Troubleshooting

This chapter explains how to isolate faults in the Cisco 6260 system. Most problems in a Cisco 6260 can be traced to one of the system field-replaceable units (FRUs), which include the following:

- NI-2 cards
- Line cards
- Input/Output (I/O) modules
- Power entry modules (PEMs)
- Fan trays
- Air filters

This chapter consists of three major sections:

- System-Wide Problems, page 5-3
- FRU-Specific Problems, page 5-8
- Alarms, page 5-17

5.1 Hot-Swappable FRUs

All Cisco 6260 FRUs are hot swappable, except the PEM in configurations where only a single PEM is operating. However, hot swapping some FRUs causes an interruption in service. See Table 5-1.

Table 5-1 Service Interruptions Caused by Replacing FRUs

FRU	Does Hot Swapping Interrupt Service?	Notes
NI-2 card	Yes	In systems with NI-2 card redundancy, the secondary card can be hot swapped without incurring service interruption for the system.
Line card	Yes	Service is interrupted only for subscribers served by that line card.
I/O module	Yes	You must reboot the system after you replace the I/O module because the MAC address is stored on the I/O module.
PEM	See next column	You can replace a PEM without interrupting service if the other PEM in the chassis is operating normally.

Table 5-1 Service Interruptions Caused by Replacing FRUs

FRU	Does Hot Swapping Interrupt Service?	Notes
Fan tray	No	—
Air filter	No	—

5.2 Basic Checks

Before using the troubleshooting tables in this chapter, make the following basic checks:

- Are the ports properly configured? Refer to these sources for configuration instructions:
  - *Configuration Guide for Cisco DSLAMs with NI-2*
  - *Command Reference for Cisco DSLAMs with NI-2*
  - Cisco IOS information on the World Wide Web— http://www.cisco.com/univercd/cc/td/doc/product/dsl_prod/ios_dsl/
  - *ATM Switch Router Software Configuration Guide*
  - *ATM Switch Router Command Reference Guide*
- Are power leads and data cables firmly connected at both ends?
- Are all cards firmly seated and securely locked in the chassis?
- Is the fan tray properly installed and secured to the chassis?
- Are the network I/O module and PEMs properly secured to the chassis?

5.3 Contacting the Cisco TAC for Help

In certain situations, the troubleshooting tables in this chapter direct you to contact the Cisco Technical Assistance Center (TAC) for help. If you have a maintenance contract or if your hardware is under warranty, call the TAC at 800 553 2447 (North America only), 408 526 7209, or visit this URL for a worldwide list of TAC regional telephone numbers:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

5.4 System-Wide Problems

Table 5-2 offers suggestions for problems that affect the entire Cisco 6260 system.

Table 5-2 System-Wide Problems

Symptom	Steps to Take
System fails to come up.	1. Check the Power LED on the NI-2, the Status LEDs on the line cards, and the Input OK LED on each PEM. If all LEDs are off, or if the red Out Fail LED on either PEM is on, troubleshoot the PEMs. See the "Alarms" section on page 5-17. 2. If any green LEDs are on, the system has power. Check the STATUS LED on the NI-2 card. If the STATUS LED is off, refer to the "NI-2 Card Problems" section on page 5-8. 3. If the Cisco 6260 is set to boot from a remote device over the network, make sure the remote device is up, that its network connection is solid, and that it contains the boot file. (The Cisco 6260 tries to boot over the network for a configured period, usually 5 to 15 minutes. If it is unable to boot over the network, it will eventually boot from bootflash.) 4. Try to establish a console connection to the Cisco 6260. If you cannot connect, see the steps for the symptom You cannot establish a console or Telnet connection to the system., page 5-4. 5. If you achieve a console connection – Examine the command prompt. If the prompt says `rommon 1>`, the problem could be in flash memory, in bootflash, in an incorrectly set boot configuration register, or in an incorrect file name in a **boot system** command in the startup-config file. Refer to the *Configuration Guide for Cisco DSLAMs with NI-2* for information on setting and interpreting configuration registers, configuring flash memory, and editing the startup-config file. To select an image to boot the system from flash, enter **dir flash:**. In the resulting display, find the name of the software image. Then enter **boot flash:***imagename*, replacing *imagename* with the name of the software image. The system boots from flash. – If you see a normal Cisco IOS prompt, which usually contains the name of the system (default is `c6260`), enter **show oir status**. If the results indicate that the card is loading software, wait a few minutes for the port to come back up.

