Installing and Removing a SPA Interface Processor

This chapter describes how to install or remove SIPs onCisco ASR 9000 Series Aggregation Services Routers. This chapter contains the following sections:

Handling SIPs

Each SIP 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 SIP by the carrier edges and handle; never touch the SIP components or connector pins. (See the figure below.)

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

Figure 1: Handling a SIP
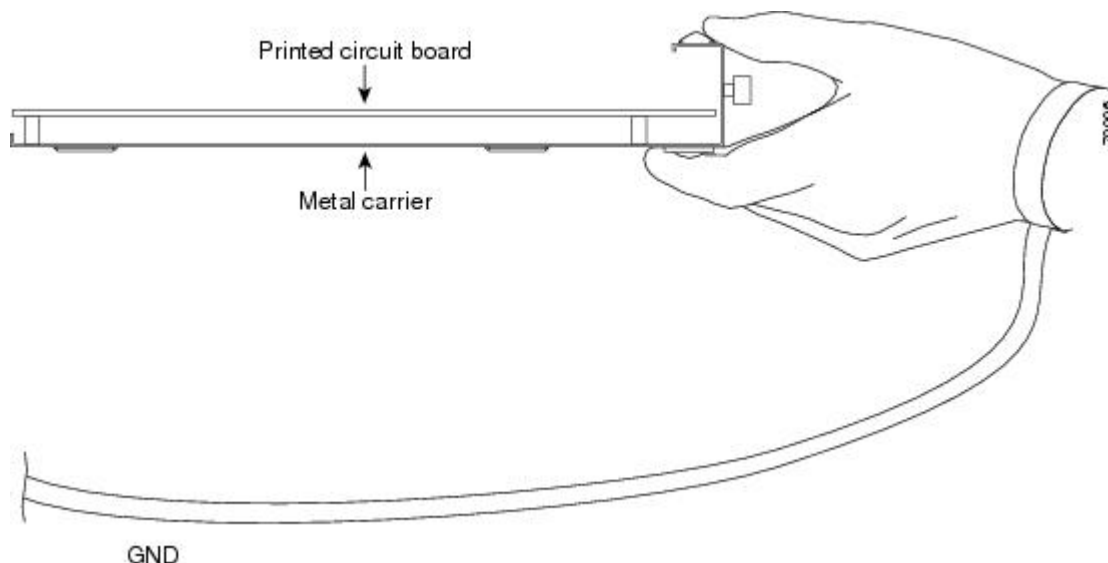
Removing and Installing a SIP

The following sections describe the procedures for removing and installing SIPs:

Note   Some of the procedures in the following sections use illustrations of a 10-slot Cisco ASR 9000 Series Router to support the descriptions of removing and installing SIPs. Although the card cages of Cisco ASR 9000 Series Aggregation Services Routers differ, the designated use of slots and the process of installing and removing a SIP are basically the same. Therefore, separate procedures and illustrations are not included in this publication.

Guidelines for SIP Removal and Installation

Guidelines for SIP removal and installation include the following:

- Online insertion and removal (OIR) is supported, enabling you to remove and install SIPs while the router is operating. OIR is seamless to users on the network, maintains all routing information, and ensures session preservation. We recommend that you perform a graceful shutdown to shut down a line card prior to removing it from the chassis.

Note   With OIR, notifying the software or resetting the power is not required. However, you have the option of using the **hw-module loc** *rack*/*slot*/**CPU0 maint** command before removing a SIP.

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Note When you perform a graceful shutdown on a SIP, cefcFRUInserted and cefcFRURemoved traps are not generated.

- After you reinstall a SIP, the router automatically downloads the necessary software from the Route Switch Processor (RSP). Next, the router brings online only those interfaces that match the current configuration and were previously configured as administratively up. You must configure all others with the **configure** command.

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Caution The router may indicate a hardware failure if you do not follow proper procedures. Remove or insert only one SIP at a time. Allow at least 15 seconds for the router to complete the preceding tasks before removing or inserting another SIP.

