Troubleshooting

Use the information in this chapter to help isolate problems you might encounter or to rule out the router as the source of a problem. This chapter contains the following sections:

Getting Started

Before troubleshooting a software problem, you must connect a terminal or PC to the router using the light-blue console port. (For information on making this connection, see the documentation listed in the "Related Documents" section on page 14.) With a connected terminal or PC, you can view status messages from the router and enter commands to troubleshoot a problem.

You can also remotely access the interface (Ethernet, ADSL, or telephone) by using Telnet. The Telnet option assumes that the interface is up and running.

Before Contacting Cisco or Your Reseller

If you cannot locate the source of a problem, contact your local reseller for advice. Before you call, you should have the following information ready:

- Chassis type and serial number
- Maintenance agreement or warranty information
- Type of software and version number
- Date you received the hardware
- Brief description of the problem

- Brief description of the steps you have taken to isolate the problem

ADSL Troubleshooting

If you experience trouble with the ADSL connection, verify the following:

- The ADSL line is connected and is using pins 3 and 4. For more information on the ADSL connection, see the hardware guide for your router.
- The ADSL CD LED is on. If it is not on, the router may not be connected to the DSL access multiplexer (DSLAM). For more information on the ADSL LEDs, see the hardware installation guide specific for your router.
- The correct Asynchronous Transfer Mode (ATM) virtual path indentifier/virtual circuit identifier (VPI/VCI) is being used.
- The DSLAM supports discrete multi-tone (DMT) Issue 2.
- The ADSL cable that you connect to the Cisco router must be 10BASE-T Category 5, unshielded twisted-pair (UTP) cable. Using regular telephone cable can introduce line errors.

SHDSL Troubleshooting

Symmetrical high-data-rate digital subscriber line (SHDSL) is available on the Cisco 1803 router model. If you experience trouble with the SHDSL connection, verify the following:

- The SHDSL line is connected and using pins 3 and 4. For more information on the G.SHDSL connection, see the hardware guide for your router.
- The G.SHDSL LED is on. If it is not on, the router may not be connected to the DSL access multiplexer (DSLAM). For more information on the G.SHDSL LED, see the hardware installation guide specific for your router.
- The correct asynchronous transfer mode (ATM) virtual path indentifier/virtual circuit identifier (VPI/VCI) is being used.
- The DSLAM supports the G.SHDSL signaling protocol.

Use the **show controllers dsl 0** command in privileged EXEC mode to view an SHDSL configuration.

PortFast Troubleshooting

PortFast is a feature that you typically enable for a port or interface that connects to a host. When the link comes up on this port, the bridge skips the first stages of the STA and directly transitions to forwarding mode.

If you use the PortFast feature on switch ports or interfaces that connect to other switches, hubs, or routers, a network loop might get created. If the looped traffic is heavy, the bridge might experience problems with the successful transmission of the BPDU that stops the loop. This problem could delay convergence, or in extreme cases, bring down the network.

Caution Do not use the PortFast feature on switch ports or interfaces that connect to other switches, hubs, or routers. Otherwise, you might create a network loop.

For details, see the "PortFast Configuration Error" section in the *Spanning Tree Protocol Problems and Related Design Considerations* document.

ATM Troubleshooting Commands

Use the following commands to troubleshoot your ATM interface.

- ping atm interface Command
- show interface Command
- show atm interface Command
- debug atm Commands

ping atm interface Command

Use the **ping atm interface** command to determine whether a particular PVC is in use. The PVC does not need to be configured on the router to use this command. Example 14-1 shows the use of this command to determine whether PVC 8/35 is in use.

Example 14-1 Determining If a PVC Is in Use

```
Router# ping atm interface atm 0 8 35 seg-loopback

Type escape sequence to abort.
Sending 5, 53-byte segment OAM echoes, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 148/148/148 ms


!----This command sends five OAM F5 loopback packets to the DSLAM (segment OAM packets).
If the PVC is configured at the DSLAM, the ping is successful.

!----To test whether the PVC is being used at the aggregator, enter the following command:

Router# ping atm interface atm 0 8 35 end-loopback

Type escape sequence to abort.
Sending 5, 53-byte end-to-end OAM echoes, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 400/401/404 ms

!----This command sends end-to-end OAM F5 packets, which are echoed back by the
aggregator.
```

show interface Command

Use the **show interface** command to display the status of all physical ports (Ethernet and ATM) and logical interfaces on the router. Example 14-2 shows sample command output.