Table 5-2 System-Wide Problems (continued)

Symptom	Steps to Take
You cannot establish a console or Telnet connection to the system.	1. For a console problem, check the terminal settings against the list of settings in the "Connect a Console Terminal" section on page 3-21 or the "Connect a Console Terminal" section on page 4-20. 2. For a Telnet problem: – If you are connecting to the Cisco 6260 through the Ethernet interface, check the configuration of your LAN for both the Cisco 6260 and the Telnet source. – If you are connecting to the Cisco 6260 through an ATM interface, make sure that PVCs are set up between the two devices and that the map-list is correctly configured. Enter the command **show running-config** to display this information. – If the Telnet source and the Cisco 6260 are on different networks, make sure static routes are configured at both ends so that the two devices can communicate. To check, use the **ping** command to ping each device from the other (that is, ping the Cisco 6260 from the Telnet source, and ping the Telnet source from the Cisco 6260). Alternatively, ping your default gateways from each end of the connection. 3. For both console and Telnet problems: – Check the cabling and connectors between the terminal or Telnet source and the Cisco 6260. See Appendix C, "Connector and Pinout Specifications," to check pinouts. – Press the **Reset** button on the NI-2 card faceplate to reset the card. – If the problem persists, replace the NI-2 card.
System experiences a critical, major, or minor alarm.	1. Enter the command **show facility-alarm status**. Note the affected slot and port, if any, and the description of the problem. 2. If no slot number is indicated, enter **show environment all** and examine the results for an indication of which FRU is at fault. Refer to the "FRU-Specific Problems" section on page 5-8 for instructions on troubleshooting that FRU. 3. If ATM0/0, ATM0/1, ATM0/2, or ATM0/3 is indicated: – Enter a **show int** command for the interface (for example, **show int atm0/1**). Results may indicate a SONET problem (Loss of Signal, for example). Refer to the "NI-2 Card Problems" section on page 5-8 for instructions on troubleshooting the NI-2 card. – Enter **show controllers** commands for all trunk and subtending ports. (The ports are atm0/1, atm0/2, and, in a DS3 system, atm0/3.) For example, **show controllers atm0/1**. In the resulting display, check that the framing mode is set to the same value on this interface as at the other end of the connection. Also check that cell payload scrambling is on (on E3 interfaces only). 4. If a line card slot is indicated, consult the "NI-2 Card Redundancy Problems" section on page 5-9.

Table 5-2 System-Wide Problems (continued)

Symptom	Steps to Take

A trunk or subtending port fails to come up (OC-3c or E3).	**1.** Check the cable connections at both ends. Refer to "" section on page B-2 to check pinouts.
	2. To check the interface status and configuration, enter **show interface atm** *slot#/port#*. Check the following in the resulting display:
	– If the port Admin Status is down, enter the commands below to correct the problem, replacing slot/port ID atm 0/1 with your slot/port ID:
	`DSLAM> configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`DSLAM(config-if)# int atm 0/1`
	`DSLAM(config-if)# no shutdown`
	`DSLAM(config-if)#`
	– If the port IF Status is down, check for disconnected or faulty cables. (Optical cables connect to the NI-2 card; E3 coaxial cables connect to the I/O module on the front of the chassis.)
	– If the Line Protocol is down, the line protocol software processes might have determined that the line is unusable. Try swapping the cable. Another possibility is that clocking might be misconfigured, or the clocking source might have failed.
	– Check the CRC field. The presence of many CRC errors but not many collisions is an indication of excessive noise. If the number is too high (greater than 0.5 to 2 percent of total traffic on the interface), check the cables to determine if any are damaged.
	If you need more information on interface configuration, refer to the *Configuration Guide for Cisco DSLAMs with NI-2* and the *ATM Switch Router Software Configuration Guide*.
	3. For an E3 interface: enter **show controllers atm***slot#/port#*. Check the following in the resulting display:
	– Framing mode must be the same at both ends of the connection.
	– Cell payload scrambling must be on at both ends of the connection.
	4. Check the status and configuration of the interface at the far end.
	5. If you need to run a loopback test, do the following:
	– In interface configuration mode, enter **loopback diagnostic** or **loopback line**.
	– Set the external test equipment to loop data through the Cisco 6260 port.
	– Obtain loopback results from your external test equipment.
	– Enter **no loopback diagnostic** to take the port out of loopback mode.
	6. In interface configuration mode, reset the trunk port by executing the **shutdown** command followed by the **no shutdown** command.
	7. Replace the NI-2 card.
	8. If the problem with an E3 interface persists, troubleshoot the I/O module. See the "I/O Module Problems" section on page 5-14.

Table 5-2 System-Wide Problems (continued)

