Chapter 8

Locate T3 Alarms and Errors

This chapter describes the most common T3 alarms and errors you can encounter when investigating line problems on a Juniper Networks router. (See Table 16.)

Table 16: Checklist of Common T3 Alarms and Errors

T3 Alarms and Errors Tasks	Command or Action
Display T3 Alarms and Errors on page 72	show interfaces t3-*fpc/pic/port* extensive
Locate Most Common T3 Alarms and Errors on page 74	
1. Locate Loss of Signal and Loss of Frame Alarms on page 74	Check the connection between the router port and the first T3 network element.
2. Locate Alarm Indication Signal Alarms on page 75	Check the T3 network element connected to the T3 interface.
3. Locate an Incoming Yellow Alarm on page 75	Check the cable between the T3 interface and the directly connected T3 network element.
4. Locate IDLE on a T3 Interface on page 76	Check that the line is provisioned for service.

NOTE: T3 is a general term used to refer to the transmission of 44.736-Mbps digital circuits over any media. T3 can be transported over copper, fiber, or radio. DS-3 is the term for the electrical signal found at the metallic interface for this circuit where most of the testing is performed.

Display T3 Alarms and Errors

Action To display T3 alarms and errors, use the following JUNOS command-line interface (CLI) operational mode command:

user@host> **show interfaces t3-***fpc*/*pic*/*port* **extensive**

Sample Output

```
user@host> show interfaces t3-1/0/0 extensive
Physical interface: t3-1/0/0, Enabled, Physical link is Down
  Interface index: 9, SNMP ifIndex: 10
  Link-level type: Cisco-HDLC, MTU: 4474, Clocking: Internal
  Speed: T3, Loopback: None, CRC: 16, Mode: C/Bit parity
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Link-Layer-Down Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Keepalive statistics:
    Input : 116 (last seen 00:02:59 ago)
    Output: 187 (last seen 00:00:09 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes :              2552                 0 bps
   Output bytes :              3703                 0 bps
   Input  packets:              116                 0 pps
   Output packets:              161                 0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 229, Policed discards: 1
    L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0
    SRAM errors: 0, HS link CRC errors: 0
  Output errors:
    Carrier transitions: 4, Errors: 0, Drops: 0, Aged packets: 0
  Active alarms  : LOF, LOS                    - DS-3 active alarms and defects
  Active defects : LOF, LOS
  DS3 Media:          Seconds       Count  State - T3 media-specific errors
    PLL Lock                0           0  OK
    Reframing             273           2  Defect Active
    AIS                     0           0  OK
    LOF                   273           2  Defect Active
    LOS                   273           2  Defect Active
    IDLE                    0           0  OK
    YELLOW                  0           0  OK
    BPV                     0           0
    EXZ                     0           0
    LCV                   275    18022125
    PCV                     0           0
    CCV                     0           0
    LES                   275
    PES                   273
    PSES                  273
    CES                   273
    CSES                  273
    SEFS                  273
    UAS                   277
  [...Output truncated...]
```

What It Means The sample output shows active alarms and active defects. When a major error (such as an alarm indication signal [AIS]) is seen for a few consecutive frames, a defect is declared within 1 second from detection. At the defect level, the interface is taken down and routing protocols are immediately notified (this is the default). In most cases, when a defect persists for 2.5 second plus or minus 0.5 seconds, an alarm is declared.

Notification messages are logged at the alarm level. Depending on the type of T3 alarm, you can configure the craft panel to display the red or yellow alarm LED and simultaneously have the alarm relay activate a physically connected device (such as a bell).

Table 17 lists the T3 media-specific alarms or errors that can render the interface unable to pass packets.

Table 17: T3 Interface Error Counter Definitions

T3 Alarm or Error	Definition
AIS	Alarm indication signal
EXZ	Excessive zeros
FERF	Far-end failures
IDLE	Idle code detected
LCV	Line code violation
LOS	Loss of signal
LOF	Loss of frame
YLW	Remote defect indication (yellow alarm)
PLL	Phase locked loop

Locate Most Common T3 Alarms and Errors

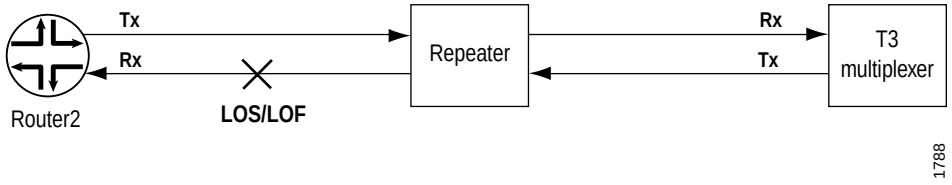
The following alarms and errors are described in this chapter:

Step 1: Locate Loss of Signal and Loss of Frame Alarms

Purpose A loss of signal (LOS) or loss of frame (LOF) alarm indicates that a signal could not be detected at the T3 interface.

