CHAPTER 6

Installing and Removing a Shared Port Adapter

This chapter describes how to install or remove SPAs on the Cisco uBR10012 router. This chapter contains the following sections:

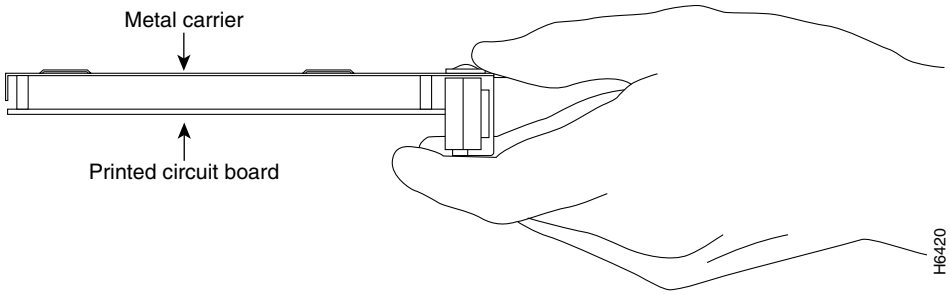
Handling SPAs

Each SPA circuit board is mounted to a metal carrier and is sensitive to electrostatic discharge (ESD) damage. Before you begin installation, read Chapter 4, "Preparing to Install a SIP or a Shared Port Adapter," for a list of parts and tools required for installation.

Caution Always handle the SPA by the carrier edges and handle; never touch the SPA components or connector pins. (See Figure 6-1.)

When a subslot is not in use, a SPA blank filler plate must fill the empty subslot 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 subslot that is not in use, you must first remove the SPA blank filler plate.

Figure 6-1 Handling a SPA



SPA Installation and Removal

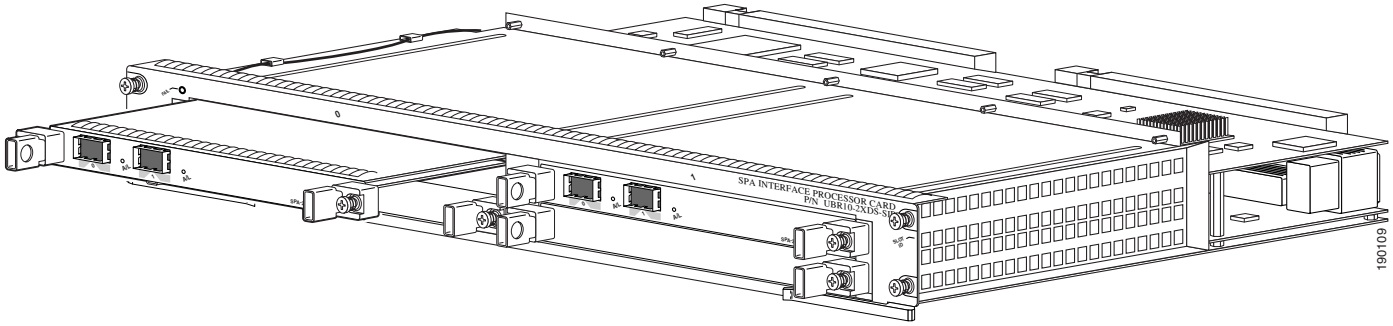
This section provides step-by-step instructions for installing and removing a SPA in a SIP.

Installing a SPA in a SIP

To install a SPA in a SIP, refer to Figure 6-2 and do the following:

Warning **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.**

Figure 6-2 SPA Installation and Removal (Horizontal Orientation)



Step 1 Attach a grounding wrist strap to your wrist and to a bare metal surface on the chassis or frame.

Step 2 To insert the SPA in the SIP, locate the guide rails inside the SIP that hold the SPA in place. In each SPA bay, there are two guide rails for the SPA. The guide rails are recessed about an inch.

- If the SIP is in a horizontal orientation (as in Figure 6-2), the guide rails are on the top left and top right of the bay.
- If the SIP is in a vertical orientation, the guide rails are at the top and bottom of the right side of the bay.

Step 3 Align the SPA edges with the two guide rails in the SIP.

Step 4 Carefully slide the SPA all the way into 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.

Step 5 After the SPA is properly seated, fasten the SPA in place with the captive installation screws.

Step 6 Install the interface cables. We recommend that you clean the fiber-optic connections before attaching the cables. Refer to the *Inspection and Cleaning Procedures for Fiber-Optic Connections* document.

Removing a SPA from a SIP

To remove a SPA from a SIP, refer to Figure 6-2 and do the following:

Warning **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.**

Step 1 Attach a grounding wrist strap to your wrist and to a bare metal surface on the chassis or frame.

