

# Recovering Catalyst Switches Running CatOS from Booting Failures

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## **Introduction**

This document explains how to recover a Cisco Catalyst switch when its software becomes corrupted. This document covers these Catalyst models that run Catalyst OS (CatOS) software with the Supervisor Engine:

- Catalyst 4500/4000 series (which includes the 2948G, 2980G, and 4912G, but not the –L3 series)
- Catalyst 5500/5000 series (which includes Catalyst 5500, 5505, 5509, and some of the 2900 series models, but not the XL series)
- Catalyst 6500/6000 series

Refer to these documents for recovery procedures for switches that this document does not cover:

- Recovery From Corrupt or Missing Software Image on Cisco Catalyst 2900XL and 3500XL Series Switches
- Recovering a Cisco IOS Catalyst 4500/4000 Series Switch from a Corrupt or Missing Image or in Rommon Mode

- Recovering a Catalyst 4000 Layer 3 Module (WS–X4232–L3) from a Corrupted or Missing Image, or from ROMmon Mode
- Recovering a Catalyst 5000 RSM from a Corrupted or Missing Image, Boot, or ROMmon Mode
- Recovering a Catalyst 6500/6000 Running Cisco IOS System Software from a Corrupted or Missing Boot Loader Image or ROMmon Mode
- Recover an MSFC Missing from the Supervisor Engine show module Command

## Prerequisites

## Requirements

There are no specific requirements for this document.

## Components Used

The information in this document is based on these software and hardware versions:

- Catalyst 4500/4000 series switch that runs CatOS
- Catalyst 5500/5000 series switch that runs CatOS
- Catalyst 6500/6000 series switch that runs CatOS

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

## Conventions

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

## Background Information

These switches run their software from RAM, after they load the software image from a Flash device. If all Flash images get corrupted or deleted, the switch cannot boot properly. In this condition, the switch generally falls back into a ROM monitor (ROMmon) mode, which has limited feature capability. This document explains how to download a new image and recover the switch from this situation.

During a software upgrade, you can issue the **delete** command in order to delete the old image from Flash and load the new image. The new image transfer can fail because of network/TFTP server problems. Or an unintentional deletion of the old image from the Flash device can occur. Still, you can issue the **undelete** command in order to recover the image. However, this recovery is possible only under these circumstances:

- You have not reloaded the switch after deletion of the image.
- or*
- You have not used the **squeeze** command in order to remove the deleted image permanently from Flash.

When you use the **delete** command in order to delete an image from the Flash, the image is permanently deleted from Flash. You can recover the image with use of the **undelete** command. This is applicable to Catalyst 4500/4000, 5500/5000, and 6500/6000 series switches.

In the case of the Catalyst 4500/4000, if you reload the switch after deletion of the image, you can still recover

the deleted image in ROMmon mode. Issue the **undelete ROM monitor** command. The commands in this list are supported in ROMmon mode for only Catalyst 4500/4000 series switches that run CatOS release 6.1 and later:

- **del**
- **undelete**
- **squeeze**

For details on these commands, refer to these documents:

- Catalyst 4500 Series Command Reference, 7.6
- Switch and ROM Monitor Commands Release 6.3 (Catalyst 5000 series)
- Catalyst 6000 Family Switch and ROM Monitor Commands

If these options do not work with your Catalyst 4500/4000, 5500/5000, and 6500/6000 series switches, follow the recovery procedures in this document.

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

## Recover the Catalyst 4500/4000, Catalyst 2948G, Catalyst 2980G, and Catalyst 4912G

### General Information

The Catalyst 4500/4000 has an onboard bootflash Flash system that is used to store image files. During normal bootup, the Supervisor Engine typically loads a software image from Flash. The Flash is no longer needed for switch operation after an image is loaded in RAM. You can then use the traditional **copy tftp flash** command in order to upgrade the software while the switch is up and operational. However, you can encounter a problem with the software that you currently have in Flash and can be unable to fully boot the switch. Or the switch can end up in ROMmon for some reason and you must get the switch back up. In such cases, you can now boot from the network (TFTP) server with use of the Recovery Procedure in this document.

Before you proceed to the recovery procedure, make sure that you do not have any valid files in the bootflash:. Issue the **dir bootflash:** command from the `rommon>` mode in order to determine if there are any files in the bootflash:. If a valid file exists, issue the **boot bootflash: filename** command in order to attempt to bring up the switch. As the Background Information section notes, you can undelete a deleted file from ROMmon on these switches. You can issue the **undelete bootflash: filename** command in order to undelete the file. The file can then be used to boot the switch. If you have no valid file in the bootflash, proceed to the Recovery Procedure.

