	All Cisco 3800 series platforms
NM-4B-S/T	4-port ISDN BRI network module (S/T interface)	All Cisco 3800 series platforms
NM-4B-U	4-port ISDN BRI network module with integrated Network Termination 1 (NT1) (U interface)	All Cisco 3800 series platforms
NM-8B-S/T	8-port ISDN BRI network module (S/T interface)	All Cisco 3800 series platforms
NM-8B-U	8-port ISDN BRI network module with integrated NT1 (U interface)	All Cisco 3800 series platforms
ATM Network Modules		
NM-1A-T3	1-port DS-3 ATM network module	All Cisco 3800 series platforms
NM-1A-E3	1-port E3 ATM network module	All Cisco 3800 series platforms
NM-4T1-IMA	4-port T1 ATM network module with inverse multiplexing over ATM (IMA)	All Cisco 3800 series platforms
NM-4E1-IMA	4-port E1 ATM network module with IMA	All Cisco 3800 series platforms
NM-8T1-IMA	8-port T1 ATM network module with IMA	All Cisco 3800 series platforms
NM-8E1-IMA	8-port E1 ATM network module with IMA	All Cisco 3800 series platforms
Analog Dialup and Remote Access Network Modules		
NM-8AM-V2	8-port analog modem network module with V.92	All Cisco 3800 series platforms
NM-16AM-V2	16-port analog modem network module with V.92	All Cisco 3800 series platforms

Table 9 Supported Interfaces for the Cisco 3800 Series Routers (continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
Analog and ISDN Basic Rate Voice Network Modules and Accessories		
NM-HD-1V	1-slot IP Communications voice and fax network module	All Cisco 3800 series platforms
NM-HD-2V	2-slot IP Communications voice and fax network module	All Cisco 3800 series platforms
NM-HD-2VE	2-slot IP Communications enhanced voice and fax network module	All Cisco 3800 series platforms
NM-HDA-4FXS	High-density analog voice and fax network module with 4 FXSs	All Cisco 3800 series platforms
EM-HDA-4FXO	4-port FXO voice and fax expansion module	All Cisco 3800 series platforms
EM-HDA-8FXS	8-port FXS voice and fax expansion module	All Cisco 3800 series platforms
EVM-HD-8FXS/DID	High-density analog and digital extension module for voice and fax, 8 FXS/DID	All Cisco 3800 series platforms
EM-HDA-8FXS	8-port voice and fax expansion module, FXS	All Cisco 3800 series platforms
EM-4BRI-NT/TE	4-port voice and fax expansion module, BRI (NT and TE)	All Cisco 3800 series platforms
EM-HDA-6FXO	6-port voice and fax expansion module, FXO	All Cisco 3800 series platforms
EM-HDA-3FXS/4FXO	7-port voice and fax expansion module, 3FXS/4FXO	All Cisco 3800 series platforms
High-Density Voice Network Modules and Accessories		
NM-HDV2	IP Communications high-density voice and fax network module	All Cisco 3800 series platforms
NM-HDV2-1T1/E1	1-port T1/E1 IP Communications high-density voice and fax network module	All Cisco 3800 series platforms
NM-HDV2-2T1/E1	2-port T1/E1 IP Communications high-density voice and fax network module	All Cisco 3800 series platforms
NM-HDV-1T1-12	1-port 12-channel T1 voice and fax network module, Bundle: NM-HDV with 1 VWIC-1MFT-T1 and 1 PVDM-12	All Cisco 3800 series platforms
NM-HDV-1T1-24	1-port 24-channel T1 voice and fax network module, Bundle: NM-HDV with 1 VWIC-1MFT-T1 and 2 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-1T1-24E	Single-port 24-enhanced channel T1 voice and fax network module, Bundle: NM-HDV with 1 VWIC-1MFT-T1 and 2 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-2T1-48	2-port 48-channel T1 voice and fax network module, Bundle: NM-HDV with 1 VWIC-2MFT-T1-DI and 4 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-1E1-12	1-port 12-channel E1 voice and fax network module, Bundle: NM-HDV with 1 VWIC-1MFT-E1 and 1 PVDM-12	All Cisco 3800 series platforms
NM-HDV-1E1-30	1-port 30-channel E1 voice and fax network module, Bundle: NM-HDV with 1 VWIC-1MFT-E1 and 3 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-1E1-30E	1-port 30-enhanced-channel E1 voice and fax network module, Bundle: NM-HDV with 1 VWIC-1MFT-E1 and 5 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-2E1-60	2-port 60-channel E1 voice and fax network module, Bundle: NM-HDV with 1 VWIC-2MFT-E1-DI and 5 PVDM-12s	All Cisco 3800 series platforms
NM-HDV-1J1-30	1-port 30-channel J1 high-density voice network module, Bundle: NM-HDV with 3 PVDM-12s and 1 VIC-1J1	All Cisco 3800 series platforms

