Chapter 28

Use Loopback Testing for Channelized OC-12 Interfaces

This chapter describes using loopback testing to isolate Channelized OC-12 and Channelized OC-12 IQ interface problems. (See Table 58.) The procedure for both types of Channelized OC-12 interfaces is the same. The naming convention for the Channelized OC-12 IQ interface varies depending on the type of interface. For a list of interface types associated with the Channelized OC-12 IQ interface, see “Channelized Intelligent Queuing Interface Naming” on page 14.

Table 58: Checklist for Using Loopback Testing for Channelized OC-12 and Channelized OC-12 IQ Interfaces

Channelized OC-12 or Channelized OC-12 IQ Loopback Testing Tasks	Command or Action
Diagnose a Suspected Hardware Problem with a Channelized OC-12 or Channelized OC-12 IQ Interface on page 303	
1. Create a Loopback on page 303	
a. Create a Physical Loopback on page 303	Connect the TX port to the RX port.
b. Configure a Local Loopback on page 304	[edit interfaces t3-*fpc*/*pic*/*port:channel* t3 options] set loopback local show commit
2. Verify That the Interface Is Up on page 305	show interfaces t3-*fpc*/*pic*/*port:channel* extensive
3. Clear Interface Statistics on page 307	clear interfaces statistics t3-*fpc*/*pic*/*port:channel*
4. Force the Link Layer to Stay Up on page 308	
a. Configure Encapsulation to Cisco-HDLC on page 308	[edit interfaces t3-*fpc*/*pic*/*port:channel*] set encapsulation cisco-hdlc show commit
b. Configure No-Keepalives on page 309	[edit interfaces t3-*fpc*/*pic*/*port:channel*] set no-keepalives show commit
5. Verify the Status of the Logical Interface on page 310	show interfaces t3-*fpc*/*pic*/*port:channel*
6. Ping the Channelized Interface on page 311	ping interface t3-*fpc*/*pic*/*port:channel local-IP-address* bypass-routing count 1000 rapid
7. Check for Interface Error Statistics on page 312	show interfaces t3-*fpc*/*pic*/*port:channel* extensive

Channelized OC-12 or Channelized OC-12 IQ Loopback Testing Tasks	Command or Action
Diagnose a Suspected Circuit Problem on page 315	
1. Loop the Entire T3 Interface towards the Network on page 315	[edit interfaces t3-*fpc*/*pic*/*port:channel* t3-options] set loopback remote show commit
2. Create a Loop to the Router from Various Points in the Network on page 316	Perform Steps 2 through 8 from “Diagnose a Suspected Hardware Problem with a Channelized OC-12 or Channelized OC-12 IQ Interface” on page 303.

Diagnose a Suspected Hardware Problem with a Channelized OC-12 or Channelized OC-12 IQ Interface

Steps To Take To diagnose a suspected hardware problem with a Channelized OC-12 or Channelized OC-12 IQ interface, follow these steps:

1. Create a Loopback on page 303
2. Verify That the Interface Is Up on page 305
3. Clear Interface Statistics on page 307
4. Force the Link Layer to Stay Up on page 308
5. Verify the Status of the Logical Interface on page 310
6. Ping the Channelized Interface on page 311
7. Check for Interface Error Statistics on page 312

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 Channelized OC-12 or Channelized OC-12 IQ port. 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).

NOTE: For a list of interface types associated with the Channelized OC-12 IQ interface, see “Channelized Intelligent Queuing Interface Naming” on page 14.

Create a Physical Loopback

Action To create a physical loopback at the port, connect the transmit port to the receive port.

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

Action To configure a local loopback, follow these steps:.

NOTE: For a list of interface types associated with the Channelized OC-12 IQ interface, see “Channelized Intelligent Queuing Interface Naming” on page 14.

