Installing and Removing a Shared Port Adapter

This chapter describes how to install or remove SPAs on the Cisco ASR 9000 Series Aggregation Services Router. This chapter contains the following sections:

Handling SPAs

Each SPA circuit board is mounted to a metal carrier and is sensitive to electrostatic discharge (ESD) damage. Before you begin installation, read Preparing to Install a Shared Port Adapter or a SPA Interface Processor for a list of parts and tools required for installation.

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Caution   Always handle the SPA by the carrier edges and handle; never touch the SPA components or connector pins. (See the figure below.)

When a bay is not in use, a blank must fill the empty bay to allow the router or switch to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the installed modules. If you plan to install a SPA in a bay that is not in use, you must first remove the blank.

Figure 1: Handling a SPA
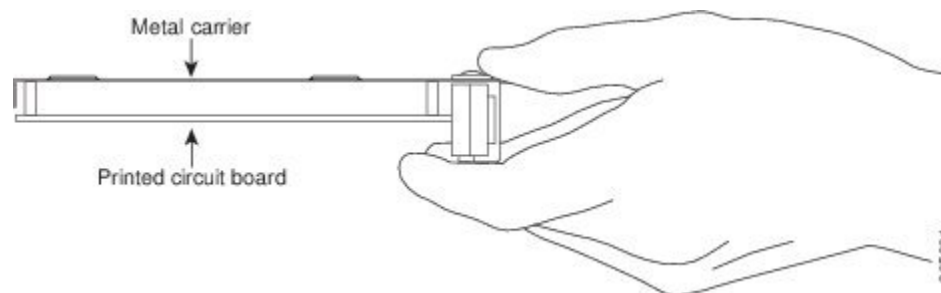
Online Insertion and Removal

Cisco ASR 9000 Series Router SIPs and SPAs support online insertion and removal (OIR). SPAs can be inserted or removed independently from the SIP. OIR of a SIP with installed SPAs is also supported.

SPA Installation and Removal

This section provides step-by-step instructions for removing and installing a SPA in an SIP.

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Caution When performing the following procedures, wear a grounding wrist strap to avoid ESD damage to the SPA. Some platforms have an ESD connector for attaching the wrist strap. Do not directly touch the midplane or backplane with your hand or any metal tool, or you could shock yourself.

To remove and install a SPA in a SIP, do the following:

Step 1 To insert the SPA in the SIP, locate the guide rails inside the SIP that hold the SPA in place. They are at the top left and top right of the SPA slot and are recessed about an inch, as shown in C of the below figure.

Step 2 Carefully slide the SPA all the way in the SIP until the SPA is firmly seated in the SPA interface connector. When fully seated, the SPA might be slightly behind the SIP faceplate.

Note The SPA will slide easily into the slot if it is properly aligned on the tracks. If the SPA does not slide easily, do NOT force it. Remove the SPA and reposition it, paying close attention to engaging it on the tracks.

Step 3 After the SPA is properly seated, turn the SPA lock to its locked and horizontal position, as shown in A of the below figure.

Step 4 To remove the SPA from the SIP, turn the SPA lock from its locked and horizontal position shown in A of the below figure to its unlocked and vertical position shown in B of the below figure.

Step 5 Grasp the handle of the SPA and pull the SPA from the SIP. (You have already disconnected the cables from the SPA).

