

Channelized T3 Interface Processor and Port Adapter Feature Enhancements

Description

You can now perform the following new tasks on the Channelized T3 Interface Processor (CT3IP) available on Cisco 7500 series routers, and on Cisco 7000 series routers with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI). You can also perform these tasks on the Channelized T3 dual-wide port adapter (PA-CT3/4T1), which can be used in Cisco 7200 series routers:

- Configure Maintenance Data Link (MDL) messages
- Enable performance monitoring via Facility Data Link (FDL) per ANSI T1.403
- Generate bit error rate testing (BERT) test patterns
- Enable remote FDL loopbacks
- Support SNMP MIB per RFC 1406 and RFC 1407

Note Throughout this document are references to the CT3IP. However, the term CT3IP also applies to the PA-CT3/4T1. Wherever you see a description of a feature of the CT3IP, the feature is also available in the PA-CT3/4T1.

Platforms

This feature is supported on these platforms:

- Cisco 7500 series routers
- Cisco 7200 series routers
- Cisco 7000 series routers with the RSP7000 and RSP7000CI

Configuration Tasks

The following sections describe the new, optional configuration tasks for the CT3IP.

Configure Maintenance Data Link (MDL) Messages

The CT3IP can be configured to send a Maintenance Data Link (MDL) message as defined in the ANSI T1.107a-1990 specification. To specify the transmission of the MDL messages, complete the following tasks beginning in global configuration mode:

Task	Command
Step 1 Select the CT3IP and enter controller configuration mode.	controller t3 <i>slot/port-adapter/port</i> (Cisco 7500 series and Cisco 7000 series routers with the RSP7000 and RSP7000CI) controller t3 <i>slot/port</i> (Cisco 7200 series)
Step 2 Configure the Maintenance Data Link (MDL) message.	mdl { transmit { path idle-signal test-signal } string { eic lic fic unit pfi port generator } <i>string</i> }

Note Specify one **mdl** command for each message. For example, use **mdl string eic Router A** to transmit “Router A” as the equipment identification code and use **mdl string lic Test Network** to transmit “Test Network” as the location identification code.

Use the **show controllers t3** command to display MDL information (received strings). MDL information is displayed only when framing is set to C-bit.

Enable Performance Report Monitoring

The CT3IP supports performance reports via the Facility Data Link (FDL) per ANSI T1.403. By default, performance reports are disabled. To enable FDL performance reports, complete the following tasks beginning in global configuration mode:

Task	Command
Step 1 Select the CT3IP and enter controller configuration mode.	controller t3 <i>slot/port-adapter/port</i> (Cisco 7500 series and Cisco 7000 series routers with the RSP7000 and RSP7000CI) controller t3 <i>slot/port</i> (Cisco 7200 series)
Step 2 Enable one-second transmission of the performance report for a specific T1 channel (values are 1 to 28).	t1 channel fdl ansi

Note Performance reporting is available only on T1 channels configured for ESF framing.

To display the remote performance report information, complete the following task in EXEC command mode:

Task	Command
Display the remote performance report information for the T1 channel (values are 1 to 28).	show controller t3 [<i>slot/port-adapter/port</i> [: <i>t1-channel</i>]] remote performance [brief tabular] (Cisco 7500 series and Cisco 7000 series routers with the RSP7000 and RSP7000CI) show controller t3 [<i>slot/port</i> [: <i>t1-channel</i>]] remote performance [brief tabular] (Cisco 7200 series)

Enable BERT Test Pattern

To enable and disable generation of a bit error rate testing (BERT) test pattern for a specified interval for a specific T1 channel, complete the following tasks beginning in global configuration mode:

Task	Command
Step 1 Select the CT3IP and enter controller configuration mode.	controller t3 <i>slot/port-adapter/port</i> (Cisco 7500 series and Cisco 7000 series routers with the RSP7000 and RSP7000CI) controller t3 <i>slot/port</i> (Cisco 7200 series)
Step 2 Enable a BERT test pattern on a T1 channel (values are 1 to 28).	t1 channel bert pattern { 0s 1s 2^15 2^20 2^23 } interval <i>minutes</i>
Step 3 Disable a BERT test pattern on a T1 channel (values are 1 to 28).	no t1 channel bert pattern { 0s 1s 2^15 2^20 2^23 } interval <i>minutes</i>

The BERT test patterns from the CT3IP are framed test patterns (that is, the test patterns are inserted into the payload of the framed T1 signal).

