C H A P T E R 1

Overview

This chapter describes the Cisco PA-POS-OC3 port adapter and contains the following sections:

Port Adapter Overview

The PA-POS-OC3 interface provides a direct connection between the supported router or switch platform and external networks. You must use the appropriate optical fiber cables to connect the PA-POS-OC3 with an external OC-3 network. (See the "PA-POS-OC3 Optical Fiber Specifications" section on page 1-5 and the "Cables and Connectors" section on page 1-6 for more information on optical fiber cables.)

Three models of the PA-POS-OC3 are available:

- PA-POS-OC3MM—Multimode. (See Figure 1-1.)
- PA-POS-OC3SML—Single-mode, long reach. (See Figure 1-2.)
- PA-POS-OC3SMI—Single-mode, intermediate reach. (See Figure 1-3.)

PA-POS-OC3 Packet OC-3 Port Adapter Installation and Configuration

Figure 1-1   PA-POS OC3MM—Faceplate View, Horizontal Orientation
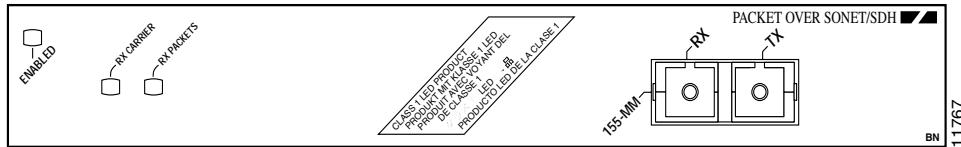

Figure 1-2   PA-POS-OC3SML—Faceplate View, Horizontal Orientation
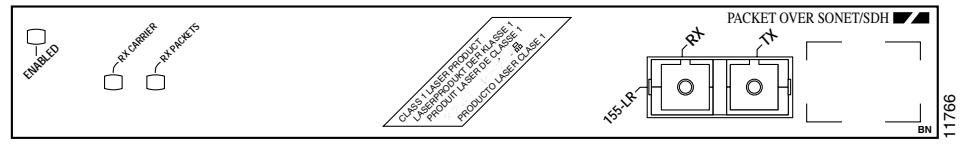
Figure 1-3   PA-POS-OC3SMI—Faceplate View, Horizontal Orientation
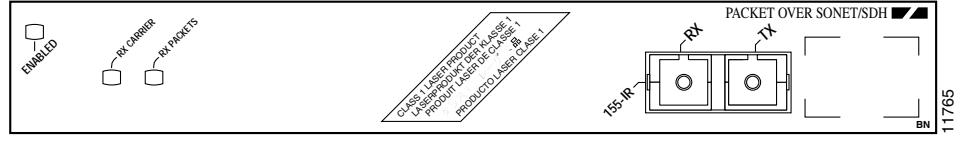
SONET/SDH Overview

The POS specification addresses the use of PPP encapsulation over SONET/Synchronous Digital Hierarchy (SDH) links. SONET is an American National Standards Institute (ANSI) standard (T1.1051988) for optical digital transmission at hierarchical rates from 51.840 Mbps (STS-1) to 2.5 Gbps (STS-48) and greater. SDH is the international standard for optical digital transmission at hierarchical rates from 155.520 Mbps (STM-1) to 2.5 Gbps (STM-16) and greater.

Because SONET/SDH is by definition a point-to-point circuit, PPP is well suited for use over these links. PPP was designed as a standard method of communicating over point-to-point links.

SONET is an octet-synchronous multiplex scheme that defines a family of standard rates and formats. The basic rate for POS is that of STS-3c/STM-1, which is 155.520 Mbps. The available information bandwidth is 149.760 Mbps, which is the STS-3c/STM-1 Synchronous Payload Envelope (SPE), the payload portion of the SONET frame into which the octet-oriented user data is mapped. (Octet boundaries are aligned with the SPE octet boundaries.) For the SPE with the PA-POS-OC3, section, line, and path overhead are removed.

The International Telecommunications Union Telecommunication Sector (ITU-T) defines a series of SDH transmission rates beginning at 155.520 Mbps, as follows:

SONET[1]	SDH Equivalent
STS-3c[2]	STM-1[2]
STS-12c	STM-4c
STS-48c	STM-16c

1. ANSI-defined SONET specifications.

2. Currently supported by the PA-POS-OC3.

Despite the name, SONET is not limited to optical links. Electrical specifications have been defined for single-mode fiber, multimode fiber, and CATV 75-ohm coaxial cable. The PA-POS-OC3 currently allows transmission over single-mode and multimode optical fiber only. Transmission rates are integral multiples of 51.840 Mbps, which can be used to carry T3/E3 bit-synchronous signals.

The following transmission multiples are currently specified and commonly used:

- STS-3c—155.520 Mbps (the PA-POS-OC3 conforms to STS-3c)
- STS-12c—622.080 Mbps
- STS-48c—2,488.320 Mbps

The following references discuss concepts and specifications of POS and PPP:

- Simpson, W., Editor, *The Point-to-Point Protocol (PPP)*, RFC 1548, Daydreamer, December 1993.
- Simpson, W., Editor, *PPP in HDLC Framing*, RFC 1662, Daydreamer, July 1994.
- Simpson, W, Editor, *PPP Over SONET/SDH*, RFC1619, May 1995.
- *American National Standard for Telecommunications - Digital Hierarchy - Optical Interface Rates and Formats Specification*, ANSI T1.105-1991.
- *American National Standard for Telecommunications - Synchronous Optical Network (SONET) Payload Mappings*, ANSI T1.105.02-1993 draft.
- ITU-T Recommendation G.707, *Synchronous Digital Hierarchy Bit Rates*, June 1992.

Features

The PA-POS-OC3 has the following features:

- Standards-compliant SONET/SDH interface; SONET/STS-3c and SDH/STM-1 framing and signaling overhead
- Full-duplex operation at 155 Mbps (half-duplex operation is not supported)
- Intermediate-reach (PA-POS-OC3SMI) and long-reach (PA-POS-OC3SML) optical interface with single-mode optical fiber
- Short-reach optical interface (PA-POS-OC3MM) with multimode optical fiber

Note   For information on the single-mode and multimode cables to use with the PA-POS-OC3, see the "PA-POS-OC3 Optical Fiber Specifications" section on page 1-5, and the "Cables and Connectors" section on page 1-6.