What to do next

Figure 2: SPA Installation and Removal
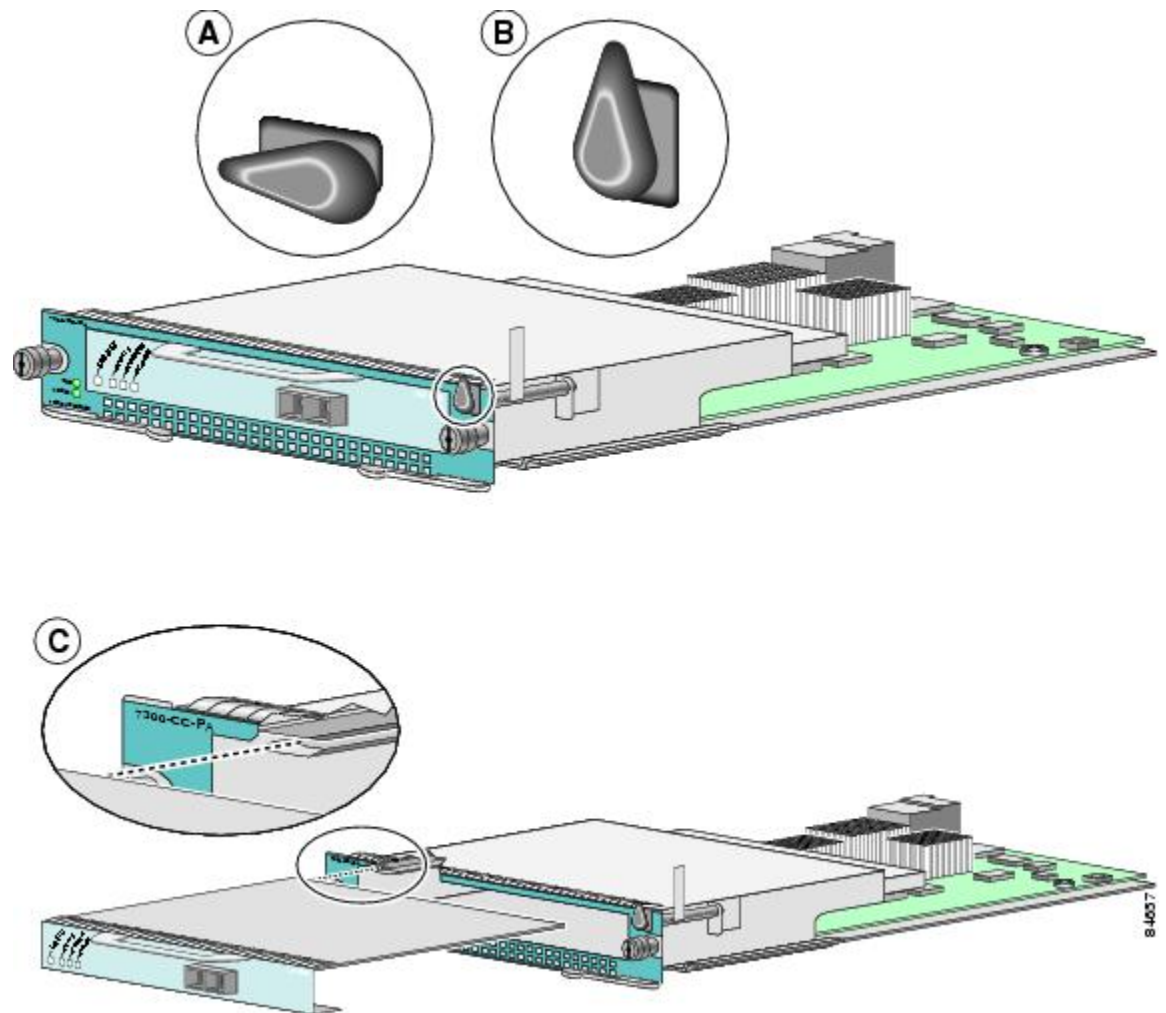
Optical Device Installation and Removal

Any contamination of the fiber connection can cause failure of the component or failure of the whole system. A particle that partially or completely blocks the core generates strong back reflections, which can cause instability in the laser system. Inspection, cleaning, and reinspection are critical steps to take before making fiber-optic connections.

Cleaning Optical Devices

Refer to the Inspection and Cleaning Procedures for Fiber-Optic Connections document for information on cleaning optical devices.

Checking the Installation

This section describes the procedures you can use to verify the SIP and SPA installation, and includes information on the following topics:

Verifying the Installation

This section describes how to verify the SIP and SPA installation by observing the SIP LED states, the SPA LED states, and the information displayed on the console terminal.

When the system has reinitialized all interfaces, the SIP STATUS LED should be green (on) and the SPA STATUS LEDs should be green (on). The port LEDs (C/A and A/L) may be green (on), depending on your connections and configuration. The console screen also displays a message as the system discovers each interface during its reinitialization.

The following sample display shows the events logged by the system as a SIP with a POS SPA was removed from module slot 4 in the router. In this example, interface 0 (interface 4/0/0) on the POS SPA was up and active when the SIP was removed from the router. Note that the system logs that the SIP card was removed from slot 4 and that interface 4/0/0 is changed to *down* .

```
Router#
00:06:17:%WS_ALARM-6-INFO:ASSERT CRITICAL slot 4 Active Card Removed OIR Alarm
00:06:17:%OIR-6-REMCARD:Card removed from slot 4, interfaces disabled
00:06:18:%LINEPROTO-5-UPDOWN:Line protocol on Interface pos4/0/0, changed state to down
```

When you reinsert the SIP with the installed POS SPA, the system automatically brings up the interface that was changed to *down* when the SIP was removed.

```
Router#
00:07:29:%OIR-6-INSCARD:Card inserted in slot 4, interfaces administratively shut down
00:07:32:%WS_ALARM-6-INFO:CLEAR CRITICAL slot 4 Active Card Removed OIR Alarm
00:07:35:%LINK-3-UPDOWN:Interface pos4/0/0, changed state to up
00:07:36:%LINEPROTO-5-UPDOWN:Line protocol on Interface pos4/0/0, changed state to up
```

Use the following procedure to verify that a SIP and SPA are installed correctly:

Step 1   Observe the console display messages and verify that the system discovers the SIP, while the system reinitializes each interface, as follows:

- As a SIP is initialized, the STATUS LED will first be amber, indicating that power is on, but the SIP is being configured. When the SIP is active, the STATUS LED will illuminate green.
- SPAs will follow the same sequence after the SIP has completed its initialization. The SPA STATUS LEDs will illuminate amber, turning to green when the SPAs become active.

