Configuring the PA-2H

To continue your PA-2H port adapter installation, you must configure the HSSI interfaces. The instructions that follow apply to all supported platforms. Minor differences between the platforms—with Cisco IOS software commands—are noted.

This chapter contains the following sections:

Using the EXEC Command Interpreter

You modify the configuration of your router through the software command interpreter called the *EXEC* (also called enable mode). You must enter the privileged level of the EXEC command interpreter with the **enable** command before you can use the **configure** command to configure a new interface or change the existing configuration of an interface. The system prompts you for a password if one has been set.

The system prompt for the privileged level ends with a pound sign (#) instead of an angle bracket (>). At the console terminal, use the following procedure to enter the privileged level:

Step 1 At the user-level EXEC prompt, enter the **enable** command. The EXEC prompts you for a privileged-level password as follows:

```
Router> enable

Password:
```

Step 2 Enter the password (the password is case sensitive). For security purposes, the password is not displayed.

When you enter the correct password, the system displays the privileged-level system prompt (#):

```
Router#
```

To configure the new interfaces, proceed to the "Configuring the Interfaces" section on page 4-2.

Configuring the Interfaces

After you verify that the new PA-2H is installed correctly (the enabled LED goes on), use the privileged-level **configure** command to configure the new interfaces. Have the following information available:

- Protocols you plan to route on each new interface
- IP addresses, if you plan to configure the interfaces for IP routing
- Bridging protocols you plan to use

If you installed a new PA-2H or if you want to change the configuration of an existing interface, you must enter configuration mode to configure the new interfaces. If you replaced a PA-2H that was previously configured, the system recognizes the new interfaces and brings each of them up in their existing configuration.

For a summary of the configuration options available and instructions for configuring interfaces on a PA-2H, refer to the appropriate configuration publications listed in the "Related Documentation" section on page viii.

You execute configuration commands from the privileged level of the EXEC command interpreter, which usually requires password access. Contact your system administrator, if necessary, to obtain password access. (See the "Using the EXEC Command Interpreter" section on page 4-1 for an explanation of the privileged level of the EXEC.)

This section contains the following subsections:

Shutting Down an Interface

Before you remove an interface that you will not replace, or replace port adapters, use the **shutdown** command to shut down (disable) the interfaces to prevent anomalies when you reinstall the new or reconfigured interface processor. When you shut down an interface, it is designated *administratively down* in the **show** command displays.

Follow these steps to shut down an interface:

Step 1 Enter the privileged level of the EXEC command interpreter (also called enable mode). (See the "Using the EXEC Command Interpreter" section on page 4-1 for instructions.)

Step 2 At the privileged-level prompt, enter configuration mode and specify that the console terminal is the source of the configuration subcommands, as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#
```

Step 3 Shut down interfaces by entering the **interface hssi** subcommand (followed by the interface address of the interface), and then enter the **shutdown** command. Table 4-1 shows the command syntax.

When you have finished, press **Ctrl-Z**–hold down the **Control** key while you press **Z**–or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter.

Table 4-1 Syntax of the shutdown Command

Platform	Command	Example

Catalyst RSM/VIP2 in Catalyst 5000 family switches	**interface**, followed by the *type* (**hssi**) and *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.
		`Router(config-if)# interface hssi 1/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 1/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	**interface**, followed by the *type* (**hssi**) and *mod_num/bay/port* (module-slot-number/ port-adapter-bay-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter bay 0 of a FlexWAN module installed in slot 3.
		`Router(config-if)# interface hssi 3/0/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 3/0/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Cisco 7120 series routers	**interface**, followed by the *type* (**hssi**) and *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 3.
		`Router(config-if)# interface hssi 3/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 3/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Cisco 7140 series routers	**interface**, followed by the *type* (**hssi**) and *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 4.
		`Router(config-if)# interface hssi 4/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 4/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Cisco 7200 series routers	**interface**, followed by the *type* (**hssi**) and *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 6.
		`Router(config-if)# interface hssi 6/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 6/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Cisco uBR7223 router	**interface**, followed by the *type* (**hssi**) and *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.
		`Router(config-if)# interface hssi 1/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 1/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Table 4-1 Syntax of the shutdown Command (continued)

Platform	Command	Example

Cisco uBR7246 and Cisco uBR7246 VXR routers	**interface**, followed by the *type* (**hssi**) and *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 2.
		`Router(config-if)# interface hssi 2/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 2/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Cisco 7301 routers	**interface**, followed by the *type* (**hssi**) and *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.
		`Router(config-if)# interface hssi 1/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 1/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	**interface**, followed by the *type* (**hssi**) and *slot/port* (module-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router.
		`Router(config-if)# interface hssi 3/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 3/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Cisco 7401ASR routers	**interface**, followed by the *type* (**hssi**) and *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.
		`Router(config-if)# interface hssi 1/0`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 1/1`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

VIP in Cisco 7000 series or Cisco 7500 series routers	**interface**, followed by the *type* (**hssi**) and *slot/port-adapter/port* (interface-processor-slot-number port-adapter-slot-number/ interface-port-number)	The example is for interface 1 and interface 0 on a port adapter in port adapter slot 1 of a VIP installed in interface processor slot 1.
		`Router(config-if)# interface hssi 1/1/1`
		`Router(config-if)# shutdown`
		`Router(config-if)# interface hssi 1/1/0`
		`Router(config-if)# shutdown`
		`Ctrl-Z`
		`Router#`

Note If you need to shut down additional interfaces, enter the **interface hssi** command (followed by the interface address of the interface) for each of the interfaces on your port adapter. Use the **no shutdown** command to enable the interface.

Step 4 Write the new configuration to NVRAM as follows:

