



Doc. No. 78-2986-01 Rev. A0

LightStream 1010 ATM Switch Carrier Module Configuration Note

Product Numbers: WATM-CAM-2P=

This document contains instructions for installing the carrier module. For complete hardware configuration and maintenance procedures, refer to the *LightStream 1010 ATM Switch User Guide* publication. For a complete description of commands used to configure and maintain the LightStream 1010 ATM switch, refer to the *LightStream 1010 ATM Switch Software Configuration Guide* and *LightStream 1010 ATM Switch Command Reference* publications.

Cisco documentation and additional literature are available on a CD called Cisco Connection Documentation, Enterprise Series. The CD is updated and shipped monthly, so it might be more up-to-date than the printed documentation. To order the Cisco Connection Documentation, Enterprise Series CD, contact your local sales representative or call Customer Service. The CD is available both as a single CD and as an annual subscription. You can access Cisco technical documentation on the World Wide Web Universal Resources Locator (URL)

<http://www.cisco.com>.

Sections in this document include the following:

- What is the LightStream 1010 ATM Switch?
- Carrier Module Description
- Safety Recommendations
- Installing and Replacing the CAMs and PAMs



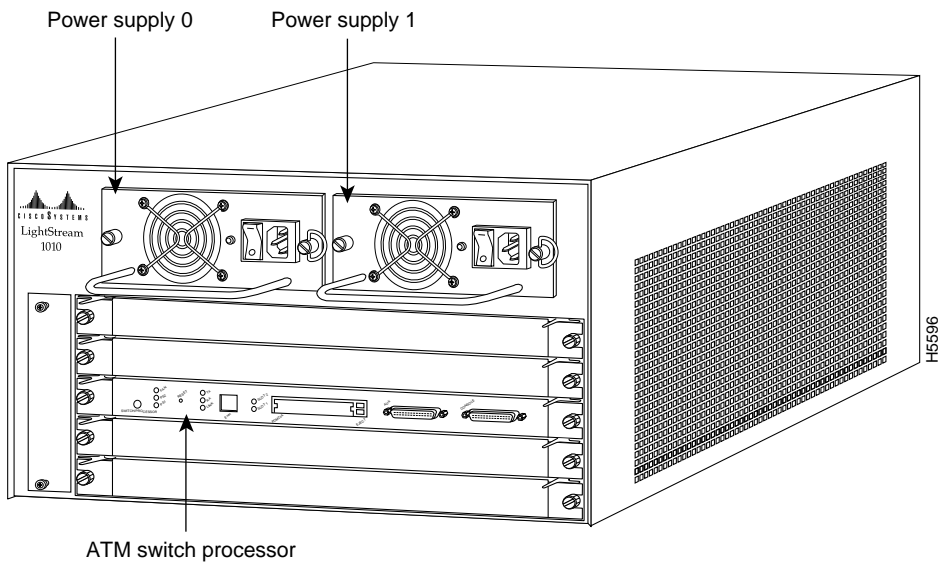
Warning Only trained and qualified personnel should install or replace the LightStream 1010 ATM switch, chassis, power supplies, fan assembly, or modules.

What is the LightStream 1010 ATM Switch?

The LightStream 1010 uses a five-slot, modular chassis featuring the option of dual, fault-tolerant, load-sharing power supplies. (See Figure 1.) The central slot in the LightStream 1010 is dedicated to a single, field-replaceable ATM switch processor (ASP) module that supports both the 5-Gbps shared memory and the fully nonblocking switch fabric. The ASP also supports the feature card and high performance reduced instruction set (RISC) processor that provides the central intelligence for the

device. The remaining slots support up to four hot-swappable Carrier Modules (CAMs). Each CAM supports up to two hot-swappable Port Adapter Modules (PAMs) for a maximum of eight PAMs per switch, supporting a wide variety of desktop, backbone, and wide-area interfaces.

