CHAPTER 4

Troubleshooting the Installation

This chapter provides general information for troubleshooting hardware faults during installation of the Cisco 6400 carrier-class broadband aggregator. For information about troubleshooting the software, refer to the *Cisco 6400 Software Setup Guide.*

This chapter includes the following sections:

General Troubleshooting Information

If you encounter a problem after you have installed the Cisco 6400, you should perform a few basic troubleshooting procedures on your equipment before contacting customer service. These simple checks involve answering the following questions:

- Are the ports properly configured? Refer to the *Cisco 6400 Software Setup Guide* for configuration instructions.
- Are power leads and data cables firmly connected at both ends?
- Are all cards firmly seated and securely screwed to the chassis?
- Are the blower module and PEMs properly connected and secured to the chassis?

Note Check the release notes for more information on how to solve problems. Release notes can be found on Cisco.com. See the "Obtaining Documentation" section on page xiii.

Reference Materials

Refer to the following materials:

- Cisco 6400 documents:
  - *Cisco 6400 Software Setup Guide*
  - *Cisco 6400 Command Reference*
  - *Regulatory Compliance and Safety Information for the Cisco 6400 (78-5789-xx)*
  - *Cisco 6400 Site Planning Guide (78-5782-xx)*
- Site log and equipment installation and maintenance records. (See Appendix B, "Configuration Worksheets.")

Recommended Tools and Test Equipment

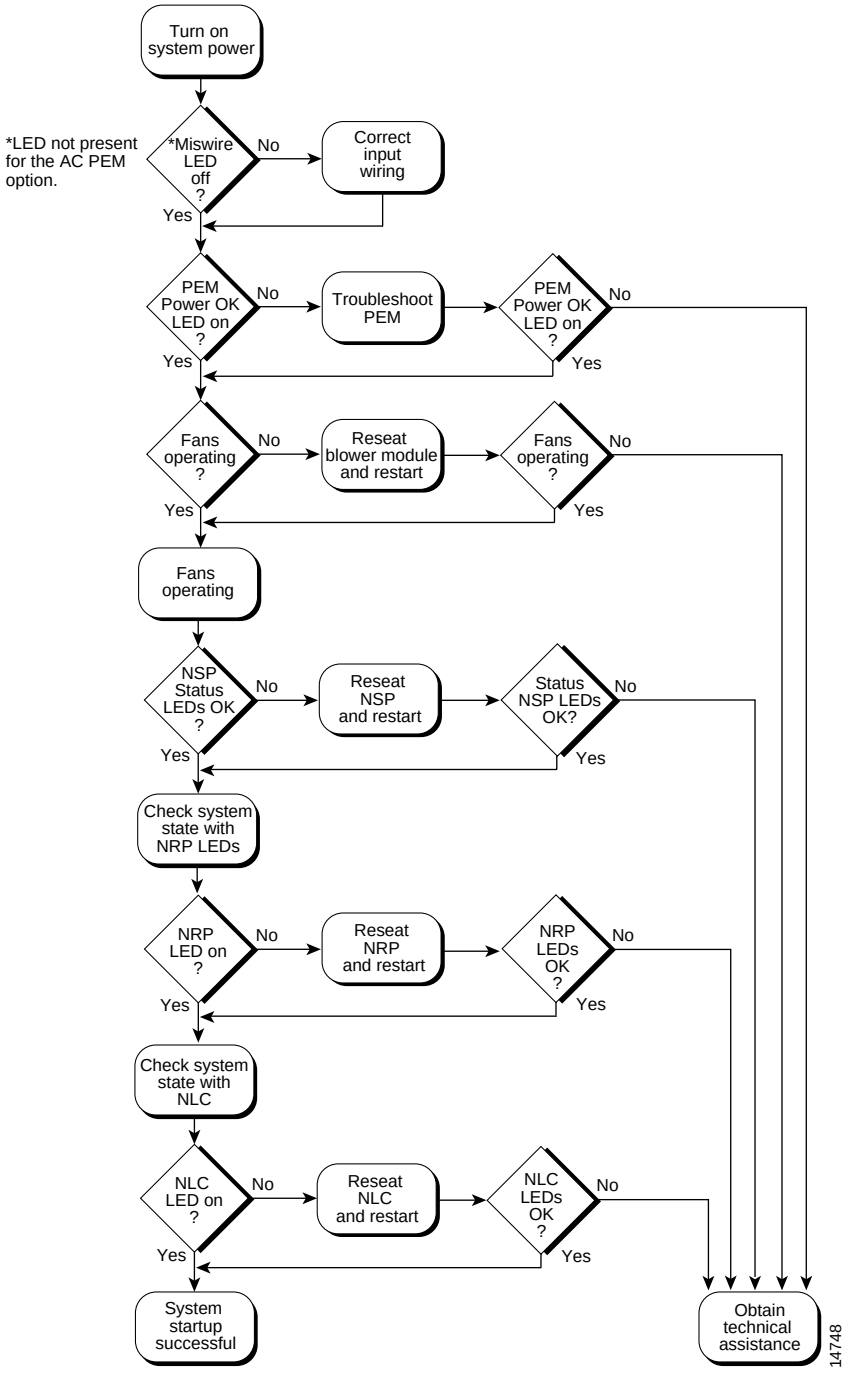
To perform general maintenance and troubleshooting tasks on the Cisco 6400, you should have the following:

- Small and medium Number 2 Phillips and flat-blade screwdrivers
- Voltage tester
- Optical fiber test equipment

Troubleshooting Flowchart

Figure 4-1 is a flowchart to help you determine which component of your Cisco 6400 has malfunctioned. The decimal numbers in the following figure refer to the sections in this chapter where the various system elements are discussed.

