JUNIPER NETWORKS

Junos® OS

Channelized OC48/STM16 IQE Interfaces Feature Guide for Routing Devices

Published: 2013-08-01

Copyright © 2013, Juniper Networks, Inc.

Juniper Networks, Inc.
1194 North Mathilda Avenue
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

This product includes the Envoy SNMP Engine, developed by Epilogue Technology, an Integrated Systems Company. Copyright © 1986-1997, Epilogue Technology Corporation. All rights reserved. This program and its documentation were developed at private expense, and no part of them is in the public domain.

This product includes memory allocation software developed by Mark Moraes, copyright © 1988, 1989, 1993, University of Toronto.

This product includes FreeBSD software developed by the University of California, Berkeley, and its contributors. All of the documentation and software included in the 4.4BSD and 4.4BSD-Lite Releases is copyrighted by the Regents of the University of California. Copyright © 1979, 1980, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994. The Regents of the University of California. All rights reserved.

GateD software copyright © 1995, the Regents of the University. All rights reserved. Gate Daemon was originated and developed through release 3.0 by Cornell University and its collaborators. Gated is based on Kirton's EGP, UC Berkeley's routing daemon (routed), and DCN's HELLO routing protocol. Development of Gated has been supported in part by the National Science Foundation. Portions of the GateD software copyright © 1988, Regents of the University of California. All rights reserved. Portions of the GateD software copyright © 1991, D. L. S. Associates.

This product includes software developed by Maker Communications, Inc., copyright © 1996, 1997, Maker Communications, Inc.

Juniper Networks, Junos, Steel-Belted Radius, NetScreen, and ScreenOS are registered trademarks of Juniper Networks, Inc. in the United States and other countries. The Juniper Networks Logo, the Junos logo, and JunosE are trademarks of Juniper Networks, Inc. All other trademarks, service marks, registered trademarks, or registered service marks are the property of their respective owners.

Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

Products made or sold by Juniper Networks or components thereof might be covered by one or more of the following patents that are owned by or licensed to Juniper Networks: U.S. Patent Nos. 5,473,599, 5,905,725, 5,909,440, 6,192,051, 6,333,650, 6,359,479, 6,406,312, 6,429,706, 6,459,579, 6,493,347, 6,538,518, 6,538,899, 6,552,918, 6,567,902, 6,578,186, and 6,590,785.

Junos® OS Channelized OC48/STM16 IQE Interfaces Feature Guide for Routing Devices
Copyright © 2013, Juniper Networks, Inc.
All rights reserved.

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at http://www.juniper.net/support/eula.html. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

Table of Contents

About the Documentation xi
Documentation and Release Notes xi
Supported Platforms xi
Using the Examples in This Manual xii
Merging a Full Example xii
Merging a Snippet xiii
Documentation Conventions xiii
Documentation Feedback xv
Requesting Technical Support xv
Self-Help Online Tools and Resources xv
Opening a Case with JTAC xvi

Part 1 Overview

Chapter 1 **Channelized OC48/STM16 IQE Interfaces 3**

Channelized OC48/STM16 IQE Interfaces Overview 3

Part 2 Configuration

Chapter 2 **Channelized OC48/STM16 IQE Interfaces 9**

Configuring Channelized OC48/STM16 IQE Interfaces in SONET Mode 9
Configuring OC12 Interfaces 9
Example: Configuring OC12 Interfaces 10
Configuring OC3 Interfaces 10
Example: Configuring OC3 Interfaces 11
Configuring T3 Interfaces 11
Example: Configuring T3 Interfaces 12
Configuring T1 Interfaces 12
Example: Configuring T1 Interfaces 13
Configuring Fractional T1 Interfaces 14
Example: Configuring Fractional T1 Interfaces 14
Configuring NxDS0 Interfaces 14
Example: Configuring NxDS0 Interfaces 16
Configuring Channelized OC48/STM16 IQE Interfaces (SDH Mode) 16
Configuring a Channelized OC48/STM16 IQE PIC for SDH Mode 17
Configuring Clear Channel STM1 and STM4 Interfaces 17
Configuring Channelized AU-4 Interfaces 18
Example: Configuring Channelized AU-4 Interfaces 18
Configuring E3 Interfaces 18
Example: Configuring E3 Interfaces 19

Copyright © 2013, Juniper Networks, Inc.

Configuring E1 or Channelized E1 Interfaces . . . 19
Example: Configuring E1 and Channelized E1 Interfaces . . . 20
Configuring NxDS0 IQE Interfaces . . . 20
Example: Configuring NxDS0 IQE Interfaces . . . 20
Configuring T3 or Channelized T3 Interfaces . . . 20
Example: Configuring T3 or Channelized T3 Interfaces . . . 21
Configuring T1 or Channelized T1 Interfaces . . . 21
Example: Configuring T1 or Channelized T1 Interfaces . . . 21
Configuring Link PIC Failover on Channelized OC48/STM16 IQE Interfaces . . . 22
Example: Configuring Channelized OC48 Interfaces with Partitioned Channels . . . 22

Chapter 3 Network Interfaces Configuration Statements and Hierarchy . . . 25

[edit chassis] Hierarchy Level . . . 25
[edit interfaces] Hierarchy Level . . . 26
[edit logical-systems] Hierarchy Level . . . 42

Chapter 4 Statement Summary . . . 49

fast-aps-switch . . . 49
interface-type (Interfaces) . . . 50
no-termination-request . . . 51
oc-slice . . . 52
partition . . . 53
timeslots . . . 54

Part 3 Administration

Chapter 5 Monitoring Commands . . . 59

show interfaces (Aggregated SONET/SDH) . . . 60
show interfaces (Channelized DS3-to-DS0) . . . 67
show interfaces (Channelized DS3-to-DS1) . . . 78
show interfaces (Channelized E1 IQ) . . . 81
show interfaces (Channelized E1) . . . 85
show interfaces (Channelized OC12 IQ and IQE) . . . 96
show interfaces (Channelized OC12) . . . 100
show interfaces (Channelized OC3 IQ and IQE) . . . 104
show interfaces (Channelized OC48 IQ and IQE) . . . 123
show interfaces (Channelized STM1 IQ) . . . 125
show interfaces (Channelized STM1) . . . 128
show interfaces (Channelized T1 IQ) . . . 143
show interfaces (Channelized T3 IQ) . . . 155
show interfaces (SONET/SDH) . . . 157
show interfaces (T1, E1, or DS) . . . 185
show interfaces (T3 or E3) . . . 210

Chapter 6 Command Summaries . . . 227

Channelized OC Interface Operational Commands . . . 227

Copyright © 2013, Juniper Networks, Inc.

Part 4 Troubleshooting

Chapter 7 Interface Diagnostics 231

Interface Diagnostics 231
Configuring Loopback Testing 231
Interface Diagnostics 233
Starting and Stopping a BERT Test 237
Example: Configuring Bit Error Rate Testing 237

Part 5 Index

Index 241

Copyright © 2013, Juniper Networks, Inc.

Copyright © 2013, Juniper Networks, Inc.

List of Figures

Part 1 Overview

Chapter 1 Channelized OC48/STM16 IQE Interfaces 3

Figure 1: Sample Channelization of OC48/STM16 IQE PIC (SONET Mode) 3
Figure 2: Sample Channelization of OC48/STM16 IQE PIC (SDH Mode) 4
Figure 3: Sample Channelization of OC48/STM16 IQE PIC to E3 Channels 4

Part 2 Configuration

Chapter 2 Channelized OC48/STM16 IQE Interfaces 9

Figure 4: T1 Interfaces on a Channelized OC48 PIC 13
Figure 5: Sample Channelization of OC48 IQE PIC 16

Copyright © 2013, Juniper Networks, Inc.

Copyright © 2013, Juniper Networks, Inc.

List of Tables

About the Documentation xi

Table 1: Notice Icons xiii
Table 2: Text and Syntax Conventions xiv

Part 3 Administration

Chapter 5 Monitoring Commands 59

Table 3: Aggregated SONET/SDH show interfaces Output Fields 60
Table 4: Channelized DS3 show interfaces Output Fields 67
Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields 85
Table 6: Channelized OC show interfaces Output Fields 105
Table 7: Channelized STM1 show interfaces Output Fields 128
Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields 143
Table 9: SONET/SDH show interfaces Output Fields 157
Table 10: T1 or E1 show interfaces Output Fields 186
Table 11: T3 or E3 show interfaces Output Fields 210

Chapter 6 Command Summaries 227

Table 12: Channelized OC Interface Operational Mode Commands 227

Part 4 Troubleshooting

Chapter 7 Interface Diagnostics 231

Table 13: Loopback Modes by Interface Type 232
Table 14: BERT Capabilities by Interface Type 236

Copyright © 2013, Juniper Networks, Inc.

Copyright © 2013, Juniper Networks, Inc.

About the Documentation

- Documentation and Release Notes on page xi
- Supported Platforms on page xi
- Using the Examples in This Manual on page xii
- Documentation Conventions on page xiii
- Documentation Feedback on page xv
- Requesting Technical Support on page xv

Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at http://www.juniper.net/techpubs/.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at http://www.juniper.net/books.

Supported Platforms

For the features described in this document, the following platforms are supported:

- M320
- M120
- M40e
- MX960
- MX480
- MX240
- T Series

Copyright © 2013, Juniper Networks, Inc.

Using the Examples in This Manual

If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   system {
     scripts {
       commit {
         file ex-script.xsl;
       }
     }
   }
   interfaces {
     fxp0 {
       disable;
       unit 0 {
         family inet {
           address 10.0.0.1/24;
         }
       }
     }
   }
   ```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

   ```
   [edit]
   user@host# load merge /var/tmp/ex-script.conf
   load complete
   ```


Copyright © 2013, Juniper Networks, Inc.

Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

   ```
   commit {
     file ex-script-snippet.xsl; }
   ```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

   ```
   [edit]
   user@host# edit system scripts
   [edit system scripts]
   ```

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

   ```
   [edit system scripts]
   user@host# load merge relative /var/tmp/ex-script-snippet.conf
   load complete
   ```

For more information about the **load** command, see the *CLI User Guide*.

Documentation Conventions

Table 1 on page xiii defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.

Table 2 on page xiv defines the text and syntax conventions used in this guide.

Copyright © 2013, Juniper Networks, Inc.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the**configure** command: user@host> **configure**
`Fixed-width text like this`	Represents output that appears on the terminal screen.	`user@host>` **show chassis alarms** `No alarms currently active`
Italic text like this	• Introduces or emphasizes important new terms. • Identifies book names. • Identifies RFC and Internet draft titles.	• A policy *term* is a named structure that defines match conditions and actions. • *Junos OS System Basics Configuration Guide* • RFC 1997, *BGP Communities Attribute*
Italic text like this	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# **set system domain-name** *domain-name*
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	• To configure a stub area, include the **stub** statement at the**[edit protocols ospf area area-id]** hierarchy level. • The console port is labeled **CONSOLE**.
< > (angle brackets)	Enclose optional keywords or variables.	**stub <default-metric** ***metric*****>;**
| (pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	**broadcast | multicast** **(*string1* | *string2* | *string3*)**
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	**rsvp { # Required for dynamic MPLS only**
[ ] (square brackets)	Enclose a variable for which you can substitute one or more values.	**community name members [** ***community-ids*** **]**

Indention and braces ({ })	Identify a level in the configuration hierarchy.	[edit]
		routing-options {
		  static {
		  route default {
		  nexthop *address*;
		  retain;
		  }
		  }
		}

; (semicolon)	Identifies a leaf statement at a configuration hierarchy level.	

GUI Conventions

Copyright © 2013, Juniper Networks, Inc.

Table 2: Text and Syntax Conventions *(continued)*

Convention	Description	Examples
Bold text like this	Represents graphical user interface (GUI) items you click or select.	• In the Logical Interfaces box, select **All Interfaces**. • To cancel the configuration, click **Cancel**.
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select **Protocols>Ospf**.

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to techpubs-comments@juniper.net, or fill out the documentation feedback form at https://www.juniper.net/cgi-bin/docbugreport/ . If you are using e-mail, be sure to include the following information with your comments:

- Document or topic name
- URL or page number
- Software release version (if applicable)

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit http://www.juniper.net/support/warranty/.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/

Copyright © 2013, Juniper Networks, Inc.

- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/
- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://tools.juniper.net/SerialNumberEntitlementSearch/

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at http://www.juniper.net/cm/.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see http://www.juniper.net/support/requesting-support.html.

Copyright © 2013, Juniper Networks, Inc.

PART 1

Overview

- Channelized OC48/STM16 IQE Interfaces on page 3

Copyright © 2013, Juniper Networks, Inc.

 Copyright © 2013, Juniper Networks, Inc.

CHAPTER 1

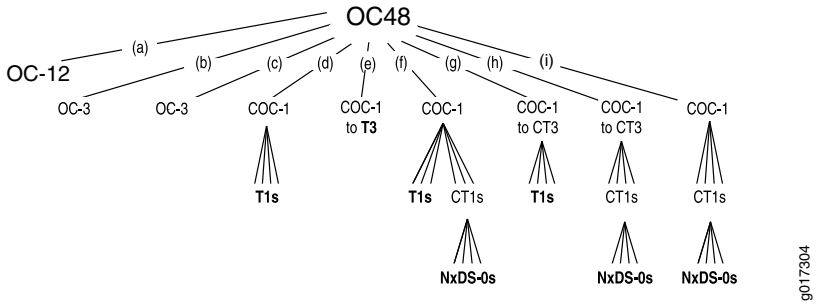
Channelized OC48/STM16 IQE Interfaces

- Channelized OC48/STM16 IQE Interfaces Overview on page 3

Channelized OC48/STM16 IQE Interfaces Overview

Channelized enhanced intelligent queuing (IQE) interfaces allow arbitrary and dynamic channelization of serial links, allowing greater flexibility than the channelized interfaces. Figure 1 on page 3, Figure 2 on page 4, and Figure 3 on page 4 illustrate the Channelized OC48/STM16 IQE Physical Interface Cards (PICs) in several examples of many possible configurations.

Figure 1: Sample Channelization of OC48/STM16 IQE PIC (SONET Mode)



Bold entries correspond to actual packet channels.

In the example in Figure 1 on page 3, a Channelized OC48/STM16 IQE PIC operating in SONET mode is partitioned into the following OC slices:

a. A clear channel OC12 interface.

b. An OC3 interface.

c. A channelized COC1 partitioned into T1 interfaces.

d. A channelized COC1 partitioned into a T3 interface.

e. A channelized COC1 partitioned into CT3, partitioned into T1 interfaces, and CT1s partitioned into *N*xDS0 interfaces.

f. A channelized COC1 partitioned into CT3, partitioned into T1 interfaces.

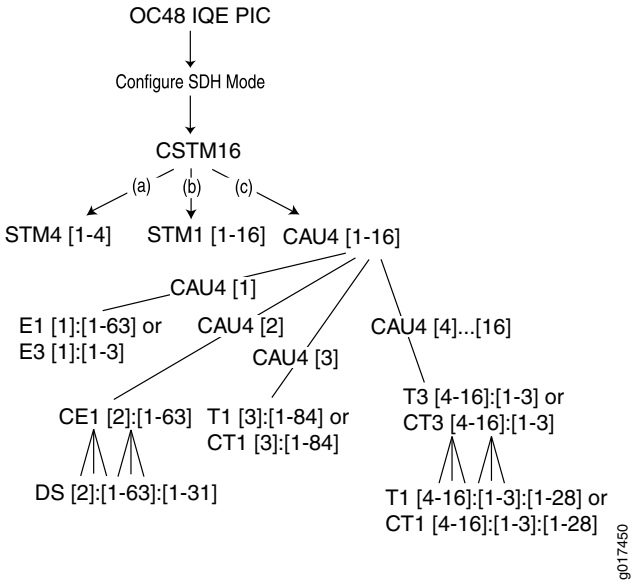
Copyright © 2013, Juniper Networks, Inc.

g. A channelized COC1 partitioned into CT3, partitioned into CT1s, partitioned into *N*xDS0 interfaces.

h. A channelized COC1 partitioned into CT1s, partitioned into *N*xDS0 interfaces.

This is one of thousands of ways to configure a Channelized OC48/STM16 IQE PIC. To configure the interfaces shown in Figure 2 on page 4, see "Configuring Channelized OC48/STM16 IQE Interfaces (SDH Mode)" on page 16.

Figure 2: Sample Channelization of OC48/STM16 IQE PIC (SDH Mode)



In Figure 2 on page 4, a Channelized OC48/STM16 IQE PIC operating in SDH mode results in a channelized STM16 interface, which can partitioned as the following:

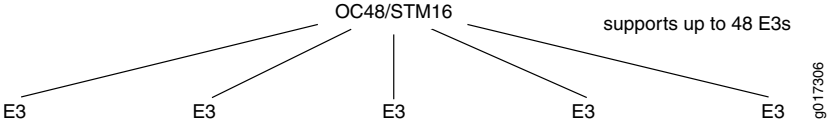
a. Up to 4 STM4s.

b. Up to 16 STM1s.

c. Up to 16 CAU4s that can each be partitioned into up to 63 E1s, up to 3 E3s, or up to 63 CE1s. Up to 16 CAU4s that can each be partitioned into up to 84 T1s, 84 CT1s, 63 E1s, 63 CE1s, 3 E3s, 3 T3s or 3 CT3s. Each CE1 can be partitioned into up to 31 NxDS0s. Each CT1 can be partitioned into up to 24 NxDS0s. Each CT3 can be partitioned into up to 28 T1s or 28 CT1s.

This is one of thousands of ways to configure a Channelized OC48/STM16 IQE PIC.

Figure 3: Sample Channelization of OC48/STM16 IQE PIC to E3 Channels



Copyright © 2013, Juniper Networks, Inc.

Figure 3 on page 4 shows five E3 channels configured on the Channelized OC48/STM16 IQE PIC. You can configure 43 additional E3 channels. For more information about configuring E3 channels on Channelized OC48/STM16 IQE PICs, see "Configuring E3 Interfaces" on page 18.

For a full configuration example, see the *Junos OS Feature Guides*.

Copyright © 2013, Juniper Networks, Inc.

 Copyright © 2013, Juniper Networks, Inc.

PART 2

Configuration

- Channelized OC48/STM16 IQE Interfaces on page 9
- Network Interfaces Configuration Statements and Hierarchy on page 25
- Statement Summary on page 49

Copyright © 2013, Juniper Networks, Inc.

 Copyright © 2013, Juniper Networks, Inc.

CHAPTER 2

Channelized OC48/STM16 IQE Interfaces

- Configuring Channelized OC48/STM16 IQE Interfaces in SONET Mode on page 9
- Configuring Channelized OC48/STM16 IQE Interfaces (SDH Mode) on page 16
- Configuring Link PIC Failover on Channelized OC48/STM16 IQE Interfaces on page 22
- Example: Configuring Channelized OC48 Interfaces with Partitioned Channels on page 22

Configuring Channelized OC48/STM16 IQE Interfaces in SONET Mode

- Configuring OC12 Interfaces on page 9
- Configuring OC3 Interfaces on page 10
- Configuring T3 Interfaces on page 11
- Configuring T1 Interfaces on page 12
- Configuring Fractional T1 Interfaces on page 14
- Configuring NxDS0 Interfaces on page 14

Configuring OC12 Interfaces

You can configure up to four OC12 interfaces on a 1-port Channelized OC48/STM16 IQE PIC. To configure an OC12 interface, include the **partition**, **oc-slice**, and **interface-type** statements at the **[edit interfaces coc48-*fpc/pic/port*]** hierarchy level, specifying the **so** interface type:

```
[edit interfaces coc48-fpc/pic/port]
partition partition-number oc-slice oc-slice-range interface-type so;
```

The partition number is the sublevel interface partition index. For SONET/SDH interfaces, the partition number does not correlate with bandwidth size. For OC12 interfaces, the partition number can be from 1 through 4.

NOTE: For channelized OC48 IQE interfaces, channel numbering begins with 1 (:1).

The OC-slice range is the range of SONET/SDH slices. For SONET/SDH interfaces, the OC-slice range specifies the bandwidth size required for the interface type you are

Copyright © 2013, Juniper Networks, Inc.

configuring. OC12 interfaces must occupy 12 consecutive OC slices per interface, in one of the following forms:

- 1–12
- 13–24
- 25–26
- 37–48

By contrast, the T3 and OC1 interfaces each occupy one OC slice per interface and OC3 interfaces occupy three slices per interface.

The interface type is the channelized interface type or data channel you are creating. For channelized OC48 IQE interfaces, the interface type can be **so**.

Example: Configuring OC12 Interfaces

Configure an OC12 interface, using partition 1 and OC slices 1 through 12. This configuration creates interface **so-1/1/0:1**.

```
[edit interfaces coc48-1/1/0]
partition 1 oc-slice 1-12 interface-type so;
```

For a full configuration example, see the *Junos OS Feature Guides*.

Configuring OC3 Interfaces

To configure an OC3 interface, include the **partition**, **oc-slice**, and **interface-type** statements at the **[edit interfaces coc48-*fpc/pic/port*]** hierarchy level, specifying the **so** interface type:

```
[edit interfaces coc48-fpc/pic/port]
partition partition-number oc-slice oc-slice-range interface-type so;
```

The partition number is the sublevel interface partition index. For SONET/SDH interfaces, the partition number does not correlate with bandwidth size. For OC3 interfaces, the partition number can be from 1 through 16.

NOTE: For channelized OC48 IQE interfaces, channel numbering begins with 1 (:1).

The OC-slice range is the range of SONET/SDH slices. For SONET/SDH interfaces, the OC-slice range specifies the bandwidth size required for the interface type you are configuring. OC3 interfaces must occupy three consecutive OC slices per interface, in one of the following forms:

- 1–3
- 4–6
- 7–9
- 10–12
- and so on (in groups of 3), up to 48

Copyright © 2013, Juniper Networks, Inc.

By contrast, the T3 and OC1 interfaces each occupy one OC slice per interface.

The interface type is the channelized interface type or data channel you are creating. For channelized OC48 IQE interfaces, the interface type can be **so**.

Example: Configuring OC3 Interfaces

Configure an OC3 interface, using partition 1 and OC slices 4 through 6. This configuration creates interface **so-1/1/0:1**.

```
[edit interfaces coc48-1/1/0]
partition 1 oc-slice 4-6 interface-type so;
```

For a full configuration example, see the *Junos OS Feature Guides*.

Configuring T3 Interfaces

To configure a T3 interface on an OC48/STM16 IQE PIC, include the **partition**, **oc-slice**, and **interface-type** statements at the **[edit interfaces coc48-*fpc/pic/port*]** hierarchy level, specifying the **coc1** interface type:

```
[edit interfaces coc48-fpc/pic/port]
partition partition-number oc-slice oc-slice-range interface-type coc1;
```

This configuration creates interface **coc1-*fpc/pic/port*:*channel***.

Then, include the **no-partition interface-type** statement at the **[edit interfaces coc1-*fpc/pic/port*:*channel*]** hierarchy level, specifying the **t3** interface type:

```
[edit interfaces coc1-fpc/pic/port:channel]
no-partition interface-type t3;
```

This configuration creates interface **t3-*fpc/pic/port*:*channel***.

The partition number is the sublevel interface partition index and is correlated with the channel number. For channelized OC1 interfaces, the partition number can be from 1 through 48. For channelized OC48/STM16 IQE interfaces, channel numbering begins with 1 (:1).

The OC-slice range is the range of SONET/SDH slices. For SONET/SDH interfaces, the OC-slice range specifies the bandwidth size required for the interface type you are configuring. For channelized OC1 interfaces, the OC slice can be from 1 through 12. You can configure only one OC slice per channelized OC1 interface.

The interface type is the channelized interface type or clear channel you are creating. For channelized OC48 interfaces, ***type*** can be **so** or **coc1**.

Copyright © 2013, Juniper Networks, Inc.

NOTE: Channelized OC48/STM16 IQE interfaces in M Series, MX Series, and T Series routers reserve channels 0 through 3 of each OC12 space for STS3C SONET channels.

When you configure E3 or T3 channels in OC12 spaces on the described PICs, the Junos OS allocates them starting from channel 4 because channels 0 through 3 are reserved for four STS3c SONET channels. Channel numbers are allocated sequentially in the following order: 4, 5, 6, 7, 8, 9, 11, 0, 1, 2, 3.

Only after channels 4 through 11 of the OC12 space are exhausted (all 4 through 11 configured) for E3 or T3 channels will the Junos OS then allocate channel 0 through 3 space for further E3 or T3 channels; thereby using up the 0 through 3 space previously reserved for four STS3c SONET channels.

If a subsequent reconfiguration of this OC12 space occurs, where you try to replace channels 4 through 6 or 7 through 9 with an OC3 SONET channel; the configuration fails because the channel 0 through 3 space is already occupied by the last E3 or T3 channels configured. This causes a failure in channel allocation and the Device Control Daemon (DCD) keeps retrying forever to configure the channel allocation on the interface. The only resolution is to reconfigure the last configured E3/T3 channels with OC3 channels, to free channels 0 through 3.

Example: Configuring T3 Interfaces

Configure a T3 interface using partition 3 and OC slice 3. This configuration creates interface **t3-1/1/0:3**:

```
[edit interfaces coc48-1/1/0]
partition 3 oc-slice 3 interface-type coc1;
[edit interfaces coc1-1/1/0:3]
no-partition interface-type t3;
```

For a full configuration example, see the *Junos OS Feature Guides*.

Configuring T1 Interfaces

To configure T1 interfaces on a Channelized OC48 IQE PIC, perform the following tasks:

1. Partition the channelized OC48 IQE interface into channelized OC1 interfaces by including the **partition**, **oc-slice**, and **interface-type** statements at the **[edit interfaces coc48-*fpc/pic/port*]** hierarchy level, specifying the **coc1** interface type:

   ```
   [edit interfaces coc48-fpc/pic/port]
   partition partition-number oc-slice oc-slice-range interface-type coc1;
   ```

2. If your network equipment uses VT mapping, partition the channelized OC1 interface into T1 interfaces by including the **partition** and **interface-type** statements at the **[edit interfaces coc1-*fpc/pic/port*]** hierarchy level, specifying the **t1** interface type:

   ```
   [edit interfaces coc1-fpc/pic/port:channel]
   partition partition-number interface-type t1;
   ```


Copyright © 2013, Juniper Networks, Inc.

3. If your network equipment uses M13 or C-bit parity, convert the channelized OC1 interface into a channelized T3 interface by including the **no-partition** and **interface-type** statements at the **[edit interfaces coc1-*fpc/pic/port*:*channel*]** hierarchy level, specifying the **ct3** interface type. Note that because the **no-partition** statement is included, this configuration does not create another level of channelization, as denoted by the number of colons in the resulting interface.

   [edit interfaces coc1-*fpc/pic/port*:*channel*]
   no-partition *partition-number* interface-type ct3;

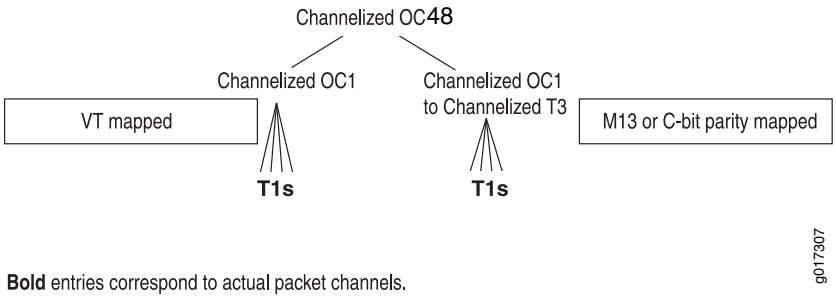
4. Partition the channelized T3 interface into T1 interfaces by including the **partition** and **interface-type** statements at the **[edit interfaces ct3-*fpc/pic/port*:*channel*]** hierarchy level, specifying the **t1** interface type:

   [edit interfaces ct3-*fpc/pic/port*:*channel*]
   partition *partition-number* interface-type t1;

NOTE: Class-of-service (CoS) rules cannot be applied to an individual channel configured on channelized IQE interfaces. You can only apply CoS rules to the aggregate bit streams.

Figure 4 on page 13 shows VT-mapped and M13 or C-bit parity-mapped configurations of T1 interfaces.

Figure 4: T1 Interfaces on a Channelized OC48 PIC



Bold entries correspond to actual packet channels.

Example: Configuring T1 Interfaces

Configure the following T1 interfaces:

t1-0/0/0:1:1
t1-0/0/0:1:2
t1-0/0/0:1:3
t1-0/0/0:1:4
t1-0/0/0:1:5

VT-Mapped Configuration

[edit interfaces coc48-0/0/0]
partition 1 oc-slice 1 interface-type coc1;

[edit interfaces coc1-0/0/0:1]
partition 1-5 interface-type t1;

Copyright © 2013, Juniper Networks, Inc.

M13 or C-bit Parity-Mapped Configuration

```
[edit interfaces coc48-0/0/0]
partition 1 oc-slice 1 interface-type coc1;

[edit interfaces coc1-0/0/0:1]
no-partition interface-type ct3;

[edit interfaces ct3-0/0/0:1]
partition 1-5 interface-type t1;
```

For a full configuration example, see the *Junos OS Feature Guides*.

Configuring Fractional T1 Interfaces

By default, all the time slots on a channelized T1 interface are used. To configure a fractional T1 interface on a Channelized OC48 IQE PIC, perform the following tasks:

1. Configure a T1 interface. For more information, see "Configuring T1 Interfaces" on page 12.
2. Configure the number of time slots allocated to the T1 interface by including the **timeslots** statement at the **[edit interfaces t1-*fpc/pic/port*<:*channel*> t1-options]** hierarchy level:

   ```
   [edit interfaces t1-fpc/pic/port<:channel> t1-options]
   timeslots time-slot-range;
   ```

For channelized T1 interfaces, the time-slot range is from 1 through 24. You can designate any combination of time slots. To configure ranges, use hyphens. To configure discontinuous time slots, use commas. Do not include spaces. For more information, see *Configuring Fractional T1 Time Slots*.

Example: Configuring Fractional T1 Interfaces

Configure a fractional T1 interface that uses time slots 1 through 5 and 10:

```
[edit interfaces coc48-0/0/0]
partition 1 oc-slice 1 interface-type coc1;
[edit interfaces coc1-0/0/0:1]
partition 1 interface-type t1;
[edit interfaces t1-0/0/0:1:1 t1-options]
timeslots 1-5,10;
```

For a full configuration example, see the *Junos OS Feature Guides*.

Configuring NxDS0 Interfaces

To configure *N*xDS0 interfaces on a Channelized OC48 IQE PIC, perform the following tasks:

1. Partition the channelized OC48 IQE interface into channelized OC1 interfaces by including the **partition**, **oc-slice**, and **interface-type** statements at the **[edit interfaces coc48-*fpc/pic/port*:*channel*]** hierarchy level, specifying the **coc1** interface type:

   ```
   [edit interfaces coc48-fpc/pic/port:channel]
   partition partition-number oc-slice oc-slice-range interface-type coc1;
   ```


Copyright © 2013, Juniper Networks, Inc.

2. If your network equipment uses VT mapping, partition the channelized OC1 interface into channelized T1 interfaces by including the **partition** and **interface-type** statements at the **[edit interfaces coc1-*fpc/pic/port*:*channel*]** hierarchy level, specifying the **ct1** interface type:

   ```
   [edit interfaces coc1-fpc/pic/port:channel]
   partition partition-number interface-type ct1;
   ```

   NOTE: Class-of-service (CoS) rules cannot be applied to an individual channel configured on channelized IQE interfaces. You can only apply CoS rules to the aggregate bit streams.

   If your network equipment uses M13 or C-bit parity, convert the channelized OC1 interface into a channelized T3 interface by including the **no-partition** and **interface-type** statements at the **[edit interfaces coc1-*fpc/pic/port*]** hierarchy level, specifying the **ct3** interface type:

   ```
   [edit interfaces coc1-fpc/pic/port:channel]
   no-partition partition-number interface-type ct3;
   ```

   NOTE: Because the **no-partition** statement is included, this configuration task does not create another level of channelization, as denoted by the number of colons in the resulting interface.

3. Partition the channelized T3 interface into channelized T1 interfaces by including the **partition** and **interface-type** statements at the **[edit interfaces ct3-*fpc/pic/port*:*channel*]** hierarchy level, specifying the **ct1** interface type:

   ```
   [edit interfaces ct3-fpc/pic/port:channel]
   partition partition-number interface-type ct1;
   ```

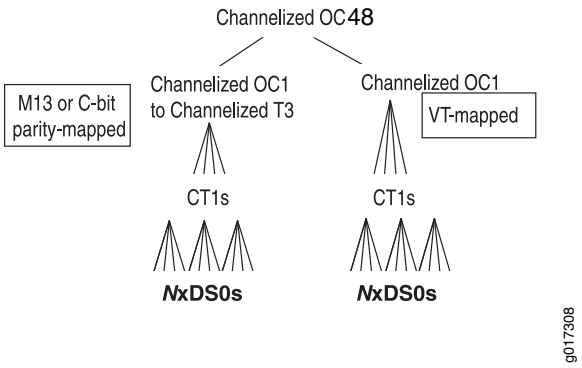
4. Configure channelized *N*xDS0 interfaces on the channelized T1 interface by including the **partition**, **timeslots**, and **interface-type** statements at the **[edit interfaces ct1-*fpc/pic/port*:*channel*]** hierarchy level, specifying the **ds** interface type:

   ```
   [edit interfaces ct1-fpc/pic/port:channel:channel]
   partition partition-number timeslots time-slot-range interface-type ds;
   ```

Figure 5 on page 16 shows VT-mapped and M13 or C-bit parity-mapped configurations of *N*xDS0 interfaces.

Copyright © 2013, Juniper Networks, Inc.

Figure 5: Sample Channelization of OC48 IQE PIC



Bold entries correspond to actual packet channels.

Example: Configuring NxDS0 Interfaces

Configure the following two *N*xDS0 interfaces with 10 time slots and 4 time slots, respectively:

ds-0/0/0:1:2:1
ds-0/0/0:1:2:2

VT-Mapped Configuration

```
[edit interfaces coc48-0/0/0]
partition 1 oc-slice 1 interface-type coc1;

[edit interfaces coc1-0/0/0:1]
partition 2 interface-type ct1;

[edit interfaces ct1-0/0/0:1:2]
partition 1 timeslots 1-10 interface-type ds;
partition 2 timeslots 12-15 interface-type ds;
```

M13 or C-bit Parity-Mapped Configuration

```
[edit interfaces coc48-0/0/0]
partition 1 oc-slice 1 interface-type coc1;

[edit interfaces coc1-0/0/0:1]
no-partition interface-type ct3;

[edit interfaces ct3-0/0/0:1]
partition 2 interface-type ct1;

[edit interfaces ct1-0/0/0:1:2]
partition 1 timeslots 1-10 interface-type ds;
partition 2 timeslots 12-15 interface-type ds;
```

For a full configuration example, see the *Junos OS Feature Guides*.

Configuring Channelized OC48/STM16 IQE Interfaces (SDH Mode)

The Channelized OC48 IQE PIC configured for SDH mode creates a single channelized STM16 interface. You can configure the STM16 interface using the **partition** statement

Copyright © 2013, Juniper Networks, Inc.

at the **[edit interfaces cstm16-*fpc/pic/port*]** hierarchy level to partition it into the following OC slices:

- 16 channelized AU-4 interfaces or a path layer with 4 STM4 or 16 STM1 interfaces.
- 16 channelized AU-4 interfaces, each partitioned to 3 clear channel E3 interfaces or 63 CE1 or E1 (ITU-T or KLM) interfaces. Combination of E1, CE1 and E3 are not supported in a single cau4.
- 16 channelized AU-4 interfaces, each partitioned to 63 CE1 (ITU-T or KLM) interfaces each partitioned to 31 *N*xDS0 interfaces

This section describes how to configure the following channelized OC48 IQE interfaces on a Channelized OC48 IQE PIC configured in SDH mode:

- Configuring a Channelized OC48/STM16 IQE PIC for SDH Mode on page 17
- Configuring Clear Channel STM1 and STM4 Interfaces on page 17
- Configuring Channelized AU-4 Interfaces on page 18
- Configuring E3 Interfaces on page 18
- Configuring E1 or Channelized E1 Interfaces on page 19
- Configuring NxDS0 IQE Interfaces on page 20
- Configuring T3 or Channelized T3 Interfaces on page 20
- Configuring T1 or Channelized T1 Interfaces on page 21

Configuring a Channelized OC48/STM16 IQE PIC for SDH Mode

To configure a Channelized OC48/STM16 IQE PIC to operate in SDH mode, include the **framing sdh** statement at the **[edit chassis fpc *fpc/pic/port*]** hierarchy level:

```
[edit chassis ]
  fpc 0 {
    pic 2 {
      framing sdh;
    }
  }
}
```

This configuration creates interface **cstm16-0/2/0**.

For more information, see the *Junos OS Administration Library for Routing Devices*.

Configuring Clear Channel STM1 and STM4 Interfaces

On a Channelized OC48/STM16 IQE PIC, you can partition the CSTM16 transport layer into 4 clear channel STM4 interfaces or 16 clear channel STM1 interfaces. Combinations of STM4 and STM1 are also permitted, but you must observe the OC-slice parameters.

To configure an STM4 interface, include the **partition** and **interface-type** statements at the **[edit interfaces cstm16-*fpc/pic/port*]** hierarchy level:

```
[edit interfaces cstm16-fpc/pic/port]
partition partition-number oc-slice oc-slice-range interface-type so;
```

Copyright © 2013, Juniper Networks, Inc.

This configuration creates interface **so-*fpc/pic/port.channel***.

To configure an STM1 interface, include the **partition** and **interface-type** statements at the **[edit interfaces cstm16-*fpc/pic/port*]** hierarchy level:

```
[edit interfaces cstm16-fpc/pic/port]
partition partition-number oc-slice oc-slice-range interface-type so;
```

This configuration creates interface **so-*fpc/pic/port.channel***.

Configuring Channelized AU-4 Interfaces

To configure a channelized AU-4 interface, include the **partition**, **oc-slice**, and **interface-type** statements at the **[edit interfaces cstm16-*fpc/pic/port*:*channel*]** hierarchy level, specifying the **cau4** interface type:

```
[edit interfaces cstm16-fpc/pic/port]
partition partition-number oc-slice oc-slice-range interface-type cau4;
```

This configuration creates interface **cau4-*fpc/pic/port*:*channel***.

The partition number is the sublevel interface partition index. For SDH interfaces, the partition number is not correlated with bandwidth size. For channelized OC48/STM16 IQE interfaces, channelized STM16 interface can have from 1 through 16 partition numbers and channel numbering begins with 1 (:1).

The OC-slice range is the range of SONET/SDH slices. For SDH interfaces, the OC-slice range specifies the bandwidth size required for the interface type you are configuring. The interface type is the channelized interface type or data channel you are creating.

Example: Configuring Channelized AU-4 Interfaces

Configure channelized AU-4 interfaces:

```
[edit interfaces cstm16-0/2/0]
partition 1 oc-slice 1-3 interface-type cau4;
```

Configuring E3 Interfaces

To configure E3 interfaces, include the **partition** and **interface-type** statements at the **[edit interfaces cau4-*fpc/pic/port*]** hierarchy level, specifying the **e3** interface type:

```
[edit interfaces]
cau4-fpc/pic/port {
  partition partition-number interface-type e3;
}
```

This configuration creates the interfaces **e3-*fpc/pic/port*:*channel***.

NOTE: Class-of-service (CoS) rules cannot be applied to an individual channel configured on channelized IQE interfaces. You can only apply CoS rules to the aggregate bit streams.

Copyright © 2013, Juniper Networks, Inc.

NOTE: Channelized OC48/STM16 IQE interfaces in M Series, MX Series, and T Series routers reserve channels 0-3 of each OC12 space for STS3C SONET channels.

When you configure E3 or T3 channels in OC12 spaces on the described PICs, Junos OS allocates them starting from channel 4 because channels 0-3 are reserved for four STS3c SONET channels. Channel numbers are allocated sequentially in the following order: 4, 5, 6, 7, 8, 9, 11, 0, 1, 2, 3.

Only after channels 4 through 11 of the OC12 space are exhausted (all 4 through 11 configured) for E3 or T3 channels will Junos OS then allocate channel 0-3 space for further E3 or T3 channels; thereby using up the 0-3 space previously reserved for four STS3c SONET channels.

If a subsequent reconfiguration of this OC12 space occurs, where you try to replace channels 4-6 or 7-9 with an OC3 SONET channel; it fails because the channel 0-3 space is already occupied by the last E3 or T3 channels configured. This causes a failure in channel allocation and the Device Control Daemon (DCD) keeps retrying forever to configure the channel allocation on the interface. The only resolution is to reconfigure the last configured E3/T3 channels with OC3 channels, to free channels 0-3.

Example: Configuring E3 Interfaces

Configure E3 interfaces, using partition 1:

```
[edit interfaces]
cau4-0/2/0:1 {
    partition 1 interface-type e3;
}
e3-0/2/0:1:1;
```

Configuring E1 or Channelized E1 Interfaces

To configure E1 or channelized E1 interfaces, include the **partition** and **interface-type** statements at the **[edit interfaces cau4-*fpc/pic/port*]** hierarchy level, specifying the **e1** or **ce1** interface type:

```
[edit interfaces]
cau4-fpc/pic/port {
    partition partition-number interface-type e1;
}
cau4-fpc/pic/port {
    partition partition-number interface-type ce1;
}
```

This configuration creates the interfaces **e1-*fpc/pic/port*:*channel*** and **ce1-*fpc/pic/port*:*channel***.

Copyright © 2013, Juniper Networks, Inc.

NOTE: Class-of-service (CoS) rules cannot be applied to an individual channel configured on channelized IQE interfaces. You can only apply CoS rules to the aggregate bit streams.

Example: Configuring E1 and Channelized E1 Interfaces

Configure E1 or channelized E1 interfaces, using partition 3 and partition 4:

```
[edit interfaces]
cau4-0/2/0:1 {
   partition 3 interface-type e1;
}
cau4-0/2/0:1 {
   partition 4 interface-type ce1;
}
```

This configuration creates interfaces **e1-0/2/0:1:3** and **ce1-0/2/0:1:4**.

Configuring NxDS0 IQE Interfaces

Configure channelized *N*xDS0 IQE interfaces on the channelized E1 IQE interface by including the **partition**, **timeslots**, and **interface-type** statements at the **[edit interfaces ce1-*fpc/pic/port*:*channel*]** hierarchy level, specifying the **ds** interface type:

```
[edit interfaces ce1-fpc/pic/port:channel:channel]
partition partition-number timeslots time-slot-range interface-type ds;
```

This configuration creates the interface **ds-*fpc/pic/port*:*channel***.

The time-slot range is from 1 through 31. You can designate any combination of time slots. To configure ranges, use hyphens. To configure discontinuous time slots, use commas. You can use a combination of ranges and discontinuous time slots, for example:

```
1,9-18,21
```

Example: Configuring NxDS0 IQE Interfaces

Configure channelized *N*xDS0 interfaces, using partition 4 and time slots 1 through 10:

```
[edit interfaces]
ce1-0/2/0:1:2:3 {
   partition 4 interface-type ds0 timeslots 1-10;
}
```

This configuration creates interface **ds0-0/2/0:1:2:3:4**.

Configuring T3 or Channelized T3 Interfaces

To configure T3 or channelized T3 interfaces, include the **partition** and **interface-type** statements at the **[edit interfaces cau4-*fpc/pic/port*]** hierarchy level, specifying the **t3** or **ct3** interface type:

```
[edit interfaces]
cau4-fpc/pic/port {
   partition partition-number interface-type t3;
```


Copyright © 2013, Juniper Networks, Inc.

```
}
cau4-fpc/pic/port {
  partition partition-number interface-type ct3;
}
```

This configuration creates the interfaces **t3-*fpc/pic/port*:*channel*** and **t3-*fpc/pic/port*:*channel***.

NOTE: Class-of-service (CoS) rules cannot be applied to an individual channel configured on channelized IQ interfaces. You can only apply CoS rules to the aggregate bit streams.

Example: Configuring T3 or Channelized T3 Interfaces

Configure T3 and channelized T3 interfaces, using partition 1 and partition 2:

```
[edit interfaces]
cau4-0/2/0:1 {
  partition 1 interface-type t3;
}
cau4-0/2/0:1 {
  partition 2 interface-type ct3;
}
t3-0/2/0:1:1 ct3-0/2/0:1:2;
```

Configuring T1 or Channelized T1 Interfaces

To configure T1 or channelized T1 interfaces, include the **partition** and **interface-type** statements at the **[edit interfaces cau4-*fpc/pic/port*]** hierarchy level, specifying the **t1** or **ct1** interface type:

```
[edit interfaces]
cau4-fpc/pic/port {
  partition partition-number interface-type t1;
}
cau4-fpc/pic/port {
  partition partition-number interface-type ct1;
}
```

This configuration creates the interfaces **t1-*fpc/pic/port*:*channel*** and **t1-*fpc/pic/port*:*channel***.

NOTE: Class-of-service (CoS) rules cannot be applied to an individual channel configured on channelized IQ interfaces. You can only apply CoS rules to the aggregate bit streams.

Example: Configuring T1 or Channelized T1 Interfaces

Configure T1 and channelized T1 interfaces, using partition 1 and partition 2:

```
[edit interfaces]
cau4-0/2/0:1 {
```

```
    partition 1 interface-type t1;
}
cau4-0/2/0:1 {
    partition 2 interface-type ct1;
}
t1-0/2/0:1:1 ct1-0/2/0:1:2;
```

Configuring Link PIC Failover on Channelized OC48/STM16 IQE Interfaces

For Channelized OC48 IQE PICs used as linking PICs in redundant LSQ configurations, you can inhibit the router from sending PPP termination-request messages to the remote host if the link PIC fails. To do this, include the no-termination-request statement at the **[edit interfaces *interface-name* ppp-options]** hierarchy level:

```
no-termination-request;
```

The **no-termination-request** statement is supported only with MLPPP and SONET APS configurations and works with PPP, PPP over Frame Relay, and MLPPP interfaces only.

For information about interchassis and intrachassis LSQ failover, see the *Junos OS Services Interfaces Library for Routing Devices*.

Example: Configuring Channelized OC48 Interfaces with Partitioned Channels

The following configuration is sufficient to get the channelized OC48 interface up and running. The OC48 interface can be divided into up to 4 OC12 channels, up to 16 OC3 channels, or up to 48 OC1 channels and combinations are permitted; for example, 1 OC12, 4 OC3s, and 24 OC1s. There are 48 OC1 slices available on the OC48 IQE interface. An OC48 configuration uses all 48 slices, each OC12 uses 12 slices, each OC1 uses 1 slice. Permissible combinations must fit within the 48 available OC1 slices. DS1 channels can use the following encapsulation types:

- PPP, PPP CCC, and PPP TCC
- Frame Relay, Frame Relay CCC, and Frame Relay TCC
- Cisco HDLC, Cisco HDLC CCC, and Cisco HDLC TCC

The channels can also have logical interfaces.