Example 14-2 Viewing the Status of Selected Interfaces

```
Router# show interface atm 0
ATM0 is up, line protocol is up
```

```
  Hardware is PQUICC_SAR (with Alcatel ADSL Module)
  Internet address is 14.0.0.16/8
  MTU 1500 bytes, sub MTU 1500, BW 640 Kbit, DLY 80 usec,
     reliability 40/255, txload 1/255, rxload 1/255
  Encapsulation ATM, loopback not set
  Keepalive not supported
  Encapsulation(s):AAL5, PVC mode
  10 maximum active VCs, 1 current VCCs
  VC idle disconnect time:300 seconds
  Last input 01:16:31, output 01:16:31, output hang never
  Last clearing of "show interface" counters never
  Input queue:0/75/0 (size/max/drops); Total output drops:0
  Queueing strategy:Per VC Queueing
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     512 packets input, 59780 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 1024 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     426 packets output, 46282 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     0 output buffer failures, 0 output buffers swapped out

Router# show interface fastethernet 0
Ethernet0 is up, line protocol is up
Hardware is PQUICC Ethernet, address is 0000.0c13.a4db
(bia0010.9181.1281)
Internet address is 170.1.4.101/24
MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
    reliability 255/255., txload 1/255, rxload 1/255
    Encapsulation ARPA, loopback not set
    Keepalive set (10 sec)

Router# show interface dialer 1
Dialer 1 is up, line protocol is up
    Hardware is Dialer interface
    Internet address is 1.1.1.1/24
    MTU 1500 bytes, BW 100000 Kbit, DLY 100000 usec, reliability
        255/255. txload 1/255, rxload 1/255
    Encapsulation PPP, loopback not set
    Keepalive set (10 sec)
DTR is pulsed for 5 seconds on reset
LCP Closed
```

Table 14-1 describes possible command output for the **show interface** command.

Table 14-1 show interface Command Output Description

Output	Cause
For ATM Interfaces	
ATM 0 is up, line protocol is up	The ATM line is up and operating correctly.
ATM 0 is down, line protocol is down	• The ATM interface has been disabled with the **shutdown** command or • The ATM line is down, possibly because the ADSL cable is disconnected or because the wrong type of cable is connected to the ATM port.

Table 14-1 show interface Command Output Description (continued)

Output	Cause
ATM 0.*n* is up, line protocol is up	The specified ATM subinterface is up and operating correctly.
ATM 0.*n* is administratively down, line protocol is down	The specified ATM subinterface has been disabled with the **shutdown** command.
ATM 0.*n* is down, line protocol is down	The specified ATM subinterface is down, possibly because the ATM line has been disconnected (by the service provider).
For Fast Ethernet Interfaces	
Fast Ethernet *n* is up, line protocol is up	The specified Fast Ethernet interface is connected to the network and operating correctly.
Fast Ethernet *n* is up, line protocol is down	The specified Fast Ethernet interface has been correctly configured and enabled, but the Ethernet cable might be disconnected from the LAN.
Fast Ethernet *n* is administratively down, line protocol is down	The specified Fast Ethernet interface has been disabled with the **shutdown** command, and the interface is disconnected.
For Dialer Interfaces	
Dialer *n* is up, line protocol is up	The specified dialer interface is up and operating correctly.
Dialer *n* is down, line protocol is down	• This is a standard message and may not indicate anything is actually wrong with the configuration or • If you are having problems with the specified dialer interface, this can mean it is not operating, possibly because the interface has been brought down with the **shutdown** command, or the ADSL cable is disconnected.

show atm interface Command

To display ATM-specific information about an ATM interface, use the **show atm interface atm 0** command from privileged EXEC mode, as shown in Example 14-3.

Example 14-3 Viewing Information About an ATM Interface

```
Router# show atm interface atm 0
Interface ATM0:
AAL enabled:  AAL5   AAL2, Maximum VCs: 23, Current VCCs: 0

VCIs per VPI: 1024,
Max. Datagram Size: 4528
PLIM Type: ADSL - 4608Kbps Upstream, DMT, TX clocking: LINE
0 input, 0 output, 0 IN fast, 0 OUT fast
 Avail bw = 4608
Config. is ACTIVE
```

Table 14-2 describes some of the fields shown in the command output.