Figure 4-1 Troubleshooting Flowchart



General System Diagnostics

If an error is detected during a system powerup or hardware reset, the red NSP STATUS LED lights. The watchdog timer or software warm-start functions may run minimum diagnostics.

If any failures occur during the power-on sequence, forward a copy of the output to the Cisco technical assistance center (TAC) for diagnosis. To contact TAC, refer to the "Obtaining Technical Assistance" section on page xiv

Confirming the Hardware Installation

Use the **show hardware** command to display the hardware components installed. These components can include:

- Node line cards (NLCs)
- Node route processors (NRPs)
- Central processing unit (CPU)

The following example shows output from the **show hardware** command (this is only a sample; your output will not match exactly):

```
Switch# show hardware

6400 named santa-2a-16, Date: 23:29:23 UTC Tue Jan 4 2000
Feature Card's FPGA Download Version: 0

Slot Ctrlr-Type    Part No.  Rev  Ser No  Mfg Date   RMA No. Hw Vrs  Tst EEP

8/0  155SM NLC     73-2890-02 02 09691183 Jul 20 98 00-00-00   1.0     0   2
1/1  155SM NLC     73-2892-02 02 09591457 Jul 20 98 00-00-00   1.0     0   2
0/0  CPU card      73-2996-02 02 09165973 Jul 20 98 00-00-00   2.0     0   2
0/1  FC-PFQ        73-2281-04 A0 08783319 Apr 25 98 00-00-00   4.1     0   2

DS1201 Backplane EEPROM:
 Model  Ver.  Serial  MAC-Address  MAC-Size  RMA  RMA-Number   MFG-Date
------- ---- -------- ------------ --------  ---  ----------  -----------
C6400    2   100001   00107BA9C600   128     0    0           Jul 20 1998
```

Displaying System Information

Use the **show version** and **show environment** commands to display the following Cisco 6400 information:

- Fan operation
- Temperature levels and alarms
- System status
- Modem status
- System uptime since last restart (in days, hours, minutes, and seconds)
- System name

Example

The following example shows output of the **show version** command (this is only a sample; your output will not match exactly):

```
Switch# show version
Cisco Internetwork Operating System Software
IOS (tm) 6400 Software (c6400r-g4p5-mz), Version 12.0(5)DC.......
Copyright (c) 1986-1999 by cisco Systems, Inc.
Compiled Tue 07-Oct-99 04:53 by jdoe
Image text-base: 0x60010910, data-base: 0x604E6000

ROM: System Bootstrap, Version XX.X(X.X.WAX.0) [integ 1.4.WAX.0], RELEASE SOFTWARE

Switch uptime is 2 weeks, 2 days, 39 minutes
System restarted by power-on
System image file is "bootflash:6400-wp-mz.112-8.0.1.FWA4.0.16", booted via bootflash

cisco NSP (R4700) processor with 65536K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
1 Ethernet/IEEE 802.3 interface(s)
20 ATM network interface(s)
123K bytes of non-volatile configuration memory.

8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2101

Switch#
```

Example

The following example shows output of the **show environment** command (this is only a sample; your output will not match exactly):

```
Switch# show environment

Temperature normal:chassis inlet measured at 27C/80F
Temperature normal:chassis core measured at 33C/91F
Fan:                                          OK
Power Entry Module 0 status:                  OK

Switch#
```

Configuration Problems

Configuration problems generally develop when the system is first installed, when the system configuration is changed, or when new equipment is added to the network and is not configured properly.

You should carefully review the port configuration information contained in your site log records, and verify that the physical equipment configuration matches the internal software configuration. By reviewing the port configuration information, you can determine whether any changes are needed to equipment and cabling in the central office or outside plant facilities.

Electrical Problems

Electrical problems are divided into two categories:

- Site electrical problems
- Cisco 6400 internal electrical problems

Site Electrical Problems

Site electrical problems can include:

- Improperly grounded equipment, particularly equipment racks and power grounds
- Fluctuating voltage, which can result from excessive power drains caused by other equipment (such as air conditioning units)
- Cable corrosion or defective power panels, circuit breakers or fuses, or cable connections
- Undersized power cables or excessive power cable lengths
- Excessive power demand on backup power systems or batteries when alternate power sources are used

Cisco 6400 Electrical Problems

Cisco 6400 electrical problems can include:

- Improperly grounded equipment, particularly equipment racks and power grounds
- Improper power cable connections to the Cisco 6400
- Improper installation of the power entry module (PEM) units in the system
- Improper installation of other plug-in units
- Circuit breakers that have tripped or that are defective
- Defective PEM units

Automatic Power-Down

The Cisco 6400 powers down when the temperature exceeds a specified threshold. If that happens, you should identify and correct the cause of the overheating before repowering the system.