```
[edit interfaces]
t3-fpc/pic/port:0 {
    encapsulation cisco-hdlc;
    t3-options {
        compatibility-mode larscom;
        payload-scrambler;
    }
    unit 0 {
        family inet {
            address 10.11.30.1/30;
        }
        family iso;
    }
}
```


Copyright © 2013, Juniper Networks, Inc.

```
t3-fpc/pic/port:1 {
  encapsulation ppp;
  t3-options {
    compatibility-mode larscom;
    payload-scrambler;
  }
  unit 0 {
    family inet {
      address 10.11.30.5/30;
    }
    family iso;
  }
}
t3-fpc/pic/port:2 {
  encapsulation frame-relay;
  t3-options {
    compatibility-mode larscom;
    payload-scrambler;
  }
  unit 0 {
    dlci 100;
    family inet {
      address 10.11.30.9/30;
    }
    family iso;
  }
  unit 1 {
    dlci 101;
    family inet {
      address 10.11.31.9/30;
    }
    family iso;
  }
}
t3-1fpc/pic/port:3 {
  encapsulation cisco-hdlc-ccc;
  t3-options {
    compatibility-mode larscom;
    payload-scrambler;
  }
  unit 0;
}
t3-fpc/pic/port:4 {
  encapsulation ppp-ccc;
  t3-options {
    compatibility-mode larscom;
    payload-scrambler;
  }
  unit 0;
}
t3-fpc/pic/port:5 {
  dce;
  encapsulation frame-relay-ccc;
  t3-options {
    compatibility-mode larscom;
    payload-scrambler;
```

Copyright © 2013, Juniper Networks, Inc.

```
    }
    unit 0 {
      encapsulation frame-relay-ccc;
      dlci 1000;
    }
    unit 1 {
      encapsulation frame-relay-ccc;
      dlci 1001;
    }
  }
```

Related Documentation

- *Channelized Interfaces Overview*

Copyright © 2013, Juniper Networks, Inc.

CHAPTER 3

Network Interfaces Configuration Statements and Hierarchy

- [edit chassis] Hierarchy Level on page 25
- [edit interfaces] Hierarchy Level on page 26
- [edit logical-systems] Hierarchy Level on page 42

[edit chassis] Hierarchy Level

```
chassis {
  aggregated-devices {
    ethernet {
      device-count number;
    }
    sonet {
      device-count number;
    }
  }
    maximum-links {
    }
  channel-group number {
    ethernet {
      device-count number;
    }
    fpc slot-number{
      pic pic-number {
        adaptive-services{
          service-package (layer-2 | layer-3);
        }
        aggregate-ports;
        atm-cell-relay-accumulation;
        atm-l2circuit-mode (aal5 | cell | trunk trunk);
        ce1 {
          e1 link-number {
            channel-group group-number;
            timeslots time-slot-range;
          }
        }
        channelization;
        ct1 {
          t1 link-number {
```

Copyright © 2013, Juniper Networks, Inc.

```
            channel-group group-number;
            timeslots time-slot-range;
          }
        }
        ct3 {
          port port-number {
            t1 link-number {
              channel-group group-number;
              timeslots time-slot-range;
            }
          }
          framing sdh;
        }
        max-queues-per-interface number;
        mlfr-uni-nni-bundles num-intf;
        no-concatenate;
        shdsl {
          pic-mode (1-port-atm | 2-port-atm);
        }
        vtmapping (klm | itu-t);
      }
    }
    fpc slot-number{
    pic pic-number{
      account-layer2-overhead
        egress-policer-overhead bytes;
        ingress-policer-overhead bytes;
      }
    }
  }
```

[edit interfaces] Hierarchy Level

The statements at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level can also be configured at the **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]** hierarchy level.

NOTE: The *accounting-profile* statement is an exception to this rule. The **accounting-profile** statement can be configured at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level, but it cannot be configured at the **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*]** hierarchy level.

```
interfaces {
  traceoptions {
    file filename <files number> <match regular-expression> <size size> <world-readable |
      no-world-readable> ;
    flag flag <disable>;
  }
  interface-name {
    account-layer2-overhead (Interface Level) {
      value;
```


Copyright © 2013, Juniper Networks, Inc.

```
    egress bytes;
    ingress bytes;
  }
  accounting-profile name;
  aggregated-ether-options {
    (flow-control | no-flow-control);
    lacp {
      (active | passive);
      link-protection {
        disable;
      (revertive | non-revertive);
      periodic interval;
      system-priority priority;
    }
    link-protection;
    link-speed speed;
    (loopback | no-loopback);
    mc-ae{
      chassis-id chassis-id;
      mc-ae-id mc-ae-id;
      mode (active-active | active-standby);
      redundancy-group group-id;
      status-control (active | standby);
    }
    minimum-links number;
    source-address-filter {
      mac-address;
    }
    (source-filtering | no-source-filtering);
  }
  shared-scheduler;
  aggregated-sonet-options {
    link-speed speed | mixed;
    minimum-links number;
  }
  atm-options {
    cell-bundle-size cells;
    ilmi;
    linear-red-profiles profile-name {
      high-plp-max-threshold percent;
      low-plp-max-threshold percent;
      queue-depth cells high-plp-threshold percent low-plp-threshold percent;
    }
    mpls {
      pop-all-labels {
        required-depth number;
      }
    }
    pic-type (atm1 | atm2);
    plp-to-clp;
    promiscuous-mode {
      vpi vpi-identifier;
    }
    scheduler-maps map-name {
      forwarding-class class-name {
        epd-threshold cells plp1 cells;
```

```
            linear-red-profile profile-name;
            priority (high | low);
            transmit-weight (cells number | percent number);
          }
          vc-cos-mode (alternate | strict);
        }
        use-null-cw;
          vpi vpi-identifier {
          maximum-vcs maximum-vcs;
          oam-liveness {
            down-count cells;
            up-count cells;
          }
          oam-period (seconds | disable);
          shaping {
            (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate
              burst length);
            queue-length number;
          }
        }
      }
      clocking clock-source;
      data-input (system | interface interface-name);
      dce;
      serial-options {
        clock-rate rate;
        clocking-mode (dce | internal | loop);
        control-polarity (negative | positive);
        cts-polarity (negative | positive);
        dcd-polarity (negative | positive);
        dce-options {
          control-signal (assert | de-assert | normal);
          cts (ignore | normal | require);
          dcd (ignore | normal | require);
          dsr (ignore | normal | require);
          dtr signal-handling-option;
          ignore-all;
          indication (ignore | normal | require);
          rts (assert | de-assert | normal);
          tm (ignore | normal | require);
        }
        dsr-polarity (negative | positive);
        dte-options {
          control-signal (assert | de-assert | normal);
          cts (ignore | normal | require);
          dcd (ignore | normal | require);
          dsr (ignore | normal | require);
          dtr signal-handling-option;
          ignore-all;
          indication (ignore | normal | require);
          rts (assert | de-assert | normal);
          tm (ignore | normal | require);
        }
        dtr-circuit (balanced | unbalanced);
        dtr-polarity (negative | positive);
        encoding (nrz | nrzi);
```

 Copyright © 2013, Juniper Networks, Inc.

```
    indication-polarity (negative | positive);
    line-protocol protocol;
    loopback mode;
    rts-polarity (negative | positive);
    tm-polarity (negative | positive);
    transmit-clock invert;
}
description text;
dialer-options {
    pool pool-name <priority priority>;
}
disable;
ds0-options {
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    byte-encoding (nx56 | nx64);
    fcs (16 | 32);
    idle-cycle-flag (flags | ones);
    invert-data;
    loopback payload;
    start-end-flag (filler | shared);
}
e1-options {
    bert-error-rate rate;
    bert-period seconds;
    fcs (16 | 32);
    framing (g704 | g704-no-crc4 | unframed);
    idle-cycle-flag (flags | ones);
    invert-data;
    loopback (local | remote);
    start-end-flag (filler | shared);
    timeslots time-slot-range;
}
e3-options {
    atm-encapsulation (direct | plcp);
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    framing feet;
    compatibility-mode (digital-link | kentrox | larscom) <subrate value>;
    fcs (16 | 32);
    framing (g.751 | g.832);
    idle-cycle-flag (filler | shared);
    invert-data;
    loopback (local | remote);
    (payload-scrambler | no-payload-scrambler);
    start-end-flag (filler | shared);
    (unframed | no-unframed);
}
encapsulation type;
es-options {
    backup-interface es-fpc/pic/port;
}
fastether-options {
    802.3ad aex;
```

Copyright © 2013, Juniper Networks, Inc.

```
    (flow-control | no-flow-control);
    ignore-l3-incompletes;
    ingress-rate-limit rate;
    (loopback | no-loopback);
    mpls {
      pop-all-labels {
        required-depth number;
      }
    }
    source-address-filter {
      mac-address;
    }
    (source-filtering | no-source-filtering);
  }
  flexible-vlan-tagging;
  gigether-options {
    802.3ad aex;
    (asynchronous-notification | no-asynchronous-notification);
    (auto-negotiation | no-auto-negotiation) remote-fault <local-interface-online |
      local-interface-offline>;
    auto-reconnect seconds;
    (flow-control | no-flow-control);
    ignore-l3-incompletes;
    (loopback | no-loopback);
    mpls {
      pop-all-labels {
        required-depth number;
      }
    }
    no-auto-mdix;
    source-address-filter {
      mac-address;
    }
    (source-filtering | no-source-filtering);
    ethernet-switch-profile {
      (mac-learn-enable | no-mac-learn-enable);
      tag-protocol-id [ tpids ];
      ethernet-policer-profile {
        input-priority-map {
          ieee802.1p premium [ values ];
        }
        output-priority-map {
          classifier {
            premium {
              forwarding-class class-name {
                loss-priority (high | low);
              }
            }
          }
        }
        policer cos-policer-name {
          aggregate {
            bandwidth-limit bps;
            burst-size-limit bytes;
          }
          premium {
```


Copyright © 2013, Juniper Networks, Inc.

```
            bandwidth-limit bps;
            burst-size-limit bytes;
          }
        }
      }
    }
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
hold-time up milliseconds down milliseconds;
ima-group-options {
  differential-delay number;
  frame-length (32 | 64 | 128 | 256);
  frame-synchronization {
    alpha number;
    beta number;
    gamma number;
  }
  minimum-links number;
  symmetry (symmetrical-config-and-operation |
    symmetrical-config-asymmetrical-operation);
  test-procedure {
    ima-test-start;
    ima-test-stop;
    interface name;
    pattern number;
    period number;
  }
  transmit-clock (common | independent);
  version (1.0 |1.1);
}
ima-link-options group-id group-id;
interface-set interface-set-name {
  interface ethernet-interface-name {
    (unit unit-number | vlan-tags-outer vlan-tag);
  }
  interface interface-name {
    (unit unit-number);
  }
}
isdn-options {
  bchannel-allocation (ascending | descending);
  calling-number number;
  pool pool-name <priority priority>;
  spid1 spid-string;
  spid2 spid-string;
  static-tei-val value;
  switch-type (att5e | etsi | ni1 | ntdms100 | ntt);
  t310 seconds;
  tei-option (first-call | power-up);
}
keepalives <down-count number> <interval seconds> <up-count number>;
link-mode mode;
lmi {
  lmi-type (ansi | itu | c-lmi);
  n391dte number;
  n392dce number;
```

Copyright © 2013, Juniper Networks, Inc.

```
    n392dte number;
    n393dce number;
    n393dte number;
    t391dte seconds;
    t392dce seconds;
}
lsq-failure-options {
    no-termination-request;
    [ trigger-link-failure interface-name ];
}
mac mac-address;
mlfr-uni-nni-bundle-options {
    acknowledge-retries number;
    acknowledge-timer milliseconds;
    action-red-differential-delay (disable-tx | remove-link);
    drop-timeout milliseconds;
    fragment-threshold bytes;
    cisco-interoperability send-lip-remove-link-for-link-reject;
    hello-timer milliseconds;
    link-layer-overhead percent;
    lmi-type (ansi | itu | c-lmi);
    minimum-links number;
    mrru bytes;
    n391 number;
    n392 number;
    n393 number;
    red-differential-delay milliseconds;
    t391 seconds;
    t392 seconds;
    yellow-differential-delay milliseconds;
}
modem-options {
    dialin (console | routable);
    init-command-string initialization-command-string;
}
mtu bytes;
multi-chassis-protection {
    peer a.b.c.d {
        interfaceinterface-name;
        }
    }
multiservice-options {
    (core-dump | no-core-dump);
    (syslog | no-syslog);
}
native-vlan-id number;
no-gratuitous-arp-request;
no-keepalives;
no-partition {
    interface-type type;
}
no-vpivci-swapping;
optics-options {
    alarm low-light-alarm {
        (link-down | syslog);
    }
```


Copyright © 2013, Juniper Networks, Inc.

```
    tx-power dbm;
    warning low-light-warning {
      (link-down | syslog);
    }
    wavelength nm;
  }
  otn-options {
    bytes transmit-payload-type value;
    fec (efec | gfec | gfec-sdfec | none);
    (is-ma | no-is-ma);
    (laser-enable | no-laser-enable);
    (line-loopback | no-line-loopback);
    (local-loopback | no-local-loopback);
    (odu-ttim-action-enable | no-odu-ttim-action-enable);
    (otu-ttim-action-enable | no-otu-ttim-action-enable);
    odu-delay-management {
      (bypass | no-bypass);
      (monitor-end-point | no-monitor-end-point);
      (number-of-frames | no-number-of-frames);
      (start-measurement | no-start-measurement);
    }
    (prbs | no-prbs);
    preemptive-fast-reroute {
      (backward-frr-enable | no-backward-frr-enable);
      (signal-degrade-monitor-enable | no-signal-degrade-monitor-enable);
    }
    rate {
      (fixed-stuff-bytes | no-fixed-stuff-bytes);
      otu4;
      (pass-through | no-pass-through);
    }
    signal-degrade {
      ber-threshold-clear value;
      ber-threshold-signal-degrade value;
      interval value;
    }
    trigger trigger-identifier;
    tti tti-identifier;
  }
  partition partition-number oc-slice oc-slice-range interface-type type;
  timeslots time-slot-range;
  passive-monitor-mode;
  per-unit-scheduler;
  ppp-options {
    chap {
      access-profile name;
      default-chap-secret name;
      local-name name;
      passive;
    }
    compression {
      acfc;
      pfc;
    }
    dynamic-profile profile-name;
    no-termination-request;
```

```
    pap {
      access-profile name;
      local-name name;
      local-password password;
      compression;
    }
  }
  psn-vcipsn-vci-identifier;
  psn-vpipsn-vpi-identifier;
  receive-bucket {
    overflow (discard | tag);
    rate percentage;
    threshold bytes;
  }
  redundancy-options {
    priority sp-fpc/pic/port;
    secondary sp-fpc/pic/port;
    hot-standby;
  }
  satop-options {
    payload-size n;
  }
  schedulers number;
  serial-options {
    clock-rate rate;
    clocking-mode (dce | internal | loop);
    control-polarity (negative | positive);
    cts-polarity (negative | positive);
    dcd-polarity (negative | positive);
    dce-options {
      control-signal (assert | de-assert | normal);
      cts (ignore | normal | require);
      dcd (ignore | normal | require);
      dsr (ignore | normal | require);
      dtr signal-handling-option;
      ignore-all;
      indication (ignore | normal | require);
      rts (assert | de-assert | normal);
      tm (ignore | normal | require);
    }
    dsr-polarity (negative | positive);
    dte-options {
      control-signal (assert | de-assert | normal);
      cts (ignore | normal | require);
      dcd (ignore | normal | require);
      dsr (ignore | normal | require);
      dtr signal-handling-option;
      ignore-all;
      indication (ignore | normal | require);
      rts (assert | de-assert | normal);
      tm (ignore | normal | require);
    }
    dtr-circuit (balanced | unbalanced);
    dtr-polarity (negative | positive);
    encoding (nrz | nrzi);
    indication-polarity (negative | positive);
```


Copyright © 2013, Juniper Networks, Inc.

```
    line-protocol protocol;
    loopback mode;
    rts-polarity (negative | positive);
    tm-polarity (negative | positive);
    transmit-clock invert;
}
services-options {
    inactivity-timeout seconds;
    open-timeout seconds;
    session-limit {
        maximum number;
        rate new-sessions-per-second;
        }
        syslog {
        host hostname {
            facility-override facility-name;
            log-prefix prefix-number;
            services priority-level;
        }
    }
}
shdsl-options {
    annex (annex-a | annex-b);
    line-rate line-rate;
    loopback (local | remote);
    snr-margin {
        current margin;
        snext margin;
    }
}
sonet-options {
    aggregate asx;
    aps {
        advertise-interval milliseconds;
        annex-b;
        authentication-key key;
        fast-aps-switch;
        force;
        hold-time milliseconds;
        lockout;
        neighbor address;
        paired-group group-name;
        preserve-interface;
        protect-circuit group-name;
        request;
        revert-time seconds;
        switching-mode (bidirectional | unidirectional);
        working-circuit group-name;
    }
    bytes {
        c2 value;
        e1-quiet value;
        f1 value;
        f2 value;
        s1 value;
        z3 value;
```

Copyright © 2013, Juniper Networks, Inc.

```
      z4 value;
    }
    fcs (16 | 32);
    loopback (local | remote);
    mpls {
      pop-all-labels {
        required-depth number;
      }
    }
    path-trace trace-string;
    (payload-scrambler | no-payload-scrambler);
    rfc-2615;
    trigger {
      defect ignore;
      hold-time up milliseconds down milliseconds;
    }
    vtmapping (itu-t | klm);
    (z0-increment | no-z0-increment);
  }
  speed (10m | 100m | 1g | oc3 | oc12 | oc48);
  stacked-vlan-tagging;
  switch-options {
    switch-port port-number {
      (auto-negotiation | no-auto-negotiation);
      speed (10m | 100m | 1g);
      link-mode (full-duplex | half-duplex);
    }
  }
  t1-options {
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    buildout value;
    byte-encoding (nx56 | nx64);
    crc-major-alarm-threshold (1e-3 | 5e-4 | 1e-4 | 5e-5 | 1e-5);
    crc-minor-alarm-threshold (1e-3 | 5e-4 | 1e-4 | 5e-5 | 1e-5 | 5e-6 | 1e-6);
    fcs (16 | 32);
    framing (esf | sf);
    idle-cycle-flag (flags | ones);
    invert-data;
    line-encoding (ami | b8zs);
    loopback (local | payload | remote);
    remote-loopback-respond;
    start-end-flag (filler | shared);
    timeslots time-slot-range;
  }
  t3-options {
    atm-encapsulation (direct | plcp);
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    buildout feet;
    (cbit-parity | no-cbit-parity);
    compatibility-mode (adtran | digital-link | kentrox | larscom | verilink) <subrate
      value>;
    fcs (16 | 32);
```


Copyright © 2013, Juniper Networks, Inc.

```
    (feac-loop-respond | no-feac-loop-respond);
    idle-cycle-flag value;
    (long-buildout | no-long-buildout);
    (loop-timing | no-loop-timing);
    loopback (local | payload | remote);
    (mac | no-mac);
    (payload-scrambler | no-payload-scrambler);
    start-end-flag (filler | shared);
}
traceoptions {
    flag flag <flag-modifier> <disable>;
}
transmit-bucket {
    overflow discard;
    rate percentage;
    threshold bytes;
}
(traps | no-traps);
unidirectional;
vlan-tagging;
vlan-vci-tagging;
unit logical-unit-number {
    accept-source-mac {
        mac-address mac-address {
            policer {
                input cos-policer-name;
                output cos-policer-name;
            }
        }
    }
    account-layer2-overhead {
        value;
        egress bytes;
        ingress bytes;
    }
    accounting-profile name;
    advisory-options {
        downstream-rate rate;
        upstream-rate rate;
    }
    allow-any-vci;
    atm-scheduler-map (map-name | default);
    backup-options {
        interface interface-name;
    }
    bandwidth rate;
    cell-bundle-size cells;
    clear-dont-fragment-bit;
    compression {
        rtp {
            f-max-period number;
            maximum-contexts number <force>;
            queues [ queue-numbers ];
            port {
                minimum port-number;
                maximum port-number;
```

```
      }
    }
  }
  compression-device interface-name;
  copy-tos-to-outer-ip-header;
  demux-destination family;
  demux-source family;
  demux-options {
    underlying-interface interface-name;
  }
  description text;
  interface {
    l2tp-interface-id name;
    (dedicated | shared);
  }
  dialer-options {
    activation-delay seconds;
    callback;
    callback-wait-period time;
    deactivation-delay seconds;
    dial-string [ dial-string-numbers ];
    idle-timeout seconds;
    incoming-map {
      caller (caller-id | accept-all);
      initial-route-check seconds;
      load-interval seconds;
      load-threshold percent;
      pool pool-name;
      redial-delay time;
      watch-list {
        [ routes ];
      }
    }
  }
  disable;
  disable-mlppp-inner-ppp-pfc;
  dlci dlci-identifier;
  drop-timeout milliseconds;
  dynamic-call-admission-control {
    activation-priority priority;
    bearer-bandwidth-limit kilobits-per-second;
  }
  encapsulation type;
  epd-threshold cells plp1 cells;
  fragment-threshold bytes;
  inner-vlan-id-range start start-id end end-id;
  input-vlan-map {
    (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
    inner-tag-protocol-id tpid;
    inner-vlan-id number;
    tag-protocol-id tpid;
    vlan-id number;
  }
  interleave-fragments;
  inverse-arp;
  layer2-policer {
```


Copyright © 2013, Juniper Networks, Inc.

```
    input-policer policer-name;
    input-three-color policer-name;
    output-policer policer-name;
    output-three-color policer-name;
  }
  link-layer-overhead percent;
  minimum-links number;
  mrru bytes;
  multicast-dlci dlci-identifier;
  multicast-vci vpi-identifier.vci-identifier;
  multilink-max-classes number;
  multipoint;
  oam-liveness {
    down-count cells;
    up-count cells;
  }
  oam-period (seconds | disable);
  output-vlan-map {
    (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
    inner-tag-protocol-id tpid;
    inner-vlan-id number;
    tag-protocol-id tpid;
    vlan-id number;
  }
  passive-monitor-mode;
  peer-unit unit-number;
  plp-to-clp;
  point-to-point;
  ppp-options {
    chap {
      access-profile name;
      default-chap-secret name;
      local-name name;
      passive;
    }
    compression {
      acfc;
      pfc;
      pap;
      default-pap-password password;
      local-name name;
      local-password password;
      passive;
    }
    dynamic-profile profile-name;
    lcp-max-conf-req number;
    lcp-restart-timer milliseconds;
    loopback-clear-timer seconds;
    ncp-max-conf-req number;
    ncp-restart-timer milliseconds;
  }
  pppoe-options {
    access-concentrator name;
    auto-reconnect seconds;
    (client | server);
    service-name name;
```

```
    underlying-interface interface-name;
}
proxy-arp;
service-domain (inside | outside);
shaping {
    (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate
      burst length);
    queue-length number;
}
short-sequence;
transmit-weight number;
(traps | no-traps);
trunk-bandwidth rate;
trunk-id number;
tunnel {
    backup-destination address;
    destination address;
    key number;
    routing-instance {
        destination routing-instance-name;
    }
    source source-address;
    ttl number;
}
vci vpi-identifier.vci-identifier;
vci-range start start-vci end end-vci;
vpi vpi-identifier;
vlan-id number;
vlan-id-list [vlan-id vlan-id–vlan-id];
vlan-id-range number-number;
vlan-tags inner tpid.vlan-id outer tpid.vlan-id;
vlan-tags-outer tpid.vlan-id inner-list [vlan-id vlan-id–vlan-id];
family family {
    accounting {
        destination-class-usage;
        source-class-usage {
            direction;
        }
    }
    access-concentrator name;
    address address {
        destination address;
    }
    bundle ml-fpc/pic/port | ls-fpc/pic/port);
    duplicate-protection;
    dynamic-profile profile-name;
    filter {
        group filter-group-number;
        input filter-name;
        input-list {
            [ filter-names ];
            output filter-name;
        }
        output-list {
            [ filter-names ];
        }
```

 Copyright © 2013, Juniper Networks, Inc.

```
}
ipsec-sa sa-name;
keep-address-and-control;
max-sessions number;
max-sessions-vsa-ignore;
mtu bytes;
multicast-only;
negotiate-address;
no-redirects;
policer {
  arp policer-template-name;
  input policer-template-name;
  output policer-template-name;
}
primary;
proxy inet-address address;
receive-options-packets;
receive-ttl-exceeded;
remote (inet-address address | mac-address address);
rpf-check {
  fail-filter filter-name;
  mode loose;
}
sampling {
  direction;
}
service {
  input {
    service-set service-set-name <service-filter filter-name>;
    post-service-filter filter-name;
  }
  output {
    service-set service-set-names <service-filter filter-name>;
  }
}
service-name-table table-name;
short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max
  maximum-seconds>;
targeted-broadcast {
  forward-and-send-to-re;
  forward-only;
}
(translate-discard-eligible | no-translate-discard-eligible);
(translate-fecn-and-becn | no-translate-fecn-and-becn);
translate-plp-control-word-de;
unnumbered-address interface-name <destination address destination-profile
  profile-name | preferred-source-address address>;
address address {
  arp ip-address (mac | multicast-mac) mac-address <publish>;
  broadcast address;
  destination address;
  destination-profile name;
  eui-64;
  multipoint-destination address (dlci dlci-identifier | vci vci-identifier);
  multipoint-destination address {
    epd-threshold cells plp1 cells;
```

Copyright © 2013, Juniper Networks, Inc.

```
                inverse-arp;
                oam-liveness {
                  up-count cells;
                  down-count cells;
                }
                oam-period (seconds | disable);
                shaping {
                  (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained
                    rate burst length);
                  queue-length number;
                }
                vci vpi-identifier.vci-identifier;
              }
              preferred;
              primary;
              (vrrp-group | vrrp-inet6-group) group-number {
                (accept-data | no-accept-data);
                advertise–interval seconds;
                authentication-type authentication;
                authentication-key key;
                fast-interval milliseconds;
                (preempt | no-preempt) {
                  hold-time seconds;
                }
                priority-number number;
                track {
                  priority-cost seconds;
                  priority-hold-time interface-name {
                    bandwidth-threshold bits-per-second {
                      priority;
                    }
                    interface priority;
                  }
                  route ip-address/mask routing-instance instance-name priority-cost cost;
                }
                virtual-address [ addresses ];
              }
            }
          }
        }
      }
    }
  }
```

Related Documentation

- *Junos OS Hierarchy and RFC Reference*
- *Ethernet Interfaces*
- *Junos OS Network Interfaces Library for Routing Devices*

[edit logical-systems] Hierarchy Level

The following lists the statements that can be configured at the **[edit logical-systems]** hierarchy level that are also documented in this manual. For more information about logical systems, see the *Logical Systems Feature Guide for Routing Devices*.

Copyright © 2013, Juniper Networks, Inc.

```
logical-systems logical-system-name {
  interfaces interface-name {
    unit logical-unit-number {
      accept-source-mac {
        mac-address mac-address {
          policer {
            input cos-policer-name;
            output cos-policer-name;
          }
        }
      }
      allow-any-vci;
      atm-scheduler-map (map-name | default);
      bandwidth rate;
      backup-options {
        interface interface-name;
      }
      cell-bundle-size cells;
      clear-dont-fragment-bit;
      compression {
        rtp {
          f-max-period number;
          port {
            minimum port-number;
            maximum port-number;
          }
          queues [ queue-numbers ];
        }
      }
      compression-device interface-name;
      description text;
      interface {
        l2tp-interface-id name;
        (dedicated | shared);
      }
      dialer-options {
        activation-delay seconds;
        deactivation-delay seconds;
        dial-string [ dial-string-numbers ];
        idle-timeout seconds;
        initial-route-check seconds;
        load-threshold number;
        pool pool;
        remote-name remote-callers;
        watch-list {
          [ routes ];
        }
      }
      disable;
      dlci dlci-identifier;
      drop-timeout milliseconds;
      dynamic-call-admission-control {
        activation-priority priority;
        bearer-bandwidth-limit kilobits-per-second;
      }
      encapsulation type;
```

Copyright © 2013, Juniper Networks, Inc.

```
epd-threshold cells plp1 cells;
fragment-threshold bytes;
input-vlan-map {
  inner-tag-protocol-id;
  inner-vlan-id;
  (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
  tag-protocol-id tpid;
  vlan-id number;
}
interleave-fragments;
inverse-arp;
layer2-policer {
  input-policer policer-name;
  input-three-color policer-name;
  output-policer policer-name;
  output-three-color policer-name;
}
link-layer-overhead percent;
minimum-links number;
mrru bytes;
multicast-dlci dlci-identifier;
multicast-vci vpi-identifier.vci-identifier;
multilink-max-classes number;
multipoint;
oam-liveness {
  up-count cells;
  down-count cells;
}
oam-period (seconds | disable);
output-vlan-map {
  inner-tag-protocol-id;
  inner-vlan-id;
  (pop | pop-pop | pop-swap | push | push-push | swap | swap-swap);
  tag-protocol-id tpid;
  vlan-id number;
}
passive-monitor-mode;
peer-unit unit-number;
plp-to-clp;
point-to-point;
ppp-options {
  chap {
    access-profile name;
    default-chap-secret name;
    local-name name;
    passive;
  }
  compression {
    acfc;
    pfc;
    }
  }
  dynamic-profile profile-name;
  pap {
    default-pap-password password;
    local-name name;
```


Copyright © 2013, Juniper Networks, Inc.

```
      local-password password;
      passive;
    }
  }
  proxy-arp;
  service-domain (inside | outside);
  shaping {
    (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate
      burst length);
    queue-length number;
  }
  short-sequence;
  transmit-weight number;
  (traps | no-traps);
  trunk-bandwidth rate;
  trunk-id number;
  tunnel {
    backup-destination address;
    destination address;
    key number;
    routing-instance {
      destination routing-instance-name;
    }
    source source-address;
    ttl number;
  }
  vci vpi-identifier.vci-identifier;
  vlan-id number;
  vlan-id-list [vlan-id vlan-id–vlan-id]
  vlan-tags inner tpid.vlan-id outer tpid.vlan-id;
  vlan-tags outer tpid.vlan-id inner-list [vlan-id vlan-id–vlan-id]
  vpi vpi-identifier;
  family family {
    accounting {
      destination-class-usage;
      source-class-usage {
        direction;
      }
    }
    bundle interface-name;
    filter {
      group filter-group-number;
      input filter-name;
      input-list {
        [ filter-names ];
      }
      output filter-name;
      output-list {
        [ filter-names ];
      }
    }
    ipsec-sa sa-name;
    keep-address-and-control;
    mtu bytes;
    multicast-only;
    no-redirects;
```

```
policer {
  arp policer-template-name;
  input policer-template-name;
  output policer-template-name;
}
primary;
proxy inet-address address;
receive-options-packets;
receive-ttl-exceeded;
remote (inet-address address | mac-address address);
rpf-check <fail-filter filter-name> {
  <mode loose>;
}
sampling {
  direction;
}
service {
  input {
    service-set service-set-name <service-filter filter-name>;
    post-service-filter filter-name;
  }
  output {
    service-set service-set-name <service-filter filter-name>;
  }
}
(translate-discard-eligible | no-translate-discard-eligible);
(translate-fecn-and-becn | no-translate-fecn-and-becn);
unnumbered-address interface-name destination address destination-profile
  profile-name;
address address {
  arp ip-address (mac | multicast-mac) mac-address <publish>;
  broadcast address;
  destination address;
  destination-profile name;
  eui-64;
  multipoint-destination address (dlci dlci-identifier | vci vci-identifier);
  multipoint-destination address {
    epd-threshold cells plp1 cells;
    inverse-arp;
    oam-liveness {
      up-count cells;
      down-count cells;
    }
    oam-period (seconds | disable);
    shaping {
      (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained
        rate burst length);
      queue-length number;
    }
    vci vpi-identifier.vci-identifier;
  }
  preferred;
  primary;
  (vrrp-group | vrrp-inet6-group) group-number {
    (accept-data | no-accept-data);
    advertise–interval seconds;
```


Copyright © 2013, Juniper Networks, Inc.

```
                authentication-type authentication;
                authentication-key key;
                fast-interval milliseconds;
                (preempt | no-preempt) {
                  hold-time seconds;
                }
                priority-number number;
                track {
                  priority-cost seconds;
                  priority-hold-time interface-name {
                    interface priority;
                    bandwidth-threshold bits-per-second {
                      priority;
                    }
                  }
                  route ip-address/mask routing-instance instance-name priority-cost cost;
                }
              }
              virtual-address [ addresses ];
            }
          }
        }
      }
    }
```

Related Documentation

- *Junos OS Hierarchy and RFC Reference*
- *Ethernet Interfaces*
- *Junos OS Network Interfaces Library for Routing Devices*

Copyright © 2013, Juniper Networks, Inc.

 Copyright © 2013, Juniper Networks, Inc.

CHAPTER 4

Statement Summary

fast-aps-switch

Syntax fast-aps-switch;

Hierarchy Level [edit interfaces *interface-name* sonet-options aps]

Release Information Statement introduced in Junos OS Release 12.1.

Description (M320 routers with Channelized OC3/STM1 Circuit Emulation PIC with SFP only and EX Series switches) Reduce the Automatic Protection Switching (APS) switchover time in Layer 2 circuits.

NOTE:

- Configuring this statement reduces the APS switchover time only when the Layer 2 circuit encapsulation type for the interface receiving traffic from a Layer 2 circuit neighbor is SAToP.
- When the **fast-aps-switch** statement is configured in revertive APS mode, you must configure an appropriate value for revert time to achieve reduction in APS switchover time.
- To prevent the logical interfaces in the data path from being shut down, configure appropriate hold-time values on all the interfaces in the data path that support TDM.
- The **fast-aps-switch** statement cannot be configured when the APS **annex-b** option is configured.
- The interfaces that have the **fast-aps-switch** statement configured cannot be used in virtual private LAN service (VPLS) environments.

Required Privilege Level interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- *Reducing APS Switchover Time in Layer 2 Circuits*

Copyright © 2013, Juniper Networks, Inc.

interface-type (Interfaces)

Syntax interface-type (bc | coc1 | ct1 | ct3 | dc | ds |so | t1 | t3);

Hierarchy Level [edit interfaces *interface-range name* no-partition],
[edit interfaces *interface-range name* partition *partition-number*],
[edit interfaces *interface-range name* partition *partition-number* oc-slice *oc-slice-range*],
[edit interfaces *interface-range name* partition *partition-number* timeslot *timeslot-range*]

Release Information Statement introduced before Junos OS Release 7.4.

Description For IQ and IQE interfaces only, configure the sublevel interface type.

Options

bc—Dual—Port Channelized E1 and T1 ISDN PRI interface type. You can specify this interface type at the **[edit interfaces *interface-name* partition *partition-number* timeslot *timeslot-range*]** hierarchy level to create a bearer (B) channel **bc-*pim*/0/*port*:*channel*** interface for each time you want to function as an ISDN PRI B-channel.

coc1—Channelized OC1 interface type. You can specify this interface type at the **[edit interfaces *interface-name* partition *partition-number* oc-slice *oc-slice-range* interface-type coc12-*fpc/pic/port*]** hierarchy level.

ct1—Channelized T1 interface type. You can specify this interface type at the **[edit interfaces *interface-name* partition *partition-number* interface-type ct3-*fpc/pic/port*<:*channel*>]** hierarchy level.

ct3—Channelized T3 interface type. You can specify this interface type at the **[edit interfaces *interface-name* partition *partition-number* oc-slice *oc-slice-range* interface-type coc1-*fpc/pic/port*:*channel* no-partition]** hierarchy level.

dc—Dual-Port Channelized E1 and T1 ISDN PRI interface type. You can specify this interface type at the **[edit interfaces *interface-name* partition *partition-number* timeslot *timeslot-range*]** hierarchy level to create a (D) channel **dc-*pim*/0/*port*** to control the B-channels.

ds—DS0 interface type. You can specify this interface type at the **[edit interfaces *interface-name*partition *partition-number* interface-type (ce1-*fpc/pic/port* | ct1-*fpc/pic/port*<:*channel*>)]** hierarchy level.

so—SONET/SDH interface type. You can specify this interface type at the **[edit interfaces *interface-name* partition *partition-number* oc-slice *oc-slice-range* interface-type coc12-*fpc/pic/port*]** hierarchy level.

t1—T1 interface type. You can specify this interface type at the **[edit interfaces *interface-name* partition *partition-number* oc-slice *oc-slice-range* interface-type (coc12-*fpc/pic/port* | coc1-*fpc/pic/port*)]** hierarchy level.

t3—T3 interface type. You can specify this interface type at the **[edit interfaces *interface-name* partition *partition-number* oc-slice*oc-slice-range* interface-type (coc12-*fpc/pic/port* | coc1-*fpc/pic/port*:*channel* no-partition)]** hierarchy level.

 Copyright © 2013, Juniper Networks, Inc.

Required Privilege Level
interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation
- *Channelized E1 IQ and IQE Interfaces Overview*
- *Channelized OC12/STM4 IQ and IQE Interfaces Overview*
- *Configuring Channelized T3 IQ Interfaces*

no-termination-request

Syntax
no-termination-request;

Hierarchy Level
[edit interfaces *interface-name* ppp-options],
[edit interfaces lsq-*fpc/pic/port* lsq-failure-options]

Release Information
Statement introduced in Junos OS Release 7.4.
Support at the **[edit interfaces *interface-name* ppp-options]** hierarchy level added in Junos OS Release 8.3.

Description
For LSQ PICs or link PICs in redundant LSQ configurations, you can inhibit the router from sending PPP termination-request messages to the remote host if the PIC fails.

Required Privilege Level
interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation
- *Configuring Link PIC Failover on Channelized OC3 IQ and IQE Interfaces*
- *Configuring Link PIC Failover on Channelized OC12/STM4 IQ and IQE Interfaces*
- *Configuring Link PIC Failover on Channelized STM1 Interfaces*
- *Junos OS Services Interfaces Library for Routing Devices*

Copyright © 2013, Juniper Networks, Inc.

oc-slice

Syntax oc-slice *oc-slice-range*;

Hierarchy Level [edit interfaces *interface-name* partition *partition-number*]

Release Information Statement introduced before Junos OS Release 7.4.

Description For channelized OC12 IQ interfaces only, configure the range of SONET/SDH slices.

Default If you do not include either this statement or the **no-partition** statement, the Channelized OC12 IQ PICs not partitioned, and no data channels are configured.

Options ***oc-slice-range***—Range of SONET/SDH slices. OC3 interfaces must occupy three consecutive OC slices per interface, in the form 1–3, 4–6, 7–9, or 10–12. The T3, T1, and DS0 interface types each occupy one OC slice per interface.

Range: For OC3 interfaces,1–3, 4–6, 7–9, or 10–12; for SONET/SDH and T3 interfaces, 1–12

The remaining statement is explained separately.

Required Privilege Level interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- *Channelized OC12/STM4 IQ and IQE Interfaces Overview*

Copyright © 2013, Juniper Networks, Inc.

partition

Syntax partition *partition-number* oc-slice *oc-slice-range* interface-type *type* timeslots *time-slot-range*;

Hierarchy Level [edit interfaces *interface-name*]

Release Information Statement introduced before Junos OS Release 7.4.

Description For IQ interfaces and J Series interfaces on the Dual-Port Channelized E1 and T1PIM, configure the channelized interface partition. The partition number is correlated with the channel number. Partition and channel numbering on IQ interfaces begins with **:1**, not **:0**.

Default If you omit this statement, the channelized PIC or PIM is not partitioned, and no data channels are configured.

Options ***partition-number***—Sublevel interface partition index.

Range:

- 1 through 4 for an OC3 interface on a channelized OC12 IQ interface.
- 1 through 12 for a T3 interface on a channelized OC12 IQ interface.
- 1 through 4 for a T3 interface on a channelized T3 IQ interface.
- 1 through 28 for a T1 IQ interface on a channelized OC12 IQ or channelized T3 IQ interface.
- 1 through 10 for an E1 interface on a channelized E1 IQ interface.
- 1 through 30 on a channelized E1 interface.
- 1 through 23 on a channelized T1 interface.
- 1 through 24 for *N*xDS0 interfaces on either channelized OC12 IQ or channelized DS3 IQ interfaces.
- 0 through 31(with 0 reserved for framing) for *N*xDS0 interfaces on channelized E1 IQ interfaces.

The remaining statements are explained separately.

Required Privilege Level interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- *Channelized E1 IQ and IQE Interfaces Overview*
- *Channelized OC12/STM4 IQ and IQE Interfaces Overview*
- *Configuring Channelized T3 IQ Interfaces*
- *no-partition*

Copyright © 2013, Juniper Networks, Inc.

timeslots

Syntax timeslots *time-slot-range*;

Hierarchy Level [edit interfaces e1-*fpc/pic/port*],
[edit interfaces t1-*fpc/pic/port*],
[edit interfaces *interface-name* e1-options],
[edit interfaces *interface-name* partition *partition-number*],
[edit interfaces *interface-name* t1-options]

Release Information Statement introduced before Junos OS Release 7.4.

Description For E1 and T1interfaces, allocate the specific time slots by number.

NOTE: When configuring E1 or T1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the **timeslots** statement must be included at the **[edit interfaces e1-*fpc/pic/port*]** or **[edit interfaces t1-*fpc/pic/port*]** hierarchy level as appropriate.

Options ***time-slot-range***—Actual time slot numbers allocated:

Range: Ranges vary by interface type and configuration option as follows:

- 1 through 24 for T1 interfaces (0 is reserved)
- 1 through 31 for 4-port E1 PICs (0 is reserved)
- 1 through 31 for *Nx*DS0 interfaces (0 is reserved)
- 2 through 32 for 10-port Channelized E1 and 10-port Channelized E1 IQ PICs (1 is reserved)
- 2 through 32 for the setting under **e1-options** with IQE PICs (1 is reserved) (when creating fractional E1)
- 1 through 31 for the setting under **partition** with IQE PICs (0 is reserved) (when creating *Nx*DS0)

NOTE: When creating fractional E1 interfaces only, if you connect a 4-port E1 PIC interface to a device that uses time slot numbering from 2 through 32, you must subtract 1 from the configured number of time slots.

Required Privilege Level interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.

Related Documentation

- *Configuring Fractional E1 IQ and IQE Interfaces*
- *Configuring Fractional T1 IQ and IQE Interfaces*

Copyright © 2013, Juniper Networks, Inc.

- *Configuring Fractional E1 Time Slots*
- *Configuring Fractional T1 Time Slots*
- *Configuring a Channelized T1/E1 Interface to Drop and Insert Time Slots*

Copyright © 2013, Juniper Networks, Inc.

 Copyright © 2013, Juniper Networks, Inc.

PART 3

Administration

- Monitoring Commands on page 59
- Command Summaries on page 227

Copyright © 2013, Juniper Networks, Inc.

 Copyright © 2013, Juniper Networks, Inc.

CHAPTER 5

Monitoring Commands

Copyright © 2013, Juniper Networks, Inc.

show interfaces (Aggregated SONET/SDH)

Syntax
show interfaces as*number*
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information
Command introduced before Junos OS Release 7.4.

Description
(M Series and T Series routers only) Display status information about the specified aggregated SONET/SDH interface.

Options
as*number*—Display standard information about the specified aggregated SONET/SDH interface.

brief | detail | extensive | terse—(Optional) Display brief interface information.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level
view

List of Sample Output
show interfaces (Aggregated SONET) on page 64
show interfaces brief (Aggregated SONET) on page 64
show interfaces detail (Aggregated SONET) on page 64
show interfaces extensive (Aggregated SONET) on page 65

Output Fields
Table 3 on page 60 lists the output fields for the **show interfaces** (aggregated SONET/SDH) command. Output fields are listed in the approximate order in which they appear.

Table 3: Aggregated SONET/SDH show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under *Common Output Fields Description*.	All levels
Interface index	Physical interface's index number, which reflects its initialization sequence.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 3: Aggregated SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SNMP ifIndex	SNMP index number for the physical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	MTU size on the physical interface.	All levels
Speed	Speed at which the interface is running.	All levels
Minimum links needed	Number of child links that must be operational for the aggregated interface to be operational.	**detail extensive** none
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under *Common Output Fields Description*.	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Link flags	Information about the link. Possible values are described in the "Link Flags" section under *Common Output Fields Description*.	All levels
Keepalive settings	(PPP and HDLC) Configured settings for keepalives. • **interval** ***seconds***—The time in seconds between successive keepalive requests. The range is **10** seconds through **32,767** seconds, with a default of **10** seconds. • **up-count** ***number***—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is**1** through **255**, with a default of **1**. • **down-count** ***number***—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is **1** through **255**, with a default of **3**.	All levels
Last flapped	Date, time, and how long ago the interface went from down to up. The format is **Last flapped:** ***year-month-day hour:minute:second timezone*** **(*****hour:minute:second*** **ago)**. For example, **Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago).**	**detail extensive** none
Input rate	Input rate in bits per second (bps) and packets per second (pps).	None specified
Output rate	Output rate in bps and pps.	None specified
Statistics last cleared	Time when the statistics for the interface were last set to zero.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 3: Aggregated SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Traffic statistics	Number of bytes and packets received and transmitted on the physical interface, and the traffic rate in bits per seconds (bps). • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface. • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**
Input errors	Input errors on the interface whose definitions are as follows: • **Errors**—Sum of the incoming frame aborts and FCS errors. • **Drops**—Number of packets dropped by the input 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. • **Framing errors**—Number of packets received with an invalid frame checksum (FCS). • **Runts**—Number of frames received that are smaller than the runt threshold. • **Giants**—Number of frames received that are larger than the giant threshold. • **Policed discards**—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • **Resource errors**—Sum of transmit drops.	**extensive**
Output errors	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Carrier transitions**—Number of times the interface has gone from **down** to **up**. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning. • **Errors**—Sum of the outgoing frame aborts and FCS errors. • **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. • **MTU errors**—Number of packets whose size exceeds the MTU of the interface. • **Resource errors**—Sum of transmit drops.	**extensive**
Egress queues	Total number of egress queues supported on the specified interface.	**detail extensive**
Queue counters	CoS queue number and its associated user-configured forwarding class name. • **Queued packets**—Number of queued packets. • **Transmitted packets**—Number of transmitted packets. • **Dropped packets**—Number of packets dropped by the ASIC's RED mechanism.	**extensive**
Logical Interface		
Logical interface	Name of the logical interface.	All levels

Copyright © 2013, Juniper Networks, Inc.

Table 3: Aggregated SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Index	Logical interface's index number (which reflects its initialization sequence).	**detail extensive** none
SNMP ifIndex	Logical interface's SNMP interface index number.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Flags	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under *Common Output Fields Description*.	All levels
Encapsulation	Encapsulation on the logical interface.	All levels
Bandwidth	Interface bandwidth.	**detail extensive** none
Statistics	Information about fragments and packets received and sent by the router All references to traffic direction (input or output) are defined with respect to the router. Input fragments received by the router are assembled into input packets; output packets are segmented into output fragments for transmission out of the router. Statistics include input and output counts for packets, packets per second (pps), bytes, and bytes per second (Bps) for the following entities: • **Bundle**—Information about bundles. • **Link**—Information about links used in the multilink operation.	**detail extensive** none
protocol-family	Protocol family configured on the logical interface. If the protocol is **inet**, the source and destination address are also displayed.	**brief**
Protocol	Protocol family configured on the logical interface.	**detail extensive** none
MTU	MTU size on the logical interface.	**detail extensive** none
Flags	Information about the protocol family flags. Possible values are described in the "Family Flags" section under *Common Output Fields Description*.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	**detail extensive**
Addresses, Flags	Information about the address flags. Possible values are described in the "Addresses Flags" section under *Common Output Fields Description*.	**detail extensive** none
Destination	IP address of the remote side of the connection.	**detail extensive** none
Local	IP address of the logical interface.	**detail extensive** none
Broadcast	Broadcast address.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 3: Aggregated SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	**detail extensive**

Sample Output

show interfaces (Aggregated SONET)

```
user@host> show interfaces as0
Physical interface: as0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 45
  Link-level type: PPP, MTU: 4474, Speed: 466560kbps, Minimum links needed: 1
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Last flapped   : Never
  Input rate     : 216 bps (1 pps)
  Output rate    : 48 bps (0 pps)

  Logical interface as0.0 (Index 79) (SNMP ifIndex 55)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
    Bandwidth: 311040kbps
    Statistics        Packets        pps         Bytes          bps
    Bundle:
        Input :          1178          1         11772          176
        Output:             0          0             0            0
    Protocol inet, MTU: 4470
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 10.100.1.1, Local: 10.100.1.2
```

show interfaces brief (Aggregated SONET)

```
user@host> show interfaces as0 brief
Physical interface: as0, Enabled, Physical link is Up
  Link-level type: PPP, MTU: 4474, Speed: 466560kbps
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3

  Logical interface as0.0
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
    inet  10.100.1.2       --> 10.100.1.1
```

show interfaces detail (Aggregated SONET)

```
user@host> show interfaces as0 detail
Physical interface: as0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 45, Generation: 32
  Link-level type: PPP, MTU: 4474, Speed: 466560kbps, Minimum links needed: 1
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
```


Copyright © 2013, Juniper Networks, Inc.

