

Recovering a Catalyst 6500/6000 Running Cisco IOS System Software from a Corrupted or Missing Boot Loader Image or ROMmon Mode

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Introduction

This document explains how to recover a Cisco Catalyst 6500/6000 series switch that runs Cisco IOS® system software from either a corrupted or a missing boot loader image on the Multilayer Switch Feature Card 1 (MSFC1). This document also explains the ROM monitor (ROMmon) recovery procedure with respect to the Supervisor Engine 32 and Supervisor Engine 720.

Note: You can use TFTP/FTP in order to transfer software image files from a PC to your device. This document uses output from the Cisco TFTP/FTP Server application. Cisco has discontinued this application and no longer supports it. If you do not have a TFTP/FTP server, obtain any third-party TFTP server application from another source.

Prerequisites

Requirements

This document assumes that your system ran the Cisco IOS Software image before the boot loader image was deleted or became corrupted. This document does not cover software conversion from Catalyst OS (CatOS) software to Cisco IOS Software, or from Cisco IOS Software to CatOS. For details on these conversions, refer to these documents:

- System Software Conversion from Cisco IOS to CatOS for Catalyst 6500/6000 Switches
- System Software Conversion from CatOS to Cisco IOS for Catalyst 6500/6000 Switches

This document uses this terminology:

- **SP (Supervisor Engine)** This is the switch component of the system and what initially used the CatOS software.
- **RP (route processor) MSFC** This is the router component of the system.
- **Cisco IOS Software** c6sup-xx image
- **CatOS** c6msfc-xx image

Note: Further details on the difference between the CatOS and Cisco IOS system software, and the naming convention that they use, appear in the Important Notes section of this document.

Components Used

This document is not restricted to specific software and hardware versions.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Important Notes

This section provides important information and terms to know when you perform the CatOS/Cisco IOS Software or Cisco IOS Software/CatOS conversions.

Difference Between CatOS and Cisco IOS System Software

- **CatOS system software** Catalyst 6500/6000 CatOS software is the image that runs on the Supervisor Engine and handles all of the Layer 2 (L2) switch functions. The image that runs on the Supervisor Engine is referred to as CatOS.
- **Cisco IOS system software** Cisco IOS Software on the Catalyst 6500/6000 series switch is the single Cisco IOS image that runs the Catalyst 6500/6000 series switch. The Supervisor Engine and the MSFC both run a single bundled Cisco IOS image.

Naming Convention That CatOS and Cisco IOS Images Use

- **CatOS system software:**

In the case of CatOS, the CatOS image on the Supervisor Engine starts with **cat6000***, and the Cisco IOS image on the MSFC starts with **c6msfc***. Examples of the images that are used on the Supervisor Engine and the MSFC are:

- ◆ **cat6000-sup.6-1-1b.bin** is the Catalyst 6500/6000 Supervisor Engine CatOS image, version 6.1(1b).
 - ◆ **c6msfc-boot-mz.121-4.E1** is the Catalyst 6500/6000 MSFC boot image, Cisco IOS Software Release 12.1(4)E1.
 - ◆ **c6msfc-ds-mz.121-4.E1** is the Catalyst 6500/6000 MSFC image, Cisco IOS Software Release 12.1(4)E1.
 - ◆ **c6msfc2-jsv-mz.121-4.E1** is the Catalyst 6500/6000 MSFC2 image, Cisco IOS Software Release 12.1(4)E1.
- **Cisco IOS system software:**

In the case of Cisco IOS Software, four types of images are listed on the Software Center. With the

release of the MSFC2 and Supervisor Engine 2, a change in the naming was necessary in order to indicate the code that will be supported.

c6supxy indicates the Supervisor Engine/MSFC combination upon which it will run, where **x** is the Supervisor Engine and **y** indicates MSFC.

- ◆ **c6sup** This is the original name for the Cisco IOS image. It runs on the Supervisor Engine 1, MSFC1.
- ◆ **c6sup11** Supervisor Engine 1, MSFC1
- ◆ **c6sup12** Supervisor Engine 1, MSFC2
- ◆ **c6sup22** Supervisor Engine 2, MSFC2

Here are examples:

- **c6sup-is-mz.120-7.XE1** is the Catalyst 6500/6000 Supervisor Engine Cisco IOS image (with Supervisor Engine 1/MSFC1), Cisco IOS Software Release 12.0(7)XE1.
- **c6sup11-is-mz.121-4.E1** is the Catalyst 6500/6000 Supervisor Engine Cisco IOS image (with Supervisor Engine 1/MSFC1), Cisco IOS Software Release 12.1(4)E1.
- **c6sup12-is-mz.121-4.E1** is the Catalyst 6500/6000 Supervisor Engine Cisco IOS image (with Supervisor Engine 1/MSFC2), Cisco IOS Software Release 12.1(4)E1.
- **c6sup22-psv-mz.121-5c.EX** is the Catalyst 6500/6000 Supervisor Engine Cisco IOS image (with Supervisor Engine 2/MSFC2), Cisco IOS Software Release 12.1(5c)EX.

Note: You can find and download all these images, with a complete list of other images, from the Switches Software and the Cisco IOS Software sections of the Software Center.

Catalyst 6500/6000 switches that run Cisco IOS Software have two boot Flash areas. The boot Flash area at the Supervisor Engine (SP) holds the Cisco IOS image, and the area at the MSFC (RP) holds the boot loader image. In order to run Cisco IOS Software on the Catalyst 6500/6000, you need to have both images installed.

Note: MSFC2 does not require a boot loader image (c6msfc*-boot) in the MSFC2 boot Flash device in order to boot successfully when you run Cisco IOS Software. However, leave the boot loader image in the RP boot Flash, in case you decide to revert to CatOS software. Depending on the ROMmon version, the boot loader image that the **show version** command output lists is either the actual boot loader or the boot image as per the `bootldr` variable.

If the boot loader image is either corrupted or has been deleted from the MSFC1 (RP) boot Flash, the next reload causes the switch to go into RP ROMmon. At that point, you cannot boot the switch in order to run Cisco IOS Software on it.

Note: If the RP previously had the MSFC boot image (c6msfc-xx) on the boot Flash, the Catalyst 6500/6000 could boot all the way up to the router prompt (`Router >`). However, this time the RP runs the old MSFC image (c6msfc-xx) and not the Cisco IOS image. You must perform the boot Flash recovery procedure that this document provides if you want the Catalyst 6500/6000 to successfully run the Cisco IOS image. The Recovery Procedure section provides this procedure. If you want to verify whether the RP runs the Cisco IOS image or the old MSFC image, issue the **show version** command at the router prompt. For this document, consider that the MSFC does not have the old MSFC boot image on its boot Flash.