If the blower module is unplugged for two minutes, the Cisco 6400 powers down automatically.

Signal Input/Output Problems

Signal input and output problems can occur at any point in the network and can be caused by mechanical defects in the cables, poor connections, or lack of signal caused by other equipment failures.

Refer to your site log and other facility records to check signal connections for your facility.

Checking Node Connections with the Ping Command

You can use the **ping** command to confirm network connections between the switch and another node on the network. The **ping** command sends Internet Control Message Protocol (ICMP) echo request packets out, and receives a confirmation if the connection is good. The **ping** command format is:

ping *host [packet_size] [packet_count]*

Fiber-Optic Connections

An optical signal I/O problem can be caused by:

- Use of an incorrect type of fiber. Be sure to use single-mode fiber for a single-mode interface and multimode fiber for a multimode interface.
- Defective fiber.
- Transmit (TX) and Receive (RX) fibers that are reversed.
- Insufficient power budget on the optical link.
- Receiver overload on the optical link.

Evaluating the Power Budget

The power budget (PB) is the maximum possible amount of power transmitted. The following equation shows the calculation of the power budget:

PB = PTmin – PRmin

Where:
PTmin = Minimum transmitter power
PRmin = Minimum receiver sensitivity

Insufficient power budget occurs when the power margin (PM) is less than 0. PM is equal to the power budget minus the link loss (LL).

PM = PB – LL

Three factors contribute to link loss:

- Fiber attenuation (single-mode) 0.5 dB/km
- Connector 0.5 dB
- Splice 0.5 dB

Note These are typical values; refer to the manufacturer's documentation for the actual values.

Receiver Overload

Receiver overload can occur when (PRmax – (PTmax – LL)) is less than 0, where PRmax is maximum receiver power and PTmax is maximum transmitter power. To prevent overloading the receiver, you can use an attenuator on the link between any single-mode SONET transmitter and the receiver. Doing so should increase the value of LL.

Note Refer to Appendix A, "System Specifications" for fiber-optic power levels for the OC-3/STM-1 and the OC-12/STM-4 NLCs.

Ethernet Connections

If an Ethernet connection on your Cisco 6400 fails to work properly, and the corresponding LNK (Link) LED is not lit (steady green), check for the following problems:

- Visually check that an Ethernet cable is connected to the correct Ethernet port on the Cisco 6400, and that the other end of the cable is connected to a functional Ethernet hub.
- Check whether you are using the correct type of cable. The cable must meet the specifications given in the section "Connecting to a 10BASE-T Ethernet Network."
- The cable might be bad or broken. Replace the cable with a known, reliable straight-through Ethernet cable and check if the LNK LED comes on.
- Make sure the NSP module has booted up properly by checking the Status LED on its faceplate. This LED should be steady green. If necessary, remove and reinsert the module and boot it up again. Also, make sure the Ethernet hub you are using is powered up and operational.
- It is also possible that the Ethernet port might be functioning properly, but the LNK LED itself is broken. Check the Ethernet port (by trying to ping over it, for example) to determine if the problem is due to a bad LNK LED or if the Ethernet link itself is broken.

If the LNK LED is lit (steady green), but the Ethernet port does not seem to be working properly, make sure that the port in question is configured properly and is not administratively shut down. If you have a working console connection, complete the following steps:

Step 1 At the switch prompt, enter **show int ether0/0/0**. If the port is administratively down, enter these commands to enable it:

```
Switch> configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.

Switch(config-if)# int eth0/0/0

Switch(config-if)# no shut

Switch(config-if)# exit

Switch(config)# exit

Switch#
```

Step 2 Check that the Ethernet port in question has a valid IP address assigned to it.

For more information about configuring Ethernet ports, refer to the *Cisco 6400 Software Setup Guide.*

If the cable, connections, power, and configuration all check out, and you still cannot connect to the Ethernet port on the module, replace the module in question. If the problem persists, contact Cisco TAC for further assistance. See the "Obtaining Technical Assistance" section on page xiv.

Console Port Serial Connections

If the console screen connected to a Cisco 6400 console port appears frozen or fails to work properly, check for the following problems:

- Check the console cable and make sure it is properly connected to the correct console port on the Cisco 6400 system at one end and to your terminal equipment at the other end.
- Verify that you are using the right type of cable and adapter. For information about pin-out connections, refer to Chapter 1, "Hardware Description," and for installation instructions, refer to Chapter 3, "Installing the Cisco 6400."
- Make sure the cable is not defective or broken. Replace the cable with another high quality cable if possible, and check to see if the console port starts working.
- Check that your terminal equipment is configured with the correct settings for the console port. The default console port settings are:
  - 9600 baud
  - 8 data bits
  - 1 stop bit
  - No parity
  - No flow control
- Check the LEDs on the NSP faceplate to make sure that the node switch processor (NSP) and the node router processor (NRP) module containing the console port have powered up properly. If necessary, remove and reinsert each module to power it up again. Also, make sure the terminal equipment is working properly.
- If the cable, connections, power, and terminal settings check out and you still cannot connect to the console port on the module, replace the module in question. If the problem persists, contact Cisco TAC for further assistance. Refer to the "Obtaining Technical Assistance" section on page xiv.

