

Chapter 16

Configuring Channelized T1 IQ Interfaces

The Channelized T1 intelligent queuing (IQ) PIC has 10 T1 ports that you can channelize to the DS0 level. Each T1 interface has 24 DS0 time slots. You can combine DS0 time slots (channels) to create a channel group ($N \times DS0$).

The Channelized T1 IQ PIC is supported on the M7i, M10i, M20, M40e, and M320 platforms.

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For examples of channelized T1 interface configuration, see the following section:

- Example: Configuring Channelized T1 IQ Interfaces on page 338

Configuring Channelized T1 IQ Interfaces

This section describes how to configure channelized T1 IQ interfaces, discussing the following topics:

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- Configuring Fractional T1 IQ Interfaces on page 334
- Configuring $N \times DS0$ IQ Interfaces on page 335
- Configuring Payload Loopback on page 336
- Configuring Channelized T1 Interface Properties on page 337

Configuring T1 IQ Interfaces

To configure a T1 interface, include the `no-partition` and `interface-type` statements at the `[edit interfaces ct1-fpc/pic/port]` hierarchy level:

```
[edit interfaces ct1-fpc/pic/port]
no-partition interface-type t1;
```

This configuration creates the interface `t1-fpc/pic/port`.



NOTE: For a T1 (t1-) interface configured on channelized T1 (ct1-) interface on a Channelized T1 IQ PIC, you can configure the following T1 options, but in fact, these options do not take effect for the T1 interface:

- `bert-algorithm`
- `bert-error-rate`
- `bert-period`
- `buildout`
- `framing`
- `line-encoding`
- `loopback`
- `remote-loopback-respond`

The T1 interface inherits these option settings from the parent channelized T1 interface.

Configuring Fractional T1 IQ Interfaces

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

1. Include the `no-partition` statement at the `[edit interfaces ct1-fpc/pic/port]` hierarchy level:

```
[edit interfaces ct1-fpc/pic/port]
no-partition interface-type t1;
```

This configuration creates the interface `t1-fpc/pic/port`.

2. Configure the number of time slots allocated to the T1 IQ interface by including the `timeslots` statement at the `[edit interfaces t1-fpc/pic/port t1-options]` hierarchy level:

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

DS0 timeslots configured on the channelized T1 IQ interface are numbered from 1 to 24.

To configure ranges, use hyphens. To configure discontinuous time slots, use commas. Do not include spaces.

For more information about T1 time slots, see “Configuring Fractional T1 Time Slots” on page 555.

Example: Configuring Fractional T1 IQ Interfaces

Configure a fractional T1 interface that uses time slots 2 through 10:

```
[edit interfaces t1-0/0/0]
no-partition interface-type t1;

[edit interfaces t1-0/0/0 t1-options]
timeslots 1-10;
```

For a full configuration example, see the *JUNOS Feature Guide*.

Configuring NxDS0 IQ Interfaces

By default, all the time slots on a channelized T1 interface are used. To configure an NxDS0 IQ interface on a Channelized T1 IQ PIC, you must configure the number of time slots allocated to the NxDS0 IQ interface by including the `partition`, `timeslots`, and `interface-type` statements at the `[edit interfaces t1-fpc/pic/port]` hierarchy level, specifying the `ds` interface type:

```
[edit interfaces t1-fpc/pic/port]
partition partition-number timeslots time-slot-range interface-type ds;
```

For channelized T1 IQ interfaces, the partition number range is from 1 through 24.

For channelized T1 IQ interfaces (`t1-fpc/pic/port`), 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 about T1 time slots, see “Configuring Fractional T1 Time Slots” on page 555.

Example: Configuring an NxDS0 IQ Interface

Configure an NxDS0 interface that uses time slots 2 through 10. This configuration creates the `ds-0/0/0:1` interface.

```
[edit interfaces t1-0/0/0:1]
partition 1 timeslots 1-10 interface-type ds;
```

For a full configuration example, see the *JUNOS Feature Guide*.

Configuring Payload Loopback

Clocking and loopback options are configured at the controller level for all IQ-based interfaces. However, for the channelized T1 IQ interfaces, configure the payload loopback on the T1 interfaces instead of the channelized T1 IQ interface. To configure the payload option, include the `payload` statement at the `[edit interfaces t1-fpc/pic/port t1-options loopback]` hierarchy level.

By default, all the time slots on a channelized T1 IQ interface are used. There can be a maximum of 24 channel groups per channelized T1 IQ interface. Thus, you can configure a maximum of 240 channel groups per PIC.

