

Cisco 6400 Hardware Troubleshooting Guide

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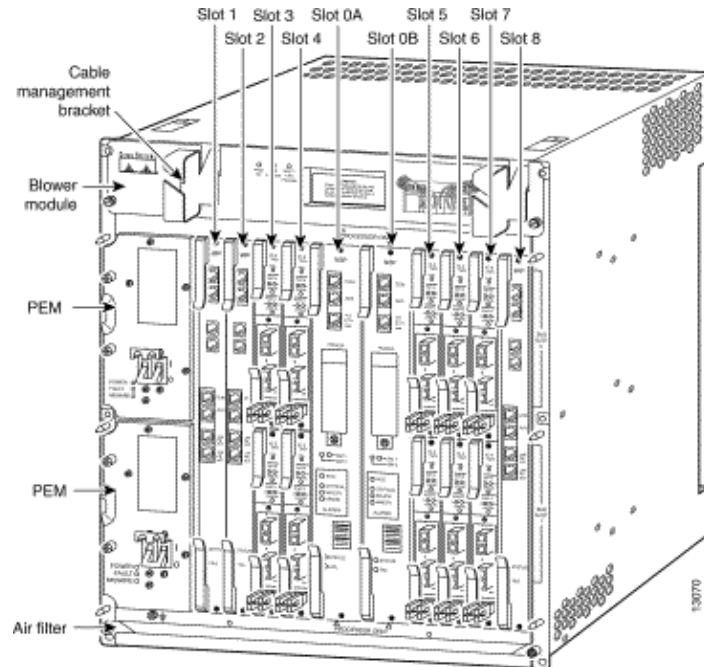
Introduction

The Cisco 6400 is a broadband concentrator that features Cisco end-to-end Asynchronous Transfer Mode (ATM) services, Point-to-Point Protocol (PPP) termination, and tunneling. The Cisco 6400 combines Cisco ATM switching and routing capabilities in a modular, scalable, redundant chassis. This document does not discuss any architectural overview of the 6400 chassis or its parts. It discusses basic displayed LED indications, how to troubleshoot IOS reboot problems, and console hangs; but not hardware architecture details. If you want a more detailed discussion about 6400 (configuration, installation, release notes, command line), please refer to Cisco 6400 Carrier-Class Broadband Aggregator . Also For quick referencing for error messages and their meaning on 6400, please read Error Messages on the Cisco 6400 UAC Descriptions and Resolutions. For more detailed descriptions and technical discussions, see the useful links below under Related Information section.

The Cisco 6400 includes the following hardware components:

- Chassis
 - ◆ Module compartment
 - ◆ Blower compartment
 - ◆ Power Entry Module (PEM) compartment
 - ◆ Blackplane
- Node Switch Processor (NSP)
- Node Route Processor (NRP)
- Node Line Card (NLC)

The following diagram shows a fully-loaded chassis with Blower compartment, PEMs, NSPs, NRPs and NLCs. The Module compartment in the chassis has ten slots two central slots that are reserved for NSP cards and eight slots that can accommodate a mixture of full-height NRP cards and full-height and half-height NLCs.



Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on the Cisco 6400 Universal Access Gateway.

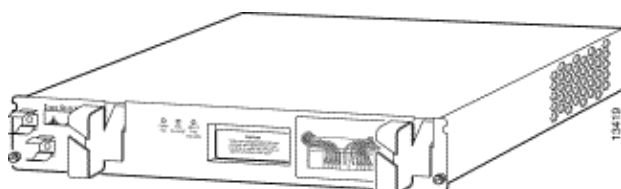
The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

Identifying Cisco 6400 Hardware Issues – Chassis

Blower Module



The Blower module is located on the top of the chassis and is connected to the backplane. The module provides airflow throughout the system. The air intake is located at the bottom of the chassis, and there is an exhaust in the top rear of the chassis through the Blower module.

The Blower module supports hot-swapping and can be replaced without interrupting system operation. It is important to note that the system will shut down after two minutes if the Blower module is removed and not replaced.

Use the **show environment** command on the NSP to display information about fan operation and temperature levels.