Figure 1 Front View of the LightStream 1010 ATM Switch



The LightStream 1010 ATM switch provides switched ATM connections to individual workstations, servers, LAN segments, or other ATM switches and routers using fiber-optic, unshielded twisted-pair (UTP), and coaxial cable.

Figure 2 shows an example of a network configuration using the LightStream 1010 ATM switch in a high-performance workgroup.

Figure 2 LightStream 1010 Workgroup Configuration Example

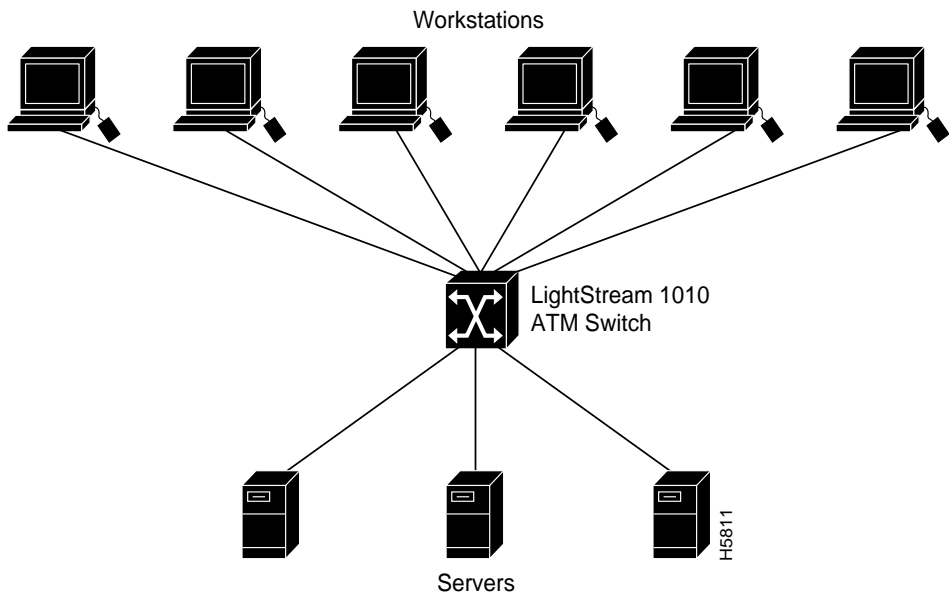
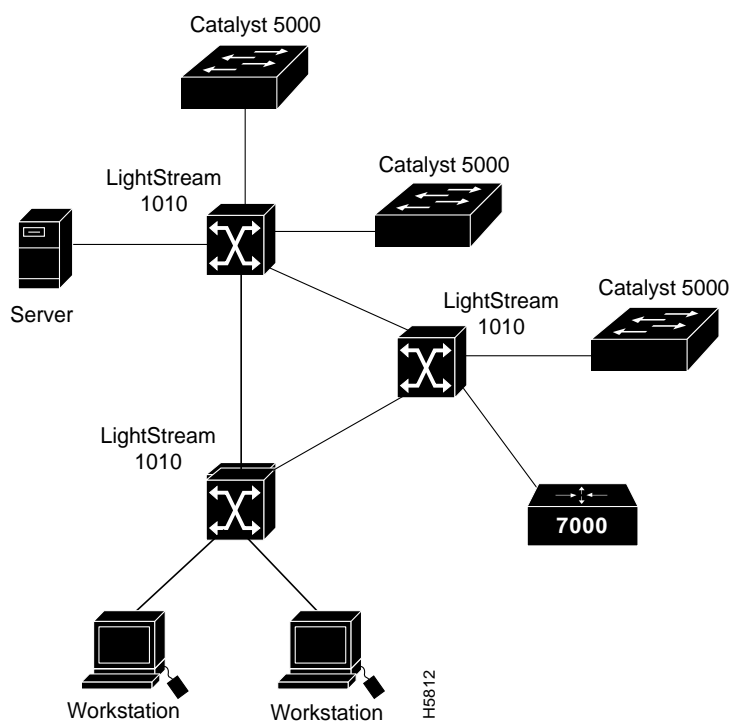


Figure 3 shows an example of a network configuration using the LightStream 1010 ATM switch for a campus backbone.