**Note:** For more information on how to connect a console to your switch, as well as how to manage and upgrade software, see the Related Information section of this document.

### Recovery Procedure

A boot from the network (TFTP) server allows you to download an image from a TFTP server directly into RAM, where the Supervisor Engine can run the image. This procedure does not create any files on the Flash system. The procedure only allows you bring up your switch and perform a normal software download.

A boot from the network (TFTP) server is fairly easy, but there are a couple of things that you need to know before you start. When your switch is in ROM, you must be directly connected to the console. The only network port that is active is interface ME1. This port is the Ethernet port on the Catalyst 4500/4000 series Supervisor Engine, next to the console connection. You must have an IP address on the ME1 interface and ensure that it is up. If your TFTP server is not on the same network, you must also set a default gateway. Additionally, you must have the TFTP server environment variable set because the syntax of the commands does not allow you to specify an IP/host address.

1. Verify that all the variables are set and that you are able to reach the TFTP server.

```
rommon 1> show interface
me1: inet 172.20.58.227 netmask 255.255.255.0 broadcast 172.20.58.255

!--- If you do not see an IP address on the ME1 interface,
!--- issue this command in order to set the IP address:
!--- set interface me1 <ip_address> [netmask]
!--- An example is set interface me1 172.20.58.227 255.255.255.0.

rommon 2> show ip route
Destination          Gateway              Interface
-----
default              0.0.0.0             me1
```

In this example, there is no default gateway set. If the TFTP server is not on the same network, you need to set a default route.

2. Set the default gateway, if necessary.

```
rommon 3> set ip route default 172.20.58.1
```

The command gives no response, but you can issue the **show ip route** command again for verification.

```
rommon 4> show ip route
Destination          Gateway              Interface
-----
default              172.20.58.1        me1
```

3. Check that the TFTP server variable is correctly set.

If you issue the **set** command by itself, the command displays the environment variables.

```
rommon 5> set
PS1=rommon ! >
AutobootStatus=success
MemorySize=32
DiagBootMode=post
?=0
ROMVERSION=4.4(1)
WHICHBOOT=bootflash:cat4000.4-4-1.bin
BOOT=bootflash:cat4000.4-4-1.bin,1;
```

Because the TFTP server variable is not part of the environment here, you must set the variable before you can proceed. Set the variable, verify that it is actually in the environment, and then ping the server in order to validate connectivity. You do not need to have the TFTP server environment variable set in order to be able to ping the server. You must access the file on the server with use of the **boot** command, which Step 4 shows.

```
rommon 6> tftpserver=172.20.59.67
```

```
!--- This command sets the TFTP server variable.
```

```
rommon 7> set

!--- This command verifies the setting.

PS1=rommon ! >
AutobootStatus=success
MemorySize=32
DiagBootMode=post
Tftpserver=172.20.59.67
?=0
ROMVERSION=4.4(1)
WHICHBOOT=bootflash:cat4000.4-4-1.bin
BOOT=bootflash:cat4000.4-4-1.bin,1;
```

4. Boot the system from the network (TFTP) server.

```
rommon 9> boot cat4000.4-4-1.bin
```

After you boot the system, you get the switch console.

5. When the system is fully operational again, issue the **copy tftp flash** command in order to copy the valid image to the Flash.

In order to make sure that the switch boots with the valid image at the next reload, verify the boot variables and configuration register values. See the Prevent a Switch Bootup in ROMmon Mode: Verify Boot Variables and Configuration Register Values section of this document for the verification procedure.

## Recover the Catalyst 5500/5000 with Supervisor Engine I, II, IIG, or IIIG, and Catalyst 2926

### General Information

Supervisor Engines I, II, IIG, and IIIG for the Catalyst 5500/5000 series have an onboard Flash that can only store one system image. The switch runs its image from RAM. So there is no need for a valid software image in Flash after the switch is correctly booted.

**Note:** The Catalyst 2926 has Supervisor Engine II and follows the Supervisor Engine II recovery procedure.

The upgrade procedure for these Supervisor Engines is fairly safe. First, a new image is copied into the Supervisor Engine RAM, where the image checksum is verified. If this image is declared valid, the image is then programmed into the Flash, which overwrites the previous image. If an error occurs during the download from the TFTP server, for instance, the current image in Flash is not modified. The corruption of images on these Supervisor Engines happens rarely. The corruption is often related to a problem on the Flash itself. Or a problem that occurs during the Flash programming process can cause the corruption.

**Note:** For more information on how to connect a console to your switch, as well as how to manage and upgrade software, see the Related Information section of this document.

