



## Using CompactFlash Memory Cards

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Cisco 3800 series routers, Cisco 2800 series routers, and Cisco 1800 series routers use external CompactFlash (CF) memory cards to store the system image, some software feature data, and configuration files. The CF memory cards use the following file systems. The file system that is supported depends on router model:

- Class B flash file system, also known as the *low-end file system* (LEFS)
- Class C flash file system, similar to the standard DOS file system

This document contains the following sections:

- [Platforms Supported by This Document, page 1](#)
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- [Online Insertion and Removal, page 2](#)
- [How to Format CompactFlash Memory Cards, page 3](#)
- [File Operations on CompactFlash Memory Cards, page 5](#)
- [Directory Operations on a CompactFlash Memory Card, page 8](#)

## Platforms Supported by This Document

Use this document with the following platforms:

- Cisco 1800 series routers
- Cisco 2800 series routers
- Cisco 3800 series routers



# Requirements and Restrictions

- Cisco 3800 series routers, Cisco 2800 series routers, and Cisco 1800 series routers do not support internal flash memory. Because the system image can be stored only on a CF memory card, you need to have a CF memory card installed to boot the system image.
- We recommend that you erase (Class B) or format (Class C) new CF memory cards to initialize them with either a Class B or Class C flash file system. This ensures proper formatting and enables the ROM monitor to recognize and boot the flash memory.
- Only CF memory cards purchased from Cisco are supported on these platforms.

## Cisco 1800 Series Routers and Cisco 2801 Routers

- Support only the Class C flash file system.
- Support only external CF memory cards.
- The CF memory card file system can be formatted on a Cisco 1800 series router or Cisco 2801 router. After the file system has been formatted, files on the CF memory card can be copied to or from any PC that is equipped with a CF memory reader. If you use a PC to format the CF memory card, use only the Microsoft 16-bit File Allocation Table (FAT16) file system.

## Cisco 3800 Series Routers and Cisco 2800 Series Routers (Except for Cisco 2801 Routers)

- Support Class B and Class C flash file systems.
- Support only external CF memory cards.
- If you use a PC to format the CF memory cards, you can format the cards with the Microsoft 16-bit File Allocation Table (FAT16), Microsoft 32-bit File Allocation Table (FAT32), or Microsoft Windows NT file system (NTFS). Alternatively, you can format the CF memory card on the router.



### Note

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When formatted on the router, flash memory cards are formatted with the DOSFS file system, a platform-independent industry-standard file system that is supported on all Cisco 3800 series routers, Cisco 2800 series routers, and Cisco 1800 series routers.

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# Online Insertion and Removal

Online insertion and removal (OIR) is a feature that allows you to replace CF memory cards without turning off the router and without affecting the operation of other interfaces. OIR of CF memory cards provides uninterrupted operation to network users, maintains routing information, and ensures session preservation.



### Caution

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The external CF memory card should not be removed if the flash memory busy “CF” LED on the router is ON, because this indicates that the software is accessing the CF memory card. Removing the CF memory card may disrupt the network, because some software features use the CF memory card to store tables and other important data.

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For instructions on inserting, removing, and replacing the external CF memory card, see the hardware installation documentation that came with your router.

# How to Format CompactFlash Memory Cards

This section contains the following procedures:

- [Determining the File System on a CompactFlash Memory Card, page 3](#)
- [Formatting CompactFlash Memory as a Class B Flash File System, page 4](#)
- [Formatting CompactFlash Memory as a Class C File System, page 4](#)

## Determining the File System on a CompactFlash Memory Card

To determine the file system of a CF memory card, enter the **show flash: all** command in privileged EXEC mode.

- If geometry and format information does not appear in the output, the card is formatted with a Class B flash file system.
- If geometry and format information appears in the output, the card is formatted with a Class C flash file system.

The following examples show sample outputs for Class B and Class C flash file systems.

### External Card with Class B Flash File System: Example

The geometry and format information does not appear.

```
Router# show flash: all
```

| Partition | Size    | Used   | Free    | Bank-Size | State      | Copy |
|-----------|---------|--------|---------|-----------|------------|------|
| Mode      |         |        |         |           |            |      |
| 1         | 125184K | 20390K | 104793K | 0K        | Read/Write |      |
| Direct    |         |        |         |           |            |      |

```
System Compact Flash directory:
```

| File | Length   | Name/status            |
|------|----------|------------------------|
|      |          | addr fcksum ccksum     |
| 1    | 6658376  | c28xx-i-mz             |
|      |          | 0x40 0xE0FF 0xE0FF     |
| 2    | 14221136 | c2800-telcoent-mz      |
|      |          | 0x6599C8 0x5C3D 0x5C3D |

[20879640 bytes used, 107308776 available, 128188416 total]  
125184K bytes of ATA System Compact Flash (Read/Write)

Chip information NOT available.

