Cisco ONS 15540 ESPx Software Upgrade Guide

This document describes how to upgrade system images and functional images on the Cisco ONS 15540 ESPx. This document includes the following sections:

Accessing and Displaying File System Devices

The active processor can read, write, and format files on both the active and standby processor cards. To access devices on the standby processor card from the active processor card, add the prefix "sby-" to the device name.

To display the contents of a file system directory and copy files, use the following commands at the active processor CLI (command-line interface):

Command	Purpose
dir [*fs-name*]	Displays the contents of a file system directory.
copy *fs-name1*[*filename1*] *fs-name2*[*filename2*]	Copies files from one file system to another.

Examples

The following example shows the file system devices accessible from the active processor card:

```
Switch# dir ?
  /all           List all files
  bootflash:     Directory or file name
  disk0:         Directory or file name
  disk1:         Directory or file name
  flash:         Directory or file name
  null:          Directory or file name
  nvram:         Directory or file name
  sby-bootflash: Directory or file name
  sby-disk0:     Directory or file name
  sby-disk1:     Directory or file name
  sby-nvram:     Directory or file name
  sby-slot0:     Directory or file name
  sby-slot1:     Directory or file name
  slot0:         Directory or file name
  slot1:         Directory or file name
  system:        Directory or file name
  <cr>
```

The following example shows how to copy a file from a file system device on the active processor card to a file system device on the standby processor:

```
Switch# copy slot0:ons15540-i-mz.1 sby-slot0:ons15540-i-mx.1
```

The following example shows the contents of the standby processor card bootflash directory listed on a terminal accessing the active processor card:

```
Switch# dir sby-bootflash:
Directory of sby-bootflash:/

    1  -rw-         772   May 29 2001 11:28:51  running-
    2  -rw-     2452192   May 29 2001 11:27:34 ons15540-i-mz.1
```

Using Flash PC Cards

This section describes how to use Flash PC Cards to copy system images and make standard configurations. Flash PC Cards are a type of Flash memory that provide expanded file storage for your Cisco ONS 15540 ESPx. Flash PC Cards, unlike the onboard Flash memory SIMM (bootflash), are not required for the operation of the system.

Flash PC Cards store a copy of the system image. The following sections describe how to format, delete, configure, and copy files between the onboard Flash memory SIMM (Single In-Line Memory Module), network servers, and Flash PC Cards.

Formatting Flash PC Cards

A newly purchased Flash PC Card is blank and must be formatted before use.

⚠
Caution The formatting procedure erases all information on the Flash PC Card.

After inserting the Flash PC Card in either slot 0 or slot 1, format it using the following privileged EXEC command:

Command	Purpose
format slot*n***:**	Formats the Flash PC Card in the specified slot.

Example

The following example shows how to format a Flash PC Card in slot 0 and name it "NewPCcard":

```
Switch# format slot0:
Format operation may take a while. Continue? [confirm] y
Enter volume ID (up to 30 characters): NewPCcard
Formatting sector 1
Format device slot0 completed
```

Note For more information on inserting a Flash PC Card, refer to the *Cisco ONS 15540 ESPx Hardware Installation Guide*.

Copying the Startup Configuration Files to a Flash PC Card

To copy the startup configuration file from NVRAM to a Flash PC Card once the Flash PC Card is formatted and ready to use, use the following privileged EXEC command:

Command	Purpose
copy nvram:startup-config slot*n***:**	Copies the startup-config file from NVRAM to the Flash PC Card in the specified location.

Example

The following example shows how to copy the startup configuration file to the Flash PC Card in slot 0; the default filename is used:

```
Switch# copy nvram:startup-config slot0:
Destination filename [startup-config]? y
386 bytes copied in 0.268 secs
Switch#
```

Copying Files from One Flash PC Card to Another

On platforms with multiple Flash memory file systems, you can copy files from one Flash memory file system, such as internal Flash memory or a Flash PC Card, to another Flash memory file system. Copying files to different Flash memory file systems lets you create backup copies of working configurations, duplicate configurations for other devices, and make copies of system images.

The following example describes how to copy a new system image from a Flash PC Card in slot 1 to a Flash PC Card in slot 0 that contains an old system image. This system also has a default boot image on the onboard Flash memory. Before you start, insert Flash PC Cards in both slot 0 and slot 1.

Tips Make sure that the new system image file fits on the Flash PC Card in slot 0 along with the old system image file.

To copy the new system image file from the new Flash PC Card in slot 1 to the Flash PC Card in slot 0 that contains the old system image file, enter this command from privileged EXEC mode:

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

Viewing the Contents of Flash Memory

This section describes commands you can use with the onboard Flash memory SIMM (bootflash) and Flash PC Cards.

Determining the Current File System Device

To determine which file system device you are accessing, use the **pwd** (print working directory) command, as shown in the following example:

```
Switch# pwd
bootflash:/
```

Moving Between Flash Memory Media

To move between Flash memory media, use the **cd** command, as shown in the following example:

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

Listing the Flash Memory Directory Contents

To list the directory contents of any Flash memory media, use the **show** command, as shown in the following example:

```
Switch# show slot0:
Directory of slot0:/

    1 -rw-     2438216    May 21 2001 11:44:35   ons15540-i-mz.1
    2 -rw-     2426828    May 23 2001 16:02:49   ons15540-i-mz.2
```

Deleting Files from Flash Memory

When you delete a file from Flash memory, the system marks the file as deleted, allowing you to later recover a deleted file using the **undelete** command. Erased files cannot be recovered. To permanently erase the configuration file, use the **squeeze** command.

The **squeeze** command permanently removes files marked for deletion, and pushes all the other undeleted files together to eliminate spaces between them. To prevent data loss due to sudden power loss, the "squeezed" data is temporarily saved to another location in Flash memory. The **squeeze** command keeps a log of the functions performed so that if a power failure occurs, the system continues the process when the power resumes.

⚠️
Caution   When deleting files from memory, be careful not to delete all the system images. If you delete all existing system images, you can no longer boot the system from local memory.

For an example of using the **delete** and **squeeze** commands, see the "Copying System Images to the Cisco ONS 15540 ESPx" section on page 11.

Copying a System Image from a TFTP Server to a Flash Memory

You can copy system image files from a TFTP server to Flash memory for use in booting the Cisco ONS 15540 ESPx or for backup purposes when you boot from internal Flash memory. If the system image on internal Flash memory becomes corrupted, you can replace the system software by copying the backup system image from the Flash PC card to the onboard Flash memory.

To copy the system software image from a TFTP server, perform the following steps:

	Command	Purpose
Step 1	Switch# **dir** {**bootflash:** | **slot***n***:**}	Displays the contents of the specified Flash memory device, including the amount of free space that is available.
		If enough free space is available, skip to Step 4
Step 2	Switch# **delete** {**bootflash:***filename* | **slot***n***:***filename*}	Deletes an old file to make remove for the new file.
Step 3	Switch# **squeeze** {**bootflash:** | **slot***n***:**}	Recovers the space on the Flash memory device.
Step 4	Switch# **copy tftp:** {**bootflash:** | **slot***n***:**}	Copies a file from a TFTP server to a Flash memory device.

Example

The following example shows how to copy a system image file from the default TFTP server to the Flash PC Card in slot 0:

```
Switch# copy tftp: slot0:
Address or name of remote host []? 172.68.16.129
Source filename []? ons15540-i-mz
Destination filename [ons15540-i-mz]? y
```

Booting from a Flash PC Card

The Cisco ONS 15540 ESPx can be booted, automatically or manually, from a variety of sources, including a network server or Flash memory device. This section describes how to configure the Cisco ONS 15540 ESPx to boot automatically from an system image on a Flash PC Card. For an example of configuring the system to boot manually from a Flash PC Card, see the "Upgrading System Images" section on page 11.

To enable booting from a Flash PC Card, perform the following steps:

	Command	Purpose
Step 1	Switch# **configure terminal** Switch(config)#	Enters global configuration mode.
Step 2	Switch(config)# **no boot system**	Disables booting from bootflash.
Step 3	Switch(config)# **boot system flash** [*flash-fs***:**][*partition-number***:**][*filename*]	Enables booting from the specified system image on the specified Flash file system.
Step 4	Switch(config)# **config-register 0x2102**	Sets the configuration register for automatic booting.[1]
Step 5	Switch(config)# **end** Switch#	Exits global configuration mode.
Step 6	Switch# **copy system:running-config nvram:startup-config**	Saves the configuration to NVRAM.
Step 7	Switch# **reload**	Reboots the system.

1. This is the default configuration register setting. For details on using the configuration register to set boot parameters, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide*.

When you enter **boot system** commands, be careful not to insert extra spaces because they influence the way the system interprets the command. Notice the difference in the following examples:

Examples

The following command correctly instructs the system to boot the *image1* file.

```
Switch(config)# boot system flash slot0:image1
```

The following command incorrectly contains a space between "slot0:" and "image2." The system finds the *filename* field blank and so boots the first file on the Flash PC Card.

```
Switch(config)# boot system flash slot0: image2
```

Accessing System Images on TFTP Servers

For ease of management, the Cisco ONS 15540 ESPx can access TFTP servers for booting and archiving purposes. This sections describes how to access system images on a TFTP server.

Booting from a TFTP Server

This section describes how to configure the Cisco ONS 15540 ESPx to boot a system image located on a TFTP server. To boot the standby processor card with an image located on a TFTP server, you must configure the fastethernet-sby 0 interface with a unique IP address on a subnet separate from the subnet used by the fastethernet 0 interface. This configuration prevents conflicts with the fastethernet 0 interface on the active processor card.

