CISCO SYSTEMS

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Release Notes for Cisco IOS Release 11.2(12)P Software Feature Packs—Cisco 3600 Series Routers

April 27, 1998

These release notes discuss the Cisco IOS Release 11.2(12)P feature packs for Cisco 3600 series routers. These are the product numbers for the supported feature packs:

- CD36-C-11.2= (Cisco 3600 IP Feature Pack)

- CD36-CP-11.2= (Cisco 3600 IP Plus Feature Pack)

- CD36-CW-11.2= (Cisco 3600 IP Plus 40 Feature Pack)*

- CD36-CY-11.2= (Cisco 3600 IP Plus 56 Feature Pack)*

- CD36-B-11.2= (Cisco 3600 IP/IPX/AT/DEC Feature Pack)

- CD36-BP-11.2= (Cisco 3600 IP/IPX/AT/DEC Plus Feature Pack)

- CD36-BW-11.2= (Cisco 3600 IP/IPX/AT/DEC Plus 40 Feature Pack)*

- CD36-BY-11.2= (Cisco 3600 IP/IPX/AT/DEC Plus 56 Feature Pack)*

- CD36-A-11.2= (Cisco 3600 Enterprise Feature Pack)

- CD36-AP-11.2= (Cisco 3600 Enterprise Plus Feature Pack)

- CD36-AW-11.2= (Cisco 3600 Enterprise Plus 40 Feature Pack)*

- CD36-AY-11.2= (Cisco 3600 Enterprise Plus 56 Feature Pack)*

* These feature packs contain encryption images.

Note The feature packs discussed in this document contain Cisco IOS Release 11.2(12)P software images and Router Software Loader (RSL) Version 7.0.

Note Before running RSL, read the "Installing Software Images Using RSL" on page 13.

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Contents

These release notes discuss the following topics:

Cisco Feature Packs and Memory Requirements

This section explains the following:

- What Is a Feature Pack?

- Cisco IOS Release 11.2(12)P Feature Pack Descriptions and Memory Requirements

What Is a Feature Pack?

The heart of a Cisco IOS software feature pack is a CD-ROM that contains a software image and Router Software Loader (RSL), a Windows 95 application that loads the image onto the access server/router. Each Cisco IOS Release 11.2 feature pack CD-ROM contains one feature set. For users without Windows 95, images can also be loaded with a Trivial File Transfer Protocol (TFTP) server application, as explained in these release notes.

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

- CD-ROM with the following software:

    — Feature set software image that includes bundled modem firmware

    — RSL program (Windows 95 application)

    — TFTP server application (Windows 95 application)

- Instruction booklet for using RSL

- Release notes (this document), which includes 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 access server or router

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

Cisco IOS Release 11.2(12)P Feature Pack Descriptions and Memory Requirements

This section includes two tables:

- Table 1—Describes each feature pack image, including a brief description of each feature set, the images' UNIX and DOS filenames, and memory requirements.

- Table 2—Describes the factory default available memory and the possible memory upgrades for the Cisco 3600 series routers.

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 access server 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

Model Number	CD-ROM Title	UNIX Image Name	DOS Image Name	Flash Memory Req'd	Main Memory Req'd	Software Description
CD36-C-11.2=	Cisco 3600 IP Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-i-mz.112-12.P	80180812	4 MB	16 MB	Cisco 3640 IP feature set 11.2(12)P
		c3620-i-mz-112-12.P	80180012	4 MB	16 MB	Cisco 3620 IP feature set 11.2(12)P
		c3640-i-mz.112-8.P	80180808	4 MB	16 MB	Cisco 3640 IP feature set 11.2(8)P
		c3620-i-mz-112-8.P	80180008	4 MB	16 MB	Cisco 3620 IP feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	4 MB	16 MB	MICA Modem Portware Version 2.2.3.0
CD36-CP-11.2=	Cisco 3600 IP Plus Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-is-mz.112-12.P	80180912	8 MB	24 MB	Cisco 3640 IP Plus feature set 11.2(12)P
		c3620-is-mz.112-12.P	80180112	4 MB	16 MB	Cisco 3620 IP Plus feature set 11.2(12)P
		c3640-is-mz.112-8.P	80180908	4 MB	16 MB	Cisco 3640 IP Plus feature set 11.2(8)P
		c3620-is-mz.112-8.P	80180108	4 MB	16 MB	Cisco 3620 IP Plus feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	4 MB	16 MB	MICA Modem Portware Version 2.2.3.0
CD36-CW-11.2=	Cisco 3600 IP Plus 40 Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-is40-mz.112-12.P	80182512	4 MB	16 MB	Cisco 3640 IP Plus 40 feature set 11.2(12)P
		c3620-is40-mz.112-12.P	80181712	4 MB	16 MB	Cisco 3620 IP Plus 40 feature set 11.2(12)P
		c3640-is40-mz.112-8.P	80182508	4 MB	16 MB	Cisco 3640 IP Plus 40 feature set 11.2(8)P
		c3620-is40-mz.112-8.P	80181708	4 MB	16 MB	Cisco 3620 IP Plus 40 feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	4 MB	16 MB	MICA Modem Portware Version 2.2.3.0

