

Chapter 13

Monitor SONET Interfaces

This chapter describes how to monitor SONET interfaces and begin the process of isolating SONET interface problems when they occur. (See Table 26.)

Table 26: Checklist for Monitoring SONET Interfaces

Monitor SONET Interface Tasks	Command or Action
Monitor SONET Interfaces on page 130	
1. Display the Status of SONET Interfaces on page 130	<code>show interfaces terse so*</code>
2. Display the Status of a Specific SONET Interface on page 131	<code>show interfaces so-fpc/pic/port</code>
3. Display Extensive Status Information for a Specific SONET Interface on page 132	<code>show interfaces so-fpc/pic/port extensive</code>
4. Monitor Statistics for a SONET Interface on page 134	<code>monitor interface so-fpc/pic/port</code>

Monitor SONET Interfaces

Purpose By monitoring SONET interfaces, you begin the process of isolating SONET interface problems when they occur.

Steps To Take To monitor your SONET interface, follow these steps:

1. Display the Status of SONET Interfaces on page 130
2. Display the Status of a Specific SONET Interface on page 131
3. Display Extensive Status Information for a Specific SONET Interface on page 132
4. Monitor Statistics for a SONET Interface on page 134

Step 1: Display the Status of SONET Interfaces

Action To display the status of SONET interfaces, use the following JUNOS command-line interface (CLI) operational mode command:

```
user@host> show interfaces terse so*
```

Sample Output

```
user@host> show interfaces terse so*
Interface  Admin Link Proto Local          Remote
so-1/0/0   up  up
so-1/0/0.0 up  up  inet 192.168.8.192  --> 192.168.2.250
           iso
[...Output truncated...]
so-1/1/1   down up
so-1/1/1.0 up  down inet 192.168.8.113/30
           iso
           mpls
[...Output truncated]
so-3/0/1   up  up
so-3/0/1.0 up  down inet 192.168.2.125/30
[...Output truncated...]

so-5/3/0   up  down
so-5/3/0.0 up  down inet 10.39.1.1/16
[...Output truncated...]
```

What It Means The sample output lists only the SONET interfaces. It shows the status of both the physical and logical interfaces.

For a description of what the output means, see Table 27.

Table 27: Status of SONET Interfaces

Physical Interface	Logical Interface	Status Description
so-1/0/0 Admin Up Link Up	so-1/0/0.0 Admin Up Link Up	This interface has both the physical and logical links up and running.
so-1/1/1 Admin Down Link Up	so-1/1/1.0 Admin Up Link Down	This interface is administratively disabled. The physical link is healthy (Link Up), but the logical link is not established end to end (Link Down).
so-3/0/1 Admin Up Link Up	so-3/0/1.0 Admin Up Link Down	This interface is administratively enabled and the physical link is healthy (Link Up), but the logical interface is not established end to end (Link Down).
so-5/3/0 Admin Up Link Down	so-5/3/0.0 Admin Up Link Down	This interface has the physical link down and the logical interface is down also.

Step 2: Display the Status of a Specific SONET Interface

Action To display the status of a specific SONET interface when you need to investigate its status further, use the following JUNOS CLI operational mode command:

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

Sample Output The following sample output is for an interface with the physical link down:

```
user@router> show interfaces so-1/1/1
Physical interface: so-1/1/1, Enabled, Physical link is Down
Interface index: 17, SNMP ifIndex: 16
Description: router-02 pos 4/0
Link-level type: Cisco-HDLC, MTU: 4474, Clocking: Internal, SONET mode
Speed: OC3, Loopback: None, CRC: 32, Payload scrambler: Enabled
Device flags : Present Running Down
Interface flags: Hardware-Down Link-Layer-Down Point-To-Point SNMP-Traps
Link flags : Keepalives
Keepalive Input: 621 (00:02:57 ago), Output: 889 (00:00:09 ago)
Input rate : 0 bps (0 pps), Output rate: 0 bps (0 pps)
Active alarms : LOL, LOS
Active defects : LOL, LOF, LOS, SEF, AIS-L, AIS-P, PLM-P
Logical interface so-1/1/1.0 (Index 18) (SNMP ifIndex 30)
Description: router-02 pos 4/0
Flags: Device-down Point-To-Point SNMP-Traps, Encapsulation: Cisco-HDLC
Protocol inet, MTU: 4470
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 10.10.10.48/30, Local: 10.10.10.50
Protocol iso, MTU: 4469
```

What It Means The first line of the sample output shows that the physical link is down. This means that the physical link is unhealthy and cannot pass packets. Further down the sample output, look for active alarms and defects. When you see this situation, to further diagnose the problem, see “Display Extensive Status Information for a Specific SONET Interface” on page 132 to display more extensive information about the SONET interface and the physical interface that is down.