### Recovery Procedure

For a case in which no image is available in Flash for bootup, the Supervisor Engine also has a very basic software image permanently stored in ROMmon. A jumper on the Supervisor Engine must be used in order to activate this image. After this image is loaded, it enables the ports of the Supervisor Engines. In some cases, the image can even recognize some of your line cards. But this ability depends on the firmware version.

1. Remove the Supervisor Engine and use this table in order to identify the boot jumper:

Supervisor Engine Type	Jumper
Supervisor Engine I FX (WS-X5005,6)	J25 (boot)
Supervisor Engine I TX (WS-X5009)	J24 (diag on)
Supervisor Engine II (WS-X5505,6,9)	J15 (boot)
Supervisor Engine IIG (WS-X5540)	J8
Supervisor Engine IIIG (WS-X5550)	J2

Generally, there is no jumper connector available on the Supervisor Engine. You must get one in order to establish contact between the pins.

- Place the Supervisor Engine back into the chassis and boot the switch.

You end up in a boot mode, which is actually a CatOS image that is burnt into ROM (firmware). In some cases, the switch can even recognize some of the switch line cards, which depends on the level of this firmware.

```
boot> show module
Mod Ports Module-Type          Model      Serial-Num Status
-----
 1    0      Supervisor IIG             WS-X5540   013447622 ok
 2   12      100BaseFX MM Ethernet WS-X5111   003499884 ok
 3   12      100BaseFX MM Ethernet WS-X5201   007499406 ok

Mod MAC-Address(es)          Hw      Fw      Fw1
-----
 1  00-d0-63-6a-a8-00 thru 00-d0-63-6a-ab-ff  1.1    5.1(1)  0.5(1)
 2  00-60-3e-8e-2b-48 thru 00-60-3e-8e-2b-53  1.0    1.3
 3  00-e0-1e-b7-77-68 thru 00-e0-1e-b7-77-73  2.0    3.1(1)
```

In this example, the software recognizes the two line cards in the switch. With Supervisor Engine I or II, the software always recognizes the two uplinks, even though these Supervisor Engines are likely to have an earlier firmware version than the Supervisor Engine IIG.

- Use the interfaces that are available in order to get connectivity to a TFTP server and perform the usual upgrade.
- Enable the ports manually.

**Note:** By default, ports are disabled.

```
boot> show port
Port  Status  Duplex  Speed  Type
-----
 2/1  disabled half    100    100BaseFX MM
 2/2  disabled half    100    100BaseFX MM
 2/3  disabled half    100    100BaseFX MM
 2/4  disabled half    100    100BaseFX MM
```

*!--- Output suppressed.*

```
boot> set port enable 2/1
Port 2/1 enabled/
```

- Ensure connectivity to your TFTP server as usual.
- After you have downloaded a new image into Flash, choose one of these two options:

- ◆ Turn off the switch, slide out the Supervisor Engine, remove the jumper, and boot the Catalyst normally after the Supervisor Engine is correctly reinstalled.

- ◆ Boot the image that you downloaded in Flash directly from the boot mode. Use the **execflash** command:

```
boot> execflash
uncompressing nmp image
This will take a minute...

!--- Output suppressed.
```

**Note:** If you boot the switch in this way, remember that, until you remove the jumper, your switch always restarts in boot mode first.

## Console Download

You can download an image to the Supervisor Engine without a TFTP server, directly through the console connection, if you use the Kermit protocol. Refer to the *Preparing to Download an Image Using Kermit* section of Working with System Software Images for more information. This method can be useful if you cannot get any port to be recognized on the switch during the recovery procedure. However, this method is much slower than the method in the Recovery Procedure section. **Avoid** the Kermit method, if possible.

# Recover the Catalyst 5500/5000 with Supervisor Engine III or IIIF and Catalyst 2926G

## General Information

The Catalyst 5500/5000 Supervisor Engine IIIF has an onboard Flash file system that can handle several image files. In addition to this Flash, the Supervisor Engine III also has a Flash PC card (PCMCIA) slot. These Supervisor Engines run their software from RAM and do not need the Flash system after the switch is correctly booted.

**Note:** The Catalyst 2926G has Supervisor Engine III installed and follows the Supervisor Engine III recovery procedure.

If an image is then corrupted or deleted, the standard upgrade procedure is always possible if the Supervisor Engine runs a valid image. If the Supervisor Engine does not boot because there is no valid image to boot from the ROMmon, you must use the Recovery Procedure.

