CHAPTER 4

Troubleshooting the Installation

Your router went through extensive testing and burn-in before leaving the factory; however, if your system appears to have problems starting up, use the information in this chapter to help isolate the cause. Problems with the initial startup will most likely be caused by an interface processor or power supply that has become dislodged from the backplane or chassis power connector. Although overtemperature conditions rarely occur at initial startup, the environmental monitoring functions are included because they also monitor DC line voltages.

This manual covers the system hardware installation only. At the initial system boot, you should verify the following:

- The power supplies are installed properly and are supplying power to the system.
- The system blower is operating.
- The system software boots successfully.
- The RP, SP (or SSP), and all interface processors are properly installed in their slots and each is initialized without problems.

When each of these conditions is met, the hardware installation is complete, and you should proceed to the *Router Products Getting Started Guide* on UniverCD or in the printed manual to configure the interfaces. If the startup sequence fails before these conditions are met, use the procedures in this chapter to isolate and, if possible, resolve the problem.

If you are unable to easily solve the problem, contact a customer service representative for assistance and further instructions. Before you call, have the following information ready to help your service provider assist you as quickly as possible:

- Date you received the router
- Chassis serial number (located on a label on the right rear deck of the chassis)
- Type of software and release number
- Brief description of the problem you are having
- Brief explanation of the steps you have already taken to isolate and resolve the problem
- Maintenance agreement or warranty information

Troubleshooting Overview

This section describes the troubleshooting methods used in this chapter and defines how the router is divided into subsystems for more efficient problem solving. A description of a normal startup sequence contains pointers to sections in this chapter that contain troubleshooting procedures for specific components so that you can determine where your system is having trouble and then troubleshoot that specific component or subsystem.

Problem Solving with Subsystems

The key to problem solving the system is to try to isolate 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*. Since a startup problem is usually attributable to a single component, it is more efficient to first isolate the problem to a subsystem rather than troubleshoot each separate component in the system. For these troubleshooting procedures, consider the following subsystems:

- Power subsystem—This subsystem includes the power supplies and power supply fans.
- Cooling subsystem—The chassis blower is the single component in this subsystem. The blower should be operating whenever system power is on and will usually continue to operate even when the environmental monitor shuts down the system because of an overtemperature or overvoltage condition (although it will shut down in the event of a power supply shutdown). Since the blower generates a noise level of 60 dBa, it is easy to determine whether or not it is operating. If you determine that the blower is not operating, the only recourse is to immediately contact a customer service representative. The blower is located in the interior of the chassis, and there are no installation adjustments that you should make if it does not function properly at initial startup.
- Processors subsystem—The RP contains the system operating software, so trouble with the system software initialization falls into this subsystem.
- The enabled LED—This subsystem comprises the SP (or SSP) and all interface processors. The enabled LED on the SP (or SSP) and each interface processor indicates whether or not the RP was able to initialize the board. Remember that an interface processor that is partially installed in the backplane will cause the system to hang and crash.

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

Identifying Startup Problems

When you start up the router for the first time, you should observe the startup sequence described in the chapter “Installing the Router.”

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.

With the exception of the system blower, 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, then proceed to the appropriate sections (indicated in each description) to try to resolve the problem.

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

- You should immediately hear the system blower operating (it generates an operating noise level of about 60 dBa). If not, proceed to the following section, “Troubleshooting the Power Subsystem.” If you determine that the power supplies are functioning normally and that the blower is faulty, contact a customer service representative. If the system blower does not function properly at initial startup, there are no installation adjustments that you should make.

- The power supply LEDs located on each power supply in the rear of the chassis, and the upper power and lower power LEDs on the front of the chassis, should come on as follows:
  - The green AC power LED, on the AC-input power supply (or the green input power LED on the DC-input power supply) should come on immediately when you turn the power supply switch to on (|), and should remain on during normal system operation. On the front of the chassis, the LED for the corresponding power supply bay (upper power or lower power) should also come on.
  - The DC fail LED on the AC-input power supply (or the out fail LED on the DC-input power supply) should remain off. This LED comes on only when the power supply loses input power or when it is shutting itself down because it detected an out-of-tolerance power or temperature condition within the power supply.

  If the AC power (or input power), upper power, or lower power LEDs do not come on, or if the DC fail (or out fail) LED on any power supply *does* come on, proceed to the next section, "Troubleshooting the Power Subsystem."
- The LEDs on the RP, which is located in the far right slot (RP slot) in the rear of the chassis, and the normal LED on the front of the chassis, should come on as follows:
  - The RP boot error LED comes on for 1 to 2 seconds when the system boot sequence is initialized, but it should otherwise remain off. If the system software is unable to start up, this LED will come on and remain on.
  - The RP normal and front panel normal LEDs come on after the system has completed a successful boot to indicate normal system operation. Once these LEDs come on they should remain on.
  - The CPU halt LED should always remain off. This LED comes on only if the system detects a processor hardware failure.

  If the normal LEDs on the RP and chassis front panel do not come on, or if either the boot error or CPU halt LED comes on and remains on, proceed to the section "Troubleshooting the RP Subsystem" later in this chapter.
- The enabled LED on the SP (or SSP) and on each interface processor comes on when the RP has completed initialization of the interface processor or SP (or SSP) for operation. This LED indicates that the SP (or SSP) or interface processor is receiving power and has been recognized by the RP; it does not indicate the state of the individual interfaces on the interface processors. It does, however, indicate that an interface processor or SP (or SSP) contains a valid microcode version. If an enabled LED fails to come on, proceed to the section "Troubleshooting the SP (or SSP) and Interface Processor Subsystem" later in this chapter.
  - 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, refer to the section "Connecting the Console Terminal" in the chapter "Installing the Router" to verify that the terminal is set correctly and that it is properly connected to the RP console port.

