



CHAPTER 8

Troubleshooting the ATM SPAs

This chapter describes how to monitor and troubleshoot the asynchronous transfer mode (ATM) shared port adapters (SPAs) in a Catalyst 6500 Series switch. This document covers the 1-Port OC-48c/STM-16 ATM SPA, 1-Port OC-12c/STM-4 ATM SPA, and the 2-Port and 4-Port OC-3c/STM-1 ATM SPA.

- [General Troubleshooting Information, page 8-1](#)
- [Monitoring the ATM SPA, page 8-2](#)
- [Troubleshooting the ATM Shared Port Adapter, page 8-15](#)
- [Preparing for Online Insertion and Removal of a SPA, page 8-26](#)

For more information about troubleshooting your hardware installation, refer to the *Cisco 7600 Series Router SIP, SSC, and SPA Hardware Installation Guide*.

General Troubleshooting Information

This section provides the following general information for troubleshooting ATM SPA cards and their SPA interface processor (SIP) carrier cards:

- [Interpreting Console Error and System Messages, page 8-1](#)
- [Using debug Commands, page 8-2](#)
- [Using show Commands, page 8-2](#)

Interpreting Console Error and System Messages

To view the explanations and recommended actions for Catalyst 6500 Series switch error messages, including messages related to Catalyst 6500 Series switch SIPs and SPAs, refer to the [Catalyst 6500 Series Cisco IOS System Message Guide, 12.2SX](#).

System error messages are organized in the documentation according to the particular system facility that produces the messages. The SIP and SPA error messages use the following facility names:

- Cisco 7600 SIP-200
- Cisco 7600 SIP-400
- 1-Port OC-12c/STM-4 ATM SPA
- 1-Port OC-48c/STM-16 ATM SPA
- 2-Port and 4-Port OC-3c/STM-1 ATM SPA

Using debug Commands

Along with the other debug commands supported on the Catalyst 6500 Series switch, you can obtain specific debug information for SPAs on the Catalyst 6500 Series switch using the **debug hw-module subslot** privileged exec command.

**Caution**

Because debugging output is assigned high priority in the CPU process, it can render the system unusable. For this reason, use **debug** commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support staff. Moreover, it is best to use **debug** commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased **debug** command processing overhead can affect system use.

The **debug hw-module subslot** command is intended for use by Cisco Systems technical support personnel. For more information about the **debug hw-module subslot** command and other **debug** commands, see the *Cisco IOS Debug Command Reference, Release 12.2*. For more information about other commands that can be used on a Catalyst 6500 Series switch, see the *Catalyst 6500 Series Cisco IOS Command Reference, 12.2SX*.

Using show Commands

There are several **show** commands that you can use to monitor and troubleshoot the SIP and SPA cards on a Catalyst 6500 Series switch. For more information on these commands, see the “[Monitoring the ATM SPA](#)” section on page 8-2.

Also see [Chapter 7, “Configuring the ATM SPAs”](#) for additional information about these **show** commands.

Monitoring the ATM SPA

This section contains the following subsections that describe commands that can be used to display information about the ATM SPA hardware, interfaces, PVCs, SVCs, and APS configuration:

- [Displaying Hardware Information, page 8-2](#)
- [Displaying Information About ATM Interfaces, page 8-5](#)
- [Displaying Information About PVCs and SVCs, page 8-7](#)
- [Displaying Information About Automatic Protection Switching, page 8-13](#)

**Note**

The outputs in this document are samples only. The actual output that appears on your switch depends on the model of switch, type of cards that are installed, and their configuration.

Displaying Hardware Information

Use the following commands to display different types of hardware and system information:

- **show version**—[Displaying System Information, page 8-3](#)

- **show hw-module subslot fpd** and **show idprom module**—[Displaying Information About the ATM SPA Hardware Revision Levels](#), page 8-3
- **show controllers atm**—[Displaying Information About the ATM Controller Hardware](#), page 8-4
- **show diagbus**—[Displaying Information About ATM Ports](#), page 8-5

Displaying System Information

To display information about the switch, its system hardware and software, and the number of each type of interface that is installed, use the **show version** command. The following sample output shows a Cisco 7606 router that has two four-port OC-3c ATM SPA cards installed in a Cisco 7600 SIP-400 carrier card, along with a number of Gigabit Ethernet interfaces:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) c6sup2_rp Software (c6sup2_rp-JSV-M), Released Version 12.2(XX) [BLD-sipedon2
187]
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled Tue 16-Mar-04 05:13 by jrstu
Image text-base: 0x40020F94, data-base: 0x424B0000

ROM: System Bootstrap, Version 12.2(14r)S1, RELEASE SOFTWARE (fc1)

sup2_7606 uptime is 44 minutes
Time since sup2_7606 switched to active is 43 minutes
System returned to ROM by power-on (SP by power-on)
System image file is "disk0:c6k222-jsv-mz_022204"

cisco CISC07606 (R7000) processor (revision 1.0) with 458752K/65536K bytes of memory.
Processor board ID TBM06402027
SR71000 CPU at 600Mhz, Implementation 0x504, Rev 1.2, 512KB L2, 2048KB L3 Cache
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
1 FlexWAN controller (2 ATM).
2 SIP-400 controllers (7 ATM).
1 Dual-port OC12c ATM controller (2 ATM).
1 Virtual Ethernet/IEEE 802.3 interface(s)
8 Gigabit Ethernet/IEEE 802.3 interface(s)
11 ATM network interface(s)
1917K bytes of non-volatile configuration memory.
8192K bytes of packet buffer memory.
65536K bytes of Flash internal SIMM (Sector size 512K).
Configuration register is 0x2102
```

Displaying Information About the ATM SPA Hardware Revision Levels

To display information about the hardware revision of the SPA, as well as the version of the field-programmable device (FPD) that is onboard the SPA, use the **show hw-module subslot fpd** command. Cisco technical engineers might need this information to debug or troubleshoot problems with a SPA installation.

```
Router# show hw-module subslot fpd

=====
Slot Card Type                H/W   Field Programmable   Current   Min. Required
                               Ver.   Device: "ID-Name"   Version   Version
```

```

=====
5/0 4xOC-3 ATM SPA      1.0  1-I/O FPGA           0.70   0.70
-----
5/1 4xOC-3 ATM SPA      1.0  1-I/O FPGA           0.70   0.70
=====

```

In addition, the **show idprom module** command also displays the serial number and board revisions for the ATM SPA.