To specify the DS0 channel group number in the interface name, include a colon (:) as a separator. For example, a Channelized T1 IQ PIC might have the following physical and virtual interfaces:

```
ds-0/0/0:x
```

`x` is a DS0 channel group from 1 through 24 (for more information about ranges, see Table 31 on page 337).

You can use any of the values within the range available for `x`; you do not have to configure the links sequentially. In addition, the JUNOS software applies the interface options you configure according to the following rules:

- To configure the `t1-options` statement, you must set channel group `x` to 0:


```
ds-0/0/0:0
```
- There are no restrictions on configuring the `ds0-options` statement.
- If you delete a configuration you previously committed for channel group 0, the options return to default values.

To configure the channel groups and time slots for a channelized T1 IQ interface, include the following statements at the `[edit chassis]` hierarchy level:

```
[edit chassis]
fpc slot-number {
  pic pic-number {
    ct1 {
      t1 link-number {
        channel-group group-number;
        timeslots time-slot-range;
      }
    }
  }
}
```

There are 24 time slots on a T1 interface. You can designate any combination of time slots. To configure ranges, use hyphens. To configure discontinuous time slots, use commas. Do not include spaces.

Table 31 shows the ranges you can specify.

Table 31: Ranges for Channelized T1 IQ Configuration

Item	Option	Range
FPC slot	<i>slot-number</i>	0 through 7
PIC slot	<i>pic-number</i>	0 through 3
T1 port	<i>port-number</i>	0 through 9
DS0 channel group	<i>partition</i>	1 through 24
Time slot	<i>time-slot-range</i>	1 through 24

The theoretical maximum number of channel groups possible per PIC is $10 * 24 = 240$. This is within the maximum bandwidth available.

Configuring Channelized T1 Interface Properties

To configure channelized T1 IQ interface properties, include the `t1-options` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]
t1-options {
  byte-encoding (nx56 | nx64)
  fcs (16 | 32);
  framing (esf | sf);
  idle-cycle-flag (flags | ones);
  invert-data;
  line-encoding (ami | b8zs);
  loopback (local | payload | remote);
  start-end-flag (filler | shared);
}
```



NOTE: If you configure the `line-encoding` statement with the `ami` option and the `byte-encoding` statement with the `nx64` option, excessive zeros in the payload area may bring the interface down. To prevent this, configure the `byte-encoding` statement with the `nx56` option or include the `invert-data` statement.

To specify options for each of the DS0 channels, include the `ds0-options` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]
ds0-options {
  byte-encoding (nx56 | nx64);
  fcs (16 | 32);
  idle-cycle-flag (flags | ones);
  loopback payload;
  start-end-flag (filler | shared);
}
```

Only a subset of the T1 options is valid for the channelized configuration; you specify the time slots using the [edit chassis] configuration described in “Examples: Interface Naming” on page 43. For more information about the T1 and DS0 options, see “Configuring T1 Interfaces” on page 547.

Each T1 interface has 24 time slots (DS0s). You can combine one or more of these DS0 time slots (channels) to create a channel group (NxDS0). There can be a maximum of 24 channel groups per T1 interface.

Example: Configuring Channelized T1 IQ Interfaces

Configuring a T1 Interface Configure a channelized T1 interface as an unpartitioned, clear channel.

```
[edit interfaces]
ct1-2/0/0 {
  no-partition interface-type t1; # t1-2/0/0
}
```

Configuring a Channel Group Configure a partitioned channel group.

```
[edit interfaces]
ct1-0/0/1 {
  partition 1 interface-type ds0 timeslots 1-10;
  partition 2 interface-type ds0 timeslots 11-20;
}
```

Configuring Multiple Interface Types The following configuration is sufficient to get the channelized T1 IQ interface up and running:

```
[edit]
interfaces {
  ct1-1/2/3 {
    partition 1 timeslots 10 interface-type ds; # ds-1/2/3:1
    partition 2 timeslots 1-9 interface-type ds; # ds-1/2/3:2
  }
  ds-1/2/3:1 {
    unit 0 {
      family inet {
        address 10.25.1.2/24;
      }
    }
  }
  ds-1/2/3:2 {
    unit 0 {
      family inet {
        address 10.25.2.2/24;
      }
    }
  }
}
```

```
[edit]
interfaces {
  ct1-1/2/6 {
    no-partition interface-type t1; # t1-1/2/6
  }
  t1-1/2/6 {
    t1-options {
      timeslots 1-2;
    }
    unit 0 {
      family inet {
        address 10.255.126.2/24;
      }
    }
  }
}
```