```
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Last flapped   : Never
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                15888                  272 bps
   Output bytes  :                 6189                   48 bps
   Input  packets:                 1547                    2 pps
   Output packets:                  393                    0 pps
  Egress queues: 4 supported, 4 in use
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                    0                    0                    0

    1 expedited-fo                   0                    0                    0

    2 assured-forw                   0                    0                    0

    3 network-cont              196806               196806                    0


  Logical interface as0.0 (Index 79) (SNMP ifIndex 55) (Generation 18)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
    Bandwidth: 311040kbps
    Statistics        Packets        pps         Bytes          bps
    Bundle:
        Input :          1334          2         13332          232
        Output:             0          0             0            0
    Link:
      so-0/0/0.0 <-- down
        Input :             0          0             0            0
        Output:             0          0             0            0
      so-0/0/1.0
        Input :           541          1          5406          120
        Output:             0          0             0            0
      so-0/0/2.0
        Input :           793          1          7926          112
        Output:             0          0             0            0
    Protocol inet, MTU: 4470, Generation: 38, Route table: 0
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 10.100.1.1, Local: 10.100.1.2, Broadcast: Unspecified,
        Generation: 40
```

show interfaces extensive (Aggregated SONET)

```
userhost1> show interfaces as0 extensive
Physical interface: as0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 45, Generation: 32
  Link-level type: PPP, MTU: 4474, Speed: 466560kbps, Minimum links needed: 1
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Last flapped   : Never
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                17562                  136 bps
   Output bytes  :                 6862                   72 bps
   Input  packets:                 1710                    1 pps
   Output packets:                  436                    0 pps
```

Copyright © 2013, Juniper Networks, Inc.

```
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
  Policed discards: 0, Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0,
  Resource errors: 0
Egress queues: 4 supported, 4 in use
Queue counters:       Queued packets  Transmitted packets      Dropped packets

  0 best-effort                    0                    0                    0

  1 expedited-fo                   0                    0                    0

  2 assured-forw                   0                    0                    0

  3 network-cont              196848               196848                    0


Logical interface as0.0 (Index 79) (SNMP ifIndex 55) (Generation 18)
  Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
  Bandwidth: 311040kbps
  Statistics        Packets        pps         Bytes          bps
  Bundle:
      Input :          1475          1         14742          136
      Output:             0          0             0            0
  Link:
    so-0/0/0.0 <-- down
      Input :             0          0             0            0
      Output:             0          0             0            0
    so-0/0/1.0
      Input :           598          0          5976           24
      Output:             0          0             0            0
    so-0/0/2.0
      Input :           877          1          8766          112
      Output:             0          0             0            0
  Protocol inet, MTU: 4470, Generation: 38, Route table: 0
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 10.100.1.1, Local: 10.100.1.2, Broadcast: Unspecified,
      Generation: 40
```


Copyright © 2013, Juniper Networks, Inc.

show interfaces (Channelized DS3-to-DS0)

Syntax
show interfaces ds-*fpc/pic/port:t1channel:ds0channel*
<brief | detail | extensive>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information
Command introduced before Junos OS Release 7.4.

Description
(M Series and T Series routers only) Display status information about the specified channelized DS3-to-DS0 interface.

Options
ds-*fpc/pic/port:t1channel:ds0channel*—Display standard information about the specified channelized DS3-to-DS0 interface.

brief | detail | extensive—(Optional) Display the specified level of output interface.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level
view

List of Sample Output
show interfaces extensive (Channelized DS3-to-DS0) on page 75

Output Fields
Table 4 on page 67 lists the output fields for the **show interfaces** (all Channelized DS3 interfaces) command. Output fields are listed in the approximate order in which they appear.

Table 4: Channelized DS3 show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under *Common Output Fields Description*.	All levels
Interface index	Physical interface's index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	SNMP index number for the physical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 4: Channelized DS3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	MTU size on the physical interface.	All levels
Clocking	Reference clock source. It can be **Internal** or **External**.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Whether loopback is enabled and the type of loopback (**local** or **remote**).	All levels
FCS	Frame check sequence on the interface (either **16** or **32**). The default is **16** bits.	All levels
Mode	Whether C-bit parity mode or M13 mode is enabled.	All levels
Framing	Physical layer framing format used on the link. It can be **ESF** or **SF**. The default is **ESF**.	All levels
Parent	(Channelized IQ interfaces only) Name and interface index of the interface to which a particular child interface belongs. **None** indicates that this interface is the top level.	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under *Common Output Fields Description*.	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Link flags	Information about the link. Possible values are described in the "Link Flags" section under *Common Output Fields Description*.	All levels
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	**detail extensive**
Keepalive settings	(PPP and HDLC) Configured settings for keepalives. • **interval** ***seconds***—The time in seconds between successive keepalive requests. The range is **10** seconds through **32,767** seconds, with a default of **10** seconds. • **down-count** ***number***—The number of keepalive packets that a destination must fail to receive before the network takes a link down. The range is **1** through **255**, with a default of **3**. • **up-count** ***number***—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is **1** through **255**, with a default of **1**.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 4: Channelized DS3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output

Keepalive statistics	(PPP and HDLC) Information about keepalive packets.
	• **Input**—Number of keepalive packets received by PPP.
	  • **(last seen 00:00:00 ago)**—Time since the last keepalive packet was received, in the format ***hh:mm:ss***.
	• **Output**—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received.
	  • **(last seen 00:00:00 ago)**—Time since the last keepalive packet was sent, in the format ***hh:mm:ss***.
		detail extensive none

LMI settings	(Frame Relay) Settings for Local Management Interface (LMI) can be either **ANSI LMI settings** or **ITU LMI settings**. ANSI LMI settings is the default. The format is **(ANSI or ITU) LMI settings: *value***, *value*, *value*...*xx* seconds, where ***value*** can be: • **n391dte**—DTE full status polling interval (1–255) • **n392dce**—DCE error threshold (1–10) • **n392dte**—DTE error threshold (1–10) • **n393dce**—DCE monitored event count (1–10) • **n393dte**—DTE monitored event count (1–10) • **t391dte**—DTE polling timer (5–30 seconds) • **t392dce**—DCE polling verification timer (5–30 seconds)	**detail extensive** none
LMI	(Frame Relay) LMI packet statistics: • **Input**—Number of packets coming in on the interface (*nn*) and how much time has passed since the last packet arrived. The format is **Input: *nn* (last seen *hh:mm:ss* ago)**. • **Output**—Number of packets sent out on the interface (*nn*) and how much time has passed since the last packet was sent. The format is **Output: *nn* (last seen *hh:mm:ss* ago)**.	**detail extensive** none
LCP state	(PPP) Link Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—LCP negotiation is incomplete (not yet completed or has failed). • **Not-configured**—LCP is not configured on the interface. • **Opened**—LCP negotiation is successful.	**detail extensive** none
NCP state	(PPP) Network Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—NCP negotiation is incomplete (not yet completed or has failed). • **Not-configured**—NCP is not configured on the interface. • **Opened**—NCP negotiation is successful.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 4: Channelized DS3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
CHAP state	(PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. • **Chap-Chal-received**—Challenge was received but response not yet sent. • **Chap-Chal-sent**—Challenge was sent. • **Chap-Resp-received**—Response was received for the challenge sent, but CHAP has not yet moved into the**Success** state. (Most likely with RADIUS authentication). • **Chap-Resp-sent**—Response was sent for the challenge received. • **Closed**—CHAP authentication is incomplete. • **Failure**—CHAP authentication failed. • **Not-configured**—CHAP is not configured on the interface. • **Success**—CHAP authentication was successful.	**detail extensive** none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is **Last flapped: *year-month-day hour:minute:second timezone hh:mm:ss* ago)**. For example, **Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)**.	**detail extensive** none
Statistics last cleared	Time when the statistics for the interface were last set to zero.	**detail extensive**
Traffic statistics	Number and rate of bytes and packets received and transmitted on the physical interface. • **Input bytes, Output bytes**—Number of bytes received and transmitted on the interface. • **Input packets, Output packets**—Number of packets received and transmitted on the interface.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 4: Channelized DS3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Input errors	Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Errors**—Sum of the incoming frame aborts and FCS errors. • **Drops**—Number of packets dropped by the input 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. • **Framing errors**—Number of packets received with an invalid frame checksum (FCS). • **Giants**—Number of frames received that are larger than the giant threshold. • **Runts**—Number of frames received that are smaller than the runt threshold. • **Policed discards**—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • **L3 incompletes**—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. • **L2 channel errors**—Counter increments when the software could not find a valid logical interface for an incoming frame. • **L2 mismatch timeouts**—Count of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • **SRAM errors**—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC. If the value in this field increments, the PIC is malfunctioning. • **HS link CRC errors**—Count of errors on the high-speed links between the ASICs responsible for handling the router interfaces.	**extensive**
Output errors	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Carrier transitions**—Number of times the interface has gone from **down** to **up**. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly, (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning. • **Errors**—Sum of the outgoing frame aborts and FCS errors. • **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. • **Aged packets**—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 4: Channelized DS3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
DS1 alarms **DS1 defects**	Media-specific defects that can render the interface unable to pass packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. • **LOS**—Loss of signal. • **LOF**—Loss of frame. • **AIS**—Alarm indication signal. • **YLW**—Yellow alarm. Indicates errors at the remote site receiver.	**detail extensive** none
T1 media	Counts of T1 media-specific errors. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. The T1 media-specific error types can be: • **SEF**—Severely errored framing • **BEE**—Bit error event • **AIS**—Alarm indication signal • **LOF**—Loss of frame • **LOS**—Loss of signal • **YELLOW**—Errors at the remote site receiver • **BPV**—Bipolar violation • **EXZ**—Excessive zeros • **LCV**—Line code violation • **PCV**—Pulse code violation • **CS**—Carrier state • **LES**—Line error seconds • **ES**—Errored seconds • **SEFS**—Severely errored framing seconds (section) • **SES**—Severely errored seconds • **BES**—Bit error seconds • **UAS**—Unavailable seconds	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 4: Channelized DS3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
DS3 media	Counts of T3 media-specific errors. 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. • **PLL Lock**—Phase-locked loop out of lock • **Reframing**—Frame alignment recovery time • **AIS**—Alarm indication signal • **LOF**—Loss of frame • **LOS**—Loss of signal • **IDLE**—Idle code detected • **YELLOW**—Remote defect indication • **BPV**—Bipolar violation • **EXZ**—Excessive zeros • **LCV**—Line code violation • **PCV**—Pulse code violation • **CCV**—C-bit coding violation • **LES**—Line error seconds • **PES**—P-bit errored seconds • **PSES**—P-bit errored seconds (section) • **CES**—C-bit errored seconds • **CSES**—C-bit severely errored seconds • **SEFS**—Severely errored framing seconds • **UAS**—Unavailable seconds	**extensive**
HDLC configuration	Information about the HDLC configuration. • **Giant threshold**—Giant threshold programmed into the hardware. • **Runt threshold**—Runt threshold programmed into the hardware. • **Timeslots**—Configured time slots for the interface. • **Byte encoding**—Byte encoding used: **Nx64K** or **Nx56K**. • **Data inversion**—HDLC data inversion setting: **Enabled** or **Disabled**	**extensive**
Interface transmit queues	Name of the transmit queues and their associated statistics for each DS1 channel on the Channelized DS3-to-DS1 PIC. • **B/W**—Queue bandwidth as a percentage of the total interface bandwidth. • **WRR**—Weighted round-robin (in percent). • **Packets**—Number of packets transmitted. • **Bytes**—Number of bytes transmitted. • **Drops**—Number of packets dropped. • **Errors**—Number of packet errors.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 4: Channelized DS3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
DS1 or DS3 BERT configuration	BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface. • **BERT time period**—Configured total time period that the BERT is to run. • **Elapsed**—Actual time elapsed since the start of the BERT (in seconds). • **Induced error rate**—Configured rate at which the bit errors are induced in the BERT pattern. • **Algorithm**—Type of algorithm selected for the BERT.	**detail extensive** none
Packet Forwarding Engine configuration	Information about the configuration of the Packet Forwarding Engine: • **Destination slot**—FPC slot number. • **PLP byte**—Packet Level Protocol byte.	**extensive**
CoS information	Information about the CoS queue for the physical interface. • **CoS transmit queue**—Queue number and its associated user-configured forwarding class name. • **Bandwidth %**—Percentage of bandwidth allocated to the queue. • **Bandwidth bps**—Bandwidth allocated to the queue (in bps). • **Buffer %**—Percentage of buffer space allocated to the queue. • **Buffer usec**—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • **Priority**—Queue priority: **low** or **high**. • **Limit**—Displayed if rate limiting is configured for the queue. Possible values are **none** and **exact**. If **exact** is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If **none** is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.	**extensive**
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Logical interface index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	Logical interface SNMP interface index number.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Flags	Information about the logical interface; values are described in the "Logical Interface Flags" section under *Common Output Fields Description*.	All levels
Encapsulation	Encapsulation on the logical interface.	All levels
Bandwidth	Bandwidth configured on the interface.	All levels
Protocol	Protocol family configured on the logical interface, such as **iso**, **inet6**, **mpls**.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 4: Channelized DS3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
MTU	MTU size on the logical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	detail extensive
Flags	Information about the protocol family flags. Possible values are described in the "Family Flags" section under *Common Output Fields Description*.	**detail extensive** none
Addresses, Flags	Information about the address flags. Possible values are described in the "Addresses Flags" section under *Common Output Fields Description*.	**detail extensive** none
Destination	IP address of the remote side of the connection.	**detail extensive** none
Local	IP address of the logical interface.	**detail extensive** none
Broadcast	Broadcast address.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive** none
Redundant Link	(LSQ redundancy) Backup link for Link Services IQ redundancy.	**detail extensive** none

Sample Output

show interfaces extensive (Channelized DS3-to-DS0)

```
user@host> show interfaces ds-0/0/0:0:0 extensive
Physical interface: ds-0/0/0:0:0, Enabled, Physical link is Up
  Interface index: 174, SNMP ifIndex: 4298, Generation: 177
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps, FCS: 16,
  Mode: C/Bit parity, Framing: ESF
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 280 (last seen 00:00:09 ago)
    Output: 286 (last sent 00:00:00 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,
  mpls: Not-configured
  CHAP state: Not-configured
  Last flapped   : 2002-05-23 17:53:29 PDT (00:46:46 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                 6814                   16 bps
   Output bytes  :                28840                   72 bps
   Input  packets:                  568                    0 pps
   Output packets:                  893                    0 pps
  Input errors:
```

Copyright © 2013, Juniper Networks, Inc.

```
  Errors: 0, Drops: 0, Framing errors: 39, Policed discards: 0,
  L3 incompletes: 0, L2 channel errors: 2, L2 mismatch timeouts: 0,
  HS link CRC errors: 0
Output errors:
  Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0
DS1   alarms   : None
DS3   alarms   : None
DS1   defects  : None
DS3   defects  : None
T1  media:            Seconds        Count  State
  SEF                       0            0  OK
  BEE                       5            1  OK
  AIS                       0            0  OK
  LOF                       0            0  OK
  LOS                       0            0  OK
  YELLOW                   17            1  OK
  BPV                       0            0
  EXZ                       0            0
  LCV                       5        27765
  PCV                       0            0
  CS                        0            0
  LES                       0
  ES                        0
  SES                       5
  SEFS                     10
  BES                       0
  UAS                       0
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
  IDLE                      0            0  OK
  YELLOW                    0            0  OK
  BPV                       1        65535
  EXZ                       1        65535
  LCV                       2       131070
  PCV                       1         1825
  CCV                       0            0
  LES                       1
  PES                       1
  PSES                      1
  CES                       0
  CSES                      0
  SEFS                      0
  UAS                       0
Interface transmit queues:
            B/W  WRR       Packets        Bytes        Drops       Errors
  Queue0     95   95             0            0            0            0
  Queue1      5    5           893        28840            0            0
HDLC configuration:
  Giant threshold: 1514, Runt threshold: 3
  Timeslots      : 1-10
  Byte encoding: Nx64K, Data inversion: Disabled
DS3 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Algorithm: 2^15 - 1, Induced error rate: 10e-0
DS1 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
```


Copyright © 2013, Juniper Networks, Inc.

```
  Packet Forwarding Engine configuration:
    Destination slot: 0, PLP byte: 2 (0x01)
  CoS information:    CoS transmit queue             Bandwidth           Buffer
Priority   Limit
                               %          bps   %         usec
    0 best-effort             95       608000  95            0      low    none
    3 network-control          5        32000   5            0      low    none
 Logical interface ds-0/0/0:0:0.0 (Index 5) (SNMP ifIndex 4299)
  (Generation 943)
    Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol inet, MTU: 1500, Generation: 949, Route table: 0
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 18.18.18.1, Local: 18.18.18.2, Broadcast: Unspecified,
        Generation: 1849
```

Copyright © 2013, Juniper Networks, Inc.

show interfaces (Channelized DS3-to-DS1)

Syntax show interfaces t1-*fpc/pic/port*:*t1channel*
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information Command introduced before Junos OS Release 7.4.

Description (M Series and T Series routers only) Display status information about the specified channelized DS3-to-DS1 interface.

Options **t1-*fpc/pic/port*:*t1channel***—Display standard information about the specified channelized DS3-to-DS1 interface.

brief | detail | extensive | terse—(Optional) Display brief interface information.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level view

List of Sample Output show interfaces extensive (channelized DS3-to-DS1) on page 78

Output Fields See the output field table for the show interfaces (Channelized DS3-to-DS0) command.

Sample Output

show interfaces extensive (channelized DS3-to-DS1)

```
user@host> show interfaces t1-0/0/0:0 extensive
Physical interface: t1-0/0/0:0, Enabled, Physical link is Up
  Interface index: 210, SNMP ifIndex: 14, Generation: 2977
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps,
  Loopback: None, FCS: 16, Mode: C/Bit parity, Framing: ESF
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 30 (last seen 00:00:05 ago)
    Output: 29 (last sent 00:00:00 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
  Not-configured
```


Copyright © 2013, Juniper Networks, Inc.

```
CHAP state: Not-configured
Last flapped   : 2002-05-23 17:30:12 PDT (17:29:43 ago)
Statistics last cleared: Never
Traffic statistics:
 Input  bytes  :                  944                   16 bps
 Output bytes  :                 1162                   16 bps
 Input  packets:                   66                    0 pps
 Output packets:                   82                    0 pps
Input errors:
  Errors: 1, Drops: 0, Framing errors: 1, Policed discards: 8,
  L3 incompletes: 0, L2 channel errors: 1, L2 mismatch timeouts: 0,
  HS link CRC errors: 0, SRAM errors: 0
Output errors:
  Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0
DS1   alarms   : None
DS3   alarms   : None
DS1   defects  : None
DS3   defects  : None
T1  media:            Seconds        Count  State
  SEF                       0            0  OK
  BEE                      11            5  OK
  AIS                      28            1  OK
  LOF                      27            1  OK
  LOS                       0            0  OK
  YELLOW                   23            1  OK
  BPV                       0            0
  EXZ                       0            0
  LCV                      11        20574
  PCV                       0            0
  CS                        0            0
  LES                      28
  ES                       28
  SES                      39
  SEFS                     50
  BES                       0
  UAS                       0
DS3 media:            Seconds        Count  State
  PLL Lock                  0            0  OK
  Reframing                 0            0  OK
  AIS                       0            0  OK
  LOF                       1            1  OK
  LOS                       1            1  OK
  IDLE                      0            0  OK
  YELLOW                    0            0  OK
  BPV                       2       131070
  EXZ                       3        49910
  LCV                       5       180980
  PCV                       2          327
  CCV                      12       264558
  LES                       3
  PES                       3
  PSES                      2
  CES                      13
  CSES                     13
  SEFS                      1
  UAS                      35
Interface transmit queues:
            B/W  WRR       Packets        Bytes        Drops       Errors
  Queue0     95   95             0            0            0            0
  Queue1      5    5            82         1162            0            0
HDLC configuration:
```

Copyright © 2013, Juniper Networks, Inc.

```
  Giant threshold: 1514, Runt threshold: 3
  Timeslots      : 1-10
  Line encoding: B8ZS, Byte encoding: Nx64K, Data inversion: Disabled
DS3 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Algorithm: 2^15 - 1, Induced error rate: 10e-0
DS1 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
  Destination slot: 0, PLP byte: 2 (0x00)  CoS information:
  CoS transmit queue             Bandwidth           Buffer Priority   Limit
                            %          bps   %         usec
  0 best-effort            95       608000  95            0      low    none
  3 network-control         5        32000   5            0      low    none
Logical interface t1-0/0/0:0.0 (Index 11) (SNMP ifIndex 23) (Generation 497)
  Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
  Bandwidth: 0
  Protocol inet, MTU: 1500, Generation: 576, Route table: 0
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 21.21.21.2, Local: 21.21.21.1, Broadcast: Unspecified,
      Generation: 977
```

 Copyright © 2013, Juniper Networks, Inc.

show interfaces (Channelized E1 IQ)

Syntax
show interfaces (ce1-*fpc/pic/port* | *type-fpc/pic/port*<:*channel*>)
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information
Command introduced before Junos OS Release 7.4.

Description
(M Series and T Series routers only) Display status information about the specified channelized E1 IQ interface.

Options
type-fpc/pic/port*:<*channel*>**—Interface type with optional corresponding channel levels. For the physical channelized E1 IQ interface, ***type is **ce**. For the clear channel, ***type*** is **e1**. At the first level of channelization, ***type*** is **ds**.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level
view

List of Sample Output
show interfaces (Channelized E1 IQ) (Physical) on page 81
show interfaces extensive (Channelized E1 IQ Multilink PPP Encapsulation) on page 82
show interfaces extensive (Channelized E1 IQ MLFR Encapsulation) on page 83
show interfaces detail (Clear Channel E1) on page 84

Output Fields
For information about output fields, see the output field table for the show interfaces (Channelized E1) command. Output fields are listed in the approximate order in which they appear.

Sample Output

show interfaces (Channelized E1 IQ) (Physical)

```
user@host> show interfaces ce1-1/2/3
Physical interface: ce1-1/2/3, Enabled, Physical link is Up
  Interface index: 18, SNMP ifIndex: 1128
  Link-level type: Frame-relay, Controller, MTU: 1504, Clocking: Internal,   Speed:
 E1, Loopback: None, FCS: 16, Framing: G704, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
```

Copyright © 2013, Juniper Networks, Inc.

```
  LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
  DTE statistics:
    Enquiries sent                     : 43186
    Full enquiries sent                : 8515
    Enquiry responses received         : 43185
    Full enquiry responses received    : 8515
  DCE statistics:
    Enquiries received                 : 0
    Full enquiries received            : 0
    Enquiry responses sent             : 0
    Full enquiry responses sent        : 0
  Common statistics:
    Unknown messages received          : 0
    Asynchronous updates received      : 0
    Out-of-sequence packets received   : 0
    Keepalive responses timedout       : 0
  Nonmatching DCE-end DLCIs:
          2
  Last flapped   : 2002-10-04 17:52:51 PDT (00:32:57 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  DS1   alarms   : None
  DS1   defects  : None
```

show interfaces extensive (Channelized E1 IQ Multilink PPP Encapsulation)

```
user@host> show interfaces ds-0/3/4:1 extensive
Physical interface: ds-0/3/4:1, Enabled, Physical link is Up
  Interface index: 151, SNMP ifIndex: 63, Generation: 34
  Link-level type: Multilink-PPP, MTU: 1518, Clocking: Internal, Speed: 64kbps,
  Loopback: None, FCS: 16,
  Parent: ce1-0/3/4 Interface index 150
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 0 (last seen: never)
    Output: 0 (last sent: never)
  LCP state: Down
  CHAP state: Closed
  CoS queues     : 4 supported, 4 maximum usable queues
  Last flapped   : Never
  Statistics last cleared: 2005-12-21 10:32:15 PST (1w0d 03:10 ago)
  Traffic statistics:
   Input  bytes  :                   0                   0 bps
   Output bytes  :             6070570                 224 bps
   Input  packets:                   0                   0 pps
   Output packets:              209330                   0 pps
  Input errors:
    Errors: 3, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
    Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
    L2 mismatch timeouts: 0, HS link CRC errors: 0, Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,
     Resource errors: 0
  HDLC configuration:
    Giant threshold: 1528, Runt threshold: 2
    Timeslots      : 1
    Data inversion: Disabled, Idle cycle flag: flags, Start end flag: shared
```


Copyright © 2013, Juniper Networks, Inc.

```
  DS0 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
  Packet Forwarding Engine configuration:
    Destination slot: 0, PLP byte: 4 (0x00)

  Logical interface ds-0/3/4:1.0 (Index 74) (SNMP ifIndex 64) (Generation 13)
    Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol mlppp, Multilink bundle: ls-0/1/0.0, MTU: 1514, Generation: 24,
    Route table: 0
```

show interfaces extensive (Channelized E1 IQ MLFR Encapsulation)

```
user@host> show interfaces ds-0/3/4:5 extensive
Physical interface: ds-0/3/4:5, Enabled, Physical link is Up
  Interface index: 155, SNMP ifIndex: 72, Generation: 38
  Link-level type: Multilink-FR, MTU: 1518, Clocking: Internal, Speed: 64kbps,
  Loopback: None, FCS: 16,
  Parent: ce1-0/3/4 Interface index 150
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : No-Keepalives DCE
  Hold-times     : Up 0 ms, Down 0 ms
  ANSI LMI settings: n392dce 3, n393dce 4, t392dce 15 seconds
  LMI statistics:
    Input : 0 (last seen: never)
    Output: 0 (last sent: never)
  DTE statistics:
    Enquiries sent                      : 0
    Full enquiries sent                 : 0
    Enquiry responses received          : 0
    Full enquiry responses received     : 0
  DCE statistics:
    Enquiries received                  : 0
    Full enquiries received             : 0
    Enquiry responses sent              : 0
    Full enquiry responses sent         : 0
  Common statistics:
    Unknown messages received           : 0
    Asynchronous updates received       : 0
    Out-of-sequence packets received    : 0
    Keepalive responses timedout        : 0
  CoS queues     : 4 supported, 4 maximum usable queues
  Last flapped   : 2005-12-21 09:59:01 PST (1w0d 03:44 ago)
  Statistics last cleared: 2005-12-21 10:32:15 PST (1w0d 03:10 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: 3, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
    Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
    L2 mismatch timeouts: 0, HS link CRC errors: 0, Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,
     Resource errors: 0
  HDLC configuration:
    Giant threshold: 1528, Runt threshold: 2
    Timeslots      : 5
    Data inversion: Disabled, Idle cycle flag: flags, Start end flag: shared
```

Copyright © 2013, Juniper Networks, Inc.

```
  DS0 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
  Packet Forwarding Engine configuration:
    Destination slot: 0, PLP byte: 4 (0x01)

  Logical interface ds-0/3/4:5.0 (Index 78) (SNMP ifIndex 73) (Generation 17)
    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
    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 mlfr, Multilink bundle: ls-0/1/0.1, MTU: 1514, Generation: 28, Route
 table: 0
    DLCI 10
      Flags: Active
      Total down time: 0 sec, Last down: Never
      Traffic statistics:
       Input  bytes  :                 0
       Output bytes  :                 0
       Input  packets:                 0
       Output packets:                 0
  DLCI statistics:
    Active DLCI  :1  Inactive DLCI  :0
```

show interfaces detail (Clear Channel E1)

```
user@host> show interfaces e1-1/2/6 detail
Physical interface: e1-1/2/6, Enabled, Physical link is Up
  Interface index: 89, SNMP ifIndex: 1278, Generation: 341
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: E1, Loopback:None,
...
  Logical interface e1-1/2/6.0 (Index 52) (SNMP ifIndex 1279) (Generation 169)
    Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
    Bandwidth: 0
...
```


Copyright © 2013, Juniper Networks, Inc.

show interfaces (Channelized E1)

Syntax show interfaces ds-*fpc/pic/port:ds0channel*
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information Command introduced before Junos OS Release 7.4.

Description (M Series and T Series routers only) Display status information the specified channelized E1 interface.

Options

ds-*fpc/pic/port:ds0channel*—Display standard information about the specified channelized E1 interface.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level view

List of Sample Output show interfaces extensive (Channelized E1) on page 93

Output Fields Table 5 on page 85 lists the output fields for the **show interfaces** (Channelized E1 and Channelized E1 IQ) command. Output fields are listed in the approximate order in which they appear.

Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under *Common Output Fields Description*.	All levels
Interface index	Physical interface's index number, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP index number for the physical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	MTU size on the physical interface.	All levels
Clocking	Reference clock source: **Internal** or **External**.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Whether loopback is enabled and the type of loopback (**local** or **remote**).	All levels
FCS	Frame check sequence on the interface (either **16** or **32**). The default is **16** bits.	All levels
Framing	Physical layer framing format used on the link. It can be **G704**, **G704-NO-CRC4**, or **Unframed**. The default is **G704**.	All levels
Parent	(Channelized E1 IQ interfaces only) Name and interface index of the interface to which a particular child interface belongs. **None** indicates that this interface is the top level.	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under *Common Output Fields Description*.	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Link flags	Information about the link. Possible values are described in the "Link Flags" section under *Common Output Fields Description*.	All levels
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	**detail extensive**
Keepalive settings	(PPP and HDLC) Configured settings for keepalives. • **Interval *seconds***—Time in seconds between successive keepalive requests. The range is **10** seconds through **32,767** seconds, with a default of **10** seconds. • **Down-count *number***—Number of keepalive packets a destination must fail to receive before the network takes a link down. The range is **1** through **255**, with a default of **3**. • **Up-count *number***—Number of keepalive packets a destination must receive to change a link's status from down to up. The range is **1** through **255**, with a default of **1**.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output

Keepalive statistics	(PPP and HDLC) Information about keepalive packets.
	• **Input**—Number of keepalive packets received by PPP.
	  ◦ (**last seen 00:00:00 ago**)—Time since the last keepalive packet was received, in the format ***hh:mm:ss***.
	• **Output**—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received.
	  ◦ (**last seen 00:00:00 ago**)—Time since the last keepalive packet was sent, in the format ***hh:mm:ss***.
		detail extensive none

LMI settings	(Frame Relay) Settings for link management can be either ANSI LMI settings or ITU LMI settings. ANSI LMI settings is the default. The format is **(ANSI or ITU) LMI settings: *value*, *value*... *xx*** seconds, where ***value*** can be: • **n391dte**—DTE full status polling interval (1–255) • **n392dce**—DCE error threshold (1–10) • **n392dte**—DTE error threshold (1–10) • **n393dce**—DCE monitored event count (1–10) • **n393dte**—DTE monitored event count (1–10) • **t391dte**—DTE polling timer (5–30 seconds) • **t392dce**—DCE polling verification timer (5–30 seconds)	**detail extensive** none
LMI	(Frame Relay) Statistics about the link management. • **Input**—Number of packets coming in on the interface (*nn*) and how much time has passed since the last packet arrived. The format is **Input: *nn* (last seen *hh:mm:ss* ago)** • **Output**—Number of packets sent out on the interface (*nn*) and how much time has passed since the last packet was sent. The format is **Output: *nn* (last sent *hh:mm:ss* ago)**.	**detail extensive** none
DTE statistics	(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data circuit-terminating equipment (DCE): • **Enquiries sent**—Number of link status enquiries sent from the DTE to the DCE. • **Full enquiries sent**—Number of full enquiries sent from the DTE to the DCE. • **Enquiry responses received**—Number of enquiry responses received by the DTE from the DCE. • **Full enquiry responses received**—Number of full enquiry responses sent from the DTE to the DCE.	**detail extensive** none
DCE statistics	(Frame Relay) Statistics about messages transmitted from the DCE to the DTE: • **Enquiries received**—Number of enquiries received by the DCE from the DTE. • **Full enquiries received**—Number of full enquiries received by the DCE from the DTE. • **Enquiry responses sent**—Number of enquiry responses sent from the DCE to the DTE. • **Full enquiry responses sent**—Number of full enquiry responses sent from the DCE to the DTE.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Common statistics	(Frame Relay) Statistics about messages sent between the DTE and the DCE: • **Unknown messages received**—Number of received packets that do not fall into any category. • **Asynchronous updates received**—Number of link status peer changes received. • **Out-of-sequence packets received**—Number of packets for which the sequence of the packets received is different from the expected sequence. • **Keepalive responses timedout**—Number of keepalive responses that timed out when no LMI packet was reported for**n392dte** or **n393dce** intervals. (See **LMI settings**).	**detail extensive** none
Nonmatching DCE-end DLCIs	(Frame Relay, displayed only from the DTE) Number of DLCIs configured from the DCE.	**detail extensive** none
LCP state	(PPP) Link Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—LCP negotiation is incomplete (not yet completed or has failed). • **Not-configured**—LCP is not configured on the interface. • **Opened**—LCP negotiation is successful.	**detail extensive** none
CHAP state	(PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. • **Chap-Chal-received**—Challenge was received but response not yet sent. • **Chap-Chal-sent**—Challenge was sent. • **Chap-Resp-received**—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.) • **Chap-Resp-sent**—Response was sent for the challenge received. • **Closed**—CHAP authentication is incomplete. • **Failure**—CHAP authentication failed. • **Not-configured**—CHAP is not configured on the interface. • **Success**—CHAP authentication was successful.	**detail extensive** none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is **Last flapped:** ***year-month-day hour:minute:second timezone*** **(*hour:minute:second* ago)**. For example, **Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)**.	**detail extensive** none
CoS Queues	Number of CoS queues configured.	**detail extensive** none
Input Rate	Input rate in bits per second (bps) and packets per second (pps).	None specified
Output Rate	Output rate in bps and pps.	None specified
Statistics last cleared	Time when the statistics for the interface were last set to zero.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Traffic statistics	Number of bytes and packets received and transmitted on the physical interface. • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface. • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**
Input errors	Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Errors**—Sum of the incoming frame aborts and FCS errors. • **Drops**—Number of packets dropped by the input 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. • **Framing errors**—Number of packets received with an invalid frame checksum (FCS). • **Giants**—Number of frames received that are larger than the giant threshold. • **Runts**—Number of frames received that are smaller than the runt threshold. • **Policed discards**—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • **L3 incompletes**—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. • **L2 channel errors**—Number of times the software did not find a valid logical interface for an incoming frame. • **L2 mismatch timeouts**—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • **HS link CRC errors**—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • **Resource errors**—Sum of transmit drops.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Output errors	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Carrier transitions**—Number of times the interface has gone from **down** to **up**. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), then either the cable, the far-end system, or the PIC is malfunctioning. • **Errors**—Sum of the outgoing frame aborts and FCS errors. • **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. • **Aged packets**—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware. • **MTU errors**—Number of packets larger than the MTU threshold. • **Resource errors**—Sum of transmit drops.	**extensive**
DS1 alarms **DS1 defects**	E1 media-specific defects that can render the interface unable to pass packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. The following lists all possible alarms and defects. For complete explanations of most of these alarms and defects, see *Bellcore Telcordia GR-499-CORE*. • **LOS**—Loss of signal. • **LOF**—Loss of frame. • **AIS**—Alarm indication signal. • **YLW**—Yellow alarm. Indicates errors at the remote site receiver.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
E1 media	Active alarms and defects, plus counts of specific E1 errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than OK indicates a problem. The E1 media-specific error types can be: • **SEF**—Severely errored framing • **BEE**—Bit error • **AIS**—Alarm indication signal • **LOF**—Loss of frame • **LOS**—Loss of signal • **YELLOW**—Errors at the remote site receiver • **BPV**—Bipolar violation • **EXZ**—Excessive zeros • **LCV**—Line code violation • **PCV**—Pulse code violation • **CS**—Carrier state • **FEBE**—Far-end block error • **LES**—Line error seconds • **ES**—Errored seconds • **BES**—Bursty errored seconds • **SES**—Severely errored seconds • **SEFS**—Severely errored framing seconds • **UAS**—Unavailable seconds	**extensive**
HDLC configuration	Information about the HDLC configuration. • **Giant threshold**—Giant threshold programmed into the hardware. • **Runt threshold**—Runt threshold programmed into the hardware. • **Timeslots**—Configured time slots for the interface. • **Line encodingHDB3**—Line encoding used.	**extensive**
Interface transmit queues	Names of the transmit queues and their associated statistics for each DS0 channel on the Channelized E1 to DS0 PIC. • **B/W**—Queue bandwidth as a percentage of the total interface bandwidth. • **WRR**—Weighted round robin (in percent). • **Packets**—Number of packets transmitted. • **Bytes**—Number of bytes transmitted. • **Drops**—Number of packets dropped. • **Errors**—Number of packet errors.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
DS*x* BERT configuration	BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface. • **BERT time period**—Configured total time period that the BERT is to run. • **Elapsed**—Actual time elapsed since the start of the BERT (in seconds). • **Induced error rate**—Configured rate at which the bit errors are induced in the BERT pattern. • **Algorithm**—Type of algorithm selected for the BERT.	**detail extensive** none
Packet Forwarding Engine configuration	Information about the configuration of the Packet Forwarding Engine: • **Destination slot**—FPC slot number. • **PLP byte**—Packet Level Protocol byte.	**extensive**
CoS information	Information about the CoS queue for the physical interface. • **CoS transmit queue**—Queue number and its associated user-configured forwarding class name. • **Bandwidth %**—Percentage of bandwidth allocated to the queue. • **Bandwidth bps**—Bandwidth allocated to the queue (in bps). • **Buffer %**—Percentage of buffer space allocated to the queue. • **Buffer usec**—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • **Priority**—Queue priority: **low** or **high**. • **Limit**—Displayed if rate limiting is configured for the queue. Possible values are **none** and **exact**. If **exact** is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If **none** is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.	**extensive**
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Logical interface index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	Logical interface SNMP interface index number.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Flags	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under *Common Output Fields Description*.	All levels
Encapsulation	Encapsulation on the logical interface.	All levels
Input packets	Number of packets received on the logical interface.	None specified
Output packets	Number of packets transmitted on the logical interface.	None specified

Copyright © 2013, Juniper Networks, Inc.

Table 5: Channelized E1 and Channelized E1 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Traffic statistics	Number and rate of bytes and packets received and transmitted on the logical interface. • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface. • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**
Local statistics	(Frame Relay) Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than one second) for this counter to stabilize.	**detail extensive**
Transit statistics	(Frame Relay) Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.	**detail extensive**
Protocol	Protocol family configured on the logical interface, such as **iso**, **inet6**, **mpls**.	**detail extensive** none
Multilink bundle	(Multilink) Interface name for the multilink bundle, if configured.	**detail extensive** none
MTU	MTU size on the logical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	**detail extensive**
DLCI	(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: **Flags**, **Total down time**, **Last down**, and **Traffic statistics**. **Flags** is one or more of the following: • **Active**—Set when the link is active and the DTE and DCE are exchanging information. • **Down**—Set when link is active, but no information is received from the DCE. • **Unconfigured**—Set when the corresponding DLCI in the DCE is not configured. • **Configured**—Set when the corresponding DLCI in the DCE is configured. • **Dce-configured**—Displayed when the command is issued from the DTE.	**detail extensive** none
DLCI statistics	(Frame Relay) Data-link connection identifier (DLCI) statistics. • **Active DLCI**—Number of active DLCIs. • **Inactive DLCI**—Number of inactive DLCIs.	**detail extensive** none

Sample Output

show interfaces extensive (Channelized E1)

```
user@host> show interfaces ds-0/1/1:1 extensive
```

Copyright © 2013, Juniper Networks, Inc.

```
Physical interface: ds-0/1/1:1, Enabled, Physical link is Down
  Interface index: 163, SNMP ifIndex: 37, Generation: 46
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: E1,
  Loopback: None, FCS: 16, Framing: G704
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 4 supported, 4 maximum usable queues
  Last flapped   : 2005-12-28 14:44:06 PST (00:00:30 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, Policed discards: 0,
    L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
    HS link CRC errors: 0, Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,
     Resource errors: 0
  DS1   alarms   : LOF, LOS
  DS1   defects  : LOF, LOS
  E1  media:            Seconds        Count  State
    SEF                  982318            1  Defect Active
    BEE                       0            0  OK
    AIS                       0            0  OK
    LOF                  982318            1  Defect Active
    LOS                  982318            1  Defect Active
    YELLOW                    0            0  OK
    BPV                       1            1
    EXZ                       1            1
    LCV                       1            1
    PCV                       1            2
    CS                        0            0
    FEBE                      1            9
    LES                       1
    ES                   982318
    SES                  982318
    SEFS                 982318
    BES                       1
    UAS                       0
  Interface transmit queues:
              B/W  WRR       Packets        Bytes        Drops       Errors
    Queue0     95   95             0            0            0            0
    Queue1      5    5             0            0            0            0
  HDLC configuration:
    Giant threshold: 1514, Runt threshold: 3
    Timeslots      : 31
    Line encoding: HDB3, Data inversion: Disabled, Idle cycle flag: flags,
    Start end flag: shared
  DS1 BERT configuration:
    BERT time period: 0 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^11 - 1, O.152 and O.153 (2047 type),
     Pseudorandom (8)
  Packet Forwarding Engine configuration:
    Destination slot: 0, PLP byte: 2 (0x1b)
  CoS information:
    CoS transmit queue     Bandwidth        Buffer   Priority   Limit
```


Copyright © 2013, Juniper Networks, Inc.

