



# Release Notes for Cisco IOS Release 12.0

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**August 18, 2006**

**Cisco IOS Release 12.0(28)**

**Text Part Number OL-2881-06**



**Note**

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You can find the most current Cisco IOS documentation on Cisco.com. For releases after Cisco IOS Release 12.0(19), this document will be available only online in HTML and PDF format and on the Documentation CD-ROM.

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These release notes support Cisco IOS Release 12.0. These release notes are updated to describe new memory requirements, hardware support, software platform deferrals, and changes to the microcode or modem code and related documents.

Cisco IOS Release 12.0(8) and all subsequent 12.0 releases are deemed “Generally Deployable.” Cisco believes Release 12.0 is suitable for deployment anywhere in the network where the features and functionality of the release are required.

For a list of the software caveats that apply to Cisco IOS Release 12.0, refer to *Caveats for Cisco IOS Release 12.0*. This caveats document is updated for every maintenance release and is located on Cisco.com and the Documentation CD-ROM.

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

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## System Requirements

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

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- [Determining Your Software Release, page 11](#)
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## Memory Recommendations

For Cisco routers to take advantage of the Release 12.0 features, you need to have the code or main system memory as listed in [Table 1](#). If you do not, you must upgrade your memory. Some platforms have specific chip or architecture requirements that affect what can be upgraded and in what increments.

The memory recommendations listed in [Table 1](#) are minimum recommendations. Your specific hardware configuration and the software features you choose to deploy could require more memory for your system.

**Table 1** Cisco IOS Release 12.0 Memory Recommendations

Feature Set	Image Name	Recommended Flash Memory	Recommended DRAM Memory	Runs From
<b>Cisco 1003/1004 Series</b>				
IP	c1000-y-mz	4 MB	8 MB	RAM
IP Plus	c1000-bnsy-mz	4 MB	8 MB	RAM
IP Plus 40	c1000-bnsy40-mz	4 MB	8 MB	RAM
IP Plus 56	c1000-bnsy56-mz	4 MB	8 MB	RAM
IP/IPX	c1000-ny-mz	4 MB	8 MB	RAM

Table 1 Cisco IOS Release 12.0 Memory Recommendations (continued)

Feature Set	Image Name	Recommended Flash Memory	Recommended DRAM Memory	Runs From
IP/IPX/AT	c1000-bny-mz	4 MB	8 MB	RAM
IP/IPX/AT Plus	c1000-bnsy-mz	4 MB	8MB	RAM
IP/IPX/AT Plus 40	c1000-bnsy40-mz	4 MB	8 MB	RAM
IP/IPX/AT Plus 56	c1000-bnsy56-mz	4 MB	8 MB	RAM
<b>Cisco 1005 Series</b>				
IP	c1005-y-mz	4 MB	8 MB	RAM
IP Plus	c1005-bnsy-mz	4 MB	8 MB	RAM
IP Plus 40	c1005-bnsy40-mz	4 MB	8 MB	RAM
IP Plus 56	c1005-bnsy56-mz	4 MB	8 MB	RAM
IP/IPX	c1005-ny-mz	4 MB	8 MB	RAM
IP/IPX/AT	c1005-bny-mz	4 MB	8 MB	RAM
IP/IPX/AT Plus	c1005-bnsy-mz	4 MB	8 MB	RAM
IP/IPX/AT Plus 40	c1005-bnsy40-mz	4 MB	8 MB	RAM
IP/IPX/AT Plus 56	c1005-bnsy56-mz	4 MB	8 MB	RAM
IP/Async	c1005-qy-mz	4 MB	8 MB	RAM
IP/IPX/Async	c1005-nqy-mz	4 MB	8 MB	RAM
IP/OSPF/PIM	c1005-y2-mz	4 MB	8 MB	RAM
<b>Cisco LightStream 1010</b>				
Service Provider <sup>1</sup>	ls1010-wp-mz	8 MB	64 MB	N/A
<b>Cisco 1600 Series<sup>2</sup></b>				
<b>Cisco 1601-1604 Routers</b>				
IP	c1600-y-l	6 MB	4 MB	Flash
IP Plus	c1600-sy-l	8 MB	4 MB	Flash
IP Plus 40	c1600-sy40-l	8 MB	4 MB	Flash
IP Plus 56	c1600-sy56-l	8 MB	4 MB	Flash
IP Plus IPSec 56	c1600-sy56i-l	12 MB	6 MB	Flash
IP/IPX	c1600-ny-l	6 MB	4 MB	Flash
IP/IPX/AT/IBM	c1600-bnr2y-l	12 MB	4 MB	Flash
IP/IPX/AT/IBM Plus	c1600-bnr2sy-l	12 MB	6 MB	Flash
IP/IPX/AT/IBM/FW Plus IPSec 56	c1600-bnor2sy56i-l	12 MB	6 MB	Flash
IP/IPX/FW Plus	c1600-nosy-l	8 MB	4 MB	Flash
IP/FW	c1600-oy-l	6 MB	4 MB	Flash
IP/FW Plus IPSec 56	c1600-osy56i-l	8 MB	6 MB	Flash
<b>Cisco 1601-R-1605-R Routers</b>				

