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LightStream 1010 ATM Switch PCMCIA Flash Memory Card Installation Guide

Product Numbers: MEM-ASP-FLC8M=, MEM-ASP-FLC16M=, MEM-ASP-FLC20M=

This publication describes installation and configuration procedures for the Flash memory card, which ships as a spare part and is used with the LightStream 1010 Asynchronous Transfer Mode (ATM) switch. This card is an 8-, 16-, or 20-megabyte (MB) Intel Series 2+ Flash memory card, which conforms with the Personal Computer Memory Card International Association (PCMCIA) format. For a complete description of commands used to configure and maintain the LightStream 1010 PCMCIA Flash memory card, refer to the *LightStream 1010 ATM Switch Software Configuration Guide* and *LightStream 1010 ATM Switch Command Reference* publications. For complete hardware configuration and maintenance procedures, refer to the *LightStream 1010 ATM Switch User Guide* publication. These documents are available on Enterprise CDROM or in printed form.

Note When the Flash memory card is shipped installed in a LightStream 1010 ATM switch, the Flash memory card contains an image. When the card is shipped as a spare, it is shipped unformatted.

The Flash memory card is used to store and boot Cisco Internetwork Operating System (Cisco IOS) software image, and can be used as a server to store software and microcode images for other systems. The spare Flash memory card is shipped blank; you *must* format it before using it. Procedures for formatting the card are included in this publication.

The Flash memory card is sensitive to electrostatic discharge (ESD) damage. Observe appropriate ESD-preventive procedures when handling the card.

In this publication, the first sections follow a chronological order typical of many Flash memory card installations: insert the card, format the card, copy an image to the card, and make that image bootable. The rest of the sections contain information about typical operations:

Sections in this document include the following:

- Preventing Electrostatic Discharge Damage
- Locating the Switch ASP
- Installing and Removing the Flash Memory Card in an ASP

- Formatting a Flash Memory Card
- Copying an Image into a Flash Memory Card
- Making the Flash Memory Card Image Bootable
- Copying Bootable Images between Flash Memory Cards
- Enabling Booting from Flash Memory
- Flash Memory File System Commands
- Recovering from Locked Blocks
- If You Need More Information

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. A module comprises a printed circuit board 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 board from ESD, use a preventive antistatic strap whenever handling a processor module.

Following are guidelines for preventing ESD damage:

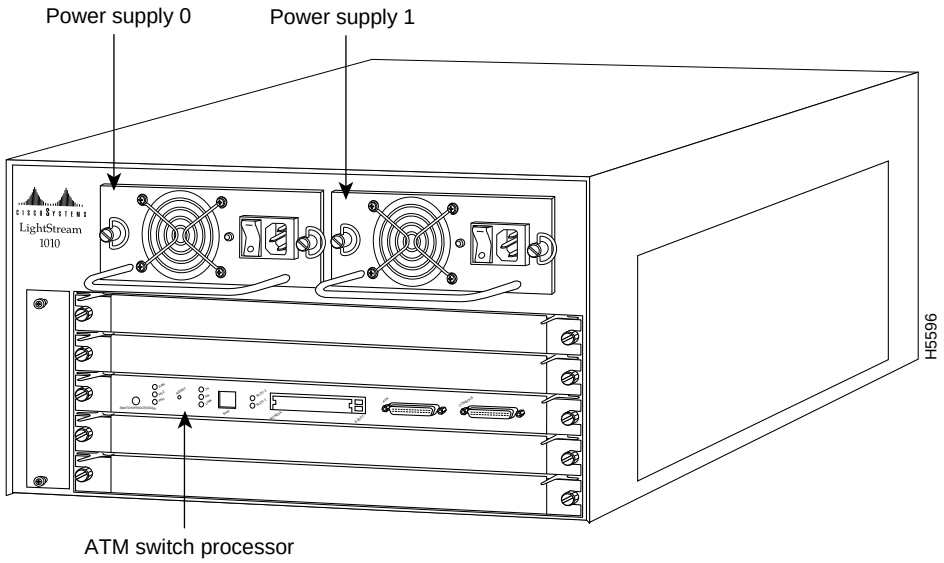
- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.
- Place a removed Flash memory card on an antistatic surface or in a static shielding bag. If the card will be returned to the factory, immediately place it in a static shielding bag.
- Avoid contact between the card and clothing. The wrist strap only protects 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.