Before you proceed to the recovery procedure, make sure that you do not have any valid files in the bootflash:. Issue the **dir bootflash:** command from the rommon> mode in order to determine if there are any files in the bootflash:. If a valid file exists, issue the **boot bootflash: filename** command in order to attempt to bring up the switch. As the Background Information section notes, you can undelete a deleted file from ROMmon on these switches. You can issue the **boot bootflash: filename** command in order to undelete the file and boot the switch. If you have no valid file in the bootflash, proceed to the Recovery Procedure.

**Note:** For more information on how to connect a console to your switch, as well as how to manage and upgrade software, see the Related Information section of this document.

## Recovery Procedure

## Boot from a Flash PC Card (PCMCIA)

If you have a Supervisor Engine III with a Flash PC Card (PCMCIA) slot, the best way to recover the Supervisor Engine is to boot from a Flash PC Card (PCMCIA). Issue the **boot slot0:image\_name** command in ROMmon mode. Try to get a Flash PC Card (PCMCIA) with a Supervisor Engine III image on it. If you do not have another operational Supervisor Engine III to write an image on the Flash card, you can use another Cisco device that has a compatible format. Refer to PCMCIA Filesystem Compatibility Matrix and Filesystem Information for more information.

## Console Download

If you have a Supervisor Engine III or if a Flash PC Card (PCMCIA) is not available, the only alternate recovery procedure is an Xmodem download via the console port. This feature is only available if you have **ROMmon version 5.1(1)** or later. If you cannot use the console download, the only possibility left is to replace the Supervisor Engine.

The exact ROMmon version is displayed on the console when the switch starts up in ROMmon. Here is an example:

```
This command will reset the system.
Do you want to continue (y/n) [n]? y
2000 May 14 15:06:13 %SYS-5-SYS_RESET:System reset from Console//
makar (enable)
System Bootstrap, Version 5.1(2)
Copyright (c) 1994-1999 by cisco Systems, Inc.
Presto processor with 32768 Kbytes of main memory
```

This version is also the firmware release that the **show module** command output shows for the Supervisor Engine. However, if you are able to issue the **show module** command, you probably do not need a recovery procedure.

```
Console> (enable) show module

!--- Output suppressed.

Mod MAC-Address(es)                               Hw    Fw    Sw
-----
1  00-50-0f-43-cc-00 to 00-50-0f-43-cf-ff  3.3   5.1(2)  4.5(7)

!--- Output suppressed.
```

The most simple way to check whether this console download procedure is available to you is to attempt the download. The feature is not currently documented, but it works in exactly the same way as it does for Cisco routers that are in ROMmon.

This example is the log of a console session during a console download on a Supervisor Engine III. The console speed is 38,400 bits per second (bps). The command is **xmodem**, with option **-s**. The command is self-explanatory. However, see the Xmodem Options Summary section of this document if you want more information on the available options.

```
rommon 5> xmodem -s 38400

Do not start the sending program yet...

Invoke this application only 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
```





**Caution:** At this point, the image that has been downloaded has not been saved in bootflash. This

output provides an example. The 4.5(7) software was downloaded via the console, and you can see that the image has not yet been stored in Flash:

```

Enter password:
Console> (enable) show module
Mod Module-Name          Ports Module-Type          Model      Serial-Num Status
Mod Module-Name          Ports Module-Type          Model      Serial-Num Status
1                        0      Supervisor III            WS-X5530   013492250 ok
2                        12     10BaseFL Ethernet         WS-X5011   003375899 ok
3                        24     10/100BaseTX Ethernet    WS-X5224   008688914 ok
4                        12     10/100BaseTX Ethernet    WS-X5213   003549295 ok
5                        12     100BaseFX MM Ethernet    WS-X5201   006596753 ok

Mod MAC-Address(es)      Hw      Fw      Sw
-----
1  00-50-0f-43-cc-00 to 00-50-0f-43-cf-ff 3.3    5.1(2)  4.5(7)
2  00-60-3e-c9-30-6c to 00-60-3e-c9-30-77 1.1    1.2     4.5(7)
3  00-10-7b-58-a6-c8 to 00-10-7b-58-a6-df 1.4    3.1(1)  4.5(7)
4  00-60-2f-96-6a-f8 to 00-60-2f-96-6b-03 1.2    1.4     4.5(7)
5  00-e0-1e-7a-18-48 to 00-e0-1e-7a-18-53 1.1    2.3(2)  4.5(7)

Mod Sub-Type Sub-Model Sub-Serial Sub-Hw
-----
1  NFFC II WS-F5531 0013512332 2.0
Console> (enable) dir
-#- -length- ----date/time----- name
1  15708 Apr 19 1993 05:44:04 config
2  4864897 Apr 09 2000 15:26:06 cat5000-sup3.5-4-2.bin

2721312 bytes available (4880864 bytes used)
Console> (enable)

```

You now have a fully operational switch. However, if you do not store a valid image in bootflash and you restart the switch, you must attempt the recovery procedure again.