Step 2 Identify the SPA to be removed. If interface cables are attached, unplug the cables connected to the SPA. Be sure to note the current connections of the cables to the ports on the SPA.

Note Before removing a SPA from a SIP, check that the top and bottom captive screws on the SIP are tight so that they secure the SIP in the router chassis.

Step 3 To remove the SPA from the SIP, unfasten the two captive screws on the SPA.

Step 4 Grasp the handle of the SPA and pull the SPA from the SIP.

Step 5 If you are not installing a new or replacement SPA, install blank filler plates to cover the empty slots and tighten the captive screws on the blank filler plates.

Warning **Blank faceplates (filler panels) serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards and faceplates are in place.** Statement 1029

Online Insertion and Removal

Cisco uBR10012 router SIPs and SPAs support online insertion and removal (OIR). SPAs can be inserted or removed independently from a SIP. OIR of a SIP with installed SPAs is also supported.

For more information about performing OIR, refer to the "Preparing for Online Removal of a SPA" section on page 5-4.

Optical Device Installation and Maintenance

This section provides references for the installation, removal, and cleaning of optical devices.

Installing and Removing Small Form-Factor Pluggable Modules

For information on installing and removing small form-factor pluggable (SFP) modules, see the Cisco Small Form-Factor Pluggable Modules Installation Notes document. SPAs only accept supported SFP modules. For details about supported SFP modules, see Table 1-2.

Cleaning Optical Devices

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.

For information on cleaning optical devices, refer to the *Inspection and Cleaning Procedures for Fiber-Optic Connections* document.

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:

Cisco Wideband SIP and SPA PLD Configuration Image Upgrades

The programmable logic device (PLD) configuration images for the Cisco Wideband SIP and Cisco Wideband SPA are automatically upgraded. Both upgrade processes require no user intervention.

- The Cisco Wideband SIP field-programmable gate array (FPGA) configuration image is not persistent. The image is bundled and downloaded with LCDOS every time the Cisco Wideband SIP is powered up. This process is invisible to the user.
- The Cisco Wideband SPA FPGAs and Complex Programmable Logic Devices (CPLDs) use configuration images that are automatically upgraded as needed. The upgrade information is part of the Cisco IOS release rather than a separate file to be downloaded by users. The Cisco IOS build contains a specific revision of the FPGA and CPLD images. When a Cisco Wideband SPA is powered up, if the Cisco IOS build has FPGA and CPLD images that are newer than those resident in the Cisco Wideband SPA, the FPGAs and CPLDs are automatically upgraded. The FPGA upgrade process takes about 12 minutes per Cisco Wideband SPA. The CPLD upgrade process takes about 13 seconds per Cisco Wideband SPA.

Verifying the Installation

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

When the system has reinitialized all interfaces, the SIP FAIL LED should be off and the SPA STATUS LEDs should be green (on). The port A/L LEDs 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.

Use the following procedure to verify that a SIP and a 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 FAIL LED will first be amber, indicating that power is on, but the SIP is being initialized. When the SIP is active, the FAIL LED will turn off.
- SPAs will follow the same sequence once the SIP has completed its initialization. The SPA STATUS LEDs will illuminate amber, turning to green when the SPAs become active.
- When the SIP FAIL LED is off and the SPA STATUS LEDs are green, all associated interfaces are configurable.

Note New interfaces are not available until you configure them.

Refer to the *Cisco uBR10012 Universal Broadband Router SIP and SPA Software Configuration Guide* for SIP and SPA 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 will be 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 will be empty.

Step 2 If the SIPs and SPAs have not become active within 15 minutes, refer to the system console messages as follows:

Note For the Cisco Wideband SPA, the field-programmable device (FPD) upgrade process takes approximately 12 minutes.

- If a SIP or SPA is undergoing an FPD upgrade, then console messages will indicate that the FPD process has been initiated, for example:

```
%ubr10k-4-LC_WARN: Slot[1/0] Line-card Programming the Blaze FPGA PROMs...
%ubr10k-4-LC_WARN: Slot[1/0] Line-card This operation will take approximately 12
minutes to complete.
```

  SIPs or SPAs that undergo an FPD upgrade will automatically be rebooted. Return to Step 1.
- If there is no indication that an FPD upgrade is under way, see Chapter 7, "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 all current SPAs and a summary of their status using the **show diag** and **show hw-module bay all oir** commands.

Step 3 Display information about the installed SIPs using the **show diag** command.

Step 4 Use the **show version** command to obtain a few details on the installed SIPs and interfaces available.