Note   The IP address and subnet mask must be different from the IP address and subnet mask for the fastethernet 0 interface on the active processor

To configure booting of a system image located on a TFTP server, perform the following steps:

	Command	Purpose
Step 1	Switch# **configure terminal** Switch(config)#	Enters global configuration mode.
Step 2	Switch(config)# **config-register 0x2102** or Switch(config)# **config-register 0x0**	Sets the configuration register for automatic booting.[1] Sets the configuration register for manual booting.
Step 3	Switch(config)# **boot system tftp** *filename* [*ip-address*]	Enables booting a system image located on a TFTP server for automatic booting.
Step 4	Switch(config)# **interface fastethernet 0** Switch(config-if)#	Enters interface configuration mode for interface fastethernet 0, the NME interface on the active processor card.
Step 5	Switch(config-if)# **ip address** *ip-address subnet-mask*	Specifies the IP address and IP subnet mask for the active NME interface.
Step 6	Switch(config-if)# **speed** {**10**	**100**	**auto**}	Specifies the transmission speed. The default is **auto** (autonegotiation).
Step 7	Switch(config-if)# **duplex** {**auto**	**full**	**half**}	Specifies the duplex mode. The default is **auto** (autonegotiation).
Step 8	Switch(config-if)# **exit** Switch(config)#	Exits interface configuration mode and returns to global configuration mode.
Step 9	Switch(config)# **interface fastethernet-sby 0** Switch(config-if)#	Enters interface configuration mode for interface fastethernet-sby 0, the NME interface on the standby processor card.
Step 10	Switch(config-if)# **ip address** *ip-address subnet-mask*	Specifies the IP address and IP subnet mask for the standby NME interface. **Note** The IP address and subnet mask must be different from the IP address and subnet mask for the NME interface on the active processor.
Step 11	Switch(config-if)# **speed** {**10**	**100**	**auto**}	Specifies the transmission speed. The default is **auto** (autonegotiation). **Note** The speed must be the same as the speed configured on the NME interface on the active processor card for processor switchovers to succeed.
Step 12	Switch(config-if)# **duplex** {**auto**	**full**	**half**}	Specifies the duplex mode. The default is **auto** (autonegotiation). **Note** The duplex mode must be the same as the duplex mode configured on the NME interface on the active processor card for processor switchovers to succeed.
Step 13	Switch(config-if)# **end** Switch#	Exits interface configuration mode.

	Command	Purpose
Step 14	Switch# **copy system:running-config nvram:startup-config**	Saves the configuration to NVRAM.
Step 15	Switch# **reload**	Reboots the system.

1. This is the default configuration register setting. For details on using the configuration register to set boot parameters, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide*.

Note You cannot use the IP address on the fastethernet-sby 0 interface for Telnet sessions or for network management system sessions.

For more information on booting system images, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide*.
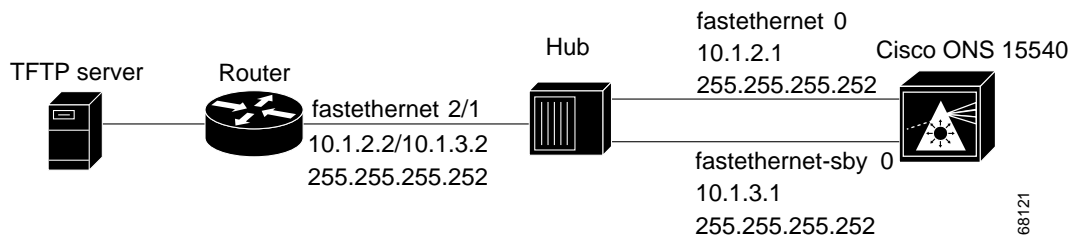
Examples

The following example shows how to configure the Cisco ONS 15540 ESPx to automatically boot using a system image located on a TFTP server.

```
Switch> enable
Switch# configure terminal
Switch(config)# boot system tftp ons15540-i-mz.1 172.20.51.30
Switch(config)# config-register 0x2102
Switch(config)# interface fastEthernet 0
Switch(config-if)# ip address 172.20.42.105 255.255.255.252
Switch(config-if)# speed 100
Switch(config-if)# duplex full
Switch(config-if)# exit
Switch(config)# interface fastEthernet-sby 0
Switch(config-if)# ip address 172.20.42.106 255.255.255.252
Switch(config-if)# speed 100
Switch(config-if)# duplex full
Switch(config-if)# end
Switch# copy system:running-config nvram:startup-config
Switch# reboot
```

Figure 0-1 shows a simple network configuration with a TFTP server, a router, a hub, and a Cisco ONS 15540 ESPx.

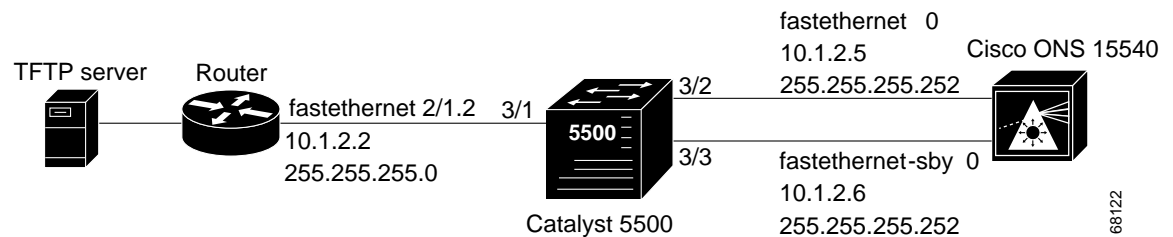*Figure 0-1   Example Network with TFTP Server, Router, Hub, and Cisco ONS 15540 ESPx*

The following example shows how to configure the network example shown in Figure 0-1.

```
router(config)# interface fastethernet2/1
router(config-if)# ip address 10.1.2.2 255.255.255.252
router(config-if)# ip address 10.1.3.2 255.255.255.252 secondary

ons15540(config)# interface fastethernet 0
ons15540(config-if)# ip address 10.1.2.1 255.255.255.252
ons15540(config-if)# exit
ons15540(config)# interface fastethernet-sby 0
ons15540(config-if)# ip address 10.1.3.1 255.255.255.252
```

Figure 1 shows a simple network configuration with a TFTP server, a router, a Catalyst 5500, and a Cisco ONS 15540 ESPx.

Figure 1   *Example Network with TFTP Server, Router, Catalyst 5500, Cisco ONS 15540 ESPx, and VLAN Trunk*

The following example shows how to configure the network example shown in Figure 1 with a VLAN trunk.

```
router(config)# interface fastethernet2/1.2
router(config-subif)# encapsulation isl 2
router(config-subif)# ip address 10.1.2.2 255.255.255.0

Cat5500> (enable) set vtp domain Corporate
Cat5500> (enable) set vtp mode server
Cat5500> (enable) set vlan 2
Cat5500> (enable) set vlan 2 3/2
Cat5500> (enable) set vlan 2 3/3
Cat5500> (enable) set trunk 3/1 on

ons15540(config)# interface fastethernet 0
ons15540(config-if)# ip address 10.1.2.5 255.255.255.252
ons15540(config-if)# exit
ons15540(config)# interface fastethernet-sby 0
ons15540(config-if)# ip address 10.1.2.6 255.255.255.252
```

Figure 1-2 shows a simple network configuration with a TFTP server, a router, a Catalyst 5500, and a Cisco ONS 15540 ESPx.

Figure 1-2   Example Network with TFTP Server, Router, Catalyst 5500, Cisco ONS 15540 ESPx, and VLAN

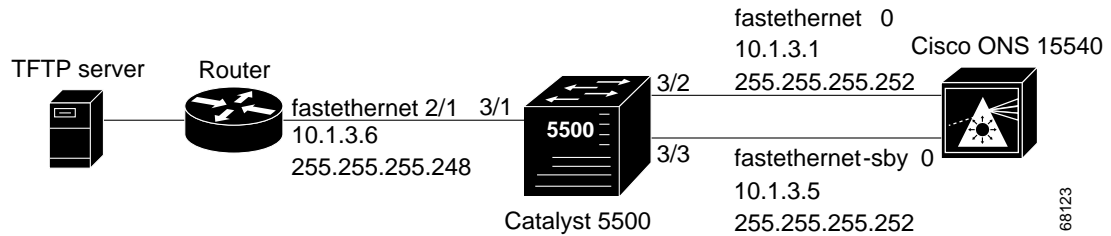The following example shows how to configure the network example shown in Figure 1-2 with a VLAN.

```
router(config)# interface fastethernet2/1
router(config-if)# ip address 10.1.3.6 255.255.255.248

Cat5500> (enable) set vlan 2
Cat5500> (enable) set vlan 2 3/1
Cat5500> (enable) set vlan 2 3/2
Cat5500> (enable) set vlan 2 3/3

ons15540(config)# interface fastethernet 0
ons15540(config-if)# ip address 10.1.3.1 255.255.255.252
ons15540(config-if)# exit
ons15540(config)# interface fastethernet-sby 0
ons15540(config-if)# ip address 10.1.3.5 255.255.255.252
```

Backing Up a System Image to a TFTP Server

To create a backup copy of your system image, or to verify that the copy in Flash memory is the same as the original file on disk, you can copy system images from Flash memory to a TFTP (Trivial File Transfer Protocol) server.

In some implementations of TFTP, you must create a dummy file on the TFTP server and give it read, write, and execute permissions before copying the file over it. Refer to your TFTP documentation for more information.

Before you copy software between the network server and Flash memory in the router, do the following:

• Make sure you have access to the network server, and obtain its IP address and name.

• Verify that the server has sufficient room to accommodate the Cisco IOS system image.

• Check the filename requirements and file space of the network server.

• Create a dummy file on the server with read-write-execute permission. You will copy the system image to this file.

To create a backup of the system software on a TFTP server, perform the following steps:

	Command	Purpose
Step 1	Switch# **show slot**_n_**:**	Displays the contents of the specified Flash memory device, including the names of the system images that currently reside there.
		Note the name of the system image file you want to copy.
Step 2	Switch# **copy slot**_n_**: tftp:**	Copies a file from a Flash memory device to a TFTP server.