```
Router# copy running-config startup-config
[OK]
Router#
```

The system displays an OK message when the configuration has been stored in NVRAM.

Step 5 Verify that the new interfaces are now in the correct state (shut down) using the **show interfaces** command (followed by the interface type and interface address of the interface) to display the specific interface. Table 4-2 provides examples.

Table 4-2 Examples of the show interfaces Command

Platform	Command	Example

Catalyst RSM/VIP2 in Catalyst 5000 family switches	**show interfaces hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1.
		`Router(config)# show interfaces hssi 1/0`
		`Router(config-if)#`

Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	**show interfaces hssi**, followed by *mod_num/bay/port* (module-slot-number/ port-adapter-bay-number/ interface-port-number)	The example is for interface 0 on a port adapter in port adapter bay 0 of a FlexWAN module in module slot 3.
		`Router# show interfaces hssi 3/0/0`
		`Serial 3/0/0 is administratively down, line protocol is down`
		`[Additional display text omitted from this example]`

Cisco 7120 series router	**show interfaces hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 3.
		`Router(config)# show interfaces hssi 3/0`
		`Router(config-if)#`

Cisco 7140 series router	**show interfaces hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 4.
		`Router(config)# show interfaces hssi 4/0`
		`Router(config-if)#`

Cisco 7200 series routers	**show interfaces hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 6.
		`Router(config)# show interfaces hssi 6/0`
		`Router(config-if)#`

Cisco uBR7223 router	**show interfaces hssi**, followed by *slot/port* (port-adapter-slot- number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1.
		`Router(config)# show interfaces hssi 1/0`
		`Router(config-if)#`

Cisco uBR7246 and Cisco uBR7246 VXR routers	**show interfaces hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 2.
		`Router(config)# show interfaces hssi 2/0`
		`Router(config-if)#`

Cisco 7301 router	**show interfaces hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1.
		`Router(config)# show interfaces hssi 1/0`
		`Router(config-if)#`

Table 4-2 Examples of the show interfaces Command (continued)

Platform	Command	Example

Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	**show interfaces hssi**, followed by *slot/port* (module-slot-number/ interface-port-number)	The example is for interface 0 on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router.
		`Router# show interfaces hssi 3/0`
		`Router(config-if)#`

Cisco 7401ASR router	**show interfaces hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1.
		`Router(config)# show interfaces hssi 1/0`
		`Router(config-if)#`

VIP in Cisco 7000 series or Cisco 7500 series routers	**show interfaces hssi**, followed by *slot/port-adapter/port* (interface-processor-slot-number/ port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1 of a VIP in interface processor slot 1.
		`Router(config)# show interfaces hssi 1/1/0`
		`Router(config-if)#`

Step 6 Reenable the interfaces by doing the following:

a. Repeat Step 3 to reenable an interface. Substitute the **no shutdown** command for the **shutdown** command.

b. Repeat Step 4 to write the new configuration to memory. Use the **copy running-config startup-config**

c. Repeat Step 5 to verify that the interfaces are in the correct state. Use the **show interfaces** command followed by the interface type and interface address of the interface.

For complete descriptions of software configuration commands, refer to the publications listed in the "Related Documentation" section on page viii.

Performing a Basic Configuration

Following are instructions for a basic configuration: enabling an interface and specifying IP routing. You might also need to enter other configuration subcommands, depending on the requirements for your system configuration and the protocols you plan to route on the interface. For complete descriptions of configuration subcommands and the configuration options available for hssi interfaces, refer to the appropriate software documentation.

In the following procedure, press the **Return** key after each step unless otherwise noted. At any time you can exit the privileged level and return to the user level by entering **disable** at the prompt as follows:

```
Router# disable

Router>
```

Step 1 Enter configuration mode and specify that the console terminal is the source of the configuration subcommands, as follows:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
```

Step 2 Specify the interface to configure by entering the **interface hssi** subcommand, followed by the interface address of the interface you plan to configure. Table 4-3 provides examples.

Table 4-3 Examples of the interface hssi Subcommand

Platform	Command	Example

Catalyst RSM/VIP2 in Catalyst 5000 family switches	**interface hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1.
		`Router(config)# interface hssi 1/0`
		`Router(config-if)#`

Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	**interface hssi,** followed by *mod_num/bay/port* (module-slot-number/ port-adapter-bay-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter bay 0 of a FlexWAN module in module slot 3.
		`Router(config)# interface hssi 3/0/0`
		`Router(config-if)#`

Cisco 7120 series router	**interface hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 3.
		`Router(config)# interface hssi 3/0`
		`Router(config-if)#`

Cisco 7140 series router	**interface hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 4.
		`Router(config)# interface hssi 4/0`
		`Router(config-if)#`

Cisco 7200 series routers	**interface hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 6.
		`Router(config)# interface hssi 6/0`
		`Router(config-if)#`

Cisco uBR7223 router	**interface hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1.
		`Router(config)# interface hssi 1/0`
		`Router(config-if)#`

Cisco uBR7246 and Cisco uBR7246 VXR routers	**interface hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 2.
		`Router(config)# interface hssi 2/0`
		`Router(config-if)#`

Cisco 7301 router	**interface hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1.
		`Router(config)# interface hssi 1/0`
		`Router(config-if)#`

Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	**interface hssi**, followed by *slot/port* (module-slot-number/ interface-port-number)	The example is for interface 0 on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router.
		`Router(config-if)# interface hssi 3/0`
		`Router(config-if)#`

Table 4-3 Examples of the interface hssi Subcommand (continued)

Platform	Command	Example

Cisco 7401ASR router	**interface hssi**, followed by *slot/port* (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1.
		`Router(config)# interface hssi 1/0`
		`Router(config-if)#`

VIP in Cisco 7000 series or Cisco 7500 series routers	**interface hssi**, followed by *slot/port-adapter/port* (interface-processor-slot-number/ port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a PA-2H in port adapter slot 1 of a VIP in interface processor slot 1.
		`Router(config)# interface hssi 1/1/0`
		`Router(config-if)#`

Step 3 Assign an IP address and subnet mask to the interface (if IP routing is enabled on the system) by using the **ip address** subcommand, as in the following example:

```
Router(config-if)# ip address 10.0.0.0 10.255.255.255
```

Step 4 Add any additional configuration subcommands required to enable routing protocols and set the interface characteristics.

Step 5 Reenable the interfaces using the **no shutdown** command. (See the "Shutting Down an Interface" section on page 4-2.)

Step 6 Configure all additional port adapter interfaces as required.

Step 7 After including all of the configuration subcommands to complete your configuration, press **Ctrl-Z**–hold down the **Control** key while you press **Z**–or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter prompt.

Step 8 Write the new configuration to NVRAM as follows:

```
Router# copy running-config startup-config
[OK]
Router#
```

This completes the procedure for creating a basic configuration.

Configuring Cyclic Redundancy Checks

Table 4-4 summarizes cyclic redundancy check (CRC) commands. For more information, see the remainder of this section.

Table 4-4 CRC Commands

Purpose	Command	Example	Further Information

Enable 32-bit CRC.	**crc** *size*	The example enables 32-bit CRC on a serial interface:
		`Router(config)# interface hssi 3/0`
		`Router(config-if)# crc 32`
			"Configuring Cyclic Redundancy Checks"

Return to default 16-bit CRC.	**no crc** *size*	The example disables 32-bit CRC on a serial interface and returns to the default 16-bit CRC:
		`Router(config)# interface hssi 3/0`
		`Router(config-if)# no crc 32`
			"Configuring Cyclic Redundancy Checks"

CRC is an error-checking technique that uses a calculated numeric value to detect errors in transmitted data. All interfaces use a 16-bit CRC (CRC-CITT) by default but also support a 32-bit CRC. The sender of a data frame calculates the frame check sequence (FCS). Before it sends the frame, the sender appends the FCS value to the message. The receiver recalculates the FCS and compares its calculation to the FCS from the sender. If there is a difference between the two calculation, the receiver assumes that a transmission error occurred and sends a request to the sender to resend the frame.

