



Troubleshooting the Cisco ISR 4451-X Power and Cooling Systems

This chapter describes how to troubleshoot the Cisco ISR 4451-X power and cooling systems.

Both the system LED and the fans can help you troubleshoot a power problem. Check the following items to help isolate the problem:

- [Normal Indications](#)
- [Fault Indications](#)
- [Environmental Reporting Features](#)

Normal Indications

With the power switch on, the normal indications are:

- SYS LED on, green, and continuous
- Fan operating

Fault Indications

This is a condensed listing of LED states. For the complete listing see “LED Indicators”.

Check the following symptoms to locate or eliminate faults in the power and cooling systems:

- With the power switch on, is the STAT on green?
 - If the LED is solid green and continuous, the router has booted and the software is functional.
 - If the LED is blinking amber, the system BIOS/ROMMON is in the process of booting. If it continues blinking for longer than 2 minutes, there might be a problem loading ROMMON.
 - If the LED is off, the system is not out of reset or the BIOS image is not loadbale.
 - If the LED is amber, BIOS/ROMMON has completed booting and system is at ROMMON prompt or booting platform software. If it is there for a very long time, it indicates that the router is sitting at a ROMMON prompt which could mean a problem loading the Cisco IOS-XE image.
- With the power switch on and the STAT on and green, does the fan operate?
 - If no, check the fan.
 - If yes, the power system is functioning.
- With the power switch on and the STAT off, does the fan operate?

- If yes, the router is receiving power. The fan is connected directly to the DC outputs of the power supply.
- If no, check the power source and power cable.
- Does the router shut down after being on a short time?
 - Check for an environmentally induced shutdown.
 - Check the environmental site requirements in “General Site Requirements”.
- Router partially boots
 - Check for a power supply failure by inspecting the PWR LED on the front panel of the router. If the PWR LED is blinking or continuously green, the power supply is functional.
 - If the PWR LED is not on, refer to [“Obtaining Documentation and Submitting a Service Request”](#) for warranty information, or contact customer service.

Environmental Reporting Features

If the router is operating at an abnormally high temperature, consider the following causes:

- Fan failure
- Air conditioner failure in the room
- Air blockage to cooling vents.

Take steps to correct the problem. Refer to the Preparing for Router Installation chapter in the *Hardware Installation Guide for the Cisco 4451-X Integrated Services Router*.

Online Troubleshooting Resources

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

Cisco.com registered users can access various troubleshooting tools such as Software Advisor, Cisco IOS Error Message Decoder Tool, and Output Interpreter Tool after logging in at http://www.cisco.com/en/US/support/tsd_most_requested_tools.html.

General Troubleshooting Tips

[Table 2-1](#) lists general troubleshooting tips.

Table 2-1 General Startup Troubleshooting Tips

Symptom	Corrective Action
System fails to power on	Check that: <ul style="list-style-type: none"> All power cords are properly connected to the Cisco ISR 4451-X and at the power connection end. The power switch is in the I ON position.
System fails to boot up properly	If your system has power, check the status LED on the Cisco ISR 4451-X route processor and make certain all connections are secure.
Power problems	The Power Supply Units have their own LEDs. If the two power supplies are both showing GREEN on their Output LEDs, then a failure of one power supply will not result in a system failure. Only one operating power supply is required for the Cisco ISR 4451-X system to operate. Having only one supply powered is a supported configuration. If both supplies have the LED off, the the system will fail..

Troubleshooting Using a Subsystem Approach

To solve a system problem, try to isolate the problem to a specific subsystem. Compare current router behavior with expected router behavior. Because a startup issue is usually attributable to one component, it is most efficient to examine each subsystem, rather than trying to troubleshoot each router component.

For troubleshooting purposes in this chapter, the router consists of the following subsystems:

- Power subsystem—Includes the following components:
AC input power supplies, also called power supply units (PSUs). The Cisco ISR 4451-X is shipped with fully redundant PSUs installed in the chassis.
- Processor subsystem—The Cisco ISR 4451-X has onboard processors. The LED is blinking yellow until the ROMMON has booted. If the board has booted ROMMON successfully, the LED is yellow. If operation software (IOS) has downloaded successfully, the LED is green.
- Cooling system—Consists of four fans in the Cisco ISR 4451-X system board. Each PSU has its own fans.

