



# Installing and Removing a Shared Port Adapter

This chapter describes how to install or remove SPAs on the Cisco 7304 router. This chapter contains the following sections:

- [Handling SPAs, page 6-1](#)
- [Online Insertion and Removal, page 6-2](#)
- [SPA Installation and Removal, page 6-2](#)
- [Optical Device Installation and Removal \(SPA-2GE-7304 optional procedure\), page 6-4](#)
- [Checking the Installation, page 6-4](#)
- [SPA Cable Management Brackets, page 6-9](#)

## 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 Carrier Card or a Shared Port Adapter,”](#) for a list of parts and tools required for installation.

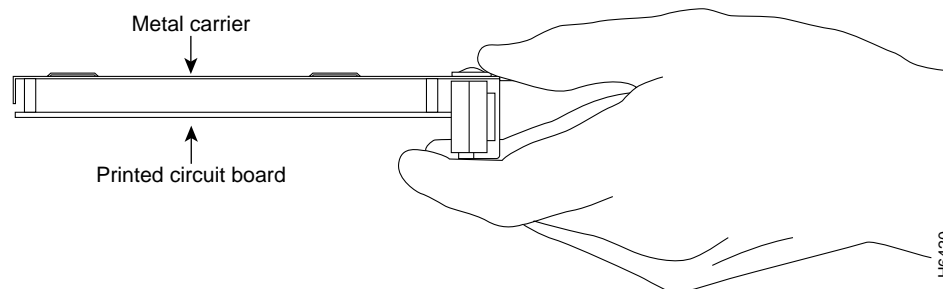


Caution

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

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

*Figure 6-1 Handling a SPA*



## Online Insertion and Removal

The Cisco 7304 router supports OIR of a SPA independently of removing the MSC. This means that an MSC can remain installed in the router with one SPA remaining active while you remove another SPA from one of the MSC subslots. If you are not planning to immediately replace a SPA into the MSC, then be sure to install a SPA blank filler plate in the subslot. The MSC can be inserted and removed using OIR without removing the SPAs in the installed subslots and the MSCs should always be fully installed with either functional SPAs or SPA blank filler plates.

For additional information regarding OIR of a SPA in an MSC, see the [Cisco 7304 Router Modular Services Card and Shared Port Adapter Software Configuration Guide](#).

## SPA Installation and Removal

You can install two half-height SPAs in an MSC-100. This section provides step-by-step instructions for removing and installing a SPA in an MSC.



### 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.



### Note

To remove and install a SPA in an MSC, refer to [Figure 6-2](#) and [Figure 6-3](#) and do the following:

The MSC can be inside or outside the router slot when the SPA is being installed or removed.



### Caution

Remove all cables from the SPAs prior to installation. Do not install cables into the SPAs until the SPA is properly seated in the MSC and the locking captive installation screws on the SPA are in their locked positions.

- Step 1** Remove all cabling from the SPA if any cabling has been connected to the SPA.
- Step 2** Remove the SPA from the MSC. To remove the SPA from the MSC, unlock the SPA locking captive installation screws from their locked positions using a screwdriver as shown in 1 of [Figure 6-2](#) to the unlocked positions.
- Step 3** Grasp the handle of the SPA and pull the SPA from the MSC.
- Step 4** To insert the SPA in the MSC, locate the guide rails inside the MSC 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 1 of [Figure 6-3](#).
- Step 5** Carefully slide the SPA all the way into the MSC until the SPA is firmly seated in the SPA interface connector. When fully seated, the SPA might be slightly behind the MSC faceplate.
- Step 6** After the SPA is properly seated, use a screwdriver to turn the SPA locking captive installation screws to their locked positions, as shown in 2 of [Figure 6-3](#).

[Figure 6-2](#) illustrates how to remove a SPA from an MSC and [Figure 6-3](#) illustrates how to install a SPA into an MSC.