Table 1		Cisco Feature Pack Image Filenames and Memory Requirements (Continued)				
Model Number	**CD-ROM Title**	**UNIX Image Name**	**DOS Image Name**	**Flash Memory Req'd**	**Main Memory Req'd**	**Software Description**
CD36-CY-11.2=	Cisco 3600 IP Plus 56 Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-is56-mz.112-12.P	80182612	4 MB	16 MB	Cisco 3640 IP Plus 56 feature set 11.2(12)P
		c3620-is56-mz.112-12.P	80181812	4 MB	16 MB	Cisco 3620 IP Plus 56 feature set 11.2(12)P
		c3640-is56-mz.112-8.P	80182608	4 MB	16 MB	Cisco 3620 IP Plus 56 feature set 11.2(8)P
		c3620-is56-mz.112-8.P	80181808	4 MB	16 MB	Cisco 3620 IP Plus 56 feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	4 MB	16 MB	MICA Modem Portware Version 2.2.3.0
CD36-B-11.2=	Cisco 3600 IP/IPX/AT/DEC Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-d-mz.112-12.P	80180612	4 MB	24 MB	Cisco 3640 IP/IPX/AppleTalk/DECnet feature set 11.2(12)P
		c3620-d-mz-112-12.P	80179812	4 MB	24 MB	Cisco 3620 IP/IPX/AppleTalk/DECnet feature set 11.2(12)P
		c3640-d-mz-112-8.P	80180608	4 MB	24 MB	Cisco 3640 IP/IPX/AppleTalk/DECnet feature set 11.2(8)P
		c3620-d-mz-112-8.P	80179808	4 MB	24 MB	Cisco 3620 IP/IPX/AppleTalk/DECnet feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	4 MB	24 MB	MICA Modem Portware Version 2.2.3.0
CD36-BP-11.2=	Cisco 3600 IP/IPX/AT/DEC Plus Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-ds-mz.112-12.P	80180712	4 MB	24 MB	Cisco 3640 IP/IPX/AppleTalk/DECnet Plus feature set 11.2(12)P
		c3620-ds-mz.112-12.P	80179912	4 MB	24 MB	Cisco 3620 IP/IPX/AppleTalk/DECnet feature set 11.2(12)P
		c3640-ds-mz.112-8.P	80180708	4 MB	24 MB	Cisco 3640 IP/IPX/AppleTalk/DECnet Plus feature set 11.2(8)P
		c3620-ds-mz.112-8.P	80179908	4 MB	24 MB	Cisco 3620 IP/IPX/AppleTalk/DECnet feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	4 MB	24 MB	MICA Modem Portware Version 2.2.3.0

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

Model Number	CD-ROM Title	UNIX Image Name	DOS Image Name	Flash Memory Req'd	Main Memory Req'd	Software Description
CD36-BW-11.2=	Cisco 3600 IP/IPX/AT/DEC Plus 40 Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-ds40-mz.112-12.P	80182312	4 MB	24 MB	Cisco 3640 IP/IPX/AppleTalk/DECnet Plus 40 feature set 11.2(12)P
		c3620-ds40-mz.112-12.P	80181512	4 MB	24 MB	Cisco 3620 IP/IPX/AppleTalk/DECnet Plus 40 feature set 11.2(12)P
		c3640-ds40-mz.112-8.P	80182308	4 MB	24 MB	Cisco 3640 IP/IPX/AppleTalk/DECnet Plus 40 feature set 11.2(8)P
		c3620-ds40-mz.112-8.P	80181508	4 MB	24 MB	Cisco 3620 IP/IPX/AppleTalk/DECnet Plus 40 feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	4 MB	24 MB	MICA Modem Portware Version 2.2.3.0
CD36-BY-11.2=	Cisco 3600 IP/IPX/AT/DEC Plus 56 Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-ds56-mz.112-12.P	80182412	4 MB	24 MB	Cisco 3640 IP/IPX/AppleTalk/DECnet Plus 56 feature set 11.2(12)P
		c3620-ds56-mz.112-12.P	80181612	4 MB	24 MB	Cisco 3620 IP/IPX/AppleTalk/DECnet Plus 56 feature set 11.2(12)P
		c3640-ds56-mz.112-8.P	80182408	4 MB	24 MB	Cisco 3640 IP/IPX/AppleTalk/DECnet Plus 56 feature set 11.2(8)P
		c3620-ds56-mz.112-8.P	80181608	4 MB	24 MB	Cisco 3620 IP/IPX/AppleTalk/DECnet Plus 56 feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	4 MB	24 MB	MICA Modem Portware Version 2.2.3.0
CD36-A-11.2=	Cisco 3600 Enterprise Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-j-mz.112-12.P	80181012	8 MB	24MB	Cisco 3640 Enterprise feature set 11.2(12)P
		c3620-j-mz.112-12.P	80180212	8 MB	24MB	Cisco 3620 Enterprise feature set 11.2(12)P
		c3640-j-mz.112-8.P	80181008	8 MB	24 MB	Cisco 3640 Enterprise feature set 11.2(8)P
		c3620-j-mz.112-8.P	80180208	8 MB	24 MB	Cisco 3620 Enterprise feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	8 MB	24 MB	MICA Modem Portware Version 2.2.3.0