- Self-synchronous $X^{43}+1$ scrambling and de scrambling of packets

- Single-width port adapter for the VIP2 in all Cisco 7000 series and Cisco 7500 routers, and in Cisco 7100 series, Cisco 7200 series, Cisco uBR7200 series routers, and the Cisco 7304 PCI Port Adapter Carrier Card in the Cisco 7304 router.

- Online insertion and removal (OIR) in Cisco 7200 series, Cisco uBR7200 series routers, Cisco 7301 routers, and Cisco 7401ASR routers, allowing you to remove, add, or replace a PA-POS-OC3 online

Note To remove a PA-POS-OC3 from a VIP2 or VIP4 in a Cisco 7000 series or Cisco 7500 series router, or the Cisco 7304 PCI Port Adapter Carrier Card in the Cisco 7304 router, you must first remove the VIP or carrier card on which the PA-POS-OC3 is installed. The VIP and carrier card support OIR.

Note To remove a PA-POS-OC3 from a Catalyst RSM/VIP2 in a Catalyst 5000 family switch, you must first remove the Catalyst RSM/VIP2 on which the PA-POS-OC3 is installed. The Catalyst RSM/VIP2 supports OIR.

Note To remove a PA-POS-OC3 from a Catalyst 6000 series switch with a Catalyst 6000 family FlexWAN module, you must first remove the FlexWAN module on which the PA-POS-OC3 is installed. The FlexWAN module supports OIR.

- Support for 16-bit and 32-bit cyclic redundancy checking (CRC-16 and CRC-32)

Interface Specifications

The physical layer interface for the PA-POS-OC3 is Optical Carrier-3 (OC-3c, the specification for SONET STS-3c and SDH STM-1 transmission rates), and the PA-POS-OC3 is designed to comply with Packet-over-SONET specifications. The PA-POS-OC3 provides a single 155.520-Mbps Packet OC-3 network interface for all supported platforms.

Each PA-POS-OC3 has one duplex SC-type receptacle to allow connection to single-mode or multimode optical fiber. (For more information on the optical fiber cables you should use with this port adapter, see the "PA-POS-OC3 Optical Fiber Specifications" section on page 1-5 and the "Cables and Connectors" section on page 1-6.)

Packet data is transported using Point-to-Point Protocol (PPP) and is mapped into the STS-3c/STM-1 frame. The encapsulations used add approximately half the number of bytes of transport overhead as that involved with ATM using ATM Adaptation Layer 5 (AAL5) and line card control (LCC) Subnetwork Access Protocol (SNAP) encapsulations.

The PA-POS-OC3 interface is compliant with RFC 1619, *PPP over SONET/SDH*, and RFC 1662, *PPP in HDLC-like Framing*. The PA-POS-OC3 supports RFC 1619 PPP-over-SONET/SDH encapsulation, and provides support for SNMP agent v1 (RFC 1155-1157), and Management Information Base (MIB) II (RFC 1213).

PA-POS-OC3 Optical Fiber Specifications

The PA-POS-OC3 specification for optical fiber transmission defines two types of fiber: single-mode and multimode. Within the single-mode category, two types of transmission are defined: intermediate reach and long reach. Within the multimode category, only short reach is available.

Modes can be thought of as bundles of light rays entering the fiber at a particular angle. Single-mode fiber allows only one mode of light to propagate through the fiber, and multimode fiber allows multiple modes of light to propagate through the fiber.

Multiple modes of light propagating through the fiber travel different distances depending on the entry angles, which causes them to arrive at the destination at different times (a phenomenon called *modal dispersion*); therefore, single-mode fiber is capable of higher bandwidth and greater cable run distances than multimode fiber lists nominal OC-3 optical parameters for single-mode and multimode optical fiber transmission.

Note If the distance between two connected stations is greater than the maximum distances listed, significant signal loss can result, making transmission unreliable.

Table 1-1 lists the OC-3 optical parameters.

Table 1-1   OC-3 Optical Parameters

Transceiver Type[1]	Transmit Power	Maximum Power to Receiver[2]	Receiver Sensitivity	Loss Budgets	Nominal Distance Between Stations
Single-mode[3] long reach	–5 dBm min. to 0 dBm max. at 1280–1335 nm[4]	–10 dBm	–34 dBm	10 to 28 dB	Up to 25 mi (40 km)
Single-mode[5] intermediate reach	–15 dBm min. to –8 dBm max. at 1280–1335 nm[4]	–8 dBm	–31 dBm	0 to 12 dB	Up to 9 mi (15 km)
Multimode[6] short reach	–20 dBm min. to –14 dBm max. at 1280–1335 nm[4]	–8 dBm	–30 dBm	0 to 7 dB	Up to 1.2 mi (2 km)

1. This table gives nominal OC-3 optical parameters.

2. This value represents the maximum power to which any receiver can be exposed.

3. Complies with Bellcore GR-253-CORE Long Reach Specification (LR-1).

4. Nominal wavelength is 1310 nm.

5. Complies with Bellcore GR-253-CORE Intermediate Reach Specification (IR-1).

6. Complies with Short-Reach OC-3 Specification SR-OC-3.

To calculate link losses and dispersion losses for your application, refer to the following specifications and documents:

- EIA/TIA-IVa Dispersion Unshifted Single-Mode Fiber

- EIA-TIA- IVb Dispersion Shifted Single-Mode Fiber

- GR-20-CORE *Generic Requirements for Optical Fiber and Fiber-Optic Cable*

- ITU-T Recommendation G.957 *Optical Interfaces for Equipment and Systems Relating to the Synchronous Digital Hierarchy*

LEDs

The PA-POS-OC3 faceplate has three LEDs that indicate port adapter and interface status.
(See Figure 1-4.)

Figure 1-4   LEDs on the PA-POS OC-3—Partial Faceplate View Shown
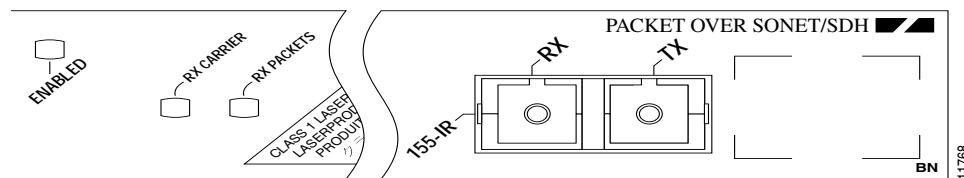
After system initialization, the enabled LED goes on to indicate that power is received and that the PA-POS-OC3 is enabled for operation.