Figure 6-2 SPA Removal

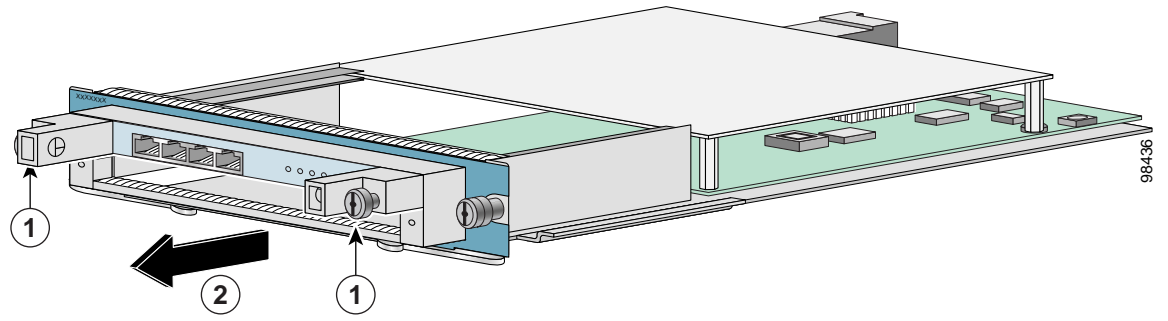
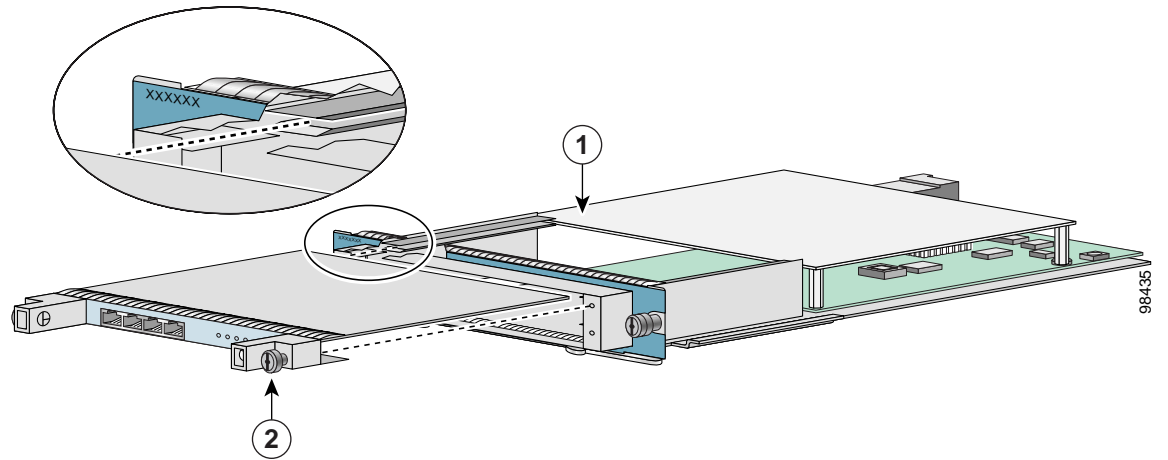


Figure 6-3 SPA Installation



# Optical Device Installation and Removal (SPA-2GE-7304 optional procedure)

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 Small Form-Factor Pluggable (SFP) modules, see the *Gigabit Interface Converter (GBIC) Module and Small Form-Factor Pluggable (SFP) GBIC Module Installation Information and Specifications* document. The following sections of that document are particularly useful when installing an SFP module:

- “Installing and Removing the GBIC Module or SFP Module”
- “Installing an SFP Module”
- “Installing the GBIC Module or SFP Module Interface Cables”

SPAs only accept supported optical devices. The list of supported optical devices can be found in the Modular Optics Compatibility table in the product overview chapter of this guide.

## 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 MSC and SPA installation, and includes information on the following topics:

- [Verifying the Installation, page 6-4](#)
- [Using show Commands to Verify MSC and SPA Status, page 6-6](#)
- [Using show Commands to Display SPA Information, page 6-7](#)
- [Using the ping Command to Verify Network Connectivity, page 6-8](#)

## Verifying the Installation

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

When the system has reinitialized all interfaces, the MSC STATUS LED should be green (on) and the port LEDs on the SPAs should 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.

**Note**

A Fast Ethernet interface is used in the following examples for illustrative purposes.