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

Model Number	CD-ROM Title	UNIX Image Name	DOS Image Name	Flash Memory Req'd	Main Memory Req'd	Software Description
CD36-AP-11.2=	Cisco 3600 Enterprise Plus Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-js-mz.112-12.P	80181112	8 MB	24 MB	Cisco 3640 Enterprise Plus feature set 11.2(12)P
		c3620-js-mz.112-12.P	80180312	8 MB	24 MB	Cisco 3620 Enterprise Plus feature set 11.2(12)P
		c3640-js-mz.112-8.P	80181108	8 MB	24 MB	Cisco 3640 Enterprise Plus feature set 11.2(8)P
		c3620-js-mz.112-8.P	80180308	8 MB	24 MB	Cisco 3620 Enterprise Plus feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	8 MB	24 MB	MICA Modem Portware Version 2.2.3.0
CD36-AW-11.2=	Cisco 3600 Enterprise Plus 40 Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-js40-mz.112-12.P	80182712	8 MB	24 MB	Cisco 3640 Enterprise Plus 40 feature set 11.2(12)P
		c3620-js40-mz.112-12.P	80181912	8 MB	24 MB	Cisco 3620 Enterprise Plus 40 feature set 11.2(12)P
		c3640-js40-mz.112-8.P	80182708	8 MB	24 MB	Cisco 3640 Enterprise Plus 40 feature set 11.2(8)P
		c3620-js40-mz.112-8.P	80181908	8 MB	24 MB	Cisco 3620 Enterprise Plus 40 feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	8 MB	24 MB	MICA Modem Portware Version 2.2.3.0
CD36-AY-11.2=	Cisco 3600 Enterprise Plus 56 Feature Pack Release 11.2(12)P RSL Version 7.0	c3640-js56-mz.112-12.P	80182812	8 MB	24 MB	Cisco 3640 Enterprise Plus 56 feature set 11.2(12)P
		c3620-js56-mz.112-12.P	80182012	8 MB	24 MB	Cisco 3620 Enterprise Plus 56 feature set 11.2(12)P
		c3640-js56-mz.112-8.P	80182808	8 MB	24 MB	Cisco 3640 Enterprise Plus 56 feature set 11.2(8)P
		c3620-js56-mz.112-8.P	80182008	8 MB	24 MB	Cisco 3620 Enterprise Plus 56 feature set 11.2(8)P
		mica-modem-portware.2.2.3.0.bin	80261301	8 MB	24 MB	MICA Modem Portware Version 2.2.3.0

Cisco IOS Feature Sets for the Cisco 3600 Series Routers

The Cisco IOS software is packaged into "feature sets" (also called "software images"). There are many different feature sets available, and each feature set contains a specific subset of Cisco IOS features. The feature set matrix is used to see the overall feature set organization.

Feature Set Matrix

The feature set matrix (see Table 2) shows the new feature set organization and lists which feature sets are available on the Cisco 3600 series for Cisco IOS Release 11.2(12)P. The matrix uses the following terms:

Feature Set Matrix Term	Description
Basic	This feature is offered in the basic feature set.
Plus	This feature is offered in the Plus feature set
Encrypt	This feature is offered in the encryption feature sets, which consist of 40-bit (Plus 40) or 56-bit (Plus 56) data encryption feature sets.

Table 2   Feature Set Matrix for the Cisco 3600 Series

Standard Feature Sets	Cisco 3600 Series Routers
IP	Basic, Plus
Desktop (IP/IPX/AppleTalk/DEC)	Basic, Plus
Enterprise	Basic, Plus

Cisco IOS images with strong encryption (including but not limited to 56-bit DES) are subject to U.S. Government export controls, and have a limited distribution. Images to be installed outside the U.S. require an export license. Customer orders might 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.

Feature Set Table

To determine what features are available with each feature set, see Table 3. The table summarizes what features you can use when running a specific feature set on the Cisco 3600 series for Cisco IOS Release 11.2(12)P. The feature set table uses the following symbols:

Feature Set Table Symbol	Description
Basic	This feature is offered in the feature set.
-	This feature is not offered in the feature set.
Plus	This feature is offered in the Plus feature set
Encrypt	This feature is offered in the Encryption feature sets, which consist of 40-bit (Plus 40) or 56-bit (Plus 56) data encryption feature sets.