Table 1 Cisco IOS Release 12.0 Memory Recommendations (continued)

Feature Set	Image Name	Recommended Flash Memory	Recommended DRAM Memory	Runs From
IP	c1600-y-mz	4 MB	10 MB	RAM
IP Plus	c1600-sy-mz	4 MB	10 MB	RAM
IP Plus 40	c1600-sy40-mz	4 MB	10 MB	RAM
IP Plus 56	c1600-sy56-mz	4 MB	10 MB	RAM
IP Plus IPsec 56	c1600-sy56i-mz	4 MB	12 MB	RAM
IP/IPX	c1600-ny-mz	4 MB	8 MB	RAM
IP/IPX/AT/IBM	c1600-bnr2y-mz	4 MB	16 MB	RAM
IP/IPX/AT/IBM Plus	c1600-bnr2sy-mz	6 MB	16 MB	RAM
IP/IPX/AT/IBM/FW Plus IPsec 56	c1600-bnor2sy56i-mz	6 MB	24 MB	RAM
IP/IPX/FW Plus	c1600-nosy-mz	4 MB	10 MB	RAM
IP/FW	c1600-oy-mz	4 MB	8 MB	RAM
IP/FW Plus IPsec 56	c1600-osy56i-mz	4 MB	16 MB	RAM
<b>Cisco 2500 Series</b>				
IP/IBM/APPN	c2500-ai3r4-l	16 MB	8 MB	Flash
Enterprise/APPN Plus <sup>3</sup>	c2500-ajs-l	16 MB	8 MB	Flash
Enterprise/APPN Plus IPsec 56	c2500-ajs56i-l	16 MB	8 MB	Flash
Remote Access Server (RAS)	c2500-c-l	8 MB	6 MB	Flash
IP/IPX Plus	c2500-ins-l	8 MB	4 MB	Flash
IP/IPX/AT/DEC	c2500-d-l	8 MB	6 MB	Flash
IP/IPX/AT/DEC/FW Plus	c2500-dos-l	16 MB	8 MB	Flash
IP/IPX/AT/DEC Plus	c2500-ds-l	16 MB	6 MB	Flash
FRAD	c2500-f-l	8 MB	4 MB	Flash
LAN FRAD/OSPF	c2500-f2in-l	8 MB	4 MB	Flash
LAN FRAD	c2500-fin-l	8 MB	4 MB	Flash
ISDN	c2500-g-l	8 MB	4 MB	Flash
IP	c2500-i-l	8 MB	6 MB	Flash
IP/FW	c2500-io-l	8 MB	6 MB	Flash
IP/FW Plus IPsec 56	c2500-ios56i-l	16 MB	8 MB	Flash
IP Plus	c2500-is-l	8 MB	6 MB	Flash
IP Plus 40 <sup>4</sup>	c2500-is40-l	8 MB	4 MB	Flash
IP Plus 56	c2500-is56-l	16 MB	8 MB	Flash
IP Plus IPsec 56	c2500-is56i-l	16 MB	8 MB	Flash

Table 1 Cisco IOS Release 12.0 Memory Recommendations (continued)