### External Card with Class C Flash File System: Example

The geometry and format information is displayed in this format.

```
Router# show flash: all
```

```
-#- --length-- -----date/time----- path
1      6658376 Mar 01 2004 04:27:46 c28xx-i-mz
```

25268224 bytes available (6664192 bytes used)

\*\*\*\*\* ATA Flash Card Geometry/Format Info \*\*\*\*\*



```

Format:All system sectors written. OK...
Format:Total sectors in formatted partition:250592
Format:Total bytes in formatted partition:128303104
Format:Operation completed successfully.
Format of flash complete

```

## File Operations on CompactFlash Memory Cards

File and directory operations vary according to the formatted file system—Class B or Class C.

This section describes the following file operations for external CF memory cards:

- [Copying Files, page 5](#)
- [Displaying Files, page 5](#)
- [Displaying File Content, page 6](#)
- [Displaying Geometry and Format Information \(Class C Only\), page 6](#)
- [Deleting Files, page 7](#)
- [Renaming Files, page 8](#)

### Copying Files

To copy files, enter the **copy** command in privileged EXEC mode. To indicate a file that is stored in a CF memory card, precede the filename with **flash:**.

#### Examples: Copying Files

In the following example, the file `my-config1` on the CF memory card is copied into the `startup-config` file in the system memory:

```

Router# copy flash:my-config1 startup-config

Destination filename [startup-config]?
[OK]
517 bytes copied in 4.188 secs (129 bytes/sec)

```

In the following example, the file `my-config2` on the CF memory card is copied into the `running-config` file in the system memory:

```

Router# copy flash:my-config2 running-config

Destination filename [running-config]?
709 bytes copied in 0.72 secs

```

### Displaying Files

To display a list of files on a CF memory card, enter the **dir flash:** command in privileged EXEC mode:

```

Router# dir flash:

Directory of flash:/
 1580  -rw-      6462268   Mar 06 2004 06:14:02  c28xx-i-mz.3600ata
      3  -rw-      6458388   Mar 01 2004 00:01:24  c28xx-i-mz
63930368 bytes total (51007488 bytes free)

```

## Displaying File Content

To display the content of a file that is stored in flash memory, enter the **more flash:** command in privileged EXEC mode:

```
Router# more flash:c28xx-i-mz

00000000: 7F454C46 01020100 00000000 00000000  .ELF  ....  ....
00000010: 00020061 00000001 80008000 00000034  ...a  ....  ...4
00000020: 00000054 20000001 00340020 00010028  ...T  ...4.  ...
00000030: 00050008 00000001 0000011C 80008000  ....  ....  ....
00000040: 80008000 00628A44 00650EEC 00000007  ....  .b.D .e.l  ....
00000050: 0000011C 0000001B 00000001 00000006  ....  ....  ....
00000060: 80008000 0000011C 00004000 00000000  ....  ....  ..@.  ....
00000070: 00000000 00000008 00000000 00000021  ....  ....  ....  ...!
00000080: 00000001 00000002 8000C000 0000411C  ....  ....  ..@.  ..A.
00000090: 00000700 00000000 00000000 00000004  ....  ....  ....  ....
000000A0: 00000000 00000029 00000001 00000003  ....  ... )  ....  ....
000000B0: 8000C700 0000481C 00000380 00000000  ..G.  ..H.  ....  ....
000000C0: 00000000 00000004 00000000 0000002F  ....  ....  ....  .../
000000D0: 00000001 10000003 8000CA80 00004B9C  ....  ....  ..J.  ..K.
000000E0: 00000020 00000000 00000000 00000008  ...  ....  ....  ....
000000F0: 00000000 0000002F 00000001 10000003  ....  .../  ....  ....
00000100: 8000CAA0 00004BBC 00623FA4 00000000  ..J  ..K<  .b?$  ....
00000110: 00000000 00000008 00000000 3C1C8001  ...  ....  ....  <...
00000120: 679C4A80 3C018001 AC3DC70C 3C018001  g.J.  <...  ,=G.  <...
00000130: AC3FC710 3C018001 AC24C714 3C018001  ,?G.  <...  ,$G.  <...
00000140: AC25C718 3C018001 AC26C71C 3C018001  ,%G.  <...  ,&G.  <...
00000150: AC27C720 3C018001 AC30C724 3C018001  ,'G  <...  ,0G$  <...
00000160: AC31C728 3C018001 AC32C72C 3C018001  ,1G(  <...  ,2G,  <...

--More-- q
```