Example

The following example shows how to copy a specified system image file from the current Flash memory device to the default TFTP server:

```
Switch# copy slot0: tftp:
Address or name of remote host []? 172.68.16.129
Source filename [] ons15540-i-mz
Destination filename [ons15540-i-mz]? y
```

Upgrading System Images

This section provides minimal instructions for upgrading system images on your Cisco ONS 15540 ESPx. The default system configuration causes the system to boot automatically from the system image specified in the BOOT environment variable. This procedure also describes now to update and manually boot the system from a system image on a Flash PC Card. For additional information on booting options and maintaining system images, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide*.

Downloading System Images from Cisco.com

Cisco IOS system images, along with other software, are available from the Software Center on Cisco.com at http://www.cisco.com. You can download system images from Cisco.com using your browser's FTP capability, using conventional FTP, or using Cisco.com asynchronous dial-up interface.

For instructions on accessing and downloading software from Cisco.com, refer to the document "Using the Software Center" at the Software Center on Cisco.com.

Copying System Images to the Cisco ONS 15540 ESPx

You can copy the system image to the Cisco ONS 15540 ESPx using either TFTP, FTP, or RCP. If the system you used to download the system image from Cisco.com does not function as a TFTP, FTP, or RCP server, you must first copy the file to an intermediate server that provides those services to your system.

Note Before copying the system image from the server to the system, check the size of the file to make sure you have enough room for it on the Flash memory device. On UNIX file systems, use the **ls -la** command from the directory where the file is stored to display the file size.

> **Note** Be sure that you have a properly formatted Flash PC Card in the appropriate slot before beginning this procedure.

To copy the system image from a TFTP server to the Flash PC Card, initiate a Telnet session or console connection to the system and perform the following steps in privileged EXEC mode:

	Command	Purpose
Step 1	Switch# **dir** *filesystem***:**	Displays the contents and available space on the Flash memory device. If there is not enough free space to copy the new system image, perform Steps 2 and 3. Otherwise, proceed to Step 4.
Step 2	Switch# **delete** *filesystem***:***filename*	Marks a file as deleted. If you have older system images stored on the file system, we recommend that you delete the oldest one and leave a newer one in case you need to revert.
Step 3	Switch# **squeeze** *filesystem***:**	Recovers the space from the files marked as deleted.
Step 4	Switch# **copy tftp:** *filesystem***:**	Initiates a TFTP session to copy the system image from the TFTP server. The system prompts you for a TFTP server name and filename.
Step 5	Switch# **dir** *filesystem***:**	Displays the contents of the file system. This step confirms that the file was copied as expected.

Example

The following example shows how to delete a file from the Flash PC Card in slot 0 on the system and copy a new system image to it using TFTP:

```
Switch# dir slot0:
Directory of slot0:/
    1 -rw-     2538248  Dec 05 2001 01:42:30  ons15540-i-mz.121-7a.EY2.bin

20578304 bytes total (18040056 bytes free)
Switch# delete slot0:ons15540-i-mz.121-7a.EY2.bin
Delete filename [ons15540-i-mz.121-7a.EY2.bin]? y
Delete slot0:ons15540-i-mz.121-7a.EY2 [confirm] y
Switch# squeeze slot0:
All deleted files will be removed, proceed? [confirm] y
Squeeze operation may take a while, proceed? [confirm] y
Erasomg squeeze log . . . . . . . . . . . . . . .
Switch# copy tftp: slot0:
Address or name of remote host [] mocha
Source filename [] joe/ons15540-i-mz
Destination filename [ons15540-i-mz]
Switch# dir slot0:
Directory of slot0:/


20530200 bytes total (20530200 bytes free)
```

> **Note** Be sure that the file size is the same after it was copied as it is on the server.

Manually Booting the Cisco ONS 15540 ESPx

When the configuration register is set for manual booting, issuing the **reload** command causes the system to enter ROM monitor mode, where you enter the **boot** command and the name of the system image to use. To perform this procedure, you must be connected to the console port, which provides access to a system in ROM monitor mode. For automatic booting you can issue the **reload** command from an Ethernet connection to the processor.

Note This procedure assumes that you need to change the boot field in the configuration register from its default value so that the system reverts to ROM monitor mode when the **reload** command is issued.

To reload the Cisco ONS 15540 ESPx with the new system image on the Flash PC Card, perform the following steps, beginning in global configuration mode:

	Command	Purpose
Step 1	Switch(config)# **config-register 0x0**	Sets the configuration register for manual booting from ROM monitor mode.[1]
Step 2	Switch(config)# **end** Switch#	Returns to privileged EXEC mode.
Step 3	Switch# **copy system:running-config nvram:startup-config**	Saves your configuration changes to NVRAM.
Step 4	Switch# **reload**	Initiates a reload of the system software. The system prompts you to save the modified configuration before you can proceed. You then enter ROM monitor mode.
Step 5	rommon 1> **dir** *filesystem***:**	Displays the contents of the file system. Perform this optional step to display and copy the name of the system image to the clipboard for use in the next step.
Step 6	rommon 2> **boot** *filesystem***:***filename*	Reboots the system with the new system image. You can paste the filename from the clipboard if you copied it in the previous step.
Step 7	Switch> **show version**	Displays the system software version information. Use this step to confirm that the system is loaded with the expected software version.

1. For details on using the configuration register to set boot parameters, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide*.