Step 2   When the SIP and SPA STATUS LEDs are green, all associated interfaces are configurable.

Refer to Cisco ASR 9000 Series Router Getting Started Guide and *Cisco ASR 9000 Series Router Interface and Hardware Component Configuration Guide* for configuration instructions.

- If a SIP or SPA is replaced with a module of the same type (as in an OIR or hardware swap), the previous configuration is reinstated when the SIP or SPA becomes active.
- If a SIP or SPA has not been previously installed in the same slot or subslot, then the configuration for all associated interfaces is empty.

Note   New interfaces are not available until you configure them.

Step 3   If the SIPs and SPAs have not become active within three minutes, refer to the system console messages. If there is no indication that a field-programmable device (FPD) upgrade is underway, see Troubleshooting the Installation.

Using show Commands to Verify SIP and SPA Status

The following procedure uses **show** commands to verify that the new SPAs are configured and operating correctly.

Step 1   Use the **show running-config** command to display the system configuration. Verify that the configuration includes the new SPA interfaces.

Step 2   Display information about the installed SIPs using the **show diag** command.

Step 3   Use the **hw-module fpd location** *<rack/slot/subslot>* command to verify the FPD version information of the SPAs installed in the system.

Note   If a SPA does not meet the minimum version required, the FPD may need to be updated. Refer to *Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide* for instructions. If the update fails, the failing module is powered down and an error message displays on the system console.

Step 4   Use the **show platform** command to check the state of all the boards in the chassis, including the SIP and the SPAs.

The SPA state should be "OK" and the SIP card state should be "IOS XR RUN" in the **show platform** command output

Step 5   Finally, you can use the **show version** command to obtain software version information for the installed SIPs as well as interfaces available.

Using show Commands to Display SPA Information

The following table describes the show commands you can use to display SPA information.

Table 1: show Commands to Display SPA Information

Command	Type of Information Provided
show running-config	Router's running configuration and interfaces available in the system.
show platform	Router's installed linecard and SPA type, slot, and state information.
show diag	SPA type in that slot, number of ports, hardware revision, part number, and EEPROM contents.
show hw-module fpd location *<rack/slot/subslot>*	FPD version information of SPAs in the system.
show version	Cisco IOS XR software version, names and sources of configuration files, and boot images.

Table 2: show Commands to Display SPA Information

Command	Type of Information Provided	Example
show controllers *type rack/slot/subslot/port*	Network link status, register contents, and controller chip errors.	**show controllers sonet 0/1/0/1**
show interfaces *type rack/slot/subslot/port*	Line status and data link protocol status for a particular SPA port. Statistics about data traffic sent and received by the port.	**show interface serial 0/1/0/0/1/1:0**
show diag *rack/slot/subslot/*	SPA type in that slot, number of ports, hardware revision, part number, and EEPROM contents.	**show diag 0/1/CPU0**
show version	Cisco IOS XR software version and boot images.	**show version**

> **Note** When a SIP is moved to a new slot, the system recognizes the new interfaces but leaves them in the shutdown state until you configure them and change their state to up. When a new SIP is inserted into a slot where a SIP previously resided, provided you reinstall the SPAs and interfaces cables in the same configuration as in the previous SIP, the interfaces will come up in the same state as though you reinserted the old SIP.

The following sample display shows the events logged by the system as you insert a *new* SIP in module slot 3.

```
Router#
18:05:25: %LINEPROTO-5-UPDOWN: Line protocol on Interface 0/POS3/1, changed state to down
```

Use the following procedure to verify that the SIP is installed correctly:

Step 1 Observe the console display messages and verify that the system discovers the SIP, while the system reinitializes each interface, as follows:

- If you installed a new SIP, the STATUS LED should be on (green). The system should recognize all new interfaces but leave them configured as *down* .
- If you replaced a SIP, the STATUS LED should be on (green). The interfaces will come up in the same state as though you reinserted the old SIP.

Step 2 Verify that the STATUS LED on the SPA goes on (is green) and remains on after the reinitialization is complete. If the STATUS LED remains on, proceed to Step 5. If the STATUS LED does not remain on, proceed to Step 3.

Step 3 If the STATUS LED on a SPA fails to go on, the SPA or the SIP might not be fully seated even if the SPA lock is in the locked and horizontal position.

- Remove the SPA from the SIP.
- Inspect the SPA. Verify there are no bent pins or parts and that there is nothing lodged in the two devices that could prevent a good connection.
- Insert the SPA in the SIP by sliding the SPA all the way in the SIP until the SPA is firmly seated in the SPA interface connector. When fully seated in the SIP, the SPA might be slightly behind the SIP faceplate.