The following conditions must all be met before the PA-POS-OC3 is enabled:

- The PA-POS-OC3 is correctly connected and receiving power.
- The system bus recognizes the PA-POS-OC3.
- A valid version of microcode is loaded and running.

If any one of these conditions is not met, or if the initialization fails, the enabled LED does not go on.

Table 1-2 lists LED colors and indications.

Table 1-2   PA-POS-OC3 LEDs

LED Label	Color	State	Function
ENABLED	Green	On	Indicates that the PA-POS-OC3 is enabled for operation.
RX CARRIER[1]	Green	On	Indicates that valid SONET/SDH framing has been detected on the received carrier.
RX PACKETS[2]	Green	On	Indicates that the PA-POS-OC3 has received a packet.

1. This LED does not merely indicate a received signal.
2. This LED will flicker rapidly during normal operation, indicating traffic.

Cables and Connectors

Use single-mode (for intermediate- or long-reach configurations) or multimode optical fiber cable to connect your router to a network or to connect two OC-3-equipped routers back to back. The PA-POS-OC3 provides the following optical fiber options:

- Multimode—155 Mbps, OC-3 optical fiber (SONET STS-3c or SDH STM-1)

    Use a multimode optical fiber that has a core/cladding diameter of 62.5/125 microns.

- Single-mode—155 Mbps, OC-3 optical fiber (SONET STS-3c or SDH STM-1)

    Use a single-mode optical fiber that has a modal-field diameter of 8.7 ±0.5 microns. (Nominal diameter is approximately 10/125 microns.)

✎

Note   For maximum cable lengths between stations, see on page 1-5. Single-mode and multimode optical fiber cables for the PA-POS-OC3 are not available from Cisco Systems; they are available from commercial cable vendors.

The PA-POS-OC3 has one duplex SC-type receptacle. For SONET/SDH single-mode and multimode optical fiber connections, use one duplex SC-type cable (see Figure 1-5) or two simplex SC-type cables (see Figure 1-6), one for transmit (TX) and one for receive (RX).

Figure 1-5   Duplex SC-Type Cable and Connector
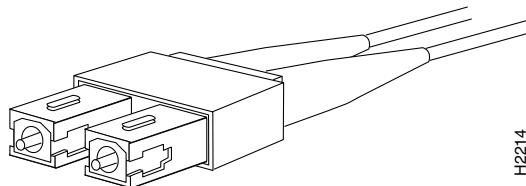
Figure 1-6   Simplex SC-Type Cable and Connector

✎
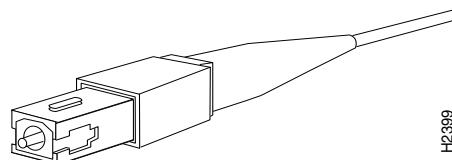
Note   For important laser and LED safety information, see the "Laser and LED Safety" section on page 2-10.

Network Management Support

Following is the protocol and MIB support for the PA-POS-OC3:

- SNMP agent v1 (RFC 1155-1157)
- MIB II (RFC 1213); POS MIB support is available with Cisco IOS Release 12.0

Encapsulation Method Support

The following encapsulation methods are supported by the PA-POS-OC3:

- RFC 1619 Point-to-Point Protocol over SONET/SDH

  We recommend that you refer to the Internet Draft *Enabling Transparency for the PPP over SONET/SDH Mapping*, which is recognized by the Internet Engineering Task Force (IETF) and Internet Engineering Steering Group (IESG) as an approved addendum to RFC 1619.

- High-Level Data Link Control (HDLC)
- Frame Relay

Using Statistics to Estimate Link Loss and Power Budget

Statistical models more accurately determine the power budget than standard worst-case methods. Determining the link loss with statistical methods requires accurate knowledge of variations in the data link components. Statistical power budget analysis is beyond the scope of this document. For further information, refer to ITU-T standards and your equipment specifications.

The following publications contain information on determining attenuation and power budget:

- T1E1.2/92-020R2 ANSI, the Draft American National Standard for Telecommunications entitled *Broadband ISDN Customer Installation Interfaces: Physical Layer Specification.*

- *Power Margin Analysis, AT&T Technical Note,* TN89-004LWP, May 1989.

Port Adapter Slot Locations on the Supported Platforms

The following sections describe the port adapter slot locations in the supported platforms. This section includes the following subsections:

Catalyst RSM/VIP2 Slot Numbering

The Catalyst RSM/VIP2 can be installed in any slot except the top slots, which contain the supervisor engine modules. The Catalyst RSM/VIP2 in a Catalyst 5000 family switch does not use interface processor slot numbering; therefore, slots are not numbered in Figure 1-7. The PA-POS-OC3 can be installed into either port adapter slot 0 or 1 on a Catalyst RSM/VIP2. Figure 1-7 shows a Catalyst RSM/VIP2 with two port adapters installed.

Note The Catalyst 5500 switch has 13 slots. Slot 1 is reserved for the supervisor engine module. If a redundant supervisor engine module is used, it must go in slot 2; otherwise, slot 2 can be used for other modules. Slot 13 is a dedicated slot, reserved for the ATM Switch Processor (ASP) module. Refer to the *Catalyst 5000 Series Route Switch Module Installation and Configuration Note* for any additional slot restrictions for the Catalyst RSM/VIP2.