Switch Is in Continuous Booting Loop or in ROMmon mode

The switch can go into a continuous booting loop or ROMmon mode for any of these reasons:

- The boot variables are not set correctly to boot the switch from a valid software image.
- The configuration register is not set correctly.

- The software image in the Flash memory is missing or corrupted, or there is a software upgrade failure.
- Fan tray mis-seated or not compatible with supervisor engine – C6KENV-2-FANUPGREQ.

Error messages similar to this appear:

```
00:01:56: %C6KENV-SP-2-FANUPGREQ: Module 5 not supported without fan upgrade
00:01:56: %C6KENV-SP-2-SHUTDOWN_SCHEDULED: shutdown for module 5 scheduled in 300 se
```

This issue can be the result of any of these situations:

- ◆ A compatibility problem with the supervisor engine installed and the fan tray. The supervisor can require a high-speed fan tray.
- ◆ The fan trays are mis-seated.
- ◆ The fan tray is damaged.

Before you proceed with the switch recovery procedure, resolve the fan tray issue. Depending on the root cause of the problem, complete one of these steps in order to resolve the issue:

- ◆ Upgrade the system fan tray.
- ◆ Reseat the fan tray.
- ◆ Replace the fan tray.

Refer to the *Fan Trays* section of Release Notes for Cisco IOS Release 12.2(33)SXH and Later Releases for more information about supervisor engine and fan tray compatibility on Cisco Catalyst switches that run Cisco IOS® Software.

For instructions on how to recover the Supervisor Engine from this issue, see the Recovery Procedure section of this document.

Recovery Procedure

You cannot boot the switch if you have MSFC1 and you lose the boot loader image that resides on the RP boot Flash. You can lose the image in one of these ways:

- A deletion or corruption occurred during the download.
- The file was transferred via FTP as ASCII instead of binary.

This section provides the current recovery to perform if you find that you cannot get the RP out of ROMmon.

Use the Xmodem procedure in order to load the boot loader image to the RP boot Flash. This procedure requires the Cisco IOS image to run on the Supervisor Engine module (SP).

The RP boot loader image is approximately 1.8 MB and takes about 45 minutes to load. These caveats apply to the Xmodem procedure:

- The Xmodem procedure does not save the downloaded image into the MSFC boot Flash.
- The Xmodem procedure only loads and runs the boot loader in the MSFC and puts it in boot mode.
- From boot mode, you must format the MSFC boot Flash before you copy the boot loader image into it.
- You must place the boot loader image that you want to load in the Supervisor Engine slot0 (PC Card).

Boot Loader Recovery Procedure with Use of Xmodem

You can only perform this procedure from the RP ROMmon. If you are at the wrong ROMmon (SP ROMmon) for some reason and you try to perform Xmodem, you see the "not executable" message.

Note: From this point, this document differentiates the SP and RP ROMmon prompts with the use of *italics* for *SP ROMmon* and blue text for RP ROMmon.

If the Catalyst 6500/6000 runs the Cisco IOS image and the boot loader image is either corrupted or missing from the MSFC1 (RP), the switch goes into either RP ROMmon or SP ROMmon at the next reload. This depends on the environment variable settings on the Catalyst 6500/6000.

1. Find out which ROMmon the switch is in.

This information is important because you can only perform the recovery procedure from the RP ROMmon. In order to make this determination, power cycle the switch and look at the bootup messages that appear just before the switch goes to the ROMmon.

If you see these messages after you power cycle the switch, you know that the Catalyst 6500/6000 is in the SP ROMmon:

```
System Bootstrap, Version 5.3(1)
Copyright (c) 1994-1999 by cisco Systems, Inc.
c6k_sup1 processor with 65536 Kbytes of main memory

!--- The System Bootstrap, Version 5.3(1) and c6k_sup1 processor
!--- keywords show that the switch is in the SP ROMmon.

rommon 1 >
```

If you see these messages after you power cycle the switch, you know that the Catalyst 6500/6000 is in the RP ROMmon:

```
boot: cannot determine first file name on device "bootflash:"
System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE
Copyright (c) 1998 by cisco Systems, Inc.

Cat6k-MSFC platform with 65536 Kbytes of main memory

!--- The System Bootstrap, Version 12.0(3)XE and Cat6k-MSFC
!--- keywords show that the switch is in the RP ROMmon.

rommon 1 >
```

If you find that the switch is in SP ROMmon, go to Step 2. If the switch is in RP ROMmon, go to Step 3.

2. From the SP ROMmon, issue the **boot** command.

The command puts the switch in the RP ROMmon:

```
rommon 1 >boot

Self decompressing the image : #####

!--- Output suppressed.

boot: cannot determine first file name on device "bootflash:"

System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE
Copyright (c) 1998 by cisco Systems, Inc.
```

Cat6k-MSFC platform with 131072 Kbytes of main memory

```
rommon 1 >
```

```
!--- You are at the RP ROMmon.
```

3. You can verify that the boot image really does exist on the boot Flash and that the BOOTLDR= variable was either not set or was set incorrectly on the MSFC.

Issue this set of commands in order to verify:

```
rommon 1
>set
PS1=rommon ! >
CONFIG_FILE=
?=0
BOOTLDR=bootflash:c6msfc-boot-mz.121-4.E1
SLOTCACHE=cards;
BOOT=sup-bootflash:c6sup11-jsv-mz.121-6.E,1;
```

```
rommon 2
>dir bootflash:
      File size           Checksum   File name

!--- Notice that there is no boot loader file
!--- present in the RP boot Flash.
```

```
rommon 3 >
```

4. Go back to SP ROMmon and make sure that the Cisco IOS image is present either on the SP boot Flash or on the PC Card (slot0).

Note the name of the image, which you will use as you continue the recovery procedure. Power cycle the switch. If necessary, hit the break sequence in order to go into the SP ROMmon.

Note: If, in Step 1 of this procedure, you found that the switch went to RP ROMmon after the power cycle, you must hit the break sequence in order to go into the SP ROMmon. Make sure that you hit the break sequence before the SP transfers the control to the RP. Otherwise, the switch again goes back to RP ROMmon. If you found that the switch went to SP ROMmon, you do not need to hit the break sequence. Simply power cycle the switch. In this example, the break sequence is hit to go into the SP ROMmon:

```
rommon 4 >
```

```
!--- The switch is power cycled and you start to see these messages:
```

```
System Bootstrap, Version 5.3(1)
Copyright (c) 1994-1999 by cisco Systems, Inc.
```

```
c6k_sup1 processor with 65536 Kbytes of main memory
```

```
!--- As soon as you as you see this message,
!--- hit the break sequence. Refer to the
!--- Standard Break Key Sequence Combinations During Password Recovery
```

!--- document for a complete list of break keys on different devices.

```
Autoboot executing command: "boot bootflash:c6sup11-jsv-mz.121-6.E"
```

```
monitor: command "boot" aborted due to user interrupt
Exit at the end of BOOT string
rommon 1 >
```

!--- You are at the SP ROMmon.