Table 3   Cisco IOS Release 11.2 Feature Sets for Cisco 3600 Series

Features	Feature Sets		
	IP Routing	Desktop (IP/IPX/AppleTalk /DEC)	Enterprise
LAN Support			
Apollo Domain	–	–	Yes
AppleTalk 1 and 2	–	Yes	Yes
Banyan VINES	–	–	Yes
Concurrent routing and bridging	Yes	Yes	Yes
DECnet IV	–	Yes	Yes
DECnet V	–	–	Yes
GRE	Yes	Yes	Yes
Integrated routing and bridging (RB)	Yes	Yes	Yes
IP	Yes	Yes	Yes
LAN extension host	Yes	Yes	Yes
Multiring	Yes	Yes	Yes
Novell IPX	–	Yes	Yes
OSI	–	–	Yes
Source-route bridging	–	–	–
Transparent and translational bridging	Yes	Yes	Yes
XNS	–	–	Yes
WAN Services			
Combinet packet protocol	Yes	Yes	Yes
Dialer profiles	Yes	Yes	Yes
Frame Relay	Yes	Yes	Yes

Table 3   Cisco IOS Release 11.2 Feature Sets for Cisco 3600 Series (Continued)

Features	IP Routing	Desktop (IP/IPX/AppleTalk /DEC)	Enterprise
Frame Relay SVC support (DTE)	–	–	Yes
Frame Relay traffic shaping[1]	–	–	–
Half bridge/half router for CPP and PPP	Yes	Yes	Yes
Multichassis Multilink PPP (MMP)	Plus	Plus	Plus
Virtual Private Dial-up Network (VPDN)	–	Yes	Yes
HDLC	Yes	Yes	Yes
IPXWAN 2.0	–	Yes	Yes
ISDN[2]	Yes	Yes	Yes
PPP[3]	Yes	Yes	Yes
SMDS	Yes	Yes	Yes
Switched 56	Yes	Yes	Yes
X.25[4]	Yes	Yes	Yes
WAN Optimization			
Bandwidth-on-demand	Yes	Yes	Yes
Custom and priority queuing	Yes	Yes	Yes
Dial backup	Yes	Yes	Yes
Dial-on-demand	Yes	Yes	Yes
Header[5], link and payload compression[6]	Yes	Yes	Yes
Snapshot routing	Yes	Yes	Yes
Weighted fair queuing	Yes	Yes	Yes
IP Routing			
BGP	Yes	Yes	Yes
BGP4	Yes	Yes	Yes
EGP	Yes	Yes	Yes
Enhanced IGRP	Yes	Yes	Yes
Enhanced IGRP optimizations	Yes	Yes	Yes
ES-IS	–	–	Yes
IGRP	Yes	Yes	Yes
IS-IS	–	–	Yes
Named IP access control list	Yes	Yes	Yes
Network Address Translation (NAT)	Plus	Plus	Plus
NHRP	Yes	Yes	Yes
OSPF	Yes	Yes	Yes
OSPF Not-So-Stubby-Areas (NSSA)	Yes	Yes	Yes
OSPF On Demand Circuit (RFC 1793)	Yes	Yes	Yes
PIM	Yes	Yes	Yes

Table 3   Cisco IOS Release 11.2 Feature Sets for Cisco 3600 Series (Continued)

Features	IP Routing	Desktop (IP/IPX/AppleTalk /DEC)	Enterprise
		Feature Sets	
Policy-based routing	Yes	Yes	Yes
RIP	Yes	Yes	Yes
RIP Version 2	Yes	Yes	Yes
Other Routing			
AURP	–	Yes	Yes
IPX RIP	–	Yes	Yes
NLSP	–	Yes	Yes
RTMP	–	Yes	Yes
SMRP	–	Yes	Yes
SRTP	–	–	Yes
Multimedia and Quality of Service			
Generic traffic shaping	Yes	Yes	Yes
Random Early Detection (RED)	Yes	Yes	Yes
Resource Reservation Protocol (RSVP)	Yes	Yes	Yes
Management			
AutoInstall	Yes	Yes	Yes
Automatic modem configuration[7]	Yes	Yes	Yes
HTTP server	Yes	Yes	Yes
RMON events and alarms[8]	Yes	Yes	Yes
SNMP	Yes	Yes	Yes
Telnet	Yes	Yes	Yes
Security			
Access lists	Yes	Yes	Yes
Access security	Yes	Yes	Yes
Extended access lists	Yes	Yes	Yes
Kerberized login	–	–	Yes
Kerberos V client support	–	–	Yes
Lock and key	–	–	Yes
MAC security for hubs	Yes	Yes	Yes
MD5 routing authentication	Yes	Yes	Yes
Network layer encryption (40-bit or export controlled 56-bit DES)	Encrypt	Encrypt	Encrypt
RADIUS	Yes	Yes	Yes
Router authentication	Encrypt	Encrypt	Encrypt
TACACS+	Yes	Yes	Yes