Table 9 Supported Interfaces for the Cisco 3800 Series Routers (continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
NM-HDV-1J1-30E	1-port 30-enhanced-channel J1 high-density voice network module, Bundle: NM-HDV with 5 PVDM-12s and 1 VIC-1J1	All Cisco 3800 series platforms
NM-HDV-FARM-C36	Network module 36-port DSP farm, bundle HDV transcoding and conferencing DSP farm equipped with 2 DSP single in-line memory modules (SIMMs)	All Cisco 3800 series platforms
NM-HDV-FARM-C54	Network module 54-port DSP farm, bundle HDV transcoding and conferencing DSP farm equipped with 3 DSP SIMMs	All Cisco 3800 series platforms
NM-HDV-FARM-C90	Network module 90-port DSP farm, bundle HDV transcoding and conferencing DSP farm equipped with 5 DSP SIMMs	All Cisco 3800 series platforms
Application Network Modules		
NM-CE-BP-40G-K9	Cisco Content Engine Network Module, basic performance, 40-GB IDE hard disk, 256-MB DRAM	All Cisco 3800 series platforms
NM-CE-BP-80G-K9	Cisco Content Engine Network Module, basic performance, 80-GB IDE hard disk, 512-MB DRAM	All Cisco 3800 series platforms
NM-CE-BP-SCSI-K9	Cisco Content Engine Network Module, basic performance, Small Computer System Interface (SCSI) controller (requires external SCSI disk array)	All Cisco 3800 series platforms
NM-CIDS	Cisco IDS Network Module	All Cisco 3800 series platforms
NM-NAM	Cisco Network Analysis Module	All Cisco 3800 series platforms
Alarm Monitoring and Control Network Modules and Accessories		
NM-AIC-64	Alarm monitoring and control network module	All Cisco 3800 series platforms
Circuit Emulation over IP (CEoIP) Network Modules		
NM-CEM-4SER	4-port serial circuit emulation over IP network module	All Cisco 3800 series platforms
NM-CEM-4TE1	4-port T1/E1 circuit emulation over IP network module	All Cisco 3800 series platforms
Serial WICs and HWICs		
WIC-1T	1-port high-speed serial WIC	All Cisco 3800 series platforms
WIC-2T	2-port high-speed serial WIC	All Cisco 3800 series platforms
WIC-2A/S	2-port asynchronous/synchronous serial WIC	All Cisco 3800 series platforms
WIC-2A/S	2-port asynchronous/synchronous serial WIC	All Cisco 3800 series platforms
HWIC-4T	Four high-speed serial ports	All Cisco 3800 series platforms
HWIC-4A/S	Four low-speed synchronous/asynchronous serial ports	All Cisco 3800 series platforms
HWIC-8A/S-232	Eight low-speed synchronous/asynchronous serial ports, EIA-232 only	All Cisco 3800 series platforms
HWIC-8A	Eight asynchronous EIA-232 serial ports	All Cisco 3800 series platforms
HWIC-16A	Sixteen asynchronous EIA-232 serial ports	All Cisco 3800 series platforms
Channel Service Unit/Data Service Unit (CSU/DSU) WICs		
WIC-1DSU-T1-V2	1-port T1/Fractional-T1 DSU/CSU WIC	All Cisco 3800 series platforms
WIC-1DSU-56K4	1-port 4-wire 56-/64-kbps CSU/DSU WIC	All Cisco 3800 series platforms

Table 9 Supported Interfaces for the Cisco 3800 Series Routers (continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
ISDN BRI WICs		
WIC-1B-S/T-V3	1-port ISDN BRI WAN interface card for dial and lease line	All Cisco 3800 series platforms
WIC-1B-U-V2	1-port ISDN BRI with integrated NT1 (U interface)	All Cisco 3800 series platforms
DSL WICs		
WIC-1ADSL	1-port asymmetric DSL (ADSL) over basic telephone service WIC	All Cisco 3800 series platforms
WIC-1ADSL-DG	1-port ADSL over basic telephone service with dying-gasp WIC	All Cisco 3800 series platforms
WIC-1ADSL-I-DG	1-port ADSL over ISDN with dying-gasp WIC	All Cisco 3800 series platforms
WIC-1SHDSL	1-port G.SHDSL WIC (two wire only)	All Cisco 3800 series platforms
WIC-1SHDSL-V2	1-port G.SHDSL WIC (two or four wire)	All Cisco 3800 series platforms
WIC-1SHDSL-V3	1-port G.SHDSL WIC with 4-wire support	All Cisco 3800 series platforms
Analog Modem WICs		
WIC-1AM	1-port analog modem WIC	All Cisco 3800 series platforms
WIC-2AM	2-port analog modem WIC	All Cisco 3800 series platforms
T1, E1, and G.703 Multiflex Trunk VWICs and WICs		
VWIC-1MFT-T1	1-port RJ-48 multiflex trunk-T1	All Cisco 3800 series platforms
VWIC-2MFT-T1	2-port RJ-48 multiflex trunk-T1	All Cisco 3800 series platforms
VWIC-2MFT-T1-DI	2-port RJ-48 multiflex trunk-T1 with drop and insert	All Cisco 3800 series platforms
VWIC-1MFT-E1	1-port RJ-48 multiflex trunk-E1	All Cisco 3800 series platforms
VWIC-1MFT-G703	1-port RJ-48 multiflex trunk-G.703	All Cisco 3800 series platforms
VWIC-2MFT-E1	2-port RJ-48 multiflex trunk-E1	All Cisco 3800 series platforms
VWIC-2MFT-E1-DI	2-port RJ-48 multiflex trunk-E1 with drop and insert	All Cisco 3800 series platforms
VWIC-2MFT-G703	2-port RJ-48 multiflex trunk-G.703	All Cisco 3800 series platforms
VWIC2-1MFT-G703	1-port G.703 multiflex trunk voice/WAN interface card	All Cisco 3800 series platforms
VWIC2-2MFT-G703	2-port G.703 multiflex trunk voice/WAN interface card	All Cisco 3800 series platforms
VICs		
VIC-2DID	2-port DID voice and fax interface card	All Cisco 3800 series platforms
VIC-1J1	1-port digital voice interface card (J1) for Japan	All Cisco 3800 series platforms
VIC-4FXS/DID	4-port FXS or DID VIC	All Cisco 3800 series platforms
VIC2-2FXS	2-port VIC, FXS	All Cisco 3800 series platforms
VIC2-2FXO	2-port VIC, FXO (universal)	All Cisco 3800 series platforms
VIC2-4FXO	4-port VIC, FXO (universal)	All Cisco 3800 series platforms
VIC2-2E/M	2-port VIC, ear and mouth (E&M)	All Cisco 3800 series platforms
VIC2-2BRI-NT/TE	2-port VIC, BRI (NT and TE)	All Cisco 3800 series platforms
Echo Cancellation Modules		