Example

The following example shows how to set the configuration register, save the configuration, and reload the Cisco ONS 15540 ESPx with the new system image on the Flash PC Card in slot 0:

```
Switch(config)# config-register 0x0
Switch(config)# end
Switch# copy system:running-config nvram:startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Switch# reload
System configuration has been modified. Save? [yes/no]: y
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
Proceed with reload? [confirm]
rommon 1> dir slot0:
Directory of slot0:/


20530200 bytes total (6270284 bytes free)
rommon 2> boot slot0:ons15540-i-mz

<The system boots.>

Switch# show version
Cisco Internetwork Operating System Software
IOS (tm) ONS-15540 Software (ONS15540-I-M)
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Wed 15-Aug-01 13:32 by jko
Image text-base: 0x60010950, data-base: 0x60630000

ROM: System Bootstrap, Version 12.1(20010726:234219) [ffrazer-lh4 102], DEVELOPMENT
SOFTWARE

man1 uptime is 14 hours, 59 minutes
System returned to ROM by reload
System image file is "slot0:ons15540-i-mz"

cisco ONS15540 (QUEENS-CPU) processor with 98304K/32768K bytes of memory.
R7000 CPU at 234Mhz, Implementation 39, Rev 2.1, 256KB L2, 2048KB L3 Cache

Last reset from power-on
2 FastEthernet/IEEE 802.3 interface(s)
509K bytes of non-volatile configuration memory.

16384K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

Updating System Images on Redundant Processors

The Cisco ONS 15540 ESPx supports software upgrades and downgrades with no interruption of data traffic. You can enter all commands from the currently active processor console connection or Telnet session.

The following upgrade procedures allow you to qualify a new image on one processor card while optionally keeping an older trusted image on the redundant peer processor card.

⚠️

Caution   If you are upgrading or downgrading with system images that differ by more than one major release, the standby processor card might not reach the hot-standby state. If a switchover occurs while not in the hot-standby state, there is a risk of loss of the configuration. If the processor cannot reach the hot-standby state, use the procedure described in the "Updating with Non-Hot-Standby Compatible System Images" section on page 17.

Updating with Hot-Standby Compatible System Images

The following procedure describes how to copy a new hot-standby compatible system image from the network to the bootflash device.

Step 1   Verify that the system is configured with the default auto-boot configuration, automatic synchronization enabled for both the running-config and startup-config files, and the standby processor in the hot-standby software state

Step 2   Copy the new system image to the standby processor card bootflash using the CLI on the active processor card. Delete the old system image from the standby processor bootflash if there is not room.

✎

Note   Make sure the active processor card bootflash only contains the old system image name and not the new system image name.

Step 3   Rearrange any existing **boot system** commands so the new system image appears as the first boot image on the list. Optionally, you can configure the original system image as the second boot image.

✎

Note   Because the new system image is only present on the standby processor card bootflash, only the standby processor card will load it. When the former active processor card reloads, it will load the original system image after trying and failing to load the missing new system image.

Step 4   Reload the original standby processor with the new system image and make sure it goes to the hot-standby state. (At this point, we recommend that you copy the running-config file to the startup-config file before continuing.)

Step 5   Initiate a switchover that causes the new system image reload on the new active processor card. After the switchover, verify that the new standby processor card, which is running the original system image, goes to the hot-standby state.

Step 6   Configure new features, and, if desired, qualify the new system image for an extended period of time on the new active processor card with the old system image running on the standby processor card.

✎

Note   If a switchover occurs back to a processor running an older system image, all configuration commands supported by the older software version are retained. Any new configuration features do not appear in the running configuration. New configuration features saved in the startup configuration will remain.

Step 7 Copy the new system image to the other processor after qualifying the new system image, and, if desired, delete the old system image.

Step 8 Reload the new system image on the standby processor card.

To update the system images on redundant processors, perform the following steps, beginning in privileged EXEC mode:

	Command	Purpose
Step 1	Switch> **enable**	Enters privileged EXEC mode on the active processor card NME interface.
Step 2	Switch# **show version**	Displays the configuration register contents. The default autoconfiguration value is 0x2102.
Step 3	Switch# **show bootvar**	Displays the automatic database synchronization configuration.
Step 4	Switch# **show redundancy**	Displays the hardware and software redundancy states of the processor cards.
Step 5	Switch# **dir sby-bootflash:**	Displays the contents and available space on the Flash memory device on the standby processor. If there is not enough free space to copy the new system image, perform Step 6 and Step 7. Otherwise, proceed to Step 8.
Step 6	Switch# **delete sby-bootflash:**_filename_	Marks a file as deleted on the standby processor card. If you have older system images stored on the file system, we recommend that you delete the oldest one and leave a newer one in case you need to revert.
Step 7	Switch# **squeeze sby-bootflash:**	Recovers the space used by the files marked as deleted.
Step 8	Switch# **copy tftp:**_new-image-name_ **sby-bootflash:**	Initiates a TFTP session to copy the system image from the TFTP server to the Flash memory device on the standby processor card. The system prompts you for a TFTP server name and filename.
Step 9	Switch# **dir sby-bootflash:**	Displays the contents of the standby processor card file system and confirms that the file was copied as expected.
Step 10	Switch# **configure terminal**	Enters global configuration mode.
Step 11	Switch(config)# **boot system bootflash:**_new-image-name_	Adds the new system image to the system boot list.
Step 12	Switch(config)# **no boot system bootflash:**_old-image-name_	Removes the old system image from top of the system boot list.
Step 13	Switch(config)# **boot system bootflash:**_old-image-name_	Adds the old system image to the system boot list after the new system image.
Step 14	Switch(config)# **exit**	Exits global configuration mode.
Step 15	Switch# **show running-config**	Shows the current running configuration to verify the order of the **boot system** commands. The new system image should appear first.
Step 16	Switch# **copy system:running-config nvram:startup-config**	Saves the configuration to NVRAM.

	Command	Purpose
Step 17	Switch# **copy system:running-config tftp:**	Saves the configuration to a TFTP server. (Optional)
Step 18	Switch# **redundancy reload peer**	Initiates a reload of the system image on the standby processor card.
Step 19	Switch# **show redundancy**	Displays the processor card redundancy status and images Verify that the standby processor card is running the desired new image. Note If the standby processor card fails to reach the hot-standby state, follow the procedure described in the "Updating with Non-Hot-Standby Compatible System Images" section on page 17.
Step 20	Switch# **redundancy switch-activity**	Switches system control over to the standby processor card by reloading the system image on the active processor card. Repeat Step 1 through Step 9 and then Step 16 through Step 19 if no problems occur with the new system image on the active processor card.

Updating with Non-Hot-Standby Compatible System Images

System images with widely different version numbers might not allow the standby processor card to reach hot-standby state. A different upgrade procedure is necessary to handle these cases.

⚠️

Caution   This procedure might cause a short data interruption, unlike the procedure described in the previous section, "Updating with Hot-Standby Compatible System Images."

To update between system images that are not hot-standby compatible, perform the following steps on the active processor card:

	Command	Purpose
Step 1	Switch> **enable** Switch#	Enters privileged EXEC mode on the active processor card NME interface.
Step 2	Switch# **show version**	Displays the configuration register contents. The default autoconfiguration value is 0x2102.
Step 3	Switch# **show bootvar**	Displays the automatic database synchronization configuration.
Step 4	Switch# **show redundancy**	Displays the hardware and software redundancy states of the processor cards.
Step 5	Switch# **dir bootflash:**	Displays the contents and available space on the Flash memory device on the active processor card. If there is not enough free space to copy the new system image, perform Step 6 and Step 7. Otherwise, proceed to Step 8.
Step 6	Switch# **delete bootflash:**_filename_	Marks a file as deleted on the active processor card. If you have older system images stored on the file system, we recommend that you delete the oldest one and leave a newer one in case you need to revert.

	Command	Purpose
Step 7	Switch# **squeeze bootflash:**	Recovers the space used by the files marked as deleted.
Step 8	Switch# **copy tftp:***new-image-name* **bootflash:**	Initiates a TFTP session to copy the system image from the TFTP server to the Flash memory device on the active processor card. The system prompts you for a TFTP server name and filename.
Step 9	Switch# **dir bootflash:**	Displays the contents of the active processor card file system and confirms that the file was copied as expected.
Step 10	Switch# **dir sby-bootflash:**	Displays the contents and available space on the Flash memory device on the standby processor card. If there is not enough free space to copy the new system image, perform Step 11 and Step 12. Otherwise, proceed to Step 13.
Step 11	Switch# **delete sby-bootflash:***filename*	Marks a file as deleted on the standby processor card. If you have older system images stored on the file system, we recommend that you delete the oldest one and leave a newer one in case you need to revert.
Step 12	Switch# **squeeze sby-bootflash:**	Recovers the space used by the files marked as deleted.
Step 13	Switch# **copy tftp:***new-image-name* **sby-bootflash:**	Initiates a TFTP session to copy the system image from the TFTP server to the Flash memory device on the standby processor card. The system prompts you for a TFTP server name and filename.
Step 14	Switch# **dir sby-bootflash:**	Displays the contents of the standby processor card file system and confirms that the file was copied as expected.
Step 15	Switch# **configure terminal** Switch(config)#	Enters global configuration mode.
Step 16	Switch(config)# **boot system bootflash:***new-image-name*	Adds the new system image to the system boot list.
Step 17	Switch(config)# **no boot system bootflash:***old-image-name*	Removes the old system image from top of the system boot list.
Step 18	Switch(config)# **boot system bootflash:***old-image-name*	Adds the old system image to the system boot list after the new system image.
Step 19	Switch(config)# **exit** Switch#	Exits global configuration mode.
Step 20	Switch# **show running-config**	Shows the current running configuration to verify the order of the **boot system** commands. The new system image should appear first.
Step 21	Switch# **copy system:running-config nvram:startup-config**	Saves the configuration to NVRAM.
Step 22	Switch# **copy system:running-config tftp:**	Saves the configuration to a TFTP server. (Optional)
Step 23	Switch# **configure terminal** Switch(config)#	Enters global configuration mode.
Step 24	Switch(config)# **redundancy** Switch(config-red)#	Enters redundancy configuration mode.

	Command	Purpose
Step 25	Switch(config-red)# **maintenance-mode**	Disables database autosynchronization between the processor cards and puts the standby processor card in cold-standby state.
Step 26	Switch(config-red)# **end** Switch#	Returns to privileged EXEC mode.
Step 27	Switch# **redundancy reload peer**	Initiates a reload of the system image on the standby processor card.
Step 28	Switch# **show redundancy**	Displays the processor card redundancy status and images. Verify that the standby processor card is running the desired new image and is in either the NEGOTIATION state or the STANDBY COLD state.
Step 29	Switch# **redundancy switch-activity**	Switches system control over to the standby processor card by reloading the system image on the active processor card.

Upgrading Functional Images

You can download functional images used by certain hardware controllers in the Cisco ONS 15540 ESPx. This section describes the function and maintenance of functional image.

Understanding Functional Images

Functional images provide the low-level operating functionality for various hardware controllers. On hardware controllers with insystem programmable devices, such as field programmable gate arrays (FPGAs) and Erasable Programmable Logic Devices (EPLDs), the hardware functional images can be reprogrammed independently of loading the system image and without removing the devices from the controller.

On the Cisco ONS 15540 ESPx, you can reprogram the functional images on the processor cards, ROMMON, OADM modules, and line cards.

All new hardware is shipped with functional images preloaded. Loading a different functional image is required only when upgrading or downgrading functional image versions.

About Version Diagnostics for ROMMON and Functional Images

The ROMMON and functional images must be upgraded correctly to ensure proper functioning of the system. To ensure that the correct functional image versions are installed on your system, you can download a data file that you can use to verify your system status.

You can download the version diagnostics file from Cisco.com from the following URL:

http://www.cisco.com/cgi-bin/tablebuild.pl/ons15540-fpga

Copying Version Diagnostics File for ROMMON and Functional Images

You can copy the data file containing version diagnostics for the ROMMON and functional images from either a TFTP server or from an FTP server.

Copying a Version Diagnostics File from a TFTP Server to Flash Memory

To download a version diagnostics file from a TFTP server, perform the following steps:

	Command	Purpose
Step 1	Switch# **dir** {**bootflash:**	**disk0:**}	Verifies that space is available in Flash memory on the active CPU switch module. If space is available, continue to Step 3.
Step 2	Switch# **delete** {**bootflash:**	**disk0:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 3	Switch# **squeeze bootflash:**	(Optional) Recovers the space in onboard Flash memory.
Step 4	Switch# **copy tftp:**[[[*//location*]/*directory*]/*filename*] {**bootflash:**	**disk0:**}[*filename*]	Copies the data file from the TFTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. **Note** Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 5	Switch# **dir** {**bootflash:**	**disk0:**}	Displays information about the files in Flash memory, including the file sizes. Use the file size information to ensure that the entire file downloaded correctly.

Example

The following example shows how to download an version diagnostics file from a TFTP server:

```
Switch# dir bootflash:
Directory of bootflash:/

    1  -rw-       5217  Aug 19 2003 14:50:14 +01:00  startup-config
    2  -r--    3001756  Aug 19 2003 14:51:15 +01:00  ons15540-i-mz.121-12c.EV1

15988495 bytes total (6410045 bytes free)
Switch# copy tftp: bootflash:
Address or name of remote host? 10.0.0.1
Source filename [fi-ons15540-index.008.dat]? fi-ons15540-index.008.dat
Destination filename [fi-ons15540-index.008.dat]?
Accessing tftp://10.0.0.1/fi-ons15540-index.008.dat...
Loading fi-ons15540-index.008.dat from 10.0.0.1 (via FastEthernet0): !
[OK - 2289 bytes]
Switch# dir bootflash:
Directory of bootflash:/

    1  -rw-       5217  Aug 19 2003 14:50:14 +01:00  startup-config
    2  -r--    3001756  Aug 19 2003 14:51:15 +01:00  ons15540-i-mz.121-12c.EV1
    3  -rw-       2289  Sep 13 2003 13:34:05 +01:00  fi-ons15540-index.008.dat