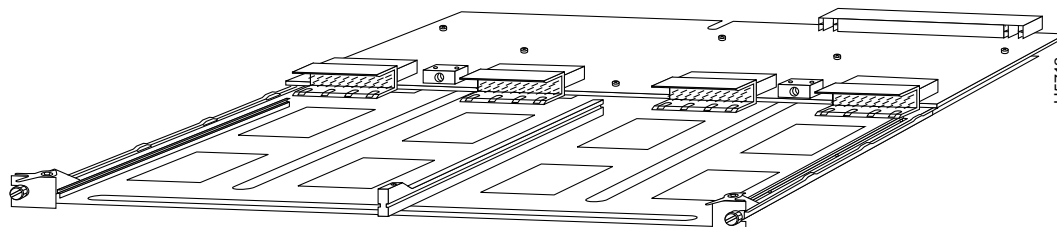
Figure 3 LightStream 1010 Backbone Configuration Example



Carrier Module Description

The port adapter carrier module (CAM), shown in Figure 4, may be installed in any slot except slot 2 in the LightStream 1010 ATM switch and allows any combination of PAMs to be installed with a maximum of two PAMs per CAM. Port adapters are numbered 1 and 0, with 0 on the left, facing the front of the switch.

Figure 4 Port Adapter Module Carrier



Specifications

Table 1 lists the LightStream 1010 ATM Switch and CAM specifications:

Table 1 Switch and CAM Module Specifications

Description	Specifications
CAM Dimensions (HxWxD)	1.2 x 14.4 x 16" (3.0 x 36.6 x 40.6 cm)
Weight	3.55 lb (1.60 kg)
Operating temperature	32 to 104 F (0 to 40 C)
Nonoperating temperature	-40 to 167 F (-40 to 75 C)
Humidity	10 to 90%, noncondensing
Altitude	-500 to 10,000 ft (-52 to 3,048 m)
Carrier adapter module (CAM)	Carrier module for 2-port adapter modules with PAM slot covers for empty slots installed (WATM-CAM -2P)
Mean Time Between Failures	2.6 years for system configuration
Agency approvals	Safety: UL ¹ 1950, CSA ² -C22.2 No. 950-93, and EN60950 EMI ³ : FCC Class A CE Mark, and VCCI Class II with shielded cables

1. UL = Underwriters Laboratory

2. CSA = Canadian Standards Association

3. EMI = electromagnetic interference

Maximum Configuration

The four CAMs allow up PAMs in any combination of network interfaces to provide the following maximum port densities:

- Up to 32 155 multimode fiber-optic ports
- Up to 32 155 single-mode fiber-optic ports
- Up to 32 155 UTP ports
- Up to 16 DS-3 coaxial ports
- Up to 16 E3 coaxial ports
- Up to 8 622-Mbps OC-12 single-mode ports
- Up to 8 622-Mbps OC-12 multimode ports

You can install any combination of PAMs in any of the eight available PAM slots. There are no restrictions on either the number of modules that can be installed or their proximity to the ASP.

Safety Recommendations

The following guidelines help ensure your safety and protect the equipment. This list is not inclusive of all potentially hazardous situations you may be exposed to as you install the module, so *be alert*.

- Never try to lift the chassis by yourself; *two people are required* to lift the switch.
- Always turn off all power supplies and unplug all power cords before removing the chassis front panel.

- Always unplug all power cords before installing or removing a chassis.
- Keep the chassis area clear and dust free during and after installation.
- Keep tools and chassis components away from walk areas.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the chassis. Fasten your tie or scarf and sleeves.



Warning Metal objects heat up when connected to power and ground, and can cause serious burns.

