

Chapter 11

Use Loopback Testing for ATM Interfaces

This chapter describes the steps for using loopback testing to isolate Asynchronous Transfer Mode (ATM) interface problems. The steps for loopback testing apply to both ATM1 and ATM2 intelligent queuing (IQ) interfaces. (See Table 21.)

Table 21: Checklist for Using Loopback Testing for ATM Interfaces

| ATM Interface Loopback Testing Tasks | Command or Action |
|--|---|
| Diagnose a Suspected Hardware Problem with an ATM1 or ATM2 IQ Interface on page 106 | |
| 1. Create a Loopback on page 106 | |
| a. Create a Physical Loopback on page 106 | Connect the transmit port to the receive port. |
| b. Configure a Local Loopback on page 107 | [edit interfaces <i>interface-name</i> (sonet-options t3-options)] set loopback local show commit |
| 2. Set Clocking to Internal on page 108 | |
| | [edit interfaces <i>interface-name</i>] set clocking internal show commit |
| 3. Verify That the ATM Interface Is Up on page 109 | |
| | show interfaces at- <i>fpc/port/pic</i> |
| 4. Clear ATM Interface Statistics on page 111 | |
| | clear interfaces statistics at- <i>fpc/port/pic</i> |
| 5. Ping the ATM Interface on page 112 | |
| | ping interface at- <i>fpc/port/pic</i> <i>local-IP-address</i> bypass-routing count 1000 rapid |
| 6. Check for ATM Interface Error Statistics on page 112 | |
| | show interfaces at- <i>fpc/port/pic</i> extensive |
| Diagnose a Suspected Circuit Problem on page 116 | |
| 1. Create a Loop from the Router to the Network on page 116 | |
| | [edit interfaces <i>interface-name</i> (sonet-options t3-options)] set loopback remote show commit |
| 2. Create a Loop to the Router from Various Points in the Network on page 117 | |
| | Perform Steps 2 through 6 from “Diagnose a Suspected Hardware Problem with an ATM1 or ATM2 IQ Interface” on page 106. |

Diagnose a Suspected Hardware Problem with an ATM1 or ATM2 IQ Interface

Purpose When you suspect a hardware problem, perform the following steps to verify if there is a hardware problem.

Steps To Take To diagnose a suspected hardware problem with an ATM1 or ATM2 IQ interface, follow these steps:

1. Create a Loopback on page 106
2. Set Clocking to Internal on page 108
3. Verify That the ATM Interface Is Up on page 109
4. Clear ATM Interface Statistics on page 111
5. Ping the ATM Interface on page 112
6. Check for ATM Interface Error Statistics on page 112

Step 1: Create a Loopback

Purpose You can create a physical loopback or configure a local loopback to help diagnose a suspected hardware problem. Creating a physical loopback is recommended because it allows you to test and verify the transmit and receive ports.

If a field engineer is not available to create the physical loopback, you can configure a local loopback for the interface. The local loopback creates a loopback internally in the Physical Interface Card (PIC).

Create a Physical Loopback

Action To create a physical loopback at the port, connect the transmit port to the receive port using a known good cable.



NOTE: Make sure you use single-mode fiber for a single-mode port and multimode fiber for a multimode port for SONET media.

What It Means When you create and test a physical loopback, you are testing the transmit and receive ports of the PIC. This action is recommended if a field engineer is available to create the physical loop as it provides a more complete test of the PIC.

Configure a Local Loopback

Purpose Because ATM interfaces can be either SONET or T3, you use the `sonet-options` or `t3-options` statements to configure a local loopback. Figure 9 illustrates a local loopback configured for an ATM interface.

Figure 9: Local Loopback



Action To configure a local loopback without physically connecting the transmit port to the receive port, follow these steps:

1. In configuration mode, go to the following hierarchy level:

```
[edit]
user@host# edit interfaces interface-name (sonet-options | t3-options)
```

2. Configure the loopback:

```
[edit interfaces interface-name (sonet-options | t3-options)]
user@host# set loopback local
```

3. Verify the configuration:

```
user@host# show
```

For example:

```
[edit interfaces (t3-1/0/0 t3-options)]
user@host# show
loopback local;
```

4. Commit the change:

```
user@host# commit
```

For example:

```
[edit interfaces t3-1/0/0 t3-options]
user@host# commit
commit complete
```

What It Means When you create a local loopback, you create an internal loop on the interface being tested. A local loopback loops the traffic internally on that PIC. A local loopback tests the interconnection of the PIC but does not test the transmit and receive ports.



NOTE: Remember to delete the loopback statement after completing the test.

Step 2: Set Clocking to Internal

Purpose Clocking is set to internal because there is no external clock source in a loopback connection.