Table 9 Supported Interfaces for the Cisco 3800 Series Routers (continued)

Network Module, WIC, VWIC, VIC, AIM, or PVDM	Product Description	Supported Platforms
EC-MFT-32	32-Channel Multiflex Trunk Dedicated ECAN Module	All Cisco 3800 series platforms
EC-MFT-64	64-Channel Multiflex Trunk Dedicated ECAN Module	All Cisco 3800 series platforms
Gigabit Ethernet High-Speed WIC		
HWIC-1GE-SFP	Cisco Gigabit Ethernet High-Speed Interface Card	All Cisco 3800 series platforms
AIMs		
AIM-ATM	High-performance ATM segmentation and reassembly (SAR) AIM	All Cisco 3800 series platforms
AIM-COMP4	Data-compression AIM	All Cisco 3800 series platforms
AIM-CUE	Cisco Unity Express Voice-Mail AIM	All Cisco 3800 series platforms
AIM-VPN/EPII-PLUS	Enhanced-performance DES, 3DES, AES, and compression VPN encryption AIM for the Cisco 3825	Cisco 3825
AIM-VPN/HPII-PLUS	Enhanced-performance DES, 3DES, AES, and compression VPN encryption AIM for the Cisco 3845	Cisco 3845
PVDMs		
PVDM2-8	8-channel fax and voice DSP module	All Cisco 3800 series platforms
PVDM2-16	16-channel fax and voice DSP module	All Cisco 3800 series platforms
PVDM2-32	32-channel fax and voice DSP module	All Cisco 3800 series platforms
PVDM2-48	48-channel fax and voice DSP module	All Cisco 3800 series platforms
PVDM2-64	64-channel fax and voice DSP module	All Cisco 3800 series platforms

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco Catalyst 4500 Access Gateway Modules

This section contains the following sections with information that is specific to the Cisco Catalyst 4500 access gateway modules:

Introduction

The Cisco Catalyst 4500 access gateway module (AGM) provides integrated telephony and routing services to the Cisco Catalyst 4000 family switches.

Chassis and Supervisor Engines Supported by the Cisco Catalyst 4500 AGM

The following is a list of the chassis and supervisor engine options that are supported by the Cisco Catalyst 4500 AGM in Cisco IOS Release 12.4.

- All Cisco Catalyst 4500 series chassis
- All Cisco Catalyst 4000 series chassis
- Supervisor Engine II
- Supervisor Engine III and IV

Note that the Cisco Catalyst 4500 AGM and the supervisor engines may run different versions of Cisco IOS software.

Memory Recommendations

For memory recommendations for the Cisco Catalyst 4500 AGM in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following hardware on the Cisco Catalyst 4500 AGM:

- Cisco Catalyst 4500 and Cisco Catalyst 4000 DSP set, 4x6 SIMMs for AGM
- Cisco Catalyst 4500 8-port RJ-21 FXS module
- Cisco Catalyst 4500 16-port RJ-21 FXS module
- Cisco Catalyst 4500 VPN encryption service adapter
- Cisco Catalyst 4500 128-MB memory module

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Data Interface Modules

- VIC-2BRI-S/T-TE
- VWIC-1MFT-E1
- VWIC-1MFT-E1-DI (without DI support)
- VWIC-1MFT-T1
- VWIC-1MFT-T1-DI (without DI support)
- VWIC-2MFT-E1
- VWIC-2MFT-E1-DI (without DI support)
- VWIC-2MFT-T1
- VWIC-2MFT-T1-DI (without DI support)
- WIC-1DSU-56K4
- WIC-2A/S
- WIC-2T

Voice Interface Modules

- VIC-2BRI-S/T-TE
- VIC-2FXO
- VIC-2FXO-EU
- VIC-2FXS
- VWIC-1MFT-E1
- VWIC-1MFT-E1-DI (without DI support)
- VWIC-1MFT-T1
- VWIC-1MFT-T1-DI (without DI support)
- VWIC-2MFT-E1
- VWIC-2MFT-E1-DI (without DI support)
- VWIC-2MFT-T1
- VWIC-2MFT-T1-DI (without DI support)

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Additional Notes for the Cisco Catalyst 4500 Access Gateway Modules

This section contains important information about using the Cisco Catalyst 4500 access gateway module (AGM) with Cisco IOS Release 12.4 software.