```
Router# show idprom module 5/2
```

```

IDPROM for SPA module #5/2
(FRU is '4-port OC3/STM1 ATM Shared Port Adapter')
Product Identifier (PID) : SPA-4XOC3-ATM
Version Identifier (VID) : V01
PCB Serial Number       : PRTA0304088
Top Assy. Part Number   : 68-2177-01
73/68 Board Revision   : 04
73/68 Board Revision   : 10
Hardware Revision      : 0.17
CLEI Code              : UNASSIGNED

```

Displaying Information About the ATM Controller Hardware

To display information about the controller hardware for an ATM interface, including framing and alarm configuration, as well as port, packet, and channel performance statistics, use the **show controllers atm** command, which has the following syntax:

```
show controllers atm slot/subslot/port
```

The following example shows typical output for an ATM SPA interface:

```
Router# show controllers atm 5/1/0
```

```

Interface ATM5/1/0 is up
Framing mode: SONET OC3 STS-3c

SONET Subblock:
SECTION
  LOF = 0          LOS   = 0          BIP(B1) = 603
LINE
  AIS = 0          RDI   = 2          FEBE = 2332    BIP(B2) = 1018
PATH
  AIS = 0          RDI   = 1          FEBE = 28      BIP(B3) = 228
  LOP = 0          NEWPTR = 0          PSE  = 1       NSE    = 2

Active Defects: None
Active Alarms:  None
Alarm reporting enabled for: SF SLOS SLOF B1-TCA B2-TCA PLOP B3-TCA

ATM framing errors:
HCS (correctable):  0
HCS (uncorrectable): 0

APS

COAPS = 0          PSBF = 0
State: PSBF_state = False
Rx(K1/K2): 00/00  Tx(K1/K2): 00/00
Rx Synchronization Status S1 = 00
S1S0 = 00, C2 = 00

```

```

PATH TRACE BUFFER : STABLE

BER thresholds:  SF = 10e-3  SD = 10e-6
TCA thresholds:  B1 = 10e-6  B2 = 10e-6  B3 = 10e-6

Clock source:  line

```

**Note**

The ATM SPA does not support automatic updates of the remote host information, if any, in the Path Trace Buffer section of the **show controllers atm** command.

Displaying Information About ATM Ports

To display information about the type of port adapters that are installed in the switch, use the **show diagbus** command, which has the following syntax:

```
show diagbus slot
```

The *slot* argument is the slot number that contains the port adapter. The following example shows typical output for a 4-port OC-3c ATM SPA that is in slot 4 in the switch:

```

Router# show diagbus 4

Slot 4: Logical_index 8
        4-adapter SIP-200 controller
        Board is analyzed ipc ready
        HW rev 0.300, board revision 08
        Serial Number:  Part number: 73-8272-03

Slot database information:
Flags: 0x2004  Insertion time: 0x1961C (01:16:54 ago)

Controller Memory Size:
        384 MBytes CPU Memory
        128 MBytes Packet Memory
        512 MBytes Total on Board SDRAM
IOS (tm) cwlc Software (sip1-DW-M), Released Version 12.2(17)SX [BLD-sipedon2 107]

SPA Information:
subslot 4/0: 4xOC-3 ATM SPA (0x3E1), status: ok
subslot 4/1: 4xOC-3 ATM SPA (0x3E1), status: ok

```

Displaying Information About ATM Interfaces

Use the following commands to display information about ATM interfaces:

- **show interface atm**—[Displaying Layer 2 Information About an ATM Interface, page 8-6](#)
- **show atm interface atm**—[Displaying ATM-Specific Information About an ATM Interface, page 8-7](#)
- **show ip interface**—[Displaying Layer 3 IP Information About an ATM Interface, page 8-7](#)

Displaying Layer 2 Information About an ATM Interface

To display Layer 2 information about an ATM interface or subinterface, along with the current status and packet counters, use the **show interface atm** command. The following example shows sample output for an ATM interface on an ATM SPA:

```
Router# show interface atm 5/1/0

ATM5/1/0 is up, line protocol is up
  Hardware is ATM SPA, address is 000a.f330.2a80 (bia 000a.f330.2a80)
  MTU 4470 bytes, sub MTU 4470, BW 149760 Kbit, DLY 80 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ATM, loopback not set
  Encapsulation(s): AAL5
  4095 maximum active VCs, 21 current VCCs
  VC idle disconnect time: 300 seconds
  Signalling vc = 1, vpi = 0, vci = 5
    UNI Version = 4.0, Link Side = user
  6 carrier transitions
  Last input 01:47:05, output 00:00:01, output hang never
  Last clearing of "show interface" counters 01:03:35
  Input queue: 0/75/33439/80 (size/max/drops/flushes); Total output drops: 963306
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    9502306 packets input, 6654982829 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicast)
    0 runts, 0 giants, 0 throttles
    45011 input errors, 131042 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    27827569 packets output, 21072150159 bytes, 0 underruns
    0 output errors, 0 collisions, 3 interface resets
    0 output buffer failures, 0 output buffers swapped out
```

The following example shows sample output for a subinterface on this same ATM interface:

```
Router# show interface atm 5/1/0.200

ATM5/1/0.200 is up, line protocol is up
  Hardware is ATM SPA, address is 000a.f330.2a80 (bia 000a.f330.2a80)
  Internet address is 10.10.10.16/24
  MTU 4470 bytes, BW 149760 Kbit, DLY 80 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  NSAP address: 47.00918100000000107B2B4B01.222255550001.00
  Encapsulation ATM
  12630 packets input, 10521156 bytes
  4994 packets output, 4176213 bytes
  3753 OAM cells input, 4366 OAM cells output
  AAL5 CRC errors : 0
  AAL5 SAR Timeouts : 0
  AAL5 Oversized SDUs : 0
```



Note

The value for “packets output” in the default version of the **show interfaces atm** command includes the bytes used for ATM AAL5 padding, trailer and ATM cell header. To see the packet count without the padding, header, and trailer information, use the **show interfaces atm statistics** or **show atm pvc** commands.

Displaying ATM-Specific Information About an ATM Interface

To display Layer 2 ATM-specific information about an ATM interface or subinterface, use the **show atm interface atm** command:

```
Router# show atm interface atm 3/1/0

Interface ATM3/1/0:
AAL enabled: AAL5 , Maximum VCs: 1023, Current VCCs: 1

Maximum Transmit Channels: 64
Max. Datagram Size: 4528
PLIM Type: SONET - 155000Kbps, TX clocking: LINE
Cell-payload scrambling: ON
sts-stream scrambling: ON
0 input, 0 output, 0 IN fast, 0 OUT fast, 0 out drop
  Avail bw = 155000
Config. is ACTIVE
```

Displaying Layer 3 IP Information About an ATM Interface

To display Layer 3 (IP-layer) information about an ATM interface, use the **show ip interface** command. To display a brief summary about all interfaces, use the **show ip interface brief** command.

To display information about a specific ATM interface, use the **show ip interface atm slot/subslot/port** command.

The following output shows a typical example for the **show ip interface brief** command:

```
Router# show ip interface brief

Interface                IP-Address      OK? Method Status          Protocol
Vlan1                    unassigned     YES NVRAM  down            down
GigabitEthernet1/1      172.18.76.57   YES NVRAM  up              up
GigabitEthernet1/2      unassigned     YES NVRAM  administratively down down
ATM3/0/0                 unassigned     YES manual up              up
ATM3/0/0.1              unassigned     YES manual up              up
ATM3/0/0.2              10.1.1.1       YES manual up              up
ATM3/1/0                 unassigned     YES manual up              up
ATM3/1/0.1              unassigned     YES manual up              up
ATM3/1/0.2              unassigned     YES unset  up              up
ATM3/1/0.3              11.1.1.1       YES manual up              up
```

Displaying Information About PVCs and SVCs

Use the following commands to display information about PVCs and SVCs, including mapping, traffic, and VLAN configuration information:

- **show atm vp**—[Displaying Information About Virtual Paths, page 8-8](#)
- **show atm vc**—[Displaying Information About Virtual Channels, page 8-8](#)
- **show atm pvc**—[Displaying Information About PVCs, page 8-9](#)
- **show atm svc** and **show atm ilmi-status**—[Displaying Information About SVCs, page 8-10](#)
- **show atm map**—[Displaying Information About Layer 2/Layer 3 Mappings, page 8-11](#)
- **show atm traffic**—[Displaying Information About ATM Traffic, page 8-12](#)
- **show atm vlan**—[Displaying Information About VLAN Mappings, page 8-12](#)

- **show atm class-links**—[Displaying Information About VC Bundles, page 8-13](#)

Displaying Information About Virtual Paths

To display information about the virtual paths (VPs) that are configured on the switch's ATM interfaces, use the **show atm vp** command:

```
Router# show atm vp
```

Interface	VPI	Data VCs	CES VCs	Peak Kbps	CES Kbps	Status
ATM5/0/3	1	1	0	149760	0	ACTIVE
ATM5/0/3	1	2	0	299520	299000	ACTIVE
ATM5/0/3	2	0	0	1000	0	ACTIVE

```
Router#
```

To display detailed information about a specific virtual path, including its current PVCs and SVCs, specify the VPI with the **show atm vp** command:

```
Router# show atm vp 30
```

```
ATM8/1/0 VPI: 30,
ATM8/1/0 VPI: 30, PeakRate: 149760, CesRate: 0, DataVCs: 1, CesVCs: 0, Status: ACTIVE
```

VCD	VCI	Type	InPkts	OutPkts	AAL/Encap	Status
2	3	PVC	0	0	F4 OAM	ACTIVE
3	4	PVC	0	0	F4 OAM	ACTIVE
4	300	PVC	5	5	AAL5-SNAP	ACTIVE
6	11	PVC	12	1	AAL5-SNAP	ACTIVE

```
TotalInPkts: 17, TotalOutPkts: 6, TotalInFast: 0, TotalOutFast: 6, TotalBroadcasts: 0
TotalInPktDrops: 0, TotalOutPktDrops: 0
```

Displaying Information About Virtual Channels

To display information about all of the virtual channels that are currently configured on the ATM interfaces, use the **show atm vc** command without any options:

```
Router# show atm vc
```

Interface	VCD / Name	VPI	VCI	Type	Encaps	SC	Peak Kbps	Avg/Min Kbps	Burst Cells	Sts
3/0/0	1	1	100	PVC	SNAP	UBR	149760			UP
3/0/1	1	2	100	PVC	SNAP	UBR	149760			UP
3/0/2	1	3	100	PVC	SNAP	UBR	149760			UP
3/0/2	2	3	300	PVC	SNAP	UBR	149760			UP
3/0/3	1	4	100	PVC	SNAP	UBR	149760			UP

To display detailed information about a specific virtual connection, specify its VC descriptor (VCD) along with the command:

```
Router# show atm vc 20
```

```
ATM1/1/0.200: VCD: 20, VPI: 2, VCI: 200
UBR, PeakRate: 44209
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
OAM frequency: 0 second(s)
InARP frequency: 5 minutes(s)
Transmit priority 4
InPkts: 10, OutPkts: 11, InBytes: 680, OutBytes: 708
```

```

InPRoc: 10, OutPRoc: 5, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 6
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0
OAM cells received: 0
OAM cells sent: 0
Status: UP

```

You can also display information about the VCs on a specific ATM interface and its subinterfaces:

```

Router# show atm vc interface atm 2/1/0

ATM2/0.101: VCD: 201, VPI: 20, VCI: 101
UBR, PeakRate: 149760
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
OAM frequency: 0 second(s)
InARP frequency: 15 minutes(s)
Transmit priority 4
InPkts: 3153520, OutPkts: 277787, InBytes: 402748610, OutBytes: 191349235
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast: 211151, OutFast: 0, InAS: 0, OutAS: 0
InPktDrops: 0, OutPktDrops: 17
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0
OAM cells received: 0
OAM cells sent: 0
Status: UP

```

To display information about the traffic over a particular VC, use the **show atm vc** command with the following syntax:

```
show atm vc traffic interface atm slot/subslot/port vpi vci
```

```

Router# show atm vc traffic interface atm 1/0/1 1 101

Interface      VPI  VCI  Type      rx-cell-cn   tx-cell-cn
ATM1/0/1       1    101  PVC       9345         7231

```

Displaying Information About PVCs

Use the **show atm pvc** command to provide information about the PVCs that are currently configured on the switch. To display all PVCs that are currently configured on the switch's ATM interfaces and subinterfaces, use the **show atm pvc** command:

```

Router# show atm pvc

Interface      VCD /      Peak  Avg/Min  Burst
Interface Name  VPI  VCI  Type  Encaps  SC  Kbps  Kbps  Cells  Sts
2/1/0         1          2   32  PVC  SNAP   UBR    0          UP
2/1/0.1       0          0   33  PVC  MUX   UBR 599040    UP
2/1/0.2       2          0   34  PVC  MUX   UBR 599040    INAC
2/1/0.3       3          0   35  PVC  MUX   UBR 599040    INAC
2/1/0.4       4          0   36  PVC  MUX   UBR 599040    INAC
2/1/1.1       0          0   33  PVC  MUX   UBR 599040    UP
2/1/1.2       2          0   34  PVC  MUX   UBR 599040    INAC
2/1/1.3       3          0   35  PVC  MUX   UBR 599040    INAC
2/1/1.4       4          0   36  PVC  MUX   UBR 599040    INAC

```



Tip

To display all PVCs on a particular ATM interface or subinterface, use the **show atm pvc interface atm** command.

To display detailed information about a particular PVC, specify its VPI/VCI values:

```
Router# show atm pvc 1/100

ATM3/0/0: VCD: 1, VPI: 1, VCI: 100
UBR, PeakRate: 149760
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0
OAM frequency: 0 second(s), OAM retry frequency: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Disabled
OAM VC status: Not Managed
ILMI VC status: Not Managed
InARP frequency: 15 minutes(s)
Transmit priority 6
InPkts: 94964567, OutPkts: 95069747, InBytes: 833119350, OutBytes: 838799016
InPProc: 1, OutPProc: 1, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 94964566, OutAS: 95069746
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0, LengthViolation: 0, CPISerialErrors: 0
Out CLP=1 Pkts: 0
OAM cells received: 0
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 0
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutRDI: 0
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
OAM cell drops: 0
Status: UP