**Note:** Use the **copy tftp flash** command in order to copy the valid image to the Flash. In order to make sure that the switch boots with a valid image at the next reload, verify the boot variables and configuration register values. See the Prevent a Switch Bootup in ROMmon Mode: Verify Boot Variables and Configuration Register Values section of this document for the verification procedure.

## Recover the Catalyst 6500/6000 with Supervisor Engine I or II

### General Information

This section describes the recovery procedure for the Catalyst 6500/6000 Supervisor Engine I and II. The recovery procedure for the Catalyst 6500/6000 is similar to the Catalyst 5500/5000 with Supervisor Engine III Recovery Procedure. The Catalyst 6500/6000 Supervisor Engine I and II modules have an onboard Flash file system that can handle several image files. In addition to this Flash, these Supervisor Engines have a Flash PC Card (PCMCIA) slot. These Supervisor Engines run their software from RAM and do not need the Flash system after the switch is correctly booted. If an image is then corrupted or deleted, the standard upgrade procedure is always possible if the Supervisor Engine runs a valid image. If the Supervisor Engine does not boot because there is no valid image to boot from the ROMmon, you must use the Recovery Procedure.

Before you proceed to the recovery procedure, make sure that you do not have any valid files in the bootflash:. Issue the **dir bootflash:** command from the rommon> mode in order to determine if there are any

files in the bootflash:. If a valid file exists, issue the **boot bootflash: filename** command in order to attempt to bring up the switch. As the Background Information section notes, you can undelete a deleted file from ROMmon on these switches. You can issue the **boot bootflash: filename** command in order to undelete the file and boot the switch. If you have no valid file in the bootflash, proceed to the Recovery Procedure.

**Note:** For more information on how to connect a console to your switch, as well as how to manage and upgrade software, see the Related Information section of this document.

## Recovery Procedure

### Boot from a Flash PC Card (PCMCIA)

The best way to recover the Supervisor Engine is to boot from a Flash PC Card (PCMCIA). Issue the **boot slot0:image\_name** command from ROMmon mode. Try to get a Flash PC Card (PCMCIA) with a valid image on it. If you do not have another operational Supervisor Engine to write an image on the Flash card, you can use another Cisco device that has a compatible format. Refer to PCMCIA Filesystem Compatibility Matrix and Filesystem Information for more information. The use of a PC Card (PCMCIA) that is formatted in the source platform can work in some cases. However, there are a number of situations in which the bootstrap version of the switch does not support the formatted card, even if the file systems are compatible.

Make a duplicate copy of the image that is present on the Flash and copy it into the PC Card (PCMCIA). Issue the **copy bootflash:image\_name slot0:**command. The copy is useful to have if the image on the Flash is deleted or corrupted for some reason and your switch runs into ROMmon mode. You can boot the switch from slot0: and recover the switch. If you do not have a PC Card (PCMCIA) or a valid image on the PC Card, complete the Console Download or Xmodem Recovery procedure.

### Console Download or Xmodem Recovery

The example in this section is the log of a console session during a console download on a Supervisor Engine II. The console speed is 38,400 bps. The command is **xmodem**, with option **-s**. The command is self-explanatory. However, see the Xmodem Options Summary section of this document if you want more information on the available options.

The same procedure applies to the Supervisor Engine I. Copy the valid image from the Cisco Software Center to the PC that runs terminal emulation software.

**Note:** You must have a valid Cisco.com login and contract with Cisco in order to download images from the Cisco Software Center.

```
rommon 15> xmodem -s 38400
Do you wish to continue? (y/n) [n]: y
Console port and Modem must operate at same baud rate.
Use console & modem at 38400 bps for download ? (y/n) [n]: y
```

At this stage, change the speed of your terminal emulation software to 38,400 bps before you send the file with use of the Xmodem protocol. This example uses HyperTerminal on a PC. HyperTerminal is restarted in order to have the change of terminal speed take effect.

```
Ready to receive file ...Will wait for a minute
Reset your terminal to 9600 baud.
Note that you may see garbage characters until you do so.
```