Table 14-2 show atm interface Command Output Description

Field	Description
ATM interface	Interface number. Always 0 for the Cisco 1800 fixed-configuration routers.
AAL enabled	Type of AAL enabled. The Cisco 1800 fixed-configuration routers support AAL5.
Maximum VCs	Maximum number of virtual connections this interface supports.
Current VCCs	Number of active virtual channel connections (VCCs).
Maximum Transmit Channels	Maximum number of transmit channels.
Max Datagram Size	Configured maximum number of bytes in the largest datagram.
PLIM Type	Physical layer interface module (PLIM) type.

debug atm Commands

Use the **debug** commands to troubleshoot configuration problems that you might be having on your network. The **debug** commands provide extensive, informative displays to help you interpret any possible problems.

Guidelines for Using Debug Commands

Read the following guidelines before using debug commands to ensure appropriate results.

- All debug commands are entered in privileged EXEC mode.
- To view debugging messages on a console, enter the **logging console debug** command.
- Most **debug** commands take no arguments.
- To disable debugging, enter the **undebug all** command.
- To use **debug** commands during a Telnet session on your router, enter the **terminal monitor** command.

Caution Debugging is assigned a high priority in your router CPU process, and it can render your router unusable. For this reason, use **debug** commands only to troubleshoot specific problems. The best time to use debug commands is during periods of low network traffic so that other activity on the network is not adversely affected.

You can find additional information and documentation about the **debug** commands in the *Cisco IOS Debug Command Reference*.

debug atm errors Command

Use the **debug atm errors** command to display ATM errors. The **no** form of this command disables debugging output. Example 14-4 shows a sample output.

Example 14-4 Viewing ATM Errors

```
Router# debug atm errors
ATM errors debugging is on
Router#
01:32:02:ATM(ATM0.2):VC(3) Bad SAP received 4500
01:32:04:ATM(ATM0.2):VC(3) Bad SAP received 4500
01:32:06:ATM(ATM0.2):VC(3) Bad SAP received 4500
01:32:08:ATM(ATM0.2):VC(3) Bad SAP received 4500
01:32:10:ATM(ATM0.2):VC(3) Bad SAP received 4500
```

debug atm events Command

Use the **debug atm events** command to display events that occur on the ATM interface processor and to diagnose problems in an ATM network. This command provides an overall picture of the stability of the network. The **no** form of this command disables debugging output.

If the interface is successfully communicating with the Digital Subscriber Line Access Multiplexer (DSLAM) at the telephone company, the modem state is 0x10. If the interface is not communicating with the DSLAM, the modem state is 0x8. Example 14-5 shows an ADSL line that is up and communicating successfully. Example 14-6 shows an ADSL line that is not communicating correctly. Note that the modem state does not transition to 0x10.

Example 14-5 Viewing ATM Interface Processor Events—Success

```
Router# debug atm events
Router#
00:02:57: DSL: Send ADSL_OPEN command.
00:02:57: DSL: Using subfunction 0xA
00:02:57: DSL: Using subfunction 0xA
00:02:57: DSL: Sent command 0x5
00:02:57: DSL: Received response: 0x26
00:02:57: DSL: Unexpected response 0x26
00:02:57: DSL: Send ADSL_OPEN command.
00:02:57: DSL: Using subfunction 0xA
00:02:57: DSL: Using subfunction 0xA
00:02:57: DSL: Sent command 0x5
00:03:00: DSL: 1: Modem state = 0x8
00:03:02: DSL: 2: Modem state = 0x10
00:03:05: DSL: 3: Modem state = 0x10
00:03:07: DSL: 4: Modem state = 0x10
00:03:09: DSL: Received response: 0x24
00:03:09: DSL: Showtime!
00:03:09: DSL: Sent command 0x11
00:03:09: DSL: Received response: 0x61
00:03:09: DSL: Read firmware revision 0x1A04
00:03:09: DSL: Sent command 0x31
00:03:09: DSL: Received response: 0x12
00:03:09: DSL: operation mode 0x0001
00:03:09: DSL: SM: [DMTDSL_DO_OPEN -> DMTDSL_SHOWTIME]
```