Action To configure clocking to internal, follow these steps:

1. In configuration mode, go to the following hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the clocking to internal:

```
user@host# set clocking internal
```

3. Verify the configuration:

```
user@host# show
```

For example:

```
[edit interfaces t3-1/0/0]
user@host# show
clocking internal;
```

4. Commit the change:

```
user@host# commit
```

For example:

```
[edit interfaces t3-1/0/0]
user@host# commit
commit complete
```

What It Means The clock source for the interface is set to the internal Stratum 3 clock.

Step 3: Verify That the ATM Interface Is Up

Purpose Displaying the status of the ATM interface provides the information you need to determine whether the physical link is up or down.

Action To verify that the status of the ATM interface is up, use the following JUNOS CLI operational mode command:

```
user@host> show interfaces at-fpc/pic/port
```

Sample Output 1 The following sample output is for an OC-3 ATM interface:

```
user@host> show interfaces at-2/0/0
Physical interface: at-2/0/0, Enabled, Physical link is Up
  Interface index: 22, SNMP ifIndex: 42
  Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode, Speed: OC3, Loopback: Local, Payload
  scrambler: Enabled
Device flags : Present Running
  Link flags   : None
  Input rate   : 0 bps (0 pps)
  Output rate  : 0 bps (0 pps)
SONET alarms : None
SONET defects : None

Logical interface at-2/0/0.0 (Index 29) (SNMP ifIndex 49)
  Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
  Input packets : 0
  Output packets: 0
  Protocol inet, MTU: 4470, Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 192.168.1.0/30, Local: 192.168.1.1
  VCI 1.100
    Flags: Active
    Total down time: 0 sec, Last down: Never
  Traffic statistics:
    Input packets:      0
    Output packets:    0
```

Sample Output 2 The following sample output is for a T3 ATM interface:

```
user@host> show interfaces at-0/1/0
Physical interface: at-0/1/0, Enabled, Physical link is Up
  Interface index: 90, SNMP ifIndex: 18
  Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, Speed: T3, Loopback: None, Payload scrambler: Enabled,
  Mode: C/Bit parity, Line buildout: 10, ATM Encapsulation: PLCP
Device flags : Present Running
  Link flags   : None
  Current address: 00:90:69:0c:c0:1f
  Last flapped  : 2002-08-14 16:25:07 UTC (00:00:42 ago)
  Input rate   : 0 bps (0 pps)
  Output rate  : 0 bps (0 pps)
Active alarms : None
Active defects : None
```

Sample Output 3 The following sample output is for an OC-3 ATM interface:

```

user@host> show interfaces at-2/0/1
Physical interface: at-2/0/1, Enabled, Physical link is Down
Interface index: 23, SNMP ifIndex: 43
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, SONET mode, Speed: OC3, Loopback: None, Payload
scrambler: Enabled
Device flags : Present Running Down
Link flags : None
Input rate : 0 bps (0 pps)
Output rate : 0 bps (0 pps)
SONET alarms : LOL, LOS
SONET defects : LOL, LOF, LOS, SEF, AIS-L, AIS-P, RDI-P, PLM-P

Logical interface at-2/0/1.10 (Index 30) (SNMP ifIndex 65)
Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
Input packets : 0
Output packets: 0
Protocol inet, MTU: 4470, Flags: None
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 192.168.100.0/30, Local: 192.168.100.1
VCI 2.100
Flags: Active
Total down time: 0 sec, Last down: Never
Traffic statistics:
Input packets:          0
Output packets:         0

```

Sample Output 4 The following sample output is for a T3 ATM interface:

```

user@host> show interfaces at-0/1/0
Physical interface: at-0/1/0, Enabled, Physical link is Down
Interface index: 90, SNMP ifIndex: 18
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, Speed: T3, Loopback: None, Payload scrambler: Enabled,
Mode: C/Bit parity, Line buildout: 10, ATM Encapsulation: PLCP
Device flags : Present Running Down
Link flags : None
Current address: 00:90:69:0c:c0:1f
Last flapped : 2002-08-09 11:36:15 UTC (5d 04:14 ago)
Input rate : 0 bps (0 pps)
Output rate : 0 bps (0 pps)
Active alarms : PLL, LOF, LOS
Active defects : PLL, LOF, LOS

```

What It Means Sample output 1 shows that the physical link is up and there are no SONET alarms or defects.

Sample output 2 shows that the physical link is up and there are no active alarms or defects.

Sample output 3 shows that the physical link, the device flags, and interface flags are down, and that there are SONET alarms and defects. When you see that the physical link is down, there may be a problem with the port.

Sample output 4 shows that the physical link, the device flags, and interface flags are down, and that there are active alarms and defects. When you see that the physical link is down, there may be a problem with the port.

For more information about problem situations and actions to take for a physical link that is down, see Table 22.