Figure 1-7   Catalyst 5000 Family Switch with Port Adapters Installed on Catalyst RSM/VIP2

VIP2   Route Switch Module
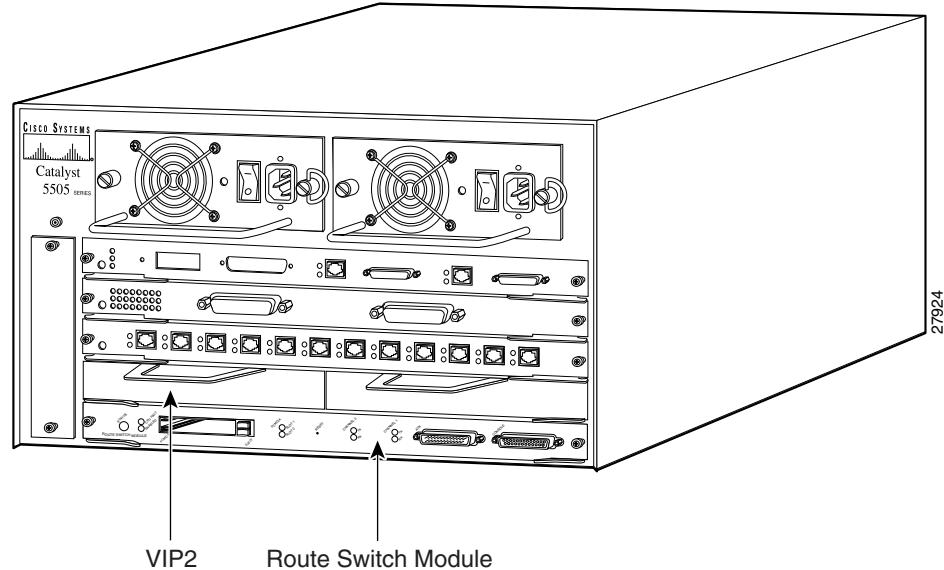
Note   For additional information, see the "Cisco 7401ASR Router Slot Numbering" section on page 1-14.

Catalyst 6000 Family FlexWAN Module Slot Numbering

The Catalyst 6000 family FlexWAN module can be installed in any slot except slot 1, which is reserved for the supervisor engine. The PA-POS-OC3 can be installed into either port adapter bay 0 or bay 1 on a FlexWAN module. Figure 1-8 shows a FlexWAN module with two blank port adapters installed.

Note   Slot 1 is reserved for the supervisor engine. If a redundant supervisor engine is used, it would go in slot 2; otherwise, slot 2 can be used for other modules.

Figure 1-8   Catalyst 6000 Family Switch with Blank Port Adapters Installed on FlexWAN Module
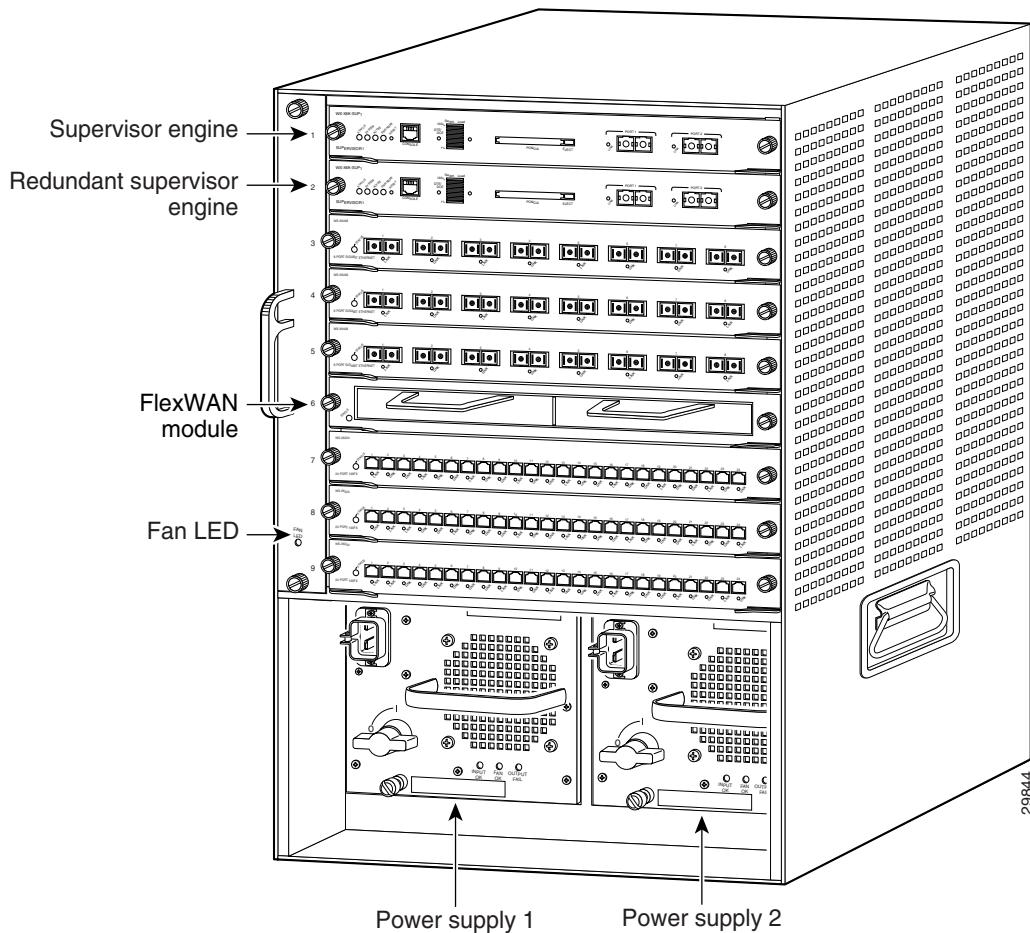
Cisco 7100 Series Routers Slot Numbering

The PA-POS-OC3 can be installed in port adapter slot 3 in Cisco 7120 series routers, and in port adapter slot 4 in Cisco 7140 series routers. Figure 1-9 shows a Cisco 7120 with a port adapter installed in slot 3. Figure 1-10 shows a Cisco 7140 with a port adapter installed in slot 4.