Field-Replaceable Units

Information about the Cisco 6400 field-replaceable units (FRUs) is given in the following sections:

General Troubleshooting Tips for Field-Replaceable Units

All Cisco 6400 FRUs are hot swappable. Procedures for removing and replacing the FRUs can be found in the *Cisco 6400 Installation and Replacement of Field-Replaceable Units.*

Table 4-1 lists general FRU fault symptoms and recommendations.

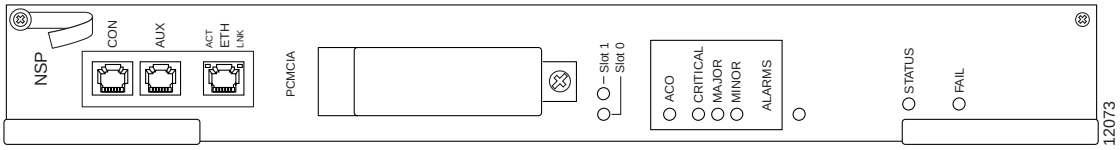
Table 4-1 General FRU Troubleshooting

Symptom	Recommended Action
System fails to come up.	1. Check the STATUS LEDs on all modules and cards, and the power LEDs on the PEMs. If none are on, see Table 4-14 on page 4-25 (DC PEM) and Table 4-16 on page 4-26 (AC PEM). 2. If the system has power, check the FAIL LED on the NSP. If the FAIL LED is steady yellow, see Table 4-3 on page 4-12. 3. Check the blower module and ensure that it is fully inserted. 4. Ensure that all FRUs are properly inserted.
System experiences a critical alarm. (Critical LED on NSP lights yellow.)	Enter the **show facility-alarm status** command at the console.
System experiences a major alarm. (Major LED on NSP lights yellow.)	Enter the **show facility-alarm status** command at the console.
System experiences a minor alarm. (Minor LED on NSP lights yellow.)	Enter the **show facility-alarm status** command at the console.
You cannot establish a console or Telnet connection to the system.	For information about troubleshooting Ethernet connections, refer to the "Ethernet Connections" section on page 4-8. For information about troubleshooting the console port serial connections, refer to the "Console Port Serial Connections" section on page 4-9.
System overheats.	Troubleshoot the blower module (Table 4-12 on page 4-24).
System experiences a power problem.	Troubleshoot the PEM(s), referring to the PEM section of this table and to Table 4-14 on page 4-25 (DC PEM) and Table 4-16 on page 4-26 (AC PEM).

NSP Module Faults

Figure 4-2 shows the NSP indicators and connectors on the faceplate.

Figure 4-2 NSP Faceplate



NSP LEDs

Table 4-2 describes the LEDs on the NSP faceplate.

Table 4-2 NSP LED

LED	Status	Condition
STATUS	Steady yellow Blinking yellow Steady green Blinking green Off	Cisco IOS is not running. System is booting. NSP is active (primary). NSP is standby (secondary). NSP has no power.
FAIL	Yellow Off	NSP has failed. NSP has not failed.
ETH		
ACT (Activity)	Green Off	Packets are being transmitted and received. No activity.
LNK (Link)	Steady green Off	Port is operational. No carrier is detected.
PCMCIA Slot 0	Steady green	Slot is active.
PCMCIA Slot 1	Steady green	Slot is active.
ALARMS		
CRITICAL	Yellow Off	Alarm is active. No alarm is active.
MAJOR	Yellow Off	Alarm is active. No alarm is active.
MINOR	Yellow Off	Alarm is active. No alarm is active.

Table 4-3 lists the NSP fault indications and recommended actions.

Table 4-3 NSP Module Fault Indications and Actions

Symptom	Recommended Action
STATUS LED is not lit.	1. Check LEDs on other modules and cards. If none are lit, refer to Table 4-13 on page 4-25 and Table 4-15 on page 4-26. 2. If LEDs on other modules and cards are lit, remove the card from its slot and check for bent or broken pins on the backplane. Return the card to its slot and screw it firmly into place. 3. Replace the card. **Note** You can store a node's software and configuration files in NVRAM and on a PCMCIA Flash card. If the files are stored on a PCMCIA card, you can move the PCMCIA card from the faulty NSP to the replacement NSP before you install the replacement NSP. This enables the new NSP to initialize itself without resetting other cards. If the new NSP must read the chassis configuration from NVRAM, it resets all the cards in the chassis. Refer to *Cisco 6400 Installation and Replacement of Field-Replaceable Units* for complete instructions on replacing NSPs and other cards. 4. If the problem persists, contact Cisco TAC.
FAIL LED is yellow, indicating that the NSP failed.	Reinsert the NSP. If the problem persists, contact Cisco TAC. Refer to the "Obtaining Technical Assistance" section on page xiv.

