C H A P T E R **3**

ATM Traffic Management Hardware and Software Planning

This chapter provides an introduction to the ATM port adapter hardware and software that is supported on the Cisco 7200 series routers. It includes hardware installation guidelines and verification information and a review of the Cisco IOS software releases supported by the Cisco 7200 series routers, including a summary of where certain key ATM features were introduced.

This chapter includes the following topics:

Hardware Planning for ATM Traffic Management

This section provides an overview of the hardware guidelines for the Cisco 7200 series routers and an introduction to the ATM port adapters supported on the Cisco 7200 series routers.

This section includes the following topics:

Hardware Installation Guidelines on the Cisco 7200 Series Router

There are specific hardware installation and memory guidelines that you should observe to achieve the optimal operating results for your Cisco 7200 series router.

Cisco 7200 series routers have a finite data-carrying capacity, referred to as *bandwidth*, that affects the port adapter distribution in the chassis, as well as the number and types of port adapters that you can install. The Cisco 7200 series routers use a concept called *bandwidth points*, which allow you to

determine whether your port adapter and I/O controller configuration can be supported by your network processing engine (NPE) or network services engine (NSE) and memory configuration. Each port adapter and I/O controller is associated with a certain bandwidth point value, and the sum of all of these bandwidth points must not exceed allowable limits.

You should meet the following objectives during your hardware configuration:

- Find the total number of bandwidth points for each PCI bus by adding the bandwidth points for the port adapters and I/O controllers that correspond to that particular PCI bus.

- Be certain not to exceed the allowable number of total bandwidth points for each PCI bus (the allowable total varies by your NPE or NSE).

- Distribute the bandwidth evenly between the buses.

Refer to the *Cisco 7200 Series Port Adapter Hardware Configuration Guidelines* document for these important hardware configuration, memory, and operating guidelines.

ATM Port Adapter Support on the Cisco 7200 Series Router

The physical interfaces that support ATM on a Cisco 7200 series router are referred to as ATM port adapters (PAs). This section provides a brief introduction to the ATM port adapters that are supported on the Cisco 7200 series router, and includes the following topics:

- PA-A1 ATM Port Adapter (OC-3), page 3-2
- PA-A2 ATM CES Port Adapter (T3, E3 , OC-3, and 4 CBR ports [T1 or E1]), page 3-3
- PA-A3 Enhanced ATM Port Adapter (T3, E3, OC-3, and T1/E1 Inverse Multiplexing Over ATM [IMA]), page 3-3
- PA-A6 Enhanced ATM Port Adapter Plus (T3, E3, and OC-3), page 3-3
- ATM Port Adapter Summary, page 3-4

For a list of documents that contain important details about the ATM port adapters and their installation, see the "Related Documentation" section on page 3-13.

Note   Not all models of ATM port adapters are supported on the Cisco 7200 series router. For example, the PA-A3 OC-12 ATM port adapter is only available initially on the Cisco 7500 series routers.

PA-A1 ATM Port Adapter (OC-3)

The PA-A1 ATM port adapter is the original Cisco Systems ATM port adapter. It is designed for use as a local-area network (LAN) campus uplink supporting LAN Emulation (LANE).

The PA-A1 does not support traffic shaping. The peak cell rate (PCR) of all virtual circuits (VCs) is the line rate, which is 155 Mbps for the OC-3 (optical carrier) interface.

Therefore, the PA-A1 supports the unspecified bit rate (UBR) service class only. You cannot configure other ATM service classes such as non-real-time variable bit rate (nrt-VBR) or available bit rate (ABR) on permanent virtual circuits (PVCs) on the PA-A1 ATM port adapter. The UBR service class provides a high degree of multiplexing or bandwidth sharing, but does not provide any bounds on cell delay or cell loss.