> **Note** The SPA will slide easily into the slot if it is properly aligned on the tracks. If the SPA does not slide easily, do NOT force it. Remove the SPA and reposition it, paying close attention to engaging it on the tracks.

- After the system reinitialization, the STATUS LED on the SPA should go on and remain on. If the STATUS LED remains on, proceed to Step 5. If it does not, try reseating the SPA in a different subslot within the SIP.
- If the STATUS LED on a SPA fails to go on after reseating the SPA in a different subslot within the SIP, proceed to Step 4.

Step 4 If the STATUS LED on a SPA still fails to go on, remove the SPA from the SIP, then remove the SIP and install it in another available slot on the router. Wait for the STATUS LED on the SIP to turn green.

- If the STATUS LED goes on, suspect a failed backplane port in the original slot.
- If the STATUS LED fails to go on, remove the SIP and ensure the SPA is firmly seated in its slot. Remove and reinstall it accordingly.
- If the STATUS LED still fails to go on, but other LEDs on the SPA go on to indicate activity, proceed to Step 5 to resume the installation checkout; suspect that the STATUS LED on the SPA or the SPA bay has failed. Contact a service representative to report the problem and obtain further instructions.

Note If the **show platform** command shows the SPA in this bay as "NOT ALLOWED ONLINE", then either software version is incompatible, or the SPA is incompatible with the adjacent SPA (for example, in Cisco IOS XR software release 4.0.1, OC192 will not allow any adjacent SPAs).

- If no LEDs on the SPA go on:
  - Verify that the SPA is supported on the SIP and that it has the required hardware revision. If the SPA is not supported or has an old hardware revision, the show diag command indicates that the SIP is deactivated.
  - If there is another SIP available in the router, to test your SPA move the SPA to the other SIP.
  - Suspect a faulty SIP. Contact a service representative to report the problem and obtain further instructions.

Note If you move the SPA to a different subslot in the SIP and it works, there are probably issues with the subslot in the SIP. Contact a service representative re: the broken subslot. If you test the SPA in another SIP and it works, the original SIP probably has some issues and needs troubleshooting. Contact a service representative to report the problem and obtain further instructions.

Step 5 If the SPA is new and is not a replacement, configure the new SPA using the instructions in *Cisco IOS XR Getting Started Guide for the Cisco ASR 9000 Series Router* and *Cisco ASR 9000 Series Aggregation Services Router Interface and Hardware Component Configuration Guide* .

Note New interfaces are not available until you configure them.

Step 6 If the SIP is a replacement, use the **show interfaces** command or the **show controllers** command to verify the status of the SPAs. (See the Using show Commands to Verify SIP and SPA Status, on page 5 section.)

If you replaced a SIP with another SIP with a different SPA installed, the system recognizes the interfaces on the previously configured SPA but does not recognize the new SPA interfaces. The new interfaces remain in the shutdown state until you configure them.

Step 7 When the interfaces are up, check the activity of each SPA by observing the carrier LED.

Step 8 If the carrier LED fails to go on and a cable is connected to the interface port, check the cable connection and make certain it is properly seated in the connector.

Step 9 Repeat Step 1 through Step 8 to verify that any additional SIPs are properly installed.

What to do next

If you experience other problems that you are unable to solve, contact TAC (see Obtaining Documentation and Submitting a Service Request or a service representative for assistance.

To configure the new interface, use *Cisco ASR 9000 Series Aggregation Services Router Interface and Hardware Component Configuration Guide* .

Using the Ping Command to Verify Network Connectivity

This section provides brief descriptions of the **ping** command. The **ping** command allows you to verify that a SPA port is functioning properly and to check the path between a specific port and connected devices at various locations on the network. After you verify that the system and the SIP have booted successfully and are operational, you can use this command to verify the status of the SPA ports. Refer to *Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide* and *Cisco ASR 9000 Series Aggregation Services Router Interface and Hardware Component Configuration Guide* for more information on bringing up and configuring the Cisco ASR 9000 Series Router and the Cisco ASR 9000 SIP-700 or Cisco ASR 9000 SIP-500. For more information on command syntax, refer to the publications listed in the Related Documentation for detailed command descriptions and examples.

The **ping** command sends an echo request out to a remote device at an IP address that you specify. After sending a series of signals, the command waits a specified time for the remote device to echo the signals. Each returned signal is displayed as an exclamation point (!) on the console terminal; each signal 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 that the connection failed.

Following is an example of a successful **ping** command to a remote server with the IP address 10.1.1.60:

```
Router# ping 10.1.1.60
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 10.1.1.60, 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 device and that the destination device is active (powered on), and then repeat the **ping** command.