The following sample display shows the events logged by the system as an MSC with a Fast Ethernet SPA was removed from module slot 4 in the router. In this example, interface 0 (interface 4/0/0) on the FastEthernet SPA was up and active when the MSC was removed from the router. Note that the system logs that the MSC 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 FastEthernet4/0/0, changed state
to down
```

When you reinsert the MSC with the installed SPA, the system automatically brings up the interface that was changed to *down* when the MSC 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 FastEthernet4/0/0, changed state to up
00:07:36:%LINEPROTO-5-UPDOWN:Line protocol on Interface FastEthernet4/0/0, changed state
to up
```

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

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- Step 1** Observe the console display messages and verify that the system discovers the MSC, while the system reinitializes each interface, as follows:
- If you installed a new MSC, the STATUS LED should be green (on). The system should recognize all new interfaces but leave them configured as *administratively down*.
  - If you replaced an MSC, the STATUS LED should be green (on). The system should recognize each interface and places each interface in the state that it was previously in before the MSC was removed.
- 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 the SPA fails to go on, the SPA or the MSC might not have a compatible FPD image or the SPA or MSC might not be fully seated *even if the SPA locking captive installation screws are locked*. When a SPA is not recognized, the SPA STATUS LED is off. If this occurs in your network, do the following:
- a. Check for system messages indicating an FPD incompatibility or enter the **show hw-module subslot fpd** command to ensure the FPD image on the SPA is compatible with the running Cisco IOS. If an incompatibility exists, an FPD image package file must be downloaded from the Software Center on Cisco.com and an FPD upgrade must be performed. For information on performing this upgrade, see the “[Upgrading Field-Programmable Devices](#)” chapter of the *Cisco 7304 Modular Services Card and Shared Port Adapter Software Configuration Guide*. If the FPD is proven to be compatible or you are unable to perform the verification steps, proceed with the following steps:
  - b. Remove the SPA from the MSC.
  - c. 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.

- d. Insert the SPA in the MSC by sliding the SPA all the way in the MSC until the SPA is firmly seated in the SPA interface connector. When fully seated in the MSC, the SPA might be slightly behind the MSC faceplate.
  - e. 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, proceed to [Step 4](#).
- Step 4** If the STATUS LED on a SPA still fails to go on and the problem is not FPD-related, remove the MSC and install it in another available slot on the router.
- If the STATUS LED on the SPA goes on, suspect a failed backplane port in the original slot.
  - If the STATUS LED fails to go on, remove the MSC 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 check; suspect that the STATUS LED on the SPA has failed. Contact a service representative to report the problem and obtain further instructions.
  - If no LEDs on the SPA go on:
    - Verify that the SPA is supported on the MSC and that it has the required hardware revision. If the SPA is not supported or has an old hardware revision, the **show diag** command output will verify that the MSC is deactivated.
    - Suspect a faulty MSC. Contact a service representative to report the problem and obtain further instructions.
- Step 5** If the SPA is new and not a replacement, configure the new SPA using the *Cisco 7304 Modular Services Card and Shared Port Adapter Software Configuration Guide*.
- Step 6** If the MSC is a replacement, use the **show interfaces** *type slot-number/port-number/SPA-port-number* command or the **show controllers** command to verify the status of the SPAs. (See the “[Using show Commands to Verify MSC and SPA Status](#)” section on page 6-6.)
- If you replaced an MSC with another MSC 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 STATUS LEDs.
- Step 8** If the port LED (a port LED is one of the numbered LEDs) on the SPA 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 MSCs are properly installed.

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If you experience other problems that you are unable to solve, contact Cisco Technical Support (see the “[Obtaining Technical Assistance](#)” section on page -xi) or a service representative for assistance.

To configure the new interface, use the *Cisco 7304 Modular Services Card and Shared Port Adapter Software Configuration Guide*.

## Using show Commands to Verify MSC and SPA Status

The following steps use **show** commands to verify that the new SPAs are configured and operating correctly:

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- Step 1** Use the **show c7300** command to display the list of supported hardware in each router slot, including supported SPAs, SPA type, and SPA status. Ensure that your SPA is listed in the output and that the status is OK.
- Step 2** Use the **show version** command to display the system hardware configuration. Ensure that the list includes the new SPAs and the correct interface types.
- Step 3** Specify one of the new SPAs with the **show interfaces type router-module-slot/subslot/SPA-port-number** command and verify that the first line of the display specifies the SPA with the correct slot number. Also verify that the SPA and line protocol are in the correct state: up or down.
- Step 4** Display the protocols configured for the entire system and specific SPAs with the **show protocols** command. If necessary, return to configuration mode to add or remove protocol routing on the system or specific SPAs.
- Step 5** Display the running configuration file with the **show running-config** command. Verify that the configuration is accurate for the system and each SPA.
- Step 6** Display the SPA FPD image version and the required image version using the **show hw-module subslot fpd** command. An FPD incompatibility can disable a SPA, so this command is useful for verifying that the FPD image on the SPA is compatible with the running Cisco IOS release.
- If the SPA is down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the network interface is properly connected. If you still have problems bringing the SPA up, contact a service representative for assistance.
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## 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	Type of Information Provided
<b>show running-config</b>	The router's running configuration and interfaces available in the system.
<b>show hw-module subslot oir</b>	The operational status of all SPAs in the system.
<b>show controllers</b>	General hardware information about a particular SPA, MSC, or all hardware in the system.
<b>show diag</b>	SPA type in that slot, number of ports, hardware revision, part number, FPGA, and EEPROM contents.
<b>show hw-module subslot fpd</b>	FPD version information of SPAs in the system.
<b>show version</b>	Cisco IOS software version, names and sources of configuration files, and boot images.