To view the BERT results, use the **show controller t3** or **show controller t3 brief** EXEC command. The BERT results include the following information:

- Type of test pattern selected
- Status of the test
- Interval selected
- Time remaining on the BERT test
- Total bit errors
- Total bits received

When the T1 channel has a BERT test running, the line state is DOWN. Also, when the BERT test is running and the Status field is Not Sync, the information in the total bit errors field is not valid. When the BERT test is done, the Status field is not relevant.

The **t1 bert pattern** command is not written to NVRAM because it is only used for testing the T1 channel for a short predefined interval and to avoid accidentally saving the command, which could cause the interface not to come up the next time the router reboots.

Enable Remote FDL Loopbacks

You can perform the following types of remote Facility Data Link (FDL) loopbacks on a T1 channel:

- Remote payload FDL ANSI—Sends a repeating, 16-bit ESF data link code word (00010100 11111111) to the remote end requesting that it enter into a network payload loopback.
- Remote line FDL ANSI—Sends a repeating, 16-bit ESF data link code word (00001110 11111111) to the remote CSU end requesting that it enter into a network line loopback.
- Remote line FDL Bellcore—Sends a repeating, 16-bit ESF data link code word (00010010 11111111) to the remote SmartJack end requesting that it enter into a network line loopback.

To enable loopbacks on a T1 channel, complete the first task beginning in global configuration mode followed by Step 2 or Step 3 depending on the type of loopback you want to perform:

Task	Command
Step 1 Select the T1 channel (values are 1 to 28) on the CT3IP and enter interface configuration mode.	interface serial <i>slot/port-adapter/port:t1-channel</i> (Cisco 7500 series and Cisco 7000 series routers with the RSP7000 and RSP7000CI) interface serial <i>slotport:t1-channel</i> (Cisco 7200 series)
Step 2 Enable the remote payload FDL ANSI bit loopback on the T1 channel.	loopback remote payload [fdl] [ansi]
Step 3 Enable the remote line FDL ANSI bit loopback or remote SmartJack loopback on the T1 channel.	loopback remote line fdl { ansi bellcore }

Note The port adapter and port numbers for the CT3IP are 0.

Configuration Examples

The following examples show several of the Maintenance Data Link (MDL) messages for the CT3IP in slot 9:

```
Router(config)# controller t3 9/0/0
Router(config-controller)# mdl string eic Router C
Router(config-controller)# mdl string lic Network A
Router(config-controller)# mdl string fic Bldg 102
Router(config-controller)# mdl string unit 123ABC
Router(config-controller)# exit
Router(config)#
```

In the following example, the performance reports are generated for T1 channel 6 on the CT3IP in slot 9:

```
Router(config)# controller t3 9/0/0
Router(config-controller)# t1 6 fdl ansi
Router(config-controller)# exit
```

The following example shows how to enable a BERT test pattern that consists of a repeating pattern of ones (...111...) and runs for 30 minutes for T1 channel 8 on CT3IP in slot 9:

```
Router(config)# controller t3 9/0/0
Router(config-controller)# t1 8 bert pattern 1s interval 30
Router(config-controller)# exit
```

The following example shows how to enable a remote payload FDL ANSI bit loopback for T1 channel 6 on CT3IP in slot 3:

```
Router(config)# interface serial 3/0/0:6  
Router(config-if)# loopback remote payload fdl ansi  
Router(config-if)# exit
```

Command Reference

This section documents new and modified commands. All other commands used with this feature are documented in the Cisco IOS Release 11.2 command references.

- **loopback (T1)**
- **mdl**
- **show controller t3**
- **t1 bert**
- **t1 fdl ansi**

loopback (T1)

To loop individual T1 channels on the Channelized T3 Interface Processor (CT3IP) in Cisco 7000 series routers with the RSP7000 and RSP7000CI and in Cisco 7500 series routers, use the **loopback** interface configuration command. Use the **no** form of this command to remove the loopback.

```
loopback [local | network {line | payload} | remote {line {fdl {ansi | bellcore} | inband} |  
  payload [fdl] [ansi] } ]  
no loopback
```

