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Release Notes for Cisco IOS Release 11.2 Software Feature Packs—Cisco 1000 Series Routers

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These release notes identify the Cisco IOS Release 11.2 feature packs for Cisco 1000 series routers (Cisco and CiscoPro models).

Product numbers for the supported feature packs are as follows:

- CD10-C/H-11.2= (Cisco 1000 IP Feature Pack)

- CD10-A/B/E-11.2= (Cisco 1000 IP/IPX/AppleTalk Feature Pack)

- CD10-AP-11.2= (Cisco 1000 IP/IPX/AppleTalk Plus Feature Pack)

- CD10-AW-11.2=(Cisco 1000 IP/IPX/AppleTalk Plus 40 Feature Pack)

- CD10-AY-11.2=(Cisco 1000 IP/IPX/AppleTalk Plus 56 Feature Pack)

Note   The feature packs listed here contain Cisco IOS Release 11.2(5)P software images and a selection of back rev images. The feature packs contain Router Software Loader (RSL) Version 5.0.

Note   Before running RSL, read the section "Installation Tips," page 7.

These release notes contain the following sections:

- What Is a Feature Pack?, page 2

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- Cisco Feature Pack Descriptions, page 3

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What Is a Feature Pack?

The heart of a Cisco IOS software feature pack is a CD-ROM that contains software images and RSL, a Windows 95 application, which loads the images onto the router. Each Cisco IOS Release 11.2 feature pack CD contains feature sets. For users without Windows 95, images can also be loaded with a Trivial File Transfer Protocol (TFTP) server application.

Each Cisco IOS Release 11.2 software feature pack box contains the following:

- CD-ROM with the following software:

    — Feature set software images

    — RSL program (a Windows 95 application)

- Instruction booklet for using RSL

- Release notes (this document), which include instructions for using a TFTP server application on a system not running Windows 95

- Software license—for using Cisco software in object code form on a single router

- Cisco Documentation CD-ROM, which contains all Cisco IOS software documentation

Supported Platforms

RSL 5.0 supports the following Cisco 1000 series routers:

- CiscoPro CPA1003, CPA1004, and CPA1005

- Cisco 1003, 1004, and 1005

Loading Cisco IOS Release 11.2 Software on CiscoPro Routers

RSL contains an upgrade utility that permanently modifies a CiscoPro router so that it will accept the Cisco IOS Release 11.2 software images.

The utility changes the router's SysObjectID Simple Network Management Protocol (SNMP) MIB value (used for network management) from CiscoPro to that of a Cisco router. The software banner also changes so that it no longer identifies the router as a CiscoPro product.

> **Note**   After this upgrade, your router will no longer be recognized by CiscoVision. If you perform the permanent upgrade and currently use the CiscoVision network management application, CiscoWorks for Windows is a recommended replacement for network management purposes. You can upgrade your CiscoVision software to CiscoWorks Windows 2.1 by ordering one of the following: CPW-CVCW-U to upgrade CiscoVision to CiscoWorks Windows (managing up to 50 nodes), or CPW-CVCW-ENT-U to upgrade CiscoVision to CiscoWorks Windows (managing up to 500 nodes). To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

The upgrade utility must be located in the Images directory. If it is not, the upgrade utility will inform you that the image is not present. The Cisco 1000 series upgrade utility's filename is cpa1000-upgrade-l.112-3.P.

Cisco Feature Pack Descriptions

This section describes the Cisco feature packs, listing the software feature sets comprising each pack. You can use this information to identify your feature pack set in conjunction with the corresponding information provided in the tables in the section "Cisco IOS Release 11.2 Feature Sets," page 9. Tables in that section identify which features are supported for a feature set on a specific platform.

Software Feature Packs

This section includes two tables: Table 1, on the following page, identifies each feature pack as specified on the label of the CD containing the router software. It also lists the feature sets comprising the feature pack, giving the UNIX and DOS filenames of the images. The table provides a brief description of each feature set and the router platform on which the feature set runs. Table 1 also identifies the memory required to run each feature set on the Cisco 1000 series router; Table 2 describes the memory delivered by default and the memory upgrades available.

You can use Table 1 to identify the memory required for your configuration based on the image you run. You can then check this against Table 2 to determine how much memory is available on the router as the factory default and the upgrades that you can obtain to satisfy your requirements.

Table 1   Cisco Feature Pack Image Filenames and Memory Requirements

Image Description	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required
Cisco 1000 IP Feature Pack Release 11.2 (model number CD10-C/H-11.2=)				
Cisco 1003/1004 IP feature set 11.2(5)	c1000-y-mz.112-5.P	80144405	2 MB	4 MB
Cisco 1003/1004 IP feature set 11.2(3)	c1000-y-mz.112-3	80112503	2 MB	4 MB
Cisco 1003/1004 IP feature set 11.1(8)	c1000-y-mz.111-8	BE11180N	2 MB	4 MB
Cisco 1003/1004 IP feature set 11.0(13)	c1000-y-mz.110-13	80082313	2 MB	4 MB
Cisco 1005 IP feature set 11.2(5)	c1005-y-mz.112-5.P	80145305	2 MB	4 MB
Cisco 1005 IP feature set 11.2(3)	c1005-y-mz.112-3	80113403	2 MB	4 MB
Cisco 1005 IP feature set 11.1(8)	c1005-xy-mz.111-8	WE11180N	2 MB	4 MB
Cisco 1005 IP feature set 11.0(13)	c1005-xy-mz.110-13	80082713	2 MB	4 MB
Cisco 1005-async IP feature set 11.2(5)	c1005-qy-mz.112-5.P	80145205	2 MB	4 MB
Cisco 1005-async IP feature set 11.2(3)	c1005-qy-mz.112-3	80113303	2 MB	4 MB
Cisco 1005-async IP feature set 11.1(8)	c1005-qy-mz.111-8	WA11180N	2 MB	4 MB
Cisco 1005-async IP feature set 11.0(13)	c1005-qy-mz.110-13	80090313	2 MB	4 MB
Cisco 1005 IP/OSPF/PIM Internet Service Provider feature set 11.2(5)	c1005-y2-mz.112-5.P	80145405	2 MB	8 MB
Cisco 1005 IP/OSPF/PIM Internet Service Provider feature set 11.2(3)	c1005-y2-mz.112-3	80113503	2 MB	8 MB
Cisco 1005 IP/OSPF/PIM Internet Service Provider feature set 11.1(8)	c1005-xy2-mz.111-8	W211180N	2 MB	8 MB
Cisco 1005 IP/OSPF/PIM Internet Service Provider feature set 11.0(13)	c1005-xy2-mz.110-13	80090513	2 MB	8 MB
Cisco 1003/1004 IP/IPX feature set 11.2(5)	c1000-ny-mz.112-5.P	80144305	2 MB	8 MB
Cisco 1003/1004 IP/IPX feature set 11.2(3)	c1000-ny-mz.112-3	80112403	2 MB	8 MB
Cisco 1003/1004 IP/IPX feature set 11.1(8)	c1000-ny-mz.111-8	BN11180N	2 MB	8 MB
Cisco 1003/1004 IP/IPX feature set 11.0(13)	c1000-ny-mz.110-13	80082513	2 MB	8 MB
Cisco 1005 IP/IPX feature set 11.2(5)	c1005-ny-mz.112-5.P	80145105	2 MB	8 MB
Cisco 1005 IP/IPX feature set 11.2(3)	c1005-ny-mz.112-3	80113203	2 MB	8 MB
Cisco 1005 IP/IPX feature set 11.1(8)	c1005-ny-mz.111-8	WN11180N	2 MB	8 MB
Cisco 1005 IP/IPX feature set 11.0(13)	c1005-ny-mz.110-13	80082913	2 MB	8 MB
Cisco 1005 async IP/IPX feature set 11.2(5)	c1005-nqy-mz.112-5.P	80145005	2 MB	8 MB