Table 3   Cisco IOS Release 11.2 Feature Sets for Cisco 3600 Series (Continued)

		Feature Sets	
Features	**IP Routing**	**Desktop (IP/IPX/AppleTalk /DEC)**	**Enterprise**
IBM Support			
BAN for SNA Frame Relay support	Plus	Yes	Yes
Bisync[9]	Plus	Yes	Yes
Caching and filtering	Plus	Yes	Yes
DLSw+	Plus	Yes	Yes
Downstream PU concentration (DSPU)	Plus	–	Yes
Frame Relay SNA Support (RFC 1490)	Plus	Yes	Yes
NetView Native Service Point	Plus	Yes	Yes
QLLC[9]	Plus	Yes	Yes
SDLC integration	Plus	Yes	Yes
SDLC transport (STUN)	Plus	Yes	Yes
SDLC-to-LAN conversion (SDLLC)	Plus	Yes	Yes
SNA and NetBIOS WAN optimization via local acknowledgment	Plus	Yes	Yes
SRB/RSRB	Plus	Yes	Yes
SRT	Plus	Yes	Yes
TG/COS	–	–	Yes
Protocol Translation			
LAT	–	–	Yes
Rlogin	–	–	Yes
Remote Node			
ARAP 1.0/2.0	–	Yes	Yes
Asynchronous master interfaces	Yes	Yes	Yes
ATCP	–	Yes	Yes
CPPP	Yes	Yes	Yes
CSLIP	Yes	Yes	Yes
DHCP	Yes	Yes	Yes
IP pooling	Yes	Yes	Yes
IPX and ARAP on virtual asynch interfaces	–	–	Yes
IPXCP	–	Yes	Yes
MacIP	–	Yes	Yes
NASI[10]	–	Yes	Yes
NetBEUI over PPP	Yes	Yes	Yes
PPP	Yes	Yes	Yes
SLIP	Yes	Yes	Yes
Terminal Services			

Table 3   Cisco IOS Release 11.2 Feature Sets for Cisco 3600 Series (Continued)

Features	IP Routing	Desktop (IP/IPX/AppleTalk /DEC)	Enterprise
LAT[11]	–	–	Yes
Rlogin	Yes	Yes	Yes
Telnet	Yes	Yes	Yes
TN3270	–	–	Yes
X.25 PAD	Yes	Yes	Yes
Xremote	–	–	Yes

1. Frame Relay traffic shaping will be available in a future 11.2 P release.
2. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features.
3. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, and PPP compression. Multilink PPP is available in Cisco IOS Release 11.0(4) and later releases.
4. Includes X.25 switching.
5. IPX header compression (RFC 1553) is available in the feature sets that support IPX in Cisco IOS Release 11.1(1) and later releases.
6. X.25 and Frame Relay payload compression are supported in Cisco IOS Release 11.0(4) and later releases.
7. Automatic modem configuration is available for all features sets in Cisco IOS Release 11.1(2) and later. For the Enterprise feature set, automatic modem configuration is available in Cisco IOS Release 11.1(1) and later releases.
8. The RMON events and alarms groups are supported on all interfaces in Cisco IOS Release 11.1 and later releases. Enhanced RMON feature sets are also available.
9. QLLC and Bisync are available in IP/IBM in Cisco IOS Release 11.0(3) and later releases, and in IP/IPX/IBM and Desktop/IBM base in Cisco IOS Release 11.0(2) and later releases.
10. NASI is supported in Cisco IOS Release 11.1(2) and later releases.
11. Use of LAT requires terminal license (FR-L8-10.X= for an 8-user license or FR-L16-10.X= for a 16-user license).

Modem Code Alert

By default, the MICA modems installed on the 3600 use the modem portware that is bundled with the Cisco IOS software image. Unless you are familiar with the Cisco MICA portware, we recommend that you use the default firmware and do not attempt to download another version.

If you do choose to override the firmware and portware selected by Cisco IOS software, the Flash memory of your router might contain modem code files that should be saved and restored before downloading the new image. Before the image download begins, the Router Software Loader (RSL) will display the Flash Copy Options dialog box that will allow you to select which files to back up and restore. By default, RSL will back up all files in the selected Flash memory partition, and restore the files you select.

If you want to verify that you are running the latest modem code, use the **show modem version** command to display the current version. Then compare that version to the modem code files available on the feature pack CD and on Cisco Connection Online (CCO).

Modem Code Information

If you are running Microsoft Windows 95 on a PC, we recommend using the RSL to download modem code. For detailed steps, refer to the RSL online help topic "Downloading Modem Files." If you are running Windows NT, UNIX, or Macintosh, use TFTP or rcp to download modem code. TFTP server instructions are in the online document titled "Another Way to Download Modem Code."

Both RSL and TFTP instructions are available from the Software Center at the following URL:
http://www.cisco.com/public/sw-center/sw-access.shtml
Click on the link **Modem Software Upgrade for Cisco 2-tier Channel Customer**. Follow the steps
to download the new modem code.