Enable 32-bit CRC using the **crc32** command. Before you can enable 32-bit CRC, you must use the **interface hssi** command (followed by the interface address of the interface) to select the interface on which you want to enable 32-bit CRC. This command functions in the same way on all supported platforms.

In the example that follows, 32-bit CRC is specified:

```
Router(config-if)# crc 32
```

The preceding command example applies to all systems in which the PA-2H is supported. Use the **no crc 32** command to disable CRC-32 and return the interface to the default CRC-16 (CRC-CITT) setting.

When you have finished, press **Ctrl-Z**–hold down the **Control** key while you press **Z–**or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter prompt. Then write the new configuration to NVRAM using the **copy running-config startup-config** command.

For complete descriptions, refer to the *Configuration Fundamentals Configuration Guide* publication. For more information, see the "Obtaining Documentation" section on page x *and the* "Obtaining Technical Assistance" section on page xii.

Note When enabling a 32-bit CRC on an interface, ensure that the remote device is also configured for a 32-bit CRC. Both the sender and the receiver must use the same CRC setting.

Checking the Configuration

After configuring the new interface, use the **show** commands to display the status of the new interface or all interfaces, and use the **ping** and **loopback** commands to check connectivity. This section includes the following subsections:

Using show Commands to Verify the New Interface Status

Table 4-5 demonstrates how you can use the **show** commands to verify that new interfaces are configured and operating correctly and that the PA-2H appears in them correctly. Sample displays of the output of selected **show** commands appear in the sections that follow. For complete command descriptions and examples, refer to the publications listed in the "Related Documentation" section on page viii.

Note The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Table 4-5 Using show Commands

Command	Function	Example
show version or **show hardware**	Displays system hardware configuration, the number of each interface type installed, Cisco IOS software version, names and sources of configuration files, and boot images	`Router# show version`
show controllers	Displays all the current interface processors and their interfaces	`Router# show controllers`
show diag *slot* **Note** The *slot* argument is not required with Catalyst 5000 family switches.	Displays types of port adapters installed in your system and information about a specific port adapter slot, interface processor slot, or chassis slot	`Router# show diag 2`
show interfaces hssi 0 or **1/** *interface-port-number*	Displays status information about a specific interface on a PA-2H in a Catalyst RSM/VIP2	`Router# show interfaces hssi 1/0`
show interfaces hssi *module-slot-number/port-adapter-bay-number/ interface-port-number*	Displays status information about a specific interface on a PA-2H in a Catalyst 6000 family FlexWAN module	`Router# show interfaces hssi 3/0/0`
show interfaces hssi 3/*interface-port-number*	Displays status information about a specific interface on a PA-2H in a Cisco 7120 series router	`Router# show interfaces hssi 3/1`

Table 4-5 Using show Commands (continued)

Command	Function	Example
show interfaces hssi 4/*interface-port-number*	Displays status information about a specific interface on a PA-2H in a Cisco 7140 series router	`Router# show interfaces hssi 4/1`
show interfaces hssi *port-adapter-slot-number/ interface-port-number*	Displays status information about a specific interface on a PA-2H in a Cisco 7200 series router, Cisco 7301 router, and Cisco 7401ASR router	`Router# show interfaces hssi 1/0`
show interfaces hssi 1/*interface-port-number*	Displays status information about a specific interface on a PA-2H in a Cisco uBR7223 router	`Router# show interfaces hssi 1/1`
show interfaces hssi 1 or **2/** *interface-port-number*	Displays status information about a specific interface on a PA-2H in a Cisco uBR7246 or Cisco uBR7246 VXR routers	`Router# show interfaces hssi 2/0`
show interfaces hssi 2 or **3** or **4** or **5/** *interface-port-number*	Displays status information about a specific interface on a PA-2H on a Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	`Router# show interfaces hssi 3/0`
show interfaces hssi *interface-processor-slot-number/port-adapter-slot-number/ interface-port-number*	Displays status information about a specific interface on a PA-2H on a VIP in a Cisco 7000 series or Cisco 7500 series router	`Router# show interfaces hssi 3/1/0`
show protocols	Displays protocols configured for the entire system and for specific interfaces	`Router# show protocols`
show running-config	Displays the running configuration file	`Router# show running-config`
show startup-config	Displays the configuration stored in NVRAM	`Router# show startup-config`

If an interface is shut down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the interface is properly connected and terminated. If you still have problems bringing up the interface, contact a service representative for assistance. This section includes the following subsections:

Choose the subsection appropriate for your system. Proceed to the "Using the ping Command to Verify Network Connectivity" section on page 4-20 when you have finished using the **show** commands.