Table 1   Cisco Feature Pack Image Filenames and Memory Requirements (Continued)

Image Description	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required
Cisco 1005 async IP/IPX feature set 11.2(3)	c1005-nqy-mz.112-3	80113103	2 MB	8 MB
Cisco 1005 async IP/IPX feature set 11.1(8)	c1005-nqy-mz.111-8	WU11180N	2 MB	8 MB
Cisco 1005 async IP/IPX feature set 11.0(13)	c1005-nqy-mz.110-13	80090413	2 MB	8 MB
Cisco 1000 IP/IPX/AppleTalk Feature Pack Release 11.2 (model number CD10-A/B/E-11.2=)				
Cisco 1003/1004 IP/Appletalk feature set 11.2(5)	c1000-by-mz.112-5.P	80144205	2 MB	8 MB
Cisco 1003/1004 IP/Appletalk feature set 11.2(3)	c1000-by-mz.112-3	80112303	2 MB	8 MB
Cisco 1003/1004 IP/Appletalk feature set 11.1(8)	c1000-by-mz.111-8	BI11180N	2 MB	8 MB
Cisco 1003/1004 IP/Appletalk feature set 11.0(13)	c1000-by-mz.110-13	80082413	2 MB	8 MB
Cisco 1005 IP/Appletalk feature set 11.2(5)	c1005-by-mz.112-5.P	80144905	2 MB	8 MB
Cisco 1005 IP/Appletalk feature set 11.2(3)	c1005-by-mz.112-3	80113003	2 MB	8 MB
Cisco 1005 IP/Appletalk feature set 11.1(8)	c1005-by-mz.111-8	WI11180N	2 MB	8 MB
Cisco 1005 IP/Appletalk feature set 11.0(13)	c1005-by-mz.110-13	80082813	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.2(5)	c1000-bny-mz.112-5.P	80144105	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.2(3)	c1000-bny-mz.112-3	80112203	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.1(8)	c1000-bny-mz.111-8	BD11180N	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.0(13)	c1000-bny-mz.110-13	80082613	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk feature set 11.2(5)	c1005-bny-mz.112-5.P	80144805	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk feature set 11.2(3)	c1005-bny-mz.112-3	80112903	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk feature set 11.1(8)	c1005-bny-mz.111-8	WD11180N	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk feature set 11.0(13)	c1005-bny-mz.110-13	80083113	2 MB	8 MB
Cisco1000 IP/IPX/AppleTalk Plus Feature Pack Release 11.2 (model number CD10-AP-11.2=)				
Cisco 1003/1004 IP/IPX/Appletalk Plus feature set 11.2(5)	c1000-bnsy-mz.112-5.P	80143805	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk Plus feature set 11.2(3)	c1000-bnsy-mz.112-3	80111903	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.1(8)	c1000-bny-mz.111-8	BD11180N	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.0(13)	c1000-bny-mz.110-13	80082613	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk Plus feature set 11.2(5)	c1005-bnsy-mz.112-5.P	80144505	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk Plus feature set 11.2(3)	c1005-bnsy-mz.112-3	80112603	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk feature set 11.1(8)	c1005-bnxy-mz.111-8	WT11180N	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk feature set 11.0(13)	c1005-bnxy-mz.110-13	80083513	2 MB	8 MB

Table 1   Cisco Feature Pack Image Filenames and Memory Requirements (Continued)

Image Description	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required
Cisco1000 IP/IPX/AppleTalk Plus 40 Feature Pack Release 11.2 (model number CD10-AW-11.2=)				
Cisco 1003/1004 IP/IPX/Appletalk Plus 40 feature set 11.2(5)	c1000-bnsy40-mz.112-5.P	80143905	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk Plus 40 feature set 11.2(3)	c1000-bnsy40-mz.112-3	80112003	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.1(8)	c1000-bny-mz.111-8	BD11180N	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.0(13)	c1000-bny-mz.110-13	80082613	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk Plus 40 feature set 11.2(5)	c1005-bnsy40-mz.112-5.P	80144605	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk Plus 40 feature set 11.2(3)	c1005-bnsy40-mz.112-3	80112703	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk/RMON feature set 11.1(8)	c1005-bnxy-mz.111-8	WT11180N	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk feature set 11.0(13)	c1005-bnxy-mz.110-13	80083513	2 MB	8 MB
Cisco1000 IP/IPX/AppleTalk Plus 56 Feature Pack Release 11.2 (model number CD10-AY-11.2=)				
Cisco 1003/1004 IP/IPX/Appletalk Plus 56 feature set 11.2(5)	c1000-bnsy56-mz.112-5.P	80144005	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk Plus 56 feature set 11.2(3)	c1000-bnsy56-mz.112-3	80112103	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.1(8)	c1000-bny-mz.111-8	BD11180N	2 MB	8 MB
Cisco 1003/1004 IP/IPX/Appletalk feature set 11.0(13)	c1000-bny-mz.110-13	80082613	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk Plus 56 feature set 11.2(5)	c1005-bnsy56-mz.112-5.P	80144705	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk Plus 56 feature set 11.2(3)	c1005-bnsy56-mz.112-3	80112803	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk/RMON feature set 11.1(8)	c1005-bnxy-mz.111-8	WT11180N	2 MB	8 MB
Cisco 1005 IP/IPX/Appletalk feature set 11.0(13)	c1005-bnxy-mz.110-13	80083513	2 MB	8 MB

Note RSL 5.0, contained in every Cisco IOS Release 11.2 software feature pack, supports Ethernet, Fast Ethernet, and Token Ring interfaces.