See the sections "Cisco Connection Online" on page 21 and "Documentation CD-ROM" on page
22 for information on accessing customer documentation.

Installing Software Images Using RSL

The Router Software Loader (RSL) application contained on the feature pack CD-ROM is designed
to work with a PC running Microsoft Windows 95. Refer to the booklet included with the CD-ROM
for instructions to install the software images.

This section describes several solutions to problems you might encounter when using RSL. These
solutions are additions to the RSL 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 access server or 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, which is set to 25 seconds, in
the Options dialog box, especially if one of the following situations applies:

Note   Increasing the Short Timeout value might 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 access server. 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 **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 (**config-register 0x***nnnn*) 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 might be deleted by RSL. This entry will need to be manually reentered into the PC's ARP
table.

- 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.

- 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.

Alternatives to RSL

The RSL is designed to work with a PC running Microsoft Windows 95 and is the recommended
method for downloading software to the router. The booklet included with the CD-ROM explains
how to perform this simple install process. However, two alternatives are available for installing
router software:

- Use the console or auxiliary port
- Use a TFTP server application

Installing the Router Software Using the Console or Auxiliary Port

This section explains how to use the **copy xmodem flash** command to install the router software
from the CD-ROM onto the router.

Note The transfer takes place only on the port at which you issue the command. If you download via the console, all console output is discarded for the duration of the transfer. You can only download files to the router; you cannot copy files from the router. Cisco recommends using the auxiliary port for this type of software download. The auxiliary port has hardware flow control and full modem control. In addition, the transfer does not occupy the system console.

The following example shows how to use the **copy xmodem flash** command on a Cisco 3600 series router.

```
Router# copy xmodem flash
                     **** WARNING ****
     x/ymodem is a slow transfer protocol limited to the current speed
     settings of the auxiliary/console ports. The use of the auxiliary
     port for this download is strongly recommended.
     During the course of the download no exec input/output will be
     available.
                     ---- ******* ----
     Proceed? [confirm]y
     Use crc block checksumming? [confirm] y
     Max Retry Count [10]:
     Perform image validation checks? [confirm] y
     Xmodem download using crc checksumming with image validation
     Continue? [confirm] y
     Partition   Size    Used     Free      Bank-Size  State        Copy Mode
       1         4096K   3259K     836K      4096K      Read/Write   Direct
       2         4096K     0K     4095K      4096K      Read/Write   Direct

     [Type ?<no> for partition directory; ? for full directory; q to abort]
     Which partition? [default = 1] 2

     System flash directory, partition 2:
     File  Length    Name/status
       1   68        TESTFILE
     [132 bytes used, 4194172 available, 4194304 total]
     Destination file name? c3620-i-mz.0918
     Erase flash device before writing? [confirm] y
     Flash contains files. Are you sure you want to erase? [confirm] y

     Copy '' from server
       as 'c3620-i-mz.0918' into Flash WITH erase? [yes/no] y
     Erasing device... eeeeeeeeeeeeeeee ...erased
     Ready to receive file...........C
     Verifying checksum...  OK (0x5DE8)
     Flash device copy took 00:12:06 [hh:mm:ss]
```

Installing Software Images Using a TFTP Server Application

The Router Software Loader application contained on the feature pack CD-ROM is designed to work with a PC running Microsoft Windows 95. The booklet included with the CD-ROM explains how to perform this simple and recommended install process. However, an alternative is available using a TFTP server application to install router software.

This section explains how to use a TFTP server application as an alternative to using the RSL to install the router software from the CD-ROM. You can perform this procedure using a PC (running Microsoft Windows 95 or Microsoft Windows 3.1), a Macintosh, or a UNIX system. You can use either the **copy tftp flash** or **copy rcp flash** command to download the software to the router.

First, obtain a TFTP application or a remote copy protocol (rcp) application to set up your computer as a TFTP server or an rcp server. You can use the RSL or the TFTP server included on the feature pack CD-ROM to install the software only if you are using a PC running Windows 95. For other operating systems, a number of TFTP or rcp applications are available from independent software vendors or as shareware from public sources on the World Wide Web.

Installation Process

This section describes how to use TFTP on a PC to install the router software.

Note To use an rcp application, follow this same procedure, but substitute rcp for TFTP in the instructions; for example, use the **copy rcp flash** command instead of the **copy tftp flash** command.

Step 1 Install any TFTP server application on the PC. (The PC application included on the feature pack CD-ROM is for Microsoft Windows 95 only.)

Step 2 Launch the TFTP server application on the PC, usually by double-clicking the application icon or its .exe filename.

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

Most TFTP server applications include 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 check box beside the word **Server**. To configure the local PC as a server, click this check box.

The TFTP server also allows the selection of a "root" directory. You must select the directory in which the Cisco IOS 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 cannot perform the copy procedure. This reminder also applies if you are using rcp instead of TFTP.