5. Issue the **dir bootflash:** command and the **dir slot0:** command in order to verify if either the SP or the PC Card has the Cisco IOS image.

Also, make sure that the boot loader image is present on the slot0:. You will need this boot loader image as you continue the procedure.

```
rommon 1 >dir bootflash:
      File size      Checksum  File name
13465088 bytes (0xcd7600) 0x326c0628  c6sup11-jsv-mz.121-6.E
rommon 2 >dir slot0:
      File size      Checksum  File name
1675428 bytes (0x1990a4) 0x58701c18  c6msfc-boot-mz.121-4.E1
```

Note: Write down the names of the images at this point, as you will use these names as you continue the recovery procedure. Also, notice that in this case the Cisco IOS image is present on the SP boot Flash. You must see both of these:

- ◆ The Cisco IOS image either on the SP boot Flash or the PC Card
- ◆ The boot loader image on the slot0:

Note: If you do not see both of these images, find another platform with the capability to either transfer files via TFTP or copy the images onto the PC Card. Copy those images on the PC Card.

6. Issue the **boot bootflash:cisco_ios_image** command in order to boot the SP.

The switch goes back to the RP ROMmon:

```
rommon 3 >boot bootflash:c6sup11-jsv-mz.121-6.E

!--- If you found the Cisco IOS image on the PC Card (slot0:),
!--- issue this command instead:

!--- rommon 3 >boot slot0:c6sup11-jsv-mz.121-6.E

Self decompressing the image : #####

!--- Output suppressed.
```

```
##### [OK]
```

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170 West Tasman Drive
San Jose, California 95134-1706

```
Cisco Internetwork Operating System Software
IOS (tm) c6sup1_sp Software (c6sup1_sp-SPV-M), Version 12.1(6)E,
EARLY DEPLOYMENT RELEASE SOFTWARE (fc3)
TAC Support: http://www.cisco.com/cgi-bin/ibld/view.pl?i=support
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Sat 17-Mar-01 00:52 by eaarmas
Image text-base: 0x60020950, data-base: 0x605FC000
```

Start as Primary processor

```
00:00:03: %SYS-3-LOGGER_FLUSHING:
System pausing to ensure console debugging output.
```

!--- The SP transfers the control to the RP.

```
00:00:03: %OIR-6-CONSOLE: Changing console ownership to route processor
```

```
System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE
Copyright (c) 1998 by cisco Systems, Inc.
Cat6k-MSFC platform with 131072 Kbytes of main memory
```

```
open(): Open Error = -9
loadprog: error - on file open
open: failed to find and/or load the bootloader:
"bootflash:c6msfc-boot-mz.121-4.E1"
```

```
loadprog: error - on file open
boot: cannot load "cisco2-Cat6k-MSFC"
```

```
System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE
Copyright (c) 1998 by cisco Systems, Inc.
Cat6k-MSFC platform with 131072 Kbytes of main memory
```

```
boot: cannot determine first file name on device "bootflash:"
```

```
System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE
Copyright (c) 1998 by cisco Systems, Inc.
Cat6k-MSFC platform with 131072 Kbytes of main memory
```

rommon 1 >

!--- Now, the switch is back at RP ROMmon.

7. Issue the **xmodem** command in order to download the boot loader image on the RP.

The default console port speed for the Catalyst 6500/6000 is 9600 bits per second (bps). If you use the Xmodem protocol at this speed, a typical boot loader image transfer can take up to 45 minutes. If you use the Ymodem protocol and change the console port speed to 38,400 bps, you can increase the data throughput rate substantially. At this speed, a typical boot loader image transfer takes approximately 10 minutes. While an increase in the console port speed results in a much faster image transfer, the process involves a few additional steps. This step of the procedure presents both methods, and you can choose the one to use.

In order to proceed, choose to either transfer a boot loader image at 9600 bps with Xmodem or at 38,400 bps with Ymodem.

◆ **Transfer a boot loader image at 9600 bps with Xmodem**

Make sure that you have the boot loader image local on the PC to use for the Xmodem

transfer. Issue the **xmodem -s9600 -c** command on the RP ROMmon in order to initiate the download of the boot loader image:

```
rommon 1
>xmodem -s9600 -c
```

```
!--- The -s9600 option sets the speed
!--- while the -c option performs checksum.
```

Do not start sending the image yet...

Invoke this application for disaster recovery.
Do you wish to continue? y/n [n]: y

Note, if the console port is attached to a modem, both the console port and the modem must be operating at the same baud rate. Use console speed 9600 bps for download [confirm]

```
!--- Press Enter.
```

Download will be performed at 9600. Make sure your terminal emulator is set to this speed before sending file.

Ready to receive file ...

```
!--- As soon as you see the message "Ready to receive file",
!--- start to send the file from Microsoft HyperTerminal with the Xmodem
!--- protocol. Use these steps on the HyperTerminal in order to send
!--- the file:
!--- 1) From the HyperTerminal menu bar, choose Transfer > Send File.
!--- This brings up a Send File window.
!--- 2) Click Browse in order to select the file.
!--- 3) Verify the protocol to be Xmodem.
!--- If it is something other than Xmodem, select Xmodem from the
!--- drop-down menu.
!--- 4) Click Send.
!--- This starts the transfer of the file.
```

Returning console speed to 9600.

Please reset your terminal emulator to this speed...