Normal Router Startup Sequence

You can generally determine when and where the power supply failed during the startup sequence by checking the status LEDs on the power supply modules.

In a normal router startup sequence, the following sequence of events and conditions occur:

- The fan in each PEM receives power and begins drawing air through the power supply. The power supply PWR OK indicator is on and reflects power supply status.
- As the power on and boot process progresses for the Cisco ISR 4451-X, the status is indicated by LEDs.

Troubleshooting the Power Subsystem

Use the information in [Table 2-2](#) to isolate problems with the power system.

Table 2-2 *Troubleshooting the Power System*

Symptom	Possible Cause	Possible Solution
System begins power on and then stops.	System has failed to boot.	There is a power fault in the chassis. Note that the The system status LEDs are located on the Cisco ISR 4451-X front panel. The LEDs stay amber during the entire IOS boot process and then turn green when IOS has completely booted.
System does not power on.	AC power cable not fully seated at system or at the wall outlet (power source).	Turn the router power switch to the standby position (I) and reseal the AC power cable at the system or at the wall outlet (power source).
	AC internal power cables are not fully seated from the power supply	Turn the router power switch to the standby position (I) and remove and reinsert the power supply cable.
System does not power on.	Power source is faulty.	Turn the power source switch off, connect the power cable to another power source, if available, and turn the router power switch back on.
	Faulty power cable.	Turn the router power switch to the standby position (I), 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, no STATUS LED, and no operating fans.	Power supply failure.	If the system is operating with only one power supply, it powers off after five minutes.

If you remove a power supply, the system can run for a maximum of five minutes before the system shuts down. The fans and power elements are independent within the power supply. Therefore, it is not required that the replacement power supply be energized within five minutes. The only requirement is that the power supply be installed in the chassis, which energizes the fans and maintains proper system cooling.

Troubleshooting the Cooling Subsystem

Use the information in [Table 2-3](#) to isolate problems with the cooling subsystem.

Table 2-3 *Troubleshooting the Cooling Subsystem*

Symptom	Possible Cause	Possible Solution
<p>System shuts down, some fans may or may not continue to rotate, and this error message is displayed:</p> <pre>Queued messages: %ENVM-1-SHUTDOWN: Environmental Monitor initiated shutdown</pre> <p>This error message indicates that the system has detected an overtemperature condition or out-of-tolerance power condition inside the chassis.</p>	<ul style="list-style-type: none"> One or more fans are not operating. The fans are operating too slowly. The power supply is not operating. <p>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.</p>	<p>Contact a service representative.</p>
<p>Multiple fan failure</p> <p>Amber indicates that one fan has stopped working.</p> <p>Blinking Amber indicates that two or more fans have stopped working, or the fan tray has been removed.</p>	<p>Fan speed dropped below its fan fail speed</p>	<ul style="list-style-type: none"> Identify and log the failed fan PEM location. Recommend immediate replacement of PEM.
	<p>Heated exhaust air from other equipment is entering the routers inlet vents.</p>	<p>Move other equipment or the router to ensure proper airflow.</p>
<p>System shuts down and this error message is displayed:</p> <pre>Queued messages: %ENVM-1-SHUTDOWN: Environmental Monitor initiated shutdown</pre> <p>This error message indicates that the system has detected an over-temperature condition or out-of-tolerance power condition inside the chassis.</p> <p>Note The system fans may continue to operate although the system shuts down.</p>	<p>The error message could indicate a faulty component or temperature sensor. Before the system shuts down, use the show env all command to display the internal chassis environment.</p> <p>If an environmental shutdown results from an out-of-tolerance power condition, the system shuts down.</p>	<p>Contact a service representative.</p> <p>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.</p>

Troubleshooting Upgrade-Related Problems

See [Table 2-4](#) below for troubleshooting tips during an upgrade:

Table 2-4

Symptom	Cause	Corrective Action
<p>An error message similar to the following example is displayed after you start the upgrade:</p> <pre> validate_package: SHA-1 hash: calculated 9526c1bf:10341089:84ecbb0d:c b12a344:b696af14 expected 93315a74:57061354:d514ff0c:8 b25f8f8:842afb4b SHA-1hashdoesn'tmatch application image failed to run </pre>	<p>There is a mismatch in the size of the image file that you are using and the expected size of the image file. Note that this error may occur, regardless of the file system to which you copy the image file.</p>	<p>Ensure that the size of the image file that you are using is the same as the expected file size. If required, download the image file again and retry the upgrade.</p>

Table 2-4


Symptom	Cause	Corrective Action
<p>Autoboot has been enabled by using the config-register 0x2102 command. The following error message is displayed when the router restarts automatically:</p> <pre>no valid BOOT image found Final autoboot attempt from default boot device... Located l2tp_rmcd_alg Image size 10271 inode num 12, bks cnt 3 blk size 8*512 # Boot image size = 10271 (0x281f) bytes . . . Boot image size = 11262 (0x2bfe) bytes Unknown image structure Located test Image size 11506 inode num 63, bks cnt 3 blk size 8*512</pre>	<p>The boot system command has not been configured by running a command similar to the following example:</p> <pre>boot system bootflash:isr4400rp1-ipbas ek9.03.05.01.S.152-1.S1.bi n</pre>	<p>Perform the following steps:</p> <ol style="list-style-type: none"> 1. Press the Break key, or run the break command from the console terminal. If Break is enabled, the router enters the rommon mode. Proceed to the last step. If Break is disabled, power cycle the router (turn the router off or unplug the power cord, and then restore power after waiting for 30 seconds). Then, proceed to the next step. 2. Within 60 seconds of restoring the power to the router, press the Break key or run the break command. This action causes the router to enter the rommon mode and display the rommon prompt. 3. Install a previously working version of the image from bootflash: or harddisk:. Alternatively, copy onto a USB stick the image to which you want to upgrade the router and then install that image on the router. <div>  <p>Note Using break can stop a boot in progress. However, if you are currently in Cisco IOS XE after a successful boot, using break will not drop you to a current ROMMON prompt.</p> </div>

Table 2-4

Symptom	Cause	Corrective Action
<p>An error message similar to the following example is displayed when you try to boot the system, and then the router switches to the rommon prompt:</p> <pre>Directory an_image.bin not found Unable to locate an_image.bin directory Unable to load an_image.bin boot: error executing "boot harddisk:an_image.bin" autoboot: boot failed, restarting</pre>	<p>The image file name specified in the boot command is invalid.</p>	<p>Perform the following steps:</p> <ol style="list-style-type: none"> 1. Verify that the image file is present in the bootflash:, or external USB device (usb0: or usb1:) by using the dir file-system command at the rommon prompt. 2. When you run the dir file-system command, if a message similar to "Please reset before continuing" is displayed, reconfigure the configuration-register to 0x0 and then run the reset command to allow the router to enter the rommon prompt without reattempting to boot using an invalid image. 3. Boot the router from the rommon prompt by using a command similar to the following example: <pre>rommon> BOOT=bootflash:isr4400rp1-ipbasek9.03.05.01.S. 152-1.S1.bin</pre> 4. To save the current environment variable setting, run the sync command as follows: <pre>rommon> sync</pre> 5. Ensure that autoboot has been enabled by using the confreg 0x2102 command at the rommon prompt, and then run the reset command at the same prompt. <p>If there is no valid image in either the local file system or the external file system, you can run the boot tftp: command to install the image that is on the TFTP server. To do this, ensure that the management Ethernet interface is physically connected to the default gateway, configure the ROMmon variables with the appropriate values, and then run the boot tftp: command as shown in the following example:</p> <pre>rommon > IP_SUBNET_MASK=255.255.255.0 TFTP_SERVER=192.0.2.2 TFTP_FILE=isr4400rp1-package-name9.03.05.01.S.152- 1.S1.bin DEFAULT_GATEWAY=192.0.2.1 IP_ADDRESS=192.0.2.26 rommon > boot tftp:</pre>