Sample Output The following output is for an interface with the physical layer up and the link layer down:

```
user@router> show interfaces so-3/0/1
Physical interface: so-3/0/1, Enabled, Physical link is Up
  Interface index: 28, SNMP ifIndex: 55
  Description: Customer ABC
  Link-level type: Cisco-HDLC, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC3,
  Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps
  Link flags   : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 113 (00:00:02 ago), Output: 119 (00:00:02 ago)
  Input rate   : 80 bps (0 pps)
  Output rate  : 88 bps (0 pps)
  SONET alarms : None
  SONET defects : None

Logical interface so-3/0/1.0 (Index 22) (SNMP ifIndex 56)
  Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: Cisco-HDLC
  Protocol inet, MTU: 4470, Flags: None
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
  Destination: 192.168.2.124/30, Local: 192.168.2.125
```

What It Means The sample output shows that the link layer is down. This means that the logical interface is not established end to end. When you see this situation, to further diagnose the problem, see “Monitor Statistics for a SONET Interface” on page 134 to monitor statistics for the SONET interface and the logical interface that is down.

Step 3: Display Extensive Status Information for a Specific SONET Interface

Action To display extensive status information about a specific interface, use the following JUNOS CLI operational mode command:

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

```
user@router> show interfaces so-1/1/1 extensive
Physical interface: so-1/1/1, Enabled, Physical link is Down
  Interface index: 17, SNMP ifIndex: 16
  Description: router-02 pos 4/0
  Link-level type: Cisco-HDLC, MTU: 4474, Clocking: Internal, SONET mode
  Speed: OC3, Loopback: None, CRC: 32, Payload scrambler: Enabled
  Device flags : Present Running Down
  Interface flags: Hardware-Down Link-Layer-Down Point-To-Point SNMP-Traps
  Link flags   : Keepalives
  Keepalive statistics:
  Input : 621 (last seen 00:05:35 ago)
  Output: 905 (last seen 00:00:07 ago)
  Statistics last cleared: Never
  Traffic statistics:
  Input bytes :      378736540          0 bps
  Output bytes :      6786356          0 bps
  Input packets:      225924          0 pps
  Output packets:      104798          0 pps
Input errors:
  Errors: 8, Drops: 0, Framing errors: 4181286, Runts: 0, Giants: 8
  Policed discards: 9474, L3 incompletes: 0, L2 channel errors: 0
  L2 mismatch timeouts: 3, HS link CRC errors: 0, HS link FIFO overflows: 0
Output errors:
```

```

Carrier transitions: 2, Errors: 0, Drops: 0, Aged packets: 0
HS link FIFO underflows: 0
Active alarms : LOL, LOS <-- SONET active alarms and defects
Active defects : LOL, LOF, LOS, SEF, AIS-L, AIS-P, PLM-P
SONET PHY:                Seconds          Count   State <-- SONET media-specific
                               errors

PLL Lock                   0          0 OK
PHY Light                  328         1 Light Missing
SONET section: <-- SONET section errors
BIP-B1                     0          0
SEF                        329         3 Defect Active
LOS                        329         2 Defect Active
LOF                        329         2 Defect Active
ES-S                       329
SES-S                      329
SEFS-S                     329
SONET line:
BIP-B2                     0          0
REI-L                      0          0
RDI-L                      0          0 OK
AIS-L                      328         1 Defect Active
BERR-SF                    0          0 OK
BERR-SD                    0          0 OK
ES-L                       329
SES-L                      329
UAS-L                      318
ES-LFE                     0
SES-LFE                    0
UAS-LFE                    0
SONET path:
BIP-B3                     0          0
REI-P                      0          0
LOP-P                      1          1 OK
AIS-P                      328         1 Defect Active
RDI-P                      0          0 OK
UNEQ-P                     0          0 OK
PLM-P                      328         1 Defect Active
ES-P                       329
SES-P                      329
UAS-P                      318
ES-PFE                     0
SES-PFE                    0
UAS-PFE                    0
[...Output truncated...]