Table 4-3 NSP Module Fault Indications and Actions (continued)

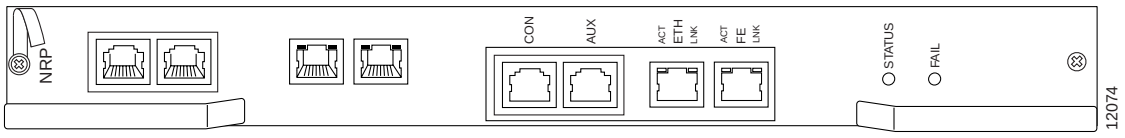
The NSP comes up, but you cannot establish a console or Telnet connection to the system.	1. Ensure that the terminal settings are properly set. For information about terminal settings, refer to the "Connecting a Terminal to the Console Port" section on page 3-29.
	2. If you still cannot connect, check the console cable. Is it firmly connected? Is it the right kind of cable with proper connectors? Refer to Chapter 1, "Hardware Description" to check pinouts.
	3. If the cable checks out and you cannot connect to the NSP, reinsert the module. If the problem persists, replace the NSP.
	4. If you achieve a console connection, enter: **`show int ether 0/0/0.`** If the port is administratively down, enter these commands to enable it:
	`Switch> configure terminal`
	`Enter configuration commands, one per line.`
	`End with CNTL/Z.`
	`Switch(config-if)# int eth0/0/0`
	`Switch(config-if)# no shut`
	`Switch(config-if)# exit`
	`Switch(config)# exit`
	`Switch#`
	5. Enter **show log** to review console messages recorded in the system log.

Card cannot be fully inserted into its slot.	Ensure that you are using slot 0A or 0B for the NSP module.

NRP-1 Module Faults

Figure 4-3 shows the NRP-1 indicators and connectors on the faceplate.

Figure 4-3 NRP-1 Faceplate



NRP-1 LEDs

Table 4-4 describes the LEDs on the NRP-1 faceplate.

Table 4-4 NRP-1 LED Indicators

LED	Status	Condition
STATUS	Steady green Blinking green Steady yellow Blinking yellow Off	NRP-1 is active (primary). NRP-1 is standby (secondary). Cisco IOS software is not running. System is booting. NRP-1 has no power.
FAIL	Steady yellow Off	NRP-1 has failed. Normal operation.
ETH		
ACT (Activity)	Blinking green Off	Packets are being transmitted and received. No activity.
LNK (Link)	Steady green Off	Port is operational. No carrier is detected.
FE		
ACT (Activity)	Blinking green Off	Packets are being transmitted and received. No activity.
LNK (Link)	Steady green Off	Port is operational. No carrier is detected.

Table 4-5 lists the NRP-1 module fault indications and recommended actions.

Table 4-5 NRP-1 Module Fault Indications and Actions

Symptom	Recommended Action
STATUS LED is not lit.	1. Check LEDs on other modules. If none are lit, see Table 4-13 on page 4-25 (DC PEM) and Table 4-15 on page 4-26 (AC PEM). 2. If power LEDs on other modules and cards are lit, reinsert the NRP. 3. If the problem persists, replace the module or contact Cisco TAC.
FAIL LED is yellow, indicating that the NRP failed.	Reinsert the NRP. If the problem persists, contact Cisco TAC.
Module cannot be fully inserted into its slot.	Inspect connectors on both the card and the backplane, looking for bent pins or other damage. Use slots 1 to 8 (slots 0A and 0B are reserved for NSP modules).
Module experiences problems in one slot but operates normally in another.	Contact Cisco TAC.

NRP-2SV Module Faults

Figure 4-4 shows the NRP-2SV indicators and connectors on the faceplate.

Figure 4-4 NRP-2SV Faceplate

Warning **Class 1 laser product. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Invisible laser radiation present. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning Statement for Sweden

Varning! **Osynlig laserstrålning när denna del är öppen och förregleringen är urkopplad. Rikta inte blicken in mot strålen.**

Warning Statement for Finland

Varoitus **Alleviates ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Äjä katso säteeseen.**

NRP-2SV LEDs

The LEDs on the NRP-2SV indicate port and module status (Table 4-6).

Table 4-6 NRP-2SV LED Indicators

LED	Status	Condition
STATUS	Steady green Blinking yellow Steady yellow Off	NRP-2SV is active. System is booting. Cisco IOS software is not running. NRP-2SV has no power.
FAIL	Steady yellow Off	NRP-2SV has failed. Normal operation.
GBIC		
TX	Blinking green Off	Packets are being transmitted. No activity.
RX	Blinking green Off	Packets are being received. No activity.
LNK	Steady green Off	Port is operational. No carrier is detected.

Alphanumeric Display

The NRP-2SV faceplate also has a four-digit alphanumeric display that indicates status information and error codes.

OC-3/STM-1 Single-Mode and Multimode NLCs and DS3 NLC Faults

Figure 4-5 shows the OC3/STM-1 single-mode NLC indicators and connectors on the faceplate.