Table 2   Cisco 1000 Series Default and Memory Upgrade Options

Default	Upgrade Options	Description
8 MB (DRAM)	MEM-1003-8MD	4 MB to 8 MB DRAM Upgrade for Cisco 1003
8 MB (DRAM)	MEM-1004-8MD	4 MB to 8 MB DRAM Upgrade for Cisco 1004
8 MB (DRAM)	MEM-1005-8MD	4 MB to 8 MB DRAM Upgrade for Cisco 1005
8 MB (DRAM)	MEM-1000-8MD=	8 MB DRAM SIMM for Cisco 1003, 1004, 1005
2 MB (Flash)	MEM-1000-2MF=	2 MB Flash Card for Cisco 1003, 1004, 1005
2 MB (Flash)	MEM-1000-4MF=	4 MB Flash Card for Cisco 1003, 1004, 1005

Installation Tips

This section describes several solutions to problems you might encounter when using RSL. These solutions are additions to RSL's online help.

Recovering From a Connection Error

This installation tip provides a possible recovery solution in the event that you are unable to connect to your router. You can skip this section unless you are experiencing a connection error.

In some cases, you might receive the following error message while connecting to the target router:

```
"Failed to configure the router to enable the Cisco IOS software image and configuration
file upload and download operations. You may want to check the router to make sure that
the selected interface exists."
```

If you encounter this message, try increasing the Short Timeout value in the Options dialog box, especially if one of the following situations applies:

Note Increasing the Short Timeout value may increase the time it takes for RSL to connect to the target router.

- You are connecting to a router that has a large configuration file.

- You are connecting to a Cisco AS5200. A Cisco AS5200 requires up to 45 seconds to write a configuration to nonvolatile random-access memory (NVRAM), due to the amount of interfaces that must be checked during this process. Increase the Short Timeout value to 60 seconds.

Restoring the Startup Configuration

In some cases, RSL is unable to restore the startup configuration. If this happens, take the following steps:

Step 1   Ensure that all cables are properly attached to both the router and the PC.

Step 2   Restart RSL and connect using the **Preconfigured router** option.

Step 3   When asked if you want to overwrite the existing startup configuration file, choose **NO**.

Step 4   When asked if you want to continue, choose **YES**.

Step 5   When connected, select **Download Router Configuration** in the Router Software Loader dialog box.

Step 6   Select the appropriate file, and click the radio button beside **Copy configuration to the router's nonvolatile memory**.

The router should now contain the startup configuration it had before the initial RSL connection. You can now exit RSL.

Note   In the previous situation, the router's configuration register is not restored.

Note   If you enter **Ctrl-Alt-Delete** to terminate RSL, the router's configuration and configuration register are not restored. However, in this case the configuration file is not deleted from the PC, so it can be restored using the previous steps.

Helpful Hints

The following information about RSL operations can help you with the installation process:

• If you have added any static entries to the PC's Address Resolution Protocol (ARP) table, one of them may be deleted by RSL. This entry will need to be manually re-entered into the PC's ARP table.

• If your router is configured with a **boot system flash** *filename* command, where *filename* is the name of the previous image residing in the first partition of Flash memory, this command must be manually changed to reflect the name of the image that was copied to the router's first Flash memory partition.

• If the router's running configuration at connection time is not the same as the router's startup configuration, the exact configuration will not be restored. Any changes that you have made since the last time a **copy running-config startup-config** or **write memory** command was entered will be lost.

• If you connect to a router with multiple Flash memory partitions, it will always copy the new image to the first partition and reload to the first partition. This will fail if there is not enough memory in the first partition.

• RSL will restore the router's running configuration, but some configuration commands will not be restored. However, the startup configuration will be correct. You can restore the exact running configuration by rebooting the router. Commands not restored to the running configuration include the following interface configuration commands: **no shutdown**, **no ringspeed**, and **media-type aui**.

Cisco IOS Release 11.2 Feature Sets

Table 3 and Table 4 show specific features supported for Cisco IOS Release 11.2 on Cisco 1000 series routers.

The tables use these conventions to identify features:

- Yes: the feature is offered in the basic feature set

- – : the feature is not offered in the feature set

- Plus: the feature is offered only in the Plus feature sets, not in the basic feature set

- Encrypt: the addition of 40-bit (Plus 40) or 56-bit (Plus 56) data encryption feature sets

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

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

Table 3   Cisco IOS Release 11.2 Feature Sets for Cisco 1003, 1004, and 1005 Routers

Features	IP Routing[1]	IP/IPX Routing[1]	IP/AppleTalk Routing[1]
LAN Support			
AppleTalk 1 and 2[2]	–	–	Yes
GRE	Yes	Yes	Yes
Integrated routing and bridging (IRB)[3]	Yes	Yes	Yes
IP	Yes	Yes	Yes
Novell IPX[4]	–	Yes	–
Transparent and translational bridging[5]	Yes	Yes	Yes
WAN Services[6]			
Dialer profiles	Yes	Yes	Yes
Frame Relay (Cisco 1005 only)	Yes	Yes	Yes
Frame Relay SVC Support (DTE) (Cisco 1005 only)	Plus	Plus	Plus
Frame Relay traffic shaping (Cisco 1005 only)	Yes	Yes	Yes
HDLC	Yes	Yes	Yes
ISDN (Cisco 1003 and Cisco 1004)[7]	Yes	Yes	Yes
PPP	Yes	Yes	Yes
SMDS (Cisco 1005 only)	Yes	Yes	Yes
Switched 56 (Cisco 1005 only)	Yes	Yes	Yes
X.25	Yes	Yes	Yes
SLIP (Cisco 1005 only)	Yes	Yes	–

Table 3   Cisco IOS Release 11.2 Feature Sets for Cisco 1003, 1004, and 1005 Routers (Continued)