Syntax Description

local	(Optional) Loops the router output data back toward the router at the T1 framer and sends an AIS signal out toward the network.
network { line payload }	(Optional) Loops the data back toward the network before the T1 framer and automatically sets a local loopback at the HDLC controllers (line) or loops the payload data back toward the network at the T1 framer and automatically sets a local loopback at the HDLC controllers (payload).
remote line fdl { ansi bellcore }	(Optional) Sends a repeating, 16-bit ESF data link code word (00001110 11111111 for FDL ANSI and 00010010 11111111 for FDL Bellcore) to the remote end requesting that it enter into a network line loopback. Specify the ansi keyword to enable the remote line Facility Data Link (FDL) ANSI bit loopback on the T1 channel, per the ANSI T1.403 Specification. Specify the bellcore keyword to enable the remote SmartJack loopback on the T1 channel, per the TR-TSY-000312 Specification.
remote line inband	(Optional) Sends a repeating, 5-bit inband pattern (00001) to the remote end requesting that it enter into a network line loopback.
remote payload [fdl] [ansi]	(Optional) Sends a repeating, 16-bit ESF data link code word (00010100 11111111) to the remote end requesting that it enter into a network payload loopback. Enables the remote payload Facility Data Link (FDL) ANSI bit loopback on the T1 channel. You can optionally specify fdl and ansi , but it is not necessary.

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1 CA.

Use this command for troubleshooting purposes.

To better diagnose T1 provisioning problems, you can place the the remote CSU or remote SmartJack into loopback. The **loopback remote line fdl** interface configuration command allows you to place either the CSU or the SmartJack into loopback:

- **ansi**—Places the CSU into loopback, per the ANSI T1.403 Specification
- **bellcore**—Places the SmartJack into loopback, per the TR-TSY-000312 Specification

When both are configured, transmission of LOF indication (yellow alarm) takes priority over transmission of some FDL messages.

If the remote loopback appears not to be working, use the **show cont t3** command to determine if the given T1 is currently attempting to transmit a LOF indication (yellow alarm):

```
Router# show controllers t3 0/0/0:2
T3 0/0/0 is up.
CT3 H/W Version: 5, CT3 ROM Version: 1.2, CT3 F/W Version: 2.5.9
Mx H/W version: 2, Mx ucode ver: 1.34

T1 2 is down, speed: 1536 kbs, non-inverted data
timeslots: 1-24
FDL per AT&T 54016 spec.
Transmitter is sending LOF Indication.
Receiver is getting AIS.
```

If the transmitter is sending a LOF indication, as in the previous example, stop the transmission of the LOF indication (yellow alarm) with the **no t1 yellow generation** configuration command as shown in the following example:

```
Router(config)# controllers t3 0/0/0
Router(config-controll)# no t1 2 yellow generation
Router(config-controll)# ^D
```

To verify that the transmission of the LOF indication (yellow alarm) has stopped, use the **show cont t3** command:

```
Router# show cont t3 0/0/0:2
T3 0/0/0 is up.
CT3 H/W Version: 5, CT3 ROM Version: 1.2, CT3 F/W Version: 2.5.9
Mx H/W version: 2, Mx ucode ver: 1.34
T1 2 is down, speed: 1536 kbs, non-inverted data
timeslots: 1-24
FDL per AT&T 54016 spec.
Receiver is getting AIS.
Framing is ESF, Line Code is B8ZS, Clock Source is Internal.
Yellow Alarm Generation is disabled
```

Now retry the remote loopback command. When diagnosis is complete, remember to re-enable the LOF indication (yellow alarm).

You can also loopback all the T1 channels by using the **loopback (CT3IP)** interface configuration command.

Example

The following example configures T1 channel 5 for a local loopback:

```
interface serial 3/0/0:5
 loopback local
```

Related Command

loopback (T3)

mdl

To configure the Maintenance Data Link (MDL) message defined in the ANSI T1.107a-1990 specification for the Channelized T3 Interface Processor (CT3IP) in Cisco 7000 series routers with the RSP7000 and RSP7000CI and in Cisco 7500 series routers, use the **mdl** interface configuration command. Use the **no** form of this command to remove the message.

```
mdl {transmit {path | idle-signal | test-signal} | string {eic | lic | fic | unit | pfi | port |
generator} string}
no mdl {transmit {path | idle-signal | test-signal} | string {eic | lic | fic | unit | pfi | port |
generator} string}
```