- SIPs have two ejector levers to release the card from its backplane connector. Use the levers when you are removing the SIP and to seat the SIP firmly in its backplane connector when you are installing the SIP. The ejector levers align and seat the card connectors in the backplane.
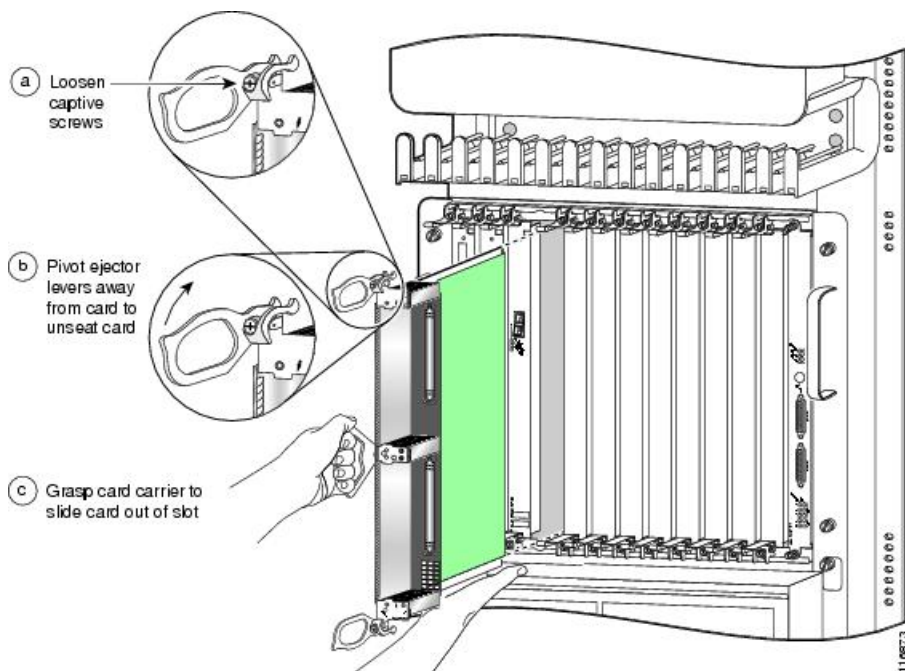
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Caution When you remove a SIP, always use the ejector levers to ensure that the connector pins disconnect from the backplane in the logical sequence expected by the router. Any card that is only partially connected to the backplane can halt the router. When you install a SIP, always use the ejector levers to ensure that the card is correctly aligned with the backplane connector; the connector pins should make contact with the backplane in the correct order, indicating that the card is fully seated in the backplane. A card that is only partially seated in the backplane will cause the router to hang and subsequently crash.

Removing a SIP

If you are replacing a failed SIP, remove the existing SIP first, then install the new SIP in the same slot. To remove a SIP, follow these steps:

Step 1 Attach an ESD-preventive wrist strap and follow its instructions for use.

Step 2 Disconnect and remove all interface cables from the ports; note the current connections of the cables to the ports on the SPAs, if any, and SPA locations if you remove the SPAs.

Step 3 Detach the SIP cable-management bracket from the SIP.

Step 4 Use a screwdriver to loosen the captive screw at each end of the SIP faceplate.

Figure 2: SIP Removal and Installation

> **Caution** When you remove a SIP, always use the ejector levers to ensure that the SIP connector pins disconnect from the backplane in the logical sequence expected by the router. Any SIP that is only partially connected to the backplane can halt the router.

Step 5 Simultaneously pivot the ejector levers away from each other to release the SIP from the backplane connector.

Step 6 Grasp the ejector levers and pull the SIP halfway out of the slot.

Step 7 Grasp the SIP by the handle and gently pull it straight out of the slot, keeping your other hand under the SIP to guide it. Avoid touching the SIP printed circuit board, components, or any connector pins.

Step 8 Place the removed SIP on an antistatic mat, or immediately place it in an antistatic bag if you plan to return it to the factory.