Feature Set	Image Name	Recommended Flash Memory	Recommended DRAM Memory	Runs From
Enterprise/FW Plus IPSec 56	c2500-jos56i-l	16 MB	8 MB	Flash
Enterprise Plus	c2500-js-l	16 MB	6 MB	Flash
Enterprise Plus IPSec 56	c2500-js56i-l	16 MB	8 MB	Flash
<b>Cisco 2600 Series</b>				
Enterprise/APPN Plus	c2600-ajs-mz	8 MB	32 MB	RAM
Enterprise/APPN Plus 40 <sup>5</sup>	c2600-ajs40-mz	8 MB	32 MB	RAM
Enterprise/APPN Plus 56 <sup>5</sup>	c2600-ajs56-mz	8 MB	32 MB	RAM
Enterprise/APPN Plus IPSec 56	c2600-ajs56i-mz	8 MB	32 MB	RAM
Remote Access Server (RAS)	c2600-c-mz	4 MB	20 MB	RAM
IP/IPX/AT/DEC	c2600-d-mz	8 MB	20 MB	RAM
IP/IPX/AT/DEC Plus	c2600-ds-mz	8 MB	24 MB	RAM
IP	c2600-i-mz	4 MB	20 MB	RAM
IP Plus	c2600-is-mz	8 MB	24 MB	RAM
IP Plus 40	c2600-is40-mz	8 MB	32 MB	RAM
IP Plus 56	c2600-is56-mz	8 MB	32 MB	RAM
IP Plus IPSec 56	c2600-is56i-mz	8 MB	32 MB	RAM
Enterprise Plus	c2600-js-mz	8 MB	24 MB	RAM
Enterprise Plus 40 <sup>5</sup>	c2600-js40-mz	8 MB	32 MB	RAM
Enterprise Plus 56 <sup>5</sup>	c2600-js56-mz	8 MB	32 MB	RAM
Enterprise Plus IPSec 56	c2600-js56i-mz	8 MB	40 MB	RAM
<b>Cisco 3620 Series</b>				
Enterprise/APPN Plus	c3620-ajs-mz	16 MB	48 MB	RAM
Enterprise/APPN Plus 40 <sup>6</sup>	c3620-ajs40-mz	16 MB	48 MB	RAM
Enterprise/APPN Plus IPSec 56	c3620-ajs56i-mz	16 MB	48 MB	RAM
IP/IPX/AT/DEC	c3620-d-mz	8 MB	24 MB	RAM
IP/IPX/AT/DEC Plus	c3620-ds-mz	8 MB	32 MB	RAM
IP	c3620-i-mz	4 MB	24 MB	RAM
IP Plus	c3620-is-mz	8 MB	32 MB	RAM
IP Plus 40	c3620-is40-mz	8 MB	32 MB	RAM
IP Plus IPSec 56	c3620-is56i-mz	8 MB	32 MB	RAM
Enterprise Plus	c3620-js-mz	8 MB	48 MB	RAM
Enterprise Plus 40 <sup>6</sup>	c3620-js40-mz	8 MB	48 MB	RAM

Table 1 Cisco IOS Release 12.0 Memory Recommendations (continued)

Feature Set	Image Name	Recommended Flash Memory	Recommended DRAM Memory	Runs From
Enterprise Plus IPsec 56	c3620-js56i-mz	8 MB	48 MB	RAM
<b>Cisco 3640 Series</b>				
Enterprise/APPN Plus	c3640-ajs-mz	16 MB	48 MB	RAM
Enterprise/APPN Plus 40 <sup>6</sup>	c3640-ajs40-mz	16 MB	48 MB	RAM
Enterprise/APPN Plus IPsec 56	c3640-ajs56i-mz	16 MB	48 MB	RAM
IP/IPX/AT/DEC	c3640-d-mz	8 MB	24 MB	RAM
IP/IPX/AT/DEC Plus	c3640-ds-mz	8 MB	32 MB	RAM
IP	c3640-i-mz	4 MB	24 MB	RAM
IP Plus	c3640-is-mz	8 MB	32 MB	RAM
IP Plus 40	c3640-is40-mz	8 MB	32 MB	RAM
IP Plus IPsec 56	c3640-is56i-mz	8 MB	32 MB	RAM
Enterprise Plus	c3640-js-mz	8 MB	48 MB	RAM
Enterprise Plus 40 <sup>6</sup>	c3640-js40-mz	8 MB	48 MB	RAM
Enterprise Plus IPsec 56	c3640-js56i-mz	8 MB	48 MB	RAM
<b>Cisco MC3810</b>				
IP/IPX/IBM/ATM	mc3810-a2inr3-mz	8 MB	32 MB	RAM
IP/IPX/AT/IBM/Voice	mc3810-binr3v2-mz	8 MB	32 MB	RAM
IP/IPX/AT/IBM/ATM/Voice	mc3810-a2binr3v2-mz	8 MB	32 MB	RAM
<b>Cisco 4000 Series</b>				
Enterprise/APPN Plus	c4000-ajs-mz	8 MB	32 MB	RAM
Enterprise/APPN Plus 40	c4000-ajs40-mz	8 MB	32 MB	RAM
Enterprise/APPN Plus IPsec 56	c4000-ajs56i-mz	8 MB	32 MB	RAM
IP/IPX/AT/DEC	c4000-d-mz	4 MB	16 MB	RAM
IP/IPX/AT/DEC Plus	c4000-ds-mz	4 MB	16 MB	RAM
IP	c4000-i-mz	4 MB	16 MB	RAM
IP Plus	c4000-is-mz	4 MB	16 MB	RAM
IP Plus 40	c4000-is40-mz	4 MB	16 MB	RAM
IP Plus IPsec 56	c4000-is56i-mz	4 MB	16 MB	RAM
Enterprise Plus	c4000-js-mz	8 MB	32 MB	RAM
Enterprise Plus 40 <sup>7</sup>	c4000-js40-mz	8 MB	32 MB	RAM
Enterprise Plus IPsec 56	c4000-js56i-mz	8 MB	32 MB	RAM
<b>Cisco 4500/4700 Series</b>				
IP Plus IPsec 56	c4500-aejs-mz	8 MB	32 MB	RAM