PA-A2 ATM CES Port Adapter (T3, E3 , OC-3, and 4 CBR ports [T1 or E1])

The target application of the PA-A2 ATM CES port adapter is access to a broadband public or private ATM network where multiservice consolidation of voice, video, and data traffic over a single ATM link is a requirement.

The PA-A2 ATM CES port adapter is a dual-wide module. It has four T1 (1.544 Mbps) or four E1 (2.048 Mbps) 120-ohm constant bit rate (CBR) ports that can support both structured (N x 64 Kbps) and unstructured ATM Forum-compliant circuit emulation services (CES), and a single port of an OC-3 (155 Mbps) single-mode intermediate reach or a T3 (45 Mbps) or E3 (34 Mbps) standards-based ATM interface.

The PA-A2 ATM CES port adapter can be used only on a Cisco 7200 series router or a Cisco uBR7200 series router that has at least a 150-MHz network processing engine (NPE-150).

PA-A3 Enhanced ATM Port Adapter (T3, E3, OC-3, and T1/E1 Inverse Multiplexing Over ATM [IMA])

Cisco Systems introduced the enhanced PA-A3 ATM port adapter for WAN links that require native, hardware-based ATM traffic shaping to control bandwidth on the VCs. When connecting an ATM router interface to a switch network that requires traffic shaping, we recommend using the PA-A3 or the PA-A6 ATM port adapter.

The PA-A3 ATM port adapters are single-port, single- and dual-wide port adapters for the Cisco 7200, Cisco 7500, and Cisco 7600 OSR series routers using the FlexWAN module for the Catalyst 6000 family of switches. The ATM PA-A3 is designed with a high-performance, dual segmentation and reassembly (SAR) architecture with local buffer memory.

The PA-A3 ATM port adapter supports advanced ATM hardware features, such as per-VC and per-virtual path (VP) traffic shaping, and up to 4096 VCs. It supports most ATM service classes including ABR, CBR, nrt-VBR, rt-VBR, UBR and UBR+ (for SVCs only).

PA-A6 Enhanced ATM Port Adapter Plus (T3, E3, and OC-3)

With advanced ATM features, the enhanced PA-A6 ATM port adapter plus supports broadband aggregation, WAN aggregation, and campus/metropolitan-area network (MAN) aggregation, including the following types of applications:

- Broadband subscriber access aggregation
- High-speed customer premises equipment (CPE) WAN link
- High-speed WAN uplink
- High-speed enterprise backbone

The enhanced PA-A6 ATM port adapter plus supports many of the same features as the PA-A3 ATM port adapter, but provides additional hardware capacity, including support of up to 8191 VCs.

The enhanced PA-A6 ATM port adapter plus is a series of single-width, single-port ATM port adapters for Cisco 7200 series, Cisco 7401ASR, Cisco 7500 series, and Cisco 7600 series routers.

Like the PA-A3 ATM port adapter, the PA-A6 ATM port adapter also supports advanced ATM hardware features such as per-VC and per-VP traffic shaping. It supports most ATM service classes including ABR, CBR, nrt-VBR, rt-VBR, UBR, and UBR+ (for SVCs only).

ATM Port Adapter Summary

Table 3-1 provides a summary of the ATM port adapter support on the Cisco 7200 series routers.

Table 3-1   ***Summary of ATM Port Adapter Support on the Cisco 7200 Series Router***