Figure 1-9   Port Adapter Slots in the Cisco 7100 Series Router—Cisco 7120 Series
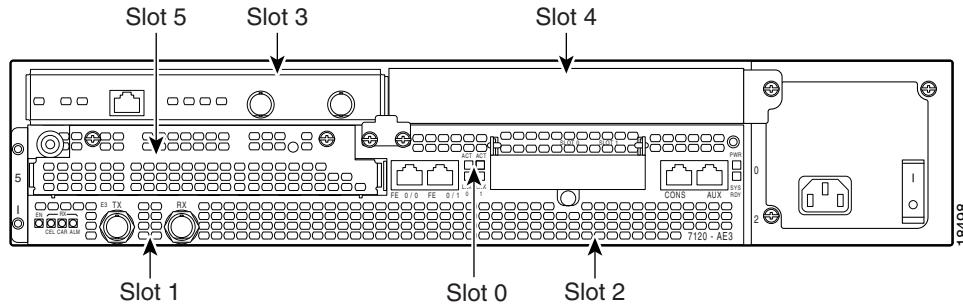
Figure 1-10   Port Adapter Slots in the Cisco 7100 Series Router—Cisco 7140 Series
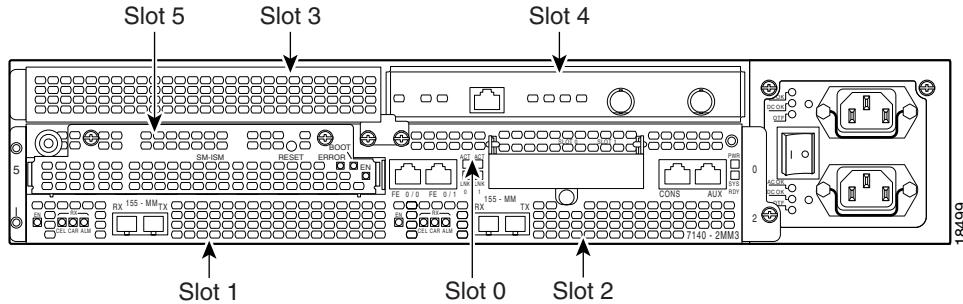
Cisco 7200 Series and Cisco uBR7200 Series Routers Slot Numbering

In the Cisco 7206 (including the Cisco 7206 and Cisco 7206VXR as router shelves in a Cisco AS5800 Universal Access Server), port adapter slot 1 is in the lower left position, and port adapter slot 6 is in the upper right position. (The Cisco 7204 and Cisco 7204VXR are not shown; however, the PA-POS-OC3 can be installed in any available port adapter slot.)

shows a Cisco 7206 with port adapters installed.

Figure 1-11   Port Adapter Slots in the Cisco 7206
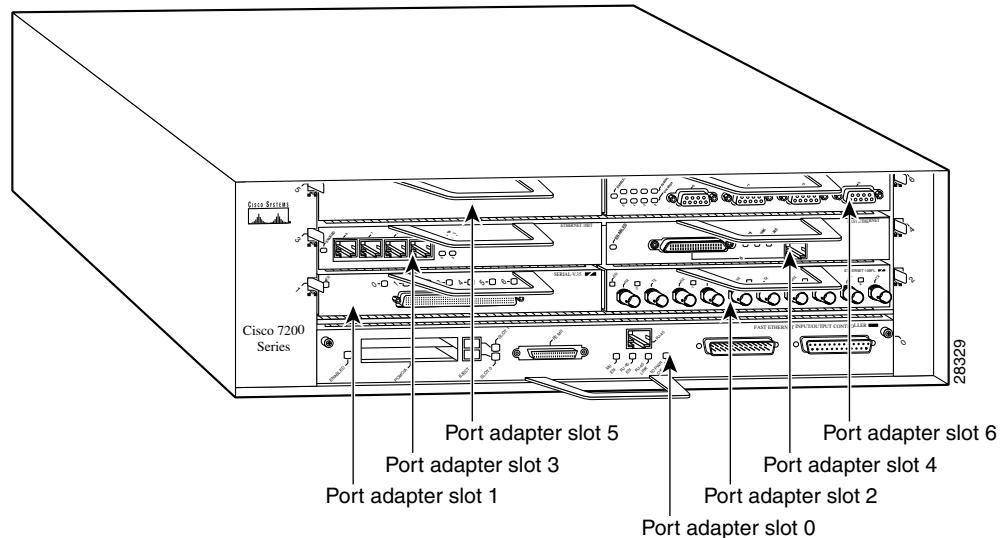
shows the slot numbering of port adapters in a Cisco uBR7246 series router. The port adapter slots are numbered slot 1 and slot 2 for the Cisco uBR7246 and Cisco uBR7246 VXR and slot 1 for the Cisco uBR7223. (Slot 0 is always reserved for the Fast Ethernet port on the I/O controller—if present.)

Figure 1-12   Port Adapter Slots in the Cisco uBR7246 and Cisco uBR7246 VXR

Port adapter slot 0
(I/O controller)

Port adapter slot 1
(blank)

Port adapter slot 2

Cable modem card slot 3
Cable modem card slot 4
Cable modem card slot 5
Cable modem card slot 6
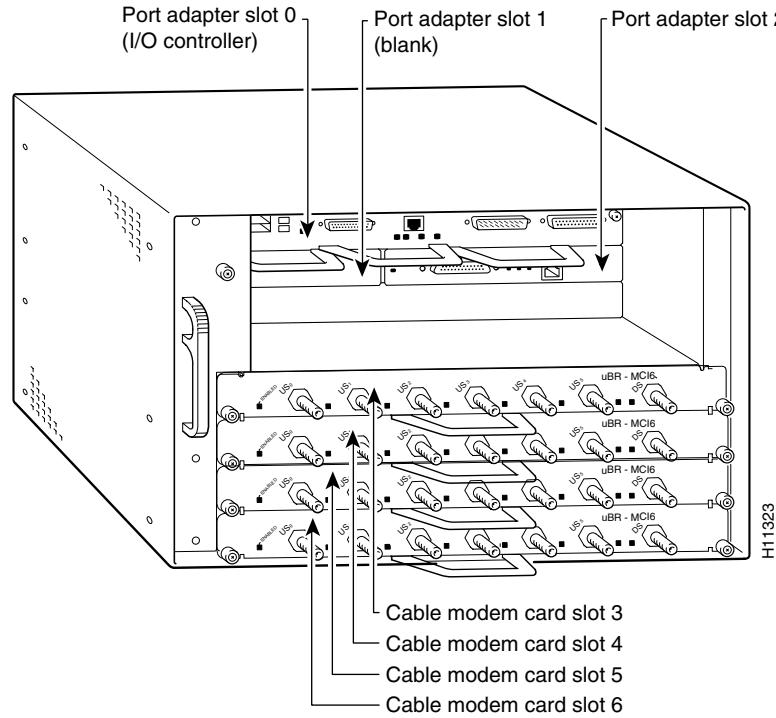
Cisco 7301 Router Slot Numbering

The Cisco 7301 router has one standard port adapter slot. See Figure 1-13.