The terminal speed in HyperTerminal is changed back to 9600 bps, and HyperTerminal is restarted again. After you confirm that the baud rate has been reset, the switch immediately starts to uncompress the image that the switch had stored in memory and executes the image. Here is an example:

```

Baud rate is correctly set now. Enter y to continue (y/n) [n]:
Baud rate is correctly set now. Enter y to continue (y/n) [n]:
Baud rate is correctly set now. Enter y to continue (y/n) [n]:
Baud rate is correctly set now. Enter y to continue (y/n) [n]: y
Download Complete!
Self decompressing the image : #####
#####
#####
#####
#####
#####
#####
##### [OK]
System Power On Diagnostics
DRAM Size .....128 MB
Testing DRAM .....Passed
Verifying Text Segment .....Passed
NVRAM Size .....512 KB
Level2 Cache .....Present
Level3 Cache .....Present
System Power On Diagnostics Complete
Currently running ROMMON from S (Gold) region
Boot image:
Runtime image not stored in the Flash. Flash sync disabled.
Running System Diagnostics from this Supervisor (Module 2)
This may take up to 2 minutes...please wait
Cisco Systems Console
2002 Apr 05 08:06:25 %SYS-3-MOD_PORTINTFINSYNC:Port Interface in sync for Module 2
Enter password: 2002 Apr 05 08:06:27 %SYS-1-SYS_ENABLEEPS: Power supply 1 enabled
2002 Apr 05 08:06:28 %SYS-5-MOD_PWRON:Module 3 powered up
2002 Apr 05 08:06:28 %SYS-5-MOD_PWRON:Module 6 powered up
2002 Apr 05 08:06:32 %MLS-5-NDEDISABLED:Netflow Data Export disabled
2002 Apr 05 08:06:34 %MLS-5-MCAST_STATUS:IP Multicast Multilayer Switching is enabled
2002 Apr 05 08:06:34 %MLS-5-FLOWMASKCHANGE:IP flowmask changed from FULL to DEST
console>
console>

```

The switch is now correctly booted with the image that has been downloaded via the console.



**Caution:** At this point, the image that has been downloaded has not been saved in bootflash. The 6.3(3)

software was downloaded via the console, and you can see in this output that the image has not yet been stored in Flash:

```

console>
console> enable
console> (enable)
console> (enable) dir bootflash:
No files on device
31981568 bytes available (0 bytes used)
console> (enable)

```

You now have a fully operational switch. However, if you do not store a valid image in bootflash and you restart the switch, you must attempt the recovery procedure again.

**Note:** Use the **copy tftp flash** command in order to copy a valid image to the Flash. In order to make sure that the switch boots with a valid image at the next reload, verify the boot variables and configuration register values. See the Prevent a Switch Bootup in ROMmon Mode: Verify Boot Variables and Configuration Register Values section of this document for the verification procedure.

# Xmodem Options Summary

When you issue the **xmodem** command at the ROMmon prompt, you invoke Xmodem. Here is an example:

```
xmodem [-cys]
-c CRC-16
-y ymodem-batch protocol
-s <SPEED> Set speed of download, where speed may be 1200|2400|4800|9600|19200|38400
```

This table provides detailed descriptions of the options:

Option	Description
-c option	16-bit CRC <sup>1</sup> error checking is performed for every packet. The default is to use 8-bit checksum.
-y option	This option specifies the Ymodem protocol. The default is Xmodem protocol. Ymodem is typically faster.
-s option	This is the baud rate of data transfer.

<sup>1</sup> CRC = cyclic redundancy check.

This table provides examples of the download times that you can expect. This table assumes a 3.2-MB image size:

Protocol	Speed (in bps)	Download Time
Xmodem	9600	1 hour, 10 min
Xmodem	38,400	20 min
Ymodem	9600	1 hour, 10 min
Ymodem	38,400	15 min

## Recover the Catalyst 6500/6000 with Supervisor Engine 720 or Supervisor Engine 32

### General Information

This section describes the recovery procedure for the Catalyst 6500/6000 Supervisor Engine that runs CatOS on the Supervisor 720 only. This recovery procedure has many similarities, and some differences, in comparison with the Catalyst 6500/6000 series switches with Supervisor Engine I or II Recovery Procedure.

### Supervisor Engine I/II Versus Supervisor Engine 720

This list provides differences between the Supervisor Engine I/II and Supervisor Engine 720:

- The Supervisor Engine 720 does not support the Xmodem recovery procedure that is supported by the Supervisor Engine I and II.
- The Supervisor Engine 720 ships with 64 MB of Supervisor Engine bootflash and 64 MB of Multilayer Switch Feature Card (MSFC) bootflash. There are two slots that are available for

CompactFlash Type II cards (disk0 and disk1) which provide additional storage. The slot0 in Supervisor Engine I and II is referred to as disk0 in the Supervisor Engine 720. In addition, the Supervisor Engine 720 can have an additional CompactFlash Type II card disk1. Both disk0 and disk1 can store a copy of the CatOS image from the Supervisor Engine 720 bootflash.