Locating the Switch ASP

In the LightStream 1010 ATM switch, access to the ATM Switch Processor (ASP), which contains the PCMCIA slots for the Flash memory card, is from the front. The middle slot, slot number 2, is reserved for the ASP. (See Figure 1.)

Figure 1 LightStream 1010 ATM Switch Front View



Installing and Removing the Flash Memory Card in an ASP

The ASP has two PCMCIA slots—slot 0 and slot 1—into which you can install a Flash memory card. Slot 0 is on the bottom and slot 1 on the top (see Figure 2–a). Both slots can be used at the same time. The following procedure is a generic one and can be used for a Flash memory card in either slot position.

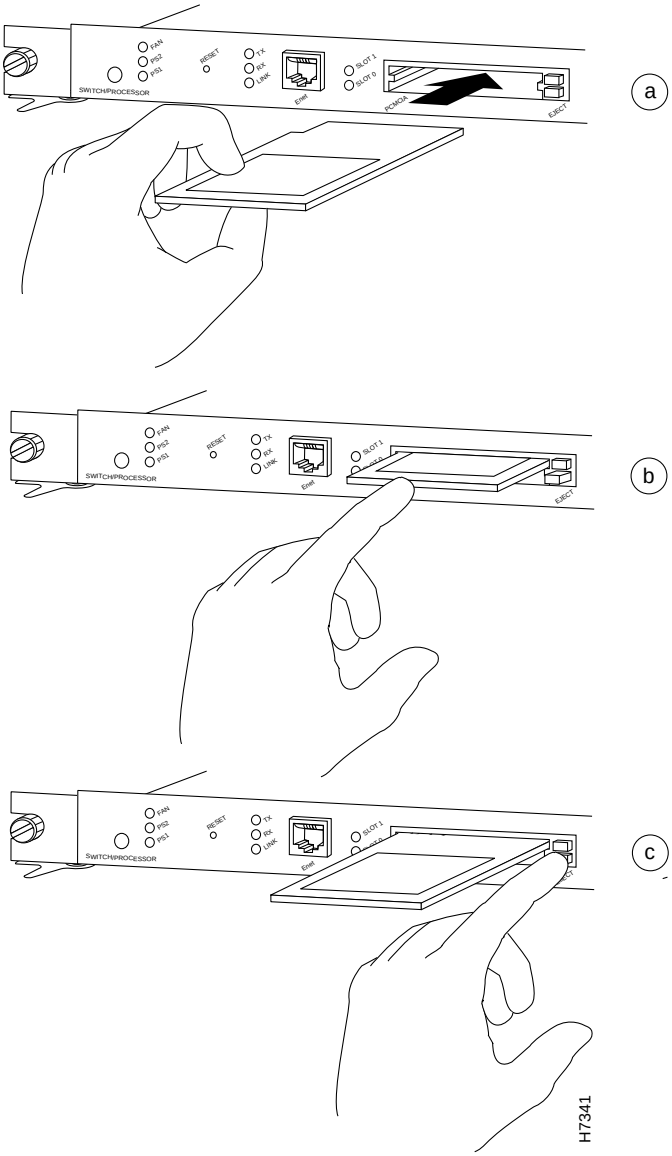
Note The Flash memory card can be inserted and removed with the power on.

Following is the procedure for installing and removing a Flash memory card:

Step 1 Face the front panel of the ASP, which should appear as shown in Figure 1 and hold the Flash memory card with the connector end of the card toward the slot. The label should face up as shown in Figure 2–a.

Note The Flash memory card is keyed and cannot be seated the wrong way. The eject button will not pop out if the card is not properly inserted.

Figure 2 Installing and Removing a Flash Memory Card



Step 2 Insert the card into the appropriate slot until the card completely seats in the connector at the back of the slot and the eject button pops out toward you (see Figure 2–b). Note that the card does not insert all the way inside the ASP; a portion of the card remains outside of the slot. *Do not attempt to force the card past this point.*

Step 3 To eject the card, press the appropriate ejector button until the card is free of the connector at the back of the slot. See Figure 2–c.

Step 4 Remove the card from the slot and place it in an antistatic bag to protect it.

Formatting a Flash Memory Card

Before you can use a new Flash memory card, you must format it.

Note The following procedure assumes you have already booted your switch.