Syntax Description

transmit path	Enables transmission of the MDL Path message.
transmit idle-signal	Enables transmission of the MDL Idle Signal message.
transmit test-signal	Enables transmission of the MDL Test Signal message.
string eic <i>string</i>	Specifies the Equipment Identification Code; can be up to 10 characters.
string lic <i>string</i>	Specifies the Location Identification Code; can be up to 11 characters.
string fic <i>string</i>	Specifies the Frame Identification Code; can be up to 10 characters.
string unit <i>string</i>	Specifies the Unit Identification Code; can be up to 6 characters.
string pfi <i>string</i>	Specifies the Facility Identification Code sent in the MDL Path message; can be up to 38 characters.
string port <i>string</i>	Specifies the Port number string sent in the MDL Idle Signal message; can be up to 38 characters.
string generator <i>string</i>	Specifies the Generator number string sent in the MDL Test Signal message; can be up to 38 characters.

Default

No MDL message is configured

Command Mode

Controller configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1 CA.

Use the **show controllers t3** command to display MDL information (received strings). MDL information is displayed only when framing is set to C-bit.

Note MDL is supported only when the DS3 framing is C-bit parity.

Examples

The following examples show several of the **mdl** commands for the CT3IP in slot 9:

```
controller t3 9/0/0
  mdl string eic Router A
  mdl string lic Test Network
  mdl string fic Building B
  mdl string unit ABC
```

Related Command

show controller t3

show controller t3

To display information about the Channelized T3 Interface Processor (CT3IP) on Cisco 7000 series routers with the RSP7000 and RSP7000CI and in Cisco 7500 series routers or to display information about the PA-CT3/4T1 in Cisco 7200 series routers, use the **show controller t3** privileged EXEC command.

show controller t3 [*slot/port-adapter/port* *[:t1-channel]*] [**remote performance** [**brief** | **tabular**]] (Cisco 7500 series and Cisco 7000 series routers with the RSP7000 and RSP7000CI)

show controller t3 [*slot/port* *[:t1-channel]*] [**remote performance** [**brief** | **tabular**]] (Cisco 7200 series)

Syntax Description

<i>slot</i>	(Optional) Backplane slot number. The value varies depending on the platform.
<i>port-adapter</i>	(Optional) The port adapter and port numbers for the CT3IP are 0.
<i>port</i>	(Optional) The port adapter and port numbers for the CT3IP are 0.
<i>:t1-channel</i>	(Optional) For the CT3IP, the T1 channel is a number between 1 and 28.
remote performance	(Optional) Displays the far-end ANSI performance monitor information when enabled on the T1 channel with the t1 fdl ansi controller command.
brief	(Optional) Displays a subset of information.
tabular	(Optional) Displays information in a tabular format.

Command Mode

Privileged EXEC

Usage Guidelines

This command was modified in Cisco IOS Release 11.1 CA to include the **remote performance** keyword.

This command displays controller status that is specific to the controller hardware. The information displayed is generally useful for diagnostic tasks performed by technical support personnel only.

Note T1 channels on the CT3IP are numbered 1 to 28 rather than the more traditional zero-based scheme (0 to 27) used with other Cisco products. This is to ensure consistency with telco numbering schemes for T1 channels within channelized T3 equipment.

The **show controllers t3** command also displays Maintenance Data Link (MDL) information (received strings) if MDL is configured and framing is set to C-bit.