## 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 MSC have booted successfully and are operational, you can use this command to verify the status of the SPA ports. Refer to the publications listed in the “[Related Documentation](#)” section on page -viii 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 <Return>
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#
```

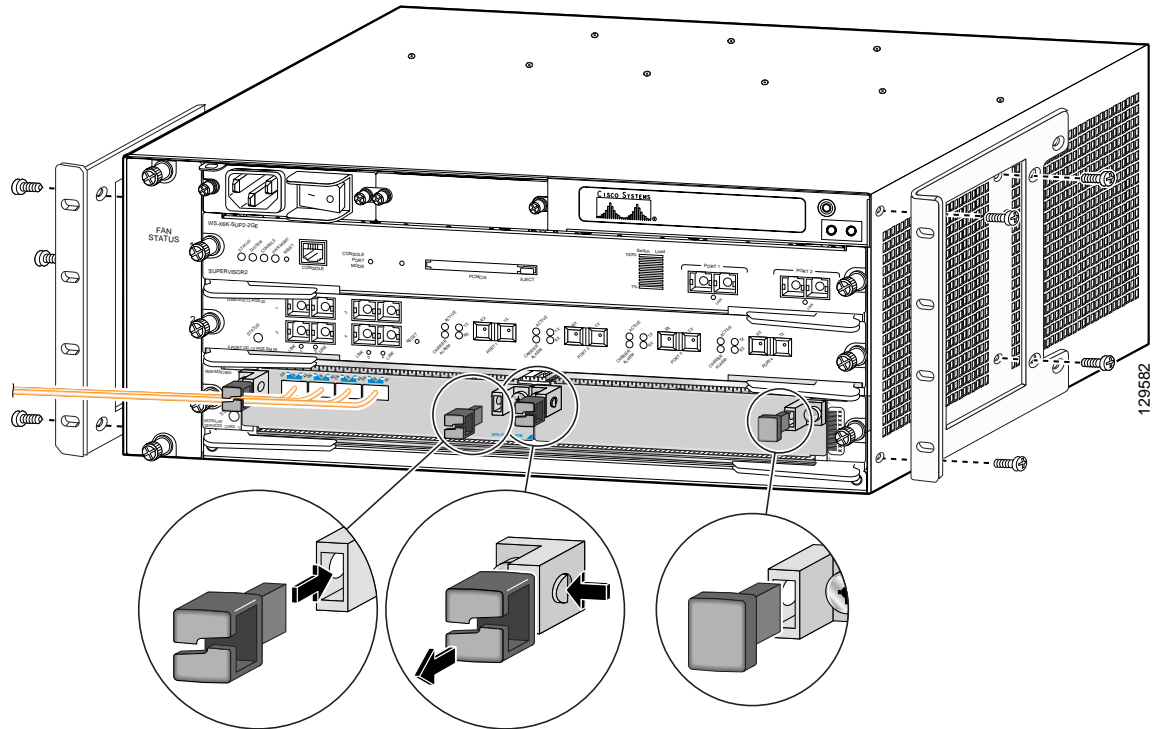
If the connection fails, verify that you have the correct IP address for the server and that the server is active (powered on), and repeat the **ping** command.

SPAs are shipped with an accessory kit that includes cable management brackets. [Figure 6-4](#) shows cable management brackets installed in a SPA, as well as cable routing.



# SPA Cable Management Brackets

Figure 6-4 SPA Cable Management Brackets



**Note**

This illustration is from a Cisco 7600 router, but the cable management brackets are identical on a Cisco 7304 router.

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.