Features	IP Routing[1]	IP/IPX Routing[1]	IP/AppleTalk Routing[1]
WAN Optimization			
Bandwidth-on-demand (Cisco 1003 and Cisco 1004)	Yes	Yes	Yes
Custom and priority queuing	Yes	Yes	Yes
Dial backup	Yes	Yes	Yes
Dial-on-demand[8]	Yes	Yes	Yes
Header[9] and link compression[10] (Cisco 1003 and Cisco 1004)	Yes	Yes	Yes
Payload compression (Cisco 1005 only)	Yes	Yes	Yes
Snapshot routing[11]	Yes	Yes	Yes
Weighted fair queuing	Yes	Yes	Yes
IP Routing			
Enhanced IGRP	Yes	Yes	Yes
Enhanced IGRP Optimizations	Yes	Yes	Yes
IGRP	Yes	Yes	Yes
Network Address Translation Table (NAT)	Plus	Plus	Plus
On Demand Routing (ODR)	Yes	Yes	Yes
OSPF	Plus	Plus	Plus
OSPF Not-So-Stubby-Areas (NSSA)	Plus	Plus	Plus
OSPF On Demand Circuit (RFC 1793)	Plus	Plus	Plus
PIM	Plus	Plus	Plus
RIP	Yes	Yes	Yes
RIP Version 2	Yes	Yes	Yes
Other Routing			
AURP	–	–	Plus
IPX RIP	–	Yes	–
NLSP	Plus	Plus	Plus
SMRP	Plus	Plus	Plus
RTMP	–	–	Yes
Multimedia and Quality of Service			
Random Early Detection (RED)	Plus	Plus	Plus
Resource Reservation Protocol (RSVP)	Plus	Plus	Plus
Management			
ClickStart	Yes	Yes	Yes
HTTP Server	Yes	Yes	Yes
SNMP	Yes	Yes	Yes

Table 3   Cisco IOS Release 11.2 Feature Sets for Cisco 1003, 1004, and 1005 Routers (Continued)

Features	IP Routing[1]	IP/IPX Routing[1]	IP/AppleTalk Routing[1]
Telnet	Yes	Yes	Yes
Security			
Access lists	Yes	Yes	Yes
Access security	Yes	Yes	Yes
Extended access lists	Yes	Yes	Yes
Lock and key	Yes	Yes	Yes
Network layer encryption (40-bit or export controlled 56-bit DES)	Encrypt	Encrypt	Encrypt
Router authentication	Encrypt	Encrypt	Encrypt
TACACS+[12]	Yes	Yes	Yes

1. The IP, IP/IPX, and IP/AppleTalk feature sets are not available with Plus, Plus 40, or Plus 56 feature set options in Cisco IOS Release 11.2.
2. Includes AppleTalk load balancing.
3. IRB supports IP, IPX, and AppleTalk; it is supported for transparent bridging, but not for SRB; it is supported on all media-type interfaces except X.25 and ISDN bridged interfaces; and IRB and concurrent routing and bridging (CRB) cannot operate at the same time.
4. The Novell IPX feature includes display SAP by name, IPX Access Control List violation logging, and plain-English IPX access lists.
5. Transparent and translational bridging is fast switched. This enhancement is on by default, but can be disabled.
6. Cisco 1005 "WAN Services" offers three feature set options: Option 1 includes HDLC, PPP, SDMS, and Frame Relay, but not X.25, and is available on all feature sets; Option 2 includes X.25 only, and is available with the IP/IPX, IP/AppleTalk, and IP/IPX/AppleTalk feature sets; and Option 3 includes Async, PPP, and SLIP and is available with the IP, IP/IPX feature sets.
7. ISDN support includes calling line identification (caller ID), ISDN subaddressing, and applicable WAN optimization features.
8. Dial-on-demand is available for the Cisco 1005 with "WAN Services" option only. See footnote [6] above.
9. IPX header compression (RFC 1553) is available in the feature sets that support IPX.
10. X.25 and Frame Relay payload compression. Payload compression is available for the Cisco 1005.
11. Snapshot routing is not included for the Cisco 1005.
12. TACACS+ Single Connection and TACACS+ SENDAUTH enhancements are supported.

Table 4   Cisco IOS Release 11.2 Feature Sets for Cisco 1005 Routers

Features	IP/OSPF/PIM Routing[1]	IP/Async[1]	IP/IPX/Async[1]
LAN Support			
AppleTalk 1 and 2	–	–	–
GRE	Yes	Yes	Yes
Integrated routing and bridging (IRB)[2]	Yes	Yes	Yes
IP	Yes	Yes	Yes
Novell IPX[3]	–	–	Yes
Transparent and translational bridging[4]	Yes	Yes	Yes
WAN Services[5]			
Async	–	Yes	Yes
Dialer profiles	Yes	Yes	Yes

Table 4   Cisco IOS Release 11.2 Feature Sets for Cisco 1005 Routers (Continued)

Features	IP/OSPF/PIM Routing[1]	IP/Async [1]	IP/IPX/Async[1]
Frame Relay	Yes	–	–
Frame Relay traffic shaping	Yes	–	–
HDLC	Yes	–	–
PPP[6]	Yes	Yes	Yes
SMDS	Yes	–	–
Switched 56	Yes	–	–
X.25[7]	Yes	–	–
SLIP	–	Yes	Yes
WAN Optimization			
Custom and priority queuing	Yes	Yes	Yes
Dial-on-demand[8]	Yes	Yes	Yes
Header[9], link and payload compression [10]	Yes	Yes	Yes
Snapshot routing[11]	Yes	Yes	Yes
Weighted fair queuing	Yes	Yes	Yes
IP Routing			
Enhanced IGRP	Yes	Yes	Yes
Enhanced IGRP optimizations	Yes	Yes	Yes
IGRP	Yes	Yes	Yes
On Demand Routing (ODR)	Yes	Yes	Yes
OSPF	Yes	–	–
OSPF Not-So-Stubby-Areas (NSSA)	Yes	–	–
OSPF On Demand Circuit (RFC 1793)	Yes	–	–
PIM	Yes	–	–
RIP	Yes	Yes	Yes
RIP Version 2	Yes	Yes	Yes
Other Routing			
IPX RIP	–	–	Yes
Management			
ClickStart	Yes	Yes	Yes
HTTP Server	Yes	Yes	Yes
SNMP	Yes	Yes	Yes
Telnet	Yes	Yes	Yes
Security			
Access lists	Yes	Yes	Yes
Access security	Yes	Yes	Yes

Table 4   Cisco IOS Release 11.2 Feature Sets for Cisco 1005 Routers (Continued)

Features	IP/OSPF/PIM Routing[1]	IP/Async [1]	IP/IPX/Async[1]
Extended access lists	Yes	Yes	Yes
Kerberos V client support	–	–	–
Lock and key	Yes	Yes	Yes
TACACS+[12]	Yes	Yes	Yes