VC 1/100 doesn't exist on 7 of 8 ATM interface(s)
```

Displaying Information About SVCs

Use the **show atm vc** and **show atm ilmi-status** commands to provide information about the SVCs that are currently configured on the switch. To display all SVCs that are currently configured on the switch's ATM interfaces and subinterfaces, use the **show atm svc** command:

```
Router# show atm svc

Interface      VCD /      VPI  VCI  Type  Encaps  SC  Peak  Avg/Min  Burst  Sts
              Name
4/0/0          1           0    5   SVC   SAAL    UBR 155000      Kbps  Cells  UP
4/0/2          4           0    35  SVC   SNAP    UBR 155000      Kbps  Cells  UP
4/1/0          16          0    47  SVC   SNAP    UBR 155000      Kbps  Cells  UP
4/1/0.1        593         0    80  SVC   SNAP    UBR 599040      Kbps  Cells  UP
```



Tip

To display all SVCs on a particular ATM interface or subinterface, use the **show atm svc interface atm** command.

To display detailed information about a particular SVC, specify its VPI/VCI values:

```
Router# show atm svc 0/35

ATM5/1/0.200: VCD: 3384, VPI: 0, VCI: 35, Connection Name: SVC00
UBR, PeakRate: 155000
AAL5-MUX, etype:0x800, Flags: 0x44, VCmode: 0x0
OAM frequency: 10 second(s), OAM retry frequency: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Received
OAM VC status: Verified
ILMI VC status: Not Managed
```

```

VC is managed by OAM.
InARP DISABLED
Transmit priority 6
InPkts: 0, OutPkts: 4, InBytes: 0, OutBytes: 400
InPRoc: 0, OutPRoc: 4, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0, LengthViolation: 0, CPiErrors: 0
Out CLP=1 Pkts: 0
OAM cells received: 10
F5 InEndloop: 10, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 10
F5 OutEndloop: 10, F5 OutSegloop: 0, F5 OutRDI: 0
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
OAM cell drops: 0
Status: UP
TTL: 4
interface = ATM5/1/0.200, call locally initiated, call reference = 8094273
vcnum = 3384, vpi = 0, vci = 35, state = Active(U10)
, point-to-point call
Retry count: Current = 0
timer currently inactive, timer value = 00:00:00
Remote Atm Nsap address: 47.00918100000000107B2B4B01.111155550001.00
, VC owner: ATM_OWNER_SMAP

```

To display information about the ILMI status and NSAP addresses being used for the SVCs on an ATM interface, use the **show atm ilmi-status** command:

```

Router# show atm ilmi-status atm 4/1/0

Interface : ATM4/1/0 Interface Type : Private UNI (User-side)
ILMI VCC : (0, 16) ILMI Keepalive : Enabled/Up (5 Sec 4 Retries)
ILMI State:      UpAndNormal
Peer IP Addr:    10.10.13.1      Peer IF Name:    ATM 3/0/3
Peer MaxVPIbits: 8              Peer MaxVCiBits: 14
Active Prefix(s) :
47.0091.8100.0000.0010.11b8.c601
End-System Registered Address(s) :
47.0091.8100.0000.0010.11b8.c601.2222.2222.2222.22(Confirmed)
47.0091.8100.0000.0010.11b8.c601.aaaa.aaaa.aaaa.aa(Confirmed)

```



Tip

To display information about the SVC signaling PVC and ILMI PVC, use the **show atm pvc 0/5** and **show atm pvc 0/16** commands.

Displaying Information About Layer 2/Layer 3 Mappings

To display the mapping between the mappings between virtual circuits and Layer 3 IP addresses, use the **show atm map** command:

```

Router# show atm map

Map list ATM3/1/0.100_ATM_INARP : DYNAMIC
ip 10.11.11.2 maps to VC 19, VPI 2, VCI 100, ATM3/1/0.100
ip 10.11.11.1 maps to VC 4, VPI 0, VCI 60, ATM3/1/0.102
ip 10.11.13.4 maps to VC 1, VPI 5, VCI 33, ATM3/1/0
ip 10.10.9.20 maps to bundle vc-group1, 0/32, 0/33, 0/34, ATM3/1/0.1, broadcast

Map list ATM3/1/1.200_ATM_INARP : DYNAMIC
ip 10.2.3.2 maps to VC 20, VPI 2, VCI 200, ATM1/1/0.200
ip 10.2.3.10 maps to bundle vc-group2, 0/32, 0/33, 0/34, ATM3/1/1.1, broadcast

```

```

Map list ATM4/0/3.95_pvc1 : PERMANENT
ip 10.4.4.4 maps to NSAP CD.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12, broadcast,
aal5mux, multipoint connection up, VC 6
ip 10.4.4.6 maps to NSAP DE.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12, broadcast,
aal5mux, connection up, VC 15, multipoint connection up, VC 6
ip 10.4.4.16 maps to VC 1, VPI 13, VCI 95, ATM4/0/3.95, aal5mux

```

Displaying Information About ATM Traffic

To display general information about the traffic over the ATM interfaces, use the **show atm traffic** command:

```

Router# show atm traffic

276875 Input packets
272965 Output packets
2 Broadcast packets
0 Packets received on non-existent VC
6 Packets attempted to send on non-existent VC
272523 OAM cells received
F5 InEndloop: 272523, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
272963 OAM cells sent
F5 OutEndloop: 272963, F5 OutSegloop: 0, F5 OutRDI: 0
0 OAM cell drops

```

To display information about traffic shaping on the ATM interfaces in a particular slot, use the **show atm traffic shaping slot** command:

```

Router# show atm traffic shaping slot 3

Traffic Shaping CAM State : ACTIVE
Shaper Configuration Status :
  Shapers In Use By Config : 3, Shapers Available for Config : 3
Shaper Status in Hardware :
  Shaper 0 : In Use - Port : 0/0/0  Class : best-effort
  Shaper 1 : Not In Use
  Shaper 2 : Not In Use
  Shaper 3 : Not In Use
Statistics :
  Total cell discards : 0, clp0 discards : 0,  clp1 discards : 0
  Free cell buffers : 262143
  Total cells queued : 0

```



Tip

You can also use the **show atm vc traffic** command to display traffic information for a particular VC.

Displaying Information About VLAN Mappings

To display the mappings of VLAN IDs to VCs, use the **show atm vlan** command:

```

Router# show atm vlan

      VCD      VLAN-ID
-----
101         1
102         2
103         3
104         4
105         5
106         6

```

```

107      7
108      8
109      9
110     10
111     11
112     12
113     13
114     14
115     15
116     16
117     17
118     18
119     19
120     20
121     21
122     22
...
800     11
801     11
802     11
803     11
804     326
805     326
806     326
807     326
808     327
809     327
810     327
811     327

```

**Tip**

To display the ports being used by a VLAN, use the **show vlan id** command.

Displaying Information About VC Bundles

To display the relationship between a particular VC and its parent VC class, including the parameters that were inherited from the class and those that were set manually, use the **show atm class-link** command:

```
Router# show atm class-links 0/66
```

```

Displaying vc-class inheritance for ATM2/0.3, vc 0/66:
broadcast - VC-class configured on main-interface
encapsulation aal5mux ip - VC-class configured on subinterface
no ilmi manage - Not configured - using default
oam-pvc manage 3 - VC-class configured on vc
oam retry 3 5 1 - Not configured - using default
ubr 10000 - Configured on vc directly

```

Displaying Information About Automatic Protection Switching

When you have configured automatic protection switching (APS) on one or more switch, you can show the current APS configuration and status with the **show aps** command, which has the following syntax:

```
show aps [atm interface | controller | group [number] ]
```

You can display information about the overall APS configuration and about the specific APS groups that include interfaces that are present in the switch.

Displaying the Current APS Status

The **show aps** command, without any options, displays information for all interfaces in the switch that are configured as Working or Protect APS interfaces. The following shows sample output for a switch with one Working interface and one Protect interface:

```
Router# show aps

ATM4/0/1 APS Group 1: protect channel 0 (inactive)
  bidirectional, revertive (2 min)
  PGP timers (default): hello time=1; hold time=3
  state:
  authentication = (default)
  PGP versions (native/negotiated): 2/2
  SONET framing; SONET APS signalling by default
  Received K1K2: 0x00 0x05
    No Request (Null)
  Transmitted K1K2: 0x20 0x05
    Reverse Request (protect)
  Working channel 1 at 10.10.10.41 Enabled
  Remote APS configuration: (null)

ATM4/0/0 APS Group 1: working channel 1 (active)
  PGP timers (from protect): hello time=3; hold time=6
  state: Enabled
  authentication = (default)
  PGP versions (native/negotiated): 2/2
  SONET framing; SONET APS signalling by default
  Protect at 10.10.10.41
  Remote APS configuration: (null)
```

The following sample output is for the same interfaces, except that the Working interface has gone down and the Protect interface is now active:

```
Router# show aps

ATM4/0/1 APS Group 1: protect channel 0 (active)
  bidirectional, revertive (2 min)
  PGP timers (default): hello time=1; hold time=3
  state:
  authentication = (default)
  PGP versions (native/negotiated): 2/2
  SONET framing; SONET APS signalling by default
  Received K1K2: 0x00 0x05
    No Request (Null)
  Transmitted K1K2: 0xC1 0x05
    Signal Failure - Low Priority (working)
  Working channel 1 at 10.10.10.41 Disabled SF
  Pending local request(s):
    0xC (, channel(s) 1)
  Remote APS configuration: (null)

ATM4/0/0 APS Group 1: working channel 1 (Interface down)
  PGP timers (from protect): hello time=3; hold time=6
  state: Disabled
  authentication = (default)
  PGP versions (native/negotiated): 2/2
  SONET framing; SONET APS signalling by default
  Protect at 10.10.10.41
  Remote APS configuration: (null)
```

**Tip**

To display the same information for a specific ATM interface, use the **show aps atm slot/subslot/port** command.

Displaying Information About APS Groups

To display information about the APS groups that are configured on the switch, use the **show aps group** command. You can display information for all groups or for a single group. For example, the following example shows a typical display for an individual group:

```
Router# show aps group 2

ATM4/0/0 APS Group 2: working channel 1 (active)
  PGP timers (from protect): hello time=3; hold time=6
  SONET framing; SONET APS signalling by default
  Protect at 10.10.10.7
  Remote APS configuration: (null)

ATM4/0/1 APS Group 2: protect channel 0 (inactive)
  bidirectional, revertive (2 min)
  PGP timers (default): hello time=1; hold time=3
  SONET framing; SONET APS signalling by default
  Received K1K2: 0x00 0x05
    No Request (Null)
  Transmitted K1K2: 0x20 0x05
    Reverse Request (protect)
  Working channel 1 at 10.10.10.7 Enabled
  Remote APS configuration: (null)
```

**Note**

In the above example, both the Working and Protect interfaces in the APS group are on the same switch. If the two interfaces are on different switches, the **show aps group** command shows information only for the local interface that is a member of the APS group.

Troubleshooting the ATM Shared Port Adapter

This section describes the following commands and messages that can provide information in troubleshooting the ATM SPA and its interfaces:

- [Understanding Line Coding Errors, page 8-16](#)
- [Using the Ping Command to Verify Network Connectivity, page 8-16](#)
- [Using the Ping Command to Verify Network Connectivity, page 8-16](#)
- [Using Loopback Commands, page 8-17](#)
- [Using ATM Debug Commands, page 8-25](#)
- [Using the Cisco IOS Event Tracer to Troubleshoot Problems, page 8-25](#)

**Tip**

For additional information on troubleshooting specific problems related to PVCs and SVCs, see the TAC tech note web page, at the following URL:

http://www.cisco.com/en/US/tech/tk39/tk48/tech_tech_notes_list.html

Understanding Line Coding Errors

This section provides a brief description of line coding and of the types of errors and alarms that can occur on a line:

- **Alarm Indication Signal (AIS)**—An AIS alarm indicates that an alarm was raised by a device on a line upstream to the ATM interface. Typically, the device creating the alarm is the adjacent network neighbor, but the AIS signal could also be generated by a device in the service provider's ATM cloud.
- **Loss of Frame (LOF)**—An LOF alarm occurs when the local interface is using a framing format that does not match the framing format being used on the line. LOF errors could also occur when the line or a device on the line is generating bit errors that are corrupting frames.
- **Rx Cell HCS Error (HCSE)**—The interface detected an error in the cell's header checksum (HCS) field, which indicates that one or more header bits were corrupted. (This field does not indicate whether any errors occurred in the cell's 48-bit payload.)
- **Remote Alarm Indication (RAI) and Far-end Receive Failure (FERF)**—An RAI/FERF error indicates that a problem exists between the local ATM interface and the far end, and that the error might not be in the local segment between the local interface and adjacent node.

Using the Ping Command to Verify Network Connectivity

The **ping** command is a convenient way to test the ability of an interface to send and receive packets over the network. The **ping** command sends ICMP echo request packets to a specified destination address, which should send an equal number of ICMP echo reply packets in reply. By measuring the numbering of packets that are successfully returned, as well as how long each packet takes to be returned, you can quickly obtain a rough idea of the Layer 3 to Layer 3 connectivity between two interfaces.

The IP **ping** command has the following syntax:

ping

or

ping ip-address [repeat count] [data hex] [size datagram-size]

If you enter just **ping**, the command interactively prompts you for all other parameters. Otherwise, you must specify at least a specific IP address as the destination for the ping. You can also optionally specify the following parameters:

- **repeat count**—Number of ICMP echo request packets to send. The default is five packets.
- **data hex**—The data pattern, in hexadecimal, to be sent in the ICMP echo request packets.
- **size datagram-size**—Specifies the size, in bytes, of the ICMP echo request packets to be sent. The range is 40 to 18024 bytes, with a default of 100 bytes.

Examples

The following shows a typical example of the **ping** command:

```
Router# ping 10.10.10.10
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echoes to 10.10.10.10, timeout is 2 seconds:
```