Figure 4-5 OC-3/STM-1 Single-Mode NLC Faceplate

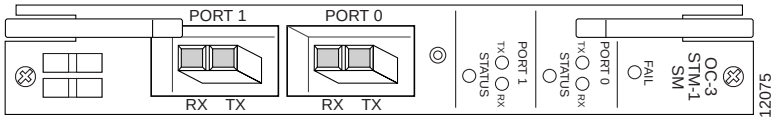
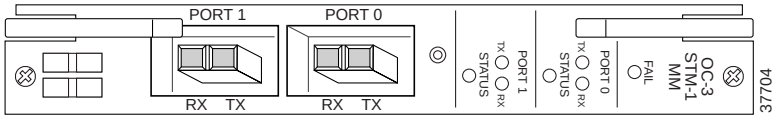


Figure 4-6 shows the OC3/STM-1 multimode NLC indicators and connectors on the faceplate.

Figure 4-6 OC-3/STM-1 Multimode NLC Faceplate



Warning **Class 1 laser product. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Invisible laser radiation present. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning Statement for Sweden

Varning! **Osynlig laserstrålning när denna del är öppen och förregleringen är urkopplad. Rikta inte blicken in mot strålen.**

Warning Statement for Finland

Varoitus **Alleviates ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Äjä katso säteeseen.**

Figure 4-7 shows the DS3 NLC indicators and connectors on the faceplate.

Figure 4-7 DS3 NLC Faceplate

Table 4-7 describes the LEDs on the OC-3/STM-1 and DS3 NLC faceplates.

Table 4-7 OC-3/STM-1 and DS3 NLC LED Indicators

LED	Status	Condition
FAIL	Steady yellow Off	OC-3/STM-1 NLC has failed OC-3/STM-1 NLC is operational
PORT 0 (top connector)		
TX (transmit)	Green Off Steady yellow Flashing yellow	Transmit activity No traffic Far end alarm Local loopback
RX (receive)	Green Off Steady yellow	Receive activity No traffic Loss of signal
STATUS	Green Blinking green Off	Active (primary) Standby mode (secondary) No power
PORT 1 (bottom connector)		
TX (transmit)	Green Off Steady yellow Flashing yellow	Transmit activity No traffic Far end alarm Local loopback
RX (receive)	Green Off Steady yellow	Receive activity No traffic Loss of signal
STATUS	Steady green Blinking green Off	Active Standby mode No power

Table 4-8 lists the OC-3/STM-1 and DS3 NLC fault indications and recommended actions.

Table 4-8 NLC Fault Indications and Recommended Actions

Symptom	Recommended Action
STATUS LED is not lit.	1. Check LEDs on other cards. If none are lit, see Table 4-14 on page 4-25. 2. If LEDs on other cards are lit, remove the card from its slot and check for bent or broken pins on both the card and the backplane. Return the card to its slot and screw it firmly into place. 3. Replace the card. 4. If the problem persists with a new card, contact Cisco TAC.
FAIL LED is lit.	1. Check STATUS LED on the NSP, if it is not lit, refer to the "NSP Module Faults" section on page 4-11. 2. Reinsert the NLC. If the FAIL LED lights up, replace the NLC. 3. If the problem persists, contact Cisco TAC.

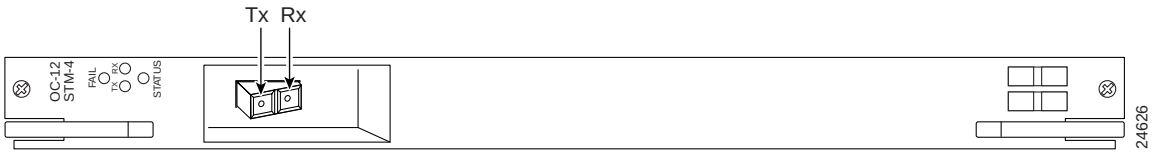
Table 4-8 NLC Fault Indications and Recommended Actions (continued)

Symptom	Recommended Action
Interface fails to come up.	1. Enter the command **show int atm** *slot/sub-slot/port*. The results tell you about the interface status. If the trunk is administratively down, use the **no shut** config command to bring it up. 2. Use the **loopback** command to run an OC-3/DS3 loopback test. If the card fails the loopback test, reinsert the card. Refer to *Cisco 6400 Command Reference* for more information about the **loopback** command. 3. If your cable is too long or if your optical signal passes through too many connectors, signal attenuation will cause signal quality problems. Check cable length and number of connectors. 4. Check that the transmit (TX) and receive (RX) connectors are not reversed on the NLC. 5. Check optical connectors for damage or for scratches on the optical surface. Replace connectors if necessary. 6. Check optical connectors for dirt on the optical surface. If a connector is dirty, clean it by blowing compressed air from a distance of 3 inches (8 cm). You can also clean the connectors on most cables with an alcohol-moistened, lint-free wipe. Check the cable manufacturer cleaning instructions first. To prevent problems caused by dirty or damaged connectors, keep any unused optical connector covered with its protective cap. 7. For more information about fiber optic connections, refer to the "Fiber-Optic Connections" section on page 4-7.
Card cannot be fully inserted into its slot.	1. Visually inspect connectors on both the card and the backplane, looking for bent pins or other damage. 2. Ensure the full-height NLC carrier is properly inserted and fastened.