Action To locate the LOS or LOF alarm, check the connection between the router port and the first T3 network element. In the example network in Figure 6, the X indicates that there is a connection problem between Router2 and the nearest T3 network element.

Figure 6: Location of an LOS or LOF Alarm in a T3 Network



NOTE: Tx represents the transmit port and Rx represents the receive port.

Sample Output

```
user@router2> show interfaces t3-1/1/1 extensive
[... Output truncated...]
Active alarms  : LOF, LOS
 Active defects : LOF, LOS
 DS3 Media:          Seconds      Count  State
   PLL Lock            0          0  OK
   Reframing           273        2  Defect Active
   AIS                 0          0  OK
   LOF                 273        2  Defect Active
   LOS                 273        2  Defect Active
[...Output truncated...]
```

What It Means The sample output shows that Router2 (Rx) detected a cumulative LOS and LOF for 273 seconds. The defect was declared twice during that time.

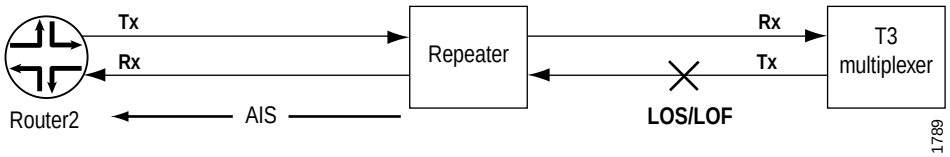
Step 2: Locate Alarm Indication Signal Alarms

Purpose An alarm indication signal (AIS) is a valid framed signal with payload containing a repeating 1010 pattern. An AIS alarm indicates a problem with the line upstream from the T3 network element connected to the T3 interface.

Action To locate the AIS alarm, have the carrier check the T3 network element connected to the T3 interface and trace the problem.

All diagnostics are from the perspective of Router2 (the Juniper Networks router). Figure 7 illustrates the location of an AIS alarm in a T3 network.

Figure 7: Location of an AIS Alarm in a T3 Network



What It Means In Figure 7, the X indicates that there is an LOS or LOF alarm between the repeater and the Tx T3 multiplexer. An AIS alarm is sent from the repeater to Router2.

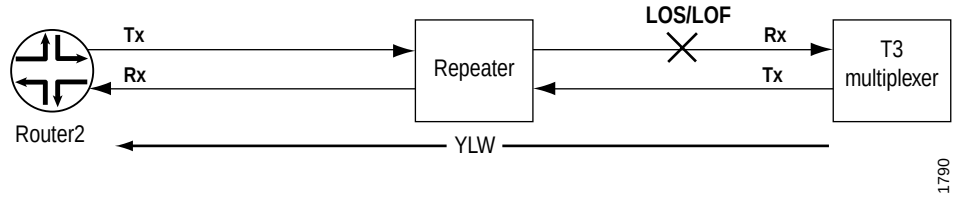
Step 3: Locate an Incoming Yellow Alarm

Purpose An incoming yellow alarm indicates that the T3 network element connected to the T3 interface has a problem with the signal it is receiving from the T3 interface.

Action To locate the yellow alarm, check the cable between the T3 interface and the directly connected T3 network element.

All diagnostics are from the perspective of Router2. Figure 8 illustrates the location of a yellow alarm in a T3 network.

Figure 8: Location of a Yellow Alarm in a T3 Network



What It Means The T3 multiplexer detects an LOS or LOF on its connection from Router2 and sends a yellow (YLW) alarm to Router2.

Step 4: Locate IDLE on a T3 Interface

Purpose The T3 (DS-3) IDLE signal is a validly framed DS-3 signal with a payload consisting of a repeated 1100 signal. IDLE indicates that the line has not been provisioned for service.

Action Have the carrier make sure that the line is provisioned for service.

Sample Output

```
user@router2> show interfaces t3-1/1/0
Physical interface: t3-1/1/0, Enabled, Physical link is Down
  Interface index: 13, SNMP ifIndex: 21
  Link-level type: PPP, MTU: 4474, Clocking: Internal
  Speed: T3, Loopback: None, CRC: 16, Mode: C/Bit parity
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Input rate     : 0 bps (0 pps), Output rate: 0 bps (0 pps)
  Active alarms  : IDLE
  Active defects : IDLE
```

NOTE: For detailed definitions of the T3 (DS-3) error events (BPV, EXZ, LCV, PCV, and CCV) and performance parameters (LES, PES, PSES, CES, CSES, SEFS, and UAS), see RFC 2496.