



Troubleshooting

Your Cisco 7304 router went through extensive testing before leaving the factory. However, if you encounter problems starting the router, use the information in this chapter to help isolate the cause of the problems. This chapter contains the following sections:

- [Troubleshoot Startup Problems, page 4-1](#)
- [Troubleshooting Overview, page 4-6](#)
- [Problem Solving Using a Subsystems Approach, page 4-7](#)
- [Troubleshooting the Processor Subsystem, page 4-11](#)
- [Configuring Autoboot to Boot from a Local Device, page 4-12](#)
- [Bootldr Command, page 4-12](#)

The procedures in this chapter assume that you are troubleshooting the initial system startup, and that your router is in the original factory configuration. If you have removed or replaced components or changed any default settings, the recommendations in this chapter might not apply. Make sure to review the safety warnings listed in the publication *Cisco 7304 Internet Routers Regulatory Compliance and Safety Information* document that accompanied your Cisco 7304 router before using the troubleshooting procedures in this chapter.

Troubleshoot Startup Problems

This section assumes you are able to boot the router. If you cannot, go to [Troubleshooting Overview, page 4-6](#).

Which prompt do you see on the console?

- None: See the [“Check the LEDs” section on page 2](#).
- Garbled: See the [“Check Terminal Settings” section on page 2](#).
- ROMmon prompt: See the [“ROMmon prompt: rommon #>” section on page 2](#).
- Router in Boot Mode: See the [“Router in Boot Mode: Router \(boot\)>” section on page 5](#).

Check the LEDs

If you get no response from the console after pressing **Return** a couple times, check the processing engine and power supply LEDs. Refer to Chapter 1, the “[Hardware Overview](#)” section on page 1 for processing engine LED information, and Chapter 2, the “[Power Supply Overview](#)” section on page 29 for power supply LED information.

Check Terminal Settings

Terminal Settings

- 9600 baud rate
- 8 data bits
- No parity
- 2 stop bits
- No flow control

ROMmon prompt: rommon # >

Use this procedure to recover a router stuck in ROMmon mode (rommon # > prompt).

Step 1 Using the **dev** command, see which devices are available on your router.

```
rommon 1 > dev
Devices in device table:
  id name
bootdisk: boot disk
disk0: PCMCIA slot 0
eprom: eprom
rommon 2 >
```

Step 2 Using the **dir [device ID]** command, look for a valid Cisco IOS image. The device ID is bootdisk: or disk0:, corresponding to the CompactFlash Disks inserted in their respective slots.

```
rommon 3 > dir disk0:
Directory of disk0:

 3      4965400  -rw-      c7300-js-mz.121-99.WS_DAILY_BUILD_20010706
1216    1867     -rw-      running-config
rommon 4 >
```

Step 3 Try to boot from the valid Cisco IOS image.

```
rommon 5 > boot disk0:c7300-js-mz.121-99.WS_DAILY_BUILD_20010706
```

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

- Step 4** If the image is valid, this brings you back to normal operation mode. Confirm that the boot variable and configuration register contain values to point to this image.

```
Router# show bootvariable
BOOT variable = disk0:c7300-js-mz.121-99.WS_DAILY_BUILD_20010706,12
CONFIG_FILE variable does not exist
BOOTLDR variable =
Configuration register is 0x2101

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
```

- Step 5** Enter **no boot system** to erase all previously defined boot variables.

```
Router(config)# no boot system
Router(config)#boot system disk0:c7304-js-mz.121.99
Router(config)#^Z
Router#
22:51:40: %SYS-5-CONFIG_I: Configured from console by console
```

A newly defined variable does not go into effect yet, as seen from **show bootvariable**.

```
Router# show bootvariable
BOOT variable = disk0:c7300-js-mz.121-99.WS_DAILY_BUILD_20010706,12
CONFIG_FILE variable does not exist
BOOTLDR variable =
Configuration register is 0x2102
```

The newly defined variable only takes effect after using the **copy running-config startup-config** command or after a save of system configuration during the **reload** command.

```
Router# copy running-config startup-config
Building configuration...
[OK]
Router#sh bootv
BOOT variable = disk0:c7304-js-mz.121.99,12
CONFIG_FILE variable does not exist
BOOTLDR variable =
Configuration register is 0x2102
```

- Step 6** If none of the images are valid, use the boot image to download a valid Cisco IOS software image using a Trivial File Transfer Protocol (TFTP) server.