15990784 bytes total (6407756 bytes free)
```

Copying a Version Diagnostics File from an FTP Server to Flash Memory

To download an version diagnostics file from an FTP server, perform the following steps

	Command	Purpose
Step 1	Switch# **configure terminal** Switch(config)#	(Optional) Enters configuration mode from the terminal. This step is required only if you override the default remote username (see Step 2 and Step 3). Otherwise, continue to Step 5.
Step 2	Switch(config)# **ip ftp username** *username*	(Optional) Changes the default remote username.
Step 3	Switch(config)# **ip ftp password** *password*	(Optional) Changes the default password.
Step 4	Switch(config)# **end** Switch#	(Optional) Exits configuration mode. This step is required only if you override the default remote username (see Step 2 and Step 3).
Step 5	Switch# **dir** {**bootflash:** | **disk0:**}	Verifies that space is available in Flash memory. If space is available, continue to Step 8.
Step 6	Switch# **delete** {**bootflash:** | **disk0:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 7	Switch# **squeeze bootflash:**	(Optional) Recovers the space in onboard Flash memory.

	Command	Purpose
Step 8	Switch# **copy** **ftp:**[[[//[*username*[**:***password*]**@**]*location*]/*directory*]/*filename*] {**bootflash:** | **disk0:**}[*filename*]	Copies the data file from the FTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. **Note** Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 9	Switch# **dir** {**bootflash:** | **disk0:**}	Displays information about the files in Flash memory, including the file sizes. Use the file size information to ensure that the entire file downloaded correctly.

Example

```
Switch# dir bootflash:
Directory of bootflash:/

1  -rw-        5217  Aug 19 2003 14:50:14 +01:00  startup-config
   2  -r--     3001756  Aug 19 2003 14:51:15 +01:00  ons15540-i-mz.121-12c.EV1

15990784 bytes total (9485748 bytes free)

Switch# copy ftp://myuser:mypass@theserver/tftpboot/fi-ons15540-index.008.dat
disk0:fi-ons15540-index.008.dat

Switch# dir bootflash:
Directory of bootflash:/

1  -rw-        5217  Aug 19 2003 14:50:14 +01:00  startup-config
   2  -r--     3001756  Aug 19 2003 14:51:15 +01:00  ons15540-i-mz.121-12c.EV1
   3  -rw-        2289  Sep 13 2003 13:34:05 +01:00  fi-ons15540-index.008.dat

15990784 bytes total (9482760 bytes free)
```

Displaying Version Diagnostics for ROMMON and Functional Images

To display the most recent data file with the ROMMON and functional image version diagnostics, perform the following steps

Command	Purpose
Switch# **show update-info functional-image** {**all** | **latest-version** [**software-compatible**]} **dat-file** *device***:***filename* [**detail**]	Displays the functional image version diagnostics.

Example

The following example shows how display the functional image version information for the system:

```
Switch# show upgrade-info functional-image all dat-file
bootflash:fi-ons15540-index.008.dat
Validating CRC...100%

Generating Functional Image Upgrade Information for the currently running IOS
using DAT file bootflash:fi-ons15540-index.008.dat, created on Tues Aug 19 00:20:15 PST
2003.

Please ensure that you are using the latest DAT file from
Cisco Connection Online (CCO) Webpage

Abbr: Cur.FV = Functional Image Version of the Card.
      Lis.FV = List of Func. Image Versions found in the DAT-file for the
               corresponding card.
      (U)    = IOS Software upgrade is required, to upgrade to
               the recommended functional image version.

Slot Product No              Cur.FV Lis.FV Listed Functional Image
---- ------------------------ ------ ------ -------------------------------
 0/* 15540-LCMB-UNKNOWN        2.66   2.66  No Func. Image Upgrade Required
 1/* 15540-LCMB-UNKNOWN        2.67   2.67  No Func. Image Upgrade Required
 3/* 15540-LCMB-1100           2.72   2.72  No Func. Image Upgrade Required
 3/0 15540-TSP2-0100=          1.F1   1.F1  No Func. Image Upgrade Required
 3/1 15540-TSP2-0100=          1.F1   1.F1  No Func. Image Upgrade Required
 3/3 15540-TSP1-13B3=          1.F1   1.F1  No Func. Image Upgrade Required
 4/0 15540-LCMB-1100           1.A0   1.A1  fi-ons15540-tlcmdb.A.1-A1.exo
 6/* 15540-CPU=                1.25   1.27  fi-ons15540-ph0cpu.A.1-27.exo
 7/* 15540-CPU=                1.27   1.27  No Func. Image Upgrade Required
```

Updating a ROMMON Image Release

To update a ROMMON images for the active and redundant processor cards, follow these steps:

Step 1 Determine the release version of the ROMMON image.

Step 2 Check the available space on Flash memory (bootflash or disk0) on the active processor card. Make space available, if necessary.

Step 3 Copy the ROMMON image to Flash memory on the standby processor card.

Step 4 Load the ROMMON image from Flash memory to the standby processor card.

Step 5 Repeat Step 2 through Step 4 on the redundant processor card after a switchover.

Note You can manage ROMMON image files like any other image file on the Cisco ONS 15540 ESPx. For more information on downloading and managing image files, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.1*.

Caution Do not interrupt the reprogramming process. A failure during reprogramming can result in the processor card being unusable. The ROMMON image cannot be reverted once reprogramming starts.

Determining the ROMMON Image Release Version

To determine the existing ROMMON image release version, use the following command in EXEC mode:

Command	Purpose
show version	Displays the ROMMON image information.

Example

The following example shows the ROMMON image version information:

```
Switch# show version

  Cisco Internetwork Operating System Software
  IOS (tm) ONS-15540 Software (ONS15540-i-mz), Release Version 12.1(10)EV
  Copyright (c) 1986-2001 by cisco Systems, Inc.
  Compiled Fri 23-Mar-02 15:23 by
  Image text-base:0x60010950, data-base:0x604E8000

  ROM:System Bootstrap, Version 12.1(12c)E1, RELEASE SOFTWARE

  Switch uptime is 30 minutes
  System returned to ROM by power-on
  System image file is "disk0:ONS15540-m0-mz"

  cisco  (QUEENS-CPU) processor with 98304K/32768K bytes of memory.
  R7000 CPU at 234Mhz, Implementation 39, Rev 2.1, 256KB L2, 2048KB L3 Cache

  Last reset from power-on
  2 Ethernet/IEEE 802.3 interface(s)
  509K bytes of non-volatile configuration memory.

  20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
  16384K bytes of Flash internal SIMM (Sector size 64K).
  Configuration register is 0x102
```

Updating a ROMMON Image from a TFTP Server

To download a ROMMON image from a TFTP server and upgrade the functional image on both processor cards, perform the following steps, starting with the active processor card:

	Command	Purpose
Step 1	Switch# **show** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}	Verifies that space is available in Flash memory on the active processor card. If space is available, continue to Step 4.
Step 2	Switch# **delete** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 3	Switch# **squeeze** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}	(Optional) Recovers the space in Flash memory.

	Command	Purpose
Step 4	Switch# **copy tftp:**[[[//*location*]/*directory*]/*filename*] {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}[*filename*]	Copies the image from the TFTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. Note Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 5	Switch# **show** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}	Verifies that space is available in Flash memory on the standby processor card. If space is available, continue to Step 8.
Step 6	Switch# **delete** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 7	Switch# **squeeze** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}	(Optional) Recovers the space in onboard Flash memory.
Step 8	Switch# **copy tftp:**[[[//*location*]/*directory*]/*filename*] {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}[*filename*]	Copies the image from the TFTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. Note Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 9	Switch# **reprogram** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}*filename* {*slot* | **sby-rommon**}	Updates the ROMMON image on the processor card and returns the processor card to ROMMON mode.
Step 10	rommon 1 > **boot** [{**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}*filename*]	(Optional) Boots the IOS system image on the standby processor card if it does not boot automatically.
Step 11	Switch# **redundancy switch-activity** [**force**]	Switches over control to the standby processor card. Repeat Step 9 through Step 10 on the new standby processor card.

Note   For Cisco ONS 15540 ESPx systems with only one processor card, you must either power cycle the shelf or remove and reinsert the processor card for the functional image upgrade to take affect.

Example

The following example shows how to download a ROMMON image from a TFTP server and update the ROMMON image on the active processor card:

```
Switch# show disk0:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image    1BD2EA73 2A7B24  26   2652836 Feb 11 2002 18:07:41 ons15540-i-mz
2   .. config   36DC62E3 2AAC54  14     12461 Feb 11 2002 18:10:34 running-config

17912748 bytes available (2665556 bytes used)

Switch# copy tftp: disk0:
Address or name of remote host []? 10.0.0.1
Source filename []? ONS15540_RM.srec
Destination filename [ONS15540_RM.srec]? y

Loading tftpboot/ONS15540_RM.srec from 10.0.0.1 (via Ethernet3/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 629458/17912748 bytes]