```
                     %         bps     %   usec
  0 best-effort     95     1945600    95      0          low    none
  3 network-control  5      102400     5      0          low    none
```

show interfaces (Channelized OC12 IQ and IQE)

Syntax show interfaces (*type-fpc/pic/port*<:*channel*><:*channel*><:*channel*>)
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information Command introduced before Junos OS Release 7.4.

Description Display status information about the specified channelized OC12 IQ and IQE interface.

Options ***type-fpc/pic/port*:*channel*:*channel*:*channel***—Interface type with optional corresponding channel levels.

For SONET mode, the interface type can be one of the following:

- ***type-fpc/pic/port***—For the physical channelized OC12 IQ or IQE interface, ***type*** is **coc12**. For the clear channel, ***type*** is **so** (for OC12).
- ***type-fpc/pic/port*:*channel***—At the first level of channelization, ***type*** can be **coc1**(channelized OC1), **ct3** (from **coc1)**, **so** (for OC3), or **t3.**
- ***type-fpc/pic/port*:*channel*:*channel***—At the second level of channelization, ***type*** can be **ct1** (from **ct3**or **coc1)** or **t1** (from **ct3** or **coc1)**.
- ***type-fpc/pic/port*:*channel*:*channel*:*channel***—At the third level of channelization, ***type*** is **ds** (from **ct1**).

For SDH mode, the interface type can be one of the following:

- ***type-fpc/pic/port***—For the physical channelized OC12 IQ or IQE interface, ***type*** is **cstm4**. For the clear channel, ***type*** is **so** (for SONET/SDH (vc-4-4c)).
- ***type-fpc/pic/port*:*channel***—At the first level of channelization,***type*** can be **so** (from **cstm4)** or **cau4** (from **cstm4)**.
- ***type-fpc/pic/port*:*channel*:*channel***—At the second level of channelization, ***type*** can be **ct3**or **t3** (from or **cau4)**.
- ***type-fpc/pic/port*:*channel*:*channel*:*channel***—At the third level of channelization, ***type*** is **ct1** or **t1** (from **ct3**).
- ***type-fpc/pic/port*:*channel*:*channel*:*channel***—At the fourth level of channelization, ***type*** is **ds** (from **ct1**).

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

Copyright © 2013, Juniper Networks, Inc.

statistics—(Optional) Display static interface statistics.

Required Privilege Level view

List of Sample Output
show interfaces extensive (CAU4 on Channelized OC-12 IQ) on page 97
show interfaces extensive (Channelized OC1 on Channelized OC12 IQ) on page 97
show interfaces extensive (Channelized OC12 IQ) (Physical) on page 97
show interfaces extensive (Channelized T1 from Channelized OC12 IQ) on page 98
show interfaces extensive (Channelized T3 on Channelized OC12 IQ) on page 98
show interfaces extensive (CSTM4 on Channelized OC-12 IQ) on page 98
show interfaces extensive (DS0 on Channelized OC12 IQ) on page 98
show interfaces extensive (SONET Interface on Channelized OC12 IQ) on page 98
show interfaces extensive (T1 on Channelized OC12 IQ) on page 99

Output Fields See the output field table for the show interfaces (Channelized OC3 IQ and IQE) command.

Sample Output

show interfaces extensive (CAU4 on Channelized OC-12 IQ)

```
user@host> show interfaces cau4-0/2/0:1 extensive
Physical interface: cau4-0/2/0:1, Enabled, Physical link is Up
   Interface index: 219, SNMP ifIndex: 139, Generation: 221
   Link-level type: Controller, Clocking: Internal, SDH mode, Speed: OC3,
   Loopback: None, Parent: cstm4-0/2/0 Interface index 216
   Device flags   : Present Running
   Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
   Link flags     : None
...
```

show interfaces extensive (Channelized OC1 on Channelized OC12 IQ)

```
user@host> show interfaces extensive coc1-4/2/0:7
Physical interface: coc1-4/2/0:7, Enabled, Physical link is Up
  Interface index: 381, SNMP ifIndex: 2524, Generation: 728
  Link-level type: Controller, MTU: 4474, Clocking: Internal, SONET mode,
  Speed: 51840kbps, Loopback: None,
  FCS: 16, Payload scrambler: Disabled, Parent: coc12-4/2/0 (Index 266)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
...
```

show interfaces extensive (Channelized OC12 IQ) (Physical)

```
user@host> show interfaces extensive coc12-4/2/0
Physical interface: coc12-4/2/0, Enabled, Physical link is Up
  Interface index: 266, SNMP ifIndex: 1269, Generation: 601
  Link-level type: Controller, MTU: 4474, Clocking: Internal, SONET mode,
  Speed: OC12, Loopback: None,
  FCS: 16, Payload scrambler: Disabled, Parent: None  Device flags   : Present
Running
  Interface flags: Point-To-Point SNMP-Traps
```

Copyright © 2013, Juniper Networks, Inc.

```
  Link flags     : Keepalives DTE
...
```

show interfaces extensive (Channelized T1 from Channelized OC12 IQ)

```
user@host> show interfaces extensive ct1-4/2/0:7:1
Physical interface: ct1-4/2/0:4:1, Enabled, Physical link is Up
  Interface index: 305, SNMP ifIndex: 2410, Generation: 640
  Link-level type: Controller, MTU: 1504, Clocking: Internal, Speed: T1,
  Loopback: None, FCS: 16,
  Framing: ESF, Parent: coc1-4/2/0:7 (Index 304)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
...
```

show interfaces extensive (Channelized T3 on Channelized OC12 IQ)

```
user@host> show interfaces ct3-0/2/0:1 extensive
Physical interface: ct3-0/2/0:1:1, Enabled, Physical link is Up
   Interface index: 220, SNMP ifIndex: 140, Generation: 222
   Link-level type: Controller, Clocking: Internal, Speed: T3, Loopback: None,
   Mode: C/Bit parity, Parent: cau4-0/2/0:1 Interface index 219
   Device flags   : Present Running
   Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
   Link flags     : None
...
```

show interfaces extensive (CSTM4 on Channelized OC-12 IQ)

```
user@host> show interfaces cstm4-0/2/0 extensive
 Physical interface: cstm4-0/2/0, Enabled, Physical link is Up
   Interface index: 216, SNMP ifIndex: 33, Generation: 218
   Link-level type: Controller, Clocking: Internal, SDH mode, Speed: OC12,
   Loopback: None, Parent: None   Device flags   : Present Running
   Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
   Link flags     : None
...
```

show interfaces extensive (DS0 on Channelized OC12 IQ)

```
user@host> show interfaces extensive ds-4/2/0:7:1:1
Physical interface: ds-4/2/0:4:1:1, Enabled, Physical link is Up
  Interface index: 306, SNMP ifIndex: 2411, Generation: 641
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 64kbps,
  Loopback: None, FCS: 16, Parent: ct1-4/2/0:7:1 (Index 305)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
...
```

show interfaces extensive (SONET Interface on Channelized OC12 IQ)

```
user@host> show interfaces so-0/2/0:1 extensive
Physical interface: so-0/2/0:1, Enabled, Physical link is Up
  Interface index: 750, SNMP ifIndex: 23, Generation: 11709
  Link-level type: Multilink-FR, MTU: 4474, Clocking: Internal, SONET mode,
  Speed: OC3, Loopback: None, FCS: 16,
  Payload scrambler: Enabled, Parent: coc12-0/2/0 Interface index 749
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
```


Copyright © 2013, Juniper Networks, Inc.

```
  Link flags     : Keepalives DTE
...
```

show interfaces extensive (T1 on Channelized OC12 IQ)

```
user@host> show interfaces t1-0/2/0:1:1:1 extensive
   Physical interface: t1-0/2/0:1:1:1, Enabled, Physical link is Up
   Interface index: 222, SNMP ifIndex: 143, Generation: 226
   Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
   Loopback: None, FCS: 16, Framing: ESF, Parent: ct3-0/2/0:1:1
   Interface index 221
   Device flags   : Present Running
   Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
   Link flags     : Keepalives
...
```

show interfaces (Channelized OC12)

Syntax show interfaces t3-*fpc/pic/port*:*t3channel*
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information Command introduced before Junos OS Release 7.4.

Description Display status information about the specified channelized OC12 interface.

Options

t3-*fpc/pic/port*:*t3channel*—Display standard information about the specified channelized OC12 interface.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level view

List of Sample Output show interfaces extensive (Channelized OC12) on page 100

Output Fields See the output field table for the show interfaces (Channelized OC3 IQ and IQE) command.

Sample Output

show interfaces extensive (Channelized OC12)

```
user@host> show interfaces t3-0/3/0:0 extensive
Physical interface: t3-0/3/0:0, Enabled, Physical link is Up
  Interface index: 32, SNMP ifIndex: 21, Generation: 2719
  Link-level type: Frame-Relay, PPP, MTU: 4474, Clocking: Internal, SONET mode,
  Speed: T3, Loopback: None, SONET Loopback: None, FCS: 16, Mode: C/Bit parity
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
  DTE statistics:
    Enquiries sent                    : 43186
    Full enquiries sent               : 8515
    Enquiry responses received        : 43185
    Full enquiry responses received   : 8515
  DCE statistics:
```

 Copyright © 2013, Juniper Networks, Inc.

```
    Enquiries received                : 0
    Full enquiries received           : 0
    Enquiry responses sent            : 0
    Full enquiry responses sent       : 0
  Common statistics:
    Unknown messages received         : 0
    Asynchronous updates received     : 0
    Out-of-sequence packets received  : 0
    Keepalive responses timedout      : 0
  Nonmatching DCE-end DLCIs:
          2
  Hold-times     : Up 0 ms, Down 0 ms
  Last flapped   : 2002-05-23 16:59:03 PDT (18:23:58 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                1700                    0 bps
   Output bytes  :                1714                    0 bps
   Input  packets:                 123                    0 pps
   Output packets:                 124                    0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 1100817, 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                      18            1  OK
    LOS                       0            0  OK
    IDLE                      0            0  OK
    YELLOW                    0            0  OK
    BPV                       0            0
    EXZ                       0            0
    LCV                       0            0
    PCV                      36       122399
    CCV                      72        91948
    LES                       0
    PES                      18
    PSES                     18
    CES                      18
    CSES                     18
    SEFS                     18
    UAS                       0
  HDLC configuration:
    Policing bucket: Disabled
    Shaping bucket : Disabled
    Giant threshold: 4484, Runt threshold: 3
  DSU configuration:
    Compatibility mode: None, Scrambling: Disabled, Subrate: Disabled
    FEAC loopback: Inactive, Response: Disabled, Count: 0
  DS3 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Algorithm: Unknown (0), Induced error rate: 10e-0
Interface transmit queues:
              B/W  WRR       Packets        Bytes        Drops       Errors
    Queue0     95   95             0            0            0            0
    Queue1      5    5           529         6348            0            0
```

Copyright © 2013, Juniper Networks, Inc.

```
SONET PHY:            Seconds        Count  State
  PLL Lock                  0            0  OK
  PHY Light                20            1  OK
SONET section:
  BIP-B1                    0            0
  SEF                      20            1  OK
  LOS                      20            1  OK
  LOF                      20            1  OK
  ES-S                     20
  SES-S                    20
  SEFS-S                   20
SONET line:
  BIP-B2                    0            0
  REI-L                     0            0
  RDI-L                     0            0  OK
  AIS-L                     0            0  OK
  BERR-SF                  18            1  OK
  BERR-SD                   2            1  OK
  ES-L                     20
  SES-L                    20
  UAS-L                    10
  ES-LFE                    0
  SES-LFE                   0
  UAS-LFE                   0
SONET path:
  BIP-B3                    0            0
  REI-P                     0            0
  LOP-P                    20            1  OK
  AIS-P                     0            0  OK
  RDI-P                     0            0  OK
  UNEQ-P                    0            0  OK
  PLM-P                    20            1  OK
  ES-P                     20
  SES-P                    20
  UAS-P                    10
  ES-PFE                    0
  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, V5      : 0x00
  V5(cmp) : 0x00
Transmitted SONET overhead:
  F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
  S1      : 0x00, C2      : 0x04, F2      : 0x00, Z3      : 0x00
  Z4      : 0x00, V5      : 0x00
Received path trace: t3-0/3/0:0
  74 33 2d 30 2f 33 2f 30 3a 30 00 00 00 00 0d 0a   t3-0/3/0:0......
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 information:
  CoS transmit queue              Bandwidth           Buffer Priority   Limit
                             %          bps   %         usec
  0 best-effort             95     42499200  95            0      low    none
  3 network-control          5      2236800   5            0      low    none
Logical interface t3-0/3/0:0.0 (Index 11) (SNMP ifIndex 268) (Generation 499)
  Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
  Protocol inet, MTU: 4470, Generation: 578, Route table: 0
```


Copyright © 2013, Juniper Networks, Inc.

```
     Flags: None
     Addresses, Flags: Is-Preferred Is-Primary
       Destination: 22.22.22.1, Local: 22.22.22.2, Broadcast: Unspecified,
Generation: 98
DLCI 100
     Flags: Active, Dce-configured
     Total down time: 0 sec, Last down: Never
     Traffic statistics:
      Input  bytes  :                   0
      Output bytes  :                   0
      Input  packets:                   0
      Output packets:                   0
 DLCI statistics:
   Active DLCI  :2 Inactive DLCI  : 0
```

show interfaces (Channelized OC3 IQ and IQE)

Syntax

show interfaces (*type-fpc/pic/port* <:*channel*><:*channel*><:*channel*>)
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information

Command introduced before Junos OS Release 7.4.

Description

(M Series and T Series routers only) Display status information about the specified channelized OC3 IQ or IQE interface.

Options

type-fpc/pic/port*:*channel*:*channel*:*channel—Interface type with optional corresponding channel levels. The interface type can be one of the following:

- ***type-fpc/pic/port***—For the physical interface, ***type*** is **coc3**. For the clear channel, ***type*** is **so** (for OC3).
- ***type-fpc/pic/port*:*channel***—At the first level of channelization, ***type*** can be **coc1** (channelized OC1), **ct3** (from **coc1**), or **t3** (from **coc1**).
- ***type-fpc/pic/port*:*channel*:*channel***—At the second level of channelization, ***type*** can be **ct1** (from **coc1** or **ct3**) or **t1** (from **coc1** or **ct3**).
- ***type-fpc/pic/port*:*channel*:*channel*:*channel***—At the third level of channelization, ***type*** can be **ds** (from **ct1**).

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level

view

List of Sample Output

show interfaces extensive (Channelized OC3 IQ) (Physical) on page 118
show interfaces extensive (Channelized OC1 on Channelized OC3 IQ) on page 119
show interfaces extensive (Channelized T1 on Channelized OC3 IQ) on page 120
show interfaces extensive (DS0 on Channelized OC3 IQ) on page 121

Output Fields

Table 6 on page 105 lists the output fields for the **show interfaces** (all Channelized OC interfaces) command. Output fields are listed in the approximate order in which they appear.

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under *Common Output Fields Description*.	All levels
Interface index	Physical interface's index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	SNMP index number for the physical interface.	**detail extensive** none
Description	Interface description.	All levels
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	MTU size on the physical interface.	All levels
Clocking	SONET/SDH reference clock source. It can be **Internal** or **External**. Clocking is configured and displayed only for channel 0.	All levels
***Framing* mode**	Framing mode: **SONET** or **SDH**.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Whether loopback is enabled and the type of loopback (**local** or **remote**).	All levels
SONET loopback	Whether loopback is enabled on a SONET/SDH interface, and the type of loopback (**local** or **remote**).	All levels
FCS	Frame check sequence on the interface (either **16** or **32**). The default is **16-bit**.	All levels
Payload scrambler	Whether payload scrambling is enabled.	All levels
Parent	Name and interface index of the interface to which a particular child interface belongs. **None** indicates that this interface is the top level.	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under *Common Output Fields Description*.	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Link flags	Information about the link. Possible values are described in the "Link Flags" section under *Common Output Fields Description*.	All levels
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
ANSI or ITU LMI settings	(Frame Relay) Settings for Local Management Interface (LMI). The format is **(ANSI or ITU) LMI settings: *value*, *value*... *nn*** seconds, where ***value*** can be: • **n391dte**—DTE full status polling interval (1–255) • **n392dce**—DCE error threshold (1–10) • **n392dte**—DTE error threshold (1–10) • **n393dce**—DCE monitored event count (1–10) • **n393dte**—DTE monitored event count (1–10) • **t391dte**—DTE polling timer (5–30 seconds) • **t392dce**—DCE polling verification timer (5–30 seconds)	All levels
LMI statistics	(Frame Relay) Statistics about the link management. • **Input**—Number of packets coming in on the interface (*nn*) and how much time has passed since the last packet arrived. The format is **Input: *nn* (last sent *hh*:*mm*:*ss* ago)**. • **Output**—Number of packets sent out on the interface (*nn*) and how much time has passed since the last packet was sent. The format is **Output: *nn* (last sent *hh*:*mm*:*ss* ago)**.	**detail extensive**
DTE statistics	(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data circuit-terminating equipment (DCE): • **Enquiries sent**—Number of link status enquiries sent from the DTE to the DCE. • **Full enquiries sent**—Number of full enquiries sent from the DTE to the DCE. • **Enquiry responses received**—Number of enquiry responses received by the DTE from the DCE. • **Full enquiry responses received**—Number of full enquiry responses sent from the DTE to the DCE.	**detail extensive** none
DCE statistics	(Frame Relay) Statistics about messages transmitted from the DCE to the DTE: • **Enquiries received**—Number of enquiries received by the DCE from the DTE. • **Full enquiries received**—Number of full enquiries received by the DCE from the DTE. • **Enquiry responses sent**—Number of enquiry responses sent from the DCE to the DTE. • **Full enquiry responses sent**—Number of full enquiry responses sent from the DCE to the DTE.	**detail extensive** none
Common statistics	(Frame Relay) Statistics about messages sent between the DTE and the DCE: • **Unknown messages received**—Number of received packets that do not fall into any category. • **Asynchronous updates received**—Number of link status peer changes received. • **Out-of-sequence packets received**—Number of packets for which the sequence of the packets received is different from the expected sequence. • **Keepalive responses timedout**—Number of keepalive responses that timed out when no LMI packet was reported for **n392dte** or **n393dce** intervals. (See **LMI settings**.)	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Nonmatching DCE-end DLCIs	(Frame Relay) Number of DLCIs configured from the DCE, displayed only from the DTE.	**detail extensive** none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is **Last flapped:** ***year-month-day hh:mm:ss timezone year-month-day (hh:mm:ss*** **ago)**. For example, **Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)**.	**detail extensive** none
CoS Queues	Number of CoS queues configured.	**detail extensive** none
Statistics last cleared	Time when the statistics for the interface were last set to zero.	**detail extensive**
DS1 alarms **DS1 defects**	E1or T1 media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. See the following list for all possible alarms and defects. For complete explanations of most of these alarms and defects, see *Bellcore Telcordia GR-499-CORE*. • **LOS**—Loss of signal. • **LOF**—Loss of frame. • **AIS**—Alarm indication signal. • **YLW**—Yellow alarm. Indicates errors at the remote site receiver.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
T1 media	Counts of T1 or E1 media-specific errors. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. The T1 or E1 media-specific error types are: • **SEF**—Severely errored framing • **BEE**—Bit error • **AIS**—Alarm indication signal • **LOF**—Loss of frame • **LOS**—Loss of signal • **YELLOW**—Errors at the remote site receiver • **BPV**—Bipolar violation • **EXZ**—Excessive zeros • **LCV**—Line code violation • **PCV**—Pulse code violation • **CS**—Carrier state • **FEBE**—Far-end block error (E1 only) • **LES**—Line error seconds • **ES**—Errored seconds • **BES**—Bit error seconds • **SES**—Severely errored seconds • **SEFS**—Severely errored framing seconds • **UAS**—Unavailable seconds	**extensive**
Traffic statistics	Number and rate of bytes and packets received and transmitted on the physical interface. • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface. • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Input errors	Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Errors**—Sum of the incoming frame aborts and FCS errors. • **Drops**—Number of packets dropped by the input 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. • **Framing errors**—Number of packets received with an invalid frame checksum (FCS). • **Runts**—Number of frames received that are smaller than the runt threshold. • **Giants**—Number of frames received that are larger than the giant threshold. • **Bucket Drops**—Drops caused by traffic load exceeding the interface transmit/receive leaky bucket configuration. The default is off. • **Policed discards**—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • **L3 incompletes**—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. • **L2 channel errors**—Number of times the software did not find a valid logical interface for an incoming frame. • **L2 mismatch timeouts**—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • **HS link CRC errors**—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • **SRAM errors**—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC. If the value of this field increments, the PIC is malfunctioning. • **HS link FIFO overflows**—Number of FIFO overflows on the high-speed links between the ASICs responsible for handling the router interfaces. • **Resource errors**—Sum of transmit drops.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Output errors	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Carrier transitions** —Number of times the interface has gone from **down** to **up**. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning. • **Errors**—Sum of the outgoing frame aborts and FCS errors. • **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. • **Aged packets**—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware. • **HS link FIFO underflows**—Number of FIFO underflows on the high-speed links between the ASICs responsible for handling the router interfaces. • **MTU errors**—Number of packets whose size exceeds the MTU of the interface. • **Resource errors**—Sum of transmit drops.	**extensive**
Egress queues	Total number of egress queues supported on the specified interface.	**detail extensive**
Queue counters	CoS queue number and its associated user-configured forwarding class name. • **Queued packets**—Number of queued packets. • **Transmitted packets**—Number of transmitted packets. • **Dropped packets**—Number of packets dropped by the ASIC's RED mechanism.	**detail extensive**
Active alarms **Active defects**	Defects that can prevent the interface from passing packets: • **None**—There are no active defects or alarms. • **LOF**—Loss of frame.	**detail extensive**
SONET alarms **SONET defects**	Media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: **SONET PHY**, **SONET section**, **SONET line**, and **SONET path**.	All levels

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SONET vt	SONET virtual-tributary (VT) alarms and defects: • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **BIP-B2**—Bit interleaved parity for SONET line overhead • **REI-V**—Remote error indication (near-end VT) • **LOP-V**—Loss of pointer (near-end VT) • **AIS-V**—Alarm indication signal (near-end VT) • **RDI-V**—Remote defect indication (near-end VT) • **UNEQ-V**—Unequipped (near-end VT) • **PLM-V**—Payload label mismatch (near-end VT) • **ES-V**—Errored seconds (near-end VT) • **SES-V**—Severely errored seconds (near-end VT) • **UAS-V**—Unavailable seconds (near-end VT) • **ES-VFE**—Errored seconds (far-end VT) • **SES-VFE**—Severely errored seconds (far-end VT) • **UAS-VFE**—Unavailable seconds (far-end VT)	**extensive**
SONET PHY	Counts of specific SONET errors with detailed information: • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **PLL Lock**—Phase-locked loop • **PHY Light**—Loss of optical signal	**extensive**
SONET section	Counts of specific SONET errors with detailed information: • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **BIP-B1**—Bit interleaved parity for SONET section overhead • **SEF**—Severely errored framing • **LOS**—Loss of signal • **LOL**—Loss of light • **LOF**—Loss of frame • **ES-S**—Errored seconds (section) • **SES-S**—Severely errored seconds (section) • **SEFS-S**—Severely errored framing seconds (section)	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SONET line	Active alarms and defects, plus counts of specific SONET errors with detailed information: • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State** —State of the error. State other than **OK** indicates a problem. Subfields are: • **BIP-B2**—Bit interleaved parity for SONET line overhead • **REI-L**—Remote error indication (near-end line) • **RDI-L**—Remote defect indication (near-end line) • **AIS-L**—Alarm indication signal (near-end line) • **BERR-SF**—Bit error rate fault (signal failure) • **BERR-SD**—Bit error rate defect (signal degradation) • **ES-L**—Errored seconds (near-end line) • **SES-L**—Severely errored seconds (near-end line) • **UAS-L**—Unavailable seconds (near-end line) • **ES-LFE**—Errored seconds (far-end line) • **SES-LFE**—Severely errored seconds (far-end line) • **UAS-LFE**—Unavailable seconds (far-end line)	**extensive**
SONET path	Active alarms and defects, plus counts of specific SONET errors with detailed information: • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **BIP-B3**—Bit interleaved parity for SONET section overhead • **REI-P**—Remote error indication • **LOP-P**—Loss of pointer (path) • **AIS-P**—Path alarm indication signal • **RDI-P**—Path remote defect indication • **UNEQ-P**—Path unequipped • **PLM-P**—Path payload (signal) label mismatch • **ES-P**—Errored seconds (near-end STS path) • **SES-P**—Severely errored seconds (near-end STS path) • **UAS-P**—Unavailable seconds (near-end STS path) • **ES-PFE**—Errored seconds (far-end STS path) • **SES-PFE**—Severely errored seconds (far-end STS path) • **UAS-PFE**—Unavailable seconds (far-end STS path)	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Received SONET overhead **Transmitted SONET overhead**	Values of the received and transmitted SONET/SDH overhead: **F1**—Section user channel byte. This byte is set aside for the purposes of users. **S1**—Synchronization Status (S1). The S1 byte is located in the first STS-1 of an STS-*N*. Bits 5 through 8 convey the synchronization status of the network element. **Z3** and **Z4**—Path overhead. **V5**—Virtual Tributary (VT) path overhead byte.	**extensive**
SDH alarms **SDH defects**	SDH media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: SDH PHY, SDH regenerator section, SDH multiplex section, and SDH path. NOTE: For controller based SONET PICs, the SDH alarms and SDH defects output in the **show interface coc3 extensive** command output only shows the section and line level defects. The path level defects can be found under the SONET (so) interface output.	All levels
SDH PHY	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **PLL Lock**—Phase-locked loop • **PHY Light**—Loss of optical signal	**extensive**
SDH regenerator section	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **RS-BIP8**—24-bit BIP for multiplex section overhead (B2 bytes) • **OOF**—Out of frame • **LOS**—Loss of signal • **LOF**—Loss of frame • **RS-ES**—Errored seconds (near-end regenerator section) • **RS-SES**—Severely errored seconds (near-end regenerator section) • **RS-SEFS**—Severely errored framing seconds (regenerator section)	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SDH multiplex section	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **MS-BIP24**—8-bit BIP for high-order path overhead (B3 byte) • **MS-FEBE**—Far-end block error (multiplex section) • **MS-FERF**—Far-end remote fail (multiplex section) • **MS-AIS**—alarm indication signal (multiplex section) • **BERR-SF**—Bit error rate fault (signal failure) • **BERR-SD**—Bit error rate defect (signal degradation) • **MS-ES**—Errored seconds (near-end multiplex section) • **MS-SES**—Severely errored seconds (near-end multiplex section) • **MS-UAS**—Unavailable seconds (near-end multiplex section) • **MS-ES-FE**—Errored seconds (far-end multiplex section) • **MS-SES-FE**—Severely errored seconds (far-end multiplex section) • **MS-UAS-FE**—Unavailable seconds (far-end multiplex section	**extensive**
SDH path	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **HP-BIP8**—8-bit BIP for regenerator section overhead (B1 byte) • **HP-FEBE**—Far-end block error (high-order path) • **HP-LOP**—Loss of pointer (high-order path) • **HP-AIS**—High-order-path alarm indication signal • **HP-FERF**—Far-end remote fail (high-order path) • **HP-UNEQ**—Unequipped (high-order path) • **HP-PLM**—Payload label mismatch (high-order path) • **HP-ES**—Errored seconds (near-end high-order path) • **HP-SES**—Severely errored seconds (near-end high-order path) • **HP-UAS**—Unavailable seconds (near-end high-order path) • **HP-ES-FE**—Errored seconds (far-end high-order path) • **HP-SES-FE**—Severely errored seconds (far-end high-order path) • **HP-UAS-FE**—Unavailable seconds (far-end high-order path)	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Received SDH overhead **Transmitted SDH overhead**	Values of the received and transmitted SONET overhead: • **C2**—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P. • **F1**—Section user channel byte. This byte is set aside for the purposes of users. • **K1** and **K2**—These bytes are allocated for APS signaling for the protection of the multiplex section. • **J0**—Section trace. This byte is defined for STS-1 number 1of an STS-*N* signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter. • **S1**—Synchronization status. The S1 byte is located in the first STS-1 of an STS-*N*. • **Z3** and **Z4**—Allocated for future use.	**extensive**
Received path trace **Transmitted path trace**	Channelized OC12 interfaces allow path trace bytes to be sent inband across the SONET/SDH link. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits. This information is specific to each of the 12 channelized OC12 interfaces.	**extensive**
DS3 media	Counts of T3 media-specific errors. 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. The DS3 or E3 media-specific error types can be: • **PLL Lock**—Phase-locked loop out of lock • **Reframing**—Frame alignment recovery time • **AIS**—Alarm indication signal • **LOF**—Loss of frame • **LOS**—Loss of signal • **IDLE**—Idle code detected • **YELLOW**—Errors at the remote site receiver • **BPV**—Bipolar violation • **EXZ**—Excessive zeros • **LCV**—Line code violation • **PCV**—(DS3 only) Pulse code violation • **CCV**—(DS3 only) C-bit coding violation • **FEBE**—(DS3 only) Far-end block error • **LES**—Line error seconds • **PES**—(DS3 only) P-bit errored seconds • **PSES**—(DS3 only) P-bit errored seconds (section) • **CES**—(DS3 only) C-bit errored seconds • **CSES**—(DS3 only) C-bit severely errored seconds • **SEFS**—Severely errored framing seconds • **UAS**—Unavailable seconds	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
HDLC configuration	Information about the HDLC configuration. • **Policing bucket**—Configured state of the receiving policer. • **Shaping bucket**—Configured state of the transmitting shaper. • **Giant threshold**—Giant threshold programmed into the hardware. • **Runt threshold**—Runt threshold programmed into the hardware. • **Timeslots**—Configured time slots for the interface. • **Line encoding**—Line encoding used. It is always **HDB3**. • **Byte encoding**—(T1 only) Byte encoding used: **Nx64K** or **Nx56K**. • **Line encoding**—Line encoding used. For T1, the value can be **B8ZS** or **AMI**. For E1, the value is **HDB3**. • **Data inversion**—HDLC data inversion setting: **Enabled** or **Disabled**. • **Idle cycle flag**—Idle cycle flags. • **Start end flag**—Start and end flag.	**extensive**
Interface transmit queues	Name of the transmit queues and their associated statistics for each DS3 channel on the Channelized OC12 PIC. • **B/W**—Queue bandwidth as a percentage of the total interface bandwidth. • **WRR**—Weighted round-robin (in percent). • **Packets**—Number of packets transmitted. • **Bytes**—Number of bytes transmitted. • **Drops**—Number of packets dropped. • **Errors**—Number of packet errors.	**extensive**
DSU configuration	Information about the DSU configuration. The last three lines (**Bit count**, **Error bit count**, and **LOS information**) are displayed only if a BERT has ever been run on the interface. • **Compatibility mode**—CSU/DSU compatibility mode: **None**, **Larscom**, **Kentrox**, or **Digital-Link**. • **Scrambling**—Payload scrambling. It can be **Enabled** or **Disabled**. • **Subrate**—Configured subrate setting. Applies only when**Digital-Link** compatibility mode is used. It can be **Disabled** or display units in kbps. • **FEAC loopback**—(T3) Whether a far-end alarm and control (FEAC) loopback is **Active** or **Inactive**. This feature is used to send alarm or status information from the far-end terminal back to the near-end terminal and to initiate T3 loopbacks at the far-end terminal from the near-end terminal. • **Response**—Whether the FEAC signal is **Enabled** or **Disabled**. • **Count**—Number of FEAC loopbacks.	**extensive**
BERT configuration	(DS interfaces) BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface. • **BERT time period**—Configured total time period that the BERT is to run. • **Elapsed**—Actual time elapsed since the start of the BERT (in seconds). • **Induced error rate**—Configured rate at which the bit errors are induced in the BERT pattern. • **Algorithm**—Type of algorithm selected for the BERT.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Packet Forwarding Engine configuration	Information about the configuration of the Packet Forwarding Engine: • **Destination slot**—FPC slot number. • **PLP byte**—Packet Level Protocol byte.	**extensive**
CoS information	Information about the CoS queue for the physical interface. • **CoS transmit queue**—Queue number and its associated user-configured forwarding class name. • **Bandwidth %**—Percentage of bandwidth allocated to the queue. • **Bandwidth bps**—Bandwidth allocated to the queue (in bps). • **Buffer %**—Percentage of buffer space allocated to the queue. • **Buffer usec**—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • **Priority**—Queue priority: **low** or **high**. • **Limit**—Displayed if rate limiting is configured for the queue. Possible values are **none** and **exact**. If **exact** is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If **none** is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.	**extensive**
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Logical interface index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	Logical interface SNMP interface index number.	**detail extensive** none
Flags	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under *Common Output Fields Description*.	All levels
Encapsulation	Encapsulation on the logical interface.	All levels
Traffic statistics	Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize. • **Input rate**—Rate of bits and packets received on the interface. • **Output rate**—Rate of bits and packets transmitted on the interface.	**detail extensive**
Local statistics	Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 6: Channelized OC show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Transit statistics	Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.	**detail extensive**
Protocol	Protocol family configured on the logical interface, such as **iso**, **inet6**, or **mpls**.	**detail extensive** none
Multilink bundle	(If the logical interface is configured as part of a multilink bundle.) Interface name for the multilink bundle.	**detail extensive** none
MTU	MTU size on the logical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	**detail extensive**
Addresses, Flags	Information about the address flags. Possible values are described in the "Addresses Flags" section under *Common Output Fields Description*.	**detail extensive** none
Destination	IP address of the remote side of the connection.	**detail extensive** none
Local	IP address of the logical interface.	**detail extensive** none
Broadcast	Broadcast address.	**detail extensive** none
DLCI	(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: **Flags**, **Total down time**, **Last down**, and **Traffic statistics**. **Flags** is one or more of the following: • **Active**—Set when the link is active and the DTE and DCE are exchanging information. • **Down**—Set when the link is active, but no information is received from the DCE. • **Unconfigured**—Set when the corresponding DLCI in the DCE is not configured. • **Configured**—Set when the corresponding DLCI in the DCE is configured. • **Dce-configured**—Displayed when the command is issued from the DTE.	**detail extensive** none
DLCI statistics	(Frame Relay) Data-link connection identifier (DLCI) statistics. • **Active DLCI**—Number of active DLCIs. • **Inactive DLCI**—Number of inactive DLCIs.	**detail extensive** none

Sample Output

show interfaces extensive (Channelized OC3 IQ) (Physical)

```
user@host> show interfaces extensive coc3-0/0/0
Physical interface: coc3-0/0/0, Enabled, Physical link is Down
  Interface index: 128, SNMP ifIndex: 22, Generation: 11
  Description: pink coc3-0/0/0
```


Copyright © 2013, Juniper Networks, Inc.

```
  Link-level type: Controller, Clocking: Internal, SONET mode, Speed: OC3,
  Loopback: None, Parent: None
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps 16384
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 4 supported
  Last flapped   : 2005-01-27 16:39:21 PST (1w0d 22:09 ago)
  Statistics last cleared: Never
  SONET alarms   : PLL, LOS
  SONET defects  : PLL, LOF, LOS, SEF, AIS-L
  SONET PHY:            Seconds        Count  State
    PLL Lock             681767            1  PLL Lock Error
    PHY Light                 0            0  OK
  SONET section:
    BIP-B1                    0            0
    SEF                  681767            1  Defect Active
    LOS                  681767            1  Defect Active
    LOF                  681767            1  Defect Active
    ES-S                 681767
    SES-S                681767
    SEFS-S               681767
  SONET line:
    BIP-B2                    0            0
    REI-L                     0            0
    RDI-L                     0            0  OK
    AIS-L                681767            1  Defect Active
    BERR-SF                   0            0  OK
    BERR-SD                   0            0  OK
    ES-L                 681767
    SES-L                681767
    UAS-L                681757
    ES-LFE                    0
    SES-LFE                   0
    UAS-LFE                   0
  Received SONET overhead:
    F1      : 0x00, J0      : 0x00, K1      : 0xff, K2      : 0xff
    S1      : 0xff
  Transmitted SONET overhead:
    F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
    S1      : 0x00
```

show interfaces extensive (Channelized OC1 on Channelized OC3 IQ)

```
user@host> show interfaces extensive coc1-0/0/0:1
Physical interface: coc1-0/0/0:1, Enabled, Physical link is Down
  Interface index: 133, SNMP ifIndex: 27, Generation: 16
  Link-level type: Controller, Clocking: Internal, SONET mode, Speed: 51840kbps,

   Loopback: None, Parent: coc3-0/0/0
 Interface index 128
  Device flags   : Present Running Down 16384
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps 16384
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 4 supported
  Last flapped   : 2005-02-04 14:51:07 PST (00:00:35 ago)
  Statistics last cleared: Never
  SONET alarms   : None
  SONET defects  : AIS-P
  SONET path:
```

```
    BIP-B3                    0            0
    REI-P                     0            0
    LOP-P                     0            0  OK
    AIS-P                    36            1  Defect Active
    RDI-P                     0            0  OK
    UNEQ-P                    0            0  OK
    PLM-P                     0            0  OK
    ES-P                     36
    SES-P                    36
    UAS-P                    26
    ES-PFE                    0
    SES-PFE                   0
    UAS-PFE                   0
  Received SONET overhead:
    C2      : 0xff, C2(cmp) : 0x01, F2      : 0x00, Z3      : 0x00
    Z4      : 0x00, S1(cmp) : 0x00
  Transmitted SONET overhead:
    C2      : 0x01, F2      : 0x00, Z3      : 0x00, Z4      : 0x00
  Received path trace:
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
  Transmitted path trace: router-1 coc1-0/0/0:1
    6b 61 76 65 72 69 20 63 6f 63 31 2d 30 2f 30 2f   router-1 coc1-0/0/0:1
    30 3a 31 00 00 00 00 00 00 00 00 00 00 00 00 00   ..............
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
  Packet Forwarding Engine configuration:
    Destination slot: 0 (0x00)
```

show interfaces extensive (Channelized T1 on Channelized OC3 IQ)

```
user@host> show interfaces extensive ct1-0/0/0:1:1
Physical interface: ct1-0/0/0:1:1, Enabled, Physical link is Down
  Interface index: 134, SNMP ifIndex: 62, Generation: 17
  Link-level type: Controller, Clocking: Internal, Speed: T1, Loopback: None,
  Framing: ESF, Parent: coc1-0/0/0:1 Interface index 133
  Device flags   : Present Running Down 16384
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps 16384
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 4 supported
  Last flapped   : 2005-02-04 14:54:35 PST (00:00:18 ago)
  Statistics last cleared: Never
  DS1   alarms   : None
  DS1   defects  : AIS, LOF
  T1  media:            Seconds        Count  State
    SEF                       1            1  OK
    BEE                       1            1  OK
    AIS                      18            1  Defect Active
    LOF                      18            1  Defect Active
    LOS                       0            0  OK
    YELLOW                    0            0  OK
    BPV                       0            0
    EXZ                       0            0
    LCV                       0            0
    PCV                       0            0
    CS                        0            0
    LES                      18
    ES                       18
```


Copyright © 2013, Juniper Networks, Inc.

```
    SES                     18
    SEFS                    18
    BES                      0
    UAS                     14
  DS1 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
  SONET alarms    : None
  SONET defects   : None
  SONET vt:
    BIP-BIP2                 0           0
    REI-V                    0           0
    LOP-V                    0           0  OK
    AIS-V                   19           1  Defect Active
    RDI-V                   19           1  Defect Active
    UNEQ-V                   0           0  OK
    PLM-V                   19           1  Defect Active
    ES-V                    19
    SES-V                   19
    UAS-V                    9
    ES-VFE                   0
    SES-VFE                  0
    UAS-VFE                  0
  Received SONET overhead:
    V5      : 0x07, V5(cmp) : 0x02
  Transmitted SONET overhead:
    V5      : 0x02
  Packet Forwarding Engine configuration:
    Destination slot: 0 (0x00)
```

show interfaces extensive (DS0 on Channelized OC3 IQ)

```
user@host> show interfaces extensive ds-0/0/0:1:1:1
Physical interface: ds-0/0/0:1:1:1, Enabled, Physical link is Down
  Interface index: 135, SNMP ifIndex: 63, Generation: 18
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 320kbps,
  Loopback: None, FCS: 16, Parent: ct1-0/0/0:1:1  Interface index 134
  Device flags   : Present Running
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps 16384
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 4 supported
  Last flapped   : Never
  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, Runts: 0, Giants: 0,
    Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
    L2 mismatch timeouts: 0, HS link CRC errors: 0, Resource errors: 0
  Output errors:
    Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,
     Resource errors: 0
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                   0                    0                    0

    1 expedited-fo                  0                    0                    0
```

```
  2 assured-forw                  0                  0                  0

  3 network-cont                  0                  0                  0

HDLC configuration:
  Giant threshold: 1514, Runt threshold: 2
  Timeslots      : 1-5
  Byte encoding: Nx64K, Data inversion: Disabled, Idle cycle flag: flags,
  Start end flag: shared
DS0 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
  Destination slot: 0, PLP byte: 4 (0x00)
```


Copyright © 2013, Juniper Networks, Inc.

show interfaces (Channelized OC48 IQ and IQE)

Syntax show interfaces coc48-*fpc/pic/port*:*channel*
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information Command introduced before Junos OS Release 12.3.

Description Display status information about the specified channelized OC48 interface.

Options

coc48-*fpc/pic/port*:*channel*—Display standard information about the specified channelized OC48 interface as shown in the sample output.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level view

List of Sample Output show interfaces extensive (Channelized OC48 IQ) on page 123

Output Fields See the output field table for the show interfaces (Channelized OC3 IQ and IQE) command.

Sample Output

show interfaces extensive (Channelized OC48 IQ)

```
user@host> show interfaces coc48-4/1/0 extensive
Physical interface: coc48-4/1/0, Enabled, Physical link is Up
  Interface index: 138, SNMP ifIndex: 550, Generation: 141
  Link-level type: Controller, Clocking: Internal, SONET mode, Speed: OC48,
Loopback: None, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : 2012-07-10 01:55:53 PDT (00:50:07 ago)
  Statistics last cleared: Never
  Interface preservation: disabled
  SONET alarms   : None
  SONET defects  : None
  SONET PHY:            Seconds        Count  State
```

Copyright © 2013, Juniper Networks, Inc.

```
  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
Received SONET overhead:
  F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
  S1      : 0x00
Transmitted SONET overhead:
  F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
  S1      : 0x00
```


Copyright © 2013, Juniper Networks, Inc.

show interfaces (Channelized STM1 IQ)

Syntax

show interfaces (*type-fpc/pic /port* <:*channel*><:*channel*>)
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information

Command introduced before Junos OS Release 7.4.

Description

(M Series and T Series routers only) Display status information about the specified channelized STM1 IQ interface.

Options

type-fpc/pic/port*:*channel*:*channel—Interface type with optional corresponding channel levels. The interface type can be one of the following types:

- ***type-fpc/pic/port*:*channel***—For the physical channelized STM1 IQ interface, ***type*** is **cstm1.** For the clear channel, ***type*** is **so**. For channelization, the STM1 IQ interface must be converted to interface type **cau4**.
- ***type-fpc/pic/port*:*channel***—At the first level of channelization, ***type*** can be **ce1** or **e1 (** clear channel or fractional channel from **cau4)**.
- ***type-fpc/pic/port*:*channel*:*channel***—At the second level of channelization, ***type*** is **ds** (from **ce1**).

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level

view

List of Sample Output

show interfaces (Channelized STM1 IQ) (Physical) on page 125
show interfaces (Channelized AU-4) (Physical) on page 126
show interfaces (Channelized E1) (Physical) on page 126
show interfaces (DS) on page 127

Output Fields

See the output field table for the show interfaces (Channelized STM1) command.

Sample Output

show interfaces (Channelized STM1 IQ) (Physical)

```
user@host> show interfaces cstm1-0/0/0
```

Copyright © 2013, Juniper Networks, Inc.