Safety with Electricity

The supervisor engine, modules, and redundant power supplies are designed to be removed and replaced while the system is operating without presenting an electrical hazard or damage to the system. Before removing a redundant power supply, make sure the first supply is powered on. Note, you must shut down the system before removing or replacing any of the replaceable components inside the front panel, for example, the backplane. Never install equipment that appears damaged.

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before installing or removing a chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

In addition, use the guidelines that follow when working with any equipment that is disconnected from a power source but still connected to telephone wiring or other network cabling.



Warning Do not work on the system or connect or disconnect cables during periods of lightning activity.

- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Always use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which occurs when electronic cards or components are improperly handled, can result in complete or intermittent failures. The ASP and PAMs each consist of a printed circuit card that is fixed in a metal carrier. Electromagnetic interference (EMI) shielding, connectors, and a handle are integral components of the carrier. Although the metal carrier helps to

protect the cards from ESD, use a preventive antistatic strap whenever you handle the ASP or PAMs. Handle the carriers by the handles and the carrier edges only; never touch the cards or connector pins.

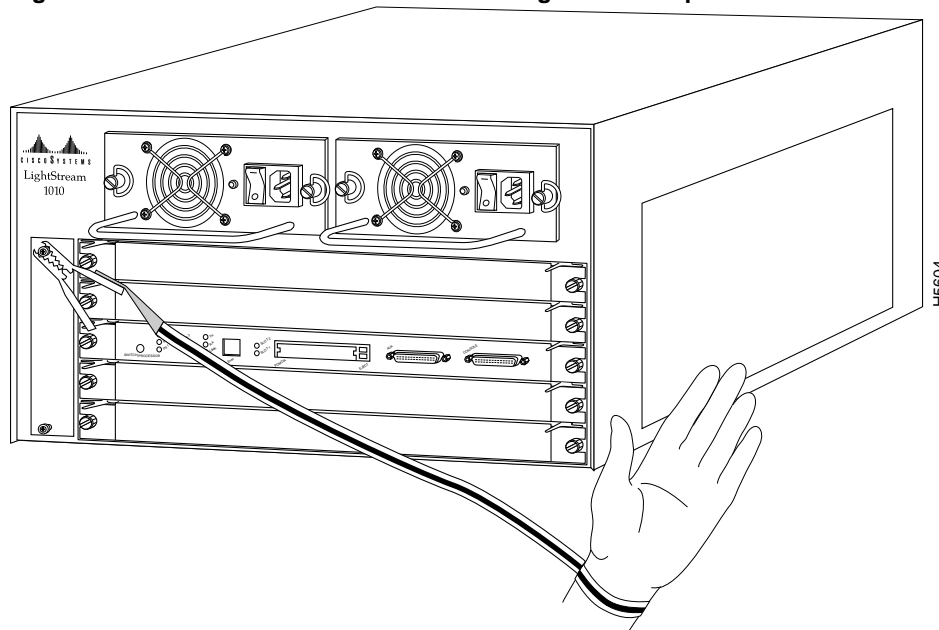


Caution Always tighten the captive installation screws on the PAMs when you are installing them. These screws prevent accidental removal of the CAMs and PAMs, provide proper grounding for the system, and help to ensure that the bus connectors are properly seated in the backplane.

Following are guidelines for preventing ESD damage:

- Use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to one of the captive installation screws on an installed PAM or power supply, before removing any module. (See Figure 5.)

Figure 5 Placement of Electrostatic Discharge Wrist Strap



- Handle carriers by the faceplates and carrier edges only; avoid touching the card or any connector pins.
- Place the removed module component-side up on an antistatic surface or in a static shielding bag. If the module is going to be returned to the factory, immediately place it in a static shielding bag.
- Avoid contact between the modules and clothing. The wrist strap protects only the card from ESD voltages on the body; ESD voltages on clothing can still cause damage.



Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms (Mohms).