629458 bytes copied
```

Updating a ROMMON Image from an FTP Server

To download a ROMMON image from an FTP server and upgrade the functional image on both processor cards, perform the following steps, starting with the active processor card:

	Command	Purpose
Step 1	Switch# **configure terminal** Switch(config)#	(Optional) Enters configuration mode from the terminal. This step is required only if you override the default remote username (see Step 2 and Step 3). Otherwise, continue to Step 9.
Step 2	Switch(config)# **ip ftp username** *username*	(Optional) Changes the default remote username.
Step 3	Switch(config)# **ip ftp password** *password*	(Optional) Changes the default password.
Step 4	Switch(config)# **end** Switch#	(Optional) Exits configuration mode. This step is required only if you override the default remote username (see Step 2 and Step 3).
Step 5	Switch# **show** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}	Verifies that space is available in Flash memory on the active processor card. If space is available, continue to Step 8.
Step 6	Switch# **delete** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 7	Switch# **squeeze** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}	(Optional) Recovers the space in Flash memory.

	Command	Purpose
Step 8	Switch# **copy** **ftp:**[[[//[*username*[**:***password*]**@**]*location*]/ *directory*]/*filename*] {**bootflash:**	**slot0:**	**slot1:**	**disk0:**	**disk1:**}[*filename*]	Copies the image from the FTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. **Note** Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 9	Switch# **show** {**sby-bootflash:**	**sby-slot0:**	**sby-slot1:**	**sby-disk0:**	**sby-disk1:**}	Verifies that space is available in Flash memory on the standby processor card. If space is available, continue to Step 12.
Step 10	Switch# **delete** {**sby-bootflash:**	**sby-slot0:**	**sby-slot1:**	**sby-disk0:**	**sby-disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 11	Switch# **squeeze** {**sby-bootflash:**	**sby-slot0:**	**sby-slot1:**	**sby-disk0:**	**sby-disk1:**}	(Optional) Recovers the space in onboard Flash memory.
Step 12	Switch# **copy** **ftp:**[[[//[*username*[**:***password*]**@**]*location*]/ *directory*]/*filename*] {**sby-bootflash:**	**sby-slot0:**	**sby-slot1:**	**sby-disk0:**	**sby-disk1:**}[*filename*]	Copies the image from the FTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. **Note** Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 13	Switch# **reprogram** {**sby-bootflash:**	**sby-slot0:**	**sby-slot1:**	**sby-disk0:**	**sby-disk1:**}*filename* {*slot*	**sby-rommon**}	Updates the functional image on the standby processor card and returns the standby processor card to ROMMON mode.
Step 14	rommon 1 > **boot** [{**bootflash:**	**slot0:**	**slot1:**	**disk0:**	**disk1**}*filename*]	(Optional) Boots the IOS system image on the standby processor card if it does not boot automatically.
Step 15	Switch# **redundancy switch-activity** [**force**]	Switches over control to the standby processor card. Repeat Step 13 through Step 14 on the new standby processor card.

✎
Note For Cisco ONS 15540 ESPx systems with only one processor card, you must either power cycle the shelf or remove and reinsert the processor card for the functional image upgrade to take affect.

Example

The following example shows how to download a ROMMON image from an FTP server and update the ROMMON image on the active processor card:

```
Switch# show disk0:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image    1BD2EA73  2A7B24   26  2652836 Feb 11 2002 18:07:41 ons15540-i-mz
2   .. config   36DC62E3  2AAC54   14    12461 Feb 11 2002 18:10:34 running-config

17912748 bytes available (2665556 bytes used)

Switch# copy ftp://myuser:mypass@theserver/tftpboot/ONS15540_RM.srec
disk0:ONS15540_RM.srec

Accessing ftp://theserver/tftpboot/ONS15540_RM.srec...Translating "theserver"...domain
server (192.168.2.132) [OK]

Loading ONS15540_RM.srec from 192.168.2.132 (via Ethernet3/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 623492/17912748 bytes]

623492 bytes copied
```

Updating a Processor Card Functional Image Release

To update a processor card functional images for the active and redundant processor cards, follow these steps:

Step 1   Determine the release version of the processor card functional image.

Step 2   Check the available space on Flash memory on the active processor card. Make space available, if necessary.

Step 3   Copy the processor card functional image to Flash memory on the standby processor card. Make space available, if necessary.

Step 4   Load the processor card functional image from Flash memory. The processor card automatically reloads when the functional image update completes.

Step 5   Boot the system image if autoboot is not configured.

Step 6   Repeat Step 4 and Step 5 on the redundant processor card after the switchover completes.

✎

Note   You can manage processor card functional image files like any other image file on the Cisco ONS 15540 ESPx. For more information on downloading and managing image files, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.1*.

⚠

Caution   Do not interrupt the reprogramming process. A failure during reprogramming can result in the processor card being unusable. The processor card functional image cannot be reverted once reprogramming starts.

Determining the Processor Card Functional Image Release Version

To determine the existing processor card functional image release version, use the following command in EXEC mode:

Command	Purpose
show hardware linecard *slot*	Displays the functional image information.

Example

The following example shows the functional image information for the processor card in slot 6:

```
Switch# show hardware linecard 6
--------------------------------------------------------------------------------
Slot Number           : 6/*
Controller Type       : 0x1000
On-Board Description   :
Orderable Product Number:
Board Part Number     : 73-5621-02
Board Revision        : 03
Serial Number         : SAK0447002M
Manufacturing Date    : 02/05/2001
Hardware Version       : 2.5
RMA Number            : 0x00
RMA Failure Code      : 0x00
Functional Image Version: 1.24
Function-ID           : 0
```

Updating a Processor Card Functional Image from a TFTP Server

To download a processor card functional image from a TFTP server and upgrade the functional image on both processor cards, perform the following steps on the active processor card console session:

	Command	Purpose
Step 1	Switch# **show** {**bootflash:**	**slot0:**	**slot1:**	**disk0:**	**disk1:**}	Verifies that space is available in Flash memory on the active processor card. If space is available, continue to Step 4.
Step 2	Switch# **delete** {**bootflash:**	**slot0:**	**slot1:**	**disk0:**	**disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 3	Switch# **squeeze** {**bootflash:**	**slot0:**	**slot1:**	**disk0:**	**disk1:**}	(Optional) Recovers the space in Flash memory.

	Command	Purpose
Step 4	Switch# **copy** **tftp:**[[[*//location*]/*directory*]/*filename*] {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}[*filename*]	Copies the image from the TFTP server to the Flash memory device.
		Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command.
		Note Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 5	Switch# **show** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}	Verifies that space is available in Flash memory on the standby processor card. If space is available, continue to Step 8.
Step 6	Switch# **delete** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 7	Switch# **squeeze** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}	(Optional) Recovers the space in onboard Flash memory.
Step 8	Switch# **copy** **tftp:**[[[*//location*]/*directory*]/*filename*] {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}[*filename*]	Copies the image from the TFTP server to the Flash memory device.
		Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command.
		Note Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 9	Switch# **reprogram** *device***:***filename* {*slot* [*subcard*]}	Updates the functional image with the specified filename to a device. The processor card automatically reloads when the functional image update completes.
		⚠
		Caution If the **reprogram** command fails, try to program again prior to power cycling the shelf. If you accidentally power cycle, the processor card with the corrupt FPGAs might loop and prevent further reprogramming.
Step 10	Switch# **redundancy switch-activity**	Switches system control over to the standby processor card by reloading the system image on the active processor card.
		Repeat Step 9 on the redundant processor card.
		For the functional image update to take effect, either powercycle the shelf or OIR the processor cards.

Note For Cisco ONS 15540 ESPx systems with only one processor card, you must either power cycle the shelf or remove and reinsert the processor card for the functional image upgrade to take affect.

Example

The following example shows how to download a processor card functional image from a TFTP server and update the processor card functional image on the active processor card:

```
Switch# show disk0:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image     1BD2EA73 2A7B24  26   2652836 Feb 11 2002 18:07:41 ons15540-i-mz
2   .. config    36DC62E3 2AAC54  14     12461 Feb 11 2002 18:10:34 running-config

17912748 bytes available (2665556 bytes used)

Switch# copy tftp: disk0:
Address or name of remote host []? 10.0.0.1
Source filename []? fi-ons15540-ph0cpu.A.1-25.exo
Destination filename [fi-ons15540-ph0cpu.A.1-25.exo]? y
Loading tftp/fi-ons15540-ph0cpu.A.1-25.exo from 10.0.0.1 (via Ethernet3/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 629458/17912748 bytes]

629458 bytes copied
Switch# reprogram bootflash:fi-ons15540-ph0cpu.A.1-25.exo 6
This command will load the image bootflash:fi-ons15540-ph0cpu.A.1-25.exo
to slot:6

WARNING:This is a non-volatile change to the card configuration.
If you choose to proceed with the command,please DO NOT power
cycle the switch or hotswap the line card until the command completes.
This command emulates a removal of the selected controller, performs
download, and then it emulates an insertion.  This will cause connections,
if any, established through through this controller to be terminated.

Do you want to continue[confirm] y
Validating CRC...100%
Verifying Image integrity
Verifying SRECORD integrity

End of Srecords
Image verification done successfully

It is highly recommended that you reprogram the Standby CPU first,
switchover to the Standby and then reprogram this CPU.
If you choose to continue with reprogramming the Active CPU, once the
reprogram completes, a CPU removal/reinsertion or power-cycle is required
for the new fpga to take effect.
Do you want to continue with reprogramming the Active CPU fpga ?.[confirm]
Downloading srecords.
Downloading FPGA image to Flash
........................................................................................
.......
End of Srecords
```