Table 1 Cisco IOS Release 12.0 Memory Recommendations (continued)

Feature Set	Image Name	Recommended Flash Memory	Recommended DRAM Memory	Runs From
Enterprise Plus	c4500-aejs40-mz	8 MB	32 MB	RAM
Enterprise Plus IPsec 56	c4500-aejs56i-mz	8MB	32 MB	RAM
Enterprise/APPN Plus	c4500-ajs-mz	8 MB	32 MB	RAM
Enterprise/APPN Plus 40	c4500-ajs40-mz	8 MB	32 MB	RAM
Enterprise/APPN Plus IPsec 56	c4500-ajs56i-mz	8 MB	32 MB	RAM
IP/IPX/AT/DEC	c4500-d-mz	8 MB	32 MB	RAM
IP/IPX/AT/DEC Plus	c4500-ds-mz	8 MB	32 MB	RAM
IP	c4500-i-mz	4 MB	32 MB	RAM
IP Plus	c4500-is-mz	8 MB	32 MB	RAM
IP Plus 40	c4500-is40-mz	8 MB	32 MB	RAM
IP Plus IPsec 56	c4500-is56i-mz	8 MB	32 MB	RAM
Enterprise Plus	c4500-js-mz	8 MB	32 MB	RAM
Enterprise Plus 40	c4500-js40-mz	8 MB	32 MB	RAM
Enterprise Plus IPsec 56	c4500-js56i-mz	8 MB	32 MB	RAM
<b>Cisco Catalyst 5000 Route Switch Module (RSM)</b>				
Enterprise/APPN	c5rsm-ajsv-mz	16 MB	32 MB	RAM
Enterprise/APPN 40	c5rsm-ajsv40-mz	16 MB	32 MB	RAM
Enterprise/APPN 56 <sup>8</sup>	c5rsm-ajsv56-mz	16 MB	32 MB	RAM
Enterprise/APPN IPsec 56	c5rsm-ajsv56i-mz	16MB	32 MB	RAM
Desktop/IBM	c5rsm-dsv-mz	16 MB	32 MB	RAM
Desktop/IBM 40	c5rsm-dsv40-mz	16 MB	32 MB	RAM
Desktop/IBM IPsec 56	c5rsm-dsv56i-mz	16 MB	32 MB	RAM
IP/VIP	c5rsm-isv-mz	16 MB	32 MB	RAM
IP/VIP 40	c5rsm-isv40-mz	16 MB	32 MB	RAM
IP/VIP IPsec 56	c5rsm-isv56i-mz	16 MB	32 MB	RAM
Enterprise/VIP	c5rsm-jsv-mz	16 MB	32 MB	RAM
Enterprise/VIP 40	c5rsm-jsv40-mz	16 MB	32 MB	RAM
Enterprise/VIP IPsec 56	c5rsm-jsv56i-mz	16 MB	32 MB	RAM
<b>Cisco AS5200 Access Server</b>				
Desktop	c5200-d-l	16 MB	8 MB	Flash
Desktop Plus	c5200-ds-l	16 MB	8 MB	Flash
IP	c5200-i-l	8 MB	8 MB	Flash
IP Plus	c5200-is-l	8 MB	8 MB	Flash
Enterprise	c5200-j-l	16 MB	8 MB	Flash

Table 1 Cisco IOS Release 12.0 Memory Recommendations (continued)