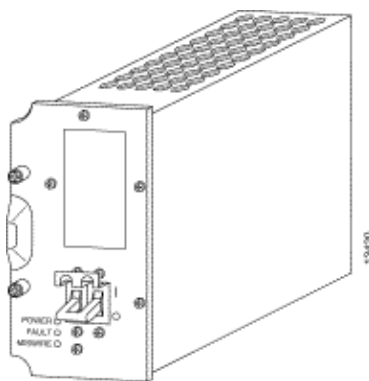
```
Switch#show environment
Temperature normal: chassis inlet measured at 27C/80F
Temperature normal: chassis core measured at 33C/91F
Fan: OK
AC Power Entry Module 0 status: OK
Switch#
```

When a single fan fails, replacing the Blower module is recommended. If several fans fail, replacing the Blower module is required. The following table shows blower module LEDs.

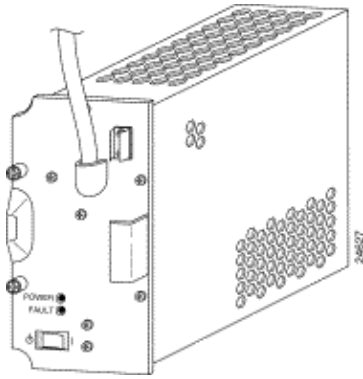
Table 1

LED	Status	Condition
Fans OK	Steady green	Fans are operational.
Single Fan Failure	Steady yellow	One fan has failed and alarms are triggered.
Multiple Fan Failure	Steady yellow	Two or more fans have failed and the system will shut down.

Power Entry Module



The DC PEM shown above provides filtering and supplies DC power to the chassis electronics. Two PEM bays are in the chassis but only one PEM is required. An additional PEM can be used for redundancy. The PEMs are located on the left side of the chassis and are installed from the front. Input source power (–48 VDC from a building centralized power source) enters the chassis through screw terminals on the rear of the chassis and is supplied to the PEMs when they are plugged into the backplane.



The AC PEM shown above provides power conversion directly from the facility VAC input power to the –48 VDC used internally in the Cisco 6400 chassis. AC power goes into the AC PEM through a power cord attached to the front faceplate.

Issue the **show environment** command on the NSP to display information about the PEM operation.

```
Switch#show environment
Temperature normal: chassis inlet measured at 27C/80F
Temperature normal: chassis core measured at 33C/91F
Fan: OK
AC Power Entry Module 0 status: OK
Switch#
```

When a PEM fails and a redundant PEM is available in the chassis, the redundant PEM will start and continuously provide power to the Cisco 6400. Replacing the PEM is recommended. If there is not a redundant PEM, replacing the PEM is required.

Table 2 shows DC power entry module LEDs.

Table 2

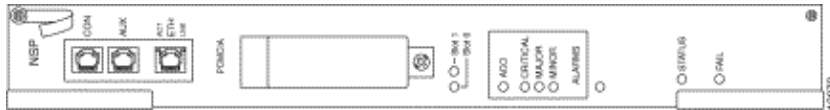
LED	Status	Condition
Power	Steady green	Power is available.
Fault	Steady yellow	The PEM has failed or is turned off.
Miswire	Steady yellow	Cables are attached incorrectly and should be reversed.

Table 3 shows AC power entry module LEDs.

Table 3

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

Identifying 6400 Hardware Issues – Node Switch Processor



The NSP is the main system processor card in the Cisco 6400 and resides in chassis slot 0A or 0B. The NSP contains the ATM switch engine and processor, and most memory components. The NSP runs the system software that maintains and executes the management functions that control the system.

Table 4 shows NSP indicators.

Table 4

LED	Status	Condition	
STATUS	Steady yellow	Cisco IOS® software is not running.	
	Blinking yellow		
	Steady green		
	Blinking green		System is booting.
	Off		NSP is active (primary).
FAIL	Yellow	NSP is standby (secondary).	
	Off	NSP has failed.	
	Off	NSP has no power.	

Useful Information

The following information is essential for determining the cause of most NSP problems.

- Outputs of the **show tech-support** command.
- Console logs.
- Syslog information.
- Crashinfo file.
- Complete bootup sequence if the router experiences boot errors.

Capturing information from the console of the NSP is essential for troubleshooting NSP problems. Log the console output in a file for later analysis or for use by the Cisco Technical Assistance Center (TAC), if a TAC case is opened.

NSP Bootup Issues

If the STATUS or the FAIL LED on the NSP remains yellow (does not change to green), the first step in determining the cause of the problem is to connect to the console and see if you can get a router prompt. For information about terminal settings of a console connection, see the *Troubleshooting* section of the Cisco 6400 UAC Hardware Installation and Maintenance Guide.