For information on commands that you can use to monitor a Cisco Wideband SIP or Cisco Wideband SPA, see the *Cisco Cable Wideband Solution Design and Implementation Guide*.

Using show Commands to Display SPA Information

Table 6-1 describes the **show** commands you can use to display SPA information.

Table 6-1 show Commands to Display SPA Information

Command	Purpose
`show controllers modular-cable`	Displays Cisco Wideband SPA information.
`show diag`	SPA type in that slot, number of ports, hardware revision, part number, and EEPROM contents.
`show hw-module bay`	Information about the wideband channels or RF channels on a Cisco Wideband SPA.

Table 6-1 show Commands to Display SPA Information

Command	Purpose
`show hw-module bay oir`	The operational status of Cisco Wideband SPAs in the system.
`show running-config`	The router's running configuration and interfaces available in the system.
`show version`	Cisco IOS software version, names and sources of configuration files, and boot images.

SPA Blank Filler Plates

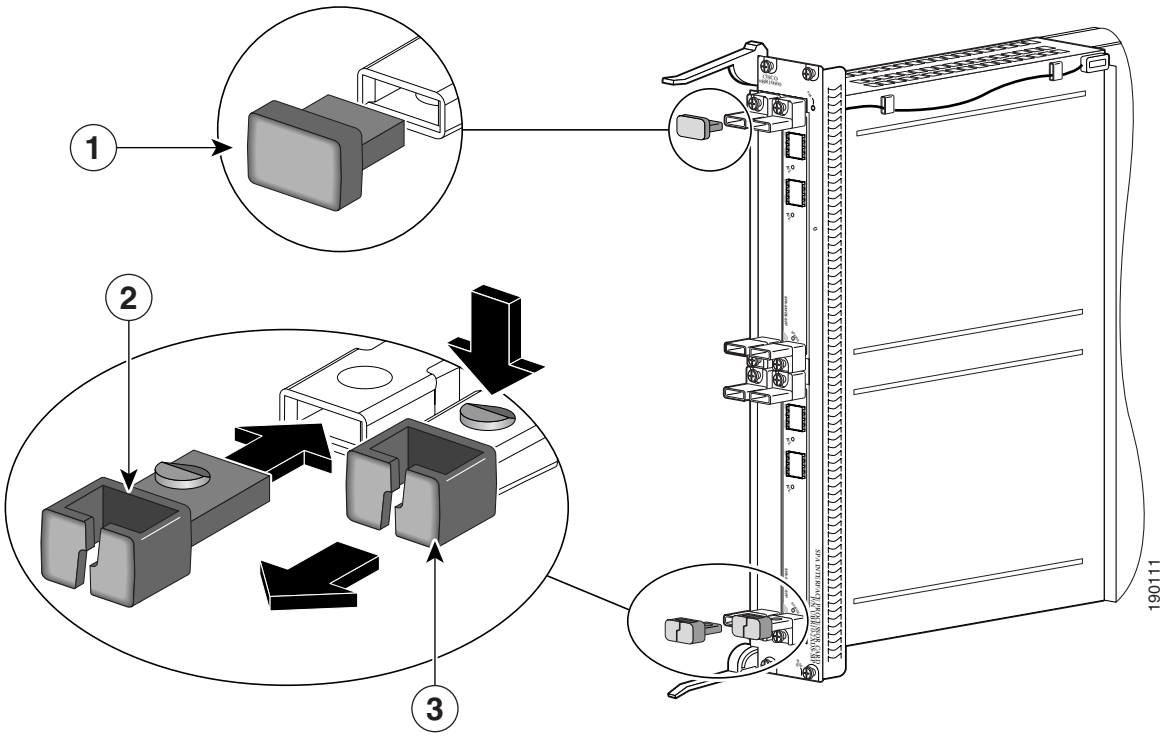
SPA blank filler plates are available to fill an unused SPA bay (subslot).

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

SPA Cable-Management Brackets

SPAs are shipped with an accessory kit that includes cable-management brackets. Figure 6-3 shows cable-management brackets installed in a SPA, as well as cable routing.

Figure 6-3 SPA Cable-Management Brackets



1	Blank filler plug	**3**	Cable-management clip being removed
2	Cable-management clip being installed		

To install cable-management brackets on a SPA, perform the following steps:

Step 1 Screw the two pull assemblies into both sides of the SPA.

Step 2 Insert the cable-management clip into the slot.

Step 3 To remove the cable-management clip, depress the button on the clip and pull it out.

Note Blank filler plugs are provided if no cable-management clips are installed.