Feature Set	Image Name	Recommended Flash Memory	Recommended DRAM Memory	Runs From
Enterprise Plus	c5200-js-l	16 MB	8 MB	Flash
<b>Cisco AS5300 Access Server</b>				
Desktop	c5300-d-mz	8 MB	32 MB	RAM
Desktop Plus	c5300-ds-mz	8 MB	32 MB	RAM
IP	c5300-i-mz	8 MB	32 MB	RAM
IP Plus	c5300-is-mz	8 MB	32 MB	RAM
IP Plus 40	c5300-is40-mz	8 MB	32 MB	RAM
IP Plus IPsec 56	c5300-is56i-mz	8 MB	32 MB	RAM
Enterprise	c5300-j-mz	8 MB	32 MB	RAM
Enterprise Plus	c5300-js-mz	8 MB	32 MB	RAM
Enterprise Plus 40	c5300-js40-mz	8 MB	32 MB	RAM
Enterprise Plus IPsec 56	c5300-js56i-mz	8 MB	32 MB	RAM
<b>Cisco 7200 Series</b>				
Enterprise/APPN/DBCONN	c7200-aejs-mz	16 MB	64 MB	RAM
Enterprise/APPN/DBCONN 40	c7200-aejs40-mz	16 MB	64 MB	RAM
Enterprise/APPN/DBCONN IPsec 56	c7200-aejs56i-mz	16 MB	64 MB	RAM
Enterprise/APPN	c7200-ajs-mz	16 MB	64 MB	RAM
Enterprise/APPN 40	c7200-ajs40-mz	16 MB	64 MB	RAM
Enterprise/APPN IPsec 56	c7200-ajs56i-mz	16 MB	64 MB	RAM
Desktop/IBM	c7200-ds-mz	16 MB	64 MB	RAM
Desktop/IBM 40	c7200-ds40-mz	16 MB	64 MB	RAM
Desktop/IBM IPsec 56	c7200-ds56i-mz	16 MB	64 MB	RAM
Network Layer 3 Switching	c7200-inu-mz	16 MB	64 MB	RAM
IP	c7200-is-mz	16 MB	64 MB	RAM
IP 40	c7200-is40-mz	16 MB	64 MB	RAM
IP IPsec 56	c7200-is56i-mz	16 MB	64 MB	RAM
Enterprise	c7200-js-mz	16 MB	64 MB	RAM
Enterprise 40	c7200-js40-mz	16 MB	64 MB	RAM
Enterprise IPsec 56	c7200-js56i-mz	16 MB	64 MB	RAM
<b>Cisco 7500 Series</b>				
Enterprise/APPN/DBCONN	rsp-aejstv-mz	16 MB	64 MB	RAM
Enterprise/APPN/DBCONN 40 <sup>7</sup>	rsp-aejstv40-mz	16 MB	64 MB	RAM

**Table 1 Cisco IOS Release 12.0 Memory Recommendations (continued)**

Feature Set	Image Name	Recommended Flash Memory	Recommended DRAM Memory	Runs From
Enterprise/APPN/DBCONN IPsec 56 <sup>7</sup>	rsp-aejsv56i-mz	16 MB	64 MB	RAM
Enterprise/APPN <sup>7</sup>	rsp-ajsv-mz	16 MB	64 MB	RAM
Enterprise/APPN 40 <sup>7</sup>	rsp-ajsv40-mz	16 MB	64 MB	RAM
Enterprise/APPN IPsec 56 <sup>7</sup>	rsp-ajsv56i-mz	16 MB	64 MB	RAM
Desktop/IBM/APPN <sup>7</sup>	rsp-ajsv-mz	16 MB	64 MB	RAM
Desktop/IBM <sup>7</sup>	rsp-dsv-mz	16 MB	64 MB	RAM
Desktop/IBM 40 <sup>7</sup>	rsp-dsv40-mz	16 MB	64 MB	RAM
Desktop/IBM IPsec 56 <sup>7</sup>	rsp-dsv56i-mz	16 MB	64 MB	RAM
IP <sup>7</sup>	rsp-isv-mz	16 MB	64 MB	RAM
IP 40 <sup>7</sup>	rsp-isv40-mz	16 MB	64 MB	RAM
IP IPsec 56 <sup>7</sup>	rsp-isv56i-mz	16 MB	64 MB	RAM
Enterprise <sup>7</sup>	rsp-jsv-mz	16 MB	64 MB	RAM
Enterprise 40 <sup>7</sup>	rsp-jsv40-mz	16 MB	64MB	RAM
Enterprise IPsec 56 <sup>7</sup>	rsp-jsv56i-mz	16 MB	64 MB	RAM

1. This image is supported on Cisco IOS Release 12.0(22) and earlier.
2. Cisco 1600 images were first released in Cisco IOS Release 12.0(3).
3. This image is supported on Cisco IOS Release 12.0(10) and earlier.
4. This image is supported on Cisco IOS Release 12.0(10) and earlier.
5. This image is supported on earlier Cisco IOS Releases or can be supported with an equivalent IPsec 56 image. Contact your Cisco representative for additional information.
6. This image is supported on Cisco IOS Release 12.0(4) and earlier.
7. This image is supported on Cisco IOS Release 12.0(11) and earlier.
8. This image is supported on Cisco IOS Release 12.0(12) and earlier.