Caution The formatting procedure erases all information on the Flash memory card. To prevent the loss of important data that might be stored on a Flash memory card, proceed carefully. If you want to save the data on a Flash memory card, copy the data to a server before you reformat the card.

A Flash memory card that is shipped as part of a LightStream 1010 ATM Switch contains an image. A *spare* Flash memory card must be formatted before use.

Use the following procedure to format a new Flash memory card:

Step 1 Using the procedures in an earlier section, "Installing and Removing the Flash Memory Card in an ASP," insert the Flash memory card into slot 0. (If slot 0 is not available, use slot 1.)

Step 2 To format the Flash memory card, use the **format slot0:** (or **format slot1:**) command as follows. (Use only Intel Series 2+ Flash memory cards.)

```
Switch# format slot0:
All sectors will be erased, proceed? [confirm]
Enter volume id (up to 30 characters): MyNewCard
Formatting sector 1
Format device slot0 completed
Switch#
```

Note For this example, an 8-MB Flash memory card was used, and at the line "Formatting sector," the system counted the card's sectors backwards from 64 to 1 as it formatted them. For 16-MB Flash memory cards, the system counts backwards from 128 to 1, and for 20-MB Flash memory cards, the system counts backwards from 160 to 1.

The new Flash memory card is now formatted and ready to use.

Note For complete command descriptions and configuration information, refer to the appropriate configuration publications listed in the section "If You Need More Information" on page 10.

Copying an Image into a Flash Memory Card

With the Flash memory card formatted, you can now copy an image into it. The following procedure assumes the following:

- You have an ASP with a good image in the onboard Flash so you can start the switch.
- The bootable image you want to copy to the Flash memory card exists on a TFTP server to which you have access (meaning you know its name and have connectivity to it), and at least one interface is available over which you can access this server.
- You know the filename of the image you want to copy into the Flash memory card.

Following is the procedure for copying a file (called *ls1010-wp-mz.111-3.018*) into the Flash memory card:

Step 1 Boot the switch and allow it to initialize.

Step 2 If the Flash memory card is unformatted or has been formatted on another switch, format it using the procedure in the section “Formatting a Flash Memory Card” on page 5.

Step 3 To copy the image *ls1010-wp-mz.111-3.018* to the Flash memory card, use the following command series:

```
Switch> enable
Password:
Switch#dir
-#- -length- -----date/time------ name
1   5393     May 03 1996 15:32:57 startup-config
2   1814648  Jul 15 1996 10:29:34 ls1010-wp-mz.111-3.005

4248452 bytes available (3746940 bytes used)
Switch#copy tftp ls1010-wp-mz.111-3.018
Enter source file name: ls1010-wp-mz.111-3.018
4248324 bytes available on device slot0, proceed? [confirm]y
Address or name of remote host [255.255.255.255]? dirt
Translating "dirt"...domain server (171.69.2.132) [OK]

Accessing file "ls1010-wp-mz.111-3.018" on dirt.cisco.com ...FOUND
Loading ls1010-wp-mz.111-3.018 from 171.69.1.129 (via Ethernet2/0/0): !!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 1819888/3639296 bytes]
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
Switch#dir
-#- -length- -----date/time------ name
1   5393     May 03 1996 15:32:57 startup-config
2   1814648  Jul 15 1996 10:29:34 ls1010-wp-mz.111-3.005
3   1819888  Aug 20 1996 15:22:21 ls1010-wp-mz.111-3.018

2428436 bytes available (5566956 bytes used)
Switch#
```

Note In the preceding example, the exclamation points (!!!) appear as the file is downloaded, and the “C” characters signify calculation of the checksum, which is a verification that the file has been correctly downloaded to the Flash memory card.

Making the Flash Memory Card Image Bootable

Use the following series of commands to make the image (the file named *new.image*) bootable. Note that, since the configuration register must be set to 0x2102, the **config-register** command is part of the sequence.

```
Switch# config terminal
Switch(config)# no boot system
Switch(config)# boot system flash slot0:new.image
Switch(config)# config-register 0x2102
Crtl-z
Switch# copy running-config startup-config
Switch# reload
```

When the system reloads it will boot the image *new.image* from the Flash memory card in slot 0.

Note For more details about the **boot system flash** command, refer to "Enabling Booting from Flash Memory" or "Enabling Booting from Flash Memory on an RP."