1. These feature sets are not available with the Plus, Plus 40, or Plus 56 feature set options in Cisco IOS Release 11.2.
2. IRB supports IP, IPX, and AppleTalk; it is supported for transparent bridging, but not for SRB; it is supported on all media-type interfaces except X.25 and ISDN bridged interfaces; and IRB and concurrent routing and bridging (CRB) cannot operate at the same time.
3. The Novell IPX feature includes display SAP by name, IPX Access Control List violation logging, and plain-English IPX access lists.
4. Transparent and translational bridging is fast switched. This enhancement is on by default, but can be disabled.
5. Cisco 1005 "WAN Services" offers three feature set options: Option 1 includes HDLC, PPP, SDMS, and Frame Relay, but not X.25, and is available on all feature sets; Option 2 includes X.25 only, and is available with the IP/IPX, IP/AppleTalk, and IP/IPX/AppleTalk feature sets; and Option 3 includes async, PPP, and SLIP and is available with the IP, IP/IPX feature sets.
6. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, Multilink PPP, and PPP compression.
7. X.25 is available for the Cisco 1005 only and is available by itself in "WAN Services" Option 2 for the following feature sets: IP/IPX, IP/AppleTalk, and IP/IPX/AppleTalk.
8. Dial-on-demand is available for the Cisco 1005 with "WAN Services" option only. See footnote [5] above.
9. IPX header compression (RFC 1553) is available in the feature sets that support IPX.
10. X.25 and Frame Relay payload compression.
11. Snapshot routing is not included for the Cisco 1005.
12. TACACS+ Single Connection and TACACS+ SENDAUTH enhancements are supported.

Back Rev Feature Sets

For a list of features supported by the back rev feature sets, see the release notes available on the Documentation CD-ROM or the World Wide Web (www.cisco.com). See the section "About Cisco IOS Software Electronic Documentation," page 23. For example, to find a feature set list for Cisco IOS Release 11.1(8), locate the **Cisco IOS Software Configuration** database. Then select **Cisco IOS Release 11.1**, and then select **Release Notes for Cisco IOS Release 11.1**.

Installing the Router Software Without Using Windows 95

This section describes an alternative method you can use to install the router software from the CD-ROM using a PC running Windows 3.1, a Macintosh, or a UNIX system. The process requires that you first obtain a TFTP application or a remote copy protocol (rcp) application, which you can use to set up your computer as a TFTP server or an rcp server. You can use either the **copy tftp flash** or **copy rcp flash** command to download the router software to the router.

You can load router software with this alternative method in the following circumstances:

- You are not running Windows 95.

- Your router does not contain an Ethernet, Fast Ethernet, or Token Ring interface.

Note   If you do not already have a TFTP or rcp application, you can choose from a number of TFTP applications or rcp applications available from independent software vendors. In addition, a number of TFTP programs are available as shareware from public sources on the World Wide Web.

> **Note** The TFTP server included with RSL will run only on Windows 95.

Installation Process

This section provides steps that describe how to install the router software using a Microsoft Windows 3.1 PC with a TFTP application. You can also set up your Macintosh or UNIX workstation as a TFTP server and follow the same steps.

> **Note** This is a two-part process. In the first part, which begins at Step 6, you will download the upgrade utility. In the second part, which begins at Step 15, you will download the Cisco IOS Release 11.2 images (referenced by the DOS names in Table 1) that you want on your particular router.

To install the software using an rcp application, follow the same procedure and substitute rcp for TFTP in the instructions. You must also substitute the **copy rcp flash** command for the **copy tftp flash** command in Step 8.

Step 1 Install any TFTP application on the PC. (Not provided by Cisco.)

Step 2 Launch the TFTP application on the PC. You commonly do this by double-clicking the application icon or its filename.

Step 3 Set up the PC as a TFTP server using the TFTP application setup or configuration facility.

The user interface of most TFTP applications includes a setup facility that allows you to specify the PC as a server. For example, from the TFTP menu of one application, you can select **Settings** to display a panel that includes a checkbox beside the word Server. To configure the local PC as a server, you click in this checkbox.

The TFTP server also allows selection of a "root" directory. You must select the directory in which the Cisco IOS and upgrade files reside, for example **d:\cpswinst\images**.

> **Caution** Make sure you set up your local PC as a TFTP server. If you overlook this step, you will not be able to perform the copy procedure. This reminder also applies if you are using rcp on your system instead of TFTP.

Step 4 Establish a console session from your local PC (which is now configured as a TFTP server), to the Cisco router.

You can do this in two ways:

- Connect the PC's COM port to the router's console port.

  This is the recommended method. If you use this method, when you reload the router to cause the image to take effect in Step 20, you will remain connected to the router. (Using Telnet, you will lose connection to the router at that point in the process.)

- Establish a Telnet session from the PC to the router.

Step 5 Connect your PC's Ethernet, Fast Ethernet, or Token Ring port to the router's corresponding LAN port. Use the 10BaseT crossover cable provided if connecting to an Ethernet or Fast Ethernet port. You must use Category 5 cable for Fast Ethernet routers.

Note Use straight-through cables if you are connecting via a 10BaseT hub or a 100BaseT hub.

For systems without a LAN interface, make sure that the router and the PC have IP connectivity through the available interface (that is, the router and PC can ping each other with IP traffic).

In the following steps, you will upgrade your CiscoPro router to a Cisco Enterprise router. If you have a model CPA100x, CPA160x, CPA25xx or CPA4500 router and plan to install an 11.2 image on the router, you must perform Step 6 through Step 14. These steps upgrade your router to allow Enterprise images to run on it. For additional information, refer to the Note on page 3.

Step 6 From the console, enter the following configuration command:

```
# config terminal
```

Step 7 From the console, enter the following configuration command and then **Ctrl-Z** to exit configuration mode:

```
# config-reg 0x2102
# Ctrl-Z
```

Step 8 At the router prompt, enter the following command to copy the router upgrade utility from the CD-ROM drive of the PC to the router:

```
# copy tftp flash
```

Note If you are using rcp, enter **copy rcp flash** instead.

Step 9 When prompted, enter the IP address of your local Microsoft Windows 3.1–based PC as in the following example:

```
Address or name of remote host [255.255.255.255]? 131.108.1.1
```

This is the IP address of your local PC, not that of the router.

Step 10 When prompted, enter the filename of the image to be copied to the router as in the following example:

```
Source file name? cpa1000-upgrade-l.112-3.P
```

Note The upgrade image file on the Feature Pack CD has a long filename (cpa1000-upgrade-l.112-3.P); note that it will be displayed in 8.3 format by DOS as cpa100~1.P.

Step 11 In response to the prompt, enter the destination filename and press **Enter** to indicate that you want to copy the image.