Figure 1-13   Port Adapter Slot in the Cisco 7301 Router
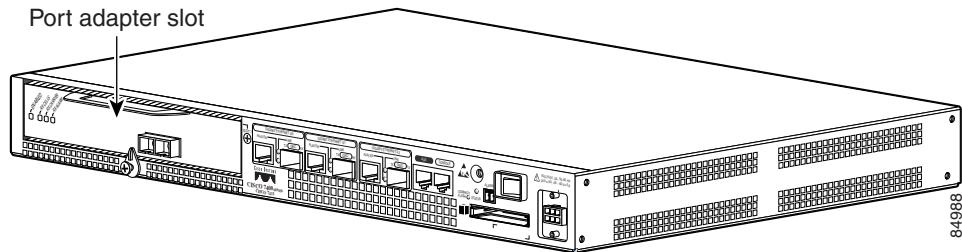
Port adapter slot

Cisco 7304 PCI Port Adapter Carrier Card Slot Numbering

The Cisco 7304 PCI Port Adapter Carrier Card accepts one single-width port adapter. Figure 1-14 shows a Cisco 7304 PCI Port Adapter Carrier Card with a port adapter installed.

Figure 1-14   Cisco 7304 PCI Port Adapter Carrier Card—Port Adapter Installed
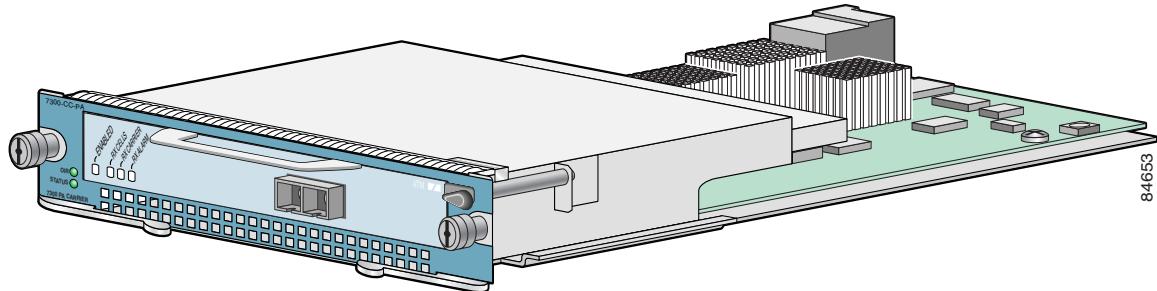
The Cisco 7304 PCI Port Adapter Carrier Card installs in Cisco 7304 router module slots 2 through 5.
See Figure 1-15 for module slot numbering on a Cisco 7304 router.

*Figure 1-15   Module Slots on the Cisco 7304 Router*
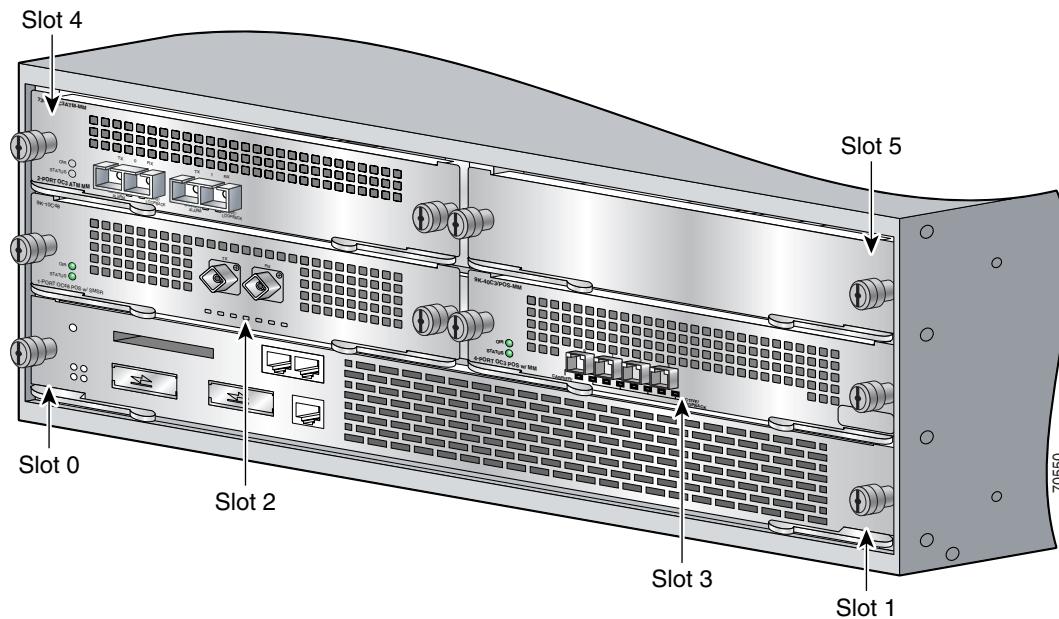
Cisco 7401ASR Router Slot Numbering

Figure 1-16 shows the front view of a Cisco 7401ASR router with a port adapter installed securely
installed with the locking lever in the locked and vertical position. The port adapter slot in the
Cisco 7401ASR router is numbered slot 1. Port adapter slot 0 is always reserved for: |0|100|1000 ports
on the system board.

Figure 1-16   Cisco 7401ASR Routers with a Port Adapter Installed
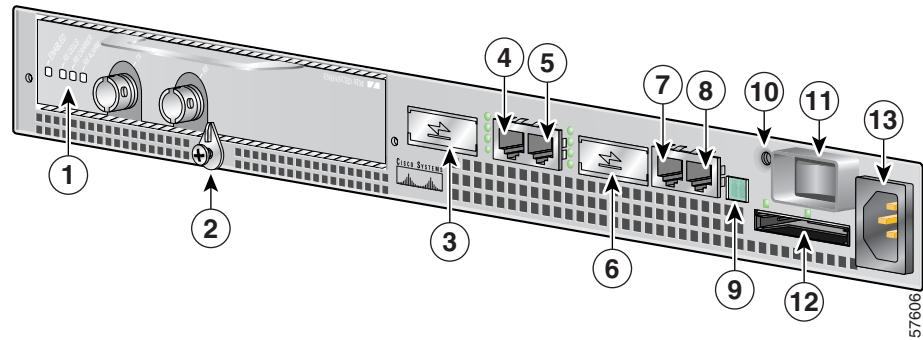
VIP Slot Numbering

Figure 1-17 shows a partial view of a VIP motherboard with installed port adapters. With the motherboard oriented as shown in Figure 1-17—with the port adapter faceplates facing you—the left port adapter is in port adapter slot 0 and the right port adapter is in port adapter slot 1. (The slot numbering is the same for the Catalyst RSM/VIP2.)