Using the show version or show hardware Commands

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 the boot images, using the **show version** (or **show hardware**) command. The following examples show some platform-specific output examples using the **show version** command.

Note The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Catalyst RSM/VIP2 in Catalyst 5000 Family Switches

Caution If you are using the PA-2H in the Catalyst 5000, 5500, 5505, or 5509 switch, you must install the port adapter on the Catalyst RSM/VIP2-15 or -40 Revision 2 (Part Number 73-3468-XX, where XX is the version number). Do not use the PA-2H in the Catalyst 5000, 5505, or 5509 switch if you are installing it on a Catalyst RSM/VIP2-15 or -40 that is *not* Revision 2. If you fail to comply with this restriction, your system will shut down because of an overload of the power supply.

Caution You can only have two PA-2H port adapters per chassis when they are installed on a Catalyst RSM/VIP2-15 or -40 module Revision 1 and used in the Catalyst 5500 switch.

Following is an example of the **show version** command from a Catalyst 5000 family switch with the PA-2H:

```
Switch# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (C5RSM-JV-MZ), Released Version 11.2(15)A
Copyright (c) 1986-1995 by cisco Systems, Inc.
Compiled Fri 06-Oct-95 12:22 by mpo
Image text-base: 0x600088A0, data-base: 0x605A4000

ROM: System Bootstrap, Version 5.3(5)
ROM: GS Bootstrap Software (RSP-BOOT-M), Version 11.1(12), RELEASED SOFTWARE

Switch uptime is 4 hours, 22 minutes
System restarted by reload
System image file is "slot0:c5rsm-jv-mz", booted via slot0
```

```
cisco RSP2 (R4700) processor with 16384K bytes of memory.
R4600 processor, Implementation 32, Revision 2.0
Last reset from power-on
G.703/E1 software, Version 1.0.
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.

1 VIP2 controllers (2 HSSI).
2 HSSI network interfaces.
125K bytes of non-volatile configuration memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
   Configuration register is 0x2
```

Catalyst 6000 Family FlexWAN Module

Following is an example of the **show version** command from a Catalyst 6000 family switch with the PA-2H:

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) MSFC Software (C6MSFC-JSV-M), Experimental Version 12.1(20000209:134547)
[amcrae-cosmos_e_nightly 163]
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Wed 09-Feb-00 07:10 by
Image text-base: 0x60008900, data-base: 0x6140E000

ROM: System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE

const-uut uptime is 5 minutes
System returned to ROM by reload
System image file is "bootflash:c6msfc-jsv-mz.Feb9"

cisco Cat6k-MSFC (R5000) processor with 122880K/8192K bytes of memory.
Processor board ID SAD03457061
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
Last reset from power-on
Channelized E1, Version 1.0.
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
6 FlexWAN controllers (13 Serial)(8 E1)(8 T1)(2 HSSI)(2 ATM)(1 Channelized T3)(1
Channelized E3)(2 POS).
1 Virtual Ethernet/IEEE 802.3  interface(s)
17 Serial network interface(s)
2 HSSI network interface(s)
2 ATM network interface(s)
2 Packet over SONET network interface(s)
1 Channelized T3 port(s)
1 Channelized E3 port(s)
123K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.

16384K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x1
```

Cisco 7100 Series, Cisco 7200 Series, and Cisco uBR7200 Series Routers

Following is an example of the **show version** command from a Cisco 7200 series router with a PA-2H:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Released Version 12.0(3)T
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Fri 09-Aug-96 21:14 by biff
Image text-base: 0x60010890, data-base: 0x605F0000

ROM: System Bootstrap, Version 12.0(3), RELEASED SOFTWARE
ROM: 7200 Software (C7200-J-M), Version 12.0(3), RELEASED SOFTWARE

Router uptime is 23 hours
System restarted by reload
System image file is "c7200-j-mz", booted via tftp from 10.0.0.10

cisco 7200 (R4700) processor with 22528K/10240K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (Level 2 Cache)
Last reset from power-on
Bridging software.
SuperLAT software copyright 1990 by Meridian Technology Corp).
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV Inc).

(additional display text omitted from this example)

2 HSSI network interfaces.
125K bytes of non-volatile configuration memory.

8192K bytes of Flash internal SIMM (Sector size 256K).
   Configuration register is 0x0
```