```
Physical interface: cstm1-0/0/0, Enabled, Physical link is Up
  Interface index: 146, SNMP ifIndex: 35
  Link-level type: Frame-relay, Controller, Clocking: Internal, SDH mode,
  Speed: OC3, Loopback: None, Parent: None  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
  DTE statistics:
    Enquiries sent                    : 43186
    Full enquiries sent               : 8515
    Enquiry responses received        : 43185
    Full enquiry responses received   : 8515
  DCE statistics:
    Enquiries received                : 0
    Full enquiries received           : 0
    Enquiry responses sent            : 0
    Full enquiry responses sent       : 0
  Common statistics:
    Unknown messages received         : 0
    Asynchronous updates received     : 0
    Out-of-sequence packets received  : 0
    Keepalive responses timedout      : 0
  Nonmatching DCE-end DLCIs:
          2
  Last flapped   : 2003-02-06 15:01:56 PST (07:15:06 ago)
...
```

show interfaces (Channelized AU-4) (Physical)

```
user@host> show interfaces cau4-0/0/0
Physical interface: cau4-0/0/0, Enabled, Physical link is Up
  Interface index: 147, SNMP ifIndex: 36
  Link-level type: Controller, Clocking: Internal, SDH mode, Speed: OC3,
  Loopback: None, Parent: cstm1-0/0/0 Interface index 146
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
  Last flapped   : 2003-02-06 19:36:31 PST (02:40:42 ago)
  SDH   alarms   : None
  SDH   defects  : None
...
```

show interfaces (Channelized E1) (Physical)

```
user@host> show interfaces ce1-0/0/0:11
Physical interface: ce1-0/0/0:11, Enabled, Physical link is Up
  Interface index: 169, SNMP ifIndex: 288
  Link-level type: Frame-relay, Controller, Clocking: Internal, Speed: E1,
  Loopback: None, Framing: G704, Parent: cau4-0/0/0 Interface index 147
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
  DTE statistics:
    Enquiries sent                    : 43186
    Full enquiries sent               : 8515
    Enquiry responses received        : 43185
    Full enquiry responses received   : 8515
  DCE statistics:
```


Copyright © 2013, Juniper Networks, Inc.

```
    Enquiries received                : 0
    Full enquiries received           : 0
    Enquiry responses sent            : 0
    Full enquiry responses sent       : 0
  Common statistics:
    Unknown messages received         : 0
    Asynchronous updates received     : 0
    Out-of-sequence packets received  : 0
    Keepalive responses timedout      : 0
  Nonmatching DCE-end DLCIs:
          2
  Last flapped   : 2003-02-06 22:05:23 PST (00:13:45 ago)
  DS1   alarms   : None
  DS1   defects  : None
  SDH   alarms   : None
  SDH   defects  : None
...
```

show interfaces (DS)

```
user@host> show interfaces ds-0/0/0:11:1
Physical interface: ds-0/0/0:11:1, Enabled, Physical link is Up
  Interface index: 170, SNMP ifIndex: 289
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps,
  Loopback: Illegal, FCS: 16, Parent: ce1-0/0/0:11 Interface index 169
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  CoS Queues: 8 maximum usable queues, 4 in use
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 0 (never), Output: 0 (never)
  LCP state: Conf-req-sent
  Egress queues: 8 supported, 4 in use
...
  Logical interface ds-0/0/0:11:1.0 (Index 77) (SNMP ifIndex 290)
    Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
    Bandwidth: 0
    Protocol inet, MTU: 1500
      Flags: Protocol-Down
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 10.134.1.0/30, Local: 10.134.1.1
DLCI 100
      Flags: Active, Dce-configured
      Total down time: 0 sec, Last down: Never
      Traffic statistics:
       Input  bytes  :                   0
       Output bytes  :                   0
       Input  packets:                   0
       Output packets:                   0
...
```

Copyright © 2013, Juniper Networks, Inc.

show interfaces (Channelized STM1)

Syntax
show interfaces e1-*fpc/pic/port*:*e1channel*
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information
Command introduced before Junos OS Release 7.4.

Description
(M Series and T Series routers only) Display status information about the specified channelized STM1 interface.

Options
e1-*fpc/pic/port*:*e1channel*—Display standard status information about the specified channelized STM1 interface.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level
view

List of Sample Output
show interfaces extensive (Channelized STM1, SDH) on page 139

Output Fields
Table 7 on page 128 lists the output fields for the **show interfaces** (all Channelized STM1 interfaces) command. Output fields are listed in the approximate order in which they appear.

Table 7: Channelized STM1 show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under *Common Output Fields Description*.	All levels
Interface index	Physical interface's index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	SNMP index number for the physical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	MTU size on the physical interface.	All levels
Clocking	Reference clock source. It can be **Internal** or **External**.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Whether loopback is enabled and the type of loopback (**local** or **remote**).	All levels
FCS	Frame check sequence on the interface (either **16** or **32**). The default is **16** bits.	All levels
Framing	Physical layer framing format used on the link. It can be **G704**, **G704-NO-CRC4**, or **Unframed**. The default is **G704**.	All levels
Parent	(Channelized STM1 IQ interfaces only) Name and interface index of the interface to which a particular child interface belongs. **None** indicates that this interface is the top level.	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under *Common Output Fields Description*.	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Link flags	Information about the link. Possible values are described in the "Link Flags" section under *Common Output Fields Description*.	All levels
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	**detail extensive**
Keepalive settings	(PPP and HDLC) Configured settings for keepalives. • **interval***seconds*—The time in seconds between successive keepalive requests. The range is **10** seconds through **32,767** seconds, with a default of **10** seconds. • **down-count** ***number***—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is**1** through **255**, with a default of **3**. • **up-count** ***number***—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is **1** through **255**, with a default of **1**.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output

Keepalive statistics	(PPP and HDLC) Information about keepalive packets.
	• **Input**—Number of keepalive packets received by PPP.
	  ◦ **(last seen 00:00:00 ago)**—Time since the last keepalive packet was received, in the format***hh:mm:ss***.
	• **Output**—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received.
	  ◦ **(last seen 00:00:00 ago)**—Time since the last keepalive packet was sent, in the format ***hh:mm:ss***.
		detail extensive none

ANSI LMI settingsor **ITU LMI settings**	(Frame Relay) Local Management Interface settings. The format is **(ANSI or ITU) LMI settings: *value*, *value*... *xx*** seconds, where ***value*** can be: • **n391dte**—DTE full status polling interval (1- 255) • **n392dce**—DCE error threshold (1-10) • **n392dte**—DTE error threshold (1-10) • **n393dce**—DCE monitored event count (1-10) • **n393dte**—DTE monitored event count (1-10) • **t391dte**—DTE polling timer (5-30 seconds) • **t392dce**—DCE polling verification timer (5-30 seconds)	**detail extensive** none
LMI	(Frame Relay) Statistics about the link management. • **Input**—Number of packets coming in on the interface (***nn***) and how much time has passed since the last packet arrived. The format is **Input: *nn* (last seen *hh:mm:ss* ago)**. • **Output**—Number of packets sent out on the interface (***nn***) and how much time has passed since the last packet was sent. The format is **Output: *nn* (last seen *hh:mm:ss* ago)**.	**detail extensive** none
DTE statistics	(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data circuit-terminating equipment (DCE): • **Enquiries sent**—Number of link status enquiries sent from the DTE to the DCE. • **Full enquiries sent**—Number of full enquiries sent from the DTE to the DCE. • **Enquiry responses received**—Number of enquiry responses received by the DTE from the DCE. • **Full enquiry responses received**—Number of full enquiry responses sent from the DTE to the DCE.	**detail extensive** none
DCE statistics	(Frame Relay) Statistics about messages transmitted from the DCE to the DTE: • **Enquiries received**—Number of enquiries received by the DCE from the DTE. • **Full enquiries received**—Number of full enquiries received by the DCE from the DTE. • **Enquiry responses sent**—Number of enquiry responses sent from the DCE to the DTE. • **Full enquiry responses sent**—Number of full enquiry responses sent from the DCE to the DTE.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Common statistics	(Frame Relay) Statistics about messages sent between the DTE and the DCE: • **Unknown messages received**—Number of received packets that do not fall into any category. • **Asynchronous updates received**—Number of link status peer changes received. • **Out-of-sequence packets received**—Number of packets for which the sequence of the packets received is different from the expected sequence. • **Keepalive responses timedout**—Number of keepalive responses that timed out when no LMI packet was reported for **n392dte** or **n393dce** intervals. (See **LMI settings**.)	**detail extensive** none
Nonmatching DCE-end DLCIs	(Frame Relay, displayed only from the DTE) Number of DLCIs configured from the DCE.	**detail extensive** none
LCP state	(PPP) Link Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—LCP negotiation is incomplete (not yet completed or has failed). • **Not-configured**—LCP is not configured on the interface. • **Opened**—LCP negotiation is successful.	**detail extensive** none
NCP state	(PPP) Network Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—NCP negotiation is incomplete (not yet completed or has failed). • **Not-configured**—NCP is not configured on the interface. • **Opened**—NCP negotiation is successful.	**detail extensive** none
CHAP state	(PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. • **Chap-Chal-received**—Challenge was received but response not yet sent. • **Chap-Chal-sent**—Challenge was sent. • **Chap-Resp-received**—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.) • **Chap-Resp-sent**—Response was sent for the challenge received. • **Closed**—CHAP authentication is incomplete. • **Failure**—CHAP authentication failed. • **Not-configured**—CHAP is not configured on the interface. • **Success**—CHAP authentication was successful.	**detail extensive** none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is **Last flapped:** ***year-month-day hour:minute:second timezone*** **(*****hour:minute:second*** **ago)**. For example, **Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)**.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Statistics last cleared	Time when the statistics for the interface were last set to zero.	**detail extensive**
Traffic statistics	Number and rate of bytes and packets received and transmitted on the physical interface. • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface. • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**
Input errors	Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Errors**—Sum of the incoming frame aborts and FCS errors. • **Drops**—Number of packets dropped by the input 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. • **Framing errors**—Number of packets received with an invalid frame checksum (FCS). • **Policed discards**—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • **L3 incompletes**—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. • **L2 channel errors**—Number of times the software did not find a valid logical interface for an incoming frame. • **L2 mismatch timeouts**—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • **HS link CRC errors**—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • **SRAM errors**—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC. If the value of this field increments, the PIC is malfunctioning.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Output errors	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Carrier transitions**—Number of times the interface has gone from **down** to **up**. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning. • **Errors**—Sum of the outgoing frame aborts and FCS errors. • **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. • **Aged packets**—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.	**extensive**
DS1 alarms **DS1 defects**	E1 media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. The following lists all possible alarms and defects. For complete explanations of most of these alarms and defects, see *Bellcore Telcordia GR-499-CORE*. • **LOS**—Loss of signal. • **LOF**—Loss of frame. • **AIS**—Alarm indication signal. • **YLW**—Yellow alarm. Indicates errors at the remote site receiver.	**detail extensive** none
SDH alarms **SDH defects**	SDH media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: SDH PHY, SDH regenerator section, SDH multiplex section, and SDH path. NOTE: For controller-based SONET PICs, the SDH alarms and SDH defects output in the **show interface cstm1 extensive** command output only shows the section and line level defects. The path level defects can be found under the SONET (so) interface output.	All levels

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
E1 media	Active alarms and defects, plus counts of specific E1 errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Error types can be: • **AIS**—Alarm indication signal • **BEE**—Bit error • **BES**—Bit error seconds • **BPV**—Bipolar violation • **CS**—Carrier state • **ES**—Errored seconds • **EXZ**—Excessive zeros • **FEBE**—Far-end block error • **LCV**—Line code violation • **LES**—Line error seconds • **LOF**—Loss of frame • **LOS**—Loss of signal • **PCV**—Pulse code violation • **SEF**—Severely errored framing • **SEFS-S**—Severely errored framing seconds (section) • **SES**—Severely errored seconds • **UAS**—Unavailable seconds • **YELLOW**—Errors at the remote site receiver	**extensive**
Interface transmit queues	Names of the transmit queues and their associated statistics for each E1 channel on the Channelized STM1-to-E1 PIC. • **B/W**—Queue bandwidth as a percentage of the total interface bandwidth. • **WRR**—Weighted round-robin (in percent). • **Packets**—Number of packets transmitted. • **Bytes**—Number of bytes transmitted. • **Drops**—Number of packets dropped. • **Errors**—Number of packet errors.	**extensive**
HDLC configuration	Information about the HDLC configuration. • **Giant threshold**—Giant threshold programmed into the hardware. • **Runt threshold**—Runt threshold programmed into the hardware. • **Timeslots**—Configured time slots for the interface. • **Line encoding**—Line encoding used. It is always **HDB3**.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
DS1 BERT configuration	BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface. • **BERT time period**—Configured total time period that the BERT is to run. • **Elapsed**—Actual time elapsed since the start of the BERT (in seconds). • **Induced error rate**—Configured rate at which the bit errors are induced in the BERT pattern. • **Algorithm**—Type of algorithm selected for the BERT.	**detail extensive** none
SDH PHY	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **PLL Lock**—Phase-locked loop • **PHY Light**—Loss of optical signal	**extensive**
SDH regenerator section	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **RS-BIP8**—24-bit BIP for multiplex section overhead (B2 bytes) • **OOF**—Out of frame • **LOS**—Loss of signal • **LOF**—Loss of frame • **RS-ES**—Errored seconds (near-end regenerator section) • **RS-SES**—Severely errored seconds (near-end regenerator section) • **RS-SEFS**—Severely errored framing seconds (regenerator section)	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SDH multiplex section	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **MS-BIP24**—8-bit BIP for high-order path overhead (B3 byte) • **MS-FEBE**—Far-end block error (multiplex section) • **MS-FERF**—Far-end remote fail (multiplex section) • **MS-AIS**—alarm indication signal (multiplex section) • **BERR-SF**—Bit error rate fault (signal failure) • **BERR-SD**—Bit error rate defect (signal degradation) • **MS-ES**—Errored seconds (near-end multiplex section) • **MS-SES**—Severely errored seconds (near-end multiplex section) • **MS-UAS**—Unavailable seconds (near-end multiplex section) • **MS-ES-FE**—Errored seconds (far-end multiplex section) • **MS-SES-FE**—Severely errored seconds (far-end multiplex section) • **MS-UAS-FE**—Unavailable seconds (far-end multiplex section)	**extensive**
SDH path	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **HP-BIP8**—8-bit BIP for regenerator section overhead (B1 byte) • **HP-FEBE**—Far-end block error (high-order path) • **HP-LOP**—Loss of pointer (high-order path) • **HP-AIS**—High-order-path alarm indication signal • **HP-FERF**—Far-end remote fail (high-order path) • **HP-UNEQ**—Unequipped (high-order path) • **HP-PLM**—Payload label mismatch (high-order path) • **HP-ES**—Errored seconds (near-end high-order path) • **HP-SES**—Severely errored seconds (near-end high-order path) • **HP-UAS**—Unavailable seconds (near-end high-order path) • **HP-ES-FE**—Errored seconds (far-end high-order path) • **HP-SES-FE**—Severely errored seconds (far-end high-order path) • **HP-UAS-FE**—Unavailable seconds (far-end high-order path)	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SDH tu	Active alarms and defects, plus counts of specific SDH tributary unit (TU) errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **TU-BIP-2**—Bit interleaved parity for SONET line overhead • **TU-FEBE**—(near-end TU) • **TU-LOP**—Loss of pointer (near-end TU) • **TU-AIS**—Alarm indication signal (near-end TU) • **TU-FERF**—(near-end TU) • **TU-UNEQ**—Unequipped (near-end TU) • **TU-PLM**—Payload label mismatch (near-end TU) • **TU-ES**—Errored seconds (near-end TU) • **TU-SES**—Severely errored seconds (near-end TU) • **TU-UAS**—Unavailable seconds (near-end TU) • **TU-ES-FE**—Errored seconds (far-end TU) • **TU-SES-FE**—Severely errored seconds (far-end TU) • **TU-UAS-FE**—Unavailable seconds (far-end TU)	**extensive**
Received SDH overhead **Transmitted SDH overhead**	Values of the received and transmitted SONET overhead: • **C2**—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P. • **F1**—Section user channel byte. This byte is set aside for the purposes of users. • **K1** and **K2**—These bytes are allocated for APS signaling for the protection of the multiplex section. • **J0**—Section trace. This byte is defined for STS-1 number 1 of an STS-*N* signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter. • **S1**—Synchronization status. The S1 byte is located in the first STS-1 of an STS-*N* signal. • **Z3** and **Z4**—Allocated for future use.	**extensive**
Received path trace **Transmitted path trace**	Channelized OC12 interfaces allow path trace bytes to be sent inband across the SONET/SDH link. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits. This information is specific to each of the 12 channelized OC12 interfaces.	**extensive**
Packet Forwarding Engine configuration	Information about the configuration of the Packet Forwarding Engine: • **Destination slot**—FPC slot number. • **PLP byte**—Packet Level Protocol byte.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
CoS information	Information about the CoS queue for the physical interface. • **CoS transmit queue**—Queue number and its associated user-configured forwarding class name. • **Bandwidth %**—Percentage of bandwidth allocated to the queue. • **Bandwidth bps**—Bandwidth allocated to the queue (in bps). • **Buffer %**—Percentage of buffer space allocated to the queue. • **Buffer usec**—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • **Priority**—Queue priority: **low** or **high**. • **Limit**—Displayed if rate limiting is configured for the queue. Possible values are **none** and **exact**. If **exact** is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If **none** is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.	**extensive**
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under *Common Output Fields Description*.	All levels
Index	Logical interface index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	Logical interface SNMP interface index number.	**detail extensive** none
Flags	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under *Common Output Fields Description*.	All levels
Encapsulation	Encapsulation on the logical interface.	All levels
Protocol	Protocol family configured on the logical interface, such as **iso**, **inet6**, or **mpls**.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	**detail extensive**
Flags	Information about the protocol family flags. Possible values are described in the "Family Flags" section under *Common Output Fields Description*.	**detail extensive** none
Addresses, Flags	Information about the address flags. Possible values are described in the "Addresses Flags" section under *Common Output Fields Description*.	**detail extensive** none
Destination	IP address of the remote side of the connection.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 7: Channelized STM1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Local	IP address of the logical interface.	**detail extensive** none
Broadcast	Broadcast address.	**detail extensive** none
DLCI	(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: **Flags**, **Total down time**, **Last down**, and **Traffic statistics**. **Flags** is one or more of the following: • **Active**—Set when the link is active and the DTE and DCE are exchanging information. • **Down**—Set when the link is active, but no information is received from the DCE. • **Unconfigured**—Set when the corresponding DLCI in the DCE is not configured. • **Configured**—Set when the corresponding DLCI in the DCE is configured. • **Dce-configured**—Displayed when the command is issued from the DTE.	**detail extensive** none
DLCI statistics	(Frame Relay) Data-link connection identifier (DLCI) statistics. • **Active DLCI**—Number of active DLCIs. • **Inactive DLCI**—Number of inactive DLCIs.	**detail extensive** none

Sample Output

show interfaces extensive (Channelized STM1, SDH)

```
user@host> show interfaces e1-1/0/0:1 extensive
Physical interface: e1-1/0/0:1, Enabled, Physical link is Up
  Interface index: 148, SNMP ifIndex: 285, Generation: 2915
  Link-level type: Frame-relay, MTU: 1504, SDH mode, Speed: E1, Loopback: None,
  FCS: 16, Framing: G704
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
  DTE statistics:
    Enquiries sent                    : 43186
    Full enquiries sent               : 8515
    Enquiry responses received        : 43185
    Full enquiry responses received   : 8515
  DCE statistics:
    Enquiries received                : 0
    Full enquiries received           : 0
    Enquiry responses sent            : 0
    Full enquiry responses sent       : 0
  Common statistics:
    Unknown messages received         : 0
    Asynchronous updates received     : 0
    Out-of-sequence packets received  : 0
    Keepalive responses timedout      : 0
  Nonmatching DCE-end DLCIs:
          2
  Hold-times     : Up 0 ms, Down 0 ms
```

Copyright © 2013, Juniper Networks, Inc.

```
Last flapped   : 2002-05-23 17:02:59 PDT (17:23:45 ago)
Statistics last cleared: Never
Traffic statistics:
 Input  bytes  :                  592                   48 bps
 Output bytes  :                  644                   48 bps
 Input  packets:                   46                    0 pps
 Output packets:                   46                    0 pps
Input errors:
  Errors: 0, Drops: 9, Framing errors: 0, Policed discards: 0,
  L3 incompletes: 0, L2 channel errors: 11, L2 mismatch timeouts: 0,
  HS link CRC errors: 0, SRAM errors: 0
Output errors:
  Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0
DS1   alarms   : None
DS1   defects  : None
SDH   alarms   : None
SDH   defects  : None
E1  media:            Seconds        Count  State
  SEF                       0            0  OK
  BEE                       0            0  OK
  AIS                     124            1  OK
  LOF                     124            1  OK
  LOS                       0            0  OK
  YELLOW                    0            0  OK
  BPV                       0            0
  EXZ                       0            0
  LCV                       0            0
  PCV                       0            0
  CS                        0            0
  FEBE                      0            0
  LES                     124
  ES                      125
  SES                     124
  SEFS                    124
  BES                       0
  UAS                      37
Interface transmit queues:
            B/W  WRR       Packets        Bytes        Drops       Errors
  Queue0     95   95             0            0            0            0
  Queue1      5    5           529         6348            0            0
HDLC configuration:
  Giant threshold: 0, Runt threshold: 0
  Timeslots      : All active
  Line encoding: HDB3
DS1 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
SDH PHY:              Seconds        Count  State
  PLL Lock                  0            0  OK
  PHY Light                 0            0  OK
SDH regenerator section:
  RS-BIP8                   0            0
  OOF                     125            1  OK
  LOS                     125            1  OK
  LOF                     125            1  OK
  RS-ES                   125
  RS-SES                  125
  RS-SEFS                 125
SDH multiplex section:
  MS-BIP24                  0            0
  MS-FEBE                   0            0
```


Copyright © 2013, Juniper Networks, Inc.

```
  MS-FERF                   0            0  OK
  MS-AIS                  125            1  OK
  BERR-SF                   0            0  OK
  BERR-SD                   0            0  OK
  MS-ES                   125
  MS-SES                  125
  MS-UAS                  115
  MS-ES-FE                  0
  MS-SES-FE                 0
  MS-UAS-FE                 0
SDH path:
  HP-BIP8                   0            0
  HP-FEBE                   0            0
  HP-LOP                    0            0  OK
  HP-AIS                  125            1  OK
  HP-FERF                   0            0  OK
  HP-UNEQ                   0            0  OK
  HP-PLM                  125            1  OK
  HP-ES                   125
  HP-SES                  125
  HP-UAS                  115
  HP-ES-FE                  0
  HP-SES-FE                 0
  HP-UAS-FE                 0
SDH tu:
  TU-BIP2                   0            0
  TU-FEBE                 124            1
  TU-LOP                    0            0  OK
  TU-AIS                  124            1  OK
  TU-FERF                 124            1  OK
  TU-UNEQ                   0            0  OK
  TU-PLM                  124            1  OK
  TU-ES                   125
  TU-SES                  125
  TU-UAS                  115
  TU-ES-FE                  0
  TU-SES-FE                 0
  TU-UAS-FE                 0
Received SDH overhead:
  F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
  S1      : 0x00, C2      : 0x02, C2(cmp) : 0x02, F2      : 0x00
  Z3      : 0x00, Z4      : 0x00, S1(cmp) : 0x00, V5      : 0x02
  V5(cmp) : 0x02
Transmitted SDH overhead:
  F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
  S1      : 0x00, C2      : 0x02, F2      : 0x00, Z3      : 0x00
  Z4      : 0x00, V5      : 0x02
Received path trace:
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
Transmitted path trace:
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
Packet Forwarding Engine configuration:
  Destination slot: 1, PLP byte: 2 (0x07)
CoS information:
  CoS transmit queue              Bandwidth           Buffer Priority   Limit
                             %          bps   %         usec
  0 best-effort             95      1945600  95            0      low    none
  3 network-control          5       102400   5            0      low    none
Logical interface e1-1/0/0:1.0 (Index 10) (SNMP ifIndex 369) (Generation 496)
  Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
  Protocol inet, MTU: 1500, Generation: 575, Route table: 0
```

```
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 19.19.19.3, Local: 19.19.19.4, Broadcast: Unspecified,
      Generation: 975
  DLCI 100
    Flags: Active, Dce-configured
    Total down time: 0 sec, Last down: Never
    Traffic statistics:
     Input  bytes  :                  0
     Output bytes  :                  0
     Input  packets:                  0
     Output packets:                  0
DLCI statistics:
  Active DLCI  :2 Inactive DLCI  : 0
```


Copyright © 2013, Juniper Networks, Inc.

show interfaces (Channelized T1 IQ)

Syntax show interfaces (ct1-*fpc/pic/port* | *type-fpc/pic/port*<:*channel*><:*channel*>)
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information Command introduced in Junos OS Release 7.4.

Description (M Series and T Series routers only) Display status information about the specified channelized T1 IQ interface.

Options ***type-fpc/pic/port*:*channel***—Interface type. With optional corresponding channel levels, the interface type can be one of the following:

- ***type-fpc/pic/port***—For the physical channelized T1 IQ interface, ***type*** is **ct1.**
- ***type-fpc/pic/port*:*channel***—For the clear channel, ***type*** is **t1**. At the first level of channelization, ***type*** can be **ct1** or **t1.**
- ***type-fpc/pic/port*:*channel*:*channel***—At the second level of channelization, ***type*** can be **ds**.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level view

List of Sample Output
show interfaces extensive (CT1) on page 151
show interfaces extensive (T1) on page 152
show interfaces extensive (DS0) on page 153

Output Fields Table 8 on page 143 lists the output fields for the **show interfaces** (Channelized T1 IQ and T3 IQ interfaces) command. Output fields are listed in the approximate order in which they appear.

Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels

Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under *Common Output Fields Description*.	All levels
Interface index	Physical interface's index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	SNMP index number for the physical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	MTU size on the physical interface.	All levels
Clocking	Reference clock source. It can be **Internal** or **External**.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Whether loopback is enabled and the type of loopback (**local** or **remote**).	All levels
FCS	Frame check sequence on the interface (either **16** or **32**). The default is **16** bits.	All levels
Framing	Physical layer framing format used on the link. It can be **ESF** or **SF**. The default is **ESF**.	All levels
Parent	Name and interface index of the interface to which a particular child interface belongs. **None** indicates that this interface is the top level.	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under *Common Output Fields Description*.	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Link flags	Information about the link. Possible values are described in the "Link Flags" section under *Common Output Fields Description*.	All levels
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	**detail extensive**
Keepalive settings	Configured settings for keepalives. • **interval** ***seconds***—The time in seconds between successive keepalive requests. The range is **10** seconds through **32,767** seconds, with a default of **10** seconds. • **down-count** ***number***—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is **1** through **255**, with a default of **3**. • **up-count** ***number***—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is **1** through **255**, with a default of **1**.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output

Keepalive statistics	Information about keepalive packets.
	• **Input**—Number of keepalive packets received by PPP.
	  ◦ **(last seen 00:00:00 ago)**—Time since the last keepalive packet was received, in the format ***hh:mm:ss***.
	• **Output**—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received.
	  ◦ **(last seen 00:00:00 ago)**—Time since the last keepalive packet was sent, in the format ***hh:mm:ss***.
		detail extensive none

LMI settings	(Frame Relay) Settings for Local Management Interface (LMI) can be either **ANSI LMI settings** or **ITU LMI settings**. ANSI LMI settings is the default. The format is **(ANSI or ITU) LMI settings: *value*, *value*... *xx seconds***, where ***value*** can be: • **n391dte**—DTE full status polling interval (1–255) • **n392dce**—DCE error threshold (1–10) • **n392dte**—DTE error threshold (1–10) • **n393dce**—DCE monitored event count (1–10) • **n393dte**—DTE monitored event count (1–10) • **t391dte**—DTE polling timer (5–30 seconds) • **t392dce**—DCE polling verification timer (5–30 seconds)	**detail extensive** none
LMI	(Frame Relay) LMI packet statistics: • **Input**—Number of packets coming in on the interface (***nn***) and how much time has passed since the last packet arrived. The format is **Input: *nn* (last seen *hh:mm:ss* ago)**. • **Output**—Number of packets sent out on the interface (***nn***) and how much time has passed since the last packet was sent. The format is **Output: *nn* (last sent *hh:mm:ss* ago)**.	**detail extensive** none
DTE statistics	(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data communication equipment (DCE): • **Enquiries sent**—Number of link status enquiries sent from the DTE to the DCE. • **Full enquiries sent**—Number of full enquiries sent from the DTE to the DCE. • **Enquiry responses received**—Number of enquiry responses received by the DTE from the DCE. • **Full enquiry responses received**—Number of full enquiry responses sent from the DTE to the DCE.	**detail extensive** none
DCE statistics	(Frame Relay) Statistics about messages transmitted from the DCE to the DTE: • **Enquiries received**—Number of enquiries received by the DCE from the DTE. • **Full enquiries received**—Number of full enquiries received by the DCE from the DTE. • **Enquiry responses sent**—Number of enquiry responses sent from the DCE to the DTE. • **Full enquiry responses sent**—Number of full enquiry responses sent from the DCE to the DTE.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Common statistics	(Frame Relay) Statistics about messages sent between the DTE and the DCE: • **Unknown messages received**—Number of received packets that do not fall into any category. • **Asynchronous updates received**—Number of link status peer changes received. • **Out-of-sequence packets received**—Number of packets for which the sequence of the packets received is different from the expected sequence. • **Keepalive responses timedout**—Number of keepalive responses that timed out when no LMI packet was reported for **n392dte** or **n393dce** intervals. (See **LMI settings**.)	**detail extensive** none
Nonmatching DCE-end DLCIs	(Frame Relay) Number of DLCIs configured from the DCE, displayed only from the DTE.	**detail extensive** none
LCP state	(PPP) Link Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—LCP negotiation is incomplete (not yet completed or has failed). • **Not-configured**—LCP is not configured on the interface. • **Opened**—LCP negotiation is successful.	**detail extensive** none
NCP state	(PPP) Network Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—NCP negotiation is incomplete (not yet completed or has failed). • **Not-configured**—NCP is not configured on the interface. • **Opened**—NCP negotiation is successful.	**detail extensive** none
CHAP state	(PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. • **Chap-Chal-received**—Challenge was received but response not yet sent. • **Chap-Chal-sent**—Challenge was sent. • **Chap-Resp-received**—Response was received for the challenge sent, but CHAP has not yet moved into the**Success** state. (Most likely with RADIUS authentication.) • **Chap-Resp-sent**—Response was sent for the challenge received. • **Closed**—CHAP authentication is incomplete. • **Failure**—CHAP authentication failed. • **Not-configured**—CHAP is not configured on the interface. • **Success**—CHAP authentication was successful.	**detail extensive** none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is **Last flapped:** ***year-month-day hour:minute:second timezone*** **(*hour:minute:second* ago)**. For example, **Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)**.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
CoS queues	Number of CoS queues configured.	**detail extensive** none
Statistics last cleared	Time when the statistics for the interface were last set to zero.	**detail extensive**
Traffic statistics	Number and rate of bytes and packets received and transmitted on the physical interface. • **Input bytes, Output bytes**—Number of bytes received and transmitted on the interface. • **Input packets, Output packets**—Number of packets received and transmitted on the interface.	**detail extensive**
Input errors	Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Errors**—Sum of the incoming frame aborts and FCS errors. • **Drops**—Number of packets dropped by the input 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. • **Framing errors**—Number of packets received with an invalid frame checksum (FCS). • **Giants**—Number of frames received that are larger than the giant threshold. • **Runts**—Number of frames received that are smaller than the runt threshold. • **Policed discards**—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • **L3 incompletes**—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. • **L2 channel errors**—Counter increments when the software could not find a valid logical interface for an incoming frame. • **L2 mismatch timeouts**—Count of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • **HS link CRC errors**—Count of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • **SRAM errors**—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC. If the value in this field increments, the PIC is malfunctioning. • **Resource errors**—Sum of transmit drops.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Output errors	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Carrier transitions**—Number of times the interface has gone from **down** to **up**. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly, (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning. • **Errors**—Sum of the outgoing frame aborts and FCS errors. • **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. • **Aged packets**—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware. • **MTU errors**—Number of packets whose size exceeds the MTU of the interface. • **Resource errors**—Sum of transmit drops.	**extensive**
Queue counters	CoS queue number and its associated user-configured forwarding class name. • **Queued packets**—Number of queued packets. • **Transmitted packets**—Number of transmitted packets. • **Dropped packets**—Number of packets dropped by the ASIC's RED mechanism.	**detail extensive**
DS1 alarms DS1 defects	Media-specific defects that can render the interface unable to pass packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. • **LOS**—Loss of signal. • **LOF**—Loss of frame. • **AIS**—Alarm indication signal. • **YLW**—Yellow alarm. Indicates errors at the remote site receiver.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
T1 media	Counts of T1 media-specific errors. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. The T1 media-specific error types can be: • **AIS**—Alarm indication signal • **BEE**—Bit error event • **BES**—Bit error seconds • **BPV**—Bipolar violation • **CS**—Carrier state • **ES**—Errored seconds • **EXZ**—Excessive zeros • **FEBE**—Far-end block error • **LCV**—Line code violation • **LES**—Line error seconds • **LOF**—Loss of frame • **LOS**—Loss of signal • **PCV**—Pulse code violation • **SEF**—Severely errored framing • **SEFS**—Severely errored framing seconds (section) • **SES**—Severely errored seconds • **UAS**—Unavailable seconds • **YELLOW**—Errors at the remote site receiver	**extensive**
Line encoding	Line encoding used: **B8ZS** or **AMI**.	All levels
Buildout	Buildout setting.	All levels
HDLC configuration	Information about the HDLC configuration. • **Policing bucket**—Configured state of the receiving policer. • **Shaping bucket**—Configured state of the transmitting shaper. • **Giant threshold**—Giant threshold programmed into the hardware. • **Runt threshold**—Runt threshold programmed into the hardware. • **Timeslots**—Configured time slots for the interface. • **Line encoding**—Line encoding used: **B8ZS** or **AMI**. • **Byte encoding**—Byte encoding used: **Nx64K** or **Nx56K**. • **Data inversion**—HDLC data inversion setting: **Enabled** or **Disabled**. • **Idle cycle Flag**—Idle cycle flags. • **Start end Flag**—Start and end flag.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
DS0 or DS1 BERT configuration	BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface. • **BERT time period**—Configured total time period that the BERT is to run. • **Elapsed**—Actual time elapsed since the start of the BERT (in seconds). • **Induced error rate**—Configured rate at which the bit errors are induced in the BERT pattern. • **Algorithm**—Type of algorithm selected for the BERT.	**detail extensive** none
Packet Forwarding Engine configuration	Information about the configuration of the Packet Forwarding Engine: • **Destination slot**—FPC slot number. • **PLP byte**—Packet Level Protocol byte.	**extensive**
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Logical interface index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	Logical interface SNMP interface index number.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Flags	Information about the logical interface; values are described in the "Logical Interface Flags" section under *Common Output Fields Description*.	**All levels**
Encapsulation	Encapsulation on the logical interface.	**All levels**
Protocol	Protocol family configured on the logical interface, such as **iso**, **inet6**, or **mpls**.	**detail extensive** none
MTU	MTU size on the logical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	**detail extensive**
Flags	Information about the protocol family flags. Possible values are described in the "Family Flags" section under *Common Output Fields Description*.	**detail extensive** none
Addresses, Flags	Information about the address flags. Possible values are described in the "Addresses Flags" section under *Common Output Fields Description*.	**detail extensive** none
Destination	IP address of the remote side of the connection.	**detail extensive** none
Local	IP address of the logical interface.	**detail extensive** none
Broadcast	Broadcast address.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 8: Channelized T1 IQ and T3 IQ show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
DLCI	(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: **Flags**, **Total down time**, **Last down**, and **Traffic statistics**. **Flags** is one or more of the following: • **Active**—Set when the link is active and the DTE and DCE are exchanging information. • **Down**—Set when the link is active, but no information is received from the DCE. • **Unconfigured**—Set when the corresponding DLCI in the DCE is not configured. • **Configured**—Set when the corresponding DLCI in the DCE is configured. • **Dce-configured**—Displayed when the command is issued from the DTE.	**detail extensive** none
DLCI statistics	(Frame Relay) Data-link connection identifier (DLCI) statistics. • **Active DLCI**—Number of active DLCIs. • **Inactive DLCI**—Number of inactive DLCIs.	**detail extensive** none

Sample Output

show interfaces extensive (CT1)

```
user@host> show interfaces extensive ct1-0/1/1
Physical interface: ct1-0/1/1, Enabled, Physical link is Up
   Interface index: 145, SNMP ifIndex: 32, Generation: 28
   Link-level type: Controller, Clocking: Internal, Speed: T1,
   Loopback: None, Framing: ESF, Parent: None
 Device flags   : Present Running
   Interface flags: Point-To-Point SNMP-Traps 16384
   Link flags     : None
   Hold-times     : Up 0 ms, Down 0 ms
   CoS queues     : 4 supported
   Last flapped   : 2005-08-17 11:47:09 PDT (1d 03:38 ago)
   Statistics last cleared: 2005-08-18 15:25:37 PDT (00:00:27 ago)
   DS1   alarms   : None
   DS1   defects  : None
   T1  media:            Seconds        Count  State
     SEF                       0            0  OK
     BEE                       0            0  OK
     AIS                       0            0  OK
     LOF                       0            0  OK
     LOS                       0            0  OK
     YELLOW                    0            0  OK
     BPV                       0            0
     EXZ                       0            0
     LCV                       0            0
     PCV                       0            0
     CS                        0            0
     LES                       0
     ES                        0
     SES                       0
     SEFS                      0
     BES                       0
```

```
    UAS                      0
    Line encoding: B8ZS
    Buildout       : 0 to 132 feet
  DS1 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
  Packet Forwarding Engine configuration:
    Destination slot: 0 (0x00)
```

show interfaces extensive (T1)

```
user@host> show interfaces extensive t1-0/2/0
Physical interface: t1-0/2/0, Enabled, Physical link is Up
   Interface index: 161, SNMP ifIndex: 33, Generation: 61
   Link-level type: PPP, MTU: 1504, Speed: T1, Loopback: None, FCS: 16,
   Parent: ct1-0/2/0 Interface index 148
   Device flags   : Present Running
   Interface flags: Point-To-Point SNMP-Traps 16384
   Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
  DTE statistics:
    Enquiries sent                    : 43186
    Full enquiries sent               : 8515
    Enquiry responses received        : 43185
    Full enquiry responses received   : 8515
  DCE statistics:
    Enquiries received                : 0
    Full enquiries received           : 0
    Enquiry responses sent            : 0
    Full enquiry responses sent       : 0
  Common statistics:
    Unknown messages received         : 0
    Asynchronous updates received     : 0
    Out-of-sequence packets received  : 0
    Keepalive responses timedout      : 0
  Nonmatching DCE-end DLCIs:
          2
   Hold-times     : Up 0 ms, Down 0 ms
   CoS queues     : 4 supported
   Last flapped   : 2005-09-07 15:43:47 PDT (00:00:06 ago)
   Statistics last cleared: Never
   Traffic statistics:
    Input  bytes  :                   0                   0 bps
    Output bytes  :                  14                   0 bps
    Input  packets:                   0                   0 pps
    Output packets:                   1                   0 pps
   Input errors:
     Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
     Policed discards: 0, L3 incompletes: 0,
     L2 channel errors: 0, L2 mismatch timeouts: 0,
     HS link CRC errors: 0, SRAM errors: 0, Resource errors: 0
   Output errors:
     Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0,
     MTU errors: 0, Resource errors: 0
   Queue counters:       Queued packets  Transmitted packets Dropped packets
     0 best-effort                    0                   0               0
     1 expedited-fo                   0                   0               0
     2 assured-forw                   0                   0               0
     3 network-cont                   1                   1               0
   DS1   alarms   : None
```


Copyright © 2013, Juniper Networks, Inc.

