

Chapter 13

Configure Channelized E1 Interfaces

Each Channelized E1 PIC and Channelized E1 PIC with QPP has 10 E1 ports that you can channelize to the *NxDS-0* level. Each E1 interface has 32 time slots (DS-0), in which time slot 0 is reserved. You can combine one or more of these DS-0 time slots (channels) to create a channel group (*NxDS-0*).

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For examples of Channelized E1 interface configuration, see the following:

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Example: Configure Channelized E1 QPP Interfaces on page 182

Configure Channelized E1 QPP Interfaces

This section describes how to configure Channelized E1 QPP interfaces, discussing the following topics:

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Configure Fractional E1 QPP Interfaces on page 174

Configure an *NxDS-0* QPP Interface on page 174

Configure E1 QPP Interfaces

On a 10-port Channelized E1 PIC with QPP, you can configure up to 10 E1 interfaces. To configure an E1 interface, include the `no-partition` statement at the `[edit interfaces ce1-fpc/pic/port]` hierarchy level:

```
[edit interfaces ce1-fpc/pic/port]
no-partition;
```

This configuration creates interface `e1-fpc/pic/port`.

Configure Fractional E1 QPP Interfaces

On a Channelized E1 PIC with QPP, you can configure up to 10 fractional E1 interfaces. To configure a fractional E1 interface on a Channelized E1 PIC with QPP, you must perform the following tasks:

1. Include the no-partition statement at the [edit interfaces ce1-fpc/pic/port] hierarchy level:

```
[edit interfaces ce1-fpc/pic/port]
no-partition;
```

This configuration creates interface e1-fpc/pic/port.

2. Configure the number of time slots allocated to the E1 QPP interface by including the timeslots statement at the [edit interfaces e1-fpc/pic/port e1-options] hierarchy level:

```
[edit interfaces e1-fpc/pic/port e1-options]
timeslots time-slot-range;
```

For Channelized E1 QPP interfaces, the time-slot range is 2 through 31. The default is to use all the time slots. You can designate any combination of time slots for usage. You can configure a range of values with hyphens, and you can separate multiple values with commas. Do not include spaces when you specify time slot numbers.

For more information about E1 time slots, see “Configure Fractional E1 Time Slots” on page 249.

Example: Configure Fractional E1 QPP Interfaces

Configure a fractional E1 interface that uses time slots 2 through 10:

```
[edit interfaces ce1-0/0/0]
no-partition;

[edit interfaces e1-0/0/0 e1-options]
timeslots 2-10;
```

Configure an NxDS-0 QPP Interface

On a Channelized E1 PIC with QPP, you can configure up to 310 NxDS-0 channels. To configure an NxDS-0 QPP interface on a Channelized E1 PIC with QPP, you must configure the number of time slots allocated to the NxDS-0 QPP interface by including the partition, timeslots, and interface-type statements at the [edit interfaces ce1-fpc/pic/port] hierarchy level, specifying the ds interface type:

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

For Channelized E1 QPP interfaces, the partition number range is 1 through 31; the time-slot range is 2 through 31. The default is to use all the time slots. You can designate any combination of time slots for usage. You can configure a range of values with hyphens, and you can separate multiple values with commas. Do not include spaces when you specify time slot numbers. For more information about E1 time slots, see “Configure Fractional E1 Time Slots” on page 249.

Example: Configure an NxDS-0 QPP Interface

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

```
[edit interfaces ce1-0/0/0:1]
partition 1 timeslots 2-10 interface-type ds;
```

Configure Channelized E1 QPP Interface Properties

This section lists the interface properties that are valid at each channel level on a Channelized E1 QPP interface, discussing the following topics:

Specify Options at the Channelized E1 QPP Interface Level on page 175

Specify Options at the E1 QPP Interface Level on page 176

Specify Options at the NxDS-0 QPP Interface Level on page 177

For more information, see “Channelized QPP Interface Properties” on page 169.

Specify Options at the Channelized E1 QPP Interface Level

To specify options at the Channelized E1 interface level, include the following statements at the [edit interfaces ce1-*fpc/pic/port*] hierarchy level:

```
[edit interfaces ce1-fpc/pic/port]
clocking clock-source;
disable;
description text;
e1-options {
  bert-algorithm algorithm;
  bert-error-rate rate;
  bert-period seconds;
  fcs (32 | 16);
  framing (g704 | g704-no-crc4 | unframed);
  loopback (local | remote);
}
no-partition;
partition partition-number oc-slice oc-slice-range interface-type type;
traceoptions {
  flag flag <flag-modifier> <disable>;
}
```

For more information about specific parameters, see “Configure Physical Interface Properties” on page 39 and “Configure E1 Interfaces” on page 243.

