



Configuring the T1/E1 Network Interface Module

The Cisco T1/E1 Network Interface Modules (NIM) are inserted into the NIM slot on the router to provide T1, fractional T1, E1, and fractional E1 support for data applications.

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Information About T1/E1 Network Interface Module

The IR8340 router has two Network Interface Module (NIM) slots, 0/2 and 0/3. The T1/E1 Network Interface Module IRM-NIM-2T1E1 can be installed in these two slots. It is a 2-port channelized data module and supports 24/31 channel groups for T1/E1 per port. Each T1/E1 module has two ports, P0 and P1. Each port is linked to a controller in configuration as below:

- If the module is in slot 0/2, it has two controllers 0/2/0 and 0/2/1.
- If the Module is in slot 0/3, it has two controllers 0/3/0 and 0/3/1.

Use RJ-48 cables to connect the T1/E1 modules between two devices.

Configuring T1/E1 Network Interface Module

Configuring the Card Type

The T1/E1 network interface module will not be operational until a card type is configured.

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Router> enable | Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted. |

| | Command or Action | Purpose |
|---------------|---|---|
| Step 2 | configure terminal Example: Router# <code>configure terminal</code> | Enter global configuration mode. |
| Step 3 | card type {t1 e1} slot subslot Example: Router(config)# <code>card type t1 0 2</code> | Specifies card type as T1 or E1 for the network interface module. In this example, the T1/E1 module is connected on 0/2 slot. |

Changing the Card Type

Procedure

| | Command or Action | Purpose |
|---------------|---|--|
| Step 1 | enable Example: Router> <code>enable</code> | Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted. |
| Step 2 | configure terminal Example: Router# <code>configure terminal</code> | Enter global configuration mode. |
| Step 3 | no card type {t1 e1} slot subslot Example: Router(config)# <code>no card type t1 0 2</code> | (Optional) Removes the previous configuration. |
| Step 4 | card type {t1 e1} slot subslot Example: Router(config)# <code>card type e1 0 2</code> | Specifies T1 or E1 connectivity for the network interface module. |
| Step 5 | exit Example: Router(config)# <code>exit</code> | Exits the card configuration mode and returns to global configuration mode. |
| Step 6 | write Example: Router(config)# <code>write</code> | Rebuilds the router configuration. |
| Step 7 | reload Example: Router(config)# <code>reload</code> | Reloads router so that changes can take effect. After this command executes, the router goes into the ROM monitor (rommon) mode. |

| | Command or Action | Purpose |
|---------------|---|---|
| Step 8 | boot Example: Router (rommon) # boot | Boots the router with the configuration for the newly selected card type. |

Configuring the T1/E1 Network Interface Module for Data Support

Procedure

| | Command or Action | Purpose |
|---------------|---|---|
| Step 1 | enable Example: Router> enable | Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted. |
| Step 2 | configure terminal Example: Router# configure terminal | Enter global configuration mode. |
| Step 3 | controller {t1 e1} slot/subslot/port Example: Router (config) # controller t1 0/2/0 | Enters controller configuration mode for the network interface module. <ul style="list-style-type: none"> • Valid values for slot is 0, subslot is 2 or 3, and port is 0 or 1. |
| Step 4 | Do one of the following: framing {sf esf} or framing {crc4 no-crc4} Example: Router (config-controller) # framing esf Router (config-controller) # framing crc4 | In T1 configurations, specifies super frame (sf) or extended super frame (esf) as the frame type for data lines. Default is esf . In E1 configurations, specifies cyclic redundancy check 4 (crc4) or no-crc4 as the frame type for data lines. Default is crc4 . |
| Step 5 | Do one of the following: linecode {ami b8zs} or linecode {ami hdb3} Example: Router (config-controller) # linecode b8zs | In T1 configurations, specifies alternate mark inversion (AMI) or bipolar 8-zero substitution (b8zs) as the linecode. Default is b8zs . Note When using linecode AMI, we recommend that you select 56 kbps as the speed or make sure that the channel groups created do not contain all the timeslots. See step 11. This is to avoid exceeding the “15 zeroes” threshold specified by standards. |
| Step 6 | fdl {att ansi both} Example: | T1 only. Sets the facility data link (fdl) exchange standard for T1 interfaces using esf framing. You can select the ATT standard |

| | Command or Action | Purpose |
|---------------|--|---|
| | <code>Router(config-controller)# fdl both</code> | (ATT TR54016), the ANSI standard (ANSI T1.403), or both standards. Default is ansi . To disable fdl, enter the no fdl command. |
| Step 7 | <p>clock source {internal line [primary secondary] network}</p> <p>Example:</p> <pre>Router(config-controller)# clock source network</pre> | <p>Specifies the clock source. The options are as follows:</p> <ul style="list-style-type: none"> internal—Sets the controller framer as the clock master. <p>The clock source i nternal command is only applicable with the channel-group command and the pri-group (for data) command.</p> <p>Note The pri-group command is supported on the NIM-xCE1T1-PRI for data without the keyword voice-dsp.</p> <ul style="list-style-type: none"> line—Specifies the phase-locked loop (PLL) on a port. When both a primary port and a secondary port are configured and the primary port fails, the PLL switches over to the secondary. When the PLL on the primary port becomes active again, the PLL automatically switches to the primary port. network—Sets the controller to sync to the TDMSW clock for both TDM voice and data support. This configures the far end of the T1/E1 line as the clock line. <p>Default is line.</p> |
| Step 8 | <p>line-termination {75-ohm 120-ohm}</p> <p>Example:</p> <pre>Router(config-controller)# line-termination 75-ohm</pre> | <p>E1 only. Sets the line termination on an E1 controller.</p> <ul style="list-style-type: none"> 75-ohm specifies 75-ohm unbalanced termination. 120-ohm specifies 120-ohm balanced termination. |
| Step 9 | <p>loopback {diagnostic local {payload line} remote {iboc esf {payload line}}}</p> <p>Example:</p> <pre>Router(config-controller)# loopback remote esf line</pre> | <p>Sets the loopback method for testing the interface. Options are:</p