Maximum Operating Temperature

The maximum operating temperature of the AGM card is 95 degrees Fahrenheit (35 degrees Celsius).

Tightening Screws on VICs and WICs

To properly install interface cards on the AGM, you must tighten the screws as securely as possible. If you do not properly tighten the screws, a voice interface card (VIC) or WAN interface card (WIC) could malfunction.

TDM Clocking

You can derive the time-division multiplexing (TDM) clock reference on the AGM from one of seven sources. Each VIC slot that contains an E1 or T1 card has five free-running, onboard clock sources and two recovered clock sources.

The default reference is the onboard clock. You can use the **frame-clock-select** command to select one of the E1/T1 ports as the primary reference. You can also use the **frame-clock-select** command to select up to three prioritized backups, if the primary clock fails. If you switch over to a backup source, the system does not revert back to the status of the original clock source.

The **frame-clock-select** command has the following syntax:

```
[no] frame-clock-select priority E1/T1 slot/port
```

The clock source with priority one is the primary reference, and the clock source with priority four is the lowest priority backup.

The clock reference selection that uses the **frame-clock-select** command is independent from the clock reference selection on an E1/T1 controller. If you use the onboard clock as the reference, you can observe framing and cyclic redundancy check (CRC) errors, which are caused by clock slips on E1/T1 interfaces.

Need to Support 56-kbps Operation for Slot 3 WIC

If you configure the MCC SI RAM for two entries, a defect on the 8260 Rev1A device on the AGM can cause data corruption (7 bits form the 56-kbps channel, and 1 bit is discarded). Because there is not enough available space to use three SI RAM entries as a workaround, only 64-kbps channels are supported. If you need to use 56-kbps channels, use the WIC-56K4 WIC.

Cisco AS5350 and Cisco AS5350XM Universal Gateways

This section contains the following sections with information that is specific to the Cisco AS5350 and Cisco AS5350XM universal gateways:

Introduction

The Cisco AS5350 universal gateway is the only 1-rack unit, 2-, 4-, or 8-PRI gateway that provides universal services—data, voice, and fax services on any service, any port. The Cisco AS5350 offers high performance and high reliability in a compact, modular design. This cost-effective platform is ideally suited for Internet service providers (ISPs) and enterprises that require innovative universal services.

Memory Recommendations

For memory recommendations for the Cisco AS5350 and Cisco AS5350XM universal gateways in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the Cisco AS5350 and Cisco AS5350XM universal gateways.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 10 lists the supported interfaces for the Cisco AS5350 universal gateways.

Table 10 Supported Interfaces for the Cisco AS5350 Universal Gateways

Interfaces and Dial Feature Cards	Product Description
Dial Feature Cards	AS535-DFC-60NP
	AS535-DFC-108NP
	AS535-DFC-CT3
	2 PRI DFC, 4 PRI DFC, 8 PRI DFC
Dial-Only Dial Feature Card[1]	Modem calls, ISDN digital calls, V.110 data calls, and V.120 data calls
LAN Interfaces	Fast Ethernet 10/100BASE-T (RJ-45)
	Gigabit Ethernet 10/100/1000BASE-T (RJ-45)[2]

Table 10 Supported Interfaces for the Cisco AS5350 Universal Gateways (continued)

Interfaces and Dial Feature Cards	Product Description
Trunk/Backhaul Interface Options	CT3 DFC
	2PRI CT1/CE1 DFC, 4PRI CT1/CE1 DFC, 8PRI CT1/CE1 DFC
	Two 8-MB serial ports

1. The dial-only dial feature card (DFC) is supported on the Cisco AS5xxxXM gateways only.
2. The Cisco AS5xxxXM gateways support the Gigabit Ethernet Interface.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco AS5400, Cisco AS5400HPX, and AS5400XM Universal Gateways

This section contains the following sections with information that is specific to the Cisco AS5400, Cisco AS5400HPX, and Cisco AS5400XM universal gateways:

Introduction

The Cisco AS5400 universal gateway is a 2-rack unit, 8-, 12-, or 16-T1/E1, 1-CT3 gateway that provides universal services—port data, voice, and fax services on any port at any time. The Cisco AS5400 offers high performance and high reliability in a compact, modular design. This cost-effective platform is intended for Internet service providers (ISPs) and enterprises that require innovative universal services.

Memory Recommendations

For memory recommendations for the Cisco AS5400, Cisco AS5400HPX, and Cisco AS5400XM universal gateways in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the following Cisco AS5400 universal gateways:

- Cisco AS5400
- Cisco AS5400HPX
- Cisco AS5400XM

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 11 lists the supported interfaces for the Cisco AS5400 universal gateways for Cisco IOS Release 12.4.