```
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/64 ms
```

**Note**

You must have at least one PVC or SVC defined on an ATM interface before it can respond to an ICMP ping packet.

Using Loopback Commands

The **loopback** commands place an interface in loopback mode, which enables you to use the **ping** command to send packets through the local interface and line, so as to test connectivity. These commands are especially useful when an interface is experiencing a high number of cyclic redundancy check (CRC) errors, so that you can pinpoint where the errors are occurring.

Use the following procedures to perform the different loopback tests:

- [Using loopback diagnostic to Create a Local Loopback, page 8-17](#)
- [Using loopback line, page 8-21](#)

**Tip**

For more information about using loopbacks to troubleshoot CRC errors on an interface, see the *CRC Troubleshooting Guide for ATM Interfaces* tech note, at the following URL:

http://www.cisco.com/en/US/tech/tk39/tk48/technologies_tech_note09186a00800c93ef.shtml

Using loopback diagnostic to Create a Local Loopback

To perform a local loopback test, in which the transmit data is looped back to the receive data at the physical (PHY) layer, use the **loopback diagnostic** command on an ATM interface. This loopback tests connectivity on the local ATM interface, verifying that the interface's framing circuitry and segmentation and reassembly (SAR) circuitry is operating correctly. This loopback, however, does not test the interface's optics circuitry and ports.

**Tip**

If an ATM interface is currently connected to another ATM interface and passing traffic, shut down the remote ATM interface before giving the **loopback diagnostic** command on the local ATM interface. Otherwise, the remote interface continues to send traffic to the local interface, and the remote network could also start reporting interface and network errors.

[Figure 8-1](#) shows a router-level diagram of a local loopback. In this example, the device with the ATM SPA is shown as a Cisco 7600 series router, but it can also be a Catalyst 6500 series switch. [Figure 8-2](#) shows a block-level diagram of a local loopback, as it is performed within the ATM interface circuitry.

Figure 8-1 Performing a Local Loopback—Router Level

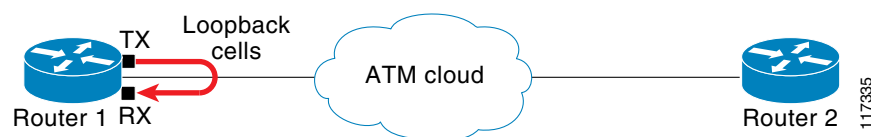
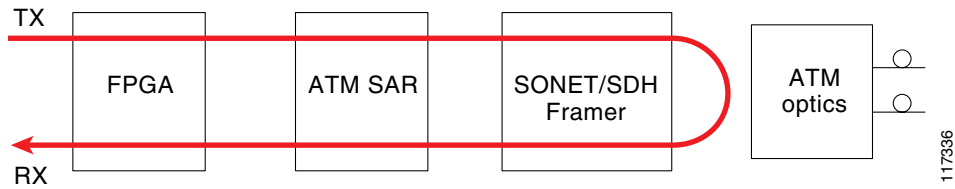


Figure 8-2 Performing a Local Loopback—Block Level



To configure a local loopback diagnostic test, perform the following task:

	Command	Purpose
Step 1	Router# configure terminal	Enters global configuration mode.
Step 2	Router(config)# interface atm slot/subslot/port	Enters interface configuration mode for the indicated port on the specified ATM SPA card.
Step 3	Router(config-if)# loopback diagnostic	Puts the ATM interface into the local loopback mode, so that data that is transmitted out the interface is internally routed back into the receive data line.
Step 4	Router(config-if)# atm clock internal	Specifies that the ATM interface should derive its clocking from its local oscillator, which is required, because the loopback command isolates the interface from the network and from the clocking signals that are derived from the network line.
Step 5	Router(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.
Step 6	Router# show interface atm slot/subslot/port	(Optional) Verifies that the interface has been configured for loopback mode. The output should show the words “loopback set” when the interface is operating in loopback mode.
Step 7	Router# debug atm packet interface atm slot/subslot/port	(Optional) Enables packet debugging on the ATM interface. Note This command generates several lines of debug output for each packet transmitted and received on the interface. Do not use it on a live network, or you could force the processor to 100% utilization.

	Command	Purpose
Step 8	Router(config-if)# ping <i>ip-address</i> [repeat count] [data hex] [size datagram-size]	<p>Sends an ICMP echo request packet to the specified IP address.</p> <ul style="list-style-type: none"> • <i>ip-address</i>—Destination IP address for the ICMP echo request packet. Because the interface has been put into loopback mode, the exact IP address does not matter—any valid IP address can be specified. • repeat count—(Optional) Specifies the number of ICMP echo request packets to be sent. The default is 5. • data hex—(Optional) The data pattern, in hexadecimal, to be sent in the ICMP echo request packets. • size datagram-size—(Optional) Specifies the size, in bytes, of the ICMP echo request packets to be sent. The range is 40 to 18024 bytes, with a default of 100 bytes. <p>Note Because the interface is in loopback mode, the ping command will report that it failed. This is to be expected.</p>
Step 9	Router# show interface atm <i>slot/subslot/port</i>	<p>Displays interface statistics, including whether any CRC or other errors occurred during the ping test. For example:</p> <pre>Router# show interface atm 5/0/1 ... Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 5 input errors, 5 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort ... Router#</pre>
Step 10	Router(config)# interface atm <i>slot/subslot/port</i>	Enters interface configuration mode for the indicated port on the specified ATM SPA card.
Step 11	Router(config-if)# no loopback diagnostic	Removes the local loopback and return the ATM interface to normal operations.
Note	Also remember to restore the proper clocking on the local ATM interface and to reenble the remote ATM interface.	

The following sample output shows a local loopback being set with the **loopback diagnostic** command. The **ping** command then sends two PING packets, and the resulting output from the **show interface** command shows that two CRC errors occurred.

```
Router# configure terminal
Router(config)# interface atm 4/1/0
Router(config-if)# loopback diagnostic
Router(config-if)# atm clock internal
Router(config-if)# end
Router# show interface atm 4/1/0

ATM4/1/0 is up, line protocol is up
  Hardware is ATM SPA, address is 000a.f330.2a80 (bia 000a.f330.2a80)
  MTU 4470 bytes, sub MTU 4470, BW 149760 Kbit, DLY 80 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ATM, loopback set
  Encapsulation(s): AAL5
  4095 maximum active VCs, 21 current VCCs
```

```

VC idle disconnect time: 300 seconds
Signalling vc = 1, vpi = 0, vci = 5
    UNI Version = 4.0, Link Side = user
6 carrier transitions
Last input 01:47:05, output 00:00:01, output hang never
Last clearing of "show interface" counters 01:03:35
Input queue: 0/75/33439/80 (size/max/drops/flushes); Total output drops: 963306
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
    9502306 packets input, 6654982829 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicast)
    0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    27827569 packets output, 21072150159 bytes, 0 underruns
    0 output errors, 0 collisions, 3 interface resets
    0 output buffer failures, 0 output buffers swapped out

```