OC-12/STM-4 Single-Mode NLC Faults

Figure 4-8 shows the OC-12/STM-4 NLC indicators and connectors on the faceplate.

Figure 4-8 OC-12/STM-4 NLC Faceplate



Warning **Class 1 laser product. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Invisible laser radiation present. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning **Because invisible radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures. To see translations of this warning, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.**

Warning Statement for Finland

Varoitus **Alleviates ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Äjä katso säteeseen.**

Warning Statement for Sweden

Varning! **Osynlig laserstrålning när denna del är öppen och förregleringen är urkopplad. Rikta inte blicken in mot strålen.**

Table 4-9 describes the LEDs on the OC-12/STM-4 NLC faceplate.

Table 4-9 OC-12/STM-4 NLC LED Indicators

LED	Status	Condition
FAIL	Steady yellow Off	OC-12/STM-4 NLC failed OC-12/STM-4 NLC operational
TX (transmit)	Green Off Steady yellow Flashing yellow	Transmit activity No traffic Far end alarm Local loopback
RX (receive)	Green Off Steady yellow	Receive activity No traffic Loss of signal
STATUS	Green Blinking green Off	Active (primary) Standby mode (secondary) No power

Table 4-10 lists the OC-12/STM-4 NLC fault indications and recommended actions.

Table 4-10 OC-12/STM-4 NLC Fault Indications and Recommended Actions

Symptom	Recommended Action
STATUS LED is not lit.	1. Check LEDs on other cards. If none are lit, see Table 4-14 on page 4-25 (DC PEM) and Table 4-15 on page 4-26 (AC PEM). 2. If LEDs on other cards are lit, remove the card from its slot and check for bent or broken pins on both the card and the backplane. Return the card to its slot and screw it firmly into place. 3. Replace the card. 4. If the problem persists with a new card, contact Cisco TAC.
FAIL LED is lit.	1. Check STATUS LED on the NSP, if it is not lit, refer to the "NSP Module Faults" section on page 4-11. 2. Reinsert the NLC. If the FAIL LED is lit, replace the NLC. 3. If the problem persists, contact Cisco TAC.

Table 4-10 OC-12/STM-4 NLC Fault Indications and Recommended Actions (continued)

Symptom	Recommended Action
Interface fails to come up.	1. Enter the command **show int atm** *slot/sub-slot/port.* The port will always be 0. The results tell you about the interface status. If the trunk is administratively down, use the **no shut** config command to bring it up. 2. Use the **loopback** command to run an OC-12 loopback test. If the card fails the loopback test, reinsert the card. Refer to *Cisco 6400 Command Reference* for more information about the **loopback** command. 3. If your cable is too long or if your optical signal passes through too many connectors, signal attenuation will cause signal quality problems. Check cable length and number of connectors. 4. Check that the transmit (TX) and receive (RX) connectors are not reversed on the NLC. 5. Check optical connectors for damage or for scratches on the optical surface. Replace connectors if necessary. 6. Check optical connectors for dirt on the optical surface. If a connector is dirty, clean it by blowing compressed air from a distance of 3 inches (8 cm). You can also clean the connectors on most cables with an alcohol-moistened, lint-free wipe. Check the cable manufacturer cleaning instructions first. To prevent problems caused by dirty or damaged connectors, keep any unused optical connector covered with its protective cap. 7. For more information about fiber optic connections, refer to the "Fiber-Optic Connections" section on page 4-7.
Card cannot be fully inserted into its slot.	1. Visually inspect connectors on both the card and the backplane, looking for bent pins or other damage. 2. Ensure the full-height NLC carrier is properly inserted and fastened.

Note Because the OC-12 has a single port, a second OC-12 module is required for an exernal loopback test. Contact Cisco TAC for more information.

Blower Module Faults

Figure 4-9 shows the blower module front panel and its indicators.

Figure 4-9 Blower Module

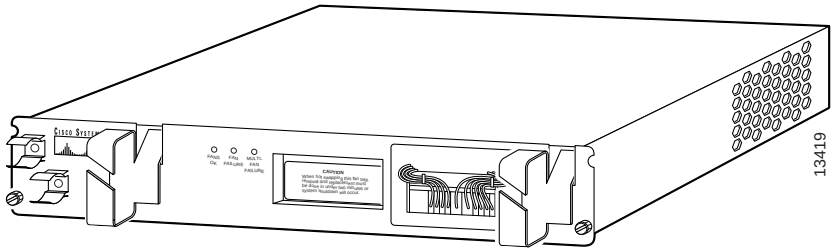


Table 4-11 describes the blower module LEDs located on the front center panel.