```
  DS1   defects  : None
  HDLC configuration:
    Policing bucket: Disabled
    Shaping bucket : Disabled
    Giant threshold: 1514, Runt threshold: 2
    Timeslots      : All active
    Byte encoding: Nx64K, Data inversion: Disabled, Idle cycle flag:
    flags, Start end flag: shared
  Packet Forwarding Engine configuration:
    Destination slot: 0, PLP byte: 4 (0x00)
```

show interfaces extensive (DS0)

```
user@host> show interfaces extensive ds-0/1/0:0
Physical interface: ds-0/1/0:1, Enabled, Physical link is Up
   Interface index: 157, SNMP ifIndex: 52, Generation: 46
   Link-level type: Frame-Relay, PPP, MTU: 1504, Clocking: Internal,
   Speed: 640kbps, Loopback: None, FCS:16,
   Parent: ct1-0/1/0 Interface index 143
   Device flags   : Present Running
   Interface flags: Point-To-Point SNMP-Traps 16384
   Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 51700 (00:00:02 ago), Output: 51701 (00:00:02 ago)
  DTE statistics:
    Enquiries sent                     : 43186
    Full enquiries sent                : 8515
    Enquiry responses received         : 43185
    Full enquiry responses received    : 8515
  DCE statistics:
    Enquiries received                 : 0
    Full enquiries received            : 0
    Enquiry responses sent             : 0
    Full enquiry responses sent        : 0
  Common statistics:
    Unknown messages received          : 0
    Asynchronous updates received      : 0
    Out-of-sequence packets received   : 0
    Keepalive responses timedout       : 0
  Nonmatching DCE-end DLCIs:
          2
   Hold-times     : Up 0 ms, Down 0 ms
   Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
   Keepalive statistics:
     Input : 8 (last seen 00:00:12 ago)
     Output: 8 (last sent 00:00:07 ago)
   LCP state: Opened
   NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,
   mpls: Not-configured
   CHAP state: Not-configured
   CoS queues     : 4 supported
   Last flapped   : 2005-08-18 15:23:46 PDT (00:03:17 ago)
   Statistics last cleared: 2005-08-18 15:25:37 PDT (00:01:26 ago)
   Traffic statistics:
    Input  bytes  :                  840                    0 bps
    Output bytes  :                  912                    0 bps
    Input  packets:                   25                    0 pps
    Output packets:                   26                    0 pps
   Input errors:
     Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
     Policed discards: 0, L3 incompletes: 0,
```

```
    L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0,
    Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0,
    MTU errors: 0, Resource errors: 0
  Queue counters:       Queued packets  Transmitted packets Dropped packets
    0 best-effort                   0                    0               0
    1 expedited-fo                  0                    0               0
    2 assured-forw                  0                    0               0
    3 network-cont                 26                   26               0
  HDLC configuration:
    Giant threshold: 1514, Runt threshold: 2
    Timeslots      : 1-10
    Byte encoding: Nx64K, Data inversion: Disabled, Idle cycle flag: flags,
    Start end flag: shared
  DS0 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
  Packet Forwarding Engine configuration:
    Destination slot: 0, PLP byte: 4 (0x00)
Logical interface ds-0/1/0:1.0 (Index 67) (SNMP ifIndex 53) (Generation 11)
    Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol inet, MTU: 1500, Generation: 26, Route table: 0
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 11.11.11.0/30, Local: 11.11.11.2, Broadcast: 11.11.11.3,
        Generation: 39
   DLCI 100
     Flags: Active, Dce-configured
     Total down time: 0 sec, Last down: Never
     Traffic statistics:
      Input  bytes  :                   0
      Output bytes  :                   0
      Input  packets:                   0
      Output packets:                   0
 DLCI statistics:
   Active DLCI  :2 Inactive DLCI  : 0
...
```


Copyright © 2013, Juniper Networks, Inc.

show interfaces (Channelized T3 IQ)

Syntax

show interfaces (ct3-*fpc/pic/port* | *type-fpc/pic/port*<:*channel*><:*channel*>)
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information

Command introduced before Junos OS Release 7.4.

Description

(M Series and T Series routers only) Display status information about the specified channelized T3 IQ interface.

Options

type-fpc/pic/port*:*channel—Interface type. With optional corresponding channel levels, the interface type can be one of the following:

- ***type-fpc/pic/port***—For the physical channelized T3 IQ interface, ***type*** is **ct3**.
- ***type-fpc/pic/port*:*channel***—For the clear channel, ***type*** is **t3**. At the first level of channelization, ***type*** can be **ct1** or **t1**.
- ***type-fpc/pic/port*:*channel*:*channel***—At the second level of channelization, ***type*** is **ds**.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level

view

List of Sample Output

show interfaces extensive (Channelized T3 IQ) (Physical) on page 156
show interfaces extensive (Channelized T1 on Channelized T3 IQ) on page 156
show interfaces extensive (DS0 on Channelized T3 IQ) on page 156

Output Fields

See the output field table for the show interfaces (Channelized T1 IQ) command.

Copyright © 2013, Juniper Networks, Inc.

Sample Output

show interfaces extensive (Channelized T3 IQ) (Physical)

```
user@host> show interfaces extensive ct3-0/0/1
Physical interface: ct3-0/0/1, Enabled, Physical link is Up
  Interface index: 30, SNMP ifIndex: 317, Generation: 29
  Link-level type: Controller, MTU: 4474, Clocking: Internal, Speed: T3,
  Loopback: None, FCS: 16, Mode: C/Bit parity, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
...
```

show interfaces extensive (Channelized T1 on Channelized T3 IQ)

```
user@host> show interfaces extensive ct1-0/0/1:2
Physical interface: ct1-0/0/1:2, Enabled, Physical link is Up
  Interface index: 175, SNMP ifIndex: 1505, Generation: 174
  Link-level type: Controller, MTU: 1504, Clocking: Internal, Speed: T1,
  Loopback: None, FCS: 16, Framing: ESF, Parent: ct3-0/0/1 (Index 32)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
...
```

show interfaces extensive (DS0 on Channelized T3 IQ)

```
user@host> show interfaces extensive ds-0/0/1:2:1
Physical interface: ds-0/0/1:2:1, Enabled, Physical link is Up
  Interface index: 176, SNMP ifIndex: 1563, Generation: 175
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps,
  Loopback: None, FCS: 16, Parent: ct1-0/0/1:2(Index 175)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
...
```


Copyright © 2013, Juniper Networks, Inc.

show interfaces (SONET/SDH)

Syntax
show interfaces so-*fpc/pic/port*
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information
Command introduced before Junos OS Release 7.4.

Description
(M Series and T Series routers only) Display status information about the specified SONET/SDH interface.

Options
so-*fpc/pic/port*—Display standard information about the specified SONET/SDH interface.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level
view

List of Sample Output
show interfaces (SDH Mode, PPP) on page 170
show interfaces brief (SDH Mode, PPP) on page 171
show interfaces detail (SDH Mode, PPP) on page 171
show interfaces extensive (SDH Mode, PPP) on page 172
show interfaces brief (SONET Mode, Frame Relay) on page 174
show interfaces (SONET Mode, Frame Relay) on page 174
show interfaces detail (SONET Mode, Frame Relay) on page 175
show interfaces extensive (SONET Mode, Frame Relay) on page 177
show interfaces extensive (OC768-over-4xOC192 Mode) on page 179
show interfaces detail (IPv6 Tracking) on page 182
show interfaces (shared interface) on page 183

Output Fields
Table 9 on page 157 lists the output fields for the **show interfaces** (SONET/SDH) command. Output fields are listed in the approximate order in which they appear.

Table 9: SONET/SDH show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under *Common Output Fields Description*.	All levels
Interface index	Physical interface's index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	SNMP index number for the physical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	MTU size on the physical interface.	All levels
Clocking	SONET/SDH reference clock source: **Internal** or **External**. Clocking is configured and displayed only for channel 0.	All levels
***Framing* mode**	Framing mode: **SONET** or **SDH**.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Whether loopback is enabled and the type of loopback (**local** or **remote**).	All levels
FCS	Frame check sequence on the interface (either **16** or **32**). The default is **16** bits.	All levels
Payload scrambler	Whether payload scrambling is enabled.	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under *Common Output Fields Description*.	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Shared-interface	Indicates whether the routing domain is the owner or non-owner of the shared interface. If the routing domain is the Root System Domain (RSD), the value is **Owner**. If the routing domain is a Protected System Domain (PSD) under the RSD, the value is **Non-owner**.	All levels
Link flags	Information about the link. Possible values are described in the "Link Flags" section under *Common Output Fields Description*.	All levels

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
ANSI or ITU LMI settings	(Frame Relay) Settings for Local Management Interface (LMI). The format is **(ANSI or ITU) LMI settings:** *value*, *value*... *xx* seconds, where *value* can be: • **n391dte**—DTE full status polling interval (1-255) • **n392dce**—DCE error threshold (1-10) • **n392dte**—DTE error threshold (1-10) • **n393dce**—DCE monitored event count (1-10) • **n393dte**—DTE monitored event count (1-10) • **t391dte**—DTE polling timer (5-30 seconds) • **t392dce**—DCE polling verification timer (5-30 seconds)	All levels
LMI	**Input:** *value* **(***hh***:***mm***:***ss* **ago), Output:** *value* **(***hh***:***mm***:***ss* **ago)**	**brief** none
LMI statistics	(Frame Relay) LMI packet statistics: • **Input**—Number of packets coming in on the interface (*nn*) and how much time has passed since the last packet arrived. The format is **Input:** ***nn*** **(last seen** ***hh*****:*****mm*****:*****ss*** **ago)**. • **Output**—Number of packets sent out on the interface (*nn*) and how much time has passed since the last packet was sent. The format is **Output:** ***nn*** **(last sent** ***hh*****:*****mm*****:*****ss*** **ago)**.	**detail extensive**
DTE statistics	(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data circuit-terminating equipment (DCE): • **Enquiries sent**—Number of link status enquiries sent from the DTE to the DCE. • **Full enquiries sent**—Number of full enquiries sent from the DTE to the DCE. • **Enquiry responses received**—Number of enquiry responses received by the DTE from the DCE. • **Full enquiry responses received**—Number of full enquiry responses sent from the DTE to the DCE.	**detail extensive** none
DCE statistics	(Frame Relay) Statistics about messages transmitted from the DCE to the DTE: • **Enquiries received**—Number of enquiries received by the DCE from the DTE. • **Full enquiries received**—Number of full enquiries received by the DCE from the DTE. • **Enquiry responses sent**—Number of enquiry responses sent from the DCE to the DTE. • **Full enquiry responses sent**—Number of full enquiry responses sent from the DCE to the DTE.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Common statistics	(Frame Relay) Statistics about messages sent between the DTE and the DCE: • **Unknown messages received**—Number of received packets that do not fall into any category. • **Asynchronous updates received**—Number of link status peer changes received. • **Out-of-sequence packets received**—Number of packets for which the sequence of the packets received is different from the expected sequence. • **Keepalive responses timedout**—Number of keepalive responses that timed out when no LMI packet was reported for **n392dte** or **n393dce** intervals. (See **LMI settings**.)	**detail extensive** none
Nonmatching DCE-end DLCIs	(Frame Relay. Displayed only from the DTE) Number of DLCIs configured from the DCE.	**detail extensive**
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	**detail extensive**
Keepalive settings	(PPP and HDLC) Configured settings for keepalives. • **interval** ***seconds***—The time in seconds between successive keepalive requests. The range is **10** seconds through **32,767** seconds, with a default of **10** seconds. • **down-count** ***number***—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is **1** through **255**, with a default of **3**. • **up-count** ***number***—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is **1** through **255**, with a default of **1**.	All levels

Keepalive or **Keepalive statistics**	(PPP and HDLC) Information about keepalive packets.
	• **Input**—Number of keepalive packets received by PPP.
	  • **(last seen 00:00:00 ago)**—Time since the last keepalive packet was received, in the format ***hh:mm:ss***.
	• **Output**—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received.
	  • **(last seen 00:00:00 ago)**—Time since the last keepalive packet was sent, in the format ***hh:mm:ss***.
		All levels

LCP state	(PPP) Link Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—LCP negotiation is incomplete (not yet completed or has failed). • **Not-configured**—LCP is not configured on the interface. • **Opened**—LCP negotiation is successful.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
NCP state	(PPP) Network Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—NCP negotiation is incomplete (not yet completed or has failed). • **Not-configured**—NCP is not configured on the interface. • **Opened**—NCP negotiation is successful.	**detail extensive** none
CHAP state	(PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. • **Chap-Chal-received**—Challenge was received but response not yet sent. • **Chap-Chal-sent**—Challenge was sent. • **Chap-Resp-received**—Response was received for the challenge sent, but CHAP has not yet moved into the **Success** state. (Most likely with RADIUS authentication.) • **Chap-Resp-sent**—Response was sent for the challenge received. • **Closed**—CHAP authentication is incomplete. • **Failure**—CHAP authentication failed. • **Not-configured**—CHAP is not configured on the interface. • **Success**—CHAP authentication was successful.	**detail extensive** none
CoS queues	Number of CoS queues configured.	**detail extensive** none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is **Last flapped:** ***year-month-day hour:minute:second timezone*** **(*****hour:minute:second*** **ago)**. For example, **Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago).**	**detail extensive** none
Input rate	Input rate in bits per second (bps) and packets per second (pps).	None specified
Output rate	Output rate in bps and pps.	None specified
Statistics last cleared	Time when the statistics for the interface were last set to zero.	**detail extensive**
Traffic statistics	Number of bytes and packets received and transmitted on the physical interface, and the traffic rate in bits per seconds (bps). • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface. • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Label-switched interface (LSI) traffic statistics	(Frame Relay) LSI traffic statistics: • **Input bytes**—Number of bytes and speed, in bits per second (bps), received on the interface. • **Output packets**—Number of packets and speed, in bps, transmitted on the interface.	**extensive**
Input errors	Input errors on the interface whose definitions are as follows: • **Errors**—Sum of the incoming frame aborts and FCS errors. • **Drops**—Number of packets dropped by the input 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. • **Framing errors**—Number of packets received with an invalid frame checksum (FCS). • **Runts**—Number of frames received that are smaller than the runt threshold. • **Giants**—Number of frames received that are larger than the giant threshold. • **Bucket Drops**—Drops resulting from the traffic load exceeding the interface transmit/receive leaky bucket configuration. The default is **off**. • **Policed discards**—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • **L3 incompletes**—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. • **L2 channel errors**—Number of times the software did not find a valid logical interface for an incoming frame. • **L2 mismatch timeouts**—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • **HS link CRC errors**—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • **HS link FIFO overflows**—Number of FIFO overflows on the high-speed links between the ASICs responsible for handling the router interfaces.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Output errors	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Carrier transitions**—Number of times the interface has gone from **down** to **up**. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning. • **Errors**—Sum of the outgoing frame aborts and FCS errors. • **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. • **Aged packets**—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware. • **HS link FIFO underflows**—Number of FIFO underflows on the high-speed links between the ASICs responsible for handling the router interfaces. • **MTU errors**—Number of packets whose size exceeds the MTU of the interface.	**extensive**
IPv6 transit statistics	Number of transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled. • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface. • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**
Egress queues	Total number of egress queues supported on the specified interface.	**detail extensive**
Queue counters	CoS queue number and its associated user-configured forwarding class name. • **Queued packets**—Number of queued packets. • **Transmitted packets**—Number of transmitted packets. • **Dropped packets**—Number of packets dropped by the ASIC's RED mechanism.	**extensive**
SONET alarms **SONET defects**	(SONET) SONET media-specific alarms and defects that prevents the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: **SONET PHY**, **SONET section**, **SONET line**, and **SONET path**.	All levels
Link	(For 4-port OC192c PIC operating in OC768-over-4xOC192 mode) The link number. Errors and alarms are displayed for each link.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SONET PHY	Counts of specific SONET errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **PLL Lock**—Phase-locked loop • **PHY Light**—Loss of optical signal	**extensive**
SONET section	Counts of specific SONET errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **BIP-B1**—Bit interleaved parity for SONET section overhead • **SEF**—Severely errored framing • **LOL**—Loss of light • **LOF**—Loss of frame • **ES-S**—Errored seconds (section) • **SES-S**—Severely errored seconds (section) • **SEFS-S**—Severely errored framing seconds (section)	**extensive**
SONET line	Active alarms and defects, plus counts of specific SONET errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **BIP-B2**—Bit interleaved parity for SONET line overhead • **REI-L**—Remote error indication (near-end line) • **RDI-L**—Remote defect indication (near-end line) • **AIS-L**—Alarm indication signal (near-end line) • **BERR-SF**—Bit error rate fault (signal failure) • **BERR-SD**—Bit error rate defect (signal degradation) • **ES-L**—Errored seconds (near-end line) • **SES-L**—Severely errored seconds (near-end line) • **UAS-L**—Unavailable seconds (near-end line) • **ES-LFE**—Errored seconds (far-end line) • **SES-LFE**—Severely errored seconds (far-end line) • **UAS-LFE**—Unavailable seconds (far-end line)	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SONET path	Active alarms and defects, plus counts of specific SONET errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than**OK** indicates a problem. Subfields are: • **BIP-B3**—Bit interleaved parity for SONET section overhead • **REI-P**—Remote error indication • **LOP-P**—Loss of pointer (path) • **AIS-P**—Path alarm indication signal • **RDI-P**—Path remote defect indication • **UNEQ-P**—Path unequipped • **PLM-P**—Path payload (signal) label mismatch • **ES-P**—Errored seconds (near-end STS path) • **SES-P**—Severely errored seconds (near-end STS path) • **UAS-P**—Unavailable seconds (near-end STS path) • **ES-PFE**—Errored seconds (far-end STS path) • **SES-PFE**—Severely errored seconds (far-end STS path) • **UAS-PFE**—Unavailable seconds (far-end STS path)	**extensive**
Received SONET overhead **Transmitted SONET overhead**	Values of the received and transmitted SONET overhead: • **C2**—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P. • **F1**—Section user channel byte. This byte is set aside for the purposes of users. • **K1** and **K2**—These bytes are allocated for APS signaling for the protection of the multiplex section. • **J0**—Section trace. This byte is defined for STS-1 number 1 of an STS-*N* signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter. • **S1**—Synchronization status. The S1 byte is located in the first STS-1 of an STS-*N*. • **Z3** and **Z4**—Allocated for future use.	**extensive**
SDH alarms **SDH defects**	SDH media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain period, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router or light the red or yellow alarm LED on the craft interface. See these fields for possible alarms and defects: **SDH PHY**, **SDH regenerator section**, **SDH multiplex section**, and **SDH path**.	All levels

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SDH PHY	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **PLL Lock**—Phase-locked loop • **PHY Light**—Loss of optical signal	**extensive**
SDH regenerator section	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **RS-BIP8**—24-bit BIP for multiplex section overhead (B2 bytes) • **OOF**—Out of frame • **LOS**—Loss of signal • **LOF**—Loss of frame • **RS-ES**—Errored seconds (near-end regenerator section) • **RS-SES**—Severely errored seconds (near-end regenerator section) • **RS-SEFS**—Severely errored framing seconds (regenerator section)	**extensive**
SDH multiplex section	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **MS-BIP24**—8-bit BIP for high-order path overhead (B3 byte) • **MS-FEBE**—Far-end block error (multiplex section) • **MS-FERF**—Far-end remote fail (multiplex section) • **MS-AIS**—Alarm indication signal (multiplex section) • **BERR-SF**—Bit error rate fault (signal failure) • **BERR-SD**—Bit error rate defect (signal degradation) • **MS-ES**—Errored seconds (near-end multiplex section) • **MS-SES**—Severely errored seconds (near-end multiplex section) • **MS-UAS**—Unavailable seconds (near-end multiplex section) • **MS-ES-FE**—Errored seconds (far-end multiplex section) • **MS-SES-FE**—Severely errored seconds (far-end multiplex section) • **MS-UAS-FE**—Unavailable seconds (far-end multiplex section)	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SDH path	Active alarms and defects, plus counts of specific SDH errors with detailed information. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. Subfields are: • **HP-BIP8**—8-bit BIP for regenerator section overhead (B1 byte) • **HP-FEBE**—Far-end block error (high-order path) • **HP-LOP**—Loss of pointer (high-order path) • **HP-AIS**—High-order-path alarm indication signal • **HP-FERF**—Far-end remote fail (high-order path) • **HP-UNEQ**—Unequipped (high-order path) • **HP-PLM**—Payload label mismatch (high-order path) • **HP-ES**—Errored seconds (near-end high-order path) • **HP-SES**—Severely errored seconds (near-end high-order path) • **HP-UAS**—Unavailable seconds (near-end high-order path) • **HP-ES-FE**—Errored seconds (far-end high-order path) • **HP-SES-FE**—Severely errored seconds (far-end high-order path) • **HP-UAS-FE**—Unavailable seconds (far-end high-order path)	**extensive**
Received SDH overhead **Transmitted SDH overhead**	Values of the received and transmitted SONET overhead: • **C2**—Signal label. Allocated to identify the construction and content of the STS-level SPE and for PDI-P. • **F1**—Section user channel byte. This byte is set aside for the purposes of users. • **K1** and **K2**—These bytes are allocated for APS signaling for the protection of the multiplex section. • **J0**—Section trace. This byte is defined for STS-1 number 1 of an STS-*N* signal. Used to transmit a 1-byte fixed-length string or a 16-byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter. • **S1**—Synchronization status. The S1 byte is located in the first STS-1 of an STS-*N*. • **Z3** and **Z4**—Allocated for future use.	**extensive**
Received path trace **Transmitted path trace**	SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other router manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the router at the other end of the fiber. The transmitted path trace value is the message that this router transmits.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
HDLC configuration	Information about the HDLC configuration. • **Policing bucket**—Configured state of the receiving policer. • **Shaping bucket**—Configured state of the transmitting shaper. • **Giant threshold**—Giant threshold programmed into the hardware. • **Runt threshold**—Runt threshold programmed into the hardware.	**extensive**
CoS information	Information about the CoS queue for the physical interface. • **CoS transmit queue**—Queue number and its associated user-configured forwarding class name. • **Bandwidth %**—Percentage of bandwidth allocated to the queue. • **Bandwidth bps**—Bandwidth allocated to the queue (in bps). • **Buffer %**—Percentage of buffer space allocated to the queue. • **Buffer usec**—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • **Priority**—Queue priority: **low** or **high**. • **Limit**—Displayed if rate limiting is configured for the queue. Possible values are **none** and **exact**. If **exact** is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If **none** is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.	**extensive**
Packet Forwarding Engine configuration	Information about the configuration of the Packet Forwarding Engine: • **Destination slot**—FPC slot number. • **PLP byte**—Packet Level Protocol byte.	**extensive**
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Logical interface index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	Logical interface SNMP interface index number.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Flags	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under *Common Output Fields Description*.	All levels
Encapsulation	Encapsulation on the logical interface.	All levels
PPP parameters	The PPP loopback clear timer value.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Shared interface	Provides the following information: • **shared with**—(RSD only) Indicates which PSD owns the logical shared interface. For example, **psd3**. • **peer interface**—(PSD only) Lists the logical tunnel interface that peers with the logical shared interface. For example, **ut-2/1/0.2**. • **tunnel token**—Specifies the receive (RX) and transmit (TX) tunnel tokens. For example, **Rx: 5.519, Tx: 13.514**.	All levels
Input packets	Number of packets received on the logical interface.	None specified
Output packets	Number of packets transmitted on the logical interface.	None specified
Traffic statistics	Total number of bytes and packets received and transmitted on the logical interface. These statistics are the sum of the local and transit statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.	**detail extensive**
Local statistics	Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.	**detail extensive**
Transit statistics	Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.	**detail extensive**
Protocol	Protocol family configured on the logical interface, such as **iso**, **inet6**, or **mpls**.	**detail extensive none**
protocol-family	Protocol family configured on the logical interface. If the protocol is **inet**, the IP address of the interface is also displayed.	**brief**
Multilink bundle	(If the logical interface is configured as part of a multilink bundle.) Interface name for the multilink bundle.	**detail extensive** none
AS bundle	(If the logical interface is configured as part of an aggregated SONET bundle.) AS bundle number.	**detail extensive**
MTU	MTU size on the logical interface.	**detail extensive none**
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	**detail extensive**
Flags	Information about the protocol family flags. Possible values are described in the “Family Flags” section under *Common Output Fields Description*.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 9: SONET/SDH show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Addresses, Flags	Information about the address flags. Possible values are described in the "Addresses Flags" section under *Common Output Fields Description*.	**detail extensive** none
Destination	IP address of the remote side of the connection.	**detail extensive** none
Local	IP address of the logical interface.	**detail extensive** none
Broadcast	Broadcast address of the interface.	**detail extensive** none
DLCI	(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: **Flags**, **Total down time**, **Last down**, and **Traffic statistics**. **Flags** is one or more of the following: • **Active**—Set when the link is active and the DTE and DCE are exchanging information. • **Down**—Set when the link is active, but no information is received from the DCE. • **Unconfigured**—Set when the corresponding DLCI in the DCE is not configured. • **Configured**—Set when the corresponding DLCI in the DCE is configured. • **Dce-configured**—Displayed when the command is issued from the DTE.	**detail extensive**
DLCI statistics	(Frame Relay) Data-link connection identifier (DLCI) statistics. • **Active DLCI**—Number of active DLCIs. • **Inactive DLCI**—Number of inactive DLCIs.	**detail extensive** none

Sample Output

show interfaces (SDH Mode, PPP)

```
user@host> show interfaces so-0/0/0
Physical interface: so-0/0/0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 66
  Link-level type: PPP, MTU: 4474, Clocking: Internal, SDH mode, Speed: OC3,
  Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 30 (00:00:07 ago), Output: 29 (00:00:05 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
  Not-configured
  CHAP state: Closed
  CoS queues     : 4 supported, 4 maximum usable queues
  Last flapped   : 2006-03-24 13:20:56 PST (00:05:09 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  SDH   alarms   : None
  SDH   defects  : None

  Logical interface so-0/0/0.0 (Index 66) (SNMP ifIndex 43)
```


Copyright © 2013, Juniper Networks, Inc.

```
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
    Protocol inet, MTU: 4470
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 10.0.12.0/30, Local: 10.0.12.1, Broadcast: 10.0.12.3
    Protocol iso, MTU: 4470
      Flags: Protocol-Down
    Protocol mpls, MTU: 4458, Maximum labels: 3
      Flags: Protocol-Down, Is-Primary
```

show interfaces brief (SDH Mode, PPP)

```
user@host> show interfaces so-0/0/0 brief
Physical interface: so-0/0/0, Enabled, Physical link is Up
  Link-level type: PPP, MTU: 4474, Clocking: Internal, SDH mode, Speed: OC3,
  Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 25 (00:00:01 ago), Output: 24 (00:00:04 ago)
  SDH   alarms   : None
  SDH   defects  : None

  Logical interface so-0/0/0.0
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
    inet  10.0.12.1/30
    iso
    mpls
```

show interfaces detail (SDH Mode, PPP)

```
user@host> show interfaces so-0/0/0 detail
Physical interface: so-0/0/0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 66, Generation: 35
  Link-level type: PPP, MTU: 4474, Clocking: Internal, SDH mode, Speed: OC3,
  Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 33 (last seen 00:00:05 ago)
    Output: 32 (last sent 00:00:06 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
  Not-configured
  CHAP state: Closed
  CoS queues     : 4 supported, 4 maximum usable queues
  Last flapped   : 2006-03-24 13:20:56 PST (00:05:38 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                  862                    0 bps
   Output bytes  :                 3592                   64 bps
   Input  packets:                   70                    0 pps
   Output packets:                  330                    0 pps
  Egress queues: 4 supported, 4 in use
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                    0                    0                    0
```

```
    1 expedited-fo                0                    0                    0

    2 assured-forw                0                    0                    0

    3 network-cont              329                  329                    0

  SDH   alarms   : None
  SDH   defects  : None

  Logical interface so-0/0/0.0 (Index 66) (SNMP ifIndex 43) (Generation 19)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
    Protocol inet, MTU: 4470, Generation: 48, Route table: 0
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 10.0.12.0/30, Local: 10.0.12.1, Broadcast: 10.0.12.3,
        Generation: 48
    Protocol iso, MTU: 4470, Generation: 49, Route table: 0
      Flags: Protocol-Down
    Protocol mpls, MTU: 4458, Maximum labels: 3, Generation: 50, Route table: 0
      Flags: Protocol-Down, Is-Primary
```

show interfaces extensive (SDH Mode, PPP)

```
user@host> show interfaces so-0/0/0 extensive
Physical interface: so-0/0/0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 66, Generation: 35
  Link-level type: PPP, MTU: 4474, Clocking: Internal, SDH mode, Speed: OC3,
  Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 36 (last seen 00:00:01 ago)
    Output: 35 (last sent 00:00:10 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
  Not-configured
  CHAP state: Closed
  CoS queues     : 4 supported, 4 maximum usable queues
  Last flapped   : 2006-03-24 13:20:56 PST (00:06:08 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                 922                   0 bps
   Output bytes  :                3850                  64 bps
   Input  packets:                  75                   0 pps
   Output packets:                 356                   0 pps
  Label-switched interface (LSI) traffic statistics:
   Input  bytes  :                   0                   0 bps
   Input  packets:                   0                   0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
    Bucket drops: 0, Policed discards: 218, L3 incompletes: 0,
    L2 channel errors: 0, L2 mismatch timeouts: 2, HS link CRC errors: 0,
    HS link FIFO overflows: 0
  Output errors:
    Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0,
    HS link FIFO underflows: 0, MTU errors: 0
  Egress queues: 4 supported, 4 in use
```


Copyright © 2013, Juniper Networks, Inc.

```
Queue counters:       Queued packets  Transmitted packets      Dropped packets

  0 best-effort                    0                    0                    0

  1 expedited-fo                   0                    0                    0

  2 assured-forw                   0                    0                    0

  3 network-cont                 354                  354                    0

SDH   alarms   : None
SDH   defects  : None
SDH PHY:              Seconds        Count  State
  PLL Lock                  0            0  OK
  PHY Light                 2            1  OK
SDH regenerator section:
  RS-BIP8                   0            0
  OOF                       3            8  OK
  LOS                       3            2  OK
  LOF                       3            2  OK
  RS-ES                     3
  RS-SES                    3
  RS-SEFS                   3
SDH multiplex section:
  MS-BIP24                  0            0
  MS-FEBE                   0            0
  MS-FERF                   3            2  OK
  MS-AIS                    2            1  OK
  BERR-SF                   0            0  OK
  BERR-SD                   0            0  OK
  MS-ES                     3
  MS-SES                    3
  MS-UAS                    0
  MS-SES-FE                 3
  MS-UAS-FE                 0
SDH path:
  HP-BIP8                   0            0
  HP-FEBE                   0            0
  HP-LOP                    1            1  OK
  HP-AIS                    2            1  OK
  HP-FERF                   3            2  OK
  HP-UNEQ                   0            0  OK
  HP-PLM                    1            1  OK
  HP-ES                     3
  HP-SES                    3
  HP-UAS                    0
  HP-ES-FE                  3
  HP-SES-FE                 3
  HP-UAS-FE                 0
Received SDH overhead:
  F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
  S1      : 0x00, C2      : 0xcf, C2(cmp) : 0xcf, F2      : 0x00
  Z3      : 0x00, Z4      : 0x00, S1(cmp) : 0x00
Transmitted SDH overhead:
  F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
  S1      : 0x00, C2      : 0xcf, F2      : 0x00, Z3      : 0x00
  Z4      : 0x00
Received path trace: R2 so-0/0/0
  52 32 20 73 6f 2d 30 2f 30 2f 30 00 00 00 00 00   R2 so-0/0/0.....
Transmitted path trace: R1 so-0/0/0
  52 31 20 73 6f 2d 30 2f 30 2f 30 00 00 00 00 00   R1 so-0/0/0.....
```

Copyright © 2013, Juniper Networks, Inc.

```
  HDLC configuration:
    Policing bucket: Disabled
    Shaping bucket : Disabled
    Giant threshold: 4484, Runt threshold: 3
  Packet Forwarding Engine configuration:
    Destination slot: 0, PLP byte: 1 (0x00)
  CoS information:
    CoS transmit queue    Bandwidth      Buffer Priority   Limit
                        %        bps   %   usec
    0 best-effort      95  147744000  95      0      low    none
    3 network-control   5    7776000   5      0      low    none

  Logical interface so-0/0/0.0 (Index 66) (SNMP ifIndex 43) (Generation 19)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
    PPP parameters:
      PPP loopback clear timer: 3 sec
    Protocol inet, MTU: 4470, Generation: 48, Route table: 0
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: 10.0.12.0/30, Local: 10.0.12.1, Broadcast: 10.0.12.3,
        Generation: 48
    Protocol iso, MTU: 4470, Generation: 49, Route table: 0
      Flags: Protocol-Down
    Protocol mpls, MTU: 4458, Maximum labels: 3, Generation: 50, Route table: 0
      Flags: Protocol-Down, Is-Primary
  MS-ES-FE                  3
```

show interfaces brief (SONET Mode, Frame Relay)

```
user@host> show interfaces so-0/0/0 brief
Physical interface: so-0/0/0, Enabled, Physical link is Up
  Link-level type: Frame-Relay, 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 Internal: 0x4000
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 29 (00:00:02 ago), Output: 28 (00:00:01 ago)
  SONET alarms   : None
  SONET defects  : None

  Logical interface so-0/0/0.0
    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
    inet  10.0.12.1        --> 10.0.12.2
    iso
    mpls
    DLCI 16
      Flags: Down, DCE-Unconfigured
      Total down time: 00:04:12 sec, Last down: 00:04:12 ago
```

show interfaces (SONET Mode, Frame Relay)

```
user@host> show interfaces so-0/0/0
Physical interface: so-0/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 66
  Link-level type: Frame-Relay, 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 Internal: 0x4000
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
```


Copyright © 2013, Juniper Networks, Inc.

```
  LMI: Input: 23 (00:00:05 ago), Output: 22 (00:00:03 ago)
  DTE statistics:
    Enquiries sent                       : 19
    Full enquiries sent                  : 3
    Enquiry responses received           : 20
    Full enquiry responses received      : 3
  DCE statistics:
    Enquiries received                   : 0
    Full enquiries received              : 0
    Enquiry responses sent               : 0
    Full enquiry responses sent          : 0
  Common statistics:
    Unknown messages received            : 0
    Asynchronous updates received        : 0
    Out-of-sequence packets received     : 0
    Keepalive responses timedout         : 1
  CoS queues     : 4 supported, 4 maximum usable queues
  Last flapped   : 2006-03-06 11:53:20 PST (3d 03:09 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 56 bps (0 pps)
  SONET alarms   : None
  SONET defects  : None

  Logical interface so-0/0/0.0 (Index 79) (SNMP ifIndex 43)
    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
    Input packets : 0
    Output packets: 0
    Protocol inet, MTU: 4470
      Flags: None
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 10.0.12.2, Local: 10.0.12.1
    Protocol iso, MTU: 4470
      Flags: None
    Protocol mpls, MTU: 4450, Maximum labels: 3
    DLCI 16
      Flags: Down, DCE-Unconfigured
      Total down time: 00:03:11 sec, Last down: 00:03:11 ago
        Input packets : 0
        Output packets: 0
  DLCI statistics:
    Active DLCI  :0  Inactive DLCI  :1
```

show interfaces detail (SONET Mode, Frame Relay)

```
user@host> show interfaces so-0/0/0 detail
Physical interface: so-0/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 66, Generation: 11
  Link-level type: Frame-Relay, 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 Internal: 0x4000
  Link flags     : Keepalives DTE
  Hold-times     : Up 0 ms, Down 0 ms
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI statistics:
    Input : 33 (last seen 00:00:09 ago)
    Output: 32 (last sent 00:00:01 ago)
  DTE statistics:
    Enquiries sent                       : 27
    Full enquiries sent                  : 5
    Enquiry responses received           : 28
```

```
  Full enquiry responses received      : 5
DCE statistics:
  Enquiries received                   : 0
  Full enquiries received              : 0
  Enquiry responses sent               : 0
  Full enquiry responses sent          : 0
Common statistics:
  Unknown messages received            : 0
  Asynchronous updates received        : 0
  Out-of-sequence packets received     : 0
  Keepalive responses timedout         : 1
CoS queues     : 4 supported, 4 maximum usable queues
Last flapped   : 2006-03-06 11:53:20 PST (3d 03:10 ago)
Statistics last cleared: Never
Traffic statistics:
 Input  bytes  :               495368                    0 bps
 Output bytes  :              2765014                   56 bps
 Input  packets:                41165                    0 pps
 Output packets:               133530                    0 pps
Egress queues: 4 supported, 4 in use
Queue counters:       Queued packets  Transmitted packets      Dropped packets

  0 best-effort                   18                   18                    0

  1 expedited-fo                   0                    0                    0

  2 assured-forw                   0                    0                    0

  3 network-cont              133506               133506                    0

SONET alarms   : None
SONET defects  : None
Logical interface so-0/0/0.0 (Index 79) (SNMP ifIndex 43) (Generation 28)
  Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
  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, Generation: 49, Route table: 0
    Flags: None
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 10.0.12.2, Local: 10.0.12.1, Broadcast: Unspecified,
      Generation: 61
  Protocol iso, MTU: 4470, Generation: 50, Route table: 0
    Flags: None
  Protocol mpls, MTU: 4450, Maximum labels: 3, Generation: 51, Route table: 0
  DLCI 16
    Flags: Down, DCE-Unconfigured
    Total down time: 00:04:54 sec, Last down: 00:04:54 ago
    Traffic statistics:
```


Copyright © 2013, Juniper Networks, Inc.

```
      Input  bytes  :                    0
      Output bytes  :                    0
      Input  packets:                    0
      Output packets:                    0
  DLCI statistics:
    Active DLCI  :0  Inactive DLCI  :1
```

show interfaces extensive (SONET Mode, Frame Relay)

```
user@host> show interfaces so-0/0/0 extensive
Physical interface: so-0/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 66, Generation: 11
  Link-level type: Frame-Relay, 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 Internal: 0x4000
  Link flags     : Keepalives DTE
  Hold-times     : Up 0 ms, Down 0 ms
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI statistics:
    Input : 39 (last seen 00:00:02 ago)
    Output: 36 (last sent 00:00:07 ago)
  DTE statistics:
    Enquiries sent                       : 30
    Full enquiries sent                  : 6
    Enquiry responses received           : 33
    Full enquiry responses received      : 6
  DCE statistics:
    Enquiries received                   : 0
    Full enquiries received              : 0
    Enquiry responses sent               : 0
    Full enquiry responses sent          : 0
  Common statistics:
    Unknown messages received            : 0
    Asynchronous updates received        : 0
    Out-of-sequence packets received     : 0
    Keepalive responses timedout         : 1
  CoS queues     : 4 supported, 4 maximum usable queues
  Last flapped   : 2006-03-06 11:53:20 PST (3d 03:11 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :              495452                   56 bps
   Output bytes  :             2765074                    0 bps
   Input  packets:               41171                    0 pps
   Output packets:              133534                    0 pps
  Label-switched interface (LSI) traffic statistics:
   Input  bytes  :                   0                    0 bps
   Input  packets:                   0                    0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
    Bucket drops: 0, Policed discards: 0, L3 incompletes: 0,
    L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0,
    HS link FIFO overflows: 0
  Output errors:
    Carrier transitions: 3, Errors: 0, Drops: 0, Aged packets: 0,
    HS link FIFO underflows: 0, MTU errors: 0
  Egress queues: 4 supported, 4 in use
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                  18                   18                    0
```

```
    1 expedited-fo                  0                    0                    0

    2 assured-forw                  0                    0                    0

    3 network-cont             133510               133510                    0

  SONET alarms   : None
  SONET defects  : None
  SONET PHY:            Seconds        Count  State
    PLL Lock                  0            0  OK
    PHY Light                60            1  OK
  SONET section:
    BIP-B1                    0            0
    SEF                     108          158  OK
    LOS                     108            2  OK
    LOF                     108            2  OK
    ES-S                    108
    SES-S                   108
    SEFS-S                  108
  SONET line:
    BIP-B2                    0            0
    REI-L                     0            0
    RDI-L                     1            1  OK
    AIS-L                   107            1  OK
    BERR-SF                   0            0  OK
    BERR-SD                  44            2  OK
    ES-L                    108
    SES-L                   108
    UAS-L                    97
    ES-LFE                    1
    SES-LFE                   1
    UAS-LFE                   0
SONET path:
    BIP-B3                    0            0
    REI-P                     0            0
    LOP-P                     1            1  OK
    AIS-P                   107            1  OK
    RDI-P                     1            1  OK
    UNEQ-P                    0            0  OK
    PLM-P                     1            1  OK
    ES-P                    108
    SES-P                   108
    UAS-P                    97
    ES-PFE                    1
    SES-PFE                   1
    UAS-PFE                   0
  Received SONET overhead:
    F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
    S1      : 0x00, C2      : 0xcf, C2(cmp) : 0xcf, F2      : 0x00
    Z3      : 0x00, Z4      : 0x00, S1(cmp) : 0x00
  Transmitted SONET overhead:
    F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
    S1      : 0x00, C2      : 0xcf, F2      : 0x00, Z3      : 0x00
    Z4      : 0x00
  Received path trace: R2 so-0/0/0
    52 32 20 73 6f 2d 30 2f 30 2f 30 00 00 00 00 00   R2 so-0/0/0.....
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 0d 0a ................
  Transmitted path trace: R1 so-0/0/0
    52 31 20 73 6f 2d 30 2f 30 2f 30 00 00 00 00 00   R1 so-0/0/0.....
```


Copyright © 2013, Juniper Networks, Inc.

```
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
HDLC configuration:
  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 4484, Runt threshold: 3
Packet Forwarding Engine configuration:
  Destination slot: 0, PLP byte: 1 (0x00)
CoS information:
  CoS transmit queue        Bandwidth              Buffer  Priority   Limit
                        %           bps     %           usec
  0 best-effort        95     147744000    95              0       low    none
  3 network-control     5       7776000     5              0       low    none

Logical interface so-0/0/0.0 (Index 79) (SNMP ifIndex 43) (Generation 28)
  Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
  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, Generation: 49, Route table: 0
    Flags: None
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 10.0.12.2, Local: 10.0.12.1, Broadcast: Unspecified,
      Generation: 61
  Protocol iso, MTU: 4470, Generation: 50, Route table: 0
    Flags: None
  Protocol mpls, MTU: 4450, Maximum labels: 3, Generation: 51, Route table: 0
  DLCI 16
    Flags: Down, DCE-Unconfigured
    Total down time: 00:05:42 sec, Last down: 00:05:42 ago
    Traffic statistics:
     Input  bytes  :                  0
     Output bytes  :                  0
     Input  packets:                  0
     Output packets:                  0
DLCI statistics:
  Active DLCI  :0  Inactive DLCI  :1
```

show interfaces extensive (OC768-over-4xOC192 Mode)

```
user@host> show interfaces so-7/0/0 extensive
Physical interface: so-7/0/0, Enabled, Physical link is Up
  Interface index: 163, SNMP ifIndex: 23, Generation: 186
  Link-level type: Cisco-HDLC, MTU: 4474, Clocking: Internal, SONET mode, Speed:
 OC768,
  Loopback: Local, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
```

```
  Link flags     : No-Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : 2006-01-13 10:43:39 PST (01:05:33 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                76992                 200 bps
   Output bytes  :                83707                 216 bps
   Input  packets:                 1343                   0 pps
   Output packets:                 1343                   0 pps
  Input errors:
    Errors: 0, Drops: 3885, Framing errors: 68154624, Runts: 0, Giants: 0, Bucket
 drops: 0,
    Policed discards: 0, L3 incompletes: 95040248, L2 channel errors: 0, L2
mismatch timeouts: 0,
    HS link CRC errors: 0, HS link FIFO overflows: 30742070
  Output errors:
    Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO
underflows: 0,
    MTU errors: 0
  Egress queues: 8 supported, 4 in use
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                   2                   2                   0

    1 expedited-fo                  0                   0                   0

    2 assured-forw                  0                   0                   0

    3 network-cont               1341                1341                   0

  SONET alarms   : None
  SONET defects  : None
  Link : 0
  SONET alarms   : None
  SONET defects  : None
  SONET PHY:            Seconds        Count  State
    PLL Lock                  0            0  OK
    PHY Light                 0            0  OK
  SONET section:
    BIP-B1                    0            0
    SEF                       2            1  OK
    LOS                       0            0  OK
    LOF                       3            2  OK
    ES-S                      2
    SES-S                     2
    SEFS-S                    2
  SONET line:
    BIP-B2                    0            0
    REI-L                     0            0
    RDI-L                     1            1  OK
    AIS-L                     2            1  OK
    BERR-SF                   0            0  OK
    BERR-SD                   0            0  OK
    ES-L                      3
    SES-L                     3
    UAS-L                     0
    ES-LFE                    1
    SES-LFE                   1
    UAS-LFE                   0
  SONET path:
```


Copyright © 2013, Juniper Networks, Inc.

```
  BIP-B3                    0            0
  REI-P                     0            0
  LOP-P                     0            0  OK
  AIS-P                     2            1  OK
  RDI-P                     0            0  OK
  UNEQ-P                    0            0  OK
  PLM-P                     0            0  OK
  ES-P                      3
  SES-P                     3
  UAS-P                     0
  ES-PFE                    0
  SES-PFE                   0
  UAS-PFE                   0
Payload pointer:
  Current pointer             :  522
  Pointer increment count     :  0
  Pointer decrement count     :  0
  New pointer NDF count       :  0
Received SONET overhead:
  F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
  S1      : 0x00, C2      : 0xcf, C2(cmp) : 0xcf, F2      : 0x00
  Z3      : 0x00, Z4      : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
  F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
  S1      : 0x00, C2      : 0xcf, F2      : 0x00, Z3      : 0x00
  Z4      : 0x00
Received path trace: fold so-7/0/0
  66 6f 6c 64 20 73 6f 2d 37 2f 30 2f 30 00 00 00   fold so-7/0/0...
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 0d 0a ................
Transmitted path trace: fold so-7/0/0
  66 6f 6c 64 20 73 6f 2d 37 2f 30 2f 30 00 00 00   fold so-7/0/0...
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
Link : 1
SONET alarms   : None
SONET defects  : None
SONET PHY:             Seconds        Count  State
  PLL Lock                  0            0  OK
  PHY Light                 0            0  OK
SONET section:
  BIP-B1                    0            0
  SEF                       2            1  OK
  LOS                       0            0  OK
  LOF                       3            2  OK
  ES-S                      2
  SES-S                     2
  SEFS-S                    2
SONET line:
  BIP-B2                    0            0
  REI-L                     0            0
  RDI-L                     0            0  OK
  AIS-L                     2            1  OK
  BERR-SF                   0            0  OK
  BERR-SD                   0            0  OK
  ES-L                      3
  SES-L                     3
  UAS-L                     0
  ES-LFE                    0
```

Copyright © 2013, Juniper Networks, Inc.

```
    SES-LFE                  0
    UAS-LFE                  0
  SONET path:
    BIP-B3                   0           0
    REI-P                    0           0
    LOP-P                    0           0  OK
    AIS-P                    2           1  OK
    RDI-P                    0           0  OK
    UNEQ-P                   0           0  OK
    PLM-P                    0           0  OK
    ES-P                     3
    SES-P                    3
    UAS-P                    0
    ES-PFE                   0
    SES-PFE                  0
    UAS-PFE                  0
  Payload pointer:
    Current pointer            :  522
    Pointer increment count    :  0
    Pointer decrement count    :  0
    New pointer NDF count      :  0
  Received SONET overhead:
    F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
    S1      : 0x00, C2      : 0xcf, C2(cmp) : 0xcf, F2      : 0x00
    Z3      : 0x00, Z4      : 0x00, S1(cmp) : 0x00
  Transmitted SONET overhead:
    F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
    S1      : 0x00, C2      : 0xcf, F2      : 0x00, Z3      : 0x00
    Z4      : 0x00
  Received path trace: fold so-7/0/0
    66 6f 6c 64 20 73 6f 2d 37 2f 30 2f 30 00 00 00   fold so-7/0/0...
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 0d 0a ................
  Transmitted path trace: fold so-7/0/0
    66 6f 6c 64 20 73 6f 2d 37 2f 30 2f 30 00 00 00   fold so-7/0/0...
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
    00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
...
```

show interfaces detail (IPv6 Tracking)

```
user@host> show interfaces so-0/2/0 detail
Physical interface: so-0/2/0, Enabled, Physical link is Up
   Interface index: 130, SNMP ifIndex: 26, Generation: 131
   Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode,
Speed: OC3,
   Loopback: None, FCS: 16, Payload scrambler: Enabled
   Device flags   : Present Running
   Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
   Link flags     : Keepalives
   Hold-times     : Up 0 ms, Down 0 ms
   Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
   Keepalive statistics:
     Input : 7 (last seen 00:00:01 ago)
     Output: 6 (last sent 00:00:08 ago)
   LCP state: Opened
   NCP state: inet: Not-configured, inet6: Opened, iso: Not- configured, mpls:
   Not-configured
   CHAP state: Closed
```


Copyright © 2013, Juniper Networks, Inc.