ATM Port Adapter	Description in show interfaces atm Command	Service Category Support	Virtual Circuit Support	Priority Scheduling
PA-A1 (OC-3)	"Hardware is TI1570 ATM"	UBR	2048 VCs	One level. Uses round robin scheduling among all VCs.
PA-A2 (T3/E3/OC-3 and 4 CBR [T1 or E1] ports)	"Hardware is ATM-CES"	• ABR • CBR—for voice • nrt-VBR • UBR	2046 VCs and 124 CBR VCs	2 levels based on CBR for voice or data VC. Strict priority is given to CBR and a weighted round robin is used for data VCs. Contention between VCs is handled using the fairness algorithm.[1]
PA-A3 (T3/E3/OC-3)	"Hardware is ENHANCED ATM PA"	• ABR • CBR—for data • nrt-VBR • rt-VBR • UBR • UBR+—SVCs only	4096 VCs	6 levels (configurable). For more information, see the "Configuring PVC Priorities" section on page 5-29.
PA-A3 IMA (T1/E1)	"Hardware is ENHANCED ATM PA"	• ABR • CBR—for data • nrt-VBR • rt-VBR • UBR • UBR+—SVCs only	• 512 VCs on UNI • 512 interface VCs per link on each IMA interface • Cell-based inverse multiplexing that allows Operation, Administration, and Maintenance (OAM) cells to provide management and monitoring information (including connectivity, alarm indication signals [AIS] and loopback) across the inverse multiplexed links.	6 levels (configurable). For more information, see the "Configuring PVC Priorities" section on page 5-29.

Table 3-1   Summary of ATM Port Adapter Support on the Cisco 7200 Series Router (continued)

ATM Port Adapter	Description in show interfaces atm Command	Service Category Support	Virtual Circuit Support	Priority Scheduling
PA-A6 (T3/E3/OC-3)	"Hardware is ENHANCED ATM PA Plus"	• ABR • CBR • nrt-VBR • rt-VBR • UBR • UBR+—SVCs only	8191 VCs (one VC is reserved for OAM processing)	6 levels (configurable). For more information, see the "Configuring PVC Priorities" section on page 5-29.

1. Uses a fairness algorithm (as defined in Appendix I.3 of Traffic Management Spec. 4.0). Specifically, the TI1585 ASIC uses the max-min fairness criteria. It divides the available bandwidth for bottlenecked connections among all connections bottlenecked on this link. The bandwidth available for bottlenecked connections is defined as the available link bandwidth minus the sum of all bandwidths of connections bottlenecked elsewhere.

Software Planning for ATM Traffic Management

The Cisco 7200 series routers and ATM port adapters are supported by a variety of Cisco IOS software releases. The currently available Cisco IOS releases include Cisco IOS Release 12.0, Cisco IOS Release 12.1, and Cisco IOS Release 12.2, and several early deployment releases including Cisco IOS Release 12.0 S, Cisco IOS Release 12.1 E, Cisco IOS Release 12.2 S, Cisco IOS Release 12.2 T, and Cisco IOS Release 12.2 B.

Note   If you are new to Cisco IOS software and its release structure, you might find it useful to refer to the ABCs of Cisco IOS Software site located on Cisco.com. Use the ABCs Site Map to access specific topics, including information about how the Cisco IOS software is packaged and its release trains. You can also go to the Cisco IOS Software home page to locate other information about the Cisco IOS software, its product documentation, and tools.

This section provides background information about some of the latest Cisco IOS software releases supported by the Cisco 7200 series routers and describes some of the relationships between the software releases. It also includes information about where new feature support is introduced and about code stability and maturity that can help you to determine which Cisco IOS software release best suits your environment and objectives.

This section includes the following topics:

Cisco IOS Software Releases 12.0 T and 12.1 Release History

Cisco IOS Release 12.1 is based directly on Cisco IOS Release 12.0 T. It offers all of the advanced features of the 12.0 T release, but with some additional fixes. Therefore, it provides better code maturity and stability.

The last Cisco IOS 12.0 T release was Cisco IOS Release 12.0(7)T, after which the release numbering was incremented—the next maintenance release of this code is called Cisco IOS Release 12.1(1). The 12.1(1) and subsequent 12.1 releases are focused on code maturity and stability, and they are intended to achieve general deployment (GD) certification. To reach this goal, the feature set of the 12.1 release was frozen with Cisco IOS Release 12.1(1). At that time, new features and hardware support were directed into the 12.1 E and 12.1 T releases.