- a. Change the configuration register to boot the boot image by setting the configuration register as follows, depending on the prompt you have:

```
rommon 1 > confreg 0x2101
```

- b. Boot the boot image by resetting the router. (You must reset or power cycle the router for the new configuration to take effect.)

```
rommon 2 > reset
```

```
or
> i
```

The System Bootstrap message appears and the router loads an image from bootdisk. On the screen, you should see something similar to the following:

```
System Bootstrap, Version 12.1(9) [biff-ws28 124], RELEASED SOFTWARE
Copyright (c) 1994-2001 by cisco Systems, Inc.
```

```
C7300 platform with 131072 Kbytes of main memory
```

```
Currently running ROMMON from OTP ROM
Self decompressing the image :
#####
#####
#####
##### [OK]
```

Restricted Rights Legend

You should now have a prompt similar to Router (boot)>. Upgrade the Cisco IOS software by following the procedure in the [“Router in Boot Mode: Router \(boot\)>”](#) section on page 5.



Note

Another option is to boot from an image copied from another router.

```
rommon 3 > boot disk0:c7300-js-mz (where disk0:is the flash disk with the image
c7300-js-mz copied from another Cisco 7304 router)
```

Step 7

If you are still in ROMmon mode, that means your boot image is either missing or corrupted. If your router has no valid image in disk0: or bootdisk, and no other ROMmon upgrade procedure, the only way to recover is to use the CompactFlash Disk on another 7304 router, download the image on that router, and then move the CompactFlash Disk to the one with a corrupt or missing boot image.

If you do not have another Cisco 7304 router, call TAC to request a CompactFlash Disk with a valid boot image.

Bootldr Command

Use the **bootldr** command to specify an image to boot the system in the case of a system crash. You can use the **bootldr** command in IOS or in ROMmon mode.

You can use the **bootldr** command in IOS:

```
Router>enable
Router#>config
Router(config)# boot bootldr bootdisk:c7300-boot-mz-my-image
Router(config)# copy running-config startup-config
```

The **show bootvar** command can be used in ROMmon mode to verify that parameter settings are correct.

```
In cases where the system will not boot up, you can also use the bootldr command in
ROMmon mode. First check to see if bootldr is set correctly:
ROMMON>set
```

If **bootldr** is not set correctly, set it with the correct image:

```
ROMMON>BOOTLDR="bootdisk:c7300-boot-mz-my-image"
```



Caution

Be careful of typographical errors in ROMmon mode as there is no error checking.

You can use the ROMmon command **sync** to save the current parameters that remain after a power cycle to NVRAM.

Use the **set** command to check your configuration.

Router in Boot Mode: Router (boot)>

If the router is in boot mode, it means the router has a corrupt or missing Cisco IOS image. Use this procedure to upgrade the Cisco IOS software.

Step 1 Set the configuration register value to 0x0 for the next reload.



Note Do not save anything while you are in boot mode. Do not use the saving commands (**write mem** or **copy run start**) and answer no to any prompt suggesting that you save your current configuration. If you save while you are in this mode, your configuration can be partially or completely erased.

```
Router (boot) >
Router (boot) > enable
Password: password
Router (boot) #conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router (boot) (config) #con
Router (boot) (config) #config-register 0x0
Router (boot) (config) #^Z
```

Step 2 Verify the TFTP server has IP connectivity to the router by confirming that the router IP address and default gateway (if necessary) are set. Ping the router to verify that a network connection exists between it and the TFTP server.

Step 3 Copy the new software image from the TFTP server to the router. (Keep a copy of the router configuration before upgrading the router software.)

```
Router> enable
Password: password
Router#
Router# copy tftp disk0:
```

Step 4 Specify the IP address of the TFTP server.

```
Address or name of remote host [255.255.255.255]? 172.17.247.195
```

Step 5 Specify the filename of the new Cisco IOS software image.

```
Source file name? c7300-js-mz.121-9.E
```



Note The image name varies depending on the filename of the image on the TFTP server.