This is the name of the image file on the router, not the full pathname of the image on the CD-ROM attached to the PC.

```
Destination file name [cpa1000-upgrade-1.112-3.p]? cpa1000-upgrade-1.112-3.P
```

During the transfer process, the software displays messages indicating that it has accessed the file you have specified and is loading it.

If the file is not found, check the following: filename; TFTP server is enabled; correct root directory is selected; IP connectivity between the router and TFTP server.

Step 12 Enter **yes** or **no** in response to the prompt asking if you want to erase the existing image copy resident in the router's Flash memory before copying the new one.

```
Erase flash device before writing? [confirm] yes
```

When copying to internal Flash memory, the system provides an option to erase existing internal Flash memory before writing onto it. Answer **yes** to the questions. The entire copying process takes several minutes and differs from network to network.

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets have been transferred successfully. If you see three periods (...), the transfer failed. Check IP connectivity between the router and TFTP server using the **ping** command.

Step 13 Enter the **reload** command to reload the router:

```
# reload
```

After reload is complete, your CiscoPro router has been upgraded to a Cisco Enterprise router. Because the original Cisco IOS image, which resided in Flash memory, was erased during the upgrade process, the router should now be running in bootstrap mode.

Step 14 Redo Step 6 and Step 7.

Step 15 At the router prompt, enter the following command to copy the new software image from the CD-ROM drive of the PC to the router:

(In the next series of steps, you download the Cisco IOS Release 11.2 images that you want installed on your router.)

```
(boot)# copy tftp flash
```

Step 16 When prompted, enter the IP address of your local Microsoft Windows 3.1–based PC as in the following example:

```
Address or name of remote host [255.255.255.255]? 131.108.1.1
```

This is the IP address of your local PC, not that of the router.

Step 17 When prompted, enter the filename of the Cisco IOS Release 11.2 image to be copied to the router as in the following example:

```
Source file name? 80144405.bin
```
This example specifies the IP feature set for Cisco 1003 and Cisco 1004 routers.

Step 18 In response to the prompt, enter the destination filename and press **Enter** to indicate that you want to copy the image.

This is the name of the image file on the router, not the full pathname of the image on the CD-ROM attached to the PC.

```
Destination file name [80144405.bin]? c1000-y-mz
```

During the transfer process, the software displays messages indicating that it has accessed the file you have specified and is loading it.

Step 19 Enter **yes** or **no** in response to the prompt asking if you want to erase the existing image copy resident in the router's Flash memory before copying the new one.

```
Erase flash device before writing? [confirm] yes
```

When copying to internal Flash memory, the system provides an option to erase existing internal Flash memory before writing onto it. Answer **yes** to the questions. The entire copying process takes several minutes and differs from network to network.

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets have been transferred successfully. A checksum verification of the image occurs after the image is written to Flash memory.

Step 20 Enter the **reload** command to reload the router:

```
(boot)# reload
```

You do *not* need to save the system configuration when prompted here. After reload is complete, the router should be running the required Cisco IOS image. Use the **show version** command to verify.

Command Reference Pages for TFTP and rcp

This section includes reference pages providing detailed information about the **copy rcp flash** and **copy tftp flash** commands. This information supplements the information provided in the steps described earlier in the section "Installing the Router Software Without Using Windows 95," page 13.

copy rcp flash

To copy a file from a network server to the router or to another destination using rcp, use the **copy rcp flash** EXEC command.

    copy rcp flash

Syntax Description

flash	Specifies internal Flash memory as the destination of the copy operation.

Command Mode
EXEC

Usage Guidelines

The rcp protocol requires that a client send the remote username of an rcp request to the server. When you issue the **copy rcp flash** command, by default the Cisco IOS software sends the username associated with the current teletype (TTY), if that name is valid. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the software sends that username as the remote username.

Note   For Cisco, TTY lines are commonly used for access services. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called TTY devices, which stands for *teletype*, the original UNIX terminal.

If the TTY username is invalid, the software uses the host name as both the remote and local usernames. To specify a different remote username to be sent to the rcp server, use the **ip rcmd remote-username** command, and possibly the **ip rcmd remote-host** command. You can also specify the path of an existing directory along with the remote username.

Caution   The remote username must be associated with an account on the destination server. If you do not use the **ip rcmd remote-username** command, and possibly the **ip rcmd remote-host** command, to specify the name of a remote user associated with an account on the server, then the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, then the host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command will not execute successfully when a default remote username is used.

If you copy a system image from a personal computer used as a file server, the remote host computer must support the remote shell (rsh) protocol.

Use the **copy rcp flash** to copy a system image from a network server to the router's internal Flash memory using rcp. The Cisco IOS software prompts for the address of the rcp server and rcp filename. When you issue this command, the system provides an option to erase existing Flash memory before writing onto it. The entire copying process takes several minutes and differs from network to network.

Before booting from Flash memory, verify that the checksum of the image in internal Flash memory matches the checksum listed in the README file distributed with the system software image. The checksum of the image in Flash memory is displayed at the bottom of the screen when you issue the **copy rcp flash** command. The README file was copied to the rcp server automatically when you installed the system software image.

Caution   If the checksum value does not match the value in the README file, do not reboot the router. Reissue the **copy rcp flash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original system software image back into Flash memory *before* you reboot the router from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash memory, the router starts the system image contained in ROM (assuming booting from a network server is not configured). If ROM does not contain a fully functional system image, the router cannot function and must be reconfigured through a direct console port connection.

Examples

The following example shows how to use the **copy rcp flash** command. The interface might differ slightly on other systems. This example copies a system image named file1 from the netadmin1 directory on the remote server named *SERVER1.CISCO.COM* with an IP address of 131.108.101.101 to Flash memory. To ensure that enough Flash memory is available to accommodate the system image to be copied, the Cisco IOS software allows you to erase the contents of Flash memory first.

```
Router1# configure terminal

Router1(config)# ip rcmd remote-username netadmin1
Router(config)# Ctrl-Z
Router# copy rcp flash

System flash directory, partition 2:
File  Length    Name/status
  1   984       file1 [deleted]
  2   984       file1
[2096 bytes used, 8386512 available, 8388608 total]
Address or name of remote host [255.255.255.255]? 131.108.101.101
Source file name? file1
Destination file name [file1]?
Accessing file 'file1' on 131.108.101.101...
Loading dirt/ssangiah/file1 .from 131.108.101.101 (via Ethernet0): ! [OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'file1' from server
  as 'file1' into Flash WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee ...erased
Loading file1 from 131.108.101.101 (via Ethernet0): !
[OK - 984/8388608 bytes]

Verifying checksum...  OK (0x14B3)
Flash copy took 0:00:01 [hh:mm:ss]
```