```
Download Completed  ==============>
Please remove & reinsert this CPU or power-cycle this system
==============>
for the new fpga to take effect.        ==============>
Controller successfully Reprogrammed   ==============>
```

Updating a Processor Card Functional Image from an FTP Server

To download a processor card functional image from an FTP server and upgrade the functional image on both processor cards, perform the following steps, starting with the active processor card:

	Command	Purpose
Step 1	Switch# **configure terminal** Switch(config)#	(Optional) Enters configuration mode from the terminal. This step is required only if you override the default remote username (see Step 2 and Step 3). Otherwise, continue to Step 9.
Step 2	Switch(config)# **ip ftp username** *username*	(Optional) Changes the default remote username.
Step 3	Switch(config)# **ip ftp password** *password*	(Optional) Changes the default password.
Step 4	Switch(config)# **end** Switch#	(Optional) Exits configuration mode. This step is required only if you override the default remote username (see Step 2 and Step 3).
Step 5	Switch# **show** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}	Verifies that space is available in Flash memory on the active processor card. If space is available, continue to Step 8.
Step 6	Switch# **delete** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 7	Switch# **squeeze** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}	(Optional) Recovers the space in Flash memory.
Step 8	Switch# **copy** **ftp:**[[[**//**[*username*[**:***password*]**@**]*location*]**/***directory*]**/***filename*] {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}[*filename*]	Copies the image from the FTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. **Note** Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 9	Switch# **show** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}	Verifies that space is available in Flash memory on the standby processor card. If space is available, continue to Step 12.
Step 10	Switch# **delete** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 11	Switch# **squeeze** {**sby-bootflash:** | **sby-slot0:** | **sby-slot1:** | **sby-disk0:** | **sby-disk1:**}	(Optional) Recovers the space in onboard Flash memory.

	Command	Purpose
Step 12	Switch# **copy** **ftp:**[[[//[*username*[**:***password*]**@**]*location*]/ *directory*]/*filename*] {**sby-bootflash:**	**sby-slot0:**	**sby-slot1:**	**sby-disk0:**	**sby-disk1:**}[*filename*]	Copies the image from the FTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. **Note** Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.
Step 13	Switch# **reprogram** *device***:***filename* {*slot* [*subcard*]}	Updates the functional image with the specified filename to a device. The processor card automatically reloads when the functional image update completes. ⚠ **Caution** If the **reprogram** command fails, try to program again prior to power cycling the shelf. If you accidentally power cycle, the processor card with the corrupt FPGAs might loop and prevent further reprogramming.
Step 14	Switch# **redundancy switch-activity**	Switches system control over to the standby processor card by reloading the system image on the active processor card. Repeat Step 13 on the redundant processor card. For the functional image update to take effect, either powercycle the shelf or OIR each processor card after the switchover completes.

Note For Cisco ONS 15540 ESPx systems with only one processor card, you must either power cycle the shelf or remove and reinsert the processor card for the functional image upgrade to take affect.

Example

The following example shows how to download a processor card functional image from an FTP server and update the processor card functional image on the active processor card:

```
Switch# show disk0:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image    1BD2EA73  2A7B24  26   2652836 Feb 11 2002 18:07:41 ons15540-i-mz
2   .. config   36DC62E3  2AAC54  14     12461 Feb 11 2002 18:10:34 running-config

17912748 bytes available (2665556 bytes used)

Switch# copy ftp://myuser:mypass@theserver/tftpboot/i-ons15540-ph0cpu.A.1-25.exo 6
disk0:i-ons15540-ph0cpu.A.1-25.exo 6

Accessing ftp://theserver/tftpboot/fi-ons15540-ph0cpu.A.1-25.exo...Translating
"theserver"...domain server (192.168.2.132) [OK]

Loading fi-ons15540-ph0cpu.A.1-25.exo from 192.168.2.132 (via Ethernet3/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 623492/17912748 bytes]

623492 bytes copied
Switch# reprogram bootflash:fi-ons15540-ph0cpu.A.1-25.exo 6
This command will load the image bootflash:fi-ons15540-ph0cpu.A.1-25.exo
to slot:6

WARNING:This is a non-volatile change to the card configuration.
If you choose to proceed with the command,please DO NOT power
cycle the switch or hotswap the line card until the command completes.
This command emulates a removal of the selected controller, performs
download, and then it emulates an insertion.  This will cause connections,
if any, established through through this controller to be terminated.

Do you want to continue[confirm] y
Validating CRC...100%
Verifying Image integrity
Verifying SRECORD integrity

End of Srecords
Image verification done successfully

It is highly recommended that you reprogram the Standby CPU first,
switchover to the Standby and then reprogram this CPU.
If you choose to continue with reprogramming the Active CPU, once the
reprogram completes, a CPU removal/reinsertion or power-cycle is required
for the new fpga to take effect.
Do you want to continue with reprogramming the Active CPU fpga ?.[confirm]
Downloading srecords.
Downloading FPGA image to Flash
...........................................................................................
.......
End of Srecords

Download Completed  ==============>
Please remove & reinsert this CPU or power-cycle this system
==============>
for the new fpga to take effect.        ==============>
Controller successfully Reprogrammed   ==============>
```

Updating Line Card Motherboard Functional Images

You update a line card motherboard functional image in three steps:

Step 1   Determine the line card motherboard functional image version.

Step 2   Copy the image to Flash memory (bootflash or disk0).

Step 3   Load the image from Flash memory to the hardware controller.

Determining the Line Card Motherboard Functional Image Version

To determine the functional image version in a line card motherboard hardware controller, use the following command in privileged EXEC mode:

Command	Purpose
show hardware linecard *slot*	Displays the functional image information.

The following example shows the functional image information in the controller for the line card motherboard in slot 8:

```
Switch# show hardware linecard 8
M1#sh har line 8
----------------------------------------------------------------------------
Slot Number           : 8/*
Controller Type       : 0x1005
On-Board Description   : TRANSPONDER_MOTHER_PHASE_0
Orderable Product Number: N/A
Board Part Number     : 73-5813-04
Board Revision        : 02
Serial Number         : CAB0511HEM8
Manufacturing Date    : 03/30/2001
Hardware Version       : 4.1
RMA Number            : 0x00
RMA Failure Code      : 0x00
Functional Image Version: 2.48
Function-ID           : 0
Subcard Power Control  : 0:OFF, 1:OFF, 2:OFF, 3:OFF
----------------------------------------------------------------------------
Slot Number           : 8/0
Controller Type       : 0x1001
On-Board Description   : TRANSPONDER_Type_I_PHASE_0
Orderable Product Number: N/A
Board Part Number     : 68-1430-01
Board Revision        : 02
Serial Number         : SAK04490027
Manufacturing Date    : 02/23/2001
Hardware Version       : 2.31
RMA Number            : 0x00
RMA Failure Code      : 0x00
Functional Image Version: 1.93
Function-ID           : 20
Transceiver type      : Non-pluggable Transceiver
----------------------------------------------------------------------------
```

```
Slot Number          : 8/3
Controller Type      : 0x1001
On-Board Description  : TRANSPONDER_Type_I_PHASE_0
Orderable Product Number: N/A
Board Part Number    : 73-5757-02
Board Revision       : 02
Serial Number        : SAK0449000U
Manufacturing Date   : 02/23/2001
Hardware Version      : 2.2
RMA Number           : 0x00
RMA Failure Code     : 0x00
Functional Image Version: 1.59
Function-ID          : 0
Transceiver type     : Non-pluggable Transceiver
```

Copying a Line Card Motherboard Functional Image from a TFTP Server to Flash Memory

To download a line card motherboard functional image from a TFTP server, perform the following steps:

	Command	Purpose
Step 1	Switch# **show** {**bootflash:**	**slot0:**	**slot1:**	**disk0:**	**disk1:**}	Verifies that space is available in Flash memory on the active processor card. If space is available, continue to Step 3.
Step 2	Switch# **delete** {**bootflash:**	**slot0:**	**slot1:**	**disk0:**	**disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 3	Switch# **squeeze** {**bootflash:**	**slot0:**	**slot1:**	**disk0:**	**disk1:**}	(Optional) Recovers the space in Flash memory.
Step 4	Switch# **copy tftp:**[[[*//location*]/*directory*]/*filename*] {**bootflash:**	**slot0:**	**slot1:**	**disk0:**	**disk1:**}[*filename*]	Copies the image from the TFTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. **Note** Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.

Example

The following example shows how to download a functional image from a TFTP server and update the functional image on the active processor card:

```
Switch# show disk0:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image   1BD2EA73 2A7B24  26   2652836 Feb 11 2002 18:07:41 ons15540-i-mz
2   .. config  36DC62E3 2AAC54  14     12461 Feb 11 2002 18:10:34 running-config

17912748 bytes available (2665556 bytes used)

Switch# copy tftp: disk0:
Address or name of remote host []? 10.0.0.1
Source filename []? fi-ons15540-escon.A.2-36.exo
Destination filename [fi-ons15540-escon.A.2-36.exo]? y

Loading tftpboot/ fi-ons15540-escon.A.2-36.exo from 10.0.0.1 (via Ethernet3/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 5779602/17912748 bytes]

5779602 bytes copied
```

Copying a Line Card Motherboard Functional Image from an FTP Server to Flash Memory

To download a line card motherboard functional image from an FTP server, perform the following steps

	Command	Purpose
Step 1	Switch# **configure terminal** Switch(config)#	(Optional) Enters configuration mode from the terminal. This step is required only if you override the default remote username (see Step 2 and Step 3). Otherwise, continue to Step 5.
Step 2	Switch(config)# **ip ftp username** *username*	(Optional) Changes the default remote username.
Step 3	Switch(config)# **ip ftp password** *password*	(Optional) Changes the default password.
Step 4	Switch(config)# **end** Switch#	(Optional) Exits configuration mode. This step is required only if you override the default remote username (see Step 2 and Step 3).
Step 5	Switch# **show** {**bootflash:**	**disk0:**}	Verifies that space is available in Flash memory. If space is available, continue to Step 8.
Step 6	Switch# **delete** {**bootflash:**	**disk0:**}*filename*	(Optional) Deletes a file from Flash memory.

	Command	Purpose
Step 7	Switch# **squeeze bootflash:**	(Optional) Recovers the space in onboard Flash memory.
Step 8	Switch# **copy ftp:**[[[//[*username*[**:***password*]**@**]*location*]/ *directory*]/*filename*] {**bootflash:** | **disk0:**}[*filename*]	Copies the image from the FTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. **Note** Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.

Example

The following example shows how to download a functional image from an FTP server:

```
Switch# show disk0:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image    1BD2EA73  2A7B24   26  2652836 Feb 11 2002 18:07:41 ons15540-i-mz
2   .. config   36DC62E3  2AAC54   14    12461 Feb 11 2002 18:10:34 running-config

17912748 bytes available (2665556 bytes used)

Switch# copy ftp://myuser:mypass@theserver/tftpboot/fi-ons15540.A.2-36.exo
disk0:fi-ons15540.A.2-36.exo

Accessing ftp://theserver/tftpboot/fi-ons15540.A.2-36.exo...Translating
"theserver"...domain
server (192.168.2.132) [OK]

Loading fi-ons15540.A.2-36.exo from 192.168.2.132 (via Ethernet3/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 623492/17912748 bytes]

623492 bytes copied
```

Updating the Line Card Motherboard Functional Image

To update a line card motherboard functional image from a Flash memory device to a hardware controller, use the following command in privileged EXEC mode from a console session:

Command	Purpose
reprogram *device***:***filename slot*	Updates the functional image with the specified filename to a device.

The **reprogram** command checks the compatibility of the image for the selected card type before downloading the functional image. If you have specified a slot number without a subcard, the functional image is downloaded to the full-width module that occupies that slot.

⚠️
Caution   Do not interrupt the download process. Wait until it has finished before attempting any commands on the switch.

Example

The following example demonstrates loading the functional image fpga_image from the PC Flash Card to the controller for the processor in slot 8.