When the12.0 T release became the 12.1 release, the following two new branches, called Cisco IOS Release 12.1 E and Cisco IOS Release 12.1 T, were created for new feature integration:

- Cisco IOS Release 12.1 T—Integrates features and hardware support for platforms across the Cisco product line.

- Cisco IOS Release 12.1 E—Focuses exclusively on feature and hardware support for the Cisco 7500, Cisco 7200, and Cisco 7100, and Catalyst 6000 families.

Both the 12.1 E and 12.1 T branches are synchronized to the 12.1 release, receiving the same bug fixes that are committed into the 12.1 branch.

Cisco IOS Software Releases 12.1 T and 12.2 Release History

The last 12.1 T release was Cisco IOS Release 12.1(5)T, after which the release numbering was again incremented. The next maintenance release of this code is called Cisco IOS Release 12.2(1). Similar to the release history and objectives of Cisco IOS Release 12.1 described in the previous topic, the 12.2(1) and subsequent 12.2 releases are focused on code maturity and stability to achieve general deployment (GD) certification. To reach this goal, the feature set of Cisco IOS Release 12.2 was frozen with Cisco IOS Release 12.2(1).

When the 12.1 T release became the 12.2 release, the following three new branches, called Cisco IOS Release 12.2 B, Cisco IOS Release 12.2 S, and Cisco IOS Release 12.2 T, were created for new feature integration:

- Cisco IOS Release 12.2 B—Focuses primarily on broadband solutions and supports the Cisco 7400, Cisco 7200, and Cisco 6400 product families.

- Cisco IOS Release 12.2 S—Focuses exclusively on feature and hardware support for the Cisco 7600, Cisco 7500, Cisco 7400, Cisco 7200, and Cisco 7100, and Catalyst 6000 product families.

- Cisco IOS Release 12.2 T—Integrates features and hardware support for platforms across the Cisco product line.

Cisco IOS Release Summary

Table 3-2 provides a list of some of the latest available Cisco IOS releases and their descriptions for the Cisco 7200 series routers.

Table 3-2   Summary of Cisco IOS Releases Supported on the Cisco 7200 Series Routers

Cisco IOS Release	Description
12.0	Offers the most code maturity, extensive field exposure, and is the preferred GD release for the Cisco 7200 series routers.
12.0 S	Based on Cisco IOS Release 12.0. Release that is most suitable for service providers. Contains additional features and hardware support for service providers, but feature sets are limited to IP protocols.
12.0 ST	Based on Cisco IOS Release 12.0 S. Technology train for Cisco IOS Release 12.0 S that contains enhanced features suitable for service providers.
12.1	Based on Cisco IOS Release 12.0 T. Offers code maturity and is focused on stability. Latest GD-available release for the Cisco 7200 series routers.
12.1 E	Based on Cisco IOS Release 12.1. Focused on Cisco 7x00 and Catalyst 6000 platforms. Offers the latest Cisco 7200 series hardware and feature support and has extensive field exposure. Includes support for all 12.0 T, 12.0 XE, and 12.1 features.
12.1 T	Based on Cisco IOS Release 12.1. Offers all 12.0 T, 12.1, and some 12.0 XE features. Offers additional features for all Cisco platforms over time.
12.2	Based on Cisco IOS Release 12.1 T. Feature-rich and supports wide variety of hardware. Focused on stability and GD certification.
12.2 B	Based on Cisco IOS Release 12.2. Primarily focused on broadband solutions, supporting the Cisco 7200, Cisco 7400, and Cisco 6400 product families.
12.2 S	Based on Cisco IOS Release12.2. Offers all 12.0 S and 12.1 E features. Offers additional features for all Cisco 7x00, Cisco 10000, Cisco 12000, and Catalyst 6000 platforms over time.
12.2 T	Based on Cisco IOS Release 12.2. Offers additional hardware and software feature support for all Cisco platforms over time.