Sample Displays

The following is partial sample output from the **show controller t3** command:

```

Router# show controller t3 3/0/0
T3 3/0/0 is up.
  CT3 H/W Version: 4, CT3 ROM Version: 0.116, CT3 F/W Version: 0.10.0
  Mx H/W version: 2, Mx ucode ver: 1.24
  Applique type is Channelized T3
  No alarms detected.
  FEAC code received: No code is being received
  Framing is M23, Line Code is B3ZS, Clock Source is Internal.
  Ext1: LOS, Ext2: LOS, Ext3: LOS, Test: OK
  Data in current interval (39 seconds elapsed):
    0 Line Code Violations, 0 P-bit Coding Violation
    0 C-bit Coding Violation
    0 P-bit Err Secs, 0 P-bit Severely Err Secs
    0 Severely Err Framing Secs, 0 Unavailable Secs
    0 Line Errored Secs, 0 C-bit Errored Secs, 0 C-bit Severely Errored Secs
  Total Data (last 1 15 minute intervals):
    0 Line Code Violations, 0 P-bit Coding Violation,
    0 C-bit Coding Violation,
    0 P-bit Err Secs, 0 P-bit Severely Err Secs,
    0 Severely Err Framing Secs, 0 Unavailable Secs,
    0 Line Errored Secs, 0 C-bit Errored Secs, 0 C-bit Severely Errored Secs

T1 1 is down, speed: 1536 kbs, non-inverted data
timeslots: 1-24
FDL per ANSI T1.403 and AT&T 54016 spec.
Configured for FDL Remotely Line Looped
No alarms detected.
Framing is ESF, LineCode is B8ZS, Clock Source is Internal.
BERT test result (running)
  Test Pattern: All 0's, Status: Sync, Sync Detected: 1
  Interval: 4 minute(s), Tim Remain: 4 minute(s)
  Bit Errors (Sync BERT Started): 0 bits
  Bit Errors (Sync last Sync): 0 bits, Bits Received: 7 Mbits

...

T1 15 is up, speed: 1536 kbs, non-inverted data
timeslots: 1-24
No alarms detected.
Framing is ESF, LineCode is B8ZS, Clock Source is Internal.
Data in current interval (69 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs, 0 Stuffed Secs
Total Data (last 1 15 minute intervals):
  0 Line Code Violations, 0 Path Code Violations,
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins,
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs, 0 Stuffed Secs

```

The following is partial sample output from the **show controller t3 brief** command:

```
router# show controllers t3 3/0/0 brief
T3 3/0/0 is up.
  CT3 H/W Version: 4, CT3 ROM Version: 0.116, CT3 F/W Version: 0.10.0
  Mxt H/W version: 2, Mxt ucode ver: 1.24
  Applique type is Channelized T3
  No alarms detected.
  FEAC code received: No code is being received
  Framing is M23, Line Code is B3ZS, Clock Source is Internal.
  Ext1: LOS, Ext2: LOS, Ext3: LOS, Test: OK

  T1 1 is up, speed: 1536 kbs, non-inverted data
  timeslots: 1-24
  FDL per ANSI T1.403 and AT&T 54016 spec.
  Configured for FDL Remotely Line Looped
  No alarms detected.
  Framing is ESF, LineCode is B8ZS, Clock Source is Internal.
  BERT test result (done)
    Test Pattern: All 0's, Status: Not Sync, Sync Detected: 1
    Interval: 4 minute(s), Tim Remain: 0 minute(s)
    Bit Errors(Sync BERT Started): 0 bits
    Bit Errors(Sync last Sync): 0 bits, Bits Received: 368 Mbits
  ...
```

The following is partial sample output from the **show controllers t3 tabular** command:

```
router# show controllers t3 3/0/0 tabular
T3 3/0/0 is up.
  CT3 H/W Version: 4, CT3 ROM Version: 1.2, CT3 F/W Version: 2.1.0
  Mx H/W version: 2, Mx ucode ver: 1.25
  Applique type is Channelized T3
  No alarms detected.
  MDL transmission is disabled

  FEAC code received: No code is being received
  Framing is C-BIT Parity, Line Code is B3ZS, Clock Source is Internal.
  Ext1: AIS, Ext2: LOS, Ext3: LOS, Test: LOS
  INTERVAL      LCV  PCV  CCV  PES  PSES  SEFS  UAS  LES  CES  CSES
  08:56-09:11   0    0    0    0    0    0    0    0    0    0
  08:41-08:56   0    0    0    0    0    0    0    0    0    0
  08:26-08:41   0    0    0    0    0    0    0    0    0    0
  Total          0    0    0    0    0    0    0    0    0    0

  T1 2 is up, speed: 1536 kbs, non-inverted data
  timeslots: 1-24
  FDL per AT&T 54016 spec.
  No alarms detected.
  Framing is ESF, Line Code is B8ZS, Clock Source is Internal.
  INTERVAL      LCV  PCV  CSS  SELS  LES  DM  ES  BES  SES  UAS  SS
  08:56-09:11   0    0    0    0    0    0    0    0    0    0    0
  08:41-08:56   0    0    0    0    0    0    0    0    0    0    0
  08:26-08:41   0    0    0    0    0    0    0    0    0    0    0
  Total          0    0    0    0    0    0    0    0    0    0    0
```