```
  PAP state: Closed
  CoS queues     : 4 supported, 4 maximum usable queues
  Last flapped   : 2007-11-29 08:45:47 PST (1d 03:44 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :              7407782                   40 bps
   Output bytes  :              7307322                   48 bps
   Input  packets:               107570                    0 pps
   Output packets:               108893                    0 pps
   IPv6 transit statistics:
    Input  bytes  :               57328
    Output bytes  :               57400
    Input  packets:                1024
    Output packets:                1025
  Egress queues: 4 supported, 4 in use
  Queue counters:       Queued packets  Transmitted packets   Dropped packets
    0 best-effort       1191             1191                 0
    1 expedited-fo      0                0                    0
    2 assured-forw      0                0                    0
    3 network-cont      107700           107700               0
  SONET alarms   : None
  SONET defects  : None

  Logical interface so-0/2/0.0 (Index 70) (SNMP ifIndex 47) (Generation 231)
    Flags: Point-To-Point SNMP-Traps 0x4000 Encapsulation: PPP
    Protocol inet6, MTU: 4470, Generation: 433, Route table: 0
      Flags: None
      Addresses, Flags: Is-Preferred Is-Primary
        Destination: abcd::a18:104/126, Local: abcd::a18:105,
        Broadcast: Unspecified, Generation: 683
      Addresses, Flags: Is-Preferred
        Destination: fe80::/64, Local: fe80::2a0:a5ff:fe56:52a,
        Broadcast: Unspecified, Generation: 684
```

show interfaces (shared interface)

```
user@rsd1> show interfaces so-7/2/0
Physical interface: so-7/2/0, Enabled, Physical link is Down
  Interface index: 128, SNMP ifIndex: 109
  Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, SONET mode,
  Speed: OC192, Loopback: None, FCS: 16, Payload scrambler: Enabled
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x4000
  Shared-interface  : Owner
  Link flags     : No-Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 0 (never), Output: 0 (never)
  DTE statistics:
    Enquiries sent                      : 0
    Full enquiries sent                 : 0
    Enquiry responses received          : 0
    Full enquiry responses received     : 0
  DCE statistics:
    Enquiries received                  : 0
    Full enquiries received             : 0
    Enquiry responses sent              : 0
    Full enquiry responses sent         : 0
  Common statistics:
    Unknown messages received           : 0
    Asynchronous updates received       : 0
    Out-of-sequence packets received    : 0
```

```
  Keepalive responses timedout         : 0
CoS queues     : 8 supported, 8 maximum usable queues
Last flapped   : 2008-08-11 10:51:51 PDT (1w1d 04:47 ago)
Input rate     : 0 bps (0 pps)
Output rate    : 0 bps (0 pps)
SONET alarms   : LOL, PLL
SONET defects  : LOL, PLL, LOF, SEF, AIS-L, AIS-P

Logical interface so-7/2/0.0 (Index 67) (SNMP ifIndex 117)
  Flags: Device-Down Point-To-Point SNMP-Traps 0x4000 Encapsulation: FR-NLPID
  Shared interface:
    Shared with: psd5
    Tunnel token: Rx: 2.517, Tx: 1.517
  Input packets : 0
  Output packets: 0
  DLCI 700
    Flags: Active
    Total down time: 00:01:09 sec, Last down: 284:58:21 ago
      Input packets : 0
      Output packets: 0
DLCI statistics:
  Active DLCI  :1  Inactive DLCI  :0
```


Copyright © 2013, Juniper Networks, Inc.

show interfaces (T1, E1, or DS)

Syntax

show interfaces *interface-type*
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information

Command introduced before Junos OS Release 7.4.

Description

Display status information about the specified T1, E1, or DS interface.

Options

interface-type—On ACX Series, M Series, MX Series, and T Series routers, the T1 interface type is **t1-*fpc/pic/port***, whereas the E1 interface type is **e1-*fpc/pic/port***, and DS interface type is **ds-*fpc/pic/port*:<channel>**. On the J Series routers, the T1 interface type is **t1-*pim*/0/*port***, whereas the E1 interface type is **e1-*pim*/0/*port***.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level

view

Related Documentation

- *Understanding Interfaces on ACX Series Universal Access Routers*

List of Sample Output

show interfaces (T1, IMA Link) on page 197
show interfaces (T1, PPP) on page 198
show interfaces detail (T1, PPP) on page 198
show interfaces extensive (T1 CRC Errors) on page 199
show interfaces extensive (T1, PPP) on page 199
show interfaces (E1, Frame Relay) on page 201
show interfaces detail (E1, Frame Relay) on page 202
show interfaces extensive (E1, Frame Relay) on page 203
show interfaces (E1, IMA Link) on page 205
show interfaces extensive (T1, TDM-CCC-SATOP) on page 206
show interfaces extensive (DS, TDM-CCC-CESoPSN) on page 207

Output Fields

Table 10 on page 186 lists the output fields for the **show interfaces** (T1 or E1) command. Output fields are listed in the approximate order in which they appear.

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface. Possible values are described in the "Enabled Field" section under *Common Output Fields Description*.	All levels
Interface index	Physical interface's index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	SNMP index number for the physical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	MTU size on the physical interface.	All levels
Clocking	Reference clock source: **Internal** or **External**.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Whether loopback is enabled and the type of loopback (**local** or **remote**).	All levels
FCS	Frame check sequence on the interface (either **16** or **32**). The default is **16** bits.	All levels
Framing	Physical layer framing format used for the E1 interface on the link: **G704**, **G704-NO-CRC4**, or **Unframed**. The default is **G704**. Physical layer framing format used for the T1 interface on the link: **SF** and **ESF**. The default is **ESF**.	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under *Common Output Fields Description*.	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Link flags	Information about the link. Possible values are described in the "Link Flags" section under *Common Output Fields Description*.	All levels
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
IMA Link alarms	Current active IMA link alarms, including the following: • **LIF** • **LODS** • **RFI-IMA** • **Tx-Mis-Connected** • **Tx-Unusable-FE** • **Rx-Unusable-FE** • **Link Fault**	**detail extensive** none
IMA Link defects	Current active IMA link defects, including the following: • **LIF** • **LODS** • **RFI-IMA** • **Tx-Mis-Connected** • **Tx-Unusable-FE** • **Rx-Unusable-FE** • **Link Fault**	**detail extensive** none

IMA Link state	Current active IMA link status, including the following:
	• **Line:** synchronized or not synchronized
	• **Near end:**—Status of near-end receive and transmit links
	  ◦ **Rx:** Usable or Unusable
	  ◦ **Tx:** Usable or Unusable
	• **Far end:**—Status of far-end receive and transmit links
	  ◦ **Rx:** Usable or Unusable
	  ◦ **Tx:** Usable or Unusable
		detail extensive none

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
IMA link media	IMA Link Media Status, which provides the seconds and count state for the following link media parameters: • LIF • LODS • Err-ICP • IV • Rx-FC • Tx-FC • FE-Defects • FE-Rx-FC • FE-Tx-FC • Rx-ICP • Rx-Stuff • Tx-ICP • Tx-Stuff • Rx-SES • Rx-UAS • Rx-UUS • Tx-UUS • FE-Rx-SES • FE-Rx-UAS • FE-Rx-UUS • FE-Tx-UUS	**detail extensive** none
Keepalive settings	(PPP and HDLC) Configured settings for keepalives. • **interval** ***seconds***—The time in seconds between successive keepalive requests. The range is **10** seconds through **32,767** seconds, with a default of **10** seconds. • **down-count** ***number***—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is **1** through **255**, with a default of **3**. • **up-count** ***number***—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is **1** through **255**, with a default of **1**.	**detail extensive** none

Keepalive statistics	(PPP and HDLC) Information about keepalive packets. (When no level of output is specified, the word **statistics** is not part of the field name and the **last seen** text is not displayed.)
	• **Input**—Number of keepalive packets received by PPP.
	  • **(last seen 00:00:00 ago)**—Time since the last keepalive packet was received, in the format ***hh:mm:ss***.
	• **Output**—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received.
	  • **(last seen 00:00:00 ago)**—Time since the last keepalive packet was sent, in the format ***hh:mm:ss***.
		detail extensive none

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
LMI settings	(Frame Relay) Settings for Local Management Interface (LMI) which can be either ANSI LMI settings or ITU LMI settings. ANSI LMI settings is the default. The format is **(ANSI or ITU) LMI settings: *value*, *value*... *xx*** seconds, where *value* can be: • **n391dte**—DTE full status polling interval (1–255) • **n392dce**—DCE error threshold (1–10) • **n392dte**—DTE error threshold (1–10) • **n393dce**—DCE monitored event count (1–10) • **n393dte**—DTE monitored event count (1–10) • **t391dte**—DTE polling timer (5–30 seconds) • **t392dce**—DCE polling verification timer (5–30 seconds)	**detail extensive** none
LMI	(Frame Relay) Local Management Interface (LMI) packet statistics: • **Input**—Number of packets coming in on the interface (***nn***) and how much time has passed since the last packet arrived. The format is **Input: *nn* (last seen *hh*:*mm*:*ss* ago)**. • **Output**—Number of packets sent out on the interface (*nn*) and how much time has passed since the last packet was sent. The format is **Output: *nn* (last sent *hh*:*mm*:*ss* ago)**.	**detail extensive** none
DTE statistics	(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data communications equipment (DCE): • **Enquiries sent**—Number of link status enquiries sent from the DTE to the DCE. • **Full enquiries sent**—Number of full enquiries sent from the DTE to the DCE. • **Enquiry responses received**—Number of enquiry responses received by the DTE from the DCE. • **Full enquiry responses received**—Number of full enquiry responses sent from the DTE to the DCE.	**detail extensive** none
DCE statistics	(Frame Relay) Statistics about messages transmitted from the DCE to the DTE: • **Enquiries received**—Number of enquiries received by the DCE from the DTE. • **Full enquiries received**—Number of full enquiries received by the DCE from the DTE. • **Enquiry responses sent**—Number of enquiry responses sent from the DCE to the DTE. • **Full enquiry responses sent**—Number of full enquiry responses sent from the DCE to the DTE.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Common statistics	(Frame Relay) Statistics about messages sent between the DTE and the DCE: • **Unknown messages received**—Number of received packets that do not fall into any category. • **Asynchronous updates received**—Number of link status peer changes received. • **Out-of-sequence packets received**—Number of packets for which the sequence of the packets received is different from the expected sequence. • **Keepalive responses timedout**—Number of keepalive responses that timed out when no Local Management Interface (LMI) packet was reported for **n392dte** or **n393dce** intervals. (See **LMI settings**.)	**detail extensive** none
Nonmatching DCE-end DLCIs	(Frame Relay. Displayed only from the DTE.) Number of DLCIs configured from the DCE.	**detail extensive** none
LCP state	(PPP) Link Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—LCP negotiation is incomplete (not yet completed or has failed). • **Not configured**—LCP is not configured on the interface. • **Opened**—LCP negotiation is successful.	**detail extensive** none
NCP state	(PPP) Network Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—NCP negotiation is incomplete (not yet completed or has failed). • **Not configured**—NCP is not configured on the interface. • **Opened**—NCP negotiation is successful.	**detail extensive** none
CHAP state	(PPP) State of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. • **Chap-Chal-received**—Challenge was received but response is not yet sent. • **Chap-Chal-sent**—Challenge was sent. • **Chap-Resp-received**—Response was received for the challenge sent, but CHAP has not yet moved into the Success state. (Most likely with RADIUS authentication.) • **Chap-Resp-sent**—Response was sent for the challenge received. • **Down**—CHAP authentication is incomplete (not yet completed or has failed). • **Not-configured**—CHAP is not configured on the interface. • **Opened**—CHAP authentication was successful.	**detail extensive** none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is **Last flapped:** ***year-month-day hour:minute:second timezone*** **(*hour:minute:second* ago)**. For example, **Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago).**	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
CoS Queues	Number of CoS queues configured.	**detail extensive** none
Input rate	Input rate in bits per second (bps) and packets per second (pps).	None specified
Output rate	Output rate in bps and pps.	None specified
Statistics last cleared	Time when the statistics for the interface were last set to zero.	**detail extensive**
Traffic statistics	Number and rate of bytes and packets received and transmitted on the physical interface. • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**
Input errors	Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Errors**—Sum of the incoming frame aborts and FCS errors. • **Drops**—Number of packets dropped by the input 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. • **Framing errors**—Number of packets received with an invalid frame checksum (FCS). • **Policed discards**—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • **L3 incompletes**—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. • **L2 channel errors**—Number of times the software did not find a valid logical interface for an incoming frame. • **L2 mismatch timeouts**—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • **HS link CRC errors**—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • **SRAM errors**—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC or PIM. If the value of this field increments, the PIC or PIM is malfunctioning. • **Resource errors**—Sum of transmit drops.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Output errors	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Carrier transitions**—Number of times the interface has gone from **down** to **up**. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning. • **Errors**—Sum of the outgoing frame aborts and FCS errors. • **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. • **Aged packets**—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware. • **MTU errors**—Number of packets whose size exceeded the MTU of the interface. • **Resource errors**—Sum of transmit drops.	**extensive**
Queue counters	CoS queue number and its associated user-configured forwarding class name. • **Queued packets**—Number of queued packets. • **Transmitted packets**—Number of transmitted packets. • **Dropped packets**—Number of packets dropped by the ASIC's RED mechanism.	**detail extensive**
DS1 alarms **DS1 defects**	E1 media-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. The following lists all possible alarms and defects. For complete explanations of most of these alarms and defects, see *Bellcore Telcordia GR-499-CORE*. • **AIS**—Alarm indication signal. • **LOF**—Loss of frame. • **LOS**—Loss of signal. • **YLW**—Yellow alarm. Indicates errors at the remote site receiver.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
T1 media or **E1 media**	Counts of T1 or E1 media-specific errors. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than **OK** indicates a problem. The T1 or E1 media-specific error types are: • **SEF**—Severely errored framing • **BEE**—Bit error • **AIS**—Alarm indication signal • **LOF**—Loss of frame • **LOS**—Loss of signal • **YELLOW**—Errors at the remote site receiver • **CRC Major**—Cyclic redundancy check major alarm threshold exceeded • **CRC Minor**—Cyclic redundancy check minor alarm threshold exceeded • **BPV**—Bipolar violation • **EXZ**—Excessive zeros • **LCV**—Line code violation • **PCV**—Pulse code violation • **CS**—Carrier state • **CRC**—Cyclic redundancy check • **FEBE**—Far-end block error (E1 only) • **LES**—Line error seconds • **ES**—Errored seconds • **BES**—Bursty errored seconds • **SES**—Severely errored seconds • **SEFS**—Severely errored framing seconds • **UAS**—Unavailable seconds	**extensive**
SAToP Configuration	Information about the SAToP configuration. • **payload-size**—Configure the payload size, in bytes (from 32 through 1024 bytes). • **idle-pattern**—An 8-bit hexadecimal pattern to replace TDM data in a lost packet (from 0 through 255). • **jitter-buffer-packets**—Number of packets in the jitter buffer (from 1 through 64 packets). • **jitter-buffer-latency**—Time delay in the jitter buffer (from 1 through 1000 milliseconds). • **excessive-packet-loss-rate**—Set packet loss options. The options are **groups**, **sample-period**, and **threshold**. • **sample-period**—Time required to calculate excessive packet loss rate (from 1000 through 65,535 milliseconds). • **threshold**—Percentile designating the threshold of excessive packet loss rate (1–100 percent).	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
CESoPSN Configuration	Information about the CESoPSN configuration. • **packetization-latency**—Time required to create packets (from 1000 through 8000 microseconds). • **idle-pattern**—An 8-bit hexadecimal pattern to replace TDM data in a lost packet (from 0 through 255). • **jitter-buffer-packets**—Number of packets in the jitter buffer (from 1 through 64 packets). • **jitter-buffer-latency**—Time delay in the jitter buffer (from 1 through 1000 milliseconds). • **excessive-packet-loss-rate**—Set packet loss options. The options are **sample-period** and **threshold**. • **sample-period**—Time required to calculate excessive packet loss rate (from 1000 through 65,535 milliseconds). • **threshold**—Percentile designating the threshold of excessive packet loss rate (1–100 percent).	**extensive**
HDLC configuration	Information about the HDLC configuration. • **Policing bucket**—Configured state of the receiving policer. • **Shaping bucket**—Configured state of the transmitting shaper. • **Giant threshold**—Giant threshold programmed into the hardware. • **Runt threshold**—Runt threshold programmed into the hardware. • **Timeslots**—Time slots configured on the interface. • **Buildout**—(T1 only) Buildout setting: 0-132, 133-265, 266-398, 399-531, or 532-655 feet. • **Timeslots**—Configured time slots for the interface. • **Byte encoding**—(T1 only) Byte encoding used: **Nx64K** or **Nx56K**. • **Line encoding**—Line encoding used. For T1, the value can be **B8ZS** or **AMI**. For E1, the value is **HDB3**. • **Data inversion**—HDLC data inversion setting: **Enabled** or **Disabled**. • **Idle cycle flag**—Idle cycle flags. • **Start end flag**—Start and end flag.	**extensive**
DS1 BERT configuration	BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface. • **BERT time period**—Configured total time period that the BERT is to run. • **Elapsed**—Actual time elapsed since the start of the BERT (in seconds). • **Induced error rate**—Configured rate at which the bit errors are induced in the BERT pattern. • **Algorithm**—Type of algorithm selected for the BERT.	**detail extensive** none
Packet Forwarding Engine configuration	Information about the configuration of the Packet Forwarding Engine: • **Destination slot**—FPC slot number. • **PLP byte**—Packet Level Protocol byte.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
CoS information	Information about the CoS queue for the physical interface. • **CoS transmit queue**—Queue number and its associated user-configured forwarding class name. • **Bandwidth %**—Percentage of bandwidth allocated to the queue. • **Bandwidth bps**—Bandwidth allocated to the queue (in bps). • **Buffer %**—Percentage of buffer space allocated to the queue. • **Buffer usec**—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • **Priority**—Queue priority: **low** or **high**. • **Limit**—Displayed if rate limiting is configured for the queue. Possible values are **none** and **exact**. If **exact** is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If **none** is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.	**extensive**
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Logical interface index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	Logical interface SNMP interface index number.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Encapsulation	Encapsulation on the logical interface.	All levels
Input packets	Number of packets received on the logical interface.	None specified
Output packets	Number of packets transmitted on the logical interface.	None specified
Traffic statistics	(Frame Relay) Number and rate of bytes and packets received and transmitted on the logical interface. • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface. • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**
Local statistics	(Frame Relay) Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes a while (generally, less than 1 second) for this counter to stabilize.	**detail extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Transit statistics	(Frame Relay) Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter normally stabilizes in less than 1 second.	**detail extensive**
Protocol	Protocol family configured on the logical interface, such as **iso**, **inet6**, **mlfr**, or **mpls**.	**detail extensive** none
Multilink bundle	Interface name for the multilink bundle, if configured.	**detail extensive** none
MTU	MTU size on the logical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	**detail extensive**
Flags	Information about the protocol family flags. Possible values are described in the "Family Flags" section under *Common Output Fields Description*.	**detail extensive** none
Addresses, Flags	Information about the address flags. Possible values are described in the "Addresses Flags" section under *Common Output Fields Description*.	**detail extensive** none
Destination	IP address of the remote side of the connection.	**detail extensive** none
Local	IP address of the logical interface.	**detail extensive** none
Broadcast	Broadcast address.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive** none
DLCI	(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: **Flags**, **Total down time**, **Last down**, and **Traffic statistics** or (**Input packets, Output packets**). **Flags** can be one or more of the following: • **Active**—Set when the link is active and the DTE and DCE are exchanging information. • **Down**—Set when the link is active, but no information is received from the DCE. • **DCE-Unconfigured**—Set when the corresponding DLCI in the DCE is not configured. • **Configured**—Set when the corresponding DLCI in the DCE is configured. • **DCE-configured**—Displayed when the command is issued from the DTE.	**detail extensive** none
DLCI statistics	(Frame Relay) Data-link connection identifier (DLCI) statistics. • **Active DLCI**—Number of active DLCIs. • **Inactive DLCI**—Number of inactive DLCIs.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 10: T1 or E1 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
CE Info	Information related to the circuit emulation statistics. • **CE Tx**—Number of transmitted packets and bytes (TDM to PSN flow). • **CE Rx**—Number of received packets and bytes and forward bytes (PSN to TDM flow). • **CE Rx Forwarded**—Number of forwarded bytes. • **CE Strayed**—Number of stray packets. • **CE Lost**—Number of lost packets. • **CE Malformed**—Number of malformed packets • **CE Misinserted**—Number of misinserted packets. • **CE AIS dropped**—Number of dropped bytes due to buffer overrun (PSN to TDM). • **CE Dropped**—Number of dropped packets during resynchronization • **CE Overrun Events**—Number of overrun events. • **CE Underrun Events**—Number of underrun events.	**extensive**

Sample Output

show interfaces (T1, IMA Link)

```
user@host> show interfaces t1-1/0/0
  IMA Link alarms   : None
  IMA Link defects  : LIF, LODS
  IMA Link state:
    Line     : Not synchronized
    Near end : Rx: Unusable, Tx: Usable
    Far  end : Rx: Unusable, Tx: Usable
  IMA link media:          Seconds        Count  State
    LIF                                       0  OK
    LODS                                      0  OK
    Err-ICP                                   0  OK
    IV                                        0  OK
    Rx-FC                                     0  OK
    Tx-FC                                     0  OK
    FE-Defects                                0
    FE-Rx-FC                                  0
    FE-Tx-FC                                  0
    Rx-ICP                                    0
    Rx-Stuff                                  0
    Tx-ICP                                   11
    Tx-Stuff                                  0
    Rx-SES                    0
    Rx-UAS                    0
    Rx-UUS                    1
    Tx-UUS                    0
    FE-Rx-SES                 0
    FE-Rx-UAS                 0
    FE-Rx-UUS                 0
    FE-Tx-UUS                 0
```

Copyright © 2013, Juniper Networks, Inc.

show interfaces (T1, PPP)

```
user@host> show interfaces t1-1/1/0
Physical interface: t1-1/1/0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 45
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
  Loopback: None, FCS: 16, Framing: ESF
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 0 (never), Output: 0 (never)
  LCP state: Opened
  NCP state: Opened
  CHAP state: Opened
  CoS queues     : 4 supported, 4 in use
  Last flapped   : 2005-12-05 08:43:06 PST (02:13:35 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 72 bps (0 pps)
  DS1   alarms   : None
  DS1   defects  : None

  Logical interface t1-1/1/0.0 (Index 66) (SNMP ifIndex 51)
    Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol inet, MTU: 1500
      Flags: Protocol-Down
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255
```

show interfaces detail (T1, PPP)

```
user@host> show interfaces t1-1/1/0 detail
Physical interface: t1-1/1/0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 45, Generation: 32
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
  Loopback: None, FCS: 16, Framing: ESF
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 0 (last seen: never)
    Output: 0 (last sent: never)
  LCP state: Opened
  NCP state: Opened
  CHAP state: Opened
  CoS queues     : 4 supported, 4 in use
  Last flapped   : 2005-12-05 08:43:06 PST (02:13:52 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                    0                    0 bps
   Output bytes  :                  798                    0 bps
   Input  packets:                    0                    0 pps
   Output packets:                   42                    0 pps
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                    0                    0                    0

    1 expedited-fo                   0                    0                    0
```


Copyright © 2013, Juniper Networks, Inc.

```
    2 assured-forw                 0                 0                 0

    3 network-cont                40                40                 0

  DS1   alarms   : None
  DS1   defects  : None
  DS1 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1
  Logical interface t1-1/1/0.0 (Index 66) (SNMP ifIndex 51) (Generation 5)
    Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol inet, MTU: 1500, Generation: 14, Route table: 0
      Flags: Protocol-Down
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
        Generation: 18
```

show interfaces extensive (T1 CRC Errors)

```
user@host> show interfaces t1-3/2/0:1:1 extensive
Physical interface: t1-3/2/0:1:1, Enabled, Physical link is Down
  Interface index: 179, SNMP ifIndex: 79, Generation: 180
  :
  :
  DS1   alarms   : AIS, LOF, CRC Major, CRC Minor
  DS1   defects  : AIS, LOF, CRC Major, CRC Minor
  T1  media:            Seconds        Count  State
    SEF                       1            1  OK
    BEE                       1            1  OK
    AIS                    1128            1  Defect Active
    LOF                    1128            1  Defect Active
    LOS                       0            0  OK
    YELLOW                    0            0  OK
    CRC Major               154            1  Defect Active
    CRC Minor               154            1  Defect Active
    BPV                       0            0
    EXZ                       0            0
    LCV                       0            0
    PCV                       0            0
    CS                        0            0
    CRC                     154        15400
    ...
```

show interfaces extensive (T1, PPP)

```
user@host> show interfaces t1-1/1/0 extensive
Physical interface: t1-1/1/0, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 45, Generation: 32
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1,
  Loopback: None, FCS: 16, Framing: ESF
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 0 (last seen: never)
    Output: 0 (last sent: never)
  LCP state: Down
  NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
  mpls: Not-configured
```

Copyright © 2013, Juniper Networks, Inc.

```
CHAP state: Closed
CoS queues     : 4 supported, 4 in use
Last flapped   : 2005-12-05 08:43:06 PST (02:13:54 ago)
Statistics last cleared: Never
Traffic statistics:
 Input  bytes  :                    0                    0 bps
 Output bytes  :                  817                   72 bps
 Input  packets:                    0                    0 pps
 Output packets:                   43                    0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
  L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
  HS link CRC errors: 0, SRAM errors: 0, Resource errors: 0
Output errors:
  Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

  Resource errors: 0
Queue counters:       Queued packets  Transmitted packets      Dropped packets

  0 best-effort                   0                    0                    0

  1 expedited-fo                  0                    0                    0

  2 assured-forw                  0                    0                    0

  3 network-cont                 42                   42                    0

DS1   alarms   : None
DS1   defects  : None
T1  media:            Seconds        Count  State
  SEF                       1            1  OK
  BEE                       0            0  OK
  AIS                       0            0  OK
  LOF                       1            1  OK
  LOS                       0            0  OK
  YELLOW                    1            1  OK
  BPV                       1            1
  EXZ                       1            1
  LCV                       1        65535
  PCV                       1         1023
  CS                        0            0
  LES                       1
  ES                        1
  SES                       1
  SEFS                      1
  BES                       0
  UAS                       0
HDLC configuration:
  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 1514, Runt threshold: 3
  Timeslots      : All active
  Line encoding: B8ZS
  Buildout       : 0 to 132 feet
  Byte encoding: Nx64K, Data inversion: Disabled, Idle cycle flag: flags,
  Start end flag: shared
DS1 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1
Packet Forwarding Engine configuration:
  Destination slot: 1, PLP byte: 1 (0x00)
```

 Copyright © 2013, Juniper Networks, Inc.

```
  CoS information:
    CoS transmit queue       Bandwidth          Buffer   Priority    Limit
                          %          bps     %     usec
    0 best-effort        95      1459200    95        0        low    none
    3 network-control     5        76800     5        0        low    none

  Logical interface t1-1/1/0.0 (Index 66) (SNMP ifIndex 51) (Generation 5)
    Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol inet, MTU: 1500, Generation: 14, Route table: 0
      Flags: Protocol-Down
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
        Generation: 18
```

show interfaces (E1, Frame Relay)

```
user@host> show interfaces e1-3/0/0
Physical interface: e1-3/0/0, Enabled, Physical link is Up
  Interface index: 146, SNMP ifIndex: 37
  Link-level type: Frame-Relay, MTU: 1504, Clocking: Internal, Speed: E1,
  Loopback: None, FCS: 16, Framing: G704
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps 16384
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 0 (never), Output: 11 (00:00:05 ago)
  DTE statistics:
    Enquiries sent                      : 10
    Full enquiries sent                 : 1
    Enquiry responses received          : 0
    Full enquiry responses received     : 0
  DCE statistics:
    Enquiries received                  : 0
    Full enquiries received             : 0
    Enquiry responses sent              : 0
    Full enquiry responses sent         : 0
  Common statistics:
    Unknown messages received           : 0
    Asynchronous updates received       : 0
    Out-of-sequence packets received    : 0
    Keepalive responses timedout        : 1
  CoS queues     : 8 supported
  Last flapped   : 2005-11-30 14:50:34 PST (4d 20:33 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  DS1   alarms   : None
  DS1   defects  : None
  Logical interface e1-3/0/0.0 (Index 72) (SNMP ifIndex 32)
    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
  Input packets : 0
  Output packets: 0
    Protocol inet, MTU: 1500
      Flags: None
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 10.1.3/24, Local: 10.1.3.1, Broadcast: 10.1.3.255
    DLCI 100
      Flags: Down, DCE-Unconfigured
      Total down time: 00:01:13 sec, Last down: 00:01:13 ago
      Input packets : 0
      Output packets: 0
```

Copyright © 2013, Juniper Networks, Inc.

```
  DLCI statistics:
    Active DLCI  :0  Inactive DLCI  :1
```

show interfaces detail (E1, Frame Relay)

```
user@host> show interfaces e1-3/0/0 detail
Physical interface: e1-3/0/0, Enabled, Physical link is Up
  Interface index: 146, SNMP ifIndex: 37, Generation: 69
  Link-level type: Frame-Relay, MTU: 1504, Clocking: Internal, Speed: E1,
  Loopback: None, FCS: 16, Framing: G704
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps 16384
  Link flags     : Keepalives DTE
  Hold-times     : Up 0 ms, Down 0 ms
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI statistics:
    Input : 0 (last seen: never)
    Output: 12 (last sent 00:00:02 ago)
  DTE statistics:
    Enquiries sent                      : 10
    Full enquiries sent                 : 2
    Enquiry responses received          : 0
    Full enquiry responses received     : 0
  DCE statistics:
    Enquiries received                  : 0
    Full enquiries received             : 0
    Enquiry responses sent              : 0
    Full enquiry responses sent         : 0
  Common statistics:
    Unknown messages received           : 0
    Asynchronous updates received       : 0
    Out-of-sequence packets received    : 0
    Keepalive responses timedout        : 1
  CoS queues     : 8 supported
  Last flapped   : 2005-11-30 14:50:34 PST (4d 20:33 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                   0                   0 bps
   Output bytes  :                 225                  56 bps
   Input  packets:                   0                   0 pps
   Output packets:                  15                   0 pps
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 limited                       0                   0                   0

    1 expedited-fo                  0                   0                   0

    2 real-plus                     0                   0                   0

    3 network-cont                 15                  15                   0

  DS1   alarms   : None
  DS1   defects  : None
  DS1 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
  Logical interface e1-3/0/0.0 (Index 72) (SNMP ifIndex 32) (Generation 26)
    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
    Traffic statistics:
     Input  bytes  :                   0
     Output bytes  :                   0
```

 Copyright © 2013, Juniper Networks, Inc.

```
    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: 1500, Generation: 32, Route table: 0
    Flags: None
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 10.1.3/24, Local: 10.1.3.1, Broadcast: 10.1.3.255,
      Generation: 42
  DLCI 100
    Flags: Down, DCE-Unconfigured
    Total down time: 00:01:18 sec, Last down: 00:01:18 ago
    Traffic statistics:
     Input  bytes  :                   0
     Output bytes  :                   0
     Input  packets:                   0
     Output packets:                   0
DLCI statistics:
  Active DLCI  :0  Inactive DLCI  :1
```

show interfaces extensive (E1, Frame Relay)

```
user@host> show interfaces e1-3/0/0 extensive
Physical interface: e1-3/0/0, Enabled, Physical link is Up
  Interface index: 146, SNMP ifIndex: 37, Generation: 69
  Link-level type: Frame-Relay, MTU: 1504, Clocking: Internal, Speed: E1,
  Loopback: None, FCS: 16, Framing: G704
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps 16384
  Link flags     : Keepalives DTE
  Hold-times     : Up 0 ms, Down 0 ms
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI statistics:
    Input : 0 (last seen: never)
    Output: 12 (last sent 00:00:05 ago)
  DTE statistics:
    Enquiries sent                     : 10
    Full enquiries sent                : 2
    Enquiry responses received         : 0
    Full enquiry responses received    : 0
  DCE statistics:
    Enquiries received                 : 0
    Full enquiries received            : 0
    Enquiry responses sent             : 0
    Full enquiry responses sent        : 0
  Common statistics:
    Unknown messages received          : 0
    Asynchronous updates received      : 0
    Out-of-sequence packets received   : 0
    Keepalive responses timedout       : 1
  CoS queues     : 8 supported
  Last flapped   : 2005-11-30 14:50:34 PST (4d 20:33 ago)
  Statistics last cleared: Never
```

Copyright © 2013, Juniper Networks, Inc.

```
Traffic statistics:
 Input  bytes  :                    0                    0 bps
 Output bytes  :                  225                    0 bps
 Input  packets:                    0                    0 pps
 Output packets:                   15                    0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
  L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
  HS link CRC errors: 0, SRAM errors: 0, Resource errors: 0
Output errors:
  Carrier transitions: 17, Errors: 0, Drops: 0, Aged packets: 0,
  MTU errors: 0, Resource errors: 0
Queue counters:       Queued packets  Transmitted packets      Dropped packets

  0 limited                      0                    0                    0

  1 expedited-fo                 0                    0                    0

  2 real-plus                    0                    0                    0

  3 network-cont                15                   15                    0

DS1   alarms   : None
DS1   defects  : None
E1  media:            Seconds        Count  State
  SEF                       0            0  OK
  BEE                       5            5  OK
  AIS                       0            0  OK
  LOF                     245           15  OK
  LOS                     245            4  OK
  YELLOW                    0           11  OK
  BPV                       0            0
  EXZ                       9            9
  LCV                       0            0
  PCV                       0            0
  CS                        0            0
  FEBE                      0            0
  LES                       0
  ES                        0
  SES                       0
  SEFS                      0
  BES                       0
  UAS                     271
HDLC configuration:
  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 1506, Runt threshold: 0
  Timeslots      : All active
  Line encoding: HDB3, Data inversion: Disabled, Idle cycle flag: flags,
  Start end flag: shared
DS1 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
  Destination slot: 3, PLP byte: 1 (0x00)
CoS information:
  CoS transmit queue       Bandwidth          Buffer   Priority    Limit
                         %          bps     %     usec
  0 limited             95      1945600    95        0        low     none
  3 network-control      5       102400     5        0        low     none
Logical interface e1-3/0/0.0 (Index 72) (SNMP ifIndex 32) (Generation 26)
```


Copyright © 2013, Juniper Networks, Inc.

```
  Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
  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: 1500, Generation: 32, Route table: 0
    Flags: None
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 10.1.3/24, Local: 10.1.3.1, Broadcast: 10.1.3.255,
      Generation: 42
  DLCI 100
    Flags: Down, DCE-Unconfigured
    Total down time: 00:01:21 sec, Last down: 00:01:21 ago
    Traffic statistics:
     Input  bytes  :                  0
     Output bytes  :                  0
     Input  packets:                  0
     Output packets:                  0
DLCI statistics:
  Active DLCI  :0  Inactive DLCI  :1
```

show interfaces (E1, IMA Link)

```
user@host> show interfaces e1-1/0/0
  IMA Link alarms   : None
  IMA Link defects  : LIF, LODS
  IMA Link state:
    Line     : Not synchronized
    Near end : Rx: Unusable, Tx: Usable
    Far  end : Rx: Unusable, Tx: Usable
  IMA link media:          Seconds        Count  State
    LIF                                     0
    LODS                                    0
    Err-ICP                                 0
    IV                                      0
    Rx-FC                                   0
    Tx-FC                                   0
    FE-Defects                              0
    FE-Rx-FC                                0
    FE-Tx-FC                                0
    Rx-ICP                                  0
    Rx-Stuff                                0
    Tx-ICP                                 11
    Tx-Stuff                                0
    Rx-SES                     0
    Rx-UAS                     0
    Rx-UUS                     1
    Tx-UUS                     0
    FE-Rx-SES                  0
    FE-Rx-UAS                  0
```

Copyright © 2013, Juniper Networks, Inc.

```
    FE-Rx-UUS                    0
    FE-Tx-UUS                    0
```

show interfaces extensive (T1, TDM-CCC-SATOP)

```
user@host>show interfaces t1-1/0/0:1:1 extensive
Physical interface: t1-1/0/0:1:1, Enabled, Physical link is Down
  Interface index: 153, SNMP ifIndex: 579, Generation: 817
  Link-level type: TDM-CCC-SATOP, MTU: 1504, Clocking: Internal, Speed: T1,
Loopback: None, FCS: 16, Framing: ESF,
  Parent: coc1-1/0/0:1 Interface index 152
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x0
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : 2012-10-28 02:12:40 PDT (22:32:13 ago)
  Statistics last cleared: 2012-10-29 00:44:52 PDT (00:00:01 ago)
  Egress queues: 8 supported, 4 in use
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                    0                    0                    0

    1 expedited-fo                   0                    0                    0

    2 assured-forw                   0                    0                    0

    3 network-cont                   0                    0                    0

  Queue number:         Mapped forwarding classes
    0                   best-effort
    1                   expedited-forwarding
    2                   assured-forwarding
    3                   network-control
  DS1   alarms   : None
  DS1   defects  : None
  T1  media:            Seconds        Count  State
    SEF                          0            0  OK
    BEE                          0            0  OK
    AIS                          0            0  OK
    LOF                          0            0  OK
    LOS                          0            0  OK
    YELLOW                       0            0  OK
    CRC Major                    0            0  OK
    CRC Minor                    0            0  OK
    BPV                          0            0
    EXZ                          0            0
    LCV                          0            0
    PCV                          0            0
    CS                           0            0
    CRC                          0            0
    LES                          0
    ES                           0
    SES                          0
    SEFS                         0
    BES                          0
    UAS                          0
  SAToP configuration:
    Payload size: 192
    Idle pattern: 0xFF
    Octet aligned: Disabled
```


Copyright © 2013, Juniper Networks, Inc.

```
    Jitter buffer: packets: 8, latency: 7 ms, auto adjust: Disabled
    Excessive packet loss rate: sample period: 10000 ms, threshold: 30%
  DS1 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
  SONET alarms    : None
  SONET defects   : AIS-V, RDI-V
  SONET vt:
    BIP-BIP2                      0            0
    REI-V                         0            0
    LOP-V                         0            0  OK
    AIS-V                         2            0  Defect Active
    RDI-V                         2            0  Defect Active
    UNEQ-V                        0            0  OK
    PLM-V                         0            0  OK
    ES-V                          0
    SES-V                         0
    UAS-V                         2
    ES-VFE                        0
    SES-VFE                       0
    UAS-VFE                       0
  Received SONET overhead:
V5      : 0x07
V5(cmp) : 0x02
  Transmitted SONET overhead:
V5      : 0x02
  Packet Forwarding Engine configuration:
    Destination slot: 1
  CoS information:
    Direction : Output
    CoS transmit queue               Bandwidth               Buffer Priority
Limit
                               %           bps     %           usec
    0 best-effort             95       1459200    95              0      low
none
    3 network-control          5         76800     5              0      low
none

  Logical interface t1-1/0/0:1:1.0 (Index 69) (SNMP ifIndex 580) (Generation 525)

    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: TDM-CCC-SATOP
  CE info               Packets        Bytes  Count
    CE Tx                  1005       192960
    CE Rx                  1004       192768
    CE Rx Forwarded                       0
    CE Strayed                0
    CE Lost                   0
    CE Malformed              0
    CE Misinserted            0
    CE AIS dropped            0
    CE Dropped             1005       192960
    CE Overrun Events                      0
    CE Underrun Events                     0
    Protocol ccc, MTU: 1504, Generation: 814, Route table: 0
      Flags: Is-Primary
```

show interfaces extensive (DS, TDM-CCC-CESoPSN)

```
user@host>show interfaces ds-1/0/0:1:1:1 extensive
Physical interface: ds-1/0/0:1:1:1, Enabled, Physical link is Down
  Interface index: 154, SNMP ifIndex: 597, Generation: 819
```

```
  Link-level type: TDM-CCC-CESoPSN, MTU: 1504, Speed: 1536kbps, Loopback: None,
FCS: 16, Parent: ct1-1/0/0:1:1 Interface index 153
  Device flags   : Present Running Down
  Interface flags: Hardware-Down Point-To-Point SNMP-Traps Internal: 0x0
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 8 supported, 8 maximum usable queues
  Last flapped   : 2012-10-29 00:49:03 PDT (00:00:35 ago)
  Statistics last cleared: Never
  Egress queues: 8 supported, 4 in use
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                   0                   0                   0

    1 expedited-fo                  0                   0                   0

    2 assured-forw                  0                   0                   0

    3 network-cont                  0                   0                   0

  Queue number:         Mapped forwarding classes
    0                   best-effort
    1                   expedited-forwarding
    2                   assured-forwarding
    3                   network-control
  CESoPSN configuration:
    Packetization latency: 1000 us
    Idle pattern: 0xFF
    Jitter buffer: packets: 8, latency: 8 ms, auto adjust: Disabled
    Excessive packet loss rate: sample period: 10000 ms, threshold: 30%
  DS0 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 0, Algorithm: 2^15 - 1, O.151, Pseudorandom (9)
  Packet Forwarding Engine configuration:
    Destination slot: 1
  CoS information:
    Direction : Output
    CoS transmit queue              Bandwidth               Buffer Priority
Limit
                                %           bps     %           usec
    0 best-effort              95       1459200    95              0      low
none
    3 network-control           5         76800     5              0      low
none

  Logical interface ds-1/0/0:1:1:1.0 (Index 69) (SNMP ifIndex 598) (Generation
549)
    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: TDM-CCC-CESoPSN
  CE info               Packets        Bytes  Count
    CE Tx                     0            0
    CE Rx                 35712        6856704
    CE Rx Forwarded                        0
    CE Strayed                0
    CE Lost                   0
    CE Malformed              0
    CE Misinserted            0
    CE AIS dropped            0
    CE Dropped                0            0
    CE Overrun Events                         0
    CE Underrun Events                        1
```


Copyright © 2013, Juniper Networks, Inc.