Symptom	Steps to Take

A trunk or subtending port fails to come up (E1).	1. Verify that the trunk port selection is correct.
	2. Check the cable connections at both ends. Refer to Appendix C, "Connector and Pinout Specifications," to check pinouts.
	3. To check the interface status and configuration, enter **show interface atm** *slot#/port#*. Check the following information in the resulting display:
	– If the port Admin Status is down, enter the commands below to correct the problem, replacing slot/port ID atm 0/2 with your slot/port ID (atm 0/2 through atm 0/9):
	`DSLAM> configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`DSLAM(config-if)# int atm 0/2`
	`DSLAM(config-if)# no shutdown`
	`DSLAM(config-if)#`
	– If the port IF Status is down, check for disconnected or faulty wire. T1/E1 twisted pair wire connects to the I/O module on the front of the chassis.
	– If the Line Protocol is down, the line protocol software processes might have determined that the line is unusable; try swapping the cable. Another possibility is that clocking might be misconfigured, or the clocking source might have failed.
	– Check the CRC field. The presence of many CRC errors but not many collisions is an indication of excessive noise. If the number is too high (greater than 0.5 to 2 percent of total traffic on the interface), check the cables to determine if any are damaged.
	If you need more information on interface configuration, refer to the *Configuration Guide for Cisco DSLAMs with NI-2* and the *ATM Switch Router Software Configuration Guide*.
	4. Enter **show controllers atm** *slot#/port#*. Check the following information in the resulting display:
	– Framing mode must be the same at both ends of the connection.
	– Line coding must be the same at both ends of the connection (E1).
	– Cell payload scrambling must be on at both ends of the connection.
	5. Check the status and configuration of the interface at the far end.
	6. If you need to run a loopback test to troubleshoot the E1 links, do the following tasks:
	– In interface configuration mode, enter **loopback diagnostic** (or **loopback line**).
	– Set the external test equipment to loop data through the Cisco 6260 port.
	– Obtain loopback results from your external test equipment.
	– Enter **no loopback diagnostic** (or **no loopback line**) to take the port out of loopback mode.
	7. In interface configuration mode, reset the trunk port by executing the **shutdown** command followed by the **no shutdown** command.
	8. Replace the NI-2 card.
	9. If the problem with a T1/E1 interface persists, troubleshoot the network I/O module. See the "I/O Module Problems" section on page 5-14.

Table 5-2 System-Wide Problems (continued)

Symptom	Steps to Take

A trunk or subtending port fails to come up (E1 IMA).	**1.** Before checking IMA interface problems, troubleshoot the E1 links that are configured in the IMA group, as described in the previous section. Verify that the links are up.
	2. Check an IMA interface status with the **show ima interface atm0/ima*X*** command, where *X* is the IMA interface ID (0 through 3). Look at the following items in the resulting display:
	– MinNumLinks (minimum number of links) should be equal to or below the number of links you have configured in your IMA group. You can change the minimum number of links parameter in the IMA group to any value from 1 to 8.
	– NeTxClkMode (near end transmit clock mode) should match the FeTxClkMode (far end transmit clock mode), which will be either ctc or itc. Both sides of the IMA link must use the same IMA clock mode.
	– DiffDelayMaxObs (maximum observed differential delay) should be less than DiffDelayMax (maximum differential delay configured for the group). If the differential delay observed is more than the maximum allowed, one or more links is not allowed in the IMA group. Configure more allowable differential delay (up to 69 ms in T1, 55 ms in E1) using T1/E1 lines with less differential delay, or reconfigure similarly-delayed lines into IMA groups if possible.
	– The IMA Link Information table shows the interfaces configured in your IMA group, the near end and far end receive state, and any IMA alarms received at the near end. The NeRxState and FeRxState must both be active for each line to be active in the IMA group. The whole IMA group is up when the number of active links on both sides is equal to or greater than the minimum number of configured links (MinNumLinks) for that IMA group.
	3. It can take several seconds for an IMA group to synchronize between two IMA systems. Wait 5 minutes after configuring or reconfiguring a group to allow the synchronization to occur.
	4. If synchronization does not occur in any one link or in the group after several minutes, or links cannot be successfully added to an active group, and the above IMA parameters have been checked and are found to be correct, clear the interface with a **clear interface atm0/ima*X*** command. This resets the IMA group and starts the IMA synchronization process again with all links in the group.
	5. To check the interface status and configuration, enter **show interface atm** *slot#/imagroup#*. Check the following information in the resulting display:
	– If the port Admin Status is down, enter the commands below to correct the problem, replacing slot/port ID atm0/ima2 with your slot/port ID:
	`DSLAM> configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`DSLAM(config-if)# int atm0/ima2`
	`DSLAM(config-if)# no shutdown`
	`DSLAM(config-if)#`
	If you need more information on interface configuration, refer to the *Configuration Guide for Cisco DSLAMs with NI-2* and the *ATM Switch Router Software Configuration Guide*.
	6. In interface configuration mode, reset the port by executing the **shutdown** command followed by the **no shutdown** command.

Table 5-2 System-Wide Problems (continued)

Symptom	Steps to Take
	7. Replace the NI-2 card. 8. If the problem with an E1 interface persists, troubleshoot the I/O module. See the "I/O Module Problems" section on page 5-14.
System overheats.	Troubleshoot the fan tray. See the "Fan Tray Problems" section on page 5-15.
System experiences a clocking problem.	Troubleshoot the NI-2 card. See the "NI-2 Card Problems" section on page 5-8.
System experiences a power problem.	Troubleshoot the PEMs. See the "Alarms" section on page 5-17.

5.5 FRU-Specific Problems

The following sections describe symptoms that might occur and the steps that you need to take if you experience problems with any Cisco 6260 FRU.

5.5.1 NI-2 Card Problems

If you need to remove or replace an NI-2 card as part of the troubleshooting steps below, see Chapter 6, "Upgrading and Maintaining the Cisco 6260 System," for instructions.