Download Complete!

```
Self decompressing the image : #####
#####
#####
##### [OK]
```

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```
Cisco Internetwork Operating System Software
IOS (TM) MSFC Software (C6MSFC-BOOT-M),
  Version 12.1(4)E1,
EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Mon 13-Nov-00 17:23 by eaarmas
Image text-base: 0x60008950, database: 0x603E0000
```

```
cisco Cat6k-MSFC (R5000) processor with 114688K/16384K bytes of memory.
Processor board ID SAD0350047X
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
Last reset from power-on
X.25 software, Version 3.0.0.
123K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.
```

```
16384K bytes of Flash internal SIMM (Sector size 256K).
```

```
Press RETURN to get started!
```

```
00:00:02: %SYS-5-RESTART: System restarted --
Cisco Internetwork Operating System Software
IOS (TM) MS
```

```
Router(boot)>
```

Note: This procedure can take up to 35 to 45 minutes. Also, the first Xmodem transfer can fail with this error message:

```
"Error : compressed image checksum is incorrect 0xBAA10EAA
  Expected a checksum of 0x6F65EA12

*** System received a Software forced crash ***
signal= 0x17, code= 0x5, context= 0x0

PC = 0x800080d4, Cause = 0x20, Status Reg = 0x3040d003"
```

Do not reset the RP. Issue the **xmodem** command again, and wait 35 to 45 minutes. This time, the transfer succeeds.

Note: The Xmodem download does not copy the boot loader image into the MSFC boot Flash. The download simply loads and uncompresses the image in order to run the MSFC. You must copy the boot loader image from the Supervisor Engine slot0, into the MSFC boot Flash.

Note: When you finish the Xmodem procedure, proceed to Step 8.

◆ **Transfer a boot loader image at 38,400 bps with Ymodem**

Make sure that you have the boot loader image local on the PC to use for the Ymodem transfer. Issue the **xmodem -y -s38400** command on the RP ROMmon in order to initiate the download of the boot loader image:

```
rommon 1 >xmodem -y -s38400
```

```
!--- The -y option selects the Ymodem protocol.
!--- The -s38400 option sets the speed*.*
```

Do not start sending the image yet...

Invoke this application for disaster recovery.
Do you wish to continue? y/n [n]: y

Note, if the console port is attached to a modem, both the console port and the modem must be operating at the same baud rate. Use console speed 38400 bps for download [confirm]

*!--- Press **Enter**.*

Download will be performed at 38400. Make sure your terminal emulator is set to this speed before sending file.

Ready to receive file ...

*!--- As soon as you see the message "Ready to receive file",
!--- perform these steps on the HyperTerminal in order to send the file:
!--- 1) Click **Disconnect**.
!--- 2) Click **Properties > Configure *.***
!--- 3) Choose **38400** from the drop-down menu in order to set the bps,
!--- and click **OK** in order to confirm.
!--- 4) Click **Connect** in order to reconnect at 38,400 bps.
!--- 5) Choose **Transfer > Send File**.
!--- This brings up a Send File window.
!--- 6) Click **Browse** in order to select the file.
!--- 7) Verify the protocol to be Ymodem.
!--- If it is something other than Ymodem, select **Ymodem** from
!--- the drop-down menu.
!--- 8) Click **Send**.
!--- This starts the transfer of the file.*

Returning console speed to 9600.

Please reset your terminal emulator to this speed...

*!--- When the transfer is complete, you see "Returning console speed to
!--- 9600" and then "Please reset your terminal emulator to this speed..."
!--- 1) Click **Disconnect** in HyperTerminal.
!--- 2) Click **Properties > Configure**.
!--- 3) Choose **9600** from the drop-down menu,
!--- and click **OK** in order to confirm.
!--- 4) Click **Connect** in order to reconnect at 9600 bps.

!--- On the basis of the amount of time necessary in order
!--- to complete these steps and reconnect at 9600 bps,
!--- you either see the bootup or simply the Router(boot)> prompt.*

Download Complete!

Self decompressing the image : #####

[OK]

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Cisco Internetwork Operating System Software
IOS (TM) MSFC Software (C6MSFC-BOOT-M),
Version 12.1(4)E1,
EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Mon 13-Nov-00 17:23 by eaarmas
Image text-base: 0x60008950, database: 0x603E0000

cisco Cat6k-MSFC (R5000) processor with 114688K/16384K bytes of memory.
Processor board ID SAD0350047X
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
Last reset from power-on
X.25 software, Version 3.0.0.
123K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.

16384K bytes of Flash internal SIMM (Sector size 256K).

Press RETURN to get started!

00:00:02: %SYS-5-RESTART: System restarted --
Cisco Internetwork Operating System Software
IOS (TM) MS

Router(boot)>

Note: The Ymodem download does not copy the boot loader image into the MSFC boot Flash. The download simply loads and uncompresses the image in order to run the MSFC. You must copy the boot loader image from the Supervisor Engine slot0: into the MSFC boot Flash.

8. Format the RP boot Flash before you copy the boot loader image onto it.

Issue this set of commands in order to format the RP boot Flash:

```
Router(boot)>enable
Router(boot)#format bootflash:
Format operation may take a while. Continue? [confirm]
```

!--- Press Enter.

```
Format operation will destroy all data in "bootflash:". Continue? [confirm]
```

!--- Press Enter.

```
Formatting sector 1
Format of bootflash complete
```

```
Router(boot)#dir bootflash:
Directory of bootflash:/
```

```
No files in directory
```

15990784 bytes total (15990784 bytes free)

9. Copy the c6msfc-boot image from slot0: to the RP boot Flash.

Note: There are two important factors to consider at this stage:

- ◆ The **copy** command does not work in boot mode.
- ◆ The **dir slot0:** command and the **dir sup-slot0:** command are not recognized in boot mode.

If you attempt to issue these commands, you see this:

```
Router(boot)#dir slot0:
% Invalid input detected at '^' marker.
```

```
!--- You cannot look at the directory with the use of either
!--- one of these commands. You must know that
!--- the boot image is on the Flash card
!--- and know the name of the image in advance.
```

```
Router(boot)#dir sup-slot0:
%Error opening sup-slot0:/ (Invalid argument)
```

Instead, use one of these two commands in order to copy the boot image. The command to use depends on the software version:

- ◆ If you run any version that is **earlier than c6msfc-boot-mz.121-12c.E2**, the command is **download**.
- ◆ In version **c6msfc-boot-mz.121-12c.E2 and later**, the name of the command is changed. The command is **emergency-download**.

Note: The **download** command and the **emergency-download** command are hidden commands. You cannot **Tab** in order to complete them, and you must use the correct command syntax in order to copy the boot image successfully into the RP boot Flash. Here is the correct command syntax:

```
Router(boot)#download slot0:
c6msfc-boot-mz.121-4.E1 bootflash:c6msfc-boot-mz.121-4.E1
```

```
!--- This command should be on one line.
```

```
Attempt to download 'slot0:c6msfc-boot-mz.121-4.E1' ... okay
Starting download of 'slot0:c6msfc-boot-mz.121-4.E1': 1675428 bytes!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Checksum: Verified!
Writing image to bootflash:c6msfc-boot-mz.121-4.E1
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
CCCCCCCCCCCCCCCCCCCCCCCCCCCC
%Download successful
```