*Figure 1-17   VIP Motherboard with Two Port Adapters—Partial View, Horizontal Orientation*
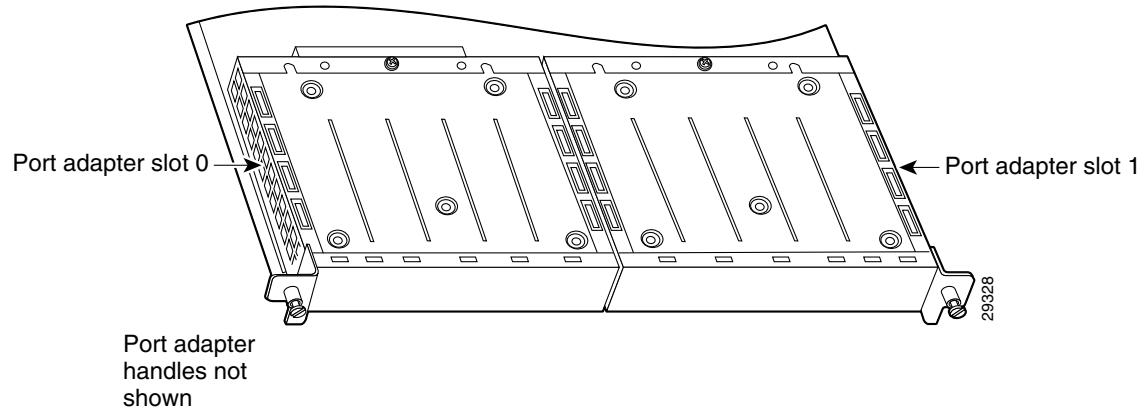
Note   In the Cisco 7000, Cisco 7507, Cisco 7513, and Cisco 7576 chassis, the VIP motherboards are installed vertically. In the Cisco 7010 and Cisco 7505 chassis, the VIP motherboards are installed horizontally.

Figure 1-18 shows a VIP2 or VIP4 installed in an interface processor slot of a Cisco 7505 router.

Figure 1-18   VIP Installed in an Interface Processor Slot Cisco 7505 Shown
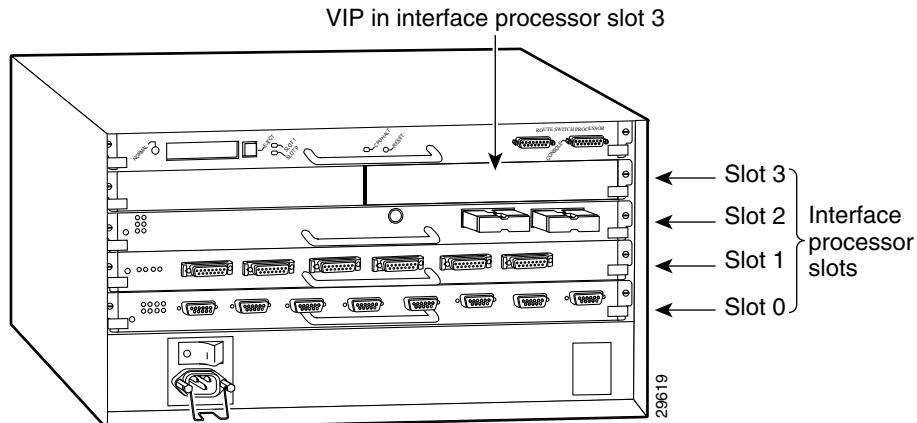
Identifying Interface Addresses

This section describes how to identify the interface address for the PA-POS-OC3 in supported platforms. Interface addresses specify the actual physical location of each interface on a router or switch.

The interface on the PA-POS-OC3 installed in a router or switch maintains the same interface address regardless of whether other port adapters are installed or removed. However, when you move a port adapter to a different slot, the first number in the interface address changes to reflect the new port adapter slot number.

The interface on a PA-POS-OC3 installed in a VIP2 or VIP4 maintains the same address regardless of whether other interface processors are installed or removed. However, when you move a VIP2 or VIP4 to a different interface processor slot, the interface processor slot number changes to reflect the new interface processor slot. This section includes the following subsections:

- Catalyst RSM/VIP2 Interface Addresses, page 1-18
- Cisco 7100 Series Routers Interface Addresses, page 1-18
- Cisco 7200 Series and Cisco uBR7200 Series Routers Interface Addresses, page 1-18
- Cisco 7301 Router Interface Addresses, page 1-19
- Cisco 7304 PCI Port Adapter Carrier Card Interface Addresses, page 1-19
- Cisco 7401ASR Router Interface Addresses, page 1-19
- VIP Interface Addresses, page 1-19

Note   Interface ports are numbered from left to right starting with 0.

Table 1-3 on page 1-17 explains how to identify interface addresses.

Table 1-3   Identifying Interface Addresses

Platform	Interface Address Format	Numbers	Syntax
Catalyst RSM/VIP2 in Catalyst 5000 family switches	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 0 or 1 Interface port—0	0/0
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	Module-slot-number/port-adapter-bay-number/interface-port-number	Module slot number—2[1] through 6 or 9 (depending on the number of slots in the switch) Port adapter bay—always 0 or 1 Interface port—0	3/0/0
Cisco 7120 series routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 3 Interface port—0	3/0
Cisco 7140 series routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 4 Interface port—0	4/0
Cisco 7200 series routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—0 through 6 (depends on the number of slots in the router)[2] Interface port—0	1/0
Cisco uBR7223 router	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 1[2] Interface port—0	1/0
Cisco uBR7246 and Cisco uBR7246 VXR routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 1 or 2[2] Interface port—0	1/0
Cisco 7301 routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 1 Interface port—0	1/0
Cisco 7304 PCI Port Adapter Carrier Card in Cisco 7304 routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—router module slot 2 through 5 Interface port—0	3/0
Cisco 7401ASR routers	Port-adapter-slot-number/interface-port-number	Port adapter slot—always 1 Interface port—0	1/0
VIP in Cisco 7000 series or Cisco 7500 series routers	Interface-processor-slot-number/port-adapter-slot-number/interface-port-number	Interface processor slot—0 through 12 (depends on the number of slots in the router) Port adapter slot—always 0 or 1 Interface port—0	3/1/0

1. Slot 1 is reserved for the supervisor engine. If a redundant supervisor engine is used, it must go in slot 2; otherwise, slot 2 can be used for other modules.