Table 5-3 NI-2 Card Problems

Symptom	Steps to Take
Power LED is off.	1. Check the Status LEDs on the line cards and the Input OK LED on each PEM. If all LEDs are off, or if the red Out Fail LED on either PEM is on, troubleshoot the PEMs—see the "PEM Problems" section on page 5-16. 2. If the line card STATUS LEDs are lit, remove the NI-2 card from its slot and check for bent or broken pins on both the card and the backplane. If you find damaged pins on the card, replace it. If you find damaged pins on the backplane, contact the Cisco TAC.
Status LED is off, indicating that the NI-2 card failed to boot or failed its power-on self test.	Press the **Reset** button on the NI-2 card. If the problem persists, replace the card.
Critical LED, Major LED, or Minor LED is on.	See the "System-Wide Problems" section on page 5-3.
A trunk or subtending port fails to come up.	See the "System-Wide Problems" section on page 5-3.
NI-2 card cannot be fully inserted into its slot.	Inspect connectors on both the card and the backplane, looking for obstructions, bent pins, or other damage. If you find damage to a line card connector, replace the line card. If you find damage to a backplane connector, contact the Cisco TAC.

5.5.2 NI-2 Card Redundancy Problems

Table 5-4 provides information about symptoms and corrective actions related to NI-2 card cold redundancy problems. If you need to remove or replace an NI-2 card as part of the troubleshooting steps below, see Chapter 6, "Upgrading and Maintaining the Cisco 6260 System," for instructions.

Table 5-4 NI-2 Card Cold Redundancy Problems

Symptom	Steps to Take
Both NI-2 cards go active.	Ensure that both NI-2 cards are Revision AO or later
DS3 traffic interrupted.	1. Ensure that both NI-2 cards are Revision AO or later. 2. Ensure that the correct boot image is installed on the NI-2 cards. Refer to the *Upgrading DSLAMs for NI-2 Card and APS Link Redundancy* document for instructions.
Line card communication is interrupted.	1. Ensure that both NI-2 cards are Revision AO or later. 2. Ensure that the correct boot image is installed on the NI-2 cards. Refer to the *Upgrading DSLAMs for NI-2 Card and APS Link Redundancy* document for instructions.
Transient environmental alarms occur.	3. Ensure that the correct boot image is installed on the NI-2 cards. Refer to the *Upgrading DSLAMs for NI-2 Card and APS Link Redundancy* document for instructions.
TFTP boot fails.	The NI-2 card is not configured to boot from flash. Refer to the *Upgrading DSLAMs for NI-2 Card and APS Link Redundancy* document for instructions.
Line cards reboot or reset upon switchover.	The software versions on the primary and secondary NI-2 cards might be mismatched. Use the Cisco IOS **show version** command to determine the IOS release currently installed on each of the NI-2 cards. Refer to the *Upgrading DSLAMs for NI-2 Card and APS Link Redundancy* document for more information on upgrading software images.
Redundant NI2 will not become active	Be sure that you have enabled the command **no auto-sync bootflash** in the redundancy configuration mode if you are using OC3 NI2's with different product numbers (for example, an NI2-155SM-155SM or NI2-155MM-155MM with an NI2-155SM-155SM2 or NI2-155MM-155MM2). Different types of NI2's require different bootflash image types to operate properly.

5.5.3 Line Card Problems

If you need to remove or replace a line card as part of the troubleshooting steps below, see Chapter 6, "Upgrading and Maintaining the Cisco 6260 System," for instructions.

Table 5-5 Line Card Problems

Symptom	Steps to Take
All LEDs are off.	1. Check the Power LED on the NI-2 card and the Input OK LEDs on the PEMs. If none of the LEDS are lit, or if the red Out Fail LED on either PEM is lit, troubleshoot the PEM—see the "Alarms" section on page 5-17. 2. If the NI-2 card Power LED is off, remove the card from its slot and check for bent or broken pins on both the card and the backplane. If you find damaged pins on the card, replace it. If you find damaged pins on the backplane, contact the Cisco TAC.
All ports on a card fail to come up (modems do not train). Status LED might be red, indicating that the line card failed to boot or failed its power-on self test.	1. Enter the **show ipc nodes** command to find out whether there is a communication problem between the line card and the NI-2 card. There should be an entry in the resulting display for each line card ("SMB IP Slot *n*") and for the NI-2 card ("IPC Master"). If there is an entry for each card, go to step 4. 2. If one or more cards are not listed, enter **show oir status**. If the resulting display indicates that the card in question is loading new code, wait a few minutes and reenter the command. (Usually, 2 to 3 minutes is long enough to wait.) The card status should change to `running`. 3. Enter the command **show dsl int atm** *slot#/port#*. If the status says `Microcode downloading`, wait 10 minutes. When the download is complete, the card reboots and comes up normally. 4. Check the ALARM LEDs on the NI-2 card or enter **show facility-alarm status** to determine the alarm status of the system. If any alarms are indicated, see the "System-Wide Problems" section on page 5-3 for instructions on how to troubleshoot alarms. 5. Enter the command **show dsl status** and examine the results to ensure that the card is configured to be in its current slot. (In the Names column of the resulting display, the slot number appears as part of the port ID. For example, in ATM19/2, the slot number is 19. Nothing is displayed for slots that are not configured.) If necessary, use the **slot** command to update the configuration, or move the card to the correct slot. If the line card is a 4xflexi[1], it will not function unless you use the **slot** command to configure either CAP or DMT operation. 6. Reset the line card by disconnecting it from the backplane and reseating it in its slot. 7. Install the card in another slot. 8. If the problem persists, replace the line card.