```
!--- Verify that the image is copied successfully.
```

```
Router(boot)#dir bootflash:
Directory of bootflash:/
  1  -rw-     1675428   Jan 01 2000 00:01:43   c6msfc-boot-mz.121-4.E1
15990784 bytes total (14315228 bytes free)
Router(boot)#
```

10. Bring up the switch that runs Cisco IOS Software and verify these items:

- ◆ The configuration register is set to at least 0x102.
- ◆ The right boot variables are correctly set.

Issue this set of commands in order to set and verify the boot variables:

```
Router(boot)#show bootvar
```

```
BOOT variable = sup-bootflash:c6sup11-jsv-mz.121-6.E,1;
CONFIG_FILE variable =
BOOTLDR variable = bootflash:c6msfc-boot-mz.121-4.E1
Configuration register is 0x2102
```

```
Router(boot)#
```

Notice that, in this case, all the boot variables are set correctly and the configuration register value is set to 0x2102. If you find that the boot variables are not set correctly, issue this set of commands in order to change the boot variables and the configuration register value:

```
Router(boot)#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.

!--- Set the configuration register value.

Router(boot)(config)#config-register 0x2102

!--- Set the boot variable.

Router(boot)(config)#boot system flash sup-bootflash:c6sup11-jsv-mz.121-6.E

!--- Set the boot loader variable.

Router(boot)(config)#boot bootldr bootflash:c6msfc-boot-mz.121-4.E1

Router(boot)(config)#end
Router(boot)#
00:01:53: %SYS-5-CONFIG_I: Configured from console by console

!--- Save the configuration.

Router(boot)#write memory
Building configuration...
[OK]

!--- Verify the settings.

Router(boot)#show bootvar
BOOT variable = sup-bootflash:c6sup11-jsv-mz.121-6.E,1;
CONFIG_FILE variable =
BOOTLDR variable = bootflash:c6msfc-boot-mz.121-4.E1
Configuration register is 0x0 (will be 0x2102 at next reload)

Router(boot)#
```

11. Reload the RP.

The RP comes back with the Cisco IOS Software loaded on it:

```
Router(boot)#reload
Proceed with reload? [confirm]
00:09:23: %SYS-5-RELOAD: Reload requested
System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE
Copyright (c) 1998 by cisco Systems, Inc.
Cat6k-MSFC platform with 131072 Kbytes of main memory

Self decompressing the image : #####
#####
#####
```

[OK]

Attempt to download 'sup-bootflash:c6sup11-jsv-mz.121-6.E' ... okay
Starting download of 'sup-bootflash:c6sup11-jsv-mz.121-6.E': 8722810 bytes
!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Chksum: Verified!
Self decompressing the image : #####

!--- Output suppressed.

[OK]

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cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706

Cisco Internetwork Operating System Software
IOS (TM) c6sup1_rp Software (c6sup1_rp-JSV-M),
Version 12.1(6)E, EARLY DEPLOYMENT RELEASE SOFTWARE (fc3)
TAC Support: <http://www.cisco.com/cgi-bin/ibld/view.pl?i=support>
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Sat 17-Mar-01 00:14 by eaarmas
Image text-base: 0x60020950, database: 0x6165E000

cisco Catalyst 6000 (R5000) processor with 114688K/16384K bytes of memory.
Processor board ID SAD04281AF6
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
Last reset from power-on
Bridging software.

X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
24 Ethernet/IEEE 802.3 interface(s)
1 Virtual Ethernet/IEEE 802.3 interface(s)
48 FastEthernet/IEEE 802.3 interface(s)
2 Gigabit Ethernet/IEEE 802.3 interface(s)
381K bytes of nonvolatile configuration memory.
4096K bytes of packet SRAM memory.

16384K bytes of Flash internal SIMM (Sector size 256K)..

Press RETURN to get started!

00:00:03: %SYS-3-LOGGER_FLUSHED:
System was paused for 00:00:00 to ensure console debugging output.

00:00:04: %C6KPWR-4-PSINSERTED: power supply inserted in slot 1.
00:00:04: %C6KPWR-4-PSOK: power supply 1 turned on.
00:47:01: %SYS-SP-5-RESTART: System restarted --

```
Cisco Internetwork Operating System Software
IOS (TM) c6sup1_SP Software (c6sup1_sp-SPV-M),
Version 12.1(6)E, EARLY DEPLOYMENT RELEASE SOFTWARE (fc3)
TAC Support: http://www.cisco.com/cgi-bin/ibld/view.pl?i=support
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Sat 17-Mar-01 00:52 by eaarmas
Cisco Internetwork Operating System Software
IOS (TM) c6sup1_RP Software (c6sup1_rp-JSV-M),
Version 12.1(6)E, EARLY DEPLOYMENT RELEASE SOFTWARE (fc3)
TAC Support: http://www.cisco.com/cgi-bin/ibld/view.pl?i=support
```

```
Router >
```

12. Verify that the switch runs the Cisco IOS image.

Issue the **show version** command:

```
Router >show version
```

```
Cisco Internetwork Operating System Software
IOS (TM) c6sup1_RP Software (c6sup1_rp-JSV-M),
Version 12.1(6)E, EARLY DEPLOYMEN
T RELEASE SOFTWARE (fc3)
TAC Support: http://www.cisco.com/cgi-bin/ibld/view.pl?i=support
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Sat 17-Mar-01 00:14 by eaarmas
Image text-base: 0x60020950, database: 0x6165E000
```

```
ROM: System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE
BOOTFLASH: MSFC Software (C6MSFC-BOOT-M), Version 12.1(4)E1,
EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)
```

```
Test uptime is 51 minutes
System returned to ROM by reload (SP by power-on)
System image file is "sup-bootflash:c6sup11-jsv-mz.121-6.E"
```

```
cisco Catalyst 6000 (R5000) processor with 114688K/16384K bytes of memory.
Processor board ID SAD04281AF6
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
--More--
```

13. Make sure that RP and SP are both set to boot automatically.

Issue this set of commands in order to check and change the boot variables (if needed) so that the system boots up normally with the Cisco IOS image on it:

Note: The **remote** command that this step uses is supported in early Cisco IOS Software releases. In Cisco IOS Software Release 12.1(5c)EX and later, this command format is changed. In releases that are earlier than Cisco IOS Software Release 12.1(5c)EX, the command format is **remote command command**. In Cisco IOS Software Release 12.1(5c)EX and later, you can use the command format **remote command switch command**. In your recovery procedure, check the Cisco IOS Software release that is used on your switch, and use the appropriate command format.