```
Switch# reprogram slot0:fpga_image 8
```

Updating Transponder Module Functional Images

You update a transponder module functional image in three steps:

Step 1   Determine the transponder module functional image version.

Step 2   Copy the image to Flash memory (bootflash or disk0).

Step 3   Load the image from Flash memory to the hardware controller.

Determining the Transponder Module Functional Image Version

To determine the functional image version in a transponder module hardware controller, use the following command in privileged EXEC mode:

Command	Purpose
show hardware linecard *slot*	Displays the functional image information.

The following example shows the functional image information in the controller for the transponder module in slot 8, subcard 3:

```
Switch# show hardware linecard 8
--------------------------------------------------------------------------------
Slot Number             : 8/*
Controller Type         : 0x1005
On-Board Description     : TRANSPONDER_MOTHER_PHASE_0
Orderable Product Number: N/A
Board Part Number       : 73-5813-04
Board Revision          : 02
Serial Number           : CAB0511HEM8
Manufacturing Date      : 03/30/2001
Hardware Version         : 4.1
RMA Number              : 0x00
RMA Failure Code        : 0x00
Functional Image Version: 2.48
Function-ID             : 0
Subcard Power Control   : 0:OFF, 1:OFF, 2:OFF, 3:OFF
--------------------------------------------------------------------------------
Slot Number             : 8/0
Controller Type         : 0x1001
On-Board Description     : TRANSPONDER_Type_I_PHASE_0
Orderable Product Number: N/A
Board Part Number       : 68-1430-01
Board Revision          : 02
Serial Number           : SAK04490027
Manufacturing Date      : 02/23/2001
Hardware Version         : 2.31
RMA Number              : 0x00
RMA Failure Code        : 0x00
Functional Image Version: 1.93
Function-ID             : 20
Transceiver type        : Non-pluggable Transceiver
--------------------------------------------------------------------------------
Slot Number             : 8/3
Controller Type         : 0x1001
On-Board Description     : TRANSPONDER_Type_I_PHASE_0
Orderable Product Number: N/A
Board Part Number       : 73-5757-02
Board Revision          : 02
Serial Number           : SAK0449000U
Manufacturing Date      : 02/23/2001
Hardware Version         : 2.2
RMA Number              : 0x00
RMA Failure Code        : 0x00
Functional Image Version: 1.59
Function-ID             : 0
Transceiver type        : Non-pluggable Transceiver
```

Copying a Transponder Module Functional Image from a TFTP Server to Flash Memory

To download a transponder module functional image from a TFTP server, perform the following steps:

	Command	Purpose
Step 1	Switch# **show** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}	Verifies that space is available in Flash memory on the active processor card. If space is available, continue to Step 3.
Step 2	Switch# **delete** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 3	Switch# **squeeze** {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}	(Optional) Recovers the space in Flash memory.
Step 4	Switch# **copy tftp:**[[[//*location*]/*directory*]/*filename*] {**bootflash:** | **slot0:** | **slot1:** | **disk0:** | **disk1:**}[*filename*]	Copies the image from the TFTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. Note Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.

Example

The following example shows how to download a functional image from a TFTP server and update the functional image on the active processor card:

```
Switch# show disk0:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image    1BD2EA73 2A7B24  26   2652836 Feb 11 2002 18:07:41 ons15540-i-mz
2   .. config   36DC62E3 2AAC54  14     12461 Feb 11 2002 18:10:34 running-config

17912748 bytes available (2665556 bytes used)

Switch# copy tftp: disk0:
Address or name of remote host []? 10.0.0.1
Source filename []? fi-ons15540-escon.A.2-36.exo
Destination filename [fi-ons15540-escon.A.2-36.exo]? y

Loading tftpboot/ fi-ons15540-escon.A.2-36.exo from 10.0.0.1 (via Ethernet3/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 5779602/17912748 bytes]

5779602 bytes copied
```

Copying a Transponder Module Functional Image from an FTP Server to Flash Memory

To download a transponder module functional image from an FTP server, perform the following steps.

	Command	Purpose
Step 1	Switch# **configure terminal** Switch(config)#	(Optional) Enters configuration mode from the terminal. This step is required only if you override the default remote username (see Step 2 and Step 3). Otherwise, continue to Step 5.
Step 2	Switch(config)# **ip ftp username** *username*	(Optional) Changes the default remote username.
Step 3	Switch(config)# **ip ftp password** *password*	(Optional) Changes the default password.
Step 4	Switch(config)# **end** Switch#	(Optional) Exits configuration mode. This step is required only if you override the default remote username (see Step 2 and Step 3).
Step 5	Switch# **show** {**bootflash:**	**disk0:**}	Verifies that space is available in Flash memory. If space is available, continue to Step 8.
Step 6	Switch# **delete** {**bootflash:**	**disk0:**}*filename*	(Optional) Deletes a file from Flash memory.
Step 7	Switch# **squeeze bootflash:**	(Optional) Recovers the space in onboard Flash memory.
Step 8	Switch# **copy ftp:**[[[//[*username*[**:***password*]**@**]*location*]/*directory*]/*filename*] {**bootflash:**	**disk0:**}[*filename*]	Copies the image from the FTP server to the Flash memory device. Reply to any CLI prompts for additional information or confirmation. The prompting depends on how much information you provide in the **copy** command. **Note** Wait until after the download finishes before attempting any commands on the switch. Confirm that the image download is done in binary mode and check file sizes before and after download.

Example

The following example shows how to download a functional image from an FTP server:

```
Switch# show disk0:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1  .. image   1BD2EA73  2A7B24  26  2652836 Feb 11 2002 18:07:41 ons15540-i-mz
2  .. config  36DC62E3  2AAC54  14    12461 Feb 11 2002 18:10:34 running-config

17912748 bytes available (2665556 bytes used)

Switch# copy ftp://myuser:mypass@theserver/tftpboot/fi-ons15540.A.2-36.exo
disk0:fi-ons15540.A.2-36.exo

Accessing ftp://theserver/tftpboot/fi-ons15540.A.2-36.exo...Translating
"theserver"...domain
server (192.168.2.132) [OK]

Loading fi-ons15540.A.2-36.exo from 192.168.2.132 (via Ethernet3/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 623492/17912748 bytes]

623492 bytes copied
```

Updating the Transponder Module Functional Image

To update a transponder module functional image from a Flash memory device to a hardware controller, use the following command in privileged EXEC mode from a console session:

Command	Purpose
reprogram *device*:*filename slot subcard*	Updates the functional image with the specified filename to a device.

The **reprogram** command checks the compatibility of the image for the selected card type before downloading the functional image. If you have specified a slot number without a subcard, the functional image is downloaded to the full-width module that occupies that slot.

⚠️
Caution The download process impacts traffic through the transponder module.

⚠️
Caution   Do not interrupt the download process. Wait until it has finished before attempting any commands on the switch.

Example

The following example demonstrates loading the functional image fpga_image from the PC Flash Card to the controller for the transponder module in slot 8, subcard 3.

```
Switch# reprogram slot0:fpga_image 8 3
```

Related Documentation

Refer to the following documents for more information about the Cisco ONS 15540 ESPx:

- *Regulatory Compliance and Safety Information for the Cisco ONS 15500 Series*
- *Cisco ONS 15540 ESPx Planning Guide*
- *Cisco ONS 15540 ESPx Optical Transport Turn-Up and Test Guide*
- *Cisco ONS 15540 ESPx Cleaning Procedures for Fiber Optic Connections*
- *Cisco ONS 15540 ESPx Configuration Guide*
- *Cisco ONS 15540 ESPx Command Reference*
- *Cisco ONS 15540 ESPx TL1 Command Reference*
- *Cisco ONS 15540 ESPx System Alarms and Error Messages*
- *Cisco ONS 15540 ESPx Troubleshooting Guide*
- *Network Management for the Cisco ONS 15540 ESPx*
- *MIB Quick Reference for the Cisco ONS 15500 Series*

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/univercd/home/home.htm

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

  http://www.cisco.com/en/US/partner/ordering/index.shtml

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

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170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool automatically provides recommended solutions. If your issue is not resolved using the recommended resources, your service request will be assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is "down," or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

  http://cisco.com/univercd/cc/td/doc/pcat/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and

troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

http://www.cisco.com/packet

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

http://www.cisco.com/go/iqmagazine

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

http://www.cisco.com/ipj

- World-class networking training is available from Cisco. You can view current offerings at this URL:

http://www.cisco.com/en/US/learning/index.html

This document is to be used in conjunction with the documents listed in the "Related Documentation" section.