Example 14-6 Viewing ATM Interface Processor Events—Failure

```
Router# debug atm events
Router#
00:02:57: DSL: Send ADSL_OPEN command.
00:02:57: DSL: Using subfunction 0xA
00:02:57: DSL: Using subfunction 0xA
```

```
00:02:57: DSL: Sent command 0x5
00:02:57: DSL: Received response: 0x26
00:02:57: DSL: Unexpected response 0x26
00:02:57: DSL: Send ADSL_OPEN command.
00:02:57: DSL: Using subfunction 0xA
00:02:57: DSL: Using subfunction 0xA
00:02:57: DSL: Sent command 0x5
00:03:00: DSL: 1: Modem state = 0x8
00:03:00: DSL: 1: Modem state = 0x8
00:03:00: DSL: 1: Modem state = 0x8
00:03:00: DSL: 1: Modem state = 0x8
00:03:00: DSL: 1: Modem state = 0x8
00:03:00: DSL: 1: Modem state = 0x8
```

debug atm packet Command

Use the **debug atm packet** command to display all process-level ATM packets for both outbound and inbound packets. The output reports information online when a packet is received or a transmission is attempted. The **no** form of this command disables debugging output.

Caution Because the **debug atm packet** command generates a significant amount of output for every packet processed, use it only when network traffic is low, so that other system activities are not adversely affected.

The command syntax is:

debug atm packet [**interface atm** *number* [**vcd** *vcd-number*] [**vc** *vpi/vci number*]]

no debug atm packet [**interface atm** *number* [**vcd** *vcd-number*] [**vc** *vpi/vci number*]]

where the keywords are defined as follows:

interface atm *number*	(Optional) ATM interface or subinterface number.
vcd *vcd-number*	(Optional) Number of the virtual circuit designator (VCD).
vc *vpi/vci number*	VPI/VCI value of the ATM PVC.

Example 14-7 shows a sample output.

Example 14-7 Viewing ATM Packet Processing

```
Router# debug atm packet
Router#
01:23:48:ATM0(O):
VCD:0x1 VPI:0x1 VCI:0x64 DM:0x0 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
01:23:48:4500 0064 0008 0000 FF01 9F80 0E00 0010 0E00 0001 0800 A103 0AF3 17F7 0000
01:23:48:0000 004C BA10 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
01:23:48:ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
01:23:48:ABCD ABCD ABCD ABCD ABCD
01:23:48:
01:23:48:ATM0(I):
VCD:0x1 VPI:0x1 VCI:0x64 Type:0x0 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
01:23:48:4500 0064 0008 0000 FE01 A080 0E00 0001 0E00 0010 0000 A903 0AF3 17F7 0000
01:23:48:0000 004C BA10 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
01:23:48:ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
01:23:48:ABCD ABCD ABCD ABCD ABCD
01:23:48:
```

Table 14-3 describes some of the fields shown in the **debug atm packet** command output.

Table 14-3 debug atm packet Command Output Description

Field	Description
ATM0	Interface that is generating the packet.
(O)	Output packet. (I) would mean receive packet.
VCD: 0x*n*	Virtual circuit associated with this packet, where *n* is some value.
VPI: 0x*n*	Virtual path identifier for this packet, where *n* is some value.
DM: 0x*n*	Descriptor mode bits, where *n* is some value.
Length: *n*	Total length of the packet (in bytes) including the ATM headers.

Software Upgrade Methods

Several methods are available for upgrading software on the Cisco 1800 series integrated services fixed-configuration routers, including:

- Copy the new software image to flash memory over the LAN or WAN while the existing Cisco IOS software image is operating.
- Copy the new software image to flash memory over the LAN while the boot image (ROM monitor) is operating.
- Copy the new software image over the console port while in ROM monitor mode.
- From ROM monitor mode, boot the router from a software image that is loaded on a TFTP server. To use this method, the TFTP server must be on the same LAN as the router.

Recovering a Lost Password

To recover a lost enable or lost enable-secret password:

1. Change the Configuration Register
2. Reset the Router
3. Reset the Password and Save Your Changes (for lost enable secret passwords only)
4. Reset the Configuration Register Value

Note Recovering a lost password is only possible when you are connected to the router through the console port. These procedures cannot be performed through a Telnet session.

Tip See the “Hot Tips” section on Cisco.com for additional information on replacing enable secret passwords.

Change the Configuration Register

To change a configuration register, follow these steps:

Step 1 Connect an ASCII terminal or a PC running a terminal emulation program to the CONSOLE port on the rear panel of the router.

Step 2 Configure the terminal to operate at 9600 baud, 8 data bits, no parity, and 1 stop bit.