Installing and Replacing the CAMs and PAMs

All CAMs and PAMs support hot-swapping, which allows you to install, remove, replace, and rearrange the CAMs or PAMs without turning off the system power. When the system detects that a CAM or PAM has been installed or removed, it automatically runs diagnostic and discovery routines, acknowledges the presence or absence of the PAM, and resumes system operation without any operator intervention.



Caution CAMs and PAMs support hot-swapping. The ASP is a required system component. Removing an ASP while the system is operating causes the system to shut down and may damage the processor.

What is Hot-Swapping?

The hot-swap feature allows you to remove and replace modules while the system is operating; you do not need to notify the software or shut down the system power. All CAMs and PAMs (except for the ASP) support hot-swapping.

Each CAM contains a bus-type connector that mates with the system backplane. Each card connector consists of a set of tiered pins, in three lengths. The pins send specific signals to the system as they make contact with the backplane. The system assesses the signals it receives and the order in which it receives them to determine what event is occurring and what task it needs to perform, such as reinitializing new interfaces or shutting down removed ones.

For example, when inserting a CAM, the longest pins make contact with the backplane first, and the shortest pins make contact last. The system recognizes the signals and the sequence in which it receives them. The system expects to receive signals from the individual pins in this logical sequence, and the ejector levers help to ensure that the pins mate in this sequence.

When you remove or insert a PAM, the backplane pins send signals to notify the system, which then performs as follows:

- 1 Rapidly scans the backplane for configuration changes.
- 2 Initializes all newly inserted PAMs, noting any removed interfaces and placing them in the administratively shutdown state.
- 3 Brings all previously configured interfaces on the PAM back to the state they were in when they were removed. If a PAM, similar to the one that was removed, has been reinserted into a slot, then its ports are configured and brought online up to the port count of the original PAM.

Unconfigured PAMs installed for the first time start up in the shutdown state. The system identifies them as present but unconfigured. Each must be manually configured from the command line.¹

Hot-swap functionality enables you to add, remove, or replace CAMs or PAMs with the system online, which provides a seamless method to users on the network, maintains all routing information, and ensures session preservation.

When you insert a new CAM or PAM, the system runs a diagnostic test on the new interfaces and compares them to the existing configuration. If this initial diagnostic fails, the system remains offline for another 15 seconds while it performs a second set of diagnostic tests to determine whether or not the PAM is faulty and if normal system operation is possible.

If the second diagnostic test passes, which indicates that the system is operating normally and the new PAM is faulty, the system resumes normal operation but leaves the new interfaces disabled.

1. Instructions for initial interface configurations are in the publication *LightStream 1010 ATM Switch Software Configuration Guide*.

If the second diagnostic test fails, the system crashes, which usually indicates that the new PAM has created a problem in the bus and should be removed.



Caution To avoid erroneous failure messages, allow at least 15 seconds for the system to reinitialize and note the current configuration of all interfaces before you remove or insert another PAM.

Incorrect CAM Insertion and Removal

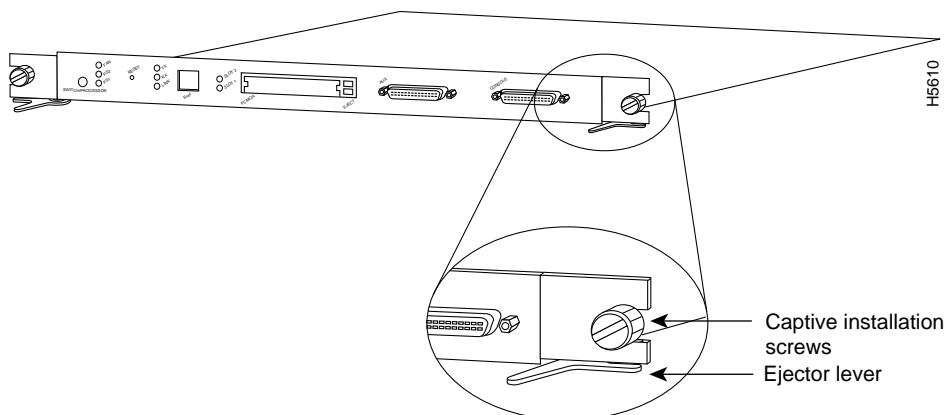
The ejector levers and installation screws (see Figure 6) align and seat the card connectors in the backplane. Follow the installation and removal instructions carefully, and review the following examples of *incorrect* insertion practices and results:

- Using the faceplate to force or slam the CAMs into the slot can also damage the pins on the module connectors if they are not aligned properly with the backplane.
- When using the faceplate (rather than the ejector levers or installation screws) to seat the CAM in the backplane, you may need to pull the CAM back out and push it in again to align it properly. Using the ejector levers and installation screws ensures that the card connector mates with the backplane correctly.
- Using the faceplate to insert or remove a CAM, or failing to push the ejector levers to the full 90-degree position, can leave some (not all) of the connector pins mated to the backplane, a state which suspends the system. Using the ejector levers and installation screws to make sure that they are pushed fully into position ensures that all three layers of pins are mated with (or free from) the backplane.

It is also important to use the ejector levers and installation screws when removing a CAM to ensure that the card connector pins disconnect from the backplane in the logical sequence expected by the system. Any CAM that is only partially connected to the backplane can hang the bus. Detailed steps for correctly performing hot-swapping are included in the following procedures for installing and removing CAMs. For more information, see the section “Installing and Replacing the ASPs, CAMs, and PAMs” in the *LightStream 1010 ATM Switch User Guide*.

Following are detailed steps for removing and replacing CAMs and successfully performing hot-swap. Figure 6 shows the ejector levers, which you must use when inserting or removing the CAMs.

Figure 6 Ejector Levers and Captive Installation Screws (ASP Shown)



Tools Required

You need a 3/16-inch flat-blade screwdriver to remove any filler (blank) PAMs and to tighten the captive installation screws that secure the CAMs and PAMs in their slots. Whenever you handle CAMs and PAMs, you should use a wrist strap or other grounding device to prevent electrostatic discharge (ESD) damage. See the section “Preventing Electrostatic Discharge Damage” in the chapter “Preparing for Installation” in the *LightStream 1010 ATM Switch User Guide*.

Removing CAMs

CAM supports hot-swapping. (The ASP is a required system component. Removing an ASP while the system is operating causes the system to shut down.)

Take the following steps to remove a CAM:

- Step 1** Use a screwdriver to loosen the captive installation screws at the left and right sides of the CAM.
- Step 2** Place your thumbs on the left and right ejector levers and simultaneously push the left lever left and the right lever right to release the CAM from the backplane connector.
- Step 3** Grasp the CAM faceplate with one hand and place your other hand under the carrier to support and guide the module out of the slot. Avoid touching the card.
- Step 4** Pull the CAM straight out of the slot carefully, keeping your other hand under the carrier to guide it. Keep the module at a 90-degree orientation to the backplane.
- Step 5** Place the removed CAM on an antistatic mat or antistatic foam, or immediately install it in another slot.
- Step 6** Install a module filler plate (part number WAT-CAM-CVR=) if the CAM slot is to remain empty, to keep dust out of the chassis and to maintain proper airflow through the module compartment.

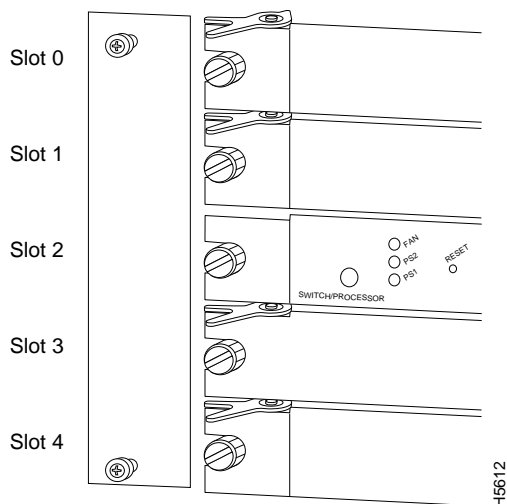


Caution Always install the CAM filler plate in empty PAM slots to maintain the proper flow of cooling air across the cards.