Step 9 If the SIP slot is to remain empty, install a line card blank to keep dust out of the chassis and to maintain proper airflow through the SIP compartment. Secure the line card blank to the chassis by tightening its captive screws.

Installing a SIP

A SIP slides into any available line card slot and connects directly to the backplane. If you install a new SIP, you must first remove the line card blank from the available slot.

> **Note** Refer to Figure 2-6 Cisco ASR 9010 Router Components and Slot Numbering and Figure 2-7 Cisco ASR 9006 Router Components and Slot Numbering in the Unpacking and Installing the Chassis chapter of the *Cisco ASR 9000 Series Aggregation Services Router Hardware Installation Guide* for information on line card slot types in order to determine an appropriate slot in which to install the SIP.

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Caution The router may indicate a hardware failure if you do not follow proper procedures. Remove or insert only one SIP at a time. Allow at least 15 seconds for the router to complete the preceding tasks before removing or inserting another SIP.

To install a SIP, follow these steps:

Step 1 Attach an ESD-preventive wrist or ankle strap and follow its instructions for use.

Step 2 Choose an available SIP slot for the SIP, and verify that the SPA interface cables are long enough for you to connect the SIP with any external equipment.

> **Caution** To prevent ESD damage, handle SIPs by the captive installation screws, the provided handle, ejector levers, or the card carrier edges only. Do not touch any of the electrical components or circuitry.

Step 3 Grasp the handle of the SIP with one hand and place your other hand under the card carrier to support the weight of the card; position the card for insertion into the card cage slot. Avoid touching the SIP printed circuit board, components, or any connector pins.

Step 4 Carefully slide the SIP into the slot until the ejector levers make contact with the edges of the card cage, then *stop* when the ejector lever hooks catch the lip of the card cage. If they do not catch, try reinserting the SIP until the ejector lever hooks are fully latched.

Figure 3: Ejector Levers

When inserting a card, make sure that the ejector lever hooks catch the lip of the card cage.
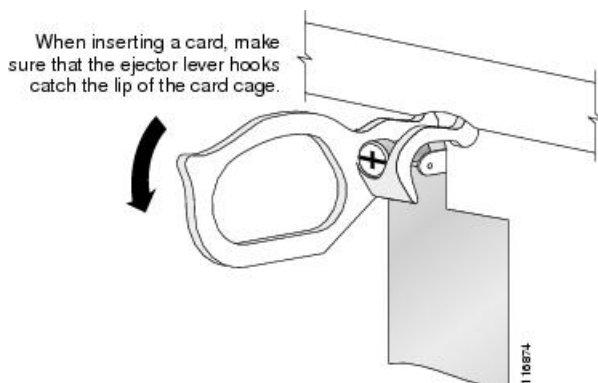
> **Caution** When you install a SIP, always use the ejector levers to ensure that the card is correctly aligned with the backplane connector, the card connector pins make contact with the backplane in the correct order, and the card is fully seated in the backplane. A card that is only partially seated in the backplane can cause the router to hang and subsequently crash.

Step 5 Simultaneously pivot both ejector levers toward each other until they are perpendicular to the SIP faceplate. This action firmly seats the card in the backplane.

Step 6 Use a 3/16-inch flat-blade screwdriver to tighten the captive screw on each end of the SIP faceplate to ensure proper EMI shielding and to prevent the SIP from becoming partially dislodged from the backplane. Tighten the locking thumbscrews on both sides of the SIP to a torque of between 8.3 and 11 inch-pounds (94 to 124 N-cm). Do not overtighten.

> **Caution** To ensure adequate space for additional SIPs, always tighten the captive installation screws on each newly installed SIP *before* you insert any additional SIPs. These screws also prevent accidental removal and provide proper grounding and EMI shielding for the router.

Step 7 Install the SPAs and SFP modules in the SPAs that use them. Refer to the SPA Installation and Removal section.

Step 8 If you are replacing a SIP install the SPAs in the same bays as you noted in Step 2 under the Removing a SIP, on page 3 section.

Step 9 Install the interface cables.