Specify Options at the E1 QPP Interface Level

To specify options at the E1 interface level, include the following statements at the [edit interfaces e1-*fpc/pic/port*] hierarchy level:

```
[edit interfaces e1-fpc/pic/port]
clocking clock-source;
dce;
disable;
description text;
e1-options {
  bert-algorithm algorithm;
  bert-error-rate rate;
  bert-period seconds;
  byte-encoding (nx64 | nx56);
  fcs (32 | 16);
  framing (g704 | g704-no-crc4 | unframed);
  idle-cycle-flag (flags | ones);
  loopback (local | remote);
  start-end-flag (shared | filler);
  timeslots time-slot-range;
}
encapsulation type;
hold-time up milliseconds down milliseconds;
keepalives <interval seconds> <down-count number> <up-count number>;
lmi {
  lmi-type (ansi | itu);
  n391dte number;
  n392dce number;
  n392dte number;
  n393dce number;
  n393dte number;
  t391dte seconds;
  t392dce seconds;
}
mtu bytes;
no-keepalives;
ppp-options {
  chap {
    access-profile name;
    local-name name;
    passive;
  }
}
traceoptions {
  flag flag <flag-modifier> <disable>;
}
(traps | no-traps);
unit logical-unit-number {
  logical-interface-statements;
}
```

For more information about specific parameters, see “Configure Physical Interface Properties” on page 39 and “Configure E1 Interfaces” on page 243.

Specify Options at the NxDS-0 QPP Interface Level

To specify options at the NxDS-0 interface level, include the following statements at the [edit interfaces ds-fpc/pic/port<:channel>] hierarchy level:

```
[edit interfaces ds-fpc/pic/port<:channel>]
accounting-profile name;
dce;
disable;
description text;
ds0-options {
  bert-algorithm algorithm;
  bert-error-rate rate;
  bert-period seconds;
  byte-encoding (nx64 | nx56);
  fcs (32 | 16);
  idle-cycle-flag (flags | ones);
  invert-data;
  loopback (payload | remote);
  start-end-flag (shared | filler);
}
encapsulation type;
hold-time up milliseconds down milliseconds;
keepalives <down-count number> <interval seconds> <up-count number>;
lmi {
  lmi-type (ansi | itu);
  n391dte number;
  n392dce number;
  n392dte number;
  n393dce number;
  n393dte number;
  t391dte seconds;
  t392dce seconds;
}
mtu bytes;
no-keepalives;
ppp-options {
  chap {
    access-profile name;
    local-name name;
    passive;
  }
}
traceoptions {
  flag flag <flag-modifier> <disable>;
}
(traps | no-traps)
unit {
  logical-interface-statements;
}
```

For more information about specific parameters, see “Configure Physical Interface Properties” on page 39.

Configure Channelized E1 Interfaces

There can be a maximum of 24 channel groups per 10-port Channelized E1 interface. Thus, you can configure a maximum of 240 channel groups per PIC.

To specify the DS-0 channel group number in the interface name, include a colon (:) as a separator. For example, a Channelized E1 PIC might have the following physical and virtual interfaces:

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

x is a DS-0 channel group ranging from 0 through 23 (see Table 18 on page 179 for more information about ranges).

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 e1-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 E1 interface, include the following statements at the [edit chassis] hierarchy level:

```
[edit chassis]
fpc slot-number {
  pic pic-number {
    ce1 {
      e1 link-number {
        channel-group group-number timeslots time-slot-range;
      }
    }
  }
}
```



Note

If you commit the interface name but do not include the [edit chassis] configuration, the Channelized E1 PIC behaves like a standard E1 PIC: None of the DS-0 functionality is accessible.

For example, the following configuration assigns channel groups and time slots for three interfaces:

```
[edit chassis]
fpc 0 {
  pic 1 {
    ce1 {
      e1 0 {
        channel-group 1 timeslots 1;
        channel-group 5 timeslots 5-7;
      }
      e1 4 {
        channel-group 10 timeslots 11,17, 28-31;
      }
    }
  }
}
```

This configuration results in the following interfaces:

ds-0/1/0:1, with time slot 1 allocated
 ds-0/1/0:5, with time slots 5 through 7 allocated
 ds-0/1/4:10, with time slots 11, 17, and 28 through 31 allocated

Note that the remaining ports (other than 0 and 4) remain as regular E1 interfaces (and follow the e1-0/1/x naming convention).