If the NSP is locked in ROM monitor (ROMMON) mode with a rommon prompt, set the configuration register to 0x2102 and reload the NSP.

NSP Stops Responding

The console will not respond if the NSP stops responding. This can be caused by a failure in hardware, memory, software, or by a high CPU utilization. Please see Troubleshooting Router Hangs for more information.

Identifying 6400 Hardware Issues – Node Route Processor

The NRP sends and receives traffic between one or more NSP ATM switch ports. The Cisco 6400 can contain multiple NRP modules configured to operate independently or as redundant pairs (1+1). You can insert NRPs into slots 1 through 8 in the Cisco 6400 chassis.

The Cisco 6400 supports two NRPs, designated as NRP-2SV and NRP-1. These can be used together in any combination in a single Cisco 6400 chassis.

NRP-2SV Module



The NRP-2SV provides a Gigabit Ethernet interface and sufficient processing capability for handling an OC-12 rate of user traffic.

Table 5 shows NRP-2SV LED indicators.

Table 5

LED	Status	Condition
STATUS	Steady yellow	NRP-2SV is active.
	Blinking yellow	
	Steady green	
	Steady yellow	
FAIL	Off	System is booting.
	Steady yellow	Cisco IOS software is not running.
	Off	NRP-2SV has failed. NRP-2SV has no power.
		Normal operation.

Methods Available for Gaining Access to the NRP-2

There are two methods available for accessing the NRP-2:

- Accessing the NRP-2 Console Through the NSP
- Using Telnet to Connect to the NRP-2 from the NSP

You can also configure the NRP-2 with the Cisco 6400 Service Connection Manager, Release 2.2(1) and later. For more information, refer to Cisco 6400 SCM .

Accessing the NRP-2 Console Through the NSP

The NSP is equipped with an internal communication server for accessing the NRP-2 console line. To access the NRP-2 console line, use Telnet to connect to the NSP as a communication server, using the port numbers shown in Table 6 below to select the NRP-2.

Table 6

NSP Communication Server Port Numbers	Associated Cisco 6400 Chassis Slot
2001, 4001, 6001	Slot 1
2002, 4002, 6002	Slot 2
2003, 4003, 6003	Slot 3
2004, 4004, 6004	Slot 4
2005, 4005, 6005	Slot 5
2006, 4006, 6006	Slot 6
2007, 4007, 6007	Slot 7
2008, 4008, 6008	Slot 8

To exit the NRP-2 console line without closing the console connection, use the escape sequence **Ctrl-Shift-6**. To close the NRP-2 console line connection, use the **exit** command.

The example procedure below illustrates this further.

1. Suppose the NSP in your Cisco 6400 system has the management IP address 10.1.5.4. To access the console line of the NRP-2 in slot 6 of the same Cisco 6400 chassis, use the **telnet** command from another router:

```
device#telnet 10.1.5.4 2006
Trying 10.1.5.4, 2006 ... Open
NRP-2#
```

2. To return to the device prompt without closing the NRP-2 console line connection, enter the escape sequence **Ctrl-Shift-6** at the NRP-2 prompt. Notice that the full escape sequence does not appear as you enter it in the command-line interface (CLI):

```
NRP-2# Ctrl^ x
device#
```

3. To return to the connected NRP-2 console line, hit **Enter** at the device prompt.

```
device#
[Resuming connection 1 to 10.1.5.4 ... ]
NRP-2#
```

4. To close the NRP-2 console line connection, use the escape sequence to return to the device prompt, and then use the **exit** command.

```
NRP-2#Ctrl^
device#exit
(You have open connections) [confirm]
Closing:10.1.5.4 !
device con0 is now available
Press RETURN to get started.
device>
```

Using Telnet to Connect to the NRP–2 from the NSP

The NSP is equipped with command aliases for using Telnet to connect to an NRP–2 in the same Cisco 6400 chassis. To use Telnet to connect to the NRP–2, use the following NSP command alias in EXEC mode.

Command	Purpose
Switch# nrpslot	Uses Telnet to connect to the NRP–2 in the specified slot.

Note: Set the enable password for the NSP before you use Telnet to connect to the NRP–2.

To exit the NRP–2 VTU line without closing the Telnet session, use the escape sequence **Ctrl–Shift–6**. To close the NRP–2 Telnet session, use the **exit** command.

The example procedure below illustrates this further.