Table 22: Problems and Solutions for a Physical Link That Is Down

| Problem | Actions |
|--|--|
| Cable mismatch | Verify that the cable connection is correct. |
| Damaged fiber or coax cable or dirty fiber cable | Verify that the cable can successfully loop a known good port of the same type. |
| Too much or too little optical attenuation (for an OC-3 or OC-12 ATM interface) | Verify that the attenuation is correct per the PIC optical specification. |
| The transmit port is not transmitting within the dBm optical range per the specifications (for an OC-3 or OC-12 ATM interface) | Verify that the Tx power of the optics is within range of the PIC optical specification. |

Step 4: Clear ATM Interface Statistics

Purpose You must reset ATM interface statistics before you initiate the ping test. Resetting the statistics provides a clean start so that previous input or output errors and packet statistics do not interfere with the current investigation.

Action To clear all statistics for the interface, use the following JUNOS CLI operational mode command:

```
user@host> clear interfaces statistics at-fpc/pic/port
```

Sample Output

```
user@host> clear interfaces statistics at-4/0/2
user@host>
```

What It Means This command clears the interface statistics counters for interface at-4/0/2 only.


```

SONET PHY:      Seconds   Count State
PLL Lock       0         0 OK
PHY Light      0         0 OK
SONET section:
BIP-B1         0         0
SEF            0         0 OK
LOS            0         0 OK
LOF            0         0 OK
ES-S          0
SES-S         0
SEFS-S        0
SONET line:
BIP-B2         0         0
REI-L          0         0
RDI-L          0         0 OK
AIS-L          0         0 OK
BERR-SF        0         0 OK
BERR-SD        0         0 OK
ES-L           0
SES-L          0
UAS-L          0
ES-LFE         0
SES-LFE        0
UAS-LFE        0
SONET path:
BIP-B3         0         0
REI-P          0         0
LOP-P          0         0 OK
AIS-P          0         0 OK
RDI-P          0         0 OK
UNEQ-P         0         0 OK
PLM-P          0         0 OK
ES-P           0
SES-P          0
UAS-P          0
ES-PFE         0
SES-PFE        0
UAS-PFE        0

```

Received SONET overhead:

```

F1 : 0x00, J0 : 0x00, K1 : 0x00, K2 : 0x00
S1 : 0x00, C2 : 0x13, C2(cmp) : 0x13, F2 : 0x00
Z3 : 0x00, Z4 : 0x00, S1(cmp) : 0x00, V5 : 0x00
V5(cmp) : 0x00

```

Transmitted SONET overhead:

```

F1 : 0x00, J0 : 0x01, K1 : 0x00, K2 : 0x00
S1 : 0x00, C2 : 0x13, F2 : 0x00, Z3 : 0x00
Z4 : 0x00, V5 : 0x00

```

ATM status:

```

HCS state: Sync
LOC : OK

```

ATM Statistics:

```

Uncorrectable HCS errors: 0, Correctable HCS errors: 0, Tx cell FIFO overruns: 0, Rx cell FIFO overruns: 0,
Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 8830024, Output idle cell count: 8830026,
Output VC queue drops: 0, Input no buffers: 0, Input length errors: 0, Input timeouts: 0, Input invalid VCs: 0,
Input bad CRCs: 0, Input OAM cell no buffers: 0

```

PFE configuration:

Destination slot: 2

| CoS transmit queue | Bandwidth | | Buffer | Priority | Limit |
|------------------------|-----------|-----|--------|----------|-------|
| | % | bps | | | |
| 0 best-effort | 0 | 0 0 | 0 | low | none |
| 1 expedited-forwarding | 0 | 0 0 | 0 | low | none |
| 2 assured-forwarding | 0 | 0 0 | 0 | low | none |
| 3 network-control | 0 | 0 0 | 0 | low | none |

```

Logical interface at-2/0/0.0 (Index 29) (SNMP ifIndex 49) (Generation 28)
Flags: Point-To-Point SNMP-Traps Encapsulation: ATM-SNAP
Traffic statistics:
Input bytes :          0
Output bytes :         0
Input packets:         0
Output packets:        0
Local statistics:
Input bytes :          0
Output bytes :         0
Input packets:         0
Output packets:        0
Transit statistics:
Input bytes :          0          0 bps
Output bytes :         0          0 bps
Input packets:         0          0 pps
Output packets:        0          0 pps
Protocol inet, MTU: 4470, Flags: None, Generation: 31 Route table: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: 192.168.1.0/30, Local: 192.168.1.1, Broadcast: Unspecified, Generation: 59
VCI 1.100
Flags: Active
Total down time: 0 sec, Last down: Never
ATM per-VC transmit statistics:
Tail queue packet drops: 0
Traffic statistics:
Input bytes :          0
Output bytes :         0
Input packets:         0
Output packets:        0
    
```