Table 11 Supported Interfaces for the Cisco AS5400 Universal Gateways

Interfaces and Dial Feature Cards	Product Description
Dial Feature Cards	AS54-DFC-CT3
	AS54-DFC-60NP
	AS54-DFC-108NP
	2 PRI DFC, 4 PRI DFC, 8 PRI DFC
Dial-Only Dial Feature Card[1]	Modem calls, ISDN digital calls, V.110 data calls, and V.120 data calls

Table 11 Supported Interfaces for the Cisco AS5400 Universal Gateways (continued)

Interfaces and Dial Feature Cards	Product Description
LAN Interfaces	Fast Ethernet 10/100BASE-T (RJ-45)
	Gigabit Ethernet 10/100/1000BASE-T (RJ-45)[2]
Trunk/Backhaul Interface Options	2PRI CT1/CE1 DFC, 4PRI CT1/CE1 DFC, 8PRI CT1/CE1 DFC
	CT3 DFC
	2 serial ports on the motherboard

1. The dial-only dial feature card (DFC) is supported on the Cisco AS5xxxXM gateways only.
2. The Cisco AS5xxxXM gateways support the Gigabit Ethernet Interface.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco AS5850 Universal Gateways

This section contains the following sections with information that is specific to the Cisco AS5850 universal gateway:

Introduction

The Cisco AS5850 universal gateway provides the highest concentration of port and ISDN terminations available in a single remote access server product. The Cisco AS5850 is specifically designed to meet the demands of large service providers such as Post, Telephone, and Telegraphs (PTTs), regional bell operating companies (RBOCs), inter-exchange carriers (IXCs), and large Internet service providers (ISPs).

Memory Recommendations

For memory recommendations for the Cisco AS5850 universal gateway in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the Cisco AS5850 universal gateways.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 12 lists the supported feature boards for the Cisco AS5850 universal gateway for Cisco IOS Release 12.4.

Table 12 Supported Feature Boards for the Cisco AS5850 Universal Gateway

Feature Boards	Product Description
ERSC	Enhanced Route Switch Controller Card
RSC	Route Switch Controller Card
Port Handling Cards	AS58-324UPC-CC
LAN Interfaces	Dual Fast Ethernet 10/100BASE-T (RJ-45) per ERSC
	Dual Gigabit Ethernet
	Dual Gigabit Ethernet per RSC and ERSC
	Fast Ethernet 10/100BASE-T (RJ-45)[1]
	Single Fast Ethernet 10/100BASE-T (RJ-45) per RSC

Table 12 Supported Feature Boards for the Cisco AS5850 Universal Gateway (continued)

Feature Boards	Product Description
WAN Interface Options	Channelized T1 (AS58-24CT1)
	Channelized T3 (AS58-1CT3/216U)
	Channelized E1 (AS58-24CE1)
	Channelized STM1 (AS58-STM1)

1. The Fast Ethernet is for management purposes only.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco Catalyst 6000/Cisco 7600 Multi-Processor WAN Application Module

This section contains the following sections with information that is specific to the Cisco Catalyst 6000/Cisco 7600 Multi-Processor WAN Application Module.

Introduction

The Cisco Multi-Processor WAN Application Module (MWAM) provides three processor complexes with dual processors used in two of the complexes and a single processor used in the remaining processor complex. This architecture provides five mobile wireless applications on one module.

The MWAM does not provide external ports but is connected to the switch fabric in the Cisco Catalyst 6500/Cisco 7600 chassis. An internal Gigabit Ethernet port provides an interface between each processor complex and the Supervisor module. Virtual Local Area Networks (VLANs) direct traffic from external ports via the Supervisor module to each mobile wireless application instance.

The MWAM provides an interface to the Cisco IOS image on the Supervisor module. The Supervisor module software enables a single session to be established to each application on the MWAM(s) in the chassis. Each session is used for configuring, monitoring, and troubleshooting application. For information on establishing sessions to mobile wireless application instances on the MWAM, see the *Cisco Multi-Processor WAN Application Module User Guide*:

http://www.cisco.com/univercd/cc/td/doc/product/core/cis7600/cfgnotes/servmod/mwam_ug/index.htm

The software image that provides the mobile wireless application feature is downloaded through the Supervisor module and distributed to each processor complex on the MWAM(s). The same image is installed on all the processors in the MWAM.

Memory Recommendations

For memory recommendations for the Cisco Catalyst 6000/Cisco 7600 MWAM in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

Cisco IOS Release 12.4 supports the Cisco Catalyst 6000/Cisco 7600 Multi-Processor WAN Application Module.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco Catalyst 6500/Cisco 7600 Communication Media Module

This section contains the following sections with information that is specific to the Cisco Catalyst 6500/Cisco 7600 Communication Media Module.

Introduction

Cisco Communication Media Module Voice Features for the Catalyst 6500 Series and Cisco 7600 Series provide interoperability between the Cisco Catalyst 6500 series and Cisco 7600 series router Communication Media Module (CMM) and Cisco gateway platforms.

Memory Recommendations

For memory recommendations for the Cisco Catalyst 6500/Cisco 7600 Communication Media Module in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

The Cisco Catalyst 6500/Cisco 7600 Communication Media Module requires a Supervisor Engine 1, Supervisor Engine 2, Supervisor Engine 32, Supervisor Engine 720 or Supervisor Engine 720-10GE. The supervisor engine can have an MSFC, MSFC2, or MSFC3 as appropriate for the supervisor engine, but the CMM does not require one for configuration or operation. Software recommendations are listed in Table 13.