These Supervisor Engines run their software from RAM and do not need the Flash system after the switch is correctly booted. If an image is then corrupted or deleted, the standard upgrade procedure is always possible if the Supervisor Engine runs a valid image. If the Supervisor Engine does not boot because there is no valid image to boot from the ROMmon, you must use the Recovery Procedure.

Before you proceed to the recovery procedure, make sure that you do not have any valid files in the bootflash:. Issue the **dir bootflash:** command from the `rommon>` mode in order to determine if there are any files in the bootflash:. If a valid file exists, issue the **boot bootflash: filename** command in order to attempt to bring up the switch. As the Background Information section notes, you can undelete a deleted file from ROMmon on these switches. You can issue the **boot bootflash: filename** command in order to undelete the file and boot the switch. If you have no valid file in the bootflash, proceed to the Recovery Procedure.

## Recovery Procedure

### Prerequisites to Perform the Recovery Procedure

Try to get a CompactFlash Type II card with a valid image on it. If you do not have another operational Supervisor Engine to write an image on the Flash card, you can use another Cisco device that has a compatible format. Refer to PCMCIA Filesystem Compatibility Matrix and Filesystem Information for more information. The use of a PC Card (PCMCIA) that is formatted in the source platform can work in some cases. However, there are a number of situations in which the bootstrap version of the switch does not support the formatted card, even if the file systems are compatible.

Make a duplicate copy of the image that is present on the Supervisor Engine bootflash and copy it into the Flash card. Issue the **copy bootflash:image\_name disk0/disk1:**command. The copy is useful to have if the image on the Flash is deleted or corrupted for some reason and your switch runs into ROMmon mode. You can boot the switch from disk0: and recover the switch. If you do not have a valid image on the Flash card, the only way to recover the Supervisor Engine 720 is to copy the image on the Flash disk from another switch that runs the same Supervisor Engine 720 CatOS image.

### Boot from CompactFlash Type II Cards (disk0 or disk1)

Assume that the switch fails in the boot process and gets into the ROMmon mode. Here is an example:

```
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.
```

```
rommon 1 >
```

1. Ensure that you have a valid copy of the CatOS image on disk0 or disk1 (which depends on which disk holds the copy).

Here is an example:

```
rommon 2 > dir disk0:
Directory of disk0:
```



**Note:** This is essential in order to ensure that the switch does not boot in ROMmon, even if you have a valid file in your bootflash: or disk0 or disk1: device.

Set the boot variable to point to this valid image that is present in bootflash. Here is an example:

```
Console> (enable) set boot system flash bootflash:cat6000-sup720k8.8-5-3.bin
```

```
!--- This command has the switch choose the image that is present  
!--- in the bootflash for boot.
```

```
BOOT variable = bootflash:cat6000-sup720k8.8-5-3.bin,1;
```

```
!--- The boot variable is set as per the set boot system flash command.
```

6. Save all the configurations into NVRAM.

```
Console> (enable) write memory
```

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

```
Configuration has been copied successfully.
```

7. Observe that the valid CatOS image exists in the bootflash.

```
Console> (enable) dir bootflash:
```

```
-#- -length- -----date/time----- name
```

```
3 17659732 Apr 19 2006 15:34:10 cat6000-sup720k8.8-5-3.bin
```

8. Issue the **reset** command on the switch.

By now, the switch boots properly with the CatOS in the Supervisor Engine bootflash. This also occurs because you have set the boot variable to boot from the bootflash.

**Note:** You can set the boot variable to boot from other devices, like disk0 or disk1, if a valid image exists in these devices.

**Note:** The recovery procedure for the Supervisor Engine 32 is the same as the Supervisor Engine 720 recovery procedure. However, differences exist in some terminology and features that are used in the Supervisor Engine 32. Here are some of the differences:

- The Supervisor Engine 32 **supports the Xmodem recovery procedure**, whereas the Supervisor Engine 720 does not support the Xmodem recovery procedure.
- The boot Flash area in the Supervisor Engine 720 is referred to as **bootflash**. In the Supervisor Engine 32, the boot Flash area is referred to as **bootdisk**.
- Because **bootflash in the Supervisor Engine 720 is equivalent to bootdisk in the Supervisor Engine 32**, some of the ROMmon commands in relation to the Supervisor Engine boot Flash area are different. In the Supervisor Engine 32, these commands are:

```
dir bootdisk:
```

```
copy disk0:image_name bootdisk:
```

```
set boot system flash bootdisk:image_name
```

**Note:** No other differences exist in the recovery procedures of the Supervisor Engine 32 and the Supervisor Engine 720.