```
Router >enable
```

```
!--- Check the boot variables on the RP.
```

```
Router#show bootvar
BOOT variable = sup-bootflash:c6sup11-jsv-mz.121-6.E,1;
CONFIG_FILE variable =
```

```
BOOTLDR variable = bootflash:c6msfc-boot-mz.121-4.E1  
Configuration register is 0x2102
```

!--- Check the boot variables on the SP.

```
Router#remote command show bootvar
```

*!--- See the "Note" that is given at beginning of this step
!--- in order to use this command.*

```
Router-sp#  
BOOT variable = bootflash:c6sup11-jsv-mz.121-6.E,1;  
CONFIG_FILE variable =  
BOOTLDR variable does not exist  
Configuration register is 0x2102
```

```
Router#dir sup-bootflash:
```

```
Directory of sup-bootflash:/
```

```
      1  -rw-      13465088   Jan 12 2000 22:39:01  c6sup11-jsv-mz.121-6.E
```

```
15990784 bytes total (2525568 bytes free)
```

```
Router#dir bootflash:
```

```
Directory of bootflash:/
```

```
      1  -rw-      1675428   Jan 01 2000 00:01:43  c6msfc-boot-mz.121-4.E1
```

```
15990784 bytes total (14315228 bytes free)
```

If you look at these outputs, you notice that the boot variables are set correctly and all the files that are necessary to run the Cisco IOS image on the Catalyst 6500/6000 with MSFC1 are present.

If you see that the boot variables are not set correctly, either on the RP or on the SP, issue this set of commands in order to correct these variables:

```
Router#configure terminal
```

```
Enter configuration commands, one per line.  End with CNTL/Z.
```

!--- Set the configuration register value.

```
Router (config)#config-register 0x2102
```

!--- Set the boot variable.

```
Router(config)#boot system flash sup-bootflash:c6sup11-jsv-mz.121-6.E
```

!--- Set the boot loader variable.

```
Router (config)#boot bootldr bootflash:c6msfc-boot-mz.121-4.E1
```

```
Router(config)#end
```

```
Router#
```

```
00:01:53: %SYS-5-CONFIG_I: Configured from console by console
```

!--- Save the configuration.

```
Router#write memory
```

```
Building configuration...
```

```
[OK]
```

!--- Verify the settings on the RP.

```
Router#show bootvar
BOOT variable = sup-bootflash:c6sup11-jsv-mz.121-6.E,1;
CONFIG_FILE variable =
BOOTLDR variable = bootflash:c6msfc-boot-mz.121-4.E1
Configuration register is 0x0 (will be 0x2102 at next reload)
```

!--- Verify the settings on the SP.

```
Router#remote command show bootvar
```

*!--- See the "Note" that is given at beginning of this
!--- step in order to use this command.*

```
Router-sp#
BOOT variable = bootflash:c6sup11-jsv-mz.121-6.E,1;
CONFIG_FILE variable =
BOOTLDR variable does not exist
Configuration register is 0x0 (will be 0x2102 at next reload)
```

14. Reload the router in order to see if it boots properly.

```
Router#reload
Proceed with reload? [confirm]
```

!--- Press Enter.

!--- Output suppressed.

Recover a Supervisor Engine 720 from a Missing/Corrupted Cisco IOS Image or ROMmon Mode

The Supervisor Engine 720/MSFC3 includes some features that vary from its predecessors. These variations include:

- The Supervisor Engine 720 for the MSFC3 requires no boot image. The basic functionality to boot the MSFC3 is embedded in ROMmon (which includes TFTP capability). You can boot MSFC3 images from any of these:
 - ◆ bootflash
 - ◆ sup-disk0 (disk0)
 - ◆ sup-disk1 (disk1)
 - ◆ sup-bootflash
- The Supervisor Engine 720 ships with 64 MB of Supervisor Engine bootflash and 64 MB of MSFC bootflash. There are two slots that are available for CompactFlash Type II cards (disk0 and disk1) which provide additional storage.
- The Supervisor Engine 720 features the Policy Feature Card 3 (PFC3), which is equipped with a high-performance application-specific integrated circuit (ASIC) complex that supports a range of hardware-based features. The PFC3 supports:
 - ◆ Routing and bridging
 - ◆ QoS
 - ◆ Multicast packet replication

In addition, PFC3 processes security policies such as access control lists (ACLs).

- The Xmodem recovery procedure is not supported in Supervisor 720.
- The MSFC3 is an integral part of the Supervisor Engine 720. Therefore, it is nonmodular in these switches.

Cisco IOS Software Naming Conventions for the Supervisor Engine 720

The Cisco IOS image in the Supervisor Engine 720 is displayed in the form **s720xy**, where **xy** indicates the MSFC/PFC combination on the Supervisor Engine 720. The **x** is the MSFC version and **y** is the PFC version. These versions appear in boldface here:

- **s72033** MSFC3, PFC3

Here is an example of the Cisco IOS Software naming convention for the Supervisor Engine 720:

- **s72033-jk9s-mz.122-14.SX** is the Catalyst 6500 Supervisor Engine 720 Cisco IOS Software Release 12.2(14)SX image (with Supervisor Engine 720/MSFC3/PFC3a).

Supervisor 720 Recovery Procedure

You cannot boot the switch when you encounter any of these situations:

- The Cisco IOS image that is present in the Supervisor Engine boot Flash (sup-bootflash) is deleted or the boot variable specifies an invalid location. The location that the boot variable specifies can include:
 - ◆ bootflash
 - ◆ sup-disk0 (disk0)
 - ◆ sup-disk1 (disk1)
 - ◆ sup-bootflash

Here, bootflash refers to the MSFC3 boot Flash area. **However, in ROMmon mode, an issue of the `dir bootflash` command refers to the `sup-bootflash`.** In normal mode, the sup-bootflash refers to the Supervisor Engine 720 internal Flash memory. The sup-disk0 and sup-disk1 refer to the external Flash PC Cards (PCMCIA). The image can be stored in any of the locations in the list above.

- A deletion or corruption occurred during the download.
- The file was transferred via FTP as ASCII instead of binary.

This section provides the current recovery to perform if you find that you cannot get the Supervisor Engine 720 out of ROMmon.

Assume that the switch enters into the ROMmon mode after a reload with this output:

```
!--- Output suppressed.
```

```
System Bootstrap, Version 8.1(3)  
Copyright (c) 1994-2004 by cisco Systems, Inc.  
Cat6k-Sup720/SP processor with 1048576 Kbytes of main memory
```

```
Autoboot: failed, BOOT string is empty
```

```
rommon 1 >
```

The switch is now stuck in ROMmon mode.

Note: In ROMmon mode, the term "bootflash" refers to the "sup-boot flash".

As the Recover a Supervisor Engine 720 from a Missing/Corrupted Cisco IOS Image or ROMmon Mode section mentions, **the Supervisor Engine 720 does not support the Xmodem recovery procedure.**

Therefore, always keep a copy of the image in disk0 or disk1, or the MSFC boot Flash. If you do not have any copies on either disk0 or disk1 and you encounter the problem of a missing/corrupted image, the only way to recover is to copy the image on the Flash disk from another switch.

Now, return to the scenario. When you are stuck in ROMmon mode, issue these commands in order to verify that there is a valid image in the boot Flash:

1. Issue the **dir bootflash:** command.