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

   ```
   [edit]
   user@host# edit interfaces t3-fpc/pic/port:channel t3-options
   ```

2. Configure the local loopback:

   ```
   [edit interfaces t3-fpc/pic/port:channel t3-options]
   user@host# set loopback local
   ```

   The following is an example of the name for a T3 channel on a channelized DS-3 interface:

   ```
   [edit interfaces t3-2/1/0:2 t3-options]
   ```

3. Verify the configuration:

   ```
   user@host# show
   ```

   For example:

   ```
   [edit interfaces t3-2/1/0:2 t3-options]
   user@host# show
   loopback local;
   ```

4. Commit the configuration:

   ```
   user@host# commit
   ```

   For example:

   ```
   [edit interfaces t3-2/1/1:2 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: Verify That the Interface Is Up

Purpose Display the status of a Channelized OC-12 or Channelized OC-12 IQ interface to determine whether the physical link is up or down.

Action To verify that the status of the Channelized OC-12 or Channelized OC-12 IQ interface is up, use the following JUNOS command-line interface (CLI) operational mode command:

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

NOTE: For a list of interface types associated with the Channelized OC-12 IQ interface, see "Channelized Intelligent Queuing Interface Naming" on page 14.

Sample Output

```
user@host> show interfaces t3-0/3/0:0 extensive
Physical interface: t3-0/3/0:0, Enabled, Physical link is Up
  Interface index: 193, SNMP ifIndex: 118, Generation: 122
  Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: T3,
  Loopback: Local, SONET Loopback: None, FCS: 16, Mode: C/Bit parity
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 4 supported
  Last flapped   : 2004-05-21 15:23:34 UTC (00:05:00 ago)
  Statistics last cleared: Never
  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, Framing errors: 0, Bucket drops: 0, Policed discards: 0,
    L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
    HS link CRC errors: 0, SRAM errors: 0
  Output errors:
    Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0
  DS3   alarms   : None
  SONET alarms   : None
  DS3   defects  : None
  SONET defects  : None
  DS3 media:          Seconds       Count  State
    AIS               0             0  OK
    LOF               0             0  OK
    LOS               0             0  OK
    IDLE              0             0  OK
    YELLOW            0             0  OK
    BPV               0             0
    EXZ               0             0
    LCV               0             0
    PCV               0             0
    CCV               0             0
    LES               0
    PES               0
    PSES              0
    CES               0
    CSES              0
    SEFS              0
    UAS               0
```

```
HDLC configuration:
  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 4484, Runt threshold: 3
  Idle cycle flag: flags, Start end flag: shared
DSU configuration:
  Compatibility mode: None, Scrambling: Disabled, Subrate: Disabled
  FEAC loopback: Inactive, Response: Disabled, Count: 0
DS-3 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Algorithm: 2^3 - 1, Pseudorandom (1), Induced error rate: 10e-0
Interface transmit queues:
                B/W  WRR       Packets        Bytes
  Queue0        0    0
    Transmitted:                    0            0
    Drops:                          0            0
    Errors:                         0
  Queue1        0    0
    Transmitted:                    0            0
    Drops:                          0            0
    Errors:                         0
  Queue2        0    0
    Transmitted:                    0            0
    Drops:                          0            0
    Errors:                         0
  Queue3        0    0
    Transmitted:                    0            0
    Drops:                          0            0
    Errors:                         0
SONET PHY:            Seconds       Count  State
  PLL Lock              0             0  OK
  PHY Light             0             0  OK
SONET section:
  BIP-B1                1            22
  SEF                   0             0  OK
  LOS                   0             0  OK
  LOF                   0             0  OK
  ES-S                  1
  SES-S                 0
  SEFS-S                0
SONET line:
  BIP-B2                1           307
  REI-L                 0             0
  RDI-L                 3             1  OK
  AIS-L                 0             0  OK
  BERR-SF               0             0  OK
  BERR-SD               0             0  OK
  ES-L                  1
  SES-L                 0
  UAS-L                 0
  ES-LFE                3
  SES-LFE               3
  UAS-LFE               0
SONET path:
  BIP-B3                1            35
  REI-P                 1             7
  LOP-P                 0             0  OK
  AIS-P                 0             0  OK
  RDI-P                 0             0  OK
  UNEQ-P                0             0  OK
  PLM-P                 1             1  OK
  ES-P                  1
  SES-P                 0
```