## Supported Hardware

Cisco IOS Release 12.0 supports the following Cisco hardware platforms:

- Cisco 1003 and Cisco 1004 routers
- Cisco 1005 router
- Cisco 1600 router
- Cisco 2500 series
- Cisco 2600 series
- Cisco 3620 router
- Cisco 3640 and Cisco 3640A routers
- Cisco MC3810
- Cisco 4000 series
- Cisco 4500 and Cisco 4700 series
- Cisco Catalyst 5000 series
- Cisco AS5200 series
- Cisco AS5300 series
- Cisco AS5800 series
- Cisco 7200 series
- Cisco 7500 series
- Cisco 7500 RSPx series<sup>1</sup>

1. Cisco 7000 series routers (Cisco 7000 and Cisco 7010) were upgraded with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI).

**Note**

The Cisco 7000 series previously included the Cisco 7000 and Cisco 7010. These products are not supported in Cisco IOS Release 12.0. However, with a Route Switch Processor (RSP) upgrade, the Cisco 7000 and Cisco 7010 are essentially converted to a Cisco 7500. Image names for this enhanced platform begin with “rsp-”, and the platform abbreviation is “7500/RSP.” All references to Cisco 7500 series routers (excluding specific slot and port references) refer also to the Cisco 7000 and Cisco 7010 equipped with the RSP7000 processor and the RSP7000 Chassis Interface (CI). These products are supported in Cisco IOS Release 12.0. For more information, see the section on 12.

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

<http://www.cisco.com/cgi-bin/front.x/Support/HWSWmatrix/hwswwmatrix.cgi>

Cisco IOS Release 12.0(1a) on the Catalyst 5000 Route Switch Module (RSM) platform supports the port adapters listed in [Table 2](#):

**Table 2 Cisco IOS Release 12.0(1a) Supported Port Adapters for Catalyst 5000 RSM**

Part Number	Product Description
PA-4T+	4-Port Serial Port Adapter, Enhanced
PA-8T-V35	8-Port Serial, V.35 Port Adapter
PA-8T-232	8-Port Serial, 232 Port Adapter
PA-8T-X21	8-Port Serial, X.21 Port Adapter
PA-4R	4-Port Token Ring 4/16-Mbps Port Adapter
PA-4R-FDX	4-Port Token Ring 4/16-Mbps, Full-Duplex Port Adapter
PA-F-MM	1-Port FDDI Multimode Port Adapter
PA-F-SM	1-Port FDDI Single-Mode Port Adapter
PA-F/FD-MM	8-Port FDDI Full-Duplex Multimode Port Adapter
PA-F/FD-SM	1-Port FDDI Full-Duplex Single-Mode Port Adapter
PA-A1-OC3SM	1-Port ATM OC 3 Single-Mode Intermediate Reach Port Adapter
PA-A1-OC3MM	1-Port ATM OC 3 Multimode Port Adapter
PA-2CT1/PRI	2-Port Channelized T1/PRI Port Adapter
PA-2CE1/PRI-75	2-Port Channelized E1/PRI Port Adapter, 75 Ohm
PA-2CE1/PRI-120	2-Port Channelized E1/PRI Port Adapter, 120 Ohm
SA-COMP/1	Service Adapter; Compression (64 VCs Stac)
SA-COMP/4	Service Adapter; Compression (256 VCs Stac)
PA-4E	4-Port Ethernet 10BASE-T Port Adapter
PA-8E	8-Port Ethernet 10BASE-T Port Adapter
PA-H, PA-2H	HSSI Port Adapter (can be used in C5500 chassis only, 2 maximum)
SA-ENCRYPT	Encryption Service Adapter

Table 2 Cisco IOS Release 12.0(1a) Supported Port Adapters for Catalyst 5000 RSM (continued)

Part Number	Product Description
PA-FE-TX	Fast Ethernet Port Adapter
PA-FE-FX	Fast Ethernet Port Adapter
PA-A3-E3	1-Port ATM Enhanced E3 Port Adapter
PA-A3-T3	1-Port ATM Enhanced T3 Port Adapter
PA-A3-OC3MM	1-Port ATM Enhanced OC-3 c/STM 1 Multimode Port Adapter
PA-A3-OC3SMI	1-Port ATM Enhanced OC-3 c/STM 1 Single-Mode (IR) Port Adapter
PAA3-OC3SML	1-Port ATM Enhanced OC-3 c/STM 1 Single-Mode (LR) Port Adapter
PA-E3	1-Port E3 Serial Port Adapter (with E3 DSU can be used in C5500 chassis only, 2 maximum)
PA-2E3	2-Port E3 Serial Port Adapter with E3 DSU (can be used in C5500 chassis only, 2 maximum)
PA-T3	1-Port T3 Serial Port Adapter with T3 DSU (can be used in C5500 chassis only, 2 maximum)
PA-2T3	2-Port T3 Serial Port Adapter with T3 DSU (can be used in C5500 chassis only, 2 maximum)
PA-5EFL	5-Port Ethernet 10BASE-FL Port Adapter
PA-POS-OC3MM	1-Port Packet/SONET OC-3 c/STM-1 Multimode Port Adapter
PA-POS-OC3SMI	1-Port Packet/SONET OC-3 c/STM-1 Single-Mode (IR) Port Adapter
PA-POS-OC3SML	1-Port Packet/SONET OC-3 c/STM-1 Single-Mode (LR) Port Adapter