Sample Output The following sample output is for a T3 ATM interface:

```

user@host> show interfaces at-0/1/0 extensive
Physical interface: at-0/1/0, Enabled, Physical link is Up
Interface index: 90, SNMP ifIndex: 18, Generation: 89
Link-level type: ATM-PVC, MTU: 4482, Clocking: Internal, Speed: T3, Loopback: None, Payload scrambler: Enabled,
Mode: C/Bit parity, Line buildout: 10, ATM Encapsulation: PLCP
Device flags : Present Running
Link flags : None
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:90:69:0c:c0:1f
Last flapped : 2002-08-14 16:25:07 UTC (00:00:21 ago)
Statistics last cleared: 2002-08-14 16:25:26 UTC (00:00:02 ago)
Traffic statistics:
Input bytes :          0          0 bps
Output bytes :         0          0 bps
Input packets:         0          0 pps
Output packets:        0          0 pps
Input errors:
Errors: 0, Drops: 0, Invalid VCs: 0, Framing errors: 0, Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
L2 mismatch timeouts: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0
Active alarms : None
Active defects : None
DS3 media:      Seconds      Count State
PLL Lock        0          0 OK
Reframing       0          0 OK
AIS             0          0 OK
LOF             0          0 OK
    
```

```

LOS          0      0 OK
YELLOW      0      0 OK
EXZ         0      0
LCV         0      0
PCV         0      0
FERR        0      0
LES         0
PES         0
PSES        0
SEFS        0
UAS         0
PLCP defects: Seconds   Count State
LOF         0      0
YELLOW      0      0
ATM defects: Seconds   Count State
LCD         0      0
ATM status:
HCS state:  Sync
LOC       :  OK
PLCP statistics (errored seconds):
Framing errors      : 0(0)
Bit interleaved parity errors: 0(0)
Far end block errors : 0(0)
ATM Statistics:
Uncorrectable HCS errors: 0, Correctable HCS errors: 0, Tx cell FIFO overruns: 0, Rx cell FIFO overruns: 0,
Rx cell FIFO underruns: 0, Input cell count: 0, Output cell count: 96041, Output idle cell count: 96040,
Output VC queue drops: 0, Input no buffers: 0, Input length errors: 0, Input timeouts: 0, Input invalid VCs: 0,
Input bad CRCs: 0, Input OAM cell no buffers: 0
Packet Forwarding Engine configuration:
Destination slot: 0
CoS transmit queue      Bandwidth      Buffer Priority Limit
                        %      bps %      bytes
0 best-effort           95  42499200 95      0  low  none
3 network-control       5   2236800  5      0  low  none

```

What It Means Check for any error statistics that may appear in the output. There should not be any input or output errors. If there are any persistent input or output errors, open a case with the JTAC at support@juniper.net, or at 1-888-314-JTAC (within the United States) or 1-408-745-9500 (from outside the United States).

Diagnose a Suspected Circuit Problem

Purpose When you suspect a circuit problem, it is important to work with the transport-layer engineer to resolve the problem. The transport-layer engineer may ask you to create a loop from the router to the network, or the engineer may create a loop to the router from various points in the network.

Steps To Take To diagnose a suspected circuit problem, follow these steps:

1. Create a Loop from the Router to the Network on page 116
2. Create a Loop to the Router from Various Points in the Network on page 117

Step 1: Create a Loop from the Router to the Network

Purpose Creating a loop from the router to the network allows the transport-layer engineer to test the router from various points in the network. This helps the engineer isolate where the problem might be located. Figure 10 illustrates a loop from a router to the network.

Figure 10: Loop from the Router to the Network



Action To create a loop from the router to the network, follow these steps:

1. In configuration mode, go to the following hierarchy level:

```
[edit]
user@host# edit interfaces interface-name (sonet-options | t3-options)
```

2. Configure the remote loopback:

```
[edit interfaces interface-name (sonet-options | t3-options)]
user@host# set loopback remote
```

3. Verify the configuration:

```
user@host# show
```

For example:

```
[edit interfaces t3-1/0/0 t3-options]
user@host# show
loopback remote;
```

4. Commit the change:

```
user@host# commit
```

For example:

```
[edit interfaces t3-1/0/0 t3-options]
user@host# commit
commit complete
```

What It Means This command loops any traffic from the network back into the network.

Step 2: Create a Loop to the Router from Various Points in the Network

Purpose The transport-layer engineer creates a loop to the router from various points in the network. You can then perform tests to verify the connection from the router to that loopback in the network.

Action After the transport-layer engineer has created the loop to the router from the network, you must verify the connection from the router to the loopback in the network. Follow Steps 2 through 6 in “Diagnose a Suspected Hardware Problem with an ATM1 or ATM2 IQ Interface” on page 106. Keep in mind that any problems encountered in the test indicate a problem with the connection from the router to the loopback in the network.

By performing tests to loopbacks at various points in the network, you can isolate the source of the problem.