```
Protocol ccc, MTU: 1504, Generation: 857, Route table: 0
  Flags: Is-Primary
```

Copyright © 2013, Juniper Networks, Inc.

show interfaces (T3 or E3)

Syntax
show interfaces *interface-type*
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index *snmp-index*>
<statistics>

Release Information
Command introduced before Junos OS Release 7.4.

Description
Display status information about the specified T3 or E3 interface.

Options
interface-type—On M Series and T Series routers, the T3 interface type is **t3-*fpc/pic/port***, whereas the E3 interface type is **e3-*fpc/pic/port*** On the J Series routers, the T3 interface type is **t3-*pim*/0/*port***, whereas the E3 interface type is **e3-*pim*/0/*port***.

brief | detail | extensive | terse—(Optional) Display the specified level of output.

descriptions—(Optional) Display interface description strings.

media—(Optional) Display media-specific information about network interfaces.

snmp-index *snmp-index*—(Optional) Display information for the specified SNMP index of the interface.

statistics—(Optional) Display static interface statistics.

Required Privilege Level
view

List of Sample Output
show interfaces (T3, PPP) on page 219
show interfaces detail (T3, PPP) on page 220
show interfaces extensive (T3, PPP) on page 221
show interfaces (E3, Frame Relay) on page 222
show interfaces detail (E3, Frame Relay) on page 223
show interfaces extensive (E3, Frame Relay) on page 224

Output Fields
Table 11 on page 210 lists the output fields for the **show interfaces** (T3 or E3) command. Output fields are listed in the approximate order in which they appear.

Table 11: T3 or E3 show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface. Possible values are described in the “Enabled Field” section under *Common Output Fields Description*.	All levels
Interface index	Physical interface's index number, which reflects its initialization sequence.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 11: T3 or E3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
SNMP ifIndex	SNMP index number for the physical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	MTU size on the physical interface.	All levels
Clocking	Reference clock source. It can be **Internal** or **External**.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Whether loopback is enabled and the type of loopback (**local** or **remote**).	All levels
FCS	Frame check sequence on the interface (either **16** or **32**). The default is **16** bits.	All levels
Mode	(T3 only) Whether C-bit parity mode or M13 mode is enabled.	All levels
Long buildout	(T3 only) Buildout setting: less than 255 feet (68 meters) or greater than 255 feet and shorter than 450 feet (137 meters).	All levels
Framing	(E3 only) Physical layer framing format used on the link. It can be **G751** or **Unframed**. The default is **G751.**	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under *Common Output Fields Description*.	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	All levels
Link flags	Information about the link. Possible values are described in the "Link Flags" section under *Common Output Fields Description*.	All levels
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	**detail extensive**
Keepalive settings	(PPP and HDLC) Configured settings for keepalives. • **interval *seconds***—Time in seconds between successive keepalive requests. The range is **10** seconds through **32,767** seconds, with a default of **10** seconds. • **down-count *number***—Number of keepalive packets a destination must fail to receive before the network takes a link down. The range is **1** through **255**, with a default of **3**. • **up-count *number***—Number of keepalive packets a destination must receive to change a link's status from down to up. The range is **1** through **255**, with a default of **1**.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 11: T3 or E3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output

Keepalive statistics or **Keepalive**	(PPP and HDLC) Information about keepalive packets.
	• **Input**—Number of keepalive packets received by PPP.
	  • **(last seen 00:00:00 ago)**—Time since the last keepalive packet was received, in the format ***hh:mm:ss***.
	• **Output**—Number of keepalive packets sent by PPP and how long ago the last keepalive packets were sent and received.
	  • **(last seen 00:00:00 ago)**—Time since the last keepalive packet was sent, in the format ***hh:mm:ss***.
		detail extensive none

LMI settings	(Frame Relay) Local Management Interface (LMI) settings (ANSI or ITU). ANSI LMI settings is the default. The format is **LMI settings: *value*, *value*... *xx*** seconds, where ***value*** can be: • **n391dte**—DTE full status polling interval (1–255) • **n392dce**—DCE error threshold (1–10) • **n392dte**—DTE error threshold (1–10) • **n393dce**—DCE monitored event count (1–10) • **n393dte**—DTE monitored event count (1–10) • **t391dte**—DTE polling timer (5–30 seconds) • **t392dce**—DCE polling verification timer (5–30 seconds)	**detail extensive** none
LMI	(Frame Relay) LMI statistics: • **Input**—Number of packets coming in on the interface (*nn*) and how much time has passed since the last packet arrived. The format is **Input: *nn* (last seen *hh:mm:ss* ago)**. • **Output**—Number of packets sent out on the interface (*nn*) and how much time has passed since the last packet was sent. The format is **Output: *nn* (last sent *hh:mm:ss* ago)**.	**detail extensive** none
DTE statistics	(Frame Relay) Statistics about messages transmitted from the data terminal equipment (DTE) to the data communications equipment (DCE): • **Enquiries sent**—Number of link status enquiries sent from the DTE to the DCE. • **Full enquiries sent**—Number of full enquiries sent from the DTE to the DCE. • **Enquiry responses received**—Number of enquiry responses received by the DTE from the DCE. • **Full enquiry responses received**—Number of full enquiry responses sent from the DTE to the DCE.	**detail extensive** none
DCE statistics	(Frame Relay) Statistics about messages transmitted from the DCE to the DTE: • **Enquiries received**—Number of enquiries received by the DCE from the DTE. • **Full enquiries received**—Number of full enquiries received by the DCE from the DTE. • **Enquiry responses sent**—Number of enquiry responses sent from the DCE to the DTE. • **Full enquiry responses sent**—Number of full enquiry responses sent from the DCE to the DTE.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 11: T3 or E3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Common statistics	(Frame Relay) Statistics about messages sent between the DTE and the DCE: • **Unknown messages received**—Number of received packets that do not fall into any category. • **Asynchronous updates received**—Number of link status peer changes received. • **Out-of-sequence packets received**—Number of packets for which the sequence of the packets received is different from the expected sequence. • **Keepalive responses timedout**—Number of keepalive responses that timed out when no LMI packet was reported for **n392dte** or **n393dce** intervals. (See **LMI settings**.)	**detail extensive** none
Nonmatching DCE-end DLCIs	(Frame Relay. Displayed only from the DTE.) Number of DLCIs configured from the DCE.	**detail extensive** none
LCP state	(PPP) Link Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—LCP negotiation is incomplete (not yet completed or has failed). • **Opened**—LCP negotiation is successful.	**detail extensive** none
NCP state	(PPP) Network Control Protocol state. • **Conf-ack-received**—Acknowledgement was received. • **Conf-ack-sent**—Acknowledgement was sent. • **Conf-req-sent**—Request was sent. • **Down**—NCP negotiation is incomplete (not yet completed or has failed). • **Opened**—NCP negotiation is successful.	**detail extensive** none
CHAP state	(PPP) Displays the state of the Challenge Handshake Authentication Protocol (CHAP) during its transaction. • **Chap-Resp-received**—Response received for the challenge sent, but CHAP not yet moved into the Success state. (Most likely with RADIUS authentication.) • **Chap-Resp-sent**—Response sent for the challenge received. • **Chap-Chal-sent**—Challenge sent. • **Chap-Chal-received**—Challenge received but response not yet sent. • **Down**—CHAP authentication is incomplete (not yet completed or has failed). • **Not-configured**—CHAP is not configured on the interface. • **Opened**—CHAP authentication was successful.	**detail extensive** none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is **Last flapped:** ***year-month-day hour:minute:second timezone*** **(*year-month-day hour:minute:second* ago)** . For example, **Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)**.	**detail extensive** none
CoS queues	Number of CoS queues configured.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 11: T3 or E3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Input rate	Input rate in bits per second (bps) and packets per second (pps).	None specified
Output rate	Output rate in bps and pps.	None specified
Statistics last cleared	Time when the statistics for the interface were last set to zero.	**detail extensive**
Traffic statistics	Number and rate of bytes and packets received and transmitted on the physical interface. • **Input bytes**—Number of bytes received on the interface • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface • **Output packets**—Number of packets received on the interface.	**detail extensive**
Input errors	Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Errors**—Sum of the incoming frame aborts and FCS errors. • **Drops**—Number of packets dropped by the input 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. • **Framing errors**—Number of packets received with an invalid frame checksum (FCS). • **Runts**—(T3 only) Number of frames received that are smaller than the runt threshold. • **Giants**—(T3 only) Number of frames received that are larger than the giant threshold. • **Bucket Drops**—Drops resulting from the traffic load exceeding the interface transmit/receive leaky bucket configuration. The default is **off**. • **Policed discards**—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • **L3 incompletes**—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. • **L2 channel errors**—Number of times the software did not find a valid logical interface for an incoming frame. • **L2 mismatch timeouts**—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • **HS link CRC errors**—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • **SRAM errors**—Number of hardware errors that occurred in the static RAM (SRAM) on the PIC or PIM. If the value of this field increments, the PIC or PIM is malfunctioning. • **Resource errors**—Sum of transmit drops.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 11: T3 or E3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Output errors	Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious: • **Carrier transitions**—Number of times the interface has gone from **down** to **up**. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning. • **Errors**—Sum of the outgoing frame aborts and FCS errors. • **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. • **Aged packets**—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware. • **MTU errors**—Number of packets whose size exceeded the MTU of the interface. • **Resource errors**—Sum of transmit drops.	**extensive**
Queue counters	CoS queue number and its associated user-configured forwarding class name. • **Queued packets**—Number of queued packets. • **Transmitted packets**—Number of transmitted packets. • **Dropped packets**—Number of packets dropped by the ASIC's RED mechanism.	**detail extensive**
Active alarms **Active defects**	E3 media-specific defects that can render the interface unable to pass packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the router configuration, an alarm can ring the red or yellow alarm bell on the router, or turn on the red or yellow alarm LED on the craft interface. • **AIS**—Alarm indication signal • **EXZ**—Excessive zeros • **FERF**—Far-end receive failures • **IDLE**—Idle code detected • **LCD**—Loss of cell delineation • **LCV**—Line code violation • **LOF**—Loss of frame • **LOS**—Loss of signal • **PLL**—Phase-locked loop • **YLW**—Remote defect indication	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 11: T3 or E3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
DS3 media or **E3 media**	Counts of DS3 (T3) or E3 media-specific errors. • **Seconds**—Number of seconds the defect has been active. • **Count**—Number of times that the defect has gone from inactive to active. • **State**—State of the error. State other than OK indicates a problem. The DS3 or E3 media-specific error types can be: • **PLL Lock**—Phase-locked loop out of lock • **Reframing**—Frame alignment recovery time • **AIS**—Alarm indication signal • **LOF**—Loss of frame • **LOS**—Loss of signal • **IDLE**—Idle code detected • **YELLOW**—Errors at the remote site receiver • **BPV**—Bipolar violation • **EXZ**—Excessive zeros • **LCV**—Line code violation • **PCV**—(DS3 only) Pulse code violation • **CCV**—(DS3 only) C-bit coding violation • **FEBE**—(DS3 only) Far-end block error • **LES**—Line error seconds • **PES**—(DS3 only) P-bit errored seconds • **PSES**—(DS3 only) P-bit errored seconds (section) • **CES**—(DS3 only) C-bit errored seconds • **CSES**—(DS3 only) C-bit severely errored seconds • **SEFS**—Severely errored framing seconds • **UAS**—Unavailable seconds	**extensive**
HDLC configuration	Information about the HDLC configuration. • **Policing bucket**—Configured state of the receiving policer. • **Shaping bucket**—Configured state of the transmitting shaper. • **Giant threshold**—Giant threshold programmed into the hardware. • **Runt threshold**—Runt threshold programmed into the hardware. • **Idle cycle flag**—Idle cycle flags. • **Start end flag**—Start and end flag.	**extensive**

Copyright © 2013, Juniper Networks, Inc.

Table 11: T3 or E3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
DSU configuration	Information about the DSU configuration. The last three lines (**Bit count**, **Error bit count**, and **LOS information**) are displayed only if a BERT has ever been run on the interface. • **Compatibility mod**—CSU/DSU compatibility mode: **None**, **Larscom**, **Kentrox**, or **Digital-Link**. • **Scrambling**—Payload scrambling: **Enabled** or **Disabled**. • **Subrate**—Configured subrate setting. Applies only when **Digital-Link** compatibility mode is used. The subrate can be **Disabled** or display units in Kbps. • **FEAC loopbac**—(T3) Whether a far-end alarm and control (FEAC) loopback is **Active** or **Inactive**. This feature is used to send alarm or status information from the far-end terminal back to the near-end terminal and to initiate T3 loopbacks at the far-end terminal from the near-end terminal. • **Response**—Whether the FEAC signal is **Enabled** or **Disabled**. • **Count**—Number of FEAC loopbacks.	**extensive**
DS3 (or **E3**) **BERT configuration**	BERT (bit error rate test) checks the quality of the line. This output appears only when a BERT is run on the interface. • **BERT time period**—Configured total time period that the BERT is to run. • **Elapsed**—Actual time elapsed since the start of the BERT (in seconds). • **Induced error rate**—Configured rate at which the bit errors are induced in the BERT pattern. • **Algorithm**—Type of algorithm selected for the BERT.	**detail extensive** none
Packet Forwarding Engine configuration	Information about the configuration of the Packet Forwarding Engine: • **Destination slot**—FPC slot number. • **PLP byte**—Packet Level Protocol byte.	**extensive**
CoS information	Information about the CoS queue for the physical interface. • **CoS transmit queue**—Queue number and its associated user-configured forwarding class name. • **Bandwidth %**—Percentage of bandwidth allocated to the queue. • **Bandwidth bps**—Bandwidth allocated to the queue (in bps). • **Buffer %**—Percentage of buffer space allocated to the queue. • **Buffer usec**—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • **Priority**—Queue priority: **low** or **high**. • **Limit**—Displayed if rate limiting is configured for the queue. Possible values are **none** and **exact**. If **exact** is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If **none** is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.	**extensive**
Logical Interface		

Copyright © 2013, Juniper Networks, Inc.

Table 11: T3 or E3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Logical interface	Name of the logical interface.	**detail extensive** none
Index	Logical interface index number, which reflects its initialization sequence.	**detail extensive** none
SNMP ifIndex	Logical interface SNMP interface index number.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**extensive**
Flags	Information about the interface. Possible values are described in the "Interface Flags" section under *Common Output Fields Description*.	**detail extensive** none
Encapsulation	Encapsulation on the logical interface.	**detail extensive** none
Input packets	Number of packets received on the logical interface.	None specified
Output packets	Number of packets transmitted on the logical interface.	None specified
Traffic statistics	(Frame Relay) Number and rate of bytes and packets received and transmitted on the logical interface. • **Input bytes**—Number of bytes received on the interface. • **Output bytes**—Number of bytes transmitted on the interface. • **Input packets**—Number of packets received on the interface. • **Output packets**—Number of packets transmitted on the interface.	**detail extensive**
Local statistics	(Frame Relay) Statistics for traffic received from and transmitted to the Routing Engine. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It takes awhile (generally, less than 1 second) for this counter to stabilize.	**detail extensive**
Transit statistics	(Frame Relay) Statistics for traffic transiting the router. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. This counter normally stabilizes in less than 1 second.	**detail extensive**
Protocol	Protocol family configured on the logical interface, such as **iso**, **inet6**, **mlfr**, or **mpls**.	**detail extensive** none
Multilink bundle	(Multilink) Interface name for the multilink bundle.	**detail extensive** none
MTU	MTU size on the logical interface.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive**
Route table	Routing table in which the logical interface address is located. For example, **0** refers to the routing table inet.0.	**detail extensive**
Flags	Information about the protocol family flags. Possible values are described in the "Family Flags" section under *Common Output Fields Description*.	**detail extensive** none

Copyright © 2013, Juniper Networks, Inc.

Table 11: T3 or E3 show interfaces Output Fields *(continued)*

Field Name	Field Description	Level of Output
Addresses, Flags	Information about the address flags. Possible values are described in the "Addresses Flags" section under *Common Output Fields Description*.	**detail extensive** none
Destination	IP address of the remote side of the connection.	**detail extensive** none
Local	IP address of the logical interface.	**detail extensive** none
Broadcast	Broadcast address.	**detail extensive** none
Generation	Unique number for use by Juniper Networks technical support only.	**detail extensive** none
DLCI	(Frame Relay) DLCI number of the logical interface. The following DLCI information is displayed: **Flags**, **Total down time**, **Last down**, and **Traffic statistics** (or **Input packets**, **Output packets**). **Flags** is one or more of the following: • **Active**—Set when the link is active and the DTE and DCE are exchanging information. • **Down**—Set when the link is active, but no information is received from the DCE. • **DCE Unconfigured**—Set when the corresponding DLCI in the DCE is not configured. • **Configured**—Set when the corresponding DLCI in the DCE is configured. • **DCE-configured**—Displayed when the command is issued from the DTE.	**detail extensive** none
DLCI statistics	(Frame Relay) Data-link connection identifier (DLCI) statistics. • **Active DLCI**—Number of active DLCIs. • **Inactive DLCI**—Number of inactive DLCIs.	**detail extensive** none

Sample Output

show interfaces (T3, PPP)

```
user@host> show interfaces t3-0/2/0
Physical interface: t3-0/2/0, Enabled, Physical link is Up
  Interface index: 139, SNMP ifIndex: 35
  Link-level type: PPP, MTU: 4474, Clocking: Internal, Speed: T3,
  Loopback: None, FCS: 16, Mode: C/Bit parity,
  Long buildout: Shorter than 255 feet
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 0 (never), Output: 0 (never)
  LCP state: Down
  NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
  mpls: Not-configured
  CHAP state: Closed
  CoS queues     : 4 supported, 4 in use
  Last flapped   : 2005-12-05 08:43:06 PST (02:18:40 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 72 bps (0 pps)
```

Copyright © 2013, Juniper Networks, Inc.

```
  Active alarms  : None
  Active defects : None
  DS3 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Algorithm: 2^15 - 1, O.151, Pseudorandom (9), Induced error rate: 10e-0

Logical interface t3-0/2/0.0 (Index 66) (SNMP ifIndex 54)
    Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol inet, MTU: 4470
      Flags: Protocol-Down
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255
```

show interfaces detail (T3, PPP)

```
user@host> show interfaces t3-0/2/0 detail
Physical interface: t3-0/2/0, Enabled, Physical link is Up
  Interface index: 139, SNMP ifIndex: 35, Generation: 22
  Link-level type: PPP, MTU: 4474, Clocking: Internal, Speed: T3,
  Loopback: None, FCS: 16, Mode: C/Bit parity,
  Long buildout: Shorter than 255 feet
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 0 (last seen: never)
    Output: 0 (last sent: never)
  LCP state: Down
  NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
  mpls: Not-configured
  CHAP state: Closed
  CoS queues     : 4 supported, 4 in use
  Last flapped   : 2005-12-05 08:43:06 PST (02:18:45 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                   0                   0 bps
   Output bytes  :                 152                   0 bps
   Input  packets:                   0                   0 pps
   Output packets:                   8                   0 pps
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                    0                   0                    0

    1 expedited-fo                   0                   0                    0

    2 assured-forw                   0                   0                    0

    3 network-cont                   6                   6                    0

  Active alarms  : None
  Active defects : None
  DS3 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Algorithm: 2^15 - 1, O.151, Pseudorandom (9), Induced error rate: 10e-0

Logical interface t3-0/2/0.0 (Index 66) (SNMP ifIndex 54) (Generation 8)
    Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol inet, MTU: 4470, Generation: 17, Route table: 0
      Flags: Protocol-Down
```


Copyright © 2013, Juniper Networks, Inc.

```
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
        Generation: 24
```

show interfaces extensive (T3, PPP)

```
user@host> show interfaces t3-0/2/0 extensive
Physical interface: t3-0/2/0, Enabled, Physical link is Up
  Interface index: 139, SNMP ifIndex: 35, Generation: 22
  Link-level type: PPP, MTU: 4474, Clocking: Internal, Speed: T3,
  Loopback: None, FCS: 16, Mode: C/Bit parity,
  Long buildout: Shorter than 255 feet
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 0 (last seen: never)
    Output: 0 (last sent: never)
  LCP state: Down
  NCP state: inet: Not-configured, inet6: Not-configured, iso: Not-configured,
  mpls: Not-configured
  CHAP state: Closed
  CoS queues     : 4 supported, 4 in use
  Last flapped   : 2005-12-05 08:43:06 PST (02:18:47 ago)
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                   0                   0 bps
   Output bytes  :                 171                  72 bps
   Input  packets:                   0                   0 pps
   Output packets:                   9                   0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 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, Resource errors: 0
  Output errors:
    Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

    Resource errors: 0
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                   0                   0                   0

    1 expedited-fo                  0                   0                   0

    2 assured-forw                  0                   0                   0

    3 network-cont                  7                   7                   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
    IDLE                      0            0  OK
    YELLOW                    0            0  OK
```

Copyright © 2013, Juniper Networks, Inc.

```
    BPV                       0           0
    EXZ                       0           0
    LCV                       1           4
    PCV                       0           0
    CCV                       0           0
    FEBE                      1          11
    LES                       1
    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
  DS3 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Algorithm: 2^15 - 1, O.151, Pseudorandom (9), Induced error rate: 10e-0
  Packet Forwarding Engine configuration:
    Destination slot: 0, PLP byte: 1 (0x00)
  CoS information:
    CoS transmit queue       Bandwidth          Buffer   Priority    Limit
                          %          bps     %     usec
    0 best-effort        95     42499200    95        0         low    none
    3 network-control     5      2236800     5        0         low    none

Logical interface t3-0/2/0.0 (Index 66) (SNMP ifIndex 54) (Generation 8)
    Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol inet, MTU: 4470, Generation: 17, Route table: 0
      Flags: Protocol-Down
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
        Generation: 24
```

show interfaces (E3, Frame Relay)

```
user@host> show interfaces e3-1/2/0
Physical interface: e3-1/2/0, Enabled, Physical link is Up
  Interface index: 153, SNMP ifIndex: 49
  Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, Speed: E3,
  Loopback: None, FCS: 16, Framing: G751
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives DTE
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI: Input: 0 (never), Output: 4 (00:00:06 ago)
  DTE statistics:
    Enquiries sent                     : 4
    Full enquiries sent                : 0
    Enquiry responses received         : 0
    Full enquiry responses received    : 0
  DCE statistics:
    Enquiries received                 : 0
    Full enquiries received            : 0
    Enquiry responses sent             : 0
```


Copyright © 2013, Juniper Networks, Inc.

```
    Full enquiry responses sent          : 0
  Common statistics:
    Unknown messages received            : 0
    Asynchronous updates received        : 0
    Out-of-sequence packets received     : 0
    Keepalive responses timedout         : 1
  CoS queues     : 4 supported, 4 in use
  Last flapped   : 2005-12-05 08:46:14 PST (02:27:17 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None

  Logical interface e3-1/2/0.0 (Index 66) (SNMP ifIndex 57)
    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
  Input packets : 0
  Output packets: 0
    Protocol inet, MTU: 4470
      Flags: None
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255
    DLCI 100
      Flags: Down, DCE-Unconfigured
      Total down time: 00:00:06 sec, Last down: 00:00:06 ago
      Input packets : 0
      Output packets: 0
  DLCI statistics:
    Active DLCI  :0  Inactive DLCI  :1
```

show interfaces detail (E3, Frame Relay)

```
user@host> show interfaces e3-1/2/0 detail
Physical interface: e3-1/2/0, Enabled, Physical link is Up
  Interface index: 153, SNMP ifIndex: 49, Generation: 36
  Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, Speed: E3,
  Loopback: None, FCS: 16, Framing: G751
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
  Link flags     : Keepalives DTE
  Hold-times     : Up 0 ms, Down 0 ms
  ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
  LMI statistics:
    Input : 0 (last seen: never)
    Output: 5 (last sent 00:00:07 ago)
  DTE statistics:
    Enquiries sent                       : 5
    Full enquiries sent                  : 0
    Enquiry responses received           : 0
    Full enquiry responses received      : 0
  DCE statistics:
    Enquiries received                   : 0
    Full enquiries received              : 0
    Enquiry responses sent               : 0
    Full enquiry responses sent          : 0
  Common statistics:
    Unknown messages received            : 0
    Asynchronous updates received        : 0
    Out-of-sequence packets received     : 0
    Keepalive responses timedout         : 1
  CoS queues     : 4 supported, 4 in use
  Last flapped   : 2005-12-05 08:46:14 PST (02:27:27 ago)
```

```
  Statistics last cleared: Never
  Traffic statistics:
   Input  bytes  :                    0                    0 bps
   Output bytes  :                  806                    0 bps
   Input  packets:                    0                    0 pps
   Output packets:                   44                    0 pps
  Queue counters:       Queued packets  Transmitted packets      Dropped packets

    0 best-effort                    0                    0                    0

    1 expedited-fo                   0                    0                    0

    2 assured-forw                   0                    0                    0

    3 network-cont                  43                   43                    0

  Active alarms  : None
  Active defects : None

  Logical interface e3-1/2/0.0 (Index 66) (SNMP ifIndex 57) (Generation 15)
    Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
    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, Generation: 24, Route table: 0
      Flags: None
      Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
        Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
        Generation: 38
    DLCI 100
      Flags: Down, DCE-Unconfigured
      Total down time: 00:00:16 sec, Last down: 00:00:16 ago
      Traffic statistics:
       Input  bytes  :                    0
       Output bytes  :                    0
       Input  packets:                    0
       Output packets:                    0
  DLCI statistics:
    Active DLCI  :0  Inactive DLCI  :1
```

show interfaces extensive (E3, Frame Relay)

```
user@host> show interfaces e3-1/2/0 extensive
Physical interface: e3-1/2/0, Enabled, Physical link is Up
  Interface index: 153, SNMP ifIndex: 49, Generation: 36
  Link-level type: Frame-Relay, MTU: 4474, Clocking: Internal, Speed: E3,
  Loopback: None, FCS: 16, Framing: G751
  Device flags   : Present Running
  Interface flags: Link-Layer-Down Point-To-Point SNMP-Traps Internal: 0x4000
```


Copyright © 2013, Juniper Networks, Inc.

```
Link flags     : Keepalives DTE
Hold-times     : Up 0 ms, Down 0 ms
ANSI LMI settings: n391dte 6, n392dte 3, n393dte 4, t391dte 10 seconds
LMI statistics:
  Input : 0 (last seen: never)
  Output: 6 (last sent 00:00:02 ago)
DTE statistics:
  Enquiries sent                       : 5
  Full enquiries sent                  : 1
  Enquiry responses received           : 0
  Full enquiry responses received      : 0
DCE statistics:
  Enquiries received                   : 0
  Full enquiries received              : 0
  Enquiry responses sent               : 0
  Full enquiry responses sent          : 0
Common statistics:
  Unknown messages received            : 0
  Asynchronous updates received        : 0
  Out-of-sequence packets received     : 0
  Keepalive responses timedout         : 1
CoS queues     : 4 supported, 4 in use
Last flapped   : 2005-12-05 08:46:14 PST (02:27:30 ago)
Statistics last cleared: Never
Traffic statistics:
 Input  bytes  :                    0                    0 bps
 Output bytes  :                  821                   56 bps
 Input  packets:                    0                    0 pps
 Output packets:                   45                    0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 21118, 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,
  Resource errors: 0
Output errors:
  Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, MTU errors: 0,

  Resource errors: 0
Queue counters:       Queued packets  Transmitted packets      Dropped packets

  0 best-effort                    0                    0                    0

  1 expedited-fo                   0                    0                    0

  2 assured-forw                   0                    0                    0

  3 network-cont                  44                   44                    0

Active alarms  : None
Active defects : None
E3  media:            Seconds        Count  State
  PLL Lock                  0            0  OK
  Reframing               187            1  OK
  AIS                       0            0  OK
  LOF                     187            1  OK
  LOS                     187            1  OK
  IDLE                      0            0  OK
  YELLOW                    0            0  OK
  BPV                       0            0
  EXZ                       0            0
  LCV                     188     12303167
```

Copyright © 2013, Juniper Networks, Inc.

```
  LES                      188
  SEFS                     187
  UAS                      195
DSU configuration:
  Compatibility mode: None, Scrambling: Disabled
E3 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Algorithm: 2^15 - 1, O.151, Pseudorandom (9), Induced Error rate: 10e-0
Packet Forwarding Engine configuration:
  Destination slot: 1, PLP byte: 1 (0x00)
CoS information:
  CoS transmit queue       Bandwidth          Buffer   Priority    Limit
                        %          bps     %     usec
  0 best-effort        95     32649600    95        0         low     none
  3 network-control     5      1718400     5        0         low     none

Logical interface e3-1/2/0.0 (Index 66) (SNMP ifIndex 57) (Generation 15)
  Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: FR-NLPID
  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, Generation: 24, Route table: 0
    Flags: None
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255,
      Generation: 38
  DLCI 100
    Flags: Down, DCE-Unconfigured
    Total down time: 00:00:19 sec, Last down: 00:00:19 ago
    Traffic statistics:
     Input  bytes  :                  0
     Output bytes  :                  0
     Input  packets:                  0
     Output packets:                  0
DLCI statistics:
  Active DLCI  :0  Inactive DLCI  :1
```


Copyright © 2013, Juniper Networks, Inc.

CHAPTER 6

Command Summaries

- Channelized OC Interface Operational Commands on page 227

Channelized OC Interface Operational Commands

Table 12 on page 227 summarizes the command-line interface (CLI) commands to monitor and troubleshoot channelized OC interfaces. Commands are listed in alphabetical order.

Table 12: Channelized OC Interface Operational Mode Commands

Task or Information to Monitor	CLI Command
Display channelized OC3 IQ and IQE interface information.	show interfaces (Channelized OC3 IQ and IQE)
Display status information about channelized OC12 interfaces.	show interfaces (Channelized OC12)
Display channelized OC12 IQ and IQE interface information.	show interfaces (Channelized OC12 IQ and IQE)
Display the interface names of the physical channelized OC3 IQ and IQE interface and the channels configured on each interface.	*show interfaces controller (Channelized OC3 IQ and IQE)*
Display the interface names of the physical channelized OC12 IQ and IQE interface and the channels configured on each interface.	*show interfaces controller (Channelized OC12 IQ and IQE)*
Display channelized OC48 IQ and IQE interface information.	show interfaces (Channelized OC48 IQ and IQE)

Copyright © 2013, Juniper Networks, Inc.

NOTE: For more information about the channel type and level of channelization, and for information about the number of channels that are supported on channelized OC interfaces, see the *Junos Network Interfaces Configuration Guide*.

For channelization illustrations and configuration examples for channelized IQ and IQE interfaces, see the *Junos Feature Guide*.

Copyright © 2013, Juniper Networks, Inc.

PART 4

Troubleshooting

- Interface Diagnostics on page 231

Copyright © 2013, Juniper Networks, Inc.

 Copyright © 2013, Juniper Networks, Inc.

CHAPTER 7

Interface Diagnostics

- Interface Diagnostics on page 231

Interface Diagnostics

You can use two diagnostic tools to test the physical layer connections of interfaces: loopback testing and bit error rate test (BERT) testing. Loopback testing enables you to verify the connectivity of a circuit. BERT testing enables you to identify poor signal quality on a circuit. This section contains the following topics:

- Configuring Loopback Testing on page 231
- Interface Diagnostics on page 233

Configuring Loopback Testing

Loopback testing allows you to verify the connectivity of a circuit. You can configure any of the following interfaces to execute a loopback test: Aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, E1, E3, *N*xDS0, serial, SONET/SDH, T1, and T3.

The physical path of a network data circuit usually consists of segments interconnected by devices that repeat and regenerate the transmission signal. The transmit path on one device connects to the receive path on the next device. If a circuit fault occurs in the form of a line break or a signal corruption, you can isolate the problem by using a loopback test. Loopback tests allow you to isolate segments of the circuit and test them separately.

To do this, configure a *line loopback* on one of the routers. Instead of transmitting the signal toward the far-end device, the line loopback sends the signal back to the originating router. If the originating router receives back its own data link layer packets, you have verified that the problem is beyond the originating router. Next, configure a line loopback farther away from the local router. If this originating router does not receive its own data link layer packets, you can assume the problem is on one of the segments between the local router and the remote router's interface card. In this case, the next troubleshooting step is to configure a line loopback closer to the local router to find the source of the problem.

There are several types of loopback testing supported by the Junos OS, as follows:

- DCE local—Loops packets back on the local DCE.
- DCE remote—Loops packets back on the remote DCE.

Copyright © 2013, Juniper Networks, Inc.

- Local—Useful for troubleshooting physical PIC errors. Configuring local loopback on an interface allows transmission of packets to the channel service unit (CSU) and then to the circuit toward the far-end device. The interface receives its own transmission, which includes data and timing information, on the local router's PIC. The data received from the CSU is ignored. To test a local loopback, issue the **show interfaces *interface-name*** command. If PPP keepalives transmitted on the interface are received by the PIC, the **Device Flags** field contains the output **Loop-Detected**.
- Payload—Useful for troubleshooting the physical circuit problems between the local router and the remote router. A payload loopback loops data only (without clocking information) on the remote router's PIC. With payload loopback, overhead is recalculated.
- Remote—Useful for troubleshooting the physical circuit problems between the local router and the remote router. A remote loopback loops packets, including both data and timing information, back on the remote router's interface card. A router at one end of the circuit initiates a remote loopback toward its remote partner. When you configure a remote loopback, the packets received from the physical circuit and CSU are received by the interface. Those packets are then retransmitted by the PIC back toward the CSU and the circuit. This loopback tests all the intermediate transmission segments.

Table 13 on page 232 shows the loopback modes supported on the various interface types.

Table 13: Loopback Modes by Interface Type

Interface	Loopback Modes	Usage Guidelines
Aggregated Ethernet, Fast Ethernet, Gigabit Ethernet	Local	*Configuring Ethernet Loopback Capability*
Circuit Emulation E1	Local and remote	*Configuring E1 Loopback Capability*
Circuit Emulation T1	Local and remote	*Configuring T1 Loopback Capability*
E1 and E3	Local and remote	*Configuring E1 Loopback Capability* and *Configuring E3 Loopback Capability*
*N*xDS0	Payload	*Configuring Channelized E1 IQ and IQE Interfaces*, *Configuring T1 and NxDS0 Interfaces*, *Configuring Channelized OC12/STM4 IQ and IQE Interfaces (SONET Mode)*, *Configuring Channelized STM1 IQ and IQE Interfaces*, and *Configuring Channelized T3 IQ Interfaces*
Serial (V.35 and X.21)	Local and remote	*Configuring Serial Loopback Capability*
Serial (EIA-530)	DCE local, DCE remote, local, and remote	*Configuring Serial Loopback Capability*
SONET/SDH	Local and remote	*Configuring SONET/SDH Loopback Capability*

Copyright © 2013, Juniper Networks, Inc.

Table 13: Loopback Modes by Interface Type *(continued)*

Interface	Loopback Modes	Usage Guidelines
T1 and T3	Local, payload, and remote	*Configuring T1 Loopback Capability* and *Configuring T3 Loopback Capability* See also *Configuring the T1 Remote Loopback Response*

To configure loopback testing, include the **loopback** statement:

loopback *mode*;

You can include this statement at the following hierarchy levels:

- **[edit interfaces** *interface-name* **aggregated-ether-options]**
- **[edit interfaces** *interface-name* **ds0-options]**
- **[edit interfaces** *interface-name* **e1-options]**
- **[edit interfaces** *interface-name* **e3-options]**
- **[edit interfaces** *interface-name* **fastether-options]**
- **[edit interfaces** *interface-name* **gigether-options]**
- **[edit interfaces** *interface-name* **serial-options]**
- **[edit interfaces** *interface-name* **sonet-options]**
- **[edit interfaces** *interface-name* **t1-options]**
- **[edit interfaces** *interface-name* **t3-options]**

Interface Diagnostics

BERT allows you to troubleshoot problems by checking the quality of links. You can configure any of the following interfaces to execute a BERT when the interface receives a request to run this test: E1, E3, T1, T3; the channelized DS3, OC3, OC12, and STM1 interfaces; and the channelized DS3 IQ, E1 IQ, and OC12 IQ interfaces.

A BERT test requires a line loop to be in place on either the transmission devices or the far-end router. The local router generates a known bit pattern and sends it out the transmit path. The received pattern is then verified against the sent pattern. The higher the bit error rate of the received pattern, the worse the noise is on the physical circuit. As you move the position of the line loop increasingly downstream toward the far-end router, you can isolate the troubled portion of the link.

To configure BERT, you must configure the duration of the test, the bit pattern to send on the transmit path, and the error rate to monitor when the inbound pattern is received.

To configure the duration of the test, the pattern to send in the bit stream, and the error rate to include in the bit stream, include the **bert-period**, **bert-algorithm**, and **bert-error-rate** statements, respectively, at the **[edit interfaces** *interface-name interface-type*-**options]** hierarchy level:

Copyright © 2013, Juniper Networks, Inc.

[edit interfaces *interface-name interface-type*-options]
bert-algorithm *algorithm*;
bert-error-rate *rate*;
bert-period *seconds*;

By default, the BERT period is 10 seconds. You can configure the BERT period to last from 1 through 239 seconds on some PICs and from 1 through 240 seconds on other PICs.

rate is the bit error rate. This can be an integer from 0 through 7, which corresponds to a bit error rate from 10^{-0} (1 error per bit) to 10^{-7} (1 error per 10 million bits).

algorithm is the pattern to send in the bit stream. For a list of supported algorithms, enter a **?** after the **bert-algorithm** statement; for example:

```
[edit interfaces t1-0/0/0 t1-options]

user@host# set bert-algorithm ?
Possible completions:
  pseudo-2e11-o152     Pattern is 2^11 -1 (per O.152 standard)
  pseudo-2e15-o151     Pattern is 2^15 - 1 (per O.152 standard)
  pseudo-2e20-o151     Pattern is 2^20 - 1 (per O.151 standard)
  pseudo-2e20-o153     Pattern is 2^20 - 1 (per O.153 standard)
        ...
```

For specific hierarchy information, see the individual interface types.

NOTE: The 4-port E1 PIC supports only the following algorithms:

```
pseudo-2e11-o152     Pattern is 2^11 -1 (per O.152 standard)
pseudo-2e15-o151     Pattern is 2^15 - 1 (per O.151 standard)
pseudo-2e20-o151     Pattern is 2^20 - 1 (per O.151 standard)
pseudo-2e23-o151     Pattern is 2^23 (per O.151 standard)
```

When you issue the help command from the CLI, all BERT algorithm options are displayed, regardless of the PIC type, and no commit check is available. Unsupported patterns for a PIC type can be viewed in system log messages.

Copyright © 2013, Juniper Networks, Inc.

NOTE: The 12-port T1/E1 Circuit Emulation (CE) PIC supports only the following algorithms:

```
all-ones-repeating   Repeating one bits
all-zeros-repeating  Repeating zero bits
alternating-double-ones-zeros  Alternating pairs of ones and zeros
alternating-ones-zeros  Alternating ones and zeros
pseudo-2e11-o152     Pattern is 2^11 -1 (per O.152 standard)
pseudo-2e15-o151     Pattern is 2^15 - 1 (per O.151 standard)
pseudo-2e20-o151     Pattern is 2^20 - 1 (per O.151 standard)
pseudo-2e7           Pattern is 2^7 - 1
pseudo-2e9-o153      Pattern is 2^9 - 1 (per O.153 standard)
repeating-1-in-4     1 bit in 4 is set
repeating-1-in-8     1 bit in 8 is set
repeating-3-in-24    3 bits in 24 are set
```

When you issue the help command from the CLI, all BERT algorithm options are displayed, regardless of the PIC type, and no commit check is available. Unsupported patterns for a PIC type can be viewed in system log messages.

NOTE: The IQE PICs support only the following algorithms:

```
all-ones-repeating   Repeating one bits
all-zeros-repeating  Repeating zero bits
alternating-double-ones-zeros  Alternating pairs of ones and zeros
alternating-ones-zeros  Alternating ones and zeros
pseudo-2e9-o153      Pattern is 2^9  -1 (per O.153 (511 type) standard)
pseudo-2e11-o152     Pattern is 2^11 -1 (per O.152 and O.153 (2047 type)
 standards)
pseudo-2e15-o151     Pattern is 2^15 -1 (per O.151 standard)
pseudo-2e20-o151     Pattern is 2^20 -1 (per O.151 standard)
pseudo-2e20-o153     Pattern is 2^20 -1 (per O.153 standard)
pseudo-2e23-o151     Pattern is 2^23 -1 (per O.151 standard)
repeating-1-in-4     1 bit in 4 is set
repeating-1-in-8     1 bit in 8 is set
repeating-3-in-24    3 bits in 24 are set
```

When you issue the help command from the CLI, all BERT algorithm options are displayed, regardless of the PIC type, and no commit check is available. Unsupported patterns for a PIC type can be viewed in system log messages.

Copyright © 2013, Juniper Networks, Inc.

NOTE: BERT is supported on the PDH interfaces of the Channelized SONET/SDH OC3/STM1 (Multi-Rate) MIC with SFP and the DS3/E3 MIC. The following BERT algorithms are supported:

```
all-ones-repeating            Repeating one bits
all-zeros-repeating           Repeating zero bits
alternating-double-ones-zeros Alternating pairs of ones and zeros
alternating-ones-zeros        Alternating ones and zeros
repeating-1-in-4              1 bit in 4 is set
repeating-1-in-8              1 bit in 8 is set
repeating-3-in-24             3 bits in 24 are set
pseudo-2e9-o153               Pattern is 2^9 - 1 (per 0.153 standard)
pseudo-2e11-o152              Pattern is 2^11 - 1 (per 0.152 standard)
pseudo-2e15-o151              Pattern is 2^15 - 1 (per 0.151 standard)
pseudo-2e20-o151              Pattern is 2^20 - 1 (per 0.151 standard)
pseudo-2e20-o153              Pattern is 2^20 - 1 (per 0.153 standard)
pseudo-2e23-o151              Pattern is 2^23 (per 0.151 standard)
```

Table 14 on page 236 shows the BERT capabilities for various interface types.

Table 14: BERT Capabilities by Interface Type

Interface	T1 BERT	T3 BERT	Comments
12-port T1/E1 Circuit Emulation	Yes (ports 0–11)		• Limited algorithms
4-port Channelized OC3/STM1 Circuit Emulation	Yes (port 0–3)		• Limited algorithms
E1 or T1	Yes (port 0–3)	Yes (port 0–3)	• Single port at a time • Limited algorithms
E3 or T3	Yes (port 0–3)	Yes (port 0–3)	• Single port at a time
Channelized OC12	N/A	Yes (channel 0–11)	• Single channel at a time • Limited algorithms • No bit count
Channelized STM1	Yes (channel 0–62)	N/A	• Multiple channels • Only one algorithm • No error insert • No bit count
Channelized T3 and Multichannel T3	Yes (channel 0–27)	Yes (port 0–3 on channel 0)	• Multiple ports and channels • Limited algorithms for T1 • No error insert for T1 • No bit count for T1

Copyright © 2013, Juniper Networks, Inc.

These limitations do not apply to channelized IQ interfaces. For information about BERT capabilities on channelized IQ interfaces, see *Channelized IQ and IQE Interfaces Properties*.

Starting and Stopping a BERT Test

Before you can start the BERT test, you must disable the interface. To do this, include the **disable** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]
disable;
```

After you configure the BERT properties and commit the configuration, begin the test by issuing the **test interface *interface-name interface-type*-bert-start** operational mode command:

```
user@host> test interface interface-name interface-type-bert-start
```

The test runs for the duration you specify with the **bert-period** statement. If you wish to terminate the test sooner, issue the **test interface *interface-name interface-type*-bert-stop** command:

```
user@host> test interface interface-name interface-type-bert-stop
```

For example:

```
user@host> test interface t3-1/2/0 t3-bert-start
user@host> test interface t3-1/2/0 t3-bert-stop
```

To view the results of the BERT test, issue the **show interfaces extensive | find BERT** command:

```
user@host> show interfaces interface-name extensive | find BERT
```

For more information about running and evaluating the results of the BERT procedure, see the *Junos OS Operational Mode Commands*.

NOTE: To exchange BERT patterns between a local router and a remote router, include the **loopback remote** statement in the interface configuration at the remote end of the link. From the local router, issue the **test interface** command.

Example: Configuring Bit Error Rate Testing

Configure a BERT test on a T3 interface. In this example, the run duration lasts for 120 seconds. The configured error rate is 0, which corresponds to a bit error rate of 10^{-0} (1 error per bit). The configured bit pattern of **all-ones-repeating** means that every bit the interface sends is a set to a value of 1.

```
[edit interfaces]
t3-1/2/0 {
    t3-options {
        bert algorithm all-ones-repeating;
        bert-error-rate 0;
        bert-period 120;
```

Copyright © 2013, Juniper Networks, Inc.

```
    }
}
```


Copyright © 2013, Juniper Networks, Inc.

PART 5

Index

- Index on page 241

Copyright © 2013, Juniper Networks, Inc.

 Copyright © 2013, Juniper Networks, Inc.

Index

Symbols

#, comments in configuration statements....xiv
( ), in syntax descriptions....xiv
< >, in syntax descriptions....xiv
[ ], in configuration statements....xiv
{ }, in configuration statements....xiv
| (pipe), in syntax descriptions....xiv

A

aggregated SONET/SDH interfaces
  status information, displaying....60

B

BERT
  configuring interface diagnostics....233
bert-algorithm statement
  usage guidelines....233
bert-error-rate statement
  usage guidelines....233
bert-period statement
  usage guidelines....233
bit error rate test *See* BERT
braces, in configuration statements....xiv
brackets
  angle, in syntax descriptions....xiv
  square, in configuration statements....xiv

C

channelized AU-4 interfaces....18
  example configuration....18
channelized DS3-to-DS0 interfaces
  status information, displaying....67
channelized DS3-to-DS1 interfaces
  status information, displaying....78
channelized E1 interfaces
  example configuration....20
  status information, displaying....85
channelized E1 IQ interfaces
  status information, displaying....81
channelized E3 (COC48/STM16) interfaces
  example configuration....19
channelized NxDS0 IQ interfaces
  example configuration....21
channelized OC12 (COC48/STM16 IQE) interfaces....9
  example configuration....10
channelized OC12 interfaces
  status information, displaying....100
channelized OC12 IQ interfaces
  status information, displaying....96
channelized OC12 IQE interfaces
  status information, displaying....96
channelized OC3 (COC48/STM16 IQE) interfaces....10
  example configuration....11
channelized OC3 IQ interfaces
  status information, displaying....104
channelized OC3 IQE interfaces
  status information, displaying....104
channelized OC48 IQ interfaces
  status information, displaying....123
channelized OC48 IQE interfaces
  example configuration....22
  status information, displaying....123
channelized STM1 interfaces
  status information, displaying....128
channelized STM1 IQ interfaces
  status information, displaying....125
channelized T1 (COC48/STM16 IQE) interfaces
  VT mapping....13
channelized T1 IQ interfaces
  status information, displaying....143
channelized T1 IQE interfaces
  VT mapping....20
channelized T1 or CT1 (COC48/STM16, SDH mode) IQE interfaces
  example configuration....21
channelized T3 (COC48/STM16 IQE) interfaces
  example configuration....12
channelized T3 IQ interfaces
  status information, displaying....155
comments, in configuration statements....xiv
conventions
  text and syntax....xiii
curly braces, in configuration statements....xiv
customer support....xv
  contacting JTAC....xv

Copyright © 2013, Juniper Networks, Inc.

D

documentation
comments on....xv
DS interfaces
status information, displaying....185

E

E1 interfaces
status information, displaying....185
E3 interfaces
status information, displaying....210

F

fast-aps-switch statement....49
font conventions....xiii
fractional T1 (COC48/STM16 IQE) interfaces
example configuration....14
time slots....14
framing statement
channelized OC48 IQE interfaces
usage guidelines....17

I

interface-type statement....50
channelized (COC48/STM16 IQE) interfaces
usage guidelines....9, 10
channelized E1 (COC48/STM16) IQE interfaces
usage guidelines....19
channelized E3 (COC48/STM16) IQE interfaces
usage guidelines....18
channelized OC48 IQE interfaces
usage guidelines....18
channelized T1 (COC48/STM16 IQE) interfaces
usage guidelines....12
channelized T1 (COC48/STM16, SDH mode) IQE interfaces
usage guidelines....21
channelized T3 (COC48/STM16, SDH mode) IQE interfaces
usage guidelines....20
E1 (COC48/STM16) IQE interfaces
usage guidelines....19
NxDS0 (COC48/STM16 IQE) interfaces
usage guidelines....14
T1 (COC48/STM16, SDH mode) IQE interfaces
usage guidelines....21
T3 (COC48/STM16, SDH mode) IQE interfaces
usage guidelines....20
interfaces
configuration statements....26

L

link PIC failover
channelized OC48 IQE interfaces....22
logical systems
configuration statements....42
loopback testing....231

M

manuals
comments on....xv

N

no-partition statement
channelized T3 (COC48/STM16 IQE) interfaces
usage guidelines....11
no-termination-request statement....51
NxDS0 (COC48/STM16) IQE interfaces
usage guidelines....20

O

oc-slice statement....52
usage guidelines....11

P

parentheses, in syntax descriptions....xiv
partition statement....53
channelized AU-4 (on OC48 IQE) interfaces
usage guidelines....18
channelized E1 (COC48/STM16) IQE interfaces
usage guidelines....19
channelized E3 (COC48/STM16) IQE interfaces
usage guidelines....18
channelized OC12 (COC48/STM16 IQE) interfaces
usage guidelines....9
channelized OC3 (COC48/STM16 IQE) interfaces
usage guidelines....10
channelized T1 (COC48/STM16 IQE) interfaces
usage guidelines....12
channelized T1 (COC48/STM16, SDH mode) IQE interfaces
usage guidelines....21
channelized T3 (COC48/STM16, SDH mode) IQE interfaces
usage guidelines....20

Copyright © 2013, Juniper Networks, Inc.

clear channel STM1, STM4, and STM16 interface
usage guide....17
E1 (COC48/STM16) IQE interfaces
usage guidelines....19
NxDS0 (COC48/STM16 IQE) interfaces
usage guidelines....14
NxDS0 (COC48/STM16) IQE interfaces
usage guidelines....20
T1 (COC48/STM16, SDH mode) IQE interfaces
usage guidelines....21
T3 (COC48/STM16, SDH mode) IQE interfaces
usage guidelines....20
physical interfaces
time slots
fractional T1 IQE interfaces....14

S

show interfaces (Aggregated SONET/SDH) command....60
show interfaces (Channelized DS3-to-DS0) command....67
show interfaces (Channelized DS3-to-DS1) command....78
show interfaces (Channelized E1 IQ) command....81
show interfaces (Channelized E1) command....85
show interfaces (Channelized OC12 IQ) command....96
show interfaces (Channelized OC12) command....100
show interfaces (Channelized OC3 IQ and IQE) command....104
show interfaces (Channelized OC48 IQ) command....123
show interfaces (Channelized STM1 IQ) command....125
show interfaces (Channelized STM1) command....128
show interfaces (Channelized T1 IQ) command....143
show interfaces (Channelized T3 IQ) command....155
show interfaces (SONET/SDH) command....157
show interfaces (T1, E1, or DS) command....185
show interfaces (T3 or E3) command....210
SONET/SDH interfaces
status information, displaying
aggregated....60
standard....157
support, technical *See* technical support
syntax conventions....xiii

T

T1 interfaces
status information, displaying....185
T3 interfaces
status information, displaying....210
technical support
contacting JTAC....xv
time slots
fractional T1 (COC48/STM16 IQE) interfaces....14
timeslots statement....54
fractional T1 (COC48/STM16 IQE) interfaces
usage guidelines....14
NxDS0 (COC48/STM16 IQE) interfaces
usage guidelines....14

V

VT mapping
channelized T1 (COC48/STM16 IQE) interfaces....13
channelized T1 IQE interfaces....20

Copyright © 2013, Juniper Networks, Inc.

Copyright © 2013, Juniper Networks, Inc.