Cisco 7401ASR Routers

Following is an example of the **show version** command from a Cisco 7401ASR router with a PA-2H:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) 7401ASR Software (C7401ASR-J-M), Released Version 12.0(3)T
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Fri 09-Aug-96 21:14 by biff
Image text-base: 0x60010890, data-base: 0x605F0000

ROM: System Bootstrap, Version 12.0(3), RELEASED SOFTWARE
ROM: 7401ASR Software (C7401ASR-J-M), Version 12.0(3), RELEASED SOFTWARE

Router uptime is 23 hours
System restarted by reload
System image file is "c7401ASR-j-mz", booted via tftp from 10.0.0.10

cisco 7401ASR (R4700) processor with 22528K/10240K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (Level 2 Cache)
Last reset from power-on
Bridging software.
SuperLAT software copyright 1990 by Meridian Technology Corp).
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV Inc).

(additional display text omitted from this example)
```

```
2 HSSI network interfaces.
125K bytes of non-volatile configuration memory.

8192K bytes of Flash internal SIMM (Sector size 256K).
   Configuration register is 0x0
```

VIP in Cisco 7000 Series or Cisco 7500 Series Routers

Following is an example of the **show version** command from a Cisco 7000 series router with a PA-2H:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-JV-MZ), Released Version 11.1(12)CA
Copyright (c) 1986-1995 by cisco Systems, Inc.
Compiled Mon 10-May-99 12:22 by biff
Image text-base: 0x600088A0, data-base: 0x605A4000

ROM: System Bootstrap, Version 5.3(5)
ROM: GS Bootstrap Software (RSP-BOOT-M), Version 11.1(12), RELEASED SOFTWARE

Router uptime is 4 hours, 22 minutes
System restarted by reload
System image file is "slot0:rsp-jv-mz", booted via slot0

cisco RSP7000 (R4600) processor with 16384K bytes of memory.
R4600 processor, Implementation 32, Revision 2.0
Last reset from power-on
G.703/E1 software, Version 1.0.
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
Chassis Interface.

1 VIP2 controllers (2 HSSI).
2 HSSI network interfaces.
125K bytes of non-volatile configuration memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
   Configuration register is 0x2
```

Using the show diag Command

Display the types of port adapters installed in your system (and specific information about each) using the **show diag** *slot* command, where *slot* is the *port adapter slot* in a Cisco 7100 series, Cisco 7200 series, Cisco uBR7200 series router, a Cisco 7301 router, and a Cisco 7401ASR router and the *interface processor slot* in a Cisco 7000 series or Cisco 7500 series router with a VIP. (The *slot* argument is not required with Catalyst 5000 family switches and the Catalyst RSM/VIP.) The following examples show some platform-specific output examples using the **show diag** command.

Note The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Catalyst RSM/VIP2 in Catalyst 5000 Family Switches

Following is an example of the **show diag** command that shows a PA-2H in a Catalyst 5000 family switch:

```
Switch# show diag
Slot 0:
HSSI-B port adapter, 1 port
Port adapter is analyzed
Port adapter insertion time 2d13h ago
Hardware revision 1.17          Board revision A0
Serial number     12345678      Part number    73-1801-05
Test history      0x0           RMA number     00-00-00
EEPROM format version 1
EEPROM contents (hex):
0x20:01 74 01 11 00 44 F1 94 49 07 09 05 00 00 00 00
0x30:50 00 00 00 97 04 21 00 FF FF FF FF FF FF FF FF

        Slot database information:
        Flags: 0x4      Insertion time: 0x14E8 (3d00h ago)

        VIP Controller Memory Size: Unknown

        PA Bay 0 Information:
                HSSI-B PA, 1 ports
                EEPROM format version 1
                HW rev 1.3, Board revision A0
                Serial number: 04551053   Part number: 73-2914-01
```

Catalyst 6000 Family FlexWAN Module

Following is an example of the **show diag** command that shows the PA-2H on a Catalyst 6000 family FlexWAN module:

```
Router# show diag

(additional display text omitted from this example)

Slot 7: Logical_index 15
Board is analyzed ipc ready FlexWAN controller

     Slot database information:
     Flags: 0x2004Insertion time: unknown

     CWAN Controller Memory Size: Unknown

     PA Bay 1 Information:
          Mx HSSI PA, 2 ports
          EEPROM format version 0
          HW rev 0.00, Board revision UNKNOWN
          Serial number: 00000000  Part number: 00-0000-00
```