Table 5-5 Line Card Problems (continued)

Symptom	Steps to Take
Port fails to come up (modems do not train), or port LED flashes continuously.	1. Enter the command **show dsl int atm** *slot#/port#* to display the port configuration. Check the display to ensure that the port is properly provisioned. Make sure the port is configured to be running ("no shutdown" or IOS admin state = up). Also check the line status; if this reads "No CPE detected," troubleshoot the CPE device and the loop as described below under the symptom "You suspect a problem with the CPE or the subscriber loop." section on page 5-11. 2. In interface configuration mode, reset the port by executing the **shutdown** command followed by the **no shutdown** command. 3. Connect the subscriber to another port on the Cisco 6260. If the modems do not train, troubleshoot the CPE device and the loop as described below under the symptom "You suspect a problem with the CPE or the subscriber loop." section on page 5-11. If the modems train, go to the next step to troubleshoot the port that failed. 4. To test the modem on the line card, enter **dsl test atm***slot#/port#* **self**. Results are displayed automatically after a few seconds. If the modem fails the test, replace the line card.
You suspect a problem with the CPE or the subscriber loop.	1. Disconnect the local loop and replace it with a test setup that consists of a modem or CPE that is known to work, and a few thousand feet of wire. If the modems train over the shorter distance, the problem lies in the local loop or in the CPE. See the steps that follow. If the modems do not train, the port is probably at fault. Replace the line card. 2. Make sure that the CPE at the subscriber site is powered up. 3. Make sure that the CPE is compatible with the Cisco 6260, and that the software version running on the CPE is compatible with the software version running on the Cisco 6260. 4. Power cycle the CPE. When you turn the power on, the WAN Link LED on the CPE should blink. If the LED does not blink, check the CPE configuration—if the interface is shut down, bring it up. 5. Perform a continuity check to find out if the cabling to the CPE is connected and intact. For example, if there is a phone on the line, check for a dial tone. 6. If there is no POTS, check DC resistance by shorting tip and ring at the remote end. 7. Make sure there are no load coils on the local loop. 8. Is the local loop too long? The maximum length range is 15,000 to 25,000 feet (4572 to 7620 meters). Within that range, wire gauge, crosstalk, and multiple bridge taps reduce the distance over which the modems can train. 9. Is the local loop too short? DMT modems train best over loops of several thousand feet. In a test situation with a loop just a few feet in length, the modem might fail to train. Add wire to the loop. 10. Replace the CPE.

Table 5-5 Line Card Problems (continued)

Symptom	Steps to Take
Modems train at a low bit rate, modems retrain continuously, or the line experiences too many errors.	**1.** Enter the command **show dsl int atm***slot#/port#* to display the port configuration. Check the display to ensure that the port is properly provisioned. Look in particular for these statistics: – Attenuation: typically this is 20 to 50 dB. If the attenuation value is higher than 50 dB, it might be depressing the bit rate. Repair or replace the cables and connectors in the loop. – SNR margin: 3 to 6 dB is optimum. Use the **dmt margin** command to adjust SNR margin. – Correction ratio: under DSL Statistics, look at the Received Superframes and Corrected Superframes values. A ratio of more than 1 corrected superframe for every 10 superframes received is too high. One or more of these adjustments might correct the problem: increase the SNR margin using the **dmt margin** command; increase error correction using the **dmt check-bytes** command; or increase interleaving using the **dmt interleaving-delay** command. – Errored seconds: a rate of 10 to 20 errored seconds per minute or more is likely to cause retraining. (1 or 2 errored seconds every 15 minutes is a good rate.) See the steps that follow on crosstalk and impulse noise for suggestions on how to compensate. – CRC errors: normal rates vary system by system. If the CRC error rate is higher than usual, it might cause excessive retraining. See the steps that follow on crosstalk and impulse noise for suggestions on how to compensate. **2.** Crosstalk is caused by interference between services in adjacent cables. It affects random bits rather than chunks of data; upstream and downstream traffic can be affected differently. If crosstalk is increasing the bit error rate (BER), you can compensate in several ways: – Reduce the bit rate using the **dmt bitrate** command. (See the *Command Reference for Cisco DSLAMs with NI-2* for information on the **dmt bitrate** command.) – Increase the SNR margin using the **dmt margin** command. (See the *Command Reference for Cisco DSLAMs with NI-2* for information on the **dmt margin** command.) – Turn on or increase error correction. Use the **dmt check-bytes** command. If the codeword size is not set to auto, you might need to use the **dmt codeword-size** command to adjust the codeword setting. (See the *Command Reference for Cisco DSLAMs with NI-2* for information on these commands.) **3.** If you experience impulse noise or clipping, both of which affect chunks of data rather than random bits, you can compensate by turning on or increasing interleaving and error correction. (However, note that this approach adds delay.) Use the **dmt interleaving-delay** command for interleaving. Use the **dmt encoding-trellis** command or the **dmt check-bytes** command for error correction. If you use **dmt check-bytes** and if the codeword size is not set to auto, you might need to use the **dmt codeword-size** command to adjust the codeword setting.