The following example shows sample output resulting from copying a system image into a partition of Flash memory. The system prompts only if there are two or more read/write partitions or one read-only and one read/write partition and dual Flash memory bank support in boot ROMs. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (**?**) for a directory display of all partitions, or a question mark and a number (**?***number*) for a directory display of a particular partition. The default is the first read/write partition.

```
Router# copy rcp flash

System flash partition information:
Partition   Size    Used    Free    Bank-Size   State       Copy-Mode
    1       4096K   2048K   2048K   2048K       Read Only   RXBOOT-FLH
    2       4096K   2048K   2048K   2048K       Read/Write  Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

If the partition is read-only and has dual Flash memory bank support in boot ROMs, the session continues as follows:

```
                            ****  NOTICE  ****
Flash load helper v1.0
This process will accept the copy options and then terminate
the current system image to use the ROM based image for the copy.
Routing functionality will not be available during that time.
```

```
          If you are logged in via telnet, this connection will terminate.
          Users with console access can see the results of the copy operation.
                              ---- ******** ----
          Proceed? [confirm]
          System flash directory, partition 1:
          File  Length   Name/status
            1   3459720  master/igs-bfpx.100-4.3
          [3459784 bytes used, 734520 available, 4194304 total]
          Address or name of remote host [255.255.255.255]? 131.108.1.1
          Source file name? master/igs-bfpx-100.4.3
          Destination file name [default = source name]?
```

The file will be copied into the partition given earlier by the user:

```
     Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
     Erase flash device before writing? [confirm]
     Flash contains files. Are you sure? [confirm]
     Copy 'master/igs-bfpx.100-4.3' from TFTP server
     as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

If the partition is read/write, the session continues as follows:

```
     System flash directory, partition 2:
     File  Length   Name/status
       1   3459720  master/igs-bfpx.100-4.3
     [3459784 bytes used, 734520 available, 4194304 total]
     Address or name of remote host [255.255.255.255]? 131.108.1.1
     Source file name? master/igs-bfpx.100-4.3
     Destination file name [default = source name]?
```

The file will be copied into the partition given earlier by the user:

```
     Accessing file 'master/igs-bfpx.100-4.3' on ABC.CISCO.COM...
     Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
     Erase flash device before writing? [confirm]
     Flash contains files. Are you sure? [confirm]
     Copy 'master/igs-bfpx.100-4.3' from TFTP server
     as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

Related Commands

boot config
boot system flash
cd
copy flash rcp
ip rcmd remote-username
verify flash

copy tftp flash

To copy a file from a TFTP server to the router or to another destination, use the **copy tftp flash** EXEC command.

> **copy tftp flash**

Syntax Description

flash	Specifies internal Flash memory as the destination of the copy operation.

Command Mode

EXEC

Usage Guidelines

The system prompts for the address of the TFTP server and TFTP filename if you do not provide them at the command line. When copying to internal Flash memory, the system provides an option to erase existing internal Flash memory before writing onto it. The entire copying process takes several minutes and differs from network to network.

Before booting from Flash memory, verify that the checksum of the image in Flash memory matches the checksum listed in the README file distributed with the system software image. The checksum of the image in Flash memory is displayed at the bottom of the screen when you issue the **copy tftp flash** command. The README file was copied to the TFTP server automatically when you installed the system software image.

Caution If the checksum value is not correct according to the value in the README file, do not reboot the router. Enter the **copy tftp flash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original system software image back into Flash memory *before* you reboot the router from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash memory, the router starts the system image contained in ROM (assuming booting from a network server is not configured). If ROM does not contain a fully functional system image, the router cannot function and must be reconfigured through a direct console port connection.

Examples

The following example shows sample output of copying a system image named file1 into Flash memory:

```
Router# copy tftp flash

System flash directory, partition 2:
File  Length   Name/status
  1   984      file1 [deleted]
  2   984      file1
[2096 bytes used, 8386512 available, 8388608 total]
Address or name of remote host [255.255.255.255]? 223.255.254.254
Source file name? file1
Destination file name [file1]?
Accessing file 'file1' on 223.255.254.254...
Loading dirt/ssangiah/file1 .from 223.255.254.254 (via Ethernet0): - [OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'file1' from server
  as 'file1' into Flash WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee ...erased
Loading file1 from 223.255.254.254 (via Ethernet0): !!!!(etc.)
[OK - 984/8388608 bytes]

Verifying checksum...  OK (0x14B3)
Flash copy took 0:00:01 [hh:mm:ss]
```

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets have been transferred successfully.

The following example shows sample output resulting from copying a system image into a partition of Flash memory. The system will prompt only if there are two or more read/write partitions or one read-only and one read/write partition and dual Flash bank support in boot ROMs. If the partition entered is not valid, the process terminates. You can enter a partition number, a question mark (**?**) for a directory display of all partitions, or a question mark and a number (**?***number*) for directory display of a particular partition. The default is the first read/write partition.

```
Router# copy tftp flash

System flash partition information:
Partition   Size    Used    Free    Bank-Size    State        Copy-Mode
    1       4096K   2048K   2048K   2048K        Read Only    RXBOOT-FLH
    2       4096K   2048K   2048K   2048K        Read/Write   Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

If the partition is read-only and has dual Flash memory bank support in boot ROMs, the session continues as follows:

```
                        ****  NOTICE  ****
Flash load helper v1.0
This process will accept the copy options and then terminate
the current system image to use the ROM based image for the copy.
Routing functionality will not be available during that time.
If you are logged in via telnet, this connection will terminate.
Users with console access can see the results of the copy operation.
                        ---- ******** ----
Proceed? [confirm]
System flash directory, partition 1:
File  Length    Name/status
  1   3459720   master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/igs-bfpx-100.4.3
Destination file name [default = source name]?
```

The file will be copied into the partition given earlier by the user:

```
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from TFTP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

If the partition is read/write, the session continues as follows:

```
System flash directory, partition 2:
File  Length    Name/status
  1   3459720   master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/igs-bfpx.100-4.3
Destination file name [default = source name]?
```

The file will be copied into the partition given earlier by the user:

```
Accessing file 'master/igs-bfpx.100-4.3' on ABC.CISCO.COM...
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from TFTP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

Related Commands
copy flash tftp
verify
verify flash

Note   The release notes shipped with your router are designed as reference material. The feature pack release notes (this document) should be sufficient for installing your software.

---

About Cisco IOS Software Electronic Documentation

Cisco IOS software documentation is provided on the Documentation CD-ROM that is included with your feature pack. To locate the correct documentation, first determine the Cisco IOS release level of the image you loaded (see Table 1, the Description column).