Cisco 7100 Series, Cisco 7200 Series and Cisco uBR7200 Series Routers

Following is an example of the **show diag** *slot* command that shows a PA-2H in port adapter slot 2 of a Cisco 7200 series router:

```
Router# show diag 2
Slot 2:
        HSSI-B port adapter, 2 ports
        Port adapter is analyzed
        Port adapter insertion time 2d13h ago
        Hardware revision 1.3           Board revision A0
```

```
Serial number     12345678      Part number 73-2914-01
Test history      0x0           RMA number     00-00-00
EEPROM format version 1
EEPROM contents (hex):
  0x20: 01 74 01 01 00 44 F1 94 49 07 09 05 00 00 00 00
  0x30: 50 00 00 00 97 04 21 00 FF FF FF FF FF FF FF FF
```

Note Port adapters used with the Cisco 7200 VXR and Cisco uBR7246 VXR routers require the correct base hardware revision in order to function. The following error message will occur on bootup if the incorrect hardware revision is used:

```
PA-3-REVNOTSUPPORTED:PA in slot 1 (Mx HSSI-B) requires base h/w revision of (1.3) for this
chassis
```

Use the **show diag** command to display the hardware revision.

Cisco 7401ASR Routers

Following is an example of the **show diag** *slot* command that shows a PA-2H in port adapter slot 1 of a Cisco 7401ASR router:

```
Router# show diag 1
Slot 1:
        HSSI-B port adapter, 2 ports
        Port adapter is analyzed
        Port adapter insertion time 2d13h ago
        Hardware revision 1.3           Board revision A0
        Serial number     12345678      Part number 73-2914-01
        Test history      0x0           RMA number     00-00-00
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 74 01 01 00 44 F1 94 49 07 09 05 00 00 00 00
          0x30: 50 00 00 00 97 04 21 00 FF FF FF FF FF FF FF FF
```

VIP in Cisco 7000 Series or Cisco 7500 Series Routers

Following is an example of the **show diag** *slot* command for a PA-2H on a VIP4 in interface processor slot 8 of a Cisco 7500 series router:

```
Router# show diag 8
Slot 8:
        Physical slot 8, ~physical slot 0x7, logical slot 8, CBus 0
        Microcode Status 0x4
        Master Enable, LED, WCS Loaded
        Board is analyzed
        Pending I/O Status:None
        EEPROM format version 2
        VIP4 RM7000 controller, HW rev 2.01, board revision A0
        Serial number:12345678  Part number:211-18700-71
        Test history:0x02        RMA number:00-00-00
        Flags: unknown flags 0x7F; 7500 compatible

        EEPROM contents (hex):
          0x20:02 22 02 01 00 AF 7B C9 D3 49 0C 47 02 00 00 00
          0x30:02 3A 0C FF FF FF FF FF FF FF FF FF FF FF FF FF

        Slot database information:
        Flags:0x4      Insertion time:0x3EC4FE0 (00:02:08 ago)

        Controller Memory Size:64 MBytes DRAM, 65536 KBytes SRAM
```

```
PA Bay 0 Information:
        Mx HSSI PA, 2 ports
        EEPROM format version 1
        HW rev 1.03, Board revision A0
       Serial number:12345678 Part number:73-2914-02
```

Using the show interfaces Command

The **show interfaces** command displays status information (including the physical slot and interface address) for the interfaces you specify. All of the examples that follow specify HSSI interfaces. The following examples show some platform-specific output examples using the **show interfaces** command.

Note The syntax for the **show interfaces** command is given in Table 4-2 for all supported platforms.

For complete descriptions of interface subcommands and the configuration options available for Catalyst RSM/VIP2, Catalyst 6000 family FlexWAN module, Cisco 7100 series, Cisco 7200 series, Cisco uBR7200 series, Cisco 7301 routers, Cisco 7401ASR routers, and VIP interfaces, refer to the publications listed in the "Related Documentation" section on page viii.