The following is partial sample output from the **show controller t3 remote performance** command. This information is available if the **t1 fdl ansi** controller command is enabled for a T1 channel on a CT3IP.

```
Router# show controller t3 3/0/0 remote performance
T3 3/0/0 is up.
CT3 H/W Version: 4, CT3 ROM Version: 0.116, CT3 F/W Version: 20.2.0
Mx H/W version: 2, Mx ucode ver: 1.25

T1 1 - Remote Performance Data
Data in current interval (356 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
Data in Interval 1:
  1 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  2 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
Data in Interval 2:
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
Total Data (last 2 15 minute intervals):
  1 Path Code Violations
  1 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins,
  2 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs
  0 Unavail Secs
...
```

Table 49 describes the **show controller t3** display fields.

Table 49 Show Controller T3 Field Descriptions

Field	Description
T3 3/0/0 is up	T3 controller in slot 3 is operating. The controller's state can be up, down, administratively down. Loopback conditions are shown by (Locally looped) or (Remotely Looped).
CT3 H/W Version	Version number of the hardware.
CT3 ROM Version	Version number of the ROM.
CT3 F/W Version	Version number of the firmware.
Mx HW version	Hardware version number of the HDLC controller chip.
Mx ucode ver	Microcode version of the HDLC controller chip.
Applique type	Controller type.
No alarms detected	Any alarms detected by the controller are displayed here. Possible alarms are as follows: <ul style="list-style-type: none"> • Transmitter is sending remote alarm. • Transmitter is sending AIS. • Receiver has loss of signal. • Receiver is getting AIS. • Receiver has loss of frame. • Receiver has remote alarm. • Receiver has no alarms.

Table 49 Show Controller T3 Field Descriptions (Continued)

Field	Description
MDL transmission is disabled	Status of the maintenance data link (either enabled or disabled).
FEAC code received	<p>Whether or not a far-end alarm code request is being received. Possible values are as follows:</p> <ul style="list-style-type: none"> • DS3 Eqpt. Failure (SA) • DS3 LOS/HBER • DS3 Out-of-Frame • DS3 AIS Received • DS3 IDLE Received • DS3 Eqpt. Failure (NSA) • Common Eqpt. Failure (NSA) • Multiple DS1 LOS/HBER • DS1 Eqpt. Failure • Single DS1 LOS/HBER • DS1 Eqpts Failure (NSA) • No code is being received
Framing is M23	Framing type on the CT3IP. Values are: M23, C-Bit, and Auto-detect.
Line Code is B3ZS	Line coding format on the CT3IP.
Clock Source is Internal	Clock source on the CT3IP. Values are: internal or line.
BERT test result	<p>BERT test information is available if the t1 bert controller command is enabled for the T1 channel on the CT3IP. The BERT results include the following information:</p> <ul style="list-style-type: none"> • Test Pattern—Type of test pattern selected. • Status—Status of the test. • Sync Detected—Number of times the pattern synch is detected (that is, the number of times the pattern goes from No Sync to Sync). • Interval—Duration selected. • Time Remain—Time remaining on the BERT test. • Bit Errors(Sync BERT Started)—Number of bit errors during the BERT test. • Bit Errors(Sync last Sync)—Number of bit errors since the last patter sync was detected. • Bits Received—Total bits received. <p>When the T1 channel has a BERT test running, the line state is DOWN. Also, when the BERT test is running and the Status field is Not Sync, the information in the total bit errors field is not valid. When the BERT test is done, the Status field is not relevant.</p>
Data in current interval (39 seconds elapsed)	Shows the current accumulation period, which rolls into the 24-hour accumulation every 15 minutes. Accumulation period is from 1 to 900 seconds. The oldest 15-minute period falls off the back of the 24-hour accumulation buffer.
Line Code Violations	Line Code Violations (LCV) is a count of both Bipolar Violations (BPs) and Excessive Zeros (EXZs) occurring over the accumulation period. An EXZ increments the LCV by one regardless of the length of the zero string.