Table 5-5 Line Card Problems (continued)

Symptom	Steps to Take
Modems train at a low bit rate, modems retrain continuously, or the line experiences too many errors (continued).	4. If errors or retraining occurs while the line is ringing, use the **dmt interleaving-delay** command to turn on interleaving. 5. In interface configuration mode, reset the port by executing the **shutdown** command followed by the **no shutdown** command. 6. Connect the customer to a different port on the Cisco 6260. If the modems train, replace the line card with the faulty port. 7. Troubleshoot the CPE device and the loop as described above under the symptom "You suspect a problem with the CPE or the subscriber loop." section on page 5-11. 8. Replace the line card.
Card cannot be fully inserted into its slot.	1. Remove the card and reinsert it, pushing firmly on both the top and the bottom of the faceplate. (The card might jam in the slot if you apply pressure to the top only.) If the chassis is full, you might need to push sideways to insert the card. 2. Inspect connectors on both the card and the backplane, looking for obstructions, bent pins, or other damage. If you find damage to a line card connector, replace the line card. If you find damage to a backplane connector, contact the Cisco TAC.
Card experiences problems in one slot but operates normally in another.	There may be a fault in your backplane. Contact the Cisco TAC.

1. 4xflexi = quad-port flexi ATU-C line card

5.5.4 I/O Module Problems

If you need to remove or replace an I/O module as part of the troubleshooting steps below, see Chapter 6, "Upgrading and Maintaining the Cisco 6260 System," for instructions.

Table 5-6 I/O Module Problems

Symptom	Steps to Take
A trunk port fails to come up.	See the "System-Wide Problems" section on page 5-3.
A subtending port fails to come up.	See the "System-Wide Problems" section on page 5-3.
An alarm relay or BITS circuit fails.	1. Check the connection at the wire-wrap connector on the I/O module. See Table C-1 on page C-3 for the pin assignments of the wire-wrap connector. 2. Check the connection at the other end of the circuit. 3. For a BITS problem, troubleshoot the E1 line at the other end of the circuit. 4. Replace the I/O module (except in the case of a circuit breaker alarm problem).
This message appears on the console or in the system log file: `00:00:28:%C6100-4-COOKIE: Corrupt or missing MAC address cookie using random base 007e.eb7d.e700`	1. Make sure the software release running on your system is compatible with the hardware. The Cisco 6260 requires Cisco IOS Release 12.1(4)DA or greater. 2. Enter the command **show hardware chassis**. In the resulting display, look for data from the I/O module EEPROM. If the system can read the contents of the EEPROM, the I/O module is likely to be healthy. 3. If the I/O module is missing, install it. 4. If the I/O module is present, reseat it. First, turn off system power. Use a Phillips-head screwdriver to unfasten the screws that secure the I/O module cover, and pull the card off the connectors. Push it firmly back into place and tighten the screws. 5. If the problem persists, replace the I/O module.

5.5.5 Fan Tray Problems

If you need to remove or replace a fan tray as part of the troubleshooting steps below, see Chapter 6, "Upgrading and Maintaining the Cisco 6260 System," for instructions.

Table 5-7 Fan Tray Problems

Symptom	Steps to Take
Fans do not run.	1. Make sure the fan trays are fully inserted into the chassis and screwed in place. 2. Replace the fan tray.
Fans run, but the system overheats.	1. Make sure that the air intake vents at the bottom front of the chassis and the exhaust vents on the top of the chassis are free of blockages, as explained in the Ventilation, page 2-12. 2. Make sure that the ambient temperature and other environmental factors affecting the system are within the ranges specified in the "Environmental Requirements" section on page 2-11. 3. Make sure that all cards, blank faceplates, and covers are in place. The cooling system cannot operate effectively unless the chassis is fully enclosed. 4. Check the fan tray LEDs on the PEMs. If the LEDs show a problem, replace the indicated fan tray. 5. Check the air filter at the bottom of the fan tray, and if necessary clean or replace it. See the "Removing and Replacing the Fan Tray" section on page 6-4 for instructions on cleaning or replacing the air filter. 6. Reduce the ambient temperature.
Air filter is damaged, dirty, or clogged.	Refer to Chapter 6, "Upgrading and Maintaining the Cisco 6260 System" for instructions on cleaning or replacing air filters.

5.5.6 PEM Problems

If you need to remove or replace a PEM as part of the troubleshooting steps below, see Chapter 6, "Upgrading and Maintaining the Cisco 6260 System," for instructions.