Note The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Catalyst RSM/VIP2 in Catalyst 5000 Family Switches

Following is an example of the **show interfaces hssi** command for a PA-2H in a Catalyst 5000 family switch:

```
Switch# show interfaces hssi 0/0
Hssi0/0 is up, line protocol is up
 Hardware is HSSI-B
  Internet address is 10.1.1.10
  MTU 4470 bytes, BW 45045 Kbit, DLY 200 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
  Last input 2d22h, output 00:00:19, output hang never
  Last clearing of "show interface" counters 2d20h
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 parity
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     4084 packets output, 1298712 bytes, 0 underruns
     0 output errors, 0 applique, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
```

Catalyst 6000 Family FlexWAN Module

Following is an example of the **show interfaces hssi** command for a PA-2H in a Catalyst 6000 family FlexWAN module:

```
Router# show interfaces hssi 7/0/0
Hssi7/0/0 is administratively up, line protocol is up
  Hardware is HSSI
```

```
MTU 4470 bytes, BW 45045 Kbit, DLY 200 usec,
   reliability 255/255, txload 1/255, rxload 1/255
Encapsulation HDLC, crc 16, loopback not set
Keepalive not set
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
   0 packets input, 0 bytes, 0 no buffer
   Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
            0 parity
   0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
   0 packets output, 0 bytes, 0 underruns
   0 output errors, 0 applique, 0 interface resets
   0 output buffer failures, 0 output buffers swapped out
   0 carrier transitions
   LC=down  CA=down  TM=down LB=down TA=down LA=down
```

Cisco 7100 Series, Cisco 7200 Series and Cisco uBR7200 Series Routers

Following is an example of the **show interfaces hssi** command for a PA-2H in a Cisco 7200 series router:

```
Router# show interfaces hssi 2/0
Hssi2/0 is up, line protocol is up
Hardware is HSSI-B
  Internet address is 10.1.1.10
  MTU 4470 bytes, BW 45045 Kbit, DLY 200 usec, rely 252/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants
              0 parity
     0 input errors, 1 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     1 packets output, 24 bytes, 0 underruns
     0 output errors, 0 applique, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions     TM=down  CA=up  LC=down
```

Note For the Cisco 7206 and Cisco 7206VXR router shelves, the **show interfaces** command requires a shelf number in the format **show interfaces** *type shelf number/port adapter slot/interface*.

Cisco 7401ASR Routers

Following is an example of the **show interfaces hssi** command for a Cisco 7401ASR router:

```
Router# show interfaces hssi 1/0
POS1/0 is up, line protocol is up
Hardware is Packet over Sonet
Internet address is 1.1.1.2/8
MTU 4470 bytes, BW 155000 Kbit, DLY 100 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation HDLC, crc 16, loopback not set
Keepalive not set
Scramble disabled
Last input 00:00:16, output never, output hang never
```

```
Last clearing of "show interface" counters never
Queueing strategy:fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
7 packets input, 1158 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 parity
10 input errors, 10 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
7 packets output, 1158 bytes, 0 underruns
0 output errors, 0 applique, 1 interface resets
0 output buffer failures, 0 output buffers swapped out
0 carrier transitions
```

VIP in Cisco 7000 Series or Cisco 7500 Series Routers

Following is an example of the **show interfaces hssi** command for a PA-2H in a Cisco 7000 series or Cisco 7500 series router:

```
Router# show interfaces hssi 1/0/0
Hssi1/0/0 is up, line protocol is up
 Hardware is HSSI-B
  Internet address is 10.1.1.10
  MTU 4470 bytes, BW 45045 Kbit, DLY 200 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
  Last input 2d22h, output 00:00:19, output hang never
  Last clearing of "show interface" counters 2d20h
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 parity
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     4084 packets output, 1298712 bytes, 0 underruns
     0 output errors, 0 applique, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
```

Using the ping Command to Verify Network Connectivity

Using the **ping** command, you can verify that an interface port is functioning properly. This section provides a brief description of this command. Refer to the publications listed in the "Related Documentation" section on page viii for detailed command descriptions and examples.

The **ping** command sends echo request packets out to a remote device at an IP address that you specify. After sending an echo request, the system waits a specified time for the remote device to reply. Each echo reply is displayed as an exclamation point (!) on the console terminal; each request that is not returned before the specified timeout is displayed as a period (.). A series of exclamation points (!!!!!) indicates a good connection; a series of periods (.....) or the messages [timed out] or [failed] indicate a bad connection.

Following is an example of a successful **ping** command to a remote server with the IP address 10.0.0.10:

```
Router# ping 10.0.0.10 <Return>
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 10.0.0.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/64 ms
Router#
```

If the connection fails, verify that you have the correct IP address for the destination and that the device is active (powered on), and repeat the **ping** command.

This completes the PA-2H interface configuration.