```
Router# debug atm packet interface atm 4/1/0
```

```

ATM packets debugging is on
Displaying packets on interface ATM4/1/0

```

```
Router# ping 10.10.10.10 count 2
```

```

Type escape sequence to abort.
Sending 2, 100-byte ICMP Echos to 10.10.10.10, timeout is 2 seconds:

```

```

1w1d: ATM4/1/0(O):
VCD:0x5 VPI:0x0 VCI:0x55 DM:0x100 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
1w1d: 4500 0064 001A 0000 FF01 B77A 0101 0102 0101 0101 0800 119A 13A2 07C5 0000
1w1d: 0000 2D41 2408 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
1w1d: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
1w1d: ABCD ABCD ABCD ABCD ABCD
1w1d:
1w1d: ATM4/1/0(I):
VCD:0x5 VPI:0x0 VCI:0x55 Type:0x0 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
1w1d: 4500 0064 001A 0000 0101 B57B 0101 0102 0101 0101 0800 119A 13A2 07C5 0000
1w1d: 0000 2D41 2408 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
1w1d: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
1w1d: ABCD ABCD ABCD ABCD ABCD
1w1d: .
1w1d: ATM4/1/0(O):
VCD:0x5 VPI:0x0 VCI:0x55 DM:0x100 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
1w1d: 4500 0064 001B 0000 FF01 B779 0101 0102 0101 0101 0800 09C9 13A3 07C5 0000
1w1d: 0000 2D41 2BD8 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
1w1d: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
1w1d: ABCD ABCD ABCD ABCD ABCD
1w1d:
1w1d: ATM4/1/0(I):
VCD:0x5 VPI:0x0 VCI:0x55 Type:0x0 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
1w1d: 4500 0064 001B 0000 0101 B57A 0101 0102 0101 0101 0800 09C9 13A3 07C5 0000
1w1d: 0000 2D41 2BD8 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
1w1d: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
1w1d: ABCD ABCD ABCD ABCD ABCD
1w1d: .
Success rate is 0 percent (0/2)

```

```
Router# configure terminal
```

```
Router(config)# interface atm 4/1/0
```

```
Router(config-if)# no loopback diagnostic
```

```
Router(config-if)# end
```

```
Router# show interface atm 4/1/0
```

```

ATM4/1/0 is up, line protocol is up
  Hardware is ATM SPA, address is 000a.f330.2a80 (bia 000a.f330.2a80)
  MTU 4470 bytes, sub MTU 4470, BW 149760 Kbit, DLY 80 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ATM, loopback not set
  Encapsulation(s): AAL5
  4095 maximum active VCs, 21 current VCCs
  VC idle disconnect time: 300 seconds
  Signalling vc = 1, vpi = 0, vci = 5
    UNI Version = 4.0, Link Side = user
  6 carrier transitions
  Last input 01:47:05, output 00:00:01, output hang never
  Last clearing of "show interface" counters 01:03:35
  Input queue: 0/75/33439/80 (size/max/drops/flushes); Total output drops: 963306
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    9502306 packets input, 6654982829 bytes, 0 no buffer
  Received 0 broadcasts (0 IP multicast)
    0 runs, 0 giants, 0 throttles
    2 input errors, 2 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  27827569 packets output, 21072150159 bytes, 0 underruns
    0 output errors, 0 collisions, 3 interface resets
    0 output buffer failures, 0 output buffers swapped out

```

Using loopback line

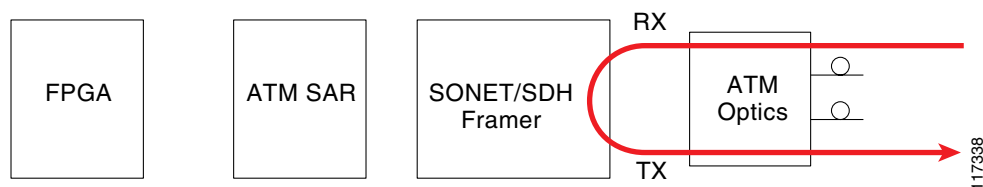
If an ATM interface can perform a local loopback successfully, without reporting errors, you can next try a line loopback (**loopback line** command) to determine if packet errors are being generated by the ATM network between the local and remote router. In a line loopback, the interface on the remote router is configured with the **loopback line** command, so that it reflects every packet that it receives back to the originating router. The local router then generates traffic with the **ping** command to determine whether the line through the network is generating the packet errors.

Figure 8-3 shows a router-level diagram of a line loopback. In this example, the device with the ATM SPA is shown as a Cisco 7600 series router, but it can also be a Catalyst 6500 series switch. Figure 8-4 shows a block-level diagram of a line loopback, as it is performed within the ATM interface circuitry.

Figure 8-3 Performing a Local Loopback—Router Level



Figure 8-4 Performing a Line Loopback—Block Level



To configure a line loopback test, perform the following task.

	Command	Purpose
	Perform the following steps on the remote router:	
Step 1	Router# configure terminal	Enters global configuration mode.
Step 2	Router(config)# interface atm slot/subslot/port	Enters interface configuration mode for the indicated port on the specified ATM SPA card.
Step 3	Router(config-if)# loopback line	Puts the ATM interface into the line loopback mode, so that it reflects any data it receives back to the originator.
Step 4	Router(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.
Step 5	Router# show interface atm slot/subslot/port	(Optional) Verifies that the interface has been configured for loopback mode. The output should show the words “loopback set” when the interface is operating in loopback mode.
	Perform the following steps on the local router:	
Step 1	Router# debug atm packet interface atm slot/subslot/port	(Optional) Enables packet debugging on the ATM interface. Note This command generates several lines of debug output for each packet transmitted and received on the interface. Do not use it on a live network, or you could force the processor to 100% utilization.
Step 2	Router(config-if)# ping ip-address [repeat count] [data hex] [size datagram-size]	Sends an ICMP echo request packet to the specified IP address. <ul style="list-style-type: none"> • <i>ip-address</i>—Destination IP address for the ICMP echo request packet. Because the interface has been put into loopback mode, the exact IP address does not matter—any valid IP address can be specified. • repeat count—(Optional) Specifies the number of ICMP echo request packets to be sent. The default is 5. • data hex—(Optional) The data pattern, in hexadecimal, to be sent in the ICMP echo request packets. The default is 0x0000. • size datagram-size—(Optional) Specifies the size, in bytes, of the ICMP echo request packets to be sent. The range is 40 to 18024 bytes, with a default of 100 bytes. Note Because the interface is in loopback mode, the ping command will report that it failed. This is to be expected.
Step 3	Router(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

Command	Purpose
Step 4	<pre>Router# show interface atm slot/subslot/port</pre> <p>Displays interface statistics, including whether any CRC or other errors during the ping test. For example:</p> <pre>Router# show interface atm 5/0/1 ... Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 5 input errors, 5 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort ... Router#</pre>

Note Also remember to remove the loopback mode on the remote ATM interface, using the **no loopback line** command.

The following example shows typical output when performing a line loopback. The following is the output on the remote router:

```
Router# configure terminal
Router(config)# interface atm 3/1/2
Router(config)# loopback line
Router(config)# end
Router# show interface atm 3/1/2

ATM3/1/2 is up, line protocol is up
  Hardware is ATM SPA, address is 000a.330e.2b08 (bia 000a.330e.2b08)
  MTU 4470 bytes, sub MTU 4470, BW 149760 Kbit, DLY 80 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ATM, loopback set
  Encapsulation(s): AAL5
  4095 maximum active VCs, 103 current VCCs
  VC idle disconnect time: 300 seconds
  Signalling vc = 1, vpi = 0, vci = 5
    UNI Version = 4.0, Link Side = user
  6 carrier transitions
  Last input 00:00:02, output 00:00:01, output hang never
  Last clearing of "show interface" counters 01:03:35
  Input queue: 0/75/13/80 (size/max/drops/flushes); Total output drops: 37
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    932603 packets input, 6798282 bytes, 0 no buffer
    Received 0 broadcasts (0 IP multicast)
    0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    387275 packets output, 371031501 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
```

On the Local Router

Perform the following on the local router:

```
Router# debug atm packet interface atm 4/0/0
ATM packets debugging is on
Displaying packets on interface ATM4/0/0

Router# ping 192.168.100.13 repeat 2 size 128

Type escape sequence to abort.
Sending 2, 128-byte ICMP Echos to 192.168.100.13, timeout is 2 seconds:
```

```

..
Success rate is 0 percent (0/2)

00:52:00: ATM4/0/0(O):
VCD:0x1 VPI:0x0 VCI:0x55 DM:0x100 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
00:52:00: 4500 0064 000F 0000 FF01 B785 0101 0102 0101 0101 0800 CE44 121D 0009 0000
00:52:00: 0000 002F 9DB0 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD
00:52:00:
00:52:00: ATM4/0/0(I):
VCD:0x1 VPI:0x0 VCI:0x55 Type:0x0 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
00:52:00: 4500 0064 000F 0000 0101 B586 0101 0102 0101 0101 0800 CE44 121D 0009 0000
00:52:00: 0000 002F 9DB0 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD
00:52:00:
00:52:02: ATM4/0/0(O):
VCD:0x1 VPI:0x0 VCI:0x55 DM:0x100 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
00:52:02: 4500 0064 0010 0000 FF01 B784 0101 0102 0101 0101 0800 C673 121E 0009 0000
00:52:02: 0000 002F A580 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:02: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD
00:52:02:
00:52:02: ATM4/0/0(I):
VCD:0x1 VPI:0x0 VCI:0x55 Type:0x0 SAP:AAAA CTL:03 OUI:000000 TYPE:0800 Length:0x70
00:52:02: 4500 0064 0010 0000 0101 B585 0101 0102 0101 0101 0800 C673 121E 0009 0000
00:52:02: 0000 002F A580 ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:02: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD ABCD
00:52:00: ABCD ABCD ABCD ABCD

```

```
Router# show interface atm 4/0/0
```

```

ATM4/0/0 is up, line protocol is up
Hardware is ATM SPA, address is 000a.12f0.80b1 (bia 000a.12f0.80b1)
MTU 4470 bytes, sub MTU 4470, BW 149760 Kbit, DLY 80 usec,
    reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ATM, loopback not set
Encapsulation(s): AAL5
4095 maximum active VCs, 103 current VCCs
VC idle disconnect time: 300 seconds
Signalling vc = 1, vpi = 0, vci = 5
    UNI Version = 4.0, Link Side = user
6 carrier transitions
Last input 00:00:02, output 00:00:01, output hang never
Last clearing of "show interface" counters 01:03:35
Input queue: 0/75/13/80 (size/max/drops/flushes); Total output drops: 37
Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
    5 minute input rate 0 bits/sec, 0 packets/sec
    5 minute output rate 0 bits/sec, 0 packets/sec
    94917 packets input, 1638383 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 2 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    102898 packets output, 2042785 bytes, 0 underruns
    0 output errors, 0 collisions, 5 interface resets
    0 output buffer failures, 0 output buffers swapped out

```

Using ATM Debug Commands

The following debug commands can be useful when troubleshooting problems on an ATM interface or subinterface:

- **debug atm bundle errors**—Displays information about VC bundle errors.
- **debug atm bundle events**—Displays information about events related to the configuration and operation of VC bundles, such as VC bumping, when bundles are brought up, when they are taken down, and so forth.
- **debug atm errors**—Displays errors that occur on an ATM interface, such as encapsulation and framing errors, as well as any errors that might occur during configuration of the ATM interfaces.
- **debug atm events**—Displays information about events that occur on the ATM interfaces, such as changes to the ATM SPA and ATM interface configuration, card and interface resets, and PVC or SVC creation.

**Note**

The output of **debug atm events** can be extremely verbose and can cause problems if large numbers of ATM VCs are configured. The command should only be used when a few VCs are configured.

- **debug atm oam**—Displays the contents of ATM operation and maintenance (OAM) cells as they arrive from the ATM network.
- **debug atm packet**—Displays a hexadecimal dump of each packet's SNAP/NLPID/SMDS header, followed by the first 40 bytes of the packet.

**Tip**

Use the **no debug all** command to turn off all debugging displays.

For more information about these commands, see the [Cisco IOS Debug Command Reference, Release 12.2](#).

Using the Cisco IOS Event Tracer to Troubleshoot Problems

**Note**

This feature is intended for use as a software diagnostic tool and should be configured only under the direction of a Cisco Technical Assistance Center (TAC) representative.

The Event Tracer feature provides a binary trace facility for troubleshooting Cisco IOS software. This feature gives Cisco service representatives additional insight into the operation of the Cisco IOS software and can be useful in helping to diagnose problems in the unlikely event of an operating system malfunction or, in the case of redundant systems, Route Processor switchover.

Event tracing works by reading informational messages from specific Cisco IOS software subsystem components that have been preprogrammed to work with event tracing, and by logging messages from those components into system memory. Trace messages stored in memory can be displayed on the screen or saved to a file for later analysis.

The SPAs currently support the “spa” component to trace SPA OIR-related events.

For more information about using the Event Tracer feature, refer to the following URL:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_event_tracer_ps6441_TSD_Products_Configuration_Guide_Chapter.html

Preparing for Online Insertion and Removal of a SPA

The Catalyst 6500 Series switch supports online insertion and removal (OIR) of the SIP, in addition to each of the SPAs. Therefore, you can remove a SIP with its SPAs still intact, or you can remove a SPA independently from the SIP, leaving the SIP installed in the switch.

This means that a SIP can remain installed in the switch with one SPA remaining active, while you remove another SPA from one of the SIP subslots. If you are not planning to immediately replace a SPA into the SIP, then be sure to install a blank filler plate in the subslot. The SIP should always be fully installed with either functional SPAs or blank filler plates.

For more information about activating and deactivating SPAs in preparation for OIR, see the “Preparing for Online Insertion and Removal of SIPs and SPAs” topic in the “Troubleshooting a SIP” chapter in this guide.