```

What It Means The sample output details where the errors might be occurring. Error details include input and output errors, active alarms and defects, and media-specific errors. The SONET section, line, and path errors help narrow down the source of the problem.

If the physical link is down, look at the active alarms and defects for the SONET interface and troubleshoot the SONET media accordingly. See “Locate SONET Alarms and Errors” on page 151 for an explanation of SONET alarms.

Step 4: Monitor Statistics for a SONET Interface

Action To monitor statistics for a SONET interface, use the following JUNOS CLI operational mode command:

```
user@host> monitor interface so-fpc/pic/port
```



CAUTION: We recommend that you use this command only for diagnostic purposes. Do not leave it on during normal router operations because real-time monitoring of traffic consumes additional CPU and memory resources.

Sample Output

```

user@router> monitor interface so-1/1/1
router          Seconds: 168          Time: 15:48:50

Interface: so-1/1/1, Enabled, Link is Down
Encapsulation: Cisco-HDLC, Keepalives, Speed: OC3
Traffic statistics:          Current Delta
Input bytes:          375527568 (0 bps)          [0]
Output bytes:          6612857 (0 bps)          [475]
Input packets:          224001 (0 pps)          [0]
Output packets:          102090 (0 pps)          [20]
Encapsulation statistics:
Input keepalives:          0          [0]
Output keepalives:          176          [17]
Error statistics:
Input errors:          0          [0]
Input drops:          0          [0]
Input framing errors:          179          [17]
Policed discards:          47          [0]
L3 incompletes:          0          [0]
L2 channel errors:          0          [0]
L2 mismatch timeouts:          0          [0]
Carrier transitions:          1          [0]
Output errors:          0          [0]
Output drops:          0          [0]
F2   : 0x00 Z3   : 0x00 Z4   : 0x00

Interface warnings:
o Received keepalive count is zero
o Framing errors are increasing, check FCS configuration and link

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'

```

What It Means

This output checks for and displays common interface failures, whether or not loopback is detected, and any increases in framing errors. Information from this command can help you narrow down possible causes of an interface problem.



NOTE: If you are accessing the router from the console connection, make sure you set the CLI terminal type using the `set cli terminal` command.

The statistics in the second column are the cumulative statistics since the last time they were cleared using the `clear interfaces statistics interface-name` command. The statistics in the third column are the statistics since the `monitor interface interface-name` command was executed.

If the framing errors are increasing, verify that the frame check sequence (FCS) and scrambling configuration match on both ends of the connection. If the configuration is correct, check the cabling to the router and have the carrier verify the integrity of the line.

If the input errors are increasing, check the cabling to the router and have the carrier verify the integrity of the line.

If you are sending output keepalives but are not receiving any input keepalives, verify that the encapsulation and keepalive configurations match on both ends of the connection.

Table 28 lists and describes the SONET error statistics in the output for the monitor interface command. The output fields are listed in the order in which they appear in the output.

Table 28: SONET Error Statistics

Output Field	Output Field Description
Input errors	Sum of the incoming frame aborts and FCS errors.
Input drops	Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's random early detection (RED) mechanism.
Input framing errors	Sum of ATM Adaption Layers (AAL5) packets that have FCS errors, AAL5 packets that have reassembly timeout errors, and AAL5 packets that have length errors.
Policed discards	Frames that the incoming packet match code discarded because they were not recognized or of interest. Usually, this field reports protocols that the JUNOS software does not handle, such as the Cisco Discovery Protocol (CDP).
L3 incompletes	Increments when the incoming packet fails Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header would be discarded and this counter would increment.
L2 channel errors	Increments when the software cannot find a valid logical interface for an incoming frame.
L2 mismatch timeouts	Count of malformed or short packets that cause the incoming packet handler to discard the frame as unreadable.
Carrier transitions	Number of times the interface has gone from down to up. This number should not increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or a similar problem occurs. If it increments quickly (perhaps once every 10 seconds), then the cable, the far-end system, or the PIC is broken.
Output errors	Sum of the outgoing frame aborts and FCS errors.
Output drops	Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.