Table 49 Show Controller T3 Field Descriptions (Continued)

Field	Description
P-bit Coding Violation	For all DS3 applications, a P-bit coding violation (PVC) error event is a P-bit parity error event. A P-bit parity error event is the occurrence of a received P-bit code on the DS3 M-frame that is not identical to the corresponding locally calculated code.
C-bit Coding Violation	For C-bit parity and SYNTRAN DS3 applications, the C-bit coding violation (CCV) is the count of coding violations reported via the C-bits. For C-bit parity, it is the count of CP-bit parity errors occurring in the accumulation interval. For SYNTRAN, it is a count of CRC-9 errors occurring in the accumulation interval.
P-bit Err Secs	P-bit errored seconds (PES) is a second with one or more PCVs, one or more out of frame defects, or a detected incoming AIS. This gauge is not incremented when unavailable seconds are counted.
P-bit Severely Err Secs	P-bit severely errored seconds (PSES) is a second with 44 or more PCVs, one or more out of frame defects, or a detected incoming AIS. This gauge is not incremented when unavailable seconds are counted.
Severely Err Framing Secs	Severely errored framing seconds (SEFS) is a second with one or more out of frame defects or a detected incoming AIS.
Unavailable Secs	Unavailable seconds (UAS) are calculated by counting the number of seconds that the interface is unavailable. For more information, refer to RFC 1407.
Line Err Secs	Line errored seconds (LES) is a second in which one or more code violations occurred or one or more LOS defects.
C-bit Errored Secs	C-bit errored seconds (CES) is a second with one or more C-bit code violations (CCV), one or more Out of Frame defects, or a detected incoming AIS. This gauge is not incremented when UASs are counted.
C-bit Severely Errored Secs	C-bit severely errored seconds (CSES) is a second with 44 or more CCVs, one or more Out of Frame defects, or a detected incoming AIS. This gauge is not incremented when UASs are counted.
Total Data (last 1 15 minute intervals)	Shows the last 15-minute accumulation period.
T1 1 is up	T1 channel is operating. The channel's state can be up, down, administratively down. Loopback conditions are shown by (Locally looped) or (Remotely looped).
speed	Speed of the T1 channel in kbps.
non-inverted data	Indicates if the T1 channel is configured for inverted data.
timeslots	Timeslots assigned to the T1 channel.
FDL per AT&T 54016 spec.	Performance monitoring is via Facility Data Link per ANSI T1.403.
No alarms detected	Any alarms detected by the T1 controller are displayed here. Possible alarms are as follows: <ul style="list-style-type: none"> • Transmitter is sending remote alarm. • Transmitter is sending AIS. • Receiver has loss of signal. • Receiver is getting AIS. • Receiver has loss of frame. • Receiver has remote alarm. • Receiver has no alarms.

Table 49 Show Controller T3 Field Descriptions (Continued)

Field	Description
Framing is ESF	Type of framing used on the T1 channel. Values are: ESF or SF.
LineCode is B8ZS	Type of line coding used on the T1 channel. Values are: B8ZS or AMI.
Clock Source is Internal	Clock source on the T1 channel. Values are: internal or line.
Path Code Violations	Path coding violation (PCV) error event is a frame synchronization bit error in the D4 and E1-noCRC formats or a CRC error in the ESF and E1-CRC formats.
Slip Secs	Controlled slip second (CSS) is a one-second interval containing one or more controlled slips.
Fr Loss Secs	Frame loss seconds (SELS) is the number of seconds an Out Of Frame (OOF) error is detected.
Line Err Secs	Line errored seconds (LES) is a second in which one or more line code violation errors are detected.
Degraded Mins	Degraded minute (DM) is one in which the estimated error rate exceeds 1E-6 but does not exceed 1E-3. For more information, refer to RFC 1406.
Errored Secs	Errored seconds (ES) is a second with one or more path coding violations, one or more Out of Frame defects, or one or more controlled slip events or a detected AIS defect.
Bursty Err Secs	Bursty errored seconds (BES) is a second with fewer than 320 and more than one path coding violation error events, no Severely Errored Frame defects, and no detected incoming AIS defects. Controlled slips are not included in this parameter.
Severely Err Secs	Severely errored seconds (SES) is a second with 320 or more path code violation errors events, one or more Out of Frame defects, or a detected AIS defect.
Stuffed Secs	Stuffed seconds (SS) is a second in which one more bit stuffings take place. This happens when the Pulse Density Enforcer detects a potential violation in the output stream and inserts a 1 to prevent it. Such bit stuffings corrupt user data and indicate the network is misconfigured. This counter can be used to help diagnose this situation.