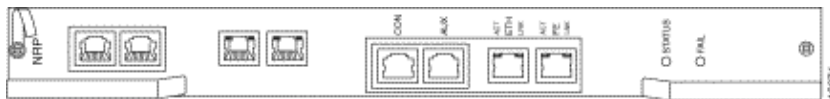
1. Suppose you want to use Telnet to connect to the NRP–2 from a device outside your Cisco 6400 system, and the NSP in the Cisco 6400 has the management IP address 10.1.5.4. To use Telnet to connect to the NRP–2, first connect to the NSP, and then use the **nrps** command alias to connect to the NRP–2.

```
device#telnet 10.1.5.4
Trying 10.1.5.4 ... Open
User Access Verification
Password:
NSP>
NSP>nrps6
Trying 10.6.0.2 ... Open
NRP-2>
```

2. To close the Telnet session to the NRP–2 and return to the NSP prompt, use the **exit** command.

```
NRP-2>exit
[Connection to 10.6.0.2 closed by foreign host]
NSP>
```

NRP–1 Module



The NRP–1 incorporates a 100 Mbps Fast Ethernet interface for connecting into an IP network and has processing capability for an OC–3 rate of user traffic.

Table 7 shows NRP–1 LED indicators.

Table 7

LED	Status	Condition
STATUS	Steady green	NRP is active (primary).
	Blinking green	NRP is standby (secondary).
	Steady yellow	Cisco IOS software is not running.

	Blinking yellow	System is booting.
	Off	NRP has no power.
FAIL	Steady yellow	NRP has failed.
	Off	Normal operation.

Useful Information

The following information is essential for determining the cause of most NRP problems.

- Outputs of the **show tech-support** command.
- Console logs.
- Syslog information.
- Crashinfo file.
- Complete bootup sequence if the router experiences boot errors.

Capturing information from the console of the NRP is essential for troubleshooting NRP problems. Log the console output in a file for later analysis or for use by the Cisco TAC, if a TAC case is opened.

NRP Bootup Issues

If the STATUS or the FAIL LED on the NSP remains yellow (does not change to green), the first step in determining the cause of the problem is to connect to the console and see if you can get a router prompt. For information about terminal settings of a console connection, see the *Troubleshooting* section of the Cisco 6400 UAC Hardware Installation and Maintenance Guide.

If the NRP is locked in ROMMON mode with a rommon prompt, set the configuration register to **0x2102** and reload the NRP.

```
rommon 1>confreg 0x2102
rommon 2>reset
```

If the NRP is still in ROMMON mode after it has been reloaded, use the following recovery procedure.

1. Issue the **dev** command to determine which devices are available on the NRP.

```
rommon 1 >dev
Devices in device table:
   id  name
  flash:  flash
bootflash: boot flash
  eprom:  eprom
rommon 2>
```

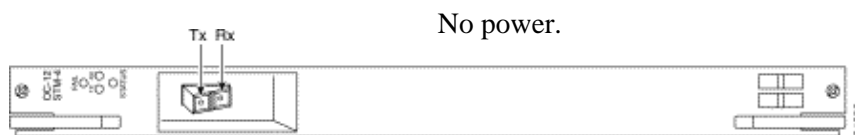
2. Issue the **dir <device_id>** command to look for a valid Cisco IOS software image.

```
rommon 2>dir flash:
File size           Checksum           File name
5545532 bytes (0x549e3c)  0xf1cbd97e      c6400r-g4p5-mz.121-5.DC1
rommon 3>
```

3. Boot from the image you selected.

```
rommon 3>boot flash:c6400r-g4p5-mz.121-5.DC1
Self decompressing the image : #####
#####
#####
```


	Off	NLC is operational.
PORT 0 (top connector)		
TX (transmit)	Green	
	Off	Transmit activity.
	Steady yellow	No traffic.
	Flashing yellow	Far-end alarm.
RX (receive)	Green	Local loopback. Receive activity.
	Off	
	Steady yellow	No traffic.
STATUS	Green	Loss of Signal.
	Blinking green	Active (primary).
	Off	Standby mode (secondary).
PORT 1 (bottom connector)		
		No power.
TX (transmit)	Green	
	Off	Transmit activity.
	Steady yellow	No traffic.
	Flashing yellow	Far-end alarm.
RX (receive)	Green	Local loopback. Receive activity.
	Off	
	Steady yellow	No traffic.
STATUS	Steady green	Loss of Signal.
	Blinking green	Active.
	Off	Standby mode.