Installing CAMs or PAMs

You can install CAMs in any of the four CAM slots numbered 0 through 4 from top to bottom when viewing the chassis from the front as shown in Figure 7. (The middle slot (number 2) contains the ASP, which is a required system component.) Blank CAM and PAM fillers are installed in CAMs or PAM slots without CAMs or PAMs to maintain consistent airflow through the module compartment.

Figure 7 Slot Numbers



CAM Installation

ASP and CAM installation instructions are essentially the same, except the ASP does not support hot-swapping. The ASP is a required system component. Removing an ASP while the system is operating causes the system to shut down. For more information, see the section “Installing and Replacing the CAMs and PAMs” in the *LightStream 1010 ATM Switch User Guide*.

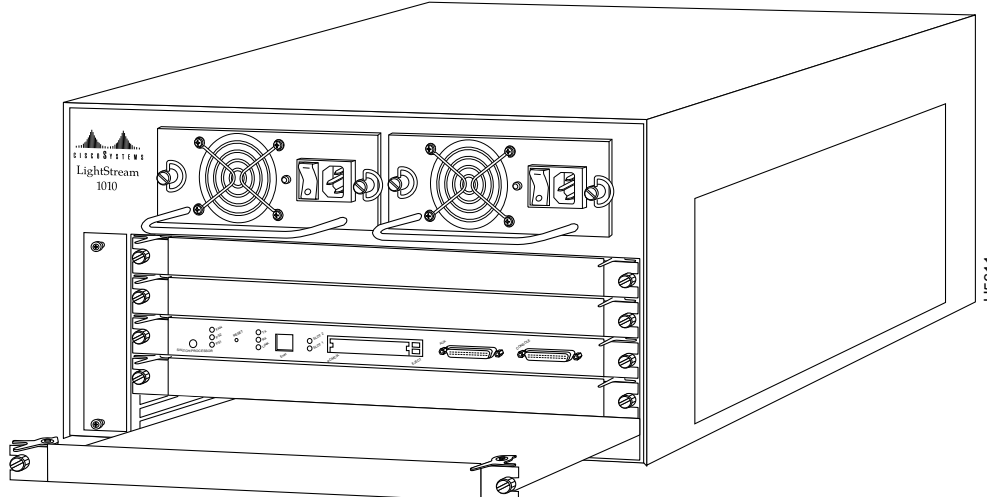


Caution Handle ASP or CAM by the carrier edges only to prevent ESD damage.

Take the following steps to install a CAM (or an ASP):

- Step 1** Ensure that there is enough clearance to accommodate any interface equipment that you connect directly to the CAM ports. If possible, insert CAMs between empty slots that contain only module filler plates.
- Step 2** Secure the CAM with two captive installation screws. Use a 1/4-inch flat-blade screwdriver to loosen the captive installation screws and remove the CAM filler (or the existing CAM) from the slot you want to use.
- Step 3** Hold the CAM faceplate with one hand place your other hand under the carrier, and guide it into the slot. Avoid touching the card. (See Figure 8.)
- Step 4** Place the back of the CAM in the slot and align the notch on the sides of the module carrier with the groove in the slot.
- Step 5** Keep the CAM at a 90-degree orientation to the backplane carefully slide it into the slot until the faceplate makes contact with the ejector levers.
- Step 6** Use your thumb and forefinger on each hand and simultaneously push the left lever and the right lever in to fully seat the CAM in the backplane connector.

Note Always use the ejector levers when installing or removing the CAM. A module that is partially seated in the backplane causes the system to halt and subsequently crash.