Table 18 shows the ranges you can specify for each of the elements in the preceding configuration:

Table 18: Ranges for Channelized E1 Configuration

Item	Option	Range
FPC slot	<i>slot-number</i>	0 through 7
PIC slot	<i>pic-number</i>	0 through 3
E1 link	<i>link-number</i>	0 through 9
DS-0 channel group	<i>group-number</i>	0 through 23
Time slot	time-slot-range	0 through 31 (with time slot 0 reserved)



Note

FPC slot range depends on platform. The maximum range of 0 through 7 applies to M40 routers; for M20 routers, the range is 0 through 3; for M10 routers the range is 0 through 1; for M5 routers, the only applicable value is 0.

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

There are 32 time slots on an E1 interface. The default is to use all the time slots; however, time slot 0 is reserved. You can designate any combination of time slots for usage. You can configure a range of values with hyphens, and you can separate multiple values with commas. Do not include spaces when you specify time slot numbers.

To use time slots 1 through 10, configure the time-slot range as follows:

```
[edit chassis fpc slot-number pic pic-number ce1 e1 link-number]
channel-group group-number timeslots 1-10;
```

To use time slots 1 through 5, time slot 10, and time slot 24, configure the time-slot range as follows:

```
[edit chassis fpc slot-number pic pic-number ce1 e1 link-number]
channel-group group-number timeslots 1-5,10,24;
```



Note

For channelized fractional E1 interfaces only, when you include the timeslots statement at the [edit interfaces interface-name e1-options] hierarchy level, time slot 1 is reserved, so you must allocate time slots in the range of 2 through 31. Alternatively, you can configure time slots by including the channel-group and timeslots statements at the [edit chassis] hierarchy level, in which case you can allocate time slots in the range of 1 through 31.

To configure Channelized E1 interface properties, include the e1-options statement at the [edit interfaces interface-name] hierarchy level:

```
[edit interfaces interface-name]
e1-options {
  fcs (32 | 16);
  framing (g704 | g704-no-crc4 | unframed);
  idle-cycle-flag (flags | ones);
  loopback (local | remote);
  start-end-flag (shared | filler);
}
```

To specify options for each of the DS-0 channels, include the ds0-options statement at the [edit interfaces interface-name] hierarchy level:

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



Note

The set of options the JUNOS software applies to the interface depends on how you specify the interface name. For more information, see “Examples: Interface Naming” on page 26.

For DS-0 channels on a Channelized E1 interface, the clocking statement is supported only for channel 0; it is ignored if included in the configuration of channels 1 through 11. The clock source configured for channel 0 applies to all channels on the Channelized E1 interface. The individual DS-0 channels use a gapped 45-MHz clock as the transmit clock. When you configure the clock source for a channelized interface—ds-x/y/z:0, for example—you must also include the channel-group statement at the [edit chassis] hierarchy level, and specify channel group 0. For more information, see “Clock Sources on Channelized Interfaces” on page 166.

Only a subset of the E1 options is valid for the channelized configuration; you specify the time slots using the [edit chassis] configuration described in “Examples: Interface Naming” on page 26. For more information about the E1 and DS-0 options, see “Configure E1 Interfaces” on page 243 and “Configure T1 Interfaces” on page 387.

Each E1 interface has 32 time slots (DS-0s), in which time slot 0 is reserved. You can combine one or more of these DS-0 time slots (channels) to create a channel group (NxDS-0). There can be a maximum of 24 channel groups per E1 interface.

Example: Configure Channelized E1 Interfaces

The following configuration is sufficient to get the Channelized E1 interface up and running:

```
[edit chassis]
  fpc 0 {
    pic 1 {
      ce1 {
        e1 0 {
          channel-group 0 timeslots 1;
          channel-group 1 timeslots 2;
          channel-group 5 timeslots 5-7;
        }
        e1 4 {
          channel-group 10 timeslots 11,17, 28-31;
        }
      }
    }
  }
}

[edit interfaces ds-0/1/0:0]
e1-options {
  fcs 32;
  framing g704-non-grc;
  loopback remote;
}

[edit interfaces ds-0/1/4:10]
ds0-options {
  byte-encoding nx56;
  start-end-flag filler;
}
```

Example: Configure Channelized E1 QPP Interfaces

The following configuration is sufficient to get the Channelized E1 QPP interface up and running:

```
[edit]
interfaces {
  ce1-1/2/3 {
    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 {
  ce1-1/2/6 {
    no-partition; #e1-1/2/6
  }
  e1-1/2/6 {
    e1-options {
      timeslots 1-2;
    }
    unit 0 {
      family inet {
        address 10.255.126.2/24;
      }
    }
  }
}
```