The OC-12/STM-4 full height NLC has one 622 Mbps fiber-optic port for the connection of uplink and downlink interfaces; single mode, intermediate reach.

Table 9 shows OC-12 NLC LED indicators.

Table 9

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

No power.

The Cisco 6400 can contain multiple NLC modules, configured to operate independently or as redundant pairs. NLCs can be inserted into slots 1 through 8 (subslots 0 and 1) in the Cisco 6400 chassis.

To show the NLC modules in the Cisco 6400, issue the **show hardware** command on the NSP.

```
Switch#show hardware
6400 named Switch, Date: 12:41:06 UTC Wed Dec 19 2001
Feature Card's FPGA Download Version: 0
Slot  Ctrlr-Type   Part No.   Rev  Ser No  Mfg Date   RMA No.   Hw Vrs  Tst  EEP
-----
1/0  NRP              73-3082-02 ??  09694065  Jan 00 00  00-00-00  2.20   FF    0
2/0  NRP              73-2342-03 F0  11667429  Feb 26 99  00-00-00  1.0    0    2
3/0  NRP              73-2342-03 F0  11667428  Feb 27 99  00-00-00  1.0    0    2
4/0  NRP2            73-4902-02 C0  25389496  Feb 28 01  00-00-00  1.0    0    2
5/0  155SM NLC       73-2892-03 01  09156343  Sep 09 98  00-00-00  0.0    0   FF
6/0  155SM NLC       73-2892-03 01  09156410  Sep 09 98  00-00-00  3.1    0   FF
7/0  155MM NLC       73-5824-02 A0  25388608  Feb 24 01  00-00-00  1.0    0    2
8/0  622SM NLC       73-3868-02 A0  14342212  Jul 15 99  00-00-00  1.0    0    2
5/1  DS3 NLC         73-3696-02 02  11555742  Feb 04 99  00-00-00  1.0    0    2
6/1  DS3 NLC         73-3696-02 A0  16088970  Dec 23 99  00-00-00  1.0    0    2
7/1  155SM NLC       73-2892-03 01  11671065  Feb 09 99  00-00-00  1.0    0    2
0A/PC NSP-PC     73-2996-06 A0  15792098  Dec 30 99  00-00-00  1.0    0    2
0A/FC FC-PFQ     73-2281-04 B0  15792035  Dec 30 99  00-00-00  4.1    0    2
0A/SC NSP-SC     73-2997-06 A0  15791346  Dec 30 99  00-00-00  1.0    0    2
0B/PC NSP-PC     73-2996-06 A0  15792204  Dec 28 99  00-00-00  1.0    0    2
0B/FC FC-PFQ     73-2281-04 B0  15791847  Dec 28 99  00-00-00  4.1    0    2
0B/SC NSP-SC     73-2997-06 A0  15791341  Dec 29 99  00-00-00  1.0    0    2
```

Primary NSP:Slot 0A

DS1201 Backplane EEPROM:

```
Model  Ver.  Serial  MAC-Address  MAC-Size  RMA  RMA-Number  MFG-Date
```

```
-----
C6400      2      10036146 00107BB9BD00  128      0      0              Sep 16 1998
```

```
Switch#
```

To determine if a NLC module is operational, issue the **show hw-module subslot <slot>/<subslot>** command on the NSP.

```
Switch#show hw-module subslot 8/0
```

```
Slot  Ctrlr-Type          Comment
-----
8/0    622SM NLC      State = Operational
```

```
Switch#
```

Related Information

- [Cisco 6400 Carrier-Class Broadband Aggregator](#)
- [Aggregation / DSLAM \(DSL Access Multiplexer\)](#)
- [Cisco 6400 Feature Guide](#)
- [Cisco 6400 NRP Configuration and Troubleshooting](#)
- [Error Messages on the Cisco 6400 UAC: Descriptions and Resolutions](#)
- [Cisco 6400 Universal Access Concentrator Frequently Asked Questions](#)
- [Cisco 6400 Node Line Card Frequently Asked Questions](#)
- [Cisco 6400 Node Route Processor Frequently Asked Questions](#)
- [Cisco 6400 Node Switch Processor Frequently Asked Questions](#)
- [Cisco 6400 Carrier-Class Broadband Aggregator Release Notes](#)
- [Cisco IOS Error Message Decoder \(registered customers only\)](#)
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