Step 3 At the privileged EXEC prompt (*router_name* #), enter the **show version** command to display the existing configuration register value (shown in bold at the bottom of this output example):

```
Router# show version
Cisco IOS Software, C180X Software (C180X-ADVENTERPRISEK9-M), Version 12.4(1.8)PI2c
ENGINEERING WEEKLY BUILD, synced to haw_t BASE_LABEL_OF_V124_2_T_THROTTLE
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Fri 27-May-05 16:14 by ccai

ROM: System Bootstrap, Version 12.3(8r)YH4, RELEASE SOFTWARE (fc1)

ng-esw1-uut1 uptime is 1 hour, 21 minutes
System returned to ROM by power-on
System image file is "flash:bootimage.ng-esw1-uut1"


This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco 1801 (MPC8500) processor (revision 0x200) with 118784K/12288K bytes of memory.
Processor board ID FHK091412QA, with hardware revision 0000

9 FastEthernet interfaces
1 ISDN Basic Rate interface
1 ATM interface
31360K bytes of ATA CompactFlash (Read/Write)

Configuration register is 0x2102
```

Step 4 Record the setting of the configuration register.

Step 5 Enter the **config-register** *value* command to set the new configuration register value. For example, to enable the break setting (indicated by the value of bit 8 in the configuration register), enter the **config-register 0x01** command from privileged EXEC mode.

- Break enabled—Bit 8 is set to 0.
- Break disabled (default setting)—Bit 8 is set to 1.

Reset the Router

To reset the router, follow these steps:

Step 1 If break is enabled, go to Step 2. If break is disabled, turn the router off (O), wait 5 seconds, and turn it on (|) again. Within 60 seconds, press the **Break** key. The terminal displays the ROM monitor prompt. Go to Step 3.

Note Some terminal keyboards have a key labeled *Break*. If your keyboard does not have a Break key, see the documentation that came with the terminal for instructions on how to send a break.

Step 2 Press **break**. The terminal displays the following prompt:

```
rommon 2>
```

Step 3 Enter **confreg 0x142** to reset the configuration register:

```
rommon 2> confreg 0x142
```

Step 4 Initialize the router by entering the **reset** command:

```
rommon 2> reset
```

The router cycles its power, and the configuration register is set to 0x142. The router uses the boot ROM system image, indicated by the system configuration dialog:

```
--- System Configuration Dialog ---
```

Step 5 Enter **no** in response to the prompts until the following message is displayed:

```
Press RETURN to get started!
```

Step 6 Press **Return**. The following prompt appears:

```
Router>
```

Step 7 Enter the **enable** command to enter enable mode. Configuration changes can be made only in enable mode:

```
Router> enable
```

The prompt changes to the privileged EXEC prompt:

```
Router#
```

Step 8 Enter the **show startup-config** command to display an enable password in the configuration file:

```
Router# show startup-config
```

If you are recovering an enable password, omit the following "Reset the Password and Save Your Changes" section, and complete the password recovery process by performing the steps in the "Reset the Configuration Register Value" section.

If you are recovering an enable secret password, it is not displayed in the **show startup-config** command output. Complete the password recovery process by performing the steps in the following "Reset the Password and Save Your Changes" section.

Reset the Password and Save Your Changes

To reset your password and save the changes, follow these steps:

Step 1 Enter the **configure terminal** command to enter global configuration mode:

```
Router# configure terminal
```

Step 2 Enter the **enable secret** command to reset the enable secret password in the router:

```
Router(config)# enable secret password
```

Step 3 Enter **exit** to exit global configuration mode:

```
Router(config)# exit
```

Step 4 Save your configuration changes:

```
Router# copy running-config startup-config
```

Reset the Configuration Register Value

To reset the configuration register value after you have recovered or reconfigured a password, follow these steps:

Step 1 Enter the **configure terminal** command to enter global configuration mode:

```
Router# configure terminal
```

Step 2 Enter the **configure register** command and the original configuration register value that you recorded.

```
Router(config)# config-reg value
```

Step 3 Enter **exit** to exit configuration mode:

```
Router(config)# exit
```

Note To return to the configuration being used before you recovered the lost enable password, do not save the configuration changes before rebooting the router.

Step 4 Reboot the router, and enter the recovered password.

Managing Your Router with SDM

The Cisco SDM tool is a free software configuration utility, supporting the Cisco 1800 series integrated services fixed-configuration routers. It includes a web-based GUI that offers the following features:

- Simplified setup
- Advanced configuration
- Router security
- Router monitoring