```
  UAS-P                 0
  ES-PFE                1
  SES-PFE               0
  UAS-PFE               0
Received SONET overhead:
  F1     : 0x00, J0     : 0x00, K1     : 0x00, K2     : 0x00
  S1     : 0x00, C2     : 0x04, C2(cmp) : 0x04, F2     : 0x00
  Z3     : 0x00, Z4     : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
  F1     : 0x00, J0     : 0x01, K1     : 0x00, K2     : 0x00
  S1     : 0x00, C2     : 0x04, F2     : 0x00, Z3     : 0x00
  Z4     : 0x00
Received path trace: t3-0/1/0:0
  74 33 2d 30 2f 31 2f 30 3a 30 00 00 00 00 0d 0a   t3-0/1/0:0.....
Transmitted path trace: t3-0/3/0:0
  74 33 2d 30 2f 33 2f 30 3a 30 00 00 00 00 00 00   t3-0/3/0:0.....
Packet Forwarding Engine configuration:
  Destination slot: 0, PLP byte: 1 (0x00)
  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 The sample output shows that the physical link is up and there are no OC-12 alarms or defects. You should not see any OC-12 alarms. If there are SONET layer errors, see “Investigate SONET Interfaces” on page 127, for information on diagnosing SONET interface problems.

Step 3: Clear Interface Statistics

Purpose You must reset the Channelized OC-12 or Channelized OC-12 IQ interface statistics before initiating 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 efforts to diagnose the problem.

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

user@host> **clear interfaces statistics t3-***fpc*/*pic*/*port:channel* .

Sample Output

```
user@host> clear interfaces statistics t3-1/1/0:0
user@host>
```

What It Means This command clears the interface statistics counters for the Channelized OC-12 interface only.

Step 4: Force the Link Layer to Stay Up

Purpose To complete the loopback test, the link layer must remain up. However, JUNOS software is designed to recognize that loop connections are not valid connections and to bring the link layer down. You need to force the link layer to stay up by making some configuration changes to the encapsulation and keepalives.

Steps To Take Force the link layer to stay up, follow these steps:

1. Configure Encapsulation to Cisco-HDLC on page 308
2. Configure No-Keepalives on page 309

Configure Encapsulation to Cisco-HDLC

Action To set the encapsulation on a T3 physical interface, follow these steps:

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

   ```
   [edit]
   user@host# edit interfaces t3-fpc/pic/port:channel
   ```

2. Configure Cisco-HDLC:

   ```
   [edit interfaces t3-fpc/pic/port:channel]
   user@host# set encapsulation cisco-hdlc
   ```

3. Verify the configuration:

   ```
   user@host# show
   ```

   For example:

   ```
   [edit interfaces t3-0/1/1:8]
   user@host# show
   encapsulation hdlc;
   ```

4. Commit the change:

   ```
   user@host# commit
   ```

   For example:

   ```
   [edit interfaces t3-0/1/1:8]
   user@host# commit
   commit complete
   ```

What It Means This command sets the interface encapsulation to the Cisco High-level Data-Link Control (HDLC) transport protocol.

Configure No-Keepalives

Action To disable the sending of link-layer keepalives on a Channelized OC-12 or Channelized OC-12 IQ interface, follow these steps:.

NOTE: For a list of interface types associated with the Channelized OC-12 IQ interface, see “Channelized Intelligent Queuing Interface Naming” on page 14.

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

   ```
   [edit]
   user@host# edit interfaces t3-fpc/pic/port:channel
   ```

2. Configure no-keepalives:

   ```
   [edit interfaces t3-fpc/pic/port:channel]
   user@host# set no-keepalives
   ```

3. Verify the configuration:

   ```
   user@host# show
   ```

   For example:

   ```
   [edit interfaces t3-0/1/1:8]
   user@host# show
   no-keepalives;
   ```

4. Commit the change:

   ```
   user@host# commit
   ```

   For example:

   ```
   [edit interfaces t3-0/1/1:8]
   user@host# commit
   commit complete
   ```

What It Means By setting no-keepalives, the link layer is forced to stay up. If the setting remains at keepalive, the router will recognize that the same link-layer keepalives are being looped back and will bring the link layer down.

Step 5: Verify the Status of the Logical Interface

Action To verify the status of the logical interface, use the following JUNOS CLI operational mode command:

user@host> **show interfaces t3-***fpc*/*pic*/*port:channel*.

NOTE: For a list of interface types associated with the Channelized OC-12 IQ interface, see “Channelized Intelligent Queuing Interface Naming” on page 14.