Table 5-8 PEM Problems

Symptom	Steps to Take
Input OK LED on PEM fails to go on.	1. Make sure the circuit breaker on the PEM is turned to the ON (1) position. 2. Make sure the PEM is properly seated in the chassis and screwed in place. 3. Make sure the power leads are properly connected to power connectors on the PEM. (If the connections are loose or their polarity is reversed on the DC PEM, the chassis does not receive power.) 4. Check the power cable for breaks, cracked insulation, loose lugs, and signs of wear. Replace the power cable if it is not in good condition. 5. Check the power source. 6. Turn the circuit breaker on the PEM to the OFF (0) position, and move it to the other PEM slot. If the PEM still fails, replace it.
Out Fail LED on PEM goes on.	1. Make sure the PEM is fully inserted into its slot and firmly screwed in place. 2. Replace the PEM. 3. If the problem persists, there may be a fault in your backplane. Contact the Cisco TAC.
Circuit breaker on PEM trips.	A tripped circuit breaker indicates a serious overcurrent situation. The probable cause is a faulty backplane, a faulty power connector on the backplane, or a faulty PEM. Contact the Cisco TAC for assistance.
PEM has problems in one slot but operates normally in the other.	There might be a fault in your backplane. Contact the Cisco TAC.

5.6 Alarms

Tables 5-9 through 5-20 describe alarms for the Cisco 6260. In each table, the text in the Alarm column is the text that appears in the description field of the alarm message. Alarm messages appear on the console screen as the alarms occur; to see a list of current alarms, enter the **show facility-alarm status** command.

Refer to the problem tables in this chapter for more detailed troubleshooting instructions.

Table 5-9 Chassis Alarm

Alarm	Severity	Description
Chassis temperature too high	Major	A temperature too high for the safe operation of the chassis has been detected. (Temperature is measured on the NI-2 card.)

Table 5-10 Card Slot Alarms

Alarm	Severity	Description
Provisioned slot is empty	Major	The card in this slot does not match the type configured for this slot.
Line card not equal to provisioning	Minor	This slot is configured for a card, but no card is present.
Invalid line card for this slot	Minor	The card detected in this slot cannot operate in this slot or is incompatible with the system configuration.

Table 5-11 Line Card Alarms

Alarm	Severity	Description
ATU-C port failure	Minor	The ATUC-DMT line card port failed.
Upstream rate below min. rate	Minor	The upstream bit rate on this port is not above the configured minimum rate.
Downstream rate below min. rate	Minor	The downstream bit rate on this port is not above the configured minimum rate.
LOS, LOF, LOCD, or LPR failure	Minor	The modem reports a near-end LOS, LOF, or LOCD or a far-end LPR (loss of power) failure. (The line must be enabled to alarm on failures.)

Table 5-12 IOS Controller Alarms

Alarm	Severity	Description
Loss of active clock sync	Major	Loss of timing reference. The configured clock source is not available, so the system is using its internal clock.
BITS clock failure	Major	BITS clock failure (LOS or AIS). The configured clock source is not available, so the system is using its internal clock.

The source of the OC-3c alarms in Table 5-13 is one of the following interfaces: ATM0/1 (the trunk) or ATM0/2 (the subtending interface).

Table 5-13 OC-3c/Synchronous Transfer Mode (STM-1) Network Interface Alarms

Alarm	Severity	Description
Loss of Cell Delineation	Critical	Loss of cell delineation on a SONET line.
Path RDI Received	Critical	Path Remote Defect Indication was received on a SONET line. This is equivalent to Path Far End Receive Failure (FERF).
Path AIS Received	Critical	Path Alarm Indication Signal was received on a SONET line.
Loss of Pointer	Critical	Loss of pointer condition on a SONET line.
Line RDI	Critical	Line Remote Defect Indication received on a SONET line. This is equivalent to line Far End Receive Failure (FERF).
Line AIS Received	Critical	Line Alarm Indication Signal received on a SONET line.
Loss of Frame	Critical	LOF condition on a SONET line.
Loss of Signal	Critical	LOS detected on the SONET line.
Signal Label Mismatch	Minor	Incorrect payload type signal label mismatch on a SONET line.

The source of the E3 alarms in Table 5-14 is one of the following interfaces: ATM0/1 (the trunk), ATM0/2 (subtending interface), or ATM0/2 (subtending interface).

Table 5-14 DS3/E3 Network Interface Alarms

Alarm	Severity	Description
Loss of Cell Delineation	Critical	The DS3/E3 line is experiencing a loss of cell delineation.
RAI Received	Critical	The DS3/E3 line is receiving a remote alarm indication.
Yellow Alarm Received	Critical	The DS3/E3 line is receiving a yellow alarm, indicating that another device has detected a failure that might be in this device.
AIS Received	Critical	The DS3/E3 line is receiving an Alarm Indication Signal.
OOF Received	Critical	The DS3/E3 line has detected an Out of Frame condition.
LOS Detected	Critical	The DS3/E3 line has detected Loss of Signal at the framer.
PLCP LOF Detected	Critical	The DS3/E3 line has detected a Physical Layer Convergence Procedure Loss of Frame error.

The source of the E1 alarms in Table 5-15 is one of the following interfaces: ATM0/2 through ATM0/9 (the trunk).

Table 5-15 E1 Network Interface Alarms

Alarm	Severity	Description
LOS Detected	Critical	The E1 line has detected a loss of signal at the framer.
AIS Received	Critical	The E1 line is receiving an alarm indication signal.
RAI Received	Critical	The E1 line is receiving a remote alarm indication.
LOF Detected (red alarm)	Critical	The E1 line has detected a loss of frame error.
LCD	Critical	The E1 line is experiencing a loss of cell delineation.