## Displaying Geometry and Format Information (Class C Only)

To display the geometry and format information of a CF memory card formatted with a Class C flash file system, enter the **show flash: filesystems** command in privileged EXEC mode:

```
Router# show flash: filesystems

***** ATA Flash Card Geometry/Format Info *****

ATA CARD GEOMETRY
  Number of Heads:          4
  Number of Cylinders       490
  Sectors per Cylinder      32
  Sector Size                512
  Total Sectors              62720

ATA CARD FORMAT
  Number of FAT Sectors     31
  Sectors Per Cluster       8
  Number of Clusters        7796
  Number of Data Sectors    62560
  Base Root Sector          155
  Base FAT Sector           93
  Base Data Sector          187
```



## Renaming Files

To rename a file on a CF memory card, enter the **rename** command in privileged EXEC mode:

```
Router# dir flash:

Directory of flash:/

   3  -rw-     6458388   Mar 01 2004 00:00:58  c28xx-i-mz.tmp
 1580 -rw-     6462268   Mar 06 2004 06:14:02  c28xx-i-mz.3600ata

63930368 bytes total (51007488 bytes free)

Router# rename flash:c28xx-i-mz.tmp flash:c28xx-i-mz

Destination filename [c28xx-i-mz]?

Router# dir flash:

Directory of flash:/

 1580 -rw-     6462268   Mar 06 2004 06:14:02  c28xx-i-mz.3600ata
    3  -rw-     6458388   Mar 01 2004 00:01:24  c28xx-i-mz

63930368 bytes total (51007488 bytes free)
```

## Directory Operations on a CompactFlash Memory Card

Directory operations vary according to the formatted file system—Class B or Class C.

The following sections describe directory operations for external CF memory cards on Cisco routers:

- [Entering a Directory and Determining Which Directory You Are In, page 8](#)
- [Creating a New Directory, page 9](#)
- [Removing a Directory, page 10](#)

### Entering a Directory and Determining Which Directory You Are In

To enter a directory of a CF memory card, enter the **cd** command in privileged EXEC mode. The **cd** command specifies or changes the default directory or file system. If you enter **cd** only, without specifying a file system, the router enters the default home directory, which is *flash*.

```
Router# cd
```

To determine which directory you are in, enter the **pwd** command in privileged EXEC mode. The CLI displays which directory or file system is specified as the default by the **cd** command.

```
Router# pwd
flash:
```

To display a list of files in the directory that you are in, enter the **dir** command in privileged EXEC mode. The command-line interface will display the files in the file system that was specified as the default by the **cd** command.

```
Router# dir

Directory of flash:/

 1580  -rw-      6462268   Mar 06 2004 06:14:02  c28xx-i-mz.3600ata
    3   -rw-      6458388   Mar 01 2004 00:01:24  c28xx-i-mz

63930368 bytes total (51007488 bytes free)
```

### Entering a Directory: Example

To enter the /config directory:

```
Router# cd config
```

To verify that you are in the /config directory:

```
Router# pwd

flash:/config/

Router# dir

Directory of flash:/config/

 380  -rw-      6462268   Mar 08 2004 06:14:02  myconfig1
 203  -rw-      6458388   Mar 03 2004 00:01:24  myconfig2

63930368 bytes total (51007488 bytes free)
```

## Creating a New Directory

To create a directory in flash memory, enter the **mkdir flash:** command in privileged EXEC mode.

### Creating a New Directory: Example

In the following example, a new directory named “config” is created; then a new subdirectory named “test-config” is created within the “config” directory.

```
Router# dir flash:

Directory of flash:/

 1580  -rw-      6462268   Mar 06 2004 06:14:02  c28xx-i-mz.3600ata
    3   -rw-      6458388   Mar 01 2004 00:01:24  c28xx-i-mz

63930368 bytes total (51007488 bytes free)
Router# mkdir flash:/config

Create directory filename [config]?
Created dir flash:/config

Router# mkdir flash:/config/test-config

Create directory filename [/config/test-config]?
Created dir flash:/config/test-config
```

```

Router# dir flash:

Directory of flash:/

   3  -rw-      6458208   Mar 01 2004 00:04:08  c28xx-i-mz.tmp
 1580 drw-          0   Mar 01 2004 23:48:36  config

128094208 bytes total (121626624 bytes free)

```

## Removing a Directory

To remove a directory in flash memory, enter the **rmdir flash:** command in privileged EXEC mode. Before you can remove a directory, you must remove all files and subdirectories from the directory.

### Example: Removing a Directory

In the following example, the subdirectory test-config is removed.

```

Router# dir

Directory of flash:/config/

 1581 drw-          0   Mar 01 2004 23:50:08  test-config

128094208 bytes total (121626624 bytes free)
Router# rmdir flash:/config/test-config

Remove directory filename [/config/test-config]?
Delete flash:/config/test-config? [confirm]
Removed dir flash:/config/test-config
Router# dir

Directory of flash:/config/

No files in directory

128094208 bytes total (121630720 bytes free)

```

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