Troubleshooting the Power Subsystem

Check the following to help isolate the problem:

- On the lower power supply, is the AC power or input power LED on?
  - — If yes, the power source is good, and the power supply is functional.
  - — If no, first suspect the power/interlock switch. Loosen the captive installation screw, turn the power switch fully counterclockwise to the off (O) position, pull the supply out of the bay a few inches, then push it firmly back into the bay, and ensure that the front of the power supply is flush with the back of the chassis.

    Tighten the captive installation screw, then turn the power switch clockwise until it is completely turned to the on (|) position, and the interlock tab is fully extended into the interlock slot in the chassis. (Refer to the section “Installing Power Supplies” in the chapter “Installing the Router.”)
  - — If the AC power (or input power) and DC fail (or out fail) LEDs both remain off, and the switch is correctly set, suspect the power source or the power cable. Turn the switch off, connect the power cable to another power source if available, and turn the switch back on. If the LED then comes on, the problem is the first power source.
  - — If the LED fails to come on after you connect the power supply to a new power source, replace the power cord, and turn the switch back on. If the AC power (or input power) LED then comes on, return the first power cable for replacement.
  - — If the LED still fails to come on when connected to a different power source with a new power cable, the power supply is probably faulty. If a second power supply is available, install it in the lower power supply bay and contact a service representative for further instructions.
- On the lower power supply, is the DC fail (or out fail) LED on?
  - — If yes, suspect the power supply. Try installing the power supply in the upper bay. If a second power supply is present, move it to the lower bay. Turn both power supplies on to determine whether the power supply or the power connector in the chassis is faulty, and then contact a service representative with the results.
- Is the AC power (input power) LED on for the second (redundant) power supply?
  - — If not, repeat each of the above procedures for the second power supply.

If you are unable to resolve the problem, or if you determine that either a power supply or chassis connector is faulty, contact a service representative for instructions.

Troubleshooting the RP Subsystem

Check the following items to help isolate the problem:

- Did any LEDs on the RP come on?
  - If no, first refer to the section "Troubleshooting the Power Subsystem" earlier in this chapter to determine whether the power subsystem is functioning properly.
  - If no, suspect that an improperly connected RP, SP (or SSP), or interface processor has hung the bus. Turn all power supply switches off, then use the ejector levers to ensure that each board is seated properly. On each ejector lever pair, push the top lever down while pushing the bottom lever up until both levers are at a 90-degree orientation to the rear of the chassis. (For a description and illustration of the ejector levers, refer to the section "Ejector Levers" in the chapter "Maintenance.") Tighten all captive installation screws, then restart the system.
- Are both the RP normal and front panel normal LEDs on?
  - If yes, the system software has initialized successfully, and the system is operational.
  - If only one of the normal LEDs is on but the other is not, suspect an LED failure. Try proceeding with the installation and configuring the interfaces, but contact a service representative for replacement instructions.
- Is the boot error LED on?
  - If yes, the system software is unable to start up. Turn the system power off and on again.
  - If you have a spare RP with the system software EPROMs installed, turn the system power off and replace the installed RP with the spare.
  - If after several attempts the boot error LED continues to come on, try to estimate the amount of time that elapses between power on and when the LED comes on, and contact a service representative.
- Is the RP CPU halt LED on?
  - If yes, the system has detected a processor hardware failure. Contact a service representative for instructions.

Troubleshooting the SP (or SSP) and Interface Processor Subsystem

Check the following to help isolate the problem:

- Are the enabled LEDs on the SP (or SSP) and all interface processors on?
  - If yes, the system is operational. Proceed to the *Router Products Getting Started Guide* or the *Router Product Configuration Guide* to configure the interfaces.
- Are any enabled LEDs on the SP (or SSP) and all interface processors on?
  - If none of the enabled LEDs are on, first refer to the section "Troubleshooting the Power Subsystem" earlier in this chapter to determine whether the power subsystem is functioning properly. Then refer to the section "Troubleshooting the RP Subsystem" earlier in this chapter to determine whether the system has booted successfully.

- If the enabled LED on the SP (or SSP) is not on, suspect that the processor has shifted out of its slot. Turn all system power off, then use the processor ejector levers to ensure that the processor is seated in the backplane. Push the top lever down while pushing the bottom lever up until both levers are at a 90-degree orientation to the rear of the chassis. (For a description and illustration of the ejector levers, refer to the section "Ejector Levers" in the chapter "Maintenance.") Tighten the captive installation screws at the top and bottom of the SP faceplate and restart the system.
- If the enabled LED on an interface processor is not on, suspect that the interface processor has shifted out of its slot. You do not have to turn off the system power to remove and replace an interface processor, but you must turn off the power before removing an RP or SP. Use the ejector levers to ensure that the interface processor is seated in the backplane. Push the top lever down while pushing the bottom lever up until both levers are at a 90-degree orientation to the rear of the chassis. (For a description and illustration of the ejector levers, refer to the section "Ejector Levers" in the chapter "Maintenance.") Tighten the captive installation screws at the top and bottom of the interface processor faceplate. After the system reinitializes the interfaces, the enabled LED on the interface processor should come on.

If you experience trouble with the startup that is not resolved with these procedures, contact a service representative for assistance.