The source of the IMA link alarms in Table 5-16 is one of the following interfaces: ATM0/2 through ATM0/9.

Table 5-16 IMA Link Network Interface Alarms

Alarm	Severity	Description
LOS Detected	Critical	The IMA link has detected Loss of Signal at the framer.
LOF Detected	Critical	The IMA link has detected a Physical Layer Convergence Procedure Loss of Frame error.
AIS Received	Critical	The IMA link is receiving an Alarm Indication Signal.
RAI Received	Critical	The IMA link is receiving a remote alarm indication.
LCD	Critical	The IMA link is experiencing a loss of cell delineation.
LIF[1]	Critical	The IMA link is experiencing an LIF defect at the near end.
LODS[2]	Critical	The link differential delay between the link and the other links in the group is over the tolerable value for link differential delay.
Rx Failed	Critical	A persistent detection of a defect at the receiver. The criteria for entering the condition are implementation specific.
Tx Link Misconnected	Critical	The Tx link is not connected to the same far end IMA unit as the other Tx links in the group. The detection is implementation specific.
Rx Link Misconnected	Critical	The Rx link is not connected to the same far end IMA unit as the other Rx links in the group. The detection is implementation specific.
Persistent NE[3] RDI-IMA	Critical	One of the available remote defect indicators (including IMA link specific defect) is in the link-related “Link Information” field.
Rx Fault	Critical	Implementation specific Rx fault declared at the near end.
Tx Fault	Critical	Implementation specific Tx fault declared at the near end.

Table 5-16 IMA Link Network Interface Alarms (continued)

Alarm	Severity	Description
Tx Link Unusable—FE[4]	Critical	The far end is reporting that Tx is unusable.
Rx Link Unusable—FE	Critical	The far end is reporting that Rx is unusable.

1. LIF = loss of IMA frame
2. LODS = link out of delay sync
3. NE = near end
4. FE = far end

The source of the IMA group alarms in Table 5-17 is one of the following interfaces: ATM0/IMA0 through ATM0/IMA3.

Table 5-17 IMA Group Alarms

Alarm	Severity	Description
Start-up—FE	Critical	The far end is starting up. The declaration of this failure alarm might be delayed to ensure that the far end remains in startup.
Configuration Abort	Critical	The far end is trying to use unacceptable configuration parameters.
Configuration Abort—FE	Critical	The far end is reporting unacceptable configuration parameters.
Insufficient Links	Critical	Fewer than P_{Tx} transmit or P_{Rx} receive links are active.
Insufficient Links—FE	Critical	The far end is reporting that fewer than P_{Tx} transmit or P_{Rx} receive links are active.
Blocked—FE	Critical	The far end is reporting that it is blocked.
Timing Mismatch	Critical	The far end transmit clock mode is different from the near end transmit clock mode.

Table 5-18 describes NI-2 card redundancy alarms.

Table 5-18 NI-2 Card Redundancy Alarms

Alarm	Keyword	Severity	Description
Active/Standby NI2 type mismatch	C6100_CONTROLLER_SLOT_MISMATCH_ALARM	Major	The NI-2 cards installed in slot 10 and slot 11 are different types; for example, one is an OC-3c/OC-3c NI-2 card and the other is a DS3/2DS3 NI-2 card.
Standby NI2 missing	C6100_CONTROLLER_SLOT_MISSING_ALARM	Major	The secondary NI-2 card slot has been provisioned for a standby NI-2 card, but the card is not installed in the chassis.
Redundancy process failed	NI2_RF_PROCESS_FAILED	Major	An internal redundancy software process has failed and redundancy might not be available.

Table 5-18 NI-2 Card Redundancy Alarms (continued)

Alarm	Keyword	Severity	Description
Peer APS mode mismatch	APS_MODE_MISMATCH_ALARM	Minor	The OC-3 trunk is connected to a device not configured for nonrevertive, unidirectional APS.
Both units ACTIVE	NI2_RF_ACTIVE_CLASH	Info	Both the primary and the secondary NI-2 cards have come up in an active state.

Table 5-19 describes fan tray alarms.

Table 5-19 Fan Tray Alarms

Alarm	Severity	Description
Not detected or missing	Major	The fan tray has been removed from the chassis or is missing.
Multiple fan failures	Major	Two or more fan modules in the fan tray have failed. When fan modules fail, the remaining fan modules run at full speed until the fault is corrected.
Single fan failure	Minor	One of the three fans in the fan tray has failed. When fans fail, the remaining fans run at full speed until the fault is corrected.

Table 5-20 describes power alarms.

Table 5-20 Power Alarms

Alarm	Severity	Description
Input voltage out of range	Major	The input voltage to one or both PEMs is outside the acceptable range.
Excessive current	Major	The current flowing through one or both PEMs is too high.
Fan voltage out of range	Major	The voltage going to the fans from one or both PEMs is outside the acceptable range.
Power supply fault	Major	One or both PEMs are reporting a fault caused by high temperature, output failure, or input failure.
Temperature exceeds limit	Major	The PEM temperature is beyond the acceptable range.