Step 6 Specify the destination image filename. This is the name the new software image will have when it is loaded onto the router. The image can be named anything, but common practice is to enter the UNIX image filename.

```
Destination file name c7300-js-mz.121-9.EP
```

The copying process takes several minutes; the time differs from network to network. During the copy process, messages are displayed to indicate which files have been accessed.

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets were transferred successfully. A checksum verification of the image occurs after the image is written to Flash memory. The router reloads itself with the new image when the software upgrade is complete.

Step 7 Reload the router.

```
Router(boot)#reload
*Mar 1 00:30:49.972: %SYS-5-CONFIG_I: Configured from console by console
System configuration has been modified. Save? [yes/no]: NO
Proceed with reload? [confirm] YES
```

Because the configuration register is set to 0x0, the router will go into ROMmon when you reload and you will load the image you just copied. Follow the instructions in the “[ROMmon prompt: rommon # >](#)” section on page 2.

Step 8 Change the boot variable and configuration register to contain values to point to the image you copied.

```
rommon 1 > confreg 0x2101
```

Step 9 Use the **show version** command to verify that the router is running with the proper image.

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) 7300 Software (C7300-js-M), Version 12.1(9), CISCO RELEASED VERSION
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 06-Jul-01 02:01 by biff
Image text-base: 0x40008970, data-base: 0x40BF6000

ROM: System Bootstrap, Version 12.1(20010705:000010) [biff-ws28 124], RELEASED
SOFTWARE
ROM: 7300 Software (C7300-BOOT-M), Version 12.1(9), CISCO RELEASED VERSION

Router uptime is 18 minutes
System returned to ROM by power-on
System image file is "disk0:c7300-js-mz.121-99.WS_DAILY_BUILD_20010706"

cisco 7300 (NSE100) processor (revision A) with 114688K/16384K bytes of memory.
Processor board ID
R7000 CPU at 350Mhz, Implementation 39, Rev 3.2, 256KB L2, 1024KB L3 Cache
4 slot midplane, Version 65.48

Last reset from watchdog nmi
X.25 software, Version 3.0.0.
PXF processor tmc0 is running.
PXF processor tmc1 is running.
1 FastEthernet/IEEE 802.3 interface(s)
2 Gigabit Ethernet/IEEE 802.3 interface(s)
509K bytes of non-volatile configuration memory.

16064K bytes of ATA compact flash disk at bootdisk (Sector size 512 bytes).
64000K bytes of ATA compact flash disk at disk 0 (Sector size 512 bytes).