Sample Output

```
user@host> show interfaces t3-0/3/0:11
Physical interface: t3-0/3/0:11, Enabled, Physical link is Up
  Interface index: 204, SNMP ifIndex: 129
  Link-level type: Cisco-HDLC, MTU: 4474, SONET mode, Speed: T3, Loopback: Local,
  SONET Loopback: None, FCS: 16, Mode: C/Bit parity
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : No-Keepalives
  CoS queues     : 4 supported
  Last flapped   : 2004-05-21 15:23:34 UTC (01:34:24 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  DS3   alarms   : None
  SONET alarms   : None
  DS3   defects  : None
  SONET defects  : None
  DS-3 BERT configuration:
    BERT time period: 0 seconds, Elapsed: 0 seconds
    Algorithm: Unknown (0), Induced error rate: 10e-0

  Logical interface t3-0/3/0:11.0 (Index 71) (SNMP ifIndex 130)
    Flags: Point-To-Point SNMP-Traps Encapsulation: Cisco-HDLC
    Protocol inet, MTU: 4470
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 10.0.0.0/30, Local: 10.0.0.1, Broadcast: 10.0.0.3
```

What It Means The sample output shows that the channelized interface has the physical and logical links up. There are no alarms or defects. If there are SONET layer errors, see “Investigate SONET Interfaces” on page 127, for information on diagnosing SONET interface problems.

Step 6: Ping the Channelized Interface

Purpose Use the ping command to verify the loopback connection.

Action To ping the local interface, use the following JUNOS CLI operational mode command:

user@host> **ping interface t3-***fpc/pic/port:channel local-IP-address* **bypass-routing count 1000 rapid**.

NOTE: For a list of interface types associated with the Channelized OC-12 IQ interface, see “Channelized Intelligent Queuing Interface Naming” on page 14.

Sample Output

```
user@host> ping interface t3-0/3/0:11 10.0.0.1 bypass-routing count 1000 rapid
PING 10.0.0.1 (10.0.0.1): 56 data bytes
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
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!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
--- 10.0.0.1 ping statistics ---
1000 packets transmitted, 1000 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.439/0.694/42.590/2.206 ms
```

What It Means This command sends 1000 ping packets out of the channelized interface to the local IP address. The ping should complete successfully with no packet loss. If there is any persistent packet loss, open a case with the Juniper Networks Technical Assistance Center (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).

Step 7: Check for Interface Error Statistics

Purpose Persistent interface error statistics indicate that you need to open a case with JTAC.

Action To check the local interface for error statistics, use the following JUNOS CLI operational mode command:

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

NOTE: For a list of interface types associated with the Channelized OC-12 IQ interface, see “Channelized Intelligent Queuing Interface Naming” on page 14.