```
rommon 1
>dir bootflash:
      File size           Checksum   File name

!--- Notice that there is no file present in the boot Flash.
```

2. Issue the **dir disk0:** command in ROMmon mode in order to verify that disk0 has a valid image in it.

Note: Be sure to make a copy of this image into your Flash disk (disk0 or disk1) from another switch that holds the same valid image. In order to make the copy, you can remove the Flash card (which is represented as disk0 or disk1) from your switch and insert the Flash card into another functional switch. Then, copy the image from that switch into this Flash card, and reinsert the Flash card back into your switch. Perform this step well in advance in order to avoid downtime of the switch.

```
rommon 13
>dir disk0:

File size           Checksum   File name
45463592 bytes (0x104aecc)  0x9a2f0302  s720333-psv-mz.122-18.SXD7.bin

!--- This output indicates that disk0 contains a valid copy of the image.
```

3. Boot the switch from the ROMmon mode with the help of the image that is available in disk0.

Issue this command:

```
rommon 2 >boot disk0:s72033-psv-mz.122-18.SXD7.bin

!--- This is the name of the Cisco IOS image in disk0.

Loading image, please wait ...

Self decompressing the image : #####
#####
#####
#####
##### [OK]
```

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cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706

Cisco Internetwork Operating System Software
IOS (tm) s72033_sp Software (s72033_sp-PSV-M), Version 12.2(18)SXD7, RELEASE SOFTWARE (fc1)
Technical Support: <http://www.cisco.com/techsupport>
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Tue 13-Dec-05 21:47 by kellythw
Image text-base: 0x4002100C, data-base: 0x40FD8000

00:00:03: %SYS-3-LOGGER_FLUSHING: System pausing to ensure console debugging output.

00:00:03: %PFREDUN-6-ACTIVE: Initializing as ACTIVE processor

00:00:04: %SYS-3-LOGGER_FLUSHING: System pausing to ensure console debugging output.

00:00:04: %SYS-3-LOGGER_FLUSHED: System was paused for 00:00:00 to ensure console debugging output.

00:00:04: %OIR-6-CONSOLE: Changing console ownership to route processor

System Bootstrap, Version 12.2(17r)S2, RELEASE SOFTWARE (fc1)
TAC Support: <http://www.cisco.com/tac>
Copyright (c) 2004 by cisco Systems, Inc.
Cat6k-Sup720/RP platform with 1048576 Kbytes of main memory

Download Start

!!
!!
!!
!!
!!
!!
!!
!!!!!!

*!--- Now the image is downloaded into the RP (MSFC3) boot Flash
!--- automatically. So now the console transfers to RP.*

Download Completed! Booting the image.
Self decompressing the image : #####

[OK]

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!--- Output suppressed.

Cisco Internetwork Operating System Software
IOS (tm) s72033_rp Software (s72033_rp-PSV-M), Version 12.2(18)SXD7, RELEASE SOFTWARE

TWARE (fc1)

!--- Output suppressed.

65536K bytes of Flash internal SIMM (Sector size 512K).

Press RETURN to get started!

!--- Output suppressed.

00:01:40: %OIR-SP-6-INSCARD: Card inserted in slot 5, interfaces are now online

Cat6509>

Now, the switch is in RP mode.

4. In RP mode, issue these commands in order to copy the image into sup-bootflash:

```
Cat6509>enable
cat6509#copy disk0:s72033-psv-mz.122-18.SXD7.bin sup-bootflash:
Destination filename [s72033-psv-mz.122-18.SXD7.bin]?
Copy in progress...CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
```

!--- Output suppressed.

45463592 bytes copied in 322.160 secs (141121 bytes/sec)

*!--- The copy command moves the image that is present in
!--- disk0 into the sup-bootflash.*

```
Cat6509-E#
cat
```

5. Set the boot variable to boot from sup-bootflash after the next reload.

Issue these commands:

```
Cat6509-E#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Cat6509-E(config)#boot system sup-bootflash:s72033-psv-mz.122-18.SXD7.bin
Cat6509-E(config)#exit
```

*!--- Now the boot variable is set to boot the image from sup-bootflash during the
!--- next reload. You can also specify the boot variable to boot from the
!--- disk0 itself.*

```
Cat6509-E#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
```

!--- Now the configuration is saved into NVRAM.

```
Cat6509-E#reload
Proceed with reload? [confirm]y
```

```
00:04:34: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload Comm
and.
00:04:37: %SYS-SP-3-LOGGER_FLUSHING: System pausing to ensure console debugging
output.

00:04:37: %OIR-SP-6-CONSOLE: Changing console ownership to switch processor
```

!--- Output suppressed.

```
System Bootstrap, Version 8.1(3)
Copyright (c) 1994-2004 by cisco Systems, Inc.
Cat6k-Sup720/SP processor with 1048576 Kbytes of main memory
```

!--- Output suppressed.

Loading image, please wait ...

```
Self decompressing the image : #####
#####[OK]
```

!--- This indicates that the switch boots properly.

!--- Output suppressed.

Press RETURN to get started!

!--- Output suppressed.

```
Cat6509-E>enable
```

```
Cat6509-E#show boot
BOOT variable = sup-bootflash:s72033-psv-mz.122-18.SXD7.bin,1
```

!--- This informs the device to search for the image from sup-bootflash for boot.