## Determining Your Software Release

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

```
Router> show version
```

```
Cisco Internetwork Operating System Software
IOS (tm) 2500 Software (C2500-JS-L), Version 12.0(1), RELEASE SOFTWARE
```

Additional command output lines include more information, such as processor revision numbers, memory amounts, hardware IDs, and partition information.

## Upgrading to a New Release

For general information about upgrading to a new software release, see *Upgrading the Cisco IOS Software Release in Cisco Routers and Modems* located at the following URL:

<http://www.cisco.com/warp/public/620/6.html>

## Microcode Software

Table 3 lists the current microcode versions for the Cisco 7500/RSP series. This series includes the Cisco 7000 equipped with the RSP7000 processor, the Cisco 7010 equipped with the RSP7000 processor, and the Cisco 7500 series routers. Note that microcode software images are bundled with the system software image, with the exception of the Channel Interface Processor (CIP) microcode (all system software images) and Versatile Interface Processor (VIP) microcode (certain system software images). Bundling eliminates the need to store separate microcode images. When the router starts, the system software unpacks the microcode software bundle and loads the proper software on all the interface processor boards.

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

**Table 3 Cisco 7500 Series Routers Microcode Versions**

Processor or Module	Current Microcode Version	Minimum Version Required
AIP (ATM Interface Processor)	20.18	20.13
CIP/CIP2 (Channel Interface Processor)	26.19	26.2
EIP (Ethernet Interface Processor)	20.6	20.3
FEIP (Fast Ethernet Interface Processor)	20.8	20.7
FIP (FDDI Interface Processor)	20.4	20.4
FSIP (Fast Serial Interface Processor)	20.9	20.9
HIP (HSSI Interface Processor)	20.2	20.2
MIP (MultiChannel Interface Processor)	22.3	22.3
TRIP (Token Ring Interface Processor)	20.2	20.2
VIP2/VIP2C (Versatile Interface Processor)	22.20	22.20

## Microcode Revision History

The following sections provide revision summaries for microcode for the following routers:

- Cisco 7000 series routers using a Route Processor/Silicon Switch Processor (RP/SSP) or Route Processor/Switch Processor (RP/SP) combination
- Cisco 7500 series routers and Cisco 7000 series routers using an RSP7000

### ATM Interface Processor (AIP) Microcode Revision Summary

These AIP Microcode versions fix the following caveats:

- Version 20.14—AIP driver rejects Teardown VC command [CSCdj20667].
- Version 20.15—OIR of any card with cip in box causes problems [CSCdj37259].
- Version 20.16—AIP forwards giants to RSP causing RSP crash at rsp\_free\_mamd-pak [CSCdj59745].

- Version 20.17—mroute corruption in AIP [CSCdj82421].
- Version 20.18—AIP applies incorrect physical format on Book Tree 8222 framer [CSCdj90325].

## Channel Interface Processor (CIP/CIP2) Microcode Revision Summary

CIP/CIP2 Microcode Version 26.16 fixes the following caveats:

- TN3270 response times include keepalive Timing Mark responses and not TN3270E responses. [CSCdm69924]
- A CIP reloads after a TN3270 shutdown. [CSCdr06895]
- CIP fatal error=09. [CSCdr07060]
- CIP fatal error=35 occurs when you run the maximum number of sessions on an Enterprise Systems Connection (ESCON) Channel Port Adapter (ECPA). [CSCdr07326]
- After an initial program load (IPL), a Cisco MultiPath Channel (CMPC) connection does not reactivate unless the virtual telecommunications access method (VTAM) major node is recycled. [CSCdr07387]
- The following “bad timer” message appears when you start a TN3270 server:
 

```
%TN3270S-6-BADTIMER: Bad timer operation(0),ra=80C1A5E4,funcPtr=80C1. [CSCdr11353]
```
- A Cisco router reloads because of null message pointer, SapCb::ProcessTestInd. [CSCdr28191]
- The secondary logical unit (SLU) name is missing on a positive BIND response Route Switch Processor (RSP). [CSCdr42284]
- Non-RFC compliant-negotiation exchanges may cause a CIP Fatal Error=35 in the TN server code because of a NULL pointer reference. [CSCdr64719]
- Systems Network Architecture (SNA) physical unit 5 to physical unit 5 session fails to recover because of incomplete CIP cleanup. [CSCdr65638]
- A Cisco AS400 access server TN3270 client adds an invalid termtype of IBM-3486-BA. [Cdr65906]
- CIP TN3270 server logical units (LUs) are not returned to pools, and the pools run out of LUs. [CSCdr66536]
- CIP fatal error=32 occurs when you use the **tasks query pid** command with the wrong PID. [CSCdr74632]
- The TN regression suite requires a UNIX-based client emulator. [CSCdr77006]
- A Cisco router deadlocks when it runs out of SCBs. [CSCdr85879]
- Cisco Multipath Channel (CMPC) Transmission Groups (TGs) may get stuck in the SAttachSapPending State. [CSCdr87920]
- A client does not respond when the server holds the keyboard restore until it receives a change direction. [CSCdr93053]
- Suppress all OFFL-4-BADDESC error message with the DESC\_Holddown state. [CSCdr98652]
- Ignore TN3270S-6-BADTIMER, operation(1) messages. [CSCds00674]
- IPC does not check the pointer, and the router reloads. [CSCds05651]
- CIP fatal error=35 occurs when you remove a TN3270 Dependent Logical Unit Requester (DLUR) configuration. [CSCds14146]
- Output stuck on a CIP does not provide diagnostic output. [CSCds18936]

- A performance enhancement for Common Link Access for Workstations (CLAW) Packing for a 4k block is added. [CSCds19174]
- A compiler error occurs when the Eno version for CSCds00674 is built. [CSCds20346]
- Common Link Access for Workstations (CLAW) Packing pauses indefinitely with a 4k block and a 4k maximum transmission unit (MTU). [CSCds24793]
- “Make tags” fails. [CSCds26247]
- A CIP reloads with CIP fatal error=09 SSI\_ASSERT failure in ../mpc/mcp.C. [CSCds27703]
- Once a logical unit (LU) is disconnected, a client cannot reconnect for 10 seconds with the **lu deletion never** command. [CSCds28146]
- CIP fatal error=35 in a TN3270 server Route Switch Processor (RSP) to structured data transfer (SDT). [CSCds31131]
- CIP fatal error=09 SSI\_ASSERT failure in ../mpc/clean.C @ 327 - elemP. [CSCds32606]
- Flapping of Cisco Multipath Channel (CMPC) transmission groups (TGs) leads to output stuck on a channel interface. [CSCds41393]
- Add device address to BADAPPL claw message. [CSCds46020]
- A CIP or Channel Port Adapter (CPA) restarts with Fast Ethernet-35 (FE-35) when you configure more than 18 adapters with Multipath Channel (MPC). [CSCds47000]
- Add ANSI to TN3270 unsupported terminal list. [CSCds51099]

## Ethernet Interface Processor (EIP) Microcode Revision Summary

EIP Microcode Version 20.6 fixes the following caveat:

- A corrupted frame is seen on RSP Ethernet under heavy load [CSCdk34545].

## Fast Ethernet Interface Processor (FEIP) Microcode Revision Summary

FEIP Microcode Version 20.8 fixes the following caveat:

- The Fast Ethernet interface stays up even when no MII transceiver and keepalives exist. If “no keepalive” (or **keepalive 0**) is configured on Fast Ethernet, the line will stay up even though the Media-Independent Interface (MII) is removed or the cable is disconnected. If the interface is then reconfigured with “keepalive” (of nonzero value) while the physical media stayed down, the link would still indicate up. The only workaround is to issue the command **shutdown** followed by **no shutdown**, or the **clear interface** command. [CSdk66019]

## Modem Code

Cisco IOS Release 11.2 and later releases, including Release 12.0, include bundled modem code for the Cisco AS5200, which is the firmware or portware that runs on the Microcom 12-port and MICA 6-port modem cards. Modem code is bundled with the Cisco IOS software image to eliminate the need to store separate modem code. When the access server starts, the Cisco IOS software unpacks the modem code and loads the proper code on the modem cards.

The modem code release notes are on Cisco.com and the Documentation CD-ROM.

On Cisco.com at:

Technical Documents: All Product Documentation: Access Servers and Access Routers: Firmware and Portware Information

On the Documentation CD-ROM at:

Cisco Product Documentation: Access Servers and Access Routers: Firmware and Portware Information