Table 13 Software Recommendations for the Communication Media Module

Product Number	Product Description	Minimum Software Version	Recommended Software Version	Minimum Cisco Catalyst Cisco IOS Release	Minimum Cisco Catalyst OS Release
WS-SVC-CMM	Communication Media Module	12.3(14)T	12.4(13f) or 12.4(18c)	12.1(19)E	7.6(12)[1]

1. For Supervisor Engine 32, Cisco requires Cisco Catalyst Release 8.4(1) or a later release.

Software Requirements

Cisco Catalyst 6500/Cisco 7600 Communications Media Module has software requirements for both Cisco IOS support and Cisco CallManager support.

Cisco IOS Support

Note

- CMM has its own software image; the image is not bundled with the supervisor engine or MSFC images. See the "Additional Notes for the Cisco Catalyst 6500/Cisco 7600 Communication Media Module" section on page 90 for instructions on downloading the image to the CMM flash memory.
- With a Cisco IOS software 12.3XY release, Supervisor Engine 720 requires the CMM to run Cisco IOS Release 12.3(8)XY4 or a later release.
- With a Cisco IOS software 12.3XY release, Supervisor Engine 720-3B/3BXL requires the CMM to run Cisco IOS Release 12.3(8)XY4 or a later release.

The software requirements for CMM to support Voice Features for Cisco IOS Release 12.3(14)T are as follows:

- Catalyst Release 7.6(12) is the minimum Catalyst Supervisor Engine software release., Cisco recommends Release 8.2(1) or a later release.
- Cisco IOS Release 12.1(19)E is the minimum release, Cisco IOS Release 12.1(20)E or a later release is recommended.
- Online diagnostic features require the following:
  - For Cisco Catalyst 6500/Cisco 7600 Supervisor Engine running Catalyst OS, Catalyst Release 8.1 or a later release is required.
  - For Cisco Catalyst 6500/Cisco 7600 Supervisor Engine running Cisco IOS, Cisco IOS Release 12.1(19)E or a later release is required.

The software requirements for CMM to support all other features are as follows:

- Cisco Catalyst software release:
  - Supervisor Engine 1 and Supervisor Engine 2—Refer to the *Memory Recommendations and Requirements* section in the *Catalyst 6500 Series Supervisor Engine 1A DRAM Upgrade Installation Note* for Supervisor Engine 1 and to the *Memory Recommendations and Requirements* section in the for Supervisor Engine 2 for the minimum and recommended memory requirements.
  - Supervisor Engine 720—Refer to the Supervisor Engine documentation for the minimum and recommended memory requirements.
- •Cisco IOS Release:
  - Supervisor Engine 1 and Supervisor Engine 2— Minimum release is Cisco IOS Release 12.1(19)E, and the recommended release is Cisco IOS Release 12.1(20)E.
  - Supervisor Engine 720—Minimum software is the Cisco IOS Release 12.2(14)SX, and the recommended release is Cisco IOS Release 12.2(17)SX.
- ISNMP is supported with Cisco IOS Release 12.4 on the CMM.

Cisco CallManager Support

Cisco IOS Release 12.4 supports Cisco CallManager Release 3.2(2) and later releases.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Additional Notes for the Cisco Catalyst 6500/Cisco 7600 Communication Media Module

Release Upgrade Notice

The CMM wscmm-i6s-mz.123-14.T image contains a new bundle 4.4.X DSPware infrastructure. Once downloaded, this software will perform an automatic FPGA upgrade to version 10 (hex 0xA) in order to take advantage of the new bundle 4.4.X DSPware infrastructure.

After the upgrade, power-cycling the CMM is required. If you have an ACT module on the CMM, you must reconfigure the ACT module with the new Fast Ethernet interface instead of Ethernet. Any other CMM release before the wscmm-i6s-mz.123-14.T image will require an automatic bundle FPGA upgrade to version 10 (hex 0xA).

The ACT module supports the following features.

Supported Features for WS-SVC-CMM-ACT	Capacity per ACT
Maximum channels for conference	128
Maximum channels for transcoding	128
Maximum channels for MTP	512[1]
Maximum port adapters for CMM	4
Maximum capacity for CMM	512 conference or transcode, 2048 MTP channels[2]
Largest conference size	64 parties
Voice codecs	G.711 mu-law and a-law, G.729, G.723
Packetization	10, 20, 30, 60 ms
Protocols	SCCP with Cisco CallManager
Maximum number of conferences	64[3]

1. Requires two channels per session.
2. With MTP-only mode at G.711.
3. With two-party MeetMe conference with Cisco CallManager (typical ad-hoc conference has three parties).

Detailed Installation and Configuration Procedures

For detailed installation and configuration procedures, see the *Catalyst 6500 Series and Cisco 7600 Series CMM Installation and Configuration Note* at the following URL:
http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/cfgnotes/78_14107.htm

For detailed information on automatically upgrading and downgrading feature cards FPGA, see the *Release Notes for the Cisco Catalyst 6500 Series and the Cisco 7600 Series Communication Media Module for Cisco IOS Release 12.3(8)XY* at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/lan/cat6000/relnotes/ol_6314.htm

Cisco 7000 Family Routers

This section contains the following sections with information that is specific to the Cisco 7000 family routers:

Memory Recommendations

For memory recommendations for the Cisco 7000 family in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Note An update to Flash memory to 64MB in Cisco IOS Release 12.4(12) has been made for the following images:

rsp-a3jk9sv-mz
rsp-boot-mz
rsp-ik9o3sv-mz
rsp-ik9sv-mz
rsp-isv-mz
rsp-jk9o3sv-mz
rsp-jk9sv-mz
rsp-jsv-mz
rsp-p-mz
rsp-pv-mz

This increase in Flash memory was due to the increased image size seen between Cisco IOS Release 12.4(10) and Release 12.4(12).