Additional Software Planning Information for the PA-A3 and PA-A6 ATM Port Adapters

This section provides information about some of the Cisco IOS software releases in which some specific software feature additions for the PA-A3 and PA-A6 ATM port adapters were introduced.

Table 3-3   *List of Key Feature Support Additions for PA-A3 and PA-A6 ATM Port Adapters*

Feature Description	Cisco IOS Software Release Where Introduced
ABR service category	12.0(4)T, 12.0(5)S **Note** The following minimum Cisco IOS software releases are recommended for ABR support—12.0(7)T and later, 12.0(8)S and later, 12.1(5) and later.
CBR service category	12.2(5), 12.2(8)T, 12.2(14)S, 12.2(15)B
Class-map groups	12.1(5)E, 12.1(5)T
Configurable per-VC hold queue	12.1(5)T
Head-insertion scheduling algorithm	12.0(21)S, 12.0(21)ST, 12.1(11), 12.1(11b)E, 12.2(6), 12.2(8)T, 12.2(14)S, 12.2(15)B
Per-VC CBWFQ (for the PA-A3 ATM port adapter on the Cisco 7200 series router)	12.0(5)T, 12.0(5)XE, 12.1(1), 12.1(1)T, 12.1(1)E
Per-VC CBWFQ (NSE support)	12.1(7)E
Per-VC CBWFQ (NSE-1 support)	12.2(4)B1
PVC transmit priority increase from 4 to 6 levels	12.2(5), 12.2(14)S, 12.2(8)T, 12.2(15)B
Real-time VBR service category	12.2(5), 12.2(8)T, 12.2(14)S, 12.2(15)B
Receive buffer default size increase	12.0 S, 12.1 E, 12.2 T
UBR+ service category (SVCs only)	11.3 T, enhanced in 12.0(3)T
Voice over ATM with AAL2 trunking	12.(2)T
VP shaping	12.0(4)T, 12.0(5)S, 12.0(7)XE

Cisco Systems Tools Overview

Cisco Systems maintains several tools that help you to configure and maintain your Cisco Systems router hardware and software. Table 3-4 provides a brief description of some of the helpful tools that you can use for hardware and software planning.

Note   All of the tools shown in Table 3-4 require that you log in to your Cisco.com account. If you do not have an account or have forgotten your username or password, click **Cancel** at the Login dialog box and follow the instructions that appear.

Table 3-4   Helpful Tools for Hardware and Software Planning

Tool Name	URL	Description
Bug Toolkit	http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl	Use the Bug Toolkit to find the latest information about Cisco IOS software defects.
Dynamic Configuration Tool	http://www.cisco.com/order/apollo/configureHome.html	Use the Dynamic Configuration Tool to help you select the appropriate hardware and software components for new Cisco Systems equipment that you want to purchase.
Feature Navigator	http://tools.cisco.com/ITDIT/CFN/jsp/index.jsp	Use Feature Navigator to find information about platform and software image support, including available features. **Note** Feature Navigator now supports all of the major Cisco IOS software releases.
Software Advisor	http://www.cisco.com/cgi-bin/front.x/Support/HWSWmatrix/hwswmatrix.cgi	Use the Software Advisor to find the minimum software requirements for your Cisco Systems hardware.

Verifying Software Support for Hardware

To find the minimum Cisco IOS software requirements for your Cisco 7200 series hardware, use the Software Advisor tool on Cisco.com. This tool does not verify whether hardware modules within a system are compatible, but it does provide the minimum Cisco IOS requirements for individual hardware modules or components.

Note   You need a Cisco.com account to access Software Advisor. If you do not have an account or have forgotten your username or password, click **Cancel** at the Login dialog box and follow the instructions that appear.

To access Software Advisor, perform the following steps:

Step 1   Go to Cisco.com and click **Login** at the top of the Cisco.com home page.

Step 2   Enter your username and password.