Copying Bootable Images between Flash Memory Cards

As future releases of Cisco IOS images become available, you will receive these images either as a file booted from a network server, a file on floppy disk, or a file on a Flash memory card.

The following scenario describes how to use a newly released image on a Flash memory card in a system that has an older image on a Flash memory card in slot 0 and a default boot image in the onboard Flash SIMM.

For this scenario, the filenames are as follows:

- The new image on the new Flash memory card in slot 1 is *image.new.*
- The old image in the Flash memory card in slot 0 is *image.old*.
- The bootable image in onboard Flash memory is *image.boot*.

You will copy the new image from the new Flash memory card onto the Flash memory card that contains the old image.

Note The scenario assumes that the new image will fit on the Flash memory card in slot 0, alongside the old image. If there is not enough available space, use the **delete** command to delete files from the Flash memory card to make sufficient room for the new image; however, *do not* delete the *image.old* file. Then use the **squeeze** command to remove these deleted files from the Flash memory card. If, after you have deleted files and used the **squeeze** command, the two files cannot coexist on the Flash memory card in slot 0, remove this card (place it in an anti-static bag and store it in a safe place), then insert the new Flash memory card (with the file *image.new*) in slot 0. Proceed to Step 5 and use the command **boot system slot0:image.new** to designate the file *image.new* as the default boot image.

Step 1 Boot the switch. By default, the file *image.boot* will be used.

Step 2 Enable the switch as follows:

```
Switch> enable
Password:
Switch#
```

Step 3 Insert the new Flash memory card in slot 1.

Step 4 Use the following command to copy the file *image.new* in slot 1, to the Flash memory card in slot 0, *only if* there is enough memory space for the two images to coexist.

```
Switch# copy slot1:image.new slot0:image.new
```

Note The previous command can also be entered as **copy slot1:image.new slot0:**.

Step 5 Use the following series of commands to designate the file *image.new* (which is in the Flash memory card in slot 0) as the default boot image:

```
Switch# configure terminal
Switch(config)# no boot system
Switch(config)# boot system flash slot0:image.new
Crtl-z
Switch# copy running-config startup-config
Switch# reload
```

When the system reloads, it will boot the file *image.new* from the Flash memory card in slot 0.

Enabling Booting from Flash Memory

To enable booting from Flash memory, set configuration register bits 3, 2, 1, and 0 to a value between 2 and 15 in conjunction with the **boot system [device]:***[filename]* configuration command.

Following are definitions of the various Flash memory-related **boot** commands:

boot system slot0:[*filename*] **—**Boots the file named on the Flash memory card in slot 0

boot system slot1:[*filename*] **—**Boots the file named on the Flash memory card in slot 1

To enter configuration mode and specify a Flash memory filename in the PCMCIA slot from which to boot, enter the **configure terminal** command at the enable prompt, as follows:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CTRL-Z.
Switch(config)# boot system flash slot0:myfile
```

To disable Break and enable the **boot system slot0:** command, enter the **config-register** command with the value shown in the following example:

```
Switch(config)# config-reg 0x2102

To exit configuration mode, enter Cntl-Z as follows:
Crtl-z
Switch#
```

To save the new configuration to memory, use the **copy running-config startup-config** command as follows:

```
Switch# copy running-config startup-config
```

When you enter **boot** commands, pay attention to the use of the space bar, which influences the way the switch interprets the command. For example, notice the difference in the following commands:

```
Switch(config)# boot system flash slot0:myfile (correct command)
Switch(config)# boot system flash slot0: myfile (incorrect command)
```

In the first case, the switch boots the file specified (*myfile*). In the second case, the switch finds the *filename* field blank and boots the first file on the Flash memory card.

Flash Memory File System Commands

Following are additional commands related to the Flash memory in the single in-line memory module (SIMM) on the ASP (called *bootflash*) and in PCMCIA cards. (The following example assumes you are currently in bootflash.) You can determine which file system device you are accessing using the **pwd** command as follows:

```
Switch#pwd
bootflash
```

You can move between Flash memory media using the **cd** [**bootflash** | **slot0** | **slot1**] command as follows:

```
Switch#cd slot0:
Switch#pwd
slot0
Switch#
```

You can list the directory of any Flash memory media using the **dir** [**bootflash** | **slot0** | **slot1**] command as follows:

```
Switch#dir
-#- -length- -----date/time------ name
1   5393     May 03 1996 15:32:57 startup-config
2   1814648  Jul 15 1996 10:29:34 ls1010-wp-mz.111-3.005
3   1819888  Aug 20 1996 15:22:21 ls1010-wp-mz.111-3.018

2428436 bytes available (5566956 bytes used)
Switch#
```

You can delete a file from any Flash memory media using the **delete** command as follows:

```
Switch#delete ls1010-wp-mz.111-3.005
Switch#dir
-#- -length- -----date/time------ name
1   5393     May 03 1996 15:32:57 startup-config
3   1819888  Aug 20 1996 15:22:21 ls1010-wp-mz.111-3.018

2428436 bytes available (5566956 bytes used)
Switch#
```

To verify that the **delete** command was successful, use the **dir/all/long** command.

Note Files that are deleted are simply marked as deleted, but still occupy space in Flash memory. To remove them, use the **squeeze** command.

The **squeeze** command permanently removes files, which are marked as deleted, and pushes all other undeleted files together to eliminate spaces between them.

Following is the syntax of the squeeze command:

```
Switch# squeeze slot0:
All deleted files will be removed, proceed? [confirm]y
Squeeze operation may take a while, proceed? [confirm]yebESESESESESESESESESESESE
SESESZ
Switch#dir
-#- -length- -----date/time------ name
1   5393     May 03 1996 15:32:57 startup-config
2   1819888  Aug 20 1996 15:22:21 ls1010-wp-mz.111-3.018

6169852 bytes available (1825540 bytes used)
Switch#
```

To prevent loss of data due to sudden power loss, the "squeezed" data is temporarily saved to another location of Flash memory, which is specially used by the system.

In the preceding command display output, the character "e" means this special location has been erased (which must be performed before any write operation). The character "b" means that the data that is about to be written to this special location has been temporarily copied. The character "E" signifies that the sector which was temporarily occupied by the data has been erased. The character "S" signifies that the data was written to its permanent location in Flash memory.

The **squeeze** command operation keeps a log of which of these functions has been performed so upon sudden power failure, it can come back to the right place and continue with the process. The character "Z" means this log was erased after the successful **squeeze** command operation.

Recovering from Locked Blocks

A locked block of Flash memory occurs when power is lost or a Flash memory card is unplugged during a write or erase operation. When a block of Flash memory is locked, it cannot be written to or erased, and the operation will consistently fail at a particular block location. The only way to recover from locked blocks is by reformatting the Flash memory card with the **format** command.

Caution Formatting a Flash memory card to recover from locked blocks will cause existing data to be lost.

Note For complete command descriptions and configuration information, refer to the LightStream 1010 ATM Switch *Command Reference* publication and the *LightStream 1010 ATM Switch Software Configuration Guide*.

If You Need More Information

The Cisco Internetwork Operating System (Cisco IOS) software running the LightStream 1010 ATM switch contains extensive features and functionality. The effective use of many of many of these features is easier if you have more information at hand.

To obtain general information about documentation, call Customer Service at 800 553-6387 or 408 526-7208. Customer Service hours are 5:00 a.m. to 6:00 p.m. Pacific time, Monday through Friday (excluding company holidays). You can also send e-mail to `cs-rep@cisco.com`. You can also refer to the *Cisco Information Packet* that shipped with your switch.

For additional information on configuring the LightStream 1010 ATM switch, the following documentation resources are available to you:

- Cisco Connection Documentation, Enterprise Series CD

  This publication and all other Cisco Systems publications are available on UniverCD, which is Cisco's online library of product information. UniverCD is updated and shipped monthly, so it might be more up to date than printed documentation. To order UniverCD, contact a Cisco Sales or Customer Service representative.

- For systems with Cisco IOS for the LightStream 1010 ATM switch Release 11.1(1) or later, refer to the following publications:

  — *LightStream 1010 ATM Switch User Guide*

  — *LightStream 1010 ATM Switch Software Configuration Guide*

  — *LightStream 1010 ATM Switch Command Reference*

Cisco Connection Online

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You can access CCO in the following ways:

- WWW: http://www.cisco.com.
- WWW: http://www-europe.cisco.com.
- WWW: http://www-china.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, LightStream 1010 ATM Switch Software Configuration,* and *LightStream 1010 ATM Switch Command Reference* publications.

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