Supported Hardware

Cisco IOS Release 12.4 supports the following platforms in the Cisco 7000 family:

- Cisco 7200 series routers (Cisco 7204VXR and Cisco 7206VXR)
- Cisco 7301 routers
- Cisco 7400 series routers (Cisco 7401 ASR router)
- Cisco 7500 series routers (Cisco 7505, Cisco 7507, Cisco 7513, and Cisco 7576)

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco IGX 8400 Series URM

This section contains the following sections with information that is specific to the Cisco IGX 8400 series URM:

Introduction

Cisco has supported the Cisco IGX 8400 series platforms since Cisco IOS Release 12.1(5)YA. The Cisco IGX 8400 series platforms can now function as components of Cisco end-to-end voice architecture. The Cisco IOS software runs only on the Universal Router Module (URM); all other components of the Cisco IGX 8400 series platforms run Switch Software (SWSW). The minimum SWSW release to support the URM is 9.3.20.

The URM is a Cisco IOS based IP router blade that enables users to provision Voice over IP (VoIP), Voice over ATM (VoATM), Multiprotocol Label Switching (MPLS), and IP services on a Cisco IGX 8400 series platform. The voice and routing capabilities of the URM have been derived from the Cisco 3660 series routers, while the ATM capabilities of the URM have been derived from the existing enhanced Universal Switching Module (UXM-E) that is used on the Cisco IGX 8400 series platform.

Additionally, Cisco IOS command-line interface (CLI) commands are now available on the Cisco IGX 8400 series platforms, which allows configuration of IP services.

The URM interoperates with all Cisco IOS based voice products and supports 30 voice channels with high-complexity codec types and 60 voice channels with medium-complexity codec types. Note that only digital voice ports are supported on the URM; analog ports are not supported.

Memory Recommendations

For memory recommendations for the Cisco IGX 8400 series URM in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

This section provides an overview of the hardware of the Cisco IGX 8400 series switches and the URM.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Introduction to the IGX Switches

Like other Cisco WAN switches, the IGX switch operates in public or private WANs. An IGX switch can support OC3, T3, E3, T1, E1, Inverse Multiplexing over ATM (IMA) for T1 or E1, fractional T1 or E1, or subrate digital transmission facilities. The IGX cell relay technology provides maximum throughput

with minimum delays. Cell relay performance characteristics are the heart of efficient digital networks and make the IGX switch an ideal choice for a high-performance, multimedia platform. Key features of the IGX switch include the following:

- A 1-Gbps cellbus for high-speed switching and a redundant 0.2-Gbps bus for backup.
- Full compatibility with BPX system software.
- Up to 64 lines, 32 trunks, and 3500 terminating connections on the Cisco IGX 8410, Cisco IGX 8420, and Cisco IGX 8430.
- IGX configuration and management through Cisco WAN Manager or the same standard user interface used with the BPX WAN switching system software.
- High-performance switching suitable for a variety of protocols and applications, including channel-associated signaling (CAS), ATM, Frame Relay, voice, FAX, slow-scan and full-bandwidth video, and synchronous or asynchronous data.
- Six cabinet models, which consist of the following:
  - An 8-slot standalone unit (Model 8410, standalone)
  - An 8-slot rack-mount unit (Model 8410, rack-mount)
  - A 16-slot standalone unit (Model 8420, standalone)
  - A 16-slot rack-mount unit (Model 8420, rack-mount)
  - A 32-slot standalone unit (Model 8430, standalone)
  - A 32-slot rack-mount unit (Model 8430, rack-mount)
- Redundancy of controller cards, service module cards, system buses, and power supplies to provide hardware reliability.
- Hot-swappable modules to facilitate nonstop operation: service cards, processor modules, AC and DC power, as well as fan tray assembly.
- 110/220 VAC and –48 DC power options for use in varied network environments.

Introduction to the Universal Router Module

The Universal Router Module (URM) is an optional module for the Cisco IGX 8400 series and delivers high-density voice interfaces, Fast Ethernet connectivity, and ATM switching. The URM consists of the following cards:

- One URM front card

  The 1-slot-wide front card contains an embedded UXM-E and an embedded router (based on the Cisco 3660 series router) running Cisco IOS software. The front card integrates all memory components, including Battery-Backed RAM (BRAM) and flash memory for the storage of Cisco IOS software.
- URM back card

  All back cards are 1-slot wide. The following two options are for back cards that support voice:
  - BC-URI-2FE2VT1, providing two T1 ports (RJ-48), two 10/100BASE-T Fast Ethernet ports (RJ-45), and one console port (RJ-45).
  - BC-URI-2FE2VE1, providing two E1 ports (RJ-48), two 10/100BASE-T Fast Ethernet ports (RJ-45), and one console port (RJ-45).