Configuration register is 0x2102
```

Troubleshooting Overview

This section describes the troubleshooting methods used in this chapter and describes how the Cisco 7304 router is divided into subsystems for more efficient problem solving. If you are unable to easily solve the problem, contact a customer service representative for assistance and further instructions. Provide the representative with the following information:

- Date you received the router

- Chassis serial number
- Type of software and release number
- Brief description of the problem you are having
- Brief explanation of the steps you have taken to isolate and resolve the problem
- Maintenance agreement or warranty information

Table 4-1 shows the general troubleshooting strategy described in this chapter. Refer to this table, as necessary, to follow the steps to isolate problems to a specific subsystem; resolve the problem if possible.

Table 4-1 Troubleshooting Strategy for Startup Problems

	Action	Yes	No
Step 1	Turn power on. Go to Step 2	—	—
Step 2	SYSTEM-UP LED on?	Go to Step 3.	Troubleshoot power system, and go to Step 3.
Step 3	PRIMARY or ACTIVE LED on?	Go to Step 4.	Obtain technical assistance.
Step 4	Fans operating?	Go to Step 5.	Troubleshoot cooling subsystem and go to Step 5.
Step 5	NSE-100 and NSE-150: GE LEDs and FE LEDs on? NPE-G100: GE LEDs on?	Go to Step 7.	Check all cable connections and restart system. Check that the GBIC is fully seated. Go to Step 6.
Step 6	Line card LEDs on?	Go to Step 9.	Reseat line cards and restart system. Go to Step 7.
Step 7	System startup successful.	—	—

Online Troubleshooting Resources

In addition to following the subsystems approach to troubleshooting, a variety of online troubleshooting resources are available.

For information on these resources, see the [Cisco 7304 Internet Routers Troubleshooting Documentation Roadmap](#).

Problem Solving Using a Subsystems Approach

The key to solving problems with the system is isolating the problem to a specific subsystem. The first step in solving startup problems is to compare what the system *is doing* to what it *should be doing*. Because a startup problem is usually caused by a single component, it is more efficient to first isolate the problem to a subsystem rather than troubleshoot each component in the system. For these troubleshooting procedures, consider the following subsystems:

- Power subsystem—This subsystem comprises the power supply, the external power cable, and the system board.
- Cooling subsystem—The chassis fans are located in the power supplies or installed fan module. The fans should be operating whenever system power is on. Contact your customer service representative if you determine a fan is not functioning properly.

- Processor subsystem—This subsystem includes the processing and input/output functions, the line cards, and system memory and management functions. The STATUS LED on the line card indicates if the line card is initialized. A line card that is partially installed can cause the system to pause indefinitely or crash.

The following sections help you isolate a problem to one of these subsystems and direct you to the appropriate troubleshooting section.

Identifying Startup Problems

Startup problems are commonly due to the source power or to a line card that is dislodged from the system board. Although an overtemperature condition is unlikely at initial startup, the environmental monitoring functions are included in this chapter because they also monitor internal voltages.

When you start up the router for the first time, you should observe the startup sequence described in the [“Starting the System and Observing Initial Conditions” section on page 3-13 in Chapter 3, “Starting and Configuring.”](#) This section contains a more detailed description of the normal startup sequence and describes the steps to take if the system does *not* perform that sequence as expected.

LEDs indicate all system states in the startup sequence. By checking the state of the LEDs, you can determine when and where the system failed in the startup sequence. Use the following descriptions to isolate the problem to a subsystem, and then proceed to the appropriate sections to try to resolve the problem.

When you start up the system by turning on the power supply switch, the following should occur:

- You should immediately hear the fans operating. If not, proceed to the [“Troubleshooting the Cooling Subsystem” section on page 4-10](#). If you determine that the power supply is functioning normally and that a fan is faulty, contact a customer service representative. If a fan does not function properly at initial startup, there are no installation adjustments that you should make.
- When all LEDs come on to indicate that the system has booted successfully, the initial system banner should be displayed on the console screen. If it is not displayed, see [Appendix A, “Specifications,”](#) the [“Console and Auxiliary Port Signals and Pinouts” section on page A-7](#) to verify that the terminal is set correctly and that it is properly connected to the console port.

Troubleshooting the Power Subsystem

Check the following to help isolate a problem with the power subsystem:


Note

If the system powers off due to an environmental shutdown, wait at least one minute before manually rebooting the system, or it will pause indefinitely.

Table 4-2 Troubleshooting the Power Subsystem

Symptom	Possible Cause	Possible Solution
System does not power on.	Power cable not fully seated at system.	Turn the power switch to the standby position and reseal the power cable in the system.
	Power cable not fully seated at source.	Turn the switch to the standby position and reseal the power cable at the power source.
	Power source is faulty.	Turn the switch to the standby position, connect the power cable to another power source, if available, and turn the switch back on.
	Faulty power cable.	Turn the switch to the standby position, remove the cable and replace it.
	Faulty power supply.	If the system still fails to come up when the power supply is connected to a different power source with a new power cable, the power supply is probably faulty. Contact a service representative.
System powers off.	Power supply failure in a single power supply system.	Call a service representative.

Table 4-3 Power Supply LEDs

LED Label	Color	State	Function
INPUT OK	Green	On	AC input voltage is greater than 85V.
		Flashing	AC input voltage is falling below 85V. Verify that AC input voltage to the power supply is above 85V.
		Off	AC input voltage is less than 70V or the power supply is off.
OUTPUT FAIL	Red	On (power up)	LED is on for 2–3 seconds to test LED function at power up.
		On	DC output voltage is outside the minimum or maximum voltage limits.
		Off	DC output voltage is within the minimum and maximum voltage limits.
FAN OK	Green	On	Both fans are working properly.
		Off	One or both fans are not working properly or have failed.

Troubleshooting the I/O Subsystem

The procedures in this section assume that you have not made changes to your configuration file.

If the Cisco 7304 router LEDs on the processing engine do not go on as expected (see the [“Identifying Startup Problems”](#) section on page 4-8), check the following items to help isolate the problem:

Table 4-4 Troubleshooting the I/O Subsystem

Symptom	Possible Cause	Possible Solution
LEDs remain off when the system power switch is turned on.	Power supply or cooling subsystem are faulty.	If the LEDs stay off, first see the “Troubleshooting the Power Subsystem” section on page 4-9 and the “Troubleshooting the Cooling Subsystem” section on page 4-10 to ensure that both the fans and the power supply are functioning properly.
Power supply and fans appear operational but none of the I/O LEDs are on.	An improperly connected line card has indefinitely paused the system.	Reseat the line card, tighten the locking thumbscrews, and then restart the system.

Troubleshooting the Cooling Subsystem

Check the following to help isolate a problem with the cooling subsystem:

Table 4-5 Troubleshooting the Cooling Subsystem

Symptom	Possible Cause	Possible Solution
System shuts down and this error message is displayed: Queued messages: %ENVM-1-SHUTDOWN: Environmental Monitor initiated shutdown This error message indicates that the system has detected an overtemperature condition or out-of-tolerance power condition inside the chassis.	The fans are not operating or the power supply is not operating. To determine if the fans are operating, listen for them. In noisy environments, place your hand on the rear of the chassis to feel if air is being forced out the vents.	If the fans are not operating, call your local service representative.
	Ensure that heated exhaust air from other equipment is not entering the router’s inlet vents, and that there is sufficient clearance on the back of the chassis to allow complete ventilation. See Chapter 2, “Installation and Maintenance,” the “Site Requirement Guidelines” section on page 2-3 for preventive site configurations.	Move other equipment or the router to ensure proper airflow.

Table 4-5 Troubleshooting the Cooling Subsystem (continued)

Symptom	Possible Cause	Possible Solution
	The error message could indicate a faulty component or temperature sensor. Before the system shuts down, use the show environment or show environment table command to display the internal chassis environment. See Chapter 3, “Starting and Configuring,” the “Reporting Functions” section on page 3-8 for descriptions of the show environment and show environment table commands.	Call your local customer service representative.
	If an environmental shutdown results from an out-of-tolerance power condition, the system shuts down.	See the “Troubleshooting the Power Subsystem” section on page 4-9 .

Troubleshooting the Processor Subsystem

The processor subsystem comprises the system board and the line card. A line card that is partially connected to the system board sends incomplete signals to the processor, which causes the system to pause indefinitely. Therefore, first ensure that the system software has initialized successfully and then check to see that all line cards and the processing engine are correctly seated.

Configuring Autoboot to Boot from the Network

To configure autoboot to boot from the network, you must have a usable network interface correctly configured. This procedure assumes your interface is configured and that a default gateway is set if the TFTP server is not local.

Follow these steps for configuring autoboot to boot from the network:

- Step 1** Specify the IOS image using the boot system command.
- Step 2** Specify the boot loader (optional).
- Step 3** Ensure your configuration register is set to autoboot (0x2102).

See the following example:

```
Router> boot system tftp server_name://c7300-js-mz
Router> boot bootldr bootdisk:c7300-boot-mz
Router> config-reg 0x2102
Router> copy running-config startup-config
```

Configuring Autoboot to Boot from a Local Device

The procedure for booting from a local device is similar to booting from the network. However, if you are booting from a local device, specifying the boot loader image is not necessary.

See the following example:

```
Router> boot system flash disk0:c7300-js-mz
Router> config-reg 0x2102
```

Bootldr Command

Use the **bootldr** command to specify the boot helper image for booting from the network. You can use the **bootldr** command in Cisco IOS or in ROMmon mode.

You can use the **bootldr** command in Cisco IOS:

```
Router> enable
Router#> config
Router(config)# boot bootldr bootdisk:c7300-boot-mz-my-image
Router(config)
Router copy running-config: startup-config
```

The **show bootvar** command can be used in ROMmon mode to verify that parameter settings are correct.

In cases where the system will not boot up, you can also use the **bootldr** command in ROMmon mode. First check to see if **bootldr** is set correctly:

```
ROMMON>set
```

If **bootldr** is not set correctly, set it with the correct image:

```
ROMMON>BOOTLDR="bootdisk:c7300-boot-mz-my-image"
```



Caution

Be careful of typographical errors in ROMmon mode as there is no error checking.

You can use the ROMmon command **sync** to save the current parameters that remain after a power cycle to NVRAM.

Use the **set** command to check your configuration.