2. Port adapter slot 0 is reserved for the Fast Ethernet port on the I/O controller (if present).

Catalyst RSM/VIP2 Interface Addresses

This section describes how to identify the interface address used for the PA-POS-OC3 on the Catalyst RSM/VIP2 in Catalyst 5000 family switches. The interface address is composed of a two-part number in the format *port-adapter-slot number/interface-port number.*

See for the interface address format.

Catalyst 6000 Family FlexWAN Module Interface Addresses

This section describes how to identify the interface addresses used for the PA-POS-OC3 on the Catalyst FlexWAN module in the Catalyst 6000 family switches.The interface address is composed of a three-part number in the format *module-number/port-adapter-bay-number/interface-port-number.*

See for the interface address format.

If the FlexWAN module is inserted in module slot 3, then the interface address of the PA-POS-OC3 is 3/0/0 (module slot 3, port adapter bay 0, and interface 0). If the port adapter was in port adapter bay 1 on the FlexWAN module, this same interface address would be numbered 3/1/0.

Note   If you remove the FlexWAN module with the PA-POS-OC3 from module slot 3 and install it in module slot 6, the interface addresses become 6/0/0 through 6/0/7.

Note   The FlexWAN module physical port address uses a zero- (0-) based port address, which differs from the conventional Catalyst 6000 family one- (1-) based port address.

Cisco 7100 Series Routers Interface Addresses

This section describes how to identify the interface addresses used for the PA-POS-OC3 in Cisco 7100 series routers. The interface address is composed of a two-part number in the format *port-adapter-slot-number/interface-port-number.* See for the interface address format.

Cisco 7200 Series and Cisco uBR7200 Series Routers Interface Addresses

This section describes how to identify the interface addresses used for the PA-POS-OC3 in Cisco 7200 series routers or Cisco uBR7200 series routers. The interface address is composed of a two-part number in the format *port-adapter-slot-number/interface-port-number.* See for the interface address format.

In Cisco 7200 series routers, port adapter slots are numbered from the lower left to the upper right, beginning with port adapter slot 1 and continuing through port adapter slot 2 for the Cisco 7202, slot 4 for the Cisco 7204 and Cisco 7204VXR, and slot 6 for the Cisco 7206 and Cisco 7206VXR. (Port adapter slot 0 is reserved for the optional Fast Ethernet port on the I/O controller—if present.)

The interface address of the interface on a PA-POS-OC3 in port adapter slot 1 is 1/0 (port adapter slot 1 and interface 0). If the PA-POS-OC3 was in port adapter slot 4, this same interface would be numbered 4/0 (port adapter slot 4 and interface 0).

In Cisco uBR7200 series routers, port adapter slots are numbered slot 1 and slot 2 for the Cisco uBR7246 and Cisco uBR7246 VXR routers and slot 1 for the Cisco uBR7223 router. (Slot 0 is always reserved for the Fast Ethernet port on the I/O controller—if present.) The individual interfaces always begin with 0.

The interface address of the interface on a PA-POS-OC3 in port adapter slot 2 of a Cisco uBR7246 or Cisco uBR7246 VXR is 2/0 (port adapter slot 2 and interface 0). If the PA-POS-OC3 was in port adapter slot 1, this same interface would be numbered 1/0 (port adapter slot 1 and interface 0).

Cisco 7301 Router Interface Addresses

This section describes how to identify the interface addresses used for the PA-POS-OC3 in the Cisco 7301 router. The interface address is made of a two-part number in the format *port-adapter-slot-number/interface-port-number*. See Table 1-3 on page 1-17 for the interface address format.

Cisco 7304 PCI Port Adapter Carrier Card Interface Addresses

This section describes how to identify the interface addresses used for the PA-POS-OC3 in the Cisco 7304 PCI Port Adapter Carrier Card in Cisco 7304 routers. The interface address is made of a two-part number in the format *port-adapter-slot-number/interface-port-number*.

The Cisco 7304 PCI Port Adapter Carrier Card installs into Cisco 7304 router module slots 2 through 5 (See Figure 1-15.) The port-adapter-slot-number is the Cisco 7304 router module slot number. For example, the interface address on a PA-POS-OC3, in which the Cisco 7304 PCI Port Adapter Carrier Card is installed in Cisco 7304 router module slot 3, would be numbered 3/0.

Cisco 7401ASR Router Interface Addresses

This section describes how to identify the interface addresses used for the PA-POS-OC3 in a Cisco 7401ASR router. The interface address is composed of a two-part number in the format *port-adapter-slot-number/logical-interface-number*. See Table 1-3 on page 1-17 for the interface address format.

VIP Interface Addresses

This section describes how to identify the interface addresses used for the PA-POS-OC3 on a VIP2 or a VIP4 in Cisco 7000 series and Cisco 7500 series routers.

Note   Although the processor slots in the 7-slot Cisco 7000 and Cisco 7507 and 13-slot Cisco 7513 and Cisco 7576 are vertically oriented and those in the 5-slot Cisco 7010 and Cisco 7505 are horizontally oriented, all Cisco 7000 series and Cisco 7500 series routers use the same method for slot and port numbering.

See Table 1-3 on page 1-17 for the interface address format. The interface address is composed of a three-part number in the format *interface-processor-slot number/port-adapter-slot-number/interface-port- number*.

For a PA-POS-OC3 installed in interface processor slot 3 of a Cisco 7000 series or Cisco 7500 series router, the interface address of the PA-POS-OC3 is 3/1/0 (interface processor slot 3, port adapter slot 1, and interface 0). If the PA-POS-OC3 was in port adapter slot 0 on the VIP2 or VIP4, this same interface address would be numbered 3/0/0.

Note   If you remove the VIP2 or VIP4 with the PA-POS-OC3 from interface processor slot 3 and install it in interface processor slot 2, the interface address becomes 2/1/0.