```
CONFIG_FILE variable =
BOOTLDR variable =
Configuration register is 0x2102
```

Standby is not up.

Note: You can set more than one boot variable with the **boot system** command. If the specified boot variable is a valid one, the switch tries to boot based on the order of the boot variables that you specified.

Recover a Supervisor Engine 32 from a Missing/Corrupted Cisco IOS Image or ROMmon Mode

The Supervisor Engine 32/MSFC2A has many similarities with that of the Supervisor Engine 720/MSFC3. The similarities include:

- The Supervisor Engine 32 does not require a separate boot loader image in the MSFC.
- The MSFC2A is an integral part of the Supervisor Engine 32. Therefore, it is nonmodular in these switches.

There are also some differences between the Supervisor Engine 32 and the Supervisor Engine 720 with respect to the recovery procedure. Some of these variations are:

- The Xmodem recovery procedure is supported in the Supervisor Engine 32.
- The image that is present in the Supervisor Engine 32 is referred to as "sup-bootdisk". In the Supervisor Engine 720, the image is referred to as "sup-bootflash".
- The Supervisor Engine 32 supports only a single external CompactFlash slot (disk0). The default size for the internal CompactFlash memory is 64 MB.

Cisco IOS Software Naming Conventions for the Supervisor Engine 32

The Supervisor Engine 32 Cisco IOS images are displayed at the console in the form **s32xy**, where **xy** indicates the MSFC/PFC combination on the Supervisor Engine 32. The **x** is the MSFC version, and **y** is the PFC version.

Here is an example of the Cisco IOS Software naming convention for the Supervisor Engine 32:

- **s3223-ipbasek9_wan-mz.122-18.SXF** is the Catalyst 6500 Supervisor Engine 32 Cisco IOS Software Release 12.2(18)SXF image (with Supervisor Engine 32/MSFC2A/PFC3B).

Supervisor Engine 32 Recovery Procedure

The same circumstances that can cause Supervisor Engine 720-based switches to enter into ROMmon mode also apply to Supervisor Engine 32-based switches. See the Supervisor 720 Recovery Procedure section of this document for details.

Assume that the switch is now stuck in ROMmon mode with this prompt at the console after a reload:

```
rommon 1 >
```

Complete these steps in order to troubleshoot:

1. Issue this command in order to determine if a valid image is available in the bootdisk:

Note: The bootdisk in ROMmon mode refers to the sup-bootdisk. Similarly, for the Supervisor Engine 720, bootflash (in ROMmon mode) refers to the sup-bootflash. See the Supervisor 720 Recovery Procedure section.

```
rommon 2 >dir bootdisk:
```

```
File size          Checksum   File name
```

```
!--- Notice that there is no image present in the boot disk.
```

2. Ensure that a valid Cisco IOS image is available in disk0 of the switch so that the image can be used to boot from ROMmon mode for further troubleshooting.

If there is not a valid Cisco IOS image in disk0, use the Boot Loader Recovery Procedure with Use of Xmodem in order to move the image onto disk0 of this switch.

3. When you have a valid image on disk0, issue this command in order to verify:

```
rommon 3 >dir disk0:
```

```
Initializing ATA monitor library...
```

```
Directory of disk0:
```

```
2      45302724  -rw-      s3223-ipbase_wan-mz.122-18.SXF4.bin
```

!--- This indicates that a valid Cisco IOS image is available on disk0.

4. Issue these commands:

```
rommon 4 >boot disk0:s3223-ipbase_wan-mz.122-18.SXF4.bin
```

!--- Boot the device with the image in disk0.

```
      Initializing ATA monitor library...
      Self extracting the image... [OK]
      Self decompressing the image : #####
##### [OK]
```

!--- Output suppressed.

```
Press RETURN to get started!
```

!--- This indicates that the switch has moved into the RP mode properly.

!--- Output suppressed.

```
6500>enable
```

```
6509#configure terminal
```

```
Enter configuration commands, one per line.  End with CNTL/Z.
```

5. Under the 6509> prompt, perform this recovery procedure:

```
6509>enable
```

```
6500#dir disk0:
```

```
Directory of disk0:/
```

```
      1  -rw-      45302724   Apr 7 2006 03:56:18 +00:00  s3223-ipbase_wan-mz.122-18.
      SXF4.bin
```

```
64233472 bytes total (18927616 bytes free)
```

```
6509#dir sup-bootdisk:
```

```
Directory of sup-bootdisk:/
```

```
No files in directory
```

!--- This indicates that there is no file in sup-bootflash.

```
255938560 bytes total (255938560 bytes free)
```

6. Issue this command in order to copy the image that is on disk0 into the bootdisk:

```
6509#copy disk0:s3223-ipbase_wan-mz.122-18.SXF4.bin sup-bootdisk:
```

```
Destination filename [s3223-ipbase_wan-mz.122-18.SXF4.bin]? y
```

```
Copy in progress...CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
```

!--- Output suppressed.

```
45302724 bytes copied in 115.432 secs (392462 bytes/sec)
```

```
!--- The image is copied into sup-bootdisk.
```

```
6509#copy run start
```

```
!--- Save the configuration into NVRAM.
```

```
Destination filename [startup-config]?
```

```
Building configuration...
```

```
[OK]
```

7. Issue the **show boot** command in order to verify if any boot variable is set.

```
6509#show boot
```

```
BOOT variable =
```

```
!--- No boot variable is set.
```

```
CONFIG_FILE variable does not exist
```

```
BOOTLDR variable =
```

```
Configuration register is 0x2102
```

```
Standby is not present.
```

8. Specify the boot variable in order to enable the switch to look for a valid Cisco IOS image from either disk0 or sup-bootdisk during the switch startup.

In this scenario, specify the boot variable to point to the image in disk0. Here is the procedure:

```
6509(config)#boot system disk0:s3223-ipbase_wan-mz.122-18.SXF4.bin
```

```
6509(config)#exit
```

```
6509#copy run start
```

```
Destination filename [startup-config]?
```

```
Building configuration...
```

```
[OK]
```

9. Reload the switch.

```
6509#reload
```

```
!--- Output suppressed.
```

```
Autoboot executing command: "boot disk0:s3223-ipbase_wan-mz.122-18.SXF4.bin.
```

```
!--- The switch boots from the location that the boot system command specifies.
```

```
elf decompressing the image : #####
```

```
!--- Output suppressed.
```

```
[OK]
```

```
!--- Output suppressed.
```

```
Press RETURN to get started!
```

!--- This indicates that the image is successfully loaded from disk0.

```
6509>enable
6509#dir sup-bootdisk:
```

Directory of sup-bootdisk:/

```
  1  -rw-   45302724  Apr 10 2006 04:27:24 +00:00  y
```

*!--- This indicates that a valid Cisco IOS image is now available in
!--- sup-bootdisk.*

!--- You can also check the boot variable in this way:

```
6509#show boot
BOOT variable = disk0:s3223-ipbase_wan-mz.122-18.SXF4.bin,12;
CONFIG_FILE variable does not exist
BOOTLDR variable =
Configuration register is 0x2102
```

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