The following option is for a data-only back card:

- BC-URI-2FE, providing two 10/100BASE-T Fast Ethernet ports (RJ-45) and one console port (RJ-45).

The URM can connect to another Cisco router in the following ways:

- Through its 155-Mbps ATM interface to the IGX backplane (ATM-to-ATM [URM-to-UXM] or ATM/FR SIW [URM-to-UFM] connections can be established with SWSW).
- Through its two Fast Ethernet ports.
- Through its two T1 or E1 ports (only on the data/voice back cards).

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco MGX 8850 Route Processor Modules

This section contains the following sections with information that is specific to the Cisco MGX 8850 Route Processor Modules (RPMs):

Memory Recommendations

For memory recommendations for the Cisco MGX 8850 RPM in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.

Cisco Signaling Link Terminals

This section contains the following sections with information that is specific to the Cisco Signaling Link Terminal:

Introduction

The Cisco Signaling Link Terminal (SLT) enables service providers to reliably transport Signaling System 7 (SS7) protocols across an IP network. The Cisco SLT uses the Cisco IOS SS7 Signaling Link Terminal feature set, providing reliable interoperability with the Cisco PGW 2200 Softswitch. The Cisco SLT is responsible for terminating the Message Transfer Part 1 (MTP 1) and MTP 2 layers of the SS7 protocol stack. Using the Cisco Reliable User Datagram Protocol (RUDP), the Cisco SLT backhauls, or transports, upper-layer SS7 protocols across an IP network to the Cisco PGW 2200 Softswitch.

In combination with this application-specific version of the Cisco IOS software, the Cisco SLT hardware component leverages the widely deployed Cisco 2600XM series multiservice access router. The Cisco 2600XM series, driven by a powerful RISC processor, provides the high performance required in complex networking infrastructures.

Note When used as a Cisco Signaling Link Terminal device with a Cisco PGW 2200 Softswitch, the Cisco 2611XM and Cisco 2651XM have SS7 functionality only; all standard Cisco 2611XM and Cisco 2651XM software features are disabled when the Cisco SLT image is run. In that case, only the *Cisco Signaling Link Terminal* document and the Cisco Media Gateway Controller documentation are relevant.

When used for Signaling Link Terminal applications, the modular Cisco 2611XM and Cisco 2651XM dual-Ethernet port routers can be configured with dual serial and the multiflex interface cards. The E1 multiflex interface cards offer integrated DSUs, and the T1 multiflex interface cards offer integrated CSU/DSUs. For additional flexibility, the multiflex interface cards can also be ordered with a dual-port drop-and-insert capability. All of these interface cards are Field Replaceable Units (FRUs).

The Cisco SLT supports only the SS7 MTP 2 serial protocol. Therefore, the serial interfaces cannot be configured for other protocols such as HDLC, PPP, X.25, LAPB, and Frame Relay.

Memory Recommendations

For memory recommendations for the Cisco Signaling Link Terminal in Cisco IOS Release 12.4, see the "Memory Recommendations" section on page 6.

Supported Hardware

The Cisco SLT feature in Cisco IOS Release 12.4 supports the Cisco 2611XM and Cisco 2651XM routers exclusively. The Cisco SLT feature is not supported with any other Cisco 2600 series chassis. For more information about the Cisco 2600 series in Cisco IOS Release 12.4, see the "Cisco 2600XM Series and Cisco 2691 Modular Access Routers" section on page 38.

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 99.

For additional information about supported hardware for this platform and release, see the Cisco Software Advisor at the following location:

http://tools.cisco.com/Support/Fusion/FusionHome.do

Table 14 lists the supported interfaces for the Cisco SLT solution data rate.

Table 14 Supported Interfaces for the Cisco SLT Solution Data Rate

Interface, Network Module, or Data Rate[1]	Product Description	Other Platforms Supporting These Modules
LAN Interfaces	2-port Ethernet (10BASE-T)	Cisco 2611XM
	2-port Ethernet (10/100BASE-T)	Cisco 2651XM
E1/T1 Multiflex Voice/WAN Interface Cards	1-port T1 multiflex trunk interface (VWIC-1MFT-T1)	All Cisco 2600 series platforms
	1-port E1 multiflex trunk interface (VWIC-1MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface (VWIC-2MFT-T1)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface (VWIC-2MFT-E1)	All Cisco 2600 series platforms
	2-port T1 multiflex trunk interface with drop-and-insert (VWIC-2MFT-T1-DI)	All Cisco 2600 series platforms
	2-port E1 multiflex trunk interface with drop-and-insert (VWIC-2MFT-E1-DI)	All Cisco 2600 series platforms
WAN Interface Cards	1-port high-speed serial (up to 2.048 Mbps)	All Cisco 2600 series platforms
	2-port dual high-speed serial (up to 2.048 Mbps; asynchronous/synchronous support)	All Cisco 2600 series platforms
	1-port serial with four-wire 56/64-kbps DSU/CSU interface card (WIC-1DSU-56K4)	All Cisco 2600 series platforms

1. See E1/T1 Multiflex Voice/WAN Interface Cards in this table.

Feature Support

For feature support in Cisco IOS Release 12.4, see the "Feature Support" section on page 5.