You can either use the Documentation CD or go to www.cisco.com (select **Products & Ordering**, **Documentation**, **Cisco Product Documentation**, **Cisco IOS Software Configuration**, then select the level of release). Typical documentation consists of the following:

- Release notes—Contains information such as new features, important notes, and caveats.

- Feature guides—Describes new features available in specific Cisco IOS releases.

- Modules that comprise the configuration guides and command references. Figure 1 describes Cisco IOS Release 11.2 modules.

- *Cisco IOS Software Command Summary*—Summarizes the commands in the command reference publications. For each command, the summary provides complete syntax, the purpose of the command, and a description of each keyword and argument in the command syntax.

- *System Error Messages*—Describes system error messages reported by Cisco IOS software.

- *Cisco Management Information Base (MIB) User Quick Reference*—Describes the Cisco Systems private, or local, Management Information Base (MIB), which is provided with all Cisco software releases and with CiscoWorks router management software. A MIB file contains variables that can be set or read to provide information on network devices and interfaces. The Cisco MIB is a set of variables that are private extensions to the Internet standard MIB II.

- *Debug Command Reference*—Provides information about using debug commands to troubleshoot your network. The *Debug Command Reference* is intended for network administrators who already know how to configure a router and are familiar with all relevant network equipment.

- Caveats.

Cisco IOS configuration guides describe system configuration and maintenance tasks and provide comprehensive configuration examples. The configuration guides do not include command syntax for every command, so you should use them in conjunction with the command references. The Cisco configuration guides give in-depth descriptions of configuration tasks.

Figure 1   Cisco IOS Configuration Guides and Command References
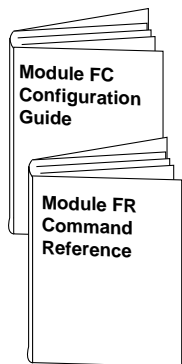
Module FC/FR:
**Configuration
Fundamentals**
• Access Server and
  Router Product
  Overview
• Cisco IOS Software
  Configuration Basics
• Images and
  Configuration Files
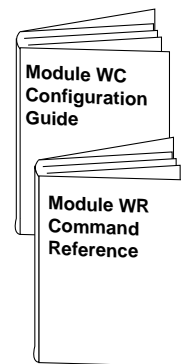• Interface Configuration
• System Management
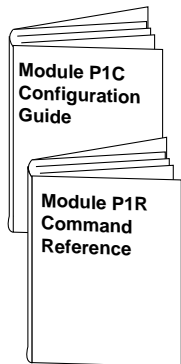
Module P1C/P1R:
**Network Protocols,
Part 1**
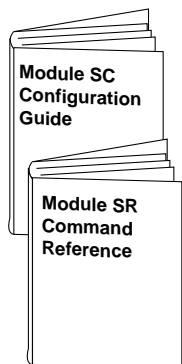• IP Addressing
• IP Services
• IP Routing Protocols
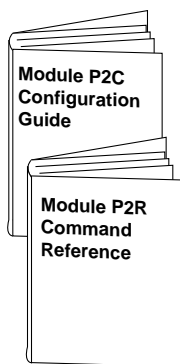
Module P2C/P2R:
**Network Protocols,
Part 2**
• AppleTalk
• Novell IPX
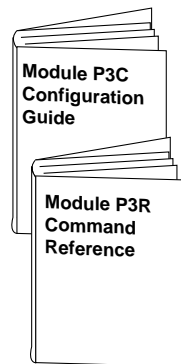
Module P3C/P3R:
**Network Protocols,
Part 3**
• Apollo Domain
• Banyan VINES
• DECnet
• ISO CLNS
• XNS

Module WC/WR:
**Wide-Area
Networking**
• ATM
• Frame Relay
• SMDS
• X.25 and LAPB

Module SC/SR:
Security
• Terminal Access Security
• Network Access Security
• Accounting and Billing
• Filtering Traffic
• Preventing Fraudulent
  Route Updates
• Network Data Encryption
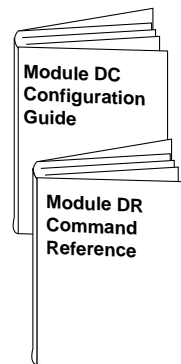
Module DC/DR:
Dial Solutions
• Dial Business
  Solutions and
  Examples
• Dial-In Port Setup
• DDR and Dial Backup
• Remote Node and
  Terminal Service
• Cost-Control and
  Large-Scale Dial
  Solutions
• VPDN
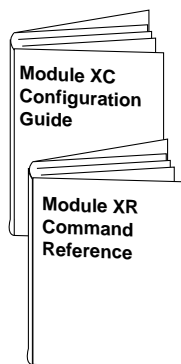
Module XC/XR:
**Cisco IOS Switching
Services**
• Switching Paths for IP
  Networks
  - Fast Switching
  - Autonomous Switching
  - NetFlow Switching
  - Optimum Switching
• Virtual LAN (VLAN)
  Switching and Routing
  - Inter-Switch Link Protocol
    Encapsulation
  - IEEE 802.10
    Encapsulation
  - LAN Emulation
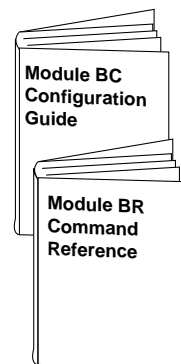
Module BC/BR:
**Bridging and IBM
Networking**
• Transparent Bridging
• Source-Route Bridging
• Remote Source-Route
  Bridging
• DLSw+
• STUN and BSTUN
• LLC2 and SDLC
• IBM Network Media Translation
• DSPU and SNA Service Point
• SNA Frame Relay Access Support
• APPN
• NCIA Client/Server Topologies
• IBM Channel Attach
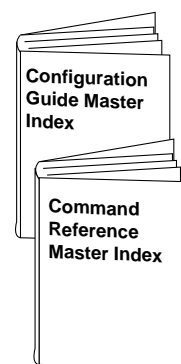
**Configuration
Guide Master
Index**

**Command
Reference
Master Index**

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Cisco IOS command references describe the commands necessary for configuring and maintaining your system. If you are new to Cisco software, you should use the Cisco command references in conjunction with the configuration guides to reference commands and detailed information pertaining to their use. If you are an experienced network administrator, you might want to use the Cisco command references as standalone manuals.

Cisco Connection Online

Cisco Connection Online (CCO) is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional information and services.

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- WWW: http://www.cisco.com

- WWW: http://www-europe.cisco.com

- WWW: http://www-china.cisco.com

- Telnet: cco.cisco.com

- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.

Note If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or tac@cisco.com. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.