Step 3   Point your browser directly to
http://www.cisco.com/cgi-bin/front.x/Support/HWSWmatrix/hwswmatrix.cgi.

The Software Advisor page appears.

Step 4   Click **Software Support for Hardware**.

Step 5   From the Software Support for Hardware page, do one of the following to search for the minimum supported software release needed for your hardware:

- Choose a product family.

- Type a specific product number.

A list of the compatible hardware product numbers and minimum software releases is provided.

Step 6   To find a list of the common software releases for your hardware, select the checkbox beside the hardware products for which you want software information and click the **Display Intersection** button at the bottom of the page.

The products that you selected are displayed with the intersecting software releases shown in bold.

Verifying Feature Support

Both Feature Navigator and Software Advisor provide information about Cisco IOS software features and releases. Each tool allows you to find the following information about features in the Cisco IOS software:

- Which Cisco IOS software release supports one or more specified features.

- A list of features that are supported by a particular Cisco IOS software release, image name, or product number.

- The list of features that are shared by, and the list of features that are unique to, any two specified Cisco IOS software releases.

Note   You can also find image names and product numbers, view MIBs, view release notes, and download images from the output of the **Compare Images** link.

Using Feature Navigator to Search for Features

To access Feature Navigator, perform the following steps:

Step 1   Go to Cisco.com and click **Login** at the top of the Cisco.com home page.

Step 2   Enter your username and password.

Step 3   Point your browser directly to http://tools.cisco.com/ITDIT/CFN/jsp/index.jsp.

The Cisco Feature Navigator II page appears.

Step 4   From the Cisco Feature Navigator II page, choose one of the following links:

- **Search by Feature**—To find which Cisco IOS software release supports the features that you want.

- **Search by Release**—To find a list of features supported by a particular Cisco IOS software release, image name, product number, or platform.

- **Compare Releases**—To compare two Cisco IOS software releases to find out what features the software has in common and which features are unique.

Verifying the Hardware and Software Installation

To obtain information about your Cisco 7200 series router hardware and software, you can use several different **show** commands, including the following commands:

- **show diag**—Displays the types of port adapters installed in your system and specific information about each one.

- **show interfaces atm**—Displays status information, including the physical slot and interface address, for the interfaces that you specify.

- **show version**—Displays the configuration of the system hardware, the number of each interface type installed, the Cisco IOS software version, the names and sources of configuration files, and boot image information.

This section includes the following examples:

✎

Note   The sample output that appears in this document might not match the output that you receive when running these commands. The sample output in this document is intended only as an example.

Example of the show diag Command

To display the types of port adapters installed in your system (and specific information about each), use the **show diag** command.

The following example shows output from the **show diag** command on a Cisco 7200 series router with a PA-A6 ATM port adapter installed in slot 6:

```
Router# show diag 6
Slot 6:
ATM WAN OC3+ (MM) Port adapter, 1 port
Port adapter is analyzed
Port adapter insertion time 00:44:57 ago
EEPROM contents at hardware discovery:
Hardware Revision: 1.0
PCB Serial Number:-----H
Part Number: 73-7981-0
Board Revision: 1A
RMA Test History: 00
RMA Number: 00-00-00
RMA History: 00
Unknown Field (type 0088): 00 00 00 01
Product Number: PA-ATM-DBL-DLX-OC3MM
Top Assy. Part Number: 800-20782-01
EEPROM format version 4
EEPROM contents (hex):
0x00: 04 FF 40 03 A7 41 01 00 C1 8B 2D 20 2D 20 2D 20
0x10: 2D 20 2D 20 48 82 49 1F 2D 01 42 31 41 03 00 81
0x20: 00 00 00 00 04 00 88 00 00 00 01 CB 94 50 41 2D
0x30: 41 54 4D 2D 44 42 4C 2D 44 4C 58 2D 4F 43 33 4D
```

```
0x40: 4D C0 46 03 20 00 51 2E 01 FF FF FF FF FF FF FF
0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

Example of the show interfaces atm Command

To display status information (including the physical slot and interface address) for the interfaces that you specify, use the **show interfaces atm** command.

The following example shows output from the **show interfaces atm** command on a Cisco 7200 series router with a PA-A6 ATM port adapter installed in slot 6:

```
Router# show interfaces atm 6/0
ATM6/0 is up, line protocol is up
Hardware is ENHANCED ATM PA Plus
MTU 4470 bytes, sub MTU 4470, BW 149760 Kbit, DLY 80 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ATM, loopback not set
Encapsulation(s): AAL5
8191 maximum active VCs, 1 current VCCs
VC idle disconnect time: 300 seconds
8 carrier transitions
Last input 00:37:33, output 00:26:16, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: None
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
54033 packets input, 81670740 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
8763526 packets output, 296268354 bytes, 0 underruns
0 output errors, 0 collisions, 0 interface resets
0 output buffer failures, 0 output buffers swapped out
```

Example of the show version Command

To display the configuration of the system hardware, the number of each interface type installed, the Cisco IOS software version, the names and sources of configuration files, and boot image information use the **show version** command.

The following example shows output from the **show version** command on a Cisco 7200 series router:

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-IS-M), Version 12.2(8)B, RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Fri 02-Aug-02 10:51 by ccai
Image text-base: 0x60008940, data-base: 0x61850000
ROM: System Bootstrap, Version 11.1(13)CA, EARLY DEPLOYMENT RELEASE SOFTWARE (f)
BOOTLDR: 7200 Software (C7200-BOOT-M), Version 11.1(16)CA, EARLY DEPLOYMENT REL
d11-5-7206-15 uptime is 1 week, 31 minutes
System returned to ROM by reload at 14:08:34 UTC Tue Aug 20 2002
System image file is "slot0:c7200-is-mz.122-11.T"
cisco 7206 (NPE200) processor (revision B) with 114688K/16384K bytes of memory.
Processor board ID 15455885
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
6 slot midplane, Version 1.3
```

```
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
Primary Rate ISDN software, Version 1.1.
1 FastEthernet/IEEE 802.3 interface(s)
2 Serial network interface(s)
2 HSSI network interface(s)
11 ATM network interface(s)
4 Channelized T1/PRI port(s)
125K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.
20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2102
```

Related Documentation

The following table provides information about additional resources that you can read to learn more about some of the topics discussed in this chapter:

For more information about:	Refer to the following publications:
Cisco IOS software overview and release structure	ABCs of Cisco IOS Software
Hardware guidelines, bandwidth points, and memory requirements	*Cisco 7200 Series Port Adapter Hardware Configuration Guidelines*
Hardware installation	• *PA-A1 ATM Port Adapter Installation and Configuration* • *PA-A2 ATM CES Port Adapter Installation and Configuration* • *PA-A3 Enhanced ATM Port Adapter Installation and Configuration* • *Inverse Multiplexing over ATM Port Adapter Installation and Configuration* • *PA-A6 Port Adapter Installation and Configuration*
Port adapter specifications and feature summaries	• *ATM Circuit Emulation Services Port Adapter for Cisco 7200 Routers* (brochure) • *PA-A1 ATM Port Adapter* (data sheet) • *Enhanced ATM Port Adapter (ATM PA-A3)* (data sheet) • *Enhanced ATM Port Adapter (ATM PA-A3)* (brochure) • *Enhanced ATM Port Adapter for Cisco 7200, 7400, 7500, and 7600 Series Routers* (ATM PA-A6 data sheet)

Next Steps

This chapter provides you with hardware and software planning information for your ATM port adapter on the Cisco 7200 series router.

Chapter 4, "Preparing to Configure ATM Traffic Management and QoS Features," provides you with some specific guidelines on gathering the necessary network information and defining your service models in preparation for configuring traffic shaping and QoS on your router.