Step 4 Establish a console session from your local PC (which is now configured as a TFTP server) to the router by using one of these methods:

- Connect the PC com port to the router console port.

  This is the recommended method.When you reload the router with the new image in Step 12, you remain connected to the router. (If you use Telnet, you lose connection to the router.)

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

Step 5 Connect your PC Ethernet port to the router Ethernet port. Use an Ethernet crossover cable.

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).

> **Note** We recommend that you back up the router configuration before upgrading the router software.

Step 6 Enter the following commands to enter enable mode and copy the new software image from the PC (set up as a TFTP server) to the router:

```
(boot)> enable
Password: <password>
(boot)#
(boot)# copy tftp flash
```

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

Step 7 When prompted, enter the IP address of your PC, as in the following example:

```
Address or name of remote host [255.255.255.255]? 172.16.1.1
```

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

Step 8 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? 80180812.bin
```

This example specifies the DOS image name of the IP feature set for a Cisco 3600 router, as listed in Table 1.

Step 9 In response to the prompt, enter the destination UNIX image filename, and press **Enter**.

This is the name of the image file on the router, not the full path name of the image on the CD-ROM attached to the PC. Refer to Table 1 in the section, "Cisco Feature Packs and Memory Requirements" for the UNIX image filename.

```
Destination file name [80180812.bin]? c3640-i-mz.112-12.P
```

Step 10 Enter **yes** in response to the prompt asking if you want to erase the existing image copy resident in the router Flash memory before copying the new one:

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

The entire copying process takes several minutes and differs from network to network.

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

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 11 Enter the following commands to change the config-reg to 0x2102. This will force the router to reload to the image running from Flash memory.

```
(boot)# configure terminal
config-reg 0x2102
(boot)(config)#
(boot)(config)# end
(boot)#
```

Step 12 Enter the **reload** command to reload the router:

```
(boot)# reload
```

After reload is complete, the router should be running the desired Cisco IOS image. Use the **show version** command to verify.

Related Documentation

All documents mentioned in this section are available as printed manuals or electronic documents. (See the section "Online Navigation" on page 21 for more information on accessing electronic documentation.)

The following documentation is related to these release notes:

- Cisco 3600-Specific Documentation
- Cisco IOS Documentation Set and Related Supporting Documents
- Software Configuration Tips on the Cisco TAC Home Page

Cisco 3600-Specific Documentation

The following documents are specific to the Cisco 3600 series routers:

- *Cisco 3600 Series Software Configuration Guide*
- *Cisco 3600 Series Manager Guide*
- *Regulatory Compliance and Safety Information*

Cisco IOS Documentation Set and Related Supporting Documents

The following documents apply to the Cisco 3600 series routers:

- *Release Notes for Cisco IOS Release 11.2*
- *Product-Specific Release Notes*
- *Feature Guide for Cisco IOS Release 11.2 P*
- *Cisco IOS Release 11.2(10+)P New Feature Documentation*
- *Cisco IOS Release 11.2 Configuration Guides/Command References*
- *Cisco IOS Software Command Summary*
- *System Error Messages*
- *Cisco Management Information Base (MIB) User Quick Reference*
- *Debug Command Reference*
- *Access Services Quick Configuration Guide*
- *Cisco IOS Software Release 11.2, 11.2P and 11.2BC Caveats*

For details about the features introduced in these release notes, refer to the *Feature Guide for Cisco IOS Release 11.2 P*. The printed version of the *Feature Guide for Cisco IOS Release 11.2 P* contains features up to Release 11.2(7)P. Features added after Release 11.2(7)P are available in the electronic (online) version of the feature guide only.

The Cisco IOS configuration guides, command references, and chapter topics are as follows:

Books	Chapter Topics
• *Configuration Fundamentals Configuration Guide*	Access Server and Router Product Overview
• *Configuration Fundamentals Command Reference*	User Interface
	System Images and Configuration Files
	Using ClickStart, AutoInstall, and Setup
	Interfaces
	System Management
• *Security Configuration Guide*	Network Access Security
• *Security Command Reference*	Terminal Access Security
	Accounting and Billing
	Traffic Filters
	Controlling Router Access
	Network Data Encryption with Router Authentication
• *Access Services Configuration Guide*	Terminal Lines and Modem Support
• *Access Services Command Reference*	Network Connections
	AppleTalk Remote Access
	SLIP and PPP
	XRemote
	LAT
	Telnet
	TN3270
	Protocol Translation
	Configuring Modem Support and Chat Scripts
	X.3 PAD
	Regular Expressions
• *Wide-Area Networking Configuration Guide*	ATM
• *Wide-Area Networking Command Reference*	Dial-on-Demand Routing (DDR)
	Frame Relay
	ISDN
	LANE
	PPP for Wide-Area Networking
	SMDS
	X.25 and LAPB
• *Network Protocols Configuration Guide, Part 1*	IP
• *Network Protocols Command Reference, Part 1*	IP Routing
• *Network Protocols Configuration Guide, Part 2*	AppleTalk
• *Network Protocols Command Reference, Part 2*	Novell IPX

Books	Chapter Topics
• *Network Protocols Configuration Guide, Part 3*	Apollo Domain
• *Network Protocols Command Reference, Part 3*	Banyan VINES
	DECnet
	ISO CLNS
	XNS
• *Bridging and IBM Networking Configuration Guide*	Transparent Bridging
• *Bridging and IBM Networking Command Reference*	Source-Route Bridging
	Remote Source-Route Bridging
	DLSw+
	STUN and BSTUN
	LLC2 and SDLC
	IBM Network Media Translation
	DSPU and SNA Service Point Support
	SNA Frame Relay Access Support
	APPN
	NCIA Client/Server Topologies
	IBM Channel Attach
• *Cisco IOS Software Command Summary*	
• *Access Services Quick Configuration Guide*	
• *System Error Messages*	
• *Debug Command Reference*	
• *Cisco Management Information Base (MIB) User Quick Reference*	

Note The *Cisco Management Information Base (MIB) User Quick Reference* publication is no longer being published. For the latest list of MIBs supported by Cisco, see the **Cisco Network Management Toolkit** on Cisco Connection Online (CCO). On CCO, go to **Software and Support**, select **Software Center**, and click on **Network Management Products**. Next, select **Cisco Network Management Toolkit** and click on **Cisco MIBs**.

Software Configuration Tips on the Cisco TAC Home Page

The following URL contains links to access helpful tips to configure your Cisco products:

http://www.cisco.com/kobayashi/serv_tips.shtml

This URL is subject to change without notice. If it does change, point your web browser to http://www.cisco.com/ and follow this path: **Software & Support, Technical Tips** (button on left margin).

"Hot Tips" are popular tips and hints gathered from Cisco's Technical Assistance Center (TAC). Most of these documents are also available from the TAC's Fax-on-Demand service. To access Fax-on-Demand and receive documents at your fax machine, call 888-50-CISCO (888-502-4726). From international areas, call 415-596-4408.

The following sections are provided from the Technical Tips page:

- Field Notices—Designed to provide notification of critical issues regarding Cisco products. These include problem descriptions, safety or security issues, and hardware defects.

- Hardware—Technical Tips related to specific hardware platforms.

- Internetworking Features—Tips on using and deploying Cisco IOS software features and services.

- Sample Configurations—Actual configuration examples complete with topology and annotations.

- Software Products—MultiNet & Cisco Suite 100, Network Management, Cisco IOS Software Bulletins, CiscoPro Configurations.

- Special Collections—Other Helpful Documents. Frequently Asked Questions, Security Advisories, References & RFCs, Case Studies, CiscoPro Documentation CD-ROM.

Online Navigation

You can access Cisco IOS software documentation, such as printed manuals and configuration notes, either at Cisco Connection Online (CCO) on the World Wide Web or on the Cisco Documentation CD-ROM.

Cisco 3600-Specific Documentation

- Using a web browser, follow this path on CCO:

  Software & Support, Cisco Documentation, Cisco IOS Software Configuration, Release Notes for Cisco 3600 Series for Cisco IOS Release 11.2(12)P.

- On the Documentation CD-ROM, follow this path:

  Cisco IOS Software Configuration, Release Notes for Cisco 3600 Series for Cisco IOS Release 11.2(12)P.

Cisco IOS Documentation Set and Related Supporting Documents

- Using a web browser, follow this path on CCO:

  Software & Support, scroll down and select **Cisco Documentation.** Next, click on **Cisco IOS Software Configuration,** and then click on **Cisco IOS Release 11.2**.

- On the Documentation CD-ROM, follow this path:

  Cisco Product Documentation, select **Cisco IOS Software Configuration,** and then select **Cisco IOS Release 11.2**.

Additional information about CCO and the Documentation CD-ROM is in the sections "Cisco Connection Online" and "Documentation CD-ROM" at the end of these release notes.

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.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to the Cisco customers and business partners. CCO services include product information, product documentation, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously: a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, and Internet e-mail, and it is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can access CCO in the following ways:

- 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 the Cisco 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.

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM, a member of the Cisco Connection Family, is updated monthly. Therefore, it might be more current than printed documentation. To order additional copies of the Documentation CD-ROM, contact your local sales representative or call customer service. The CD-ROM package is available as a single package or as an annual subscription. You can also access Cisco documentation on the World Wide Web at http://www.cisco.com, http://www-china.cisco.com, or http://www-europe.cisco.com.

If you are reading Cisco product documentation on the World Wide Web, you can submit comments electronically. Click **Feedback** in the toolbar, select **Documentation**, and click **Enter the feedback form**. After you complete the form, click **Submit** to send it to Cisco. We appreciate your comments.

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This document is to be used in conjunction with the *Cisco IOS Release 11.2 Configuration Guides* and *Command References* publication.