Figure 8 Carrier Module Installation

- Step 7** Use a screwdriver to tighten the captive installation screws on the left and right ends of the CAM.
- Step 8** Attach network interface cables or other devices to the interface ports.
- Step 9** Turn the power back on if needed. See the section “Starting the System” in the chapter “Installing the LightStream 1010 ATM Switch” in the *LightStream 1010 ATM Switch User Guide* publication.
- Step 10** Check the status of the interfaces as follows:
- If this installation is a replacement PAM, use the **show configuration** or **show atm interface [card/subcard/port]** command to verify that the system has acknowledged the new interfaces and brought them up.
 - See the publications *LightStream 1010 ATM Switch Software Configuration Guide* and *LightStream 1010 ATM Switch Command Reference* for all software instructions and information.

Sample Screen Display for Hot-Swapping Procedure

When you remove and replace CAMs and PAMs, the system provides status messages on the console screen. The messages are for information only. In the following sample display, you can follow the events logged by the system when a PAM was removed from slot 3/0. When the PAM is reinserted, the system marks the module as *ready* again.

```
Switch#
%OIR-6-REMCARD: Card removed from slot 3/0, interfaces disabled
%LINK-5-CHANGED: Interface 155UTP 3/0, changed state to administratively down
%LINK-5-CHANGED: Interface 155UTP 3/0, changed state to administratively down

Switch#

%OIR-6-INSCARD: Card inserted in slot 3/0, interfaces administratively shut down
%LINK-5-CHANGED: Interface 155UTP 3/0, changed state to up
%LINK-5-CHANGED: Interface 155UTP 3/0, changed state to up
```

Cisco Connection Online

Cisco Connection Online (CCO), formerly Cisco Information Online (CIO), is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional content and services.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to Cisco's customers and business partners. CCO services include product information, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously—a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, Internet e-mail, and fax download options, and is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can access CCO in the following ways:

- WWW: `http://www.cisco.com`.
- Telnet: `cco.cisco.com`.
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and baud rates up to 14.4 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact `cco-help@cisco.com`. For additional information, contact `cco-team@cisco.com`.

Note If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or `tac@cisco.com`. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or `cs-rep@cisco.com`.

This document is to be used in conjunction with the *LightStream 1010 ATM Switch User Guide* publication.

AtmDirector, Catalyst, CD-PAC, CiscoAdvantage, CiscoFusion, Cisco IOS, the Cisco IOS logo, *CiscoLink*, CiscoPro, the CiscoPro logo, CiscoRemote, the CiscoRemote logo, CiscoSecure, Cisco Systems, CiscoView, CiscoVision, CiscoWorks, ClickStart, ControlStream, EtherChannel, FastCell, FastForward, FastManager, FastMate, FragmentFree, HubSwitch, Internet Junction, LAN²LAN Enterprise, LAN²LAN Remote Office, LightSwitch, Newport Systems Solutions, *Packet*, Phase/IP, PIX, Point and Click Internetworking, RouteStream, Secure/IP, SMARTnet, StreamView, SwitchProbe, SwitchVision, SwitchWare, SynchroniCD, *The Cell*, TokenSwitch, TrafficDirector, Virtual EtherSwitch, VirtualStream, VlanDirector, Web Clusters, WNIC, Workgroup Director, Workgroup Stack, and XCI are trademarks; Access by Cisco, Bringing the Power of Internetworking to Everyone, Enter the Net with MultiNet, and The Network Works. No Excuses. are service marks; and Cisco, the Cisco Systems logo, CollisionFree, Combinet, EtherSwitch, FastHub, FastLink, FastNIC, FastSwitch, Grand, Grand Junction, Grand Junction Networks, the Grand Junction Networks logo, HSSI, IGRP, Kalpana, the Kalpana logo, LightStream, MultiNet, MultiWare, Personal Ethernet, TGV, the TGV logos, and UniverCD are registered trademarks of Cisco Systems, Inc. All other trademarks, service marks, registered trademarks, or registered service marks mentioned in this document are the property of their respective owners.

Copyright © 1996, Cisco Systems, Inc.
All rights reserved. Printed in USA.
965R