t1 bert

To enable or disable a BERT test pattern for a T1 channel on the Channelized T3 Interface Processor (CT3IP) in Cisco 7000 series routers with the RSP7000 and RSP7000CI and in Cisco 7500 series routers, use the **t1 bert** controller configuration command. To disabled a BERT test pattern, use the **no** form of this command.

```
t1 channel bert pattern {0s | 1s | 2^15 | 2^20 | 2^23} interval minutes
no t1 channel bert pattern {0s | 1s | 2^15 | 2^20 | 2^23} interval minutes
```

Syntax Description

<i>channel</i>	Number between 1 and 28 that indicates the T1 channel.
pattern {0s 1s 2^15 2^20 2^23}	Specifies the length of the repeating BERT test pattern. Values are: <ul style="list-style-type: none"> 0s—Repeating pattern of zeros (...000...). 1s—Repeating pattern of ones (...111...). 2^15—Pseudo-random repeating pattern that is 32767 bits in length. 2^20—Pseudo-random repeating pattern that is 1048575 bits in length. 2^23—Pseudo-random repeating pattern that is 8388607 bits in length.
interval <i>minutes</i>	Specifies the duration of the BERT test. The interval can be a value from 1 to 14400 minutes.

Default

No BERT test is performed.

Command Mode

Controller configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1 CA.

The BERT test patterns from the CT3IP are framed test patterns (that is, the test patterns are inserted into the payload of the framed T1 signal).

To view the BERT results, use the **show controller t3** or **show controller t3 brief EXEC** command. The BERT results include the following information:

- Type of test pattern selected
- Status of the test
- Interval selected
- Time remaining on the BERT test

- Total bit errors
- Total bits received

When the T1 channel has a BERT test running, the line state is DOWN. Also, when the BERT test is running and the Status field is Not Sync, the information in the Bit Errors field is not valid. When the BERT test is done, the Status field is not relevant.

The **t1 bert** command is not written to NVRAM because it is only used for testing the T1 channel for a short predefined interval and to avoid accidentally saving the command, which could cause the interface not to come up the next time the router reboots.

Note T1 channels on the CT3IP are numbered 1 to 28 rather than the more traditional zero-based scheme (0 to 27) used with other Cisco products. This is to ensure consistency with telco numbering schemes for T1 channels within channelized T3 equipment.

Example

In the following example, a BERT test pattern of all zeros is run for 30 minutes on T1 channel 6 on the CT3IP in slot 9:

```
controller t3 9/0/0
  t1 6 bert pattern 0s interval 30
```

t1 fdl ansi

To enable the one-second transmission of the remote performance reports via the Facility Data Link (FDL) per ANSI T1.403 for a T1 channel on the Channelized T3 Interface Processor (CT3IP) in Cisco 7000 series routers with the RSP7000 and RSP7000CI and in Cisco 7500 series routers, use the **t1 fdl ansi** controller configuration command. Use the **no** form of this command to disable the performance report.

```
t1 channel fdl ansi  
no t1 channel fdl ansi
```

Syntax Description

channel Number between 1 and 28 that indicates the T1 channel.

Default

Disabled

Command Mode

Controller configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1 CA.

The **t1 fdl ansi** command can be used only if the T1 framing type is extended superframe (ESF).

To display the remote performance report information, use the **show controllers t3 remote performance** command.

Note T1 channels on the CT3IP are numbered 1 to 28 rather than the more traditional zero-based scheme (0 to 27) used with other Cisco products. This is to ensure consistency with telco numbering schemes for T1 channels within channelized T3 equipment.

Example

In the following example, the performance reports are generated for T1 channel 8 on the CT3IP:

```
controller t3 9/0/0  
t1 8 fdl ansi
```

Related Command

show controller t3

Supported MIBs

The CT3IP supports RFC 1406 and RFC 1407 (CISCO-RFC-1407-CAPABILITY.my). For information on accessing Cisco MIB files, refer to the *Cisco MIB User Quick Reference*.

For RFC 1406, Cisco supports all tables except the “Frac” table. For RFC 1407, Cisco supports all tables except the “FarEnd” tables.

What to Do Next

For more information on the CT3IP, refer to the *Channelized T3 Interface Processor (CT3IP) Installation and Configuration* publication. For more information on the PA-CT3/4T1, refer to the *Channelized T3 Dual-Wide Port Adapter Installation and Configuration* publication.