## Prevent a Switch Bootup in ROMmon Mode: Verify Boot Variables and Configuration Register Values

You can verify the settings with use of the **show boot** command. The Catalyst 4500/4000, 5500/5000, and 6500/6000 series switches use the same procedure to verify boot variables and set the configuration register value. The command outputs in this section are on a Catalyst 6000 switch.

After the Catalyst switch is recovered from a corrupted or missing software image, make sure that the boot variables and configuration register values are set correctly. This is essential in order to ensure that the switch does not boot in ROMmon, even if you have a valid file in your bootflash: or slot0: device.

**Note:** This command applies only to the Catalyst 5500/5000 Supervisor Engine III or the Catalyst 4500/4000 series and 2948G switch Supervisor Engine modules. If you attempt to use this command on a Catalyst 5500/5000 Supervisor Engine I or II, you receive an error message.

Here is sample output of the **show boot** command:

```
Switch (enable) show boot
BOOT variable = bootflash:cat6000-sup.6-3-3.bin,1;

!--- The switch boots from the valid image that is present in bootflash.

CONFIG_FILE variable =
slot0:switch.cfg

Configuration register is 0x2102

!--- The configuration register values are set correctly.

ignore-config: disabled
auto-config: non-recurring, overwrite, sync disabled
console baud: 9600
boot: image specified by the boot system commands

Switch (enable)
```

In this example, the configuration register is set to the proper setting (0x2102). If you see that the "Configuration register is 0x0", you must change the setting to 0x2102. Otherwise, when the switch is reset or rebooted, the switch returns to ROMmon mode and you must boot the image manually in order for the switch to run that image. In this example, the boot variable is not set and the configuration register is set to 0x0.

```
Switch (enable) show boot
BOOT variable =

!--- The boot variable is not set to boot the switch from a valid image.

CONFIG_FILE variable = slot0:switch.cfg
Configuration register is 0x0

!--- Note that the configuration register value is set to 0x0.

ignore-config: disabled
```

```
    auto-config: non-recurring, overwrite, sync disabled
    console baud: 9600
    boot: the ROM monitor
Switch (enable)
```

If this switch is reset or rebooted, it goes to ROMmon. You must issue the **boot bootflash:** command in order to boot the image manually from ROMmon mode. The boot variable and the configuration register value can be set. Here is an example:

```
Switch (enable) set boot system flash bootflash:cat6000-sup.6-3-3.bin
BOOT variable = bootflash:cat6000-sup.6-3-3.bin,1;
```

```
Switch (enable) set boot config-register 0x2102
Configuration register is 0x2102
ignore-config: disabled
auto-config: non-recurring, overwrite, sync disabled
console baud: 9600
boot: image specified by the boot system commands
```

```
Switch (enable)
Switch (enable) show boot
BOOT variable = bootflash:cat6000-sup.6-3-3.bin,1;
```

*!-- The switch boots from the valid image that is present in bootflash.*

```
CONFIG_FILE variable = slot0:switch.cfg
```

*!-- The configuration register values are set correctly.*

```
Configuration register is 0x2102
ignore-config: disabled
auto-config: non-recurring, overwrite, sync disabled
console baud: 9600
boot: image specified by the boot system commands
Switch (enable)
```

After recovery, even if the switch goes to ROMmon mode, you can set the configuration register value in ROMmon mode. After reload, the switch loads the valid image so that you do not have to boot the switch manually, as this example shows:

```
rommon 1> confreg 0x2102
```

You must reset or power cycle for new config to take effect.

```
rommon 2> reset
```

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

```
Autoboot executing command: "boot bootflash:cat6000-sup.6-3-3.bin"
```

```
Uncompressing file: #####
```

```
System Power On Diagnostics
DRAM Size .....64 MB
Testing DRAM.....Passed
NVRAM Size .....512 KB
Level2 Cache .....Present
```

```
System Power On Diagnostics Complete
```

```
Boot image: bootflash:cat6000-sup.6-3-3.bin
```

```
Running System Diagnostics from this Supervisor (Module 1)
This may take up to 2 minutes....please wait
..
..
Switch (enable)
```

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## Related Information

- **Connecting a Terminal to the Console Port on Catalyst Switches**
- ***Downloading System Software Images to the Switch Using TFTP* section of Working With System Software Images**
- **Managing Software Images and Working with Configuration Files on Catalyst Switches**
- **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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