Table 4-11 Blower Module LEDs

LED	Status	Condition
FANS OK	Steady green	Fans are operational.
SINGLE FAN FAILURE	Steady yellow	Failure has occurred and alarms are triggered.
MULTI-FAN FAILURE	Steady yellow	Redundant fan has failed and the system will shut down.

Table 4-12 lists the blower module fault indications and recommended action.

Table 4-12 Blower Module Fault Indications and Recommended Actions

Symptom	Recommended Action
Green LED on blower module fails to go on.	1. Make sure the blower module is fully inserted into the chassis. 2. Check input power connections. If connections are loose or reversed, the chassis does not receive power and fans do not run. 3. Replace the blower module.
Fans run but the system overheats.	1. Make sure that all intake and exhaust vents on the front and rear of the chassis are free of blockages. 2. Make sure that the ambient temperature and other environmental factors in the system area are within the ranges specified in Appendix A, “System Specifications.” 3. Make sure all cards and blank faceplates are in place. The cooling system cannot operate effectively unless the chassis is fully enclosed. 4. Check the air filter, and if necessary clean or replace it. 5. Reduce the ambient temperature.

Power Entry Module Faults

Figure 4-10 shows the DC PEM and its indicators.

Figure 4-10 DC PEM

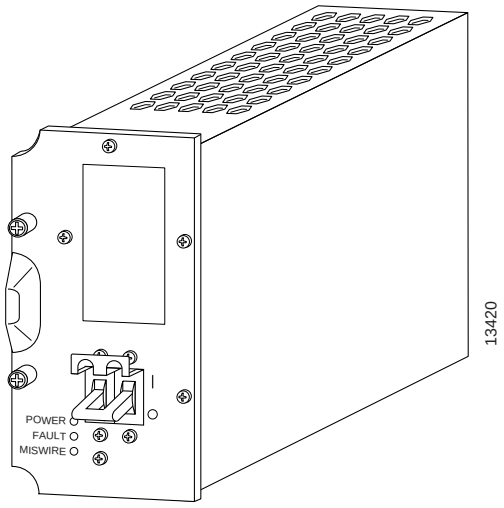


Table 4-13 describes the DC PEM LEDs located on the bottom front panel.

Table 4-13 DC Power Entry Module LEDs

LED	Status	Condition
POWER	Steady green	Power is available.
FAULT	Steady yellow	The PEM has failed or is turned off.
MISWIRE	Steady yellow	Cables are wired incorrectly and should be reversed.

Table 4-14 lists the DC PEM fault indications and recommended actions.

Table 4-14 DC PEM Fault Indications and Recommended Actions

Symptom	Recommended Action
Green LED on PEM fails to go on.	1. Make sure the circuit breaker on the PEM is turned on. 2. Make sure the PEM is properly seated and screwed in place. 3. Make sure power leads are properly connected to power connectors on the backplane. If connections are loose or their polarity is reversed, chassis does not receive power. 4. Check the power source. 5. Move the PEM to the other PEM slot. If the PEM still fails, replace it.

Table 4-14 DC PEM Fault Indications and Recommended Actions (continued)

PEM experiences problems in one slot but operates normally in the other.	1. Ensure that the input power to both slots is correct. 2. If the problem persists, contact Cisco TAC.

Figure 4-11 shows the AC PEM and its indicators.

Figure 4-11 AC Power Entry Module

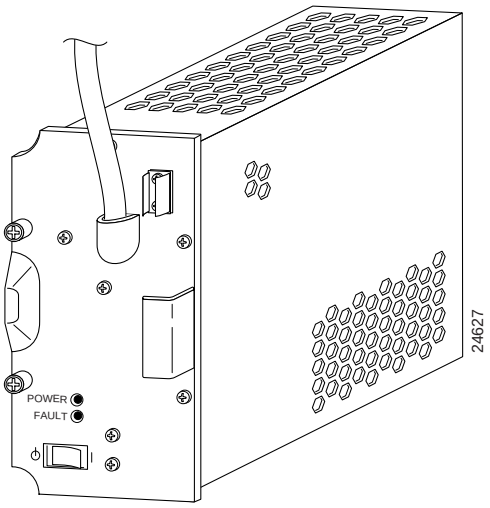


Table 4-15 describes the AC PEM LEDs located on the bottom front panel.

Table 4-15 AC Power Entry Module LEDs

LED	Status	Condition
POWER	Steady green	Power is available.
FAULT	Steady yellow	The PEM has failed or is turned off.

Table 4-16 lists the AC PEM fault indications and recommended actions.

Table 4-16 AC PEM Fault Indications and Recommended Actions

Symptom	Recommended Action
Green LED on PEM fails to go on.	1. Make sure the power enable switch to the PEM is turned on. 2. Make sure the PEM is properly seated and screwed in place. 3. Make sure the power cable is plugged in properly. 4. Check the power source. 5. Move the PEM to the other PEM slot. If the PEM still fails, replace it.

Table 4-16 AC PEM Fault Indications and Recommended Actions

PEM experiences problems with one cable but operates normally with the other.	1. Ensure that the input power on the cable is correct. 2. If the problem persists, contact Cisco TAC. Refer to the "Obtaining Technical Assistance" section on page xiv.