Sample Output

```
user@host> show interfaces t3-0/3/0:11 extensive
Physical interface: t3-0/3/0:11, Enabled, Physical link is Up
  Interface index: 204, SNMP ifIndex: 129, Generation: 133
  Link-level type: Cisco-HDLC, MTU: 4474, SONET mode, Speed: T3, Loopback: Local,
  SONET Loopback: None, FCS: 16, Mode: C/Bit parity
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : No-Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 4 supported
  Last flapped   : 2004-05-21 15:23:34 UTC (01:36:27 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes :            109318                 0 bps
   Output bytes :            109318                 0 bps
   Input  packets:             1669                 0 pps
   Output packets:             1669                 0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Bucket drops: 0, Policed discards: 0,
    L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
    HS link CRC errors: 0, SRAM errors: 0
  Output errors:
    Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0
  DS3   alarms   : None
  SONET alarms   : None
  DS3   defects  : None
  SONET defects  : None
  DS3 media:          Seconds       Count  State
    AIS                 0             0  OK
    LOF                 0             0  OK
    LOS                 0             0  OK
    IDLE                0             0  OK
    YELLOW              0             0  OK
    BPV                 0             0
    EXZ                 0             0
    LCV                 0             0
    PCV                 0             0
    CCV                 0             0
    LES                 0
    PES                 0
    PSES                0
    CES                 0
    CSES                0
    SEFS                0
    UAS                 0
  HDLC configuration:
    Policing bucket: Disabled
    Shaping bucket : Disabled
```

```
  Giant threshold: 4484, Runt threshold: 3
  Idle cycle flag: flags, Start end flag: shared
DSU configuration:
  Compatibility mode: None, Scrambling: Disabled, Subrate: Disabled
  FEAC loopback: Inactive, Response: Disabled, Count: 0
DS-3 BERT configuration:
  BERT time period: 0 seconds, Elapsed: 0 seconds
  Algorithm: Unknown (0), Induced error rate: 10e-0
Interface transmit queues:
              B/W  WRR      Packets       Bytes
  Queue0        0    0
    Transmitted:                 0           0
    Drops:                       0           0
    Errors:                      0
  Queue1        0    0
    Transmitted:                 0           0
    Drops:                       0           0
    Errors:                      0
  Queue2        0    0
    Transmitted:                 0           0
    Drops:                       0           0
    Errors:                      0
  Queue3        0    0
    Transmitted:              1669      109318
    Drops:                       0           0
    Errors:                      0
SONET PHY:           Seconds       Count  State
  PLL Lock                 0           0  OK
  PHY Light                0           0  OK
SONET section:
  BIP-B1                   1          22
  SEF                      0           0  OK
  LOS                      0           0  OK
  LOF                      0           0  OK
  ES-S                     1
  SES-S                    0
  SEFS-S                   0
SONET line:
  BIP-B2                   1         307
  REI-L                    0           0
  RDI-L                    3           1  OK
  AIS-L                    0           0  OK
  BERR-SF                  0           0  OK
  BERR-SD                  0           0  OK
  ES-L                     1
  SES-L                    0
  UAS-L                    0
  ES-LFE                   3
  SES-LFE                  3
  UAS-LFE                  0
SONET path:
  BIP-B3                   1          37
  REI-P                    1          23
  LOP-P                    0           0  OK
  AIS-P                    0           0  OK
  RDI-P                    0           0  OK
  UNEQ-P                   0           0  OK
  PLM-P                    1           1  OK
  ES-P                     1
  SES-P                    0
  UAS-P                    0
  ES-PFE                   1
  SES-PFE                  0
```

```
  UAS-PFE                 0
Received SONET overhead:
  F1     : 0x00, J0     : 0x00, K1     : 0x00, K2     : 0x00
  S1     : 0x00, C2     : 0x04, C2(cmp) : 0x04, F2     : 0x00
  Z3     : 0x00, Z4     : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
  F1     : 0x00, J0     : 0x01, K1     : 0x00, K2     : 0x00
  S1     : 0x00, C2     : 0x04, F2     : 0x00, Z3     : 0x00
  Z4     : 0x00
Received path trace: t3-0/1/0:11
  74 33 2d 30 2f 31 2f 30 3a 31 31 00 00 00 0d 0a   t3-0/1/0:11.....
Transmitted path trace: t3-0/3/0:11
  74 33 2d 30 2f 33 2f 30 3a 31 31 00 00 00 00 00   t3-0/3/0:11.....
Packet Forwarding Engine configuration:
  Destination slot: 0, PLP byte: 1 (0x02)
  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

Logical interface t3-0/3/0:11.0 (Index 71) (SNMP ifIndex 130) (Generation 22)
  Flags: Point-To-Point SNMP-Traps Encapsulation: Cisco-HDLC
  Protocol inet, MTU: 4470, Generation: 31, Route table: 0
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 10.0.0.0/30, Local: 10.0.0.1, Broadcast: 10.0.0.3, Generation: 43
```

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 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. Loop the Entire T3 Interface towards the Network on page 315
2. Create a Loop to the Router from Various Points in the Network on page 316

Step 1: Loop the Entire T3 Interface towards the Network

Purpose Creating a loop from the entire T3 interface to the network allows the transport-layer engineer to test the router from various points in the network and isolate the problem..

NOTE: For a list of interface types associated with the Channelized OC-12 IQ interface, see “Channelized Intelligent Queuing Interface Naming” on page 14.

Action To create a loop from the entire T3 interface to the network, follow these steps:

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

   ```
   [edit]
   user@host# edit interfaces t3-fpc/pic/port:channel t3-options
   ```

2. Configure the loopback:

   ```
   [edit interfaces t3-fpc/pic/port:channel t3-options]
   user@host# set loopback remote
   ```

3. Verify the configuration:

   ```
   user@host# show
   ```

   For example:

   ```
   [edit interfaces t3-2/1/1:0 t3-options]
   user@host# show
   loopback remote;
   ```

4. Commit the configuration:

   ```
   user@host# commit
   ```

What It Means The loopback remote 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 7 in “Diagnose a Suspected Hardware Problem with a Channelized OC-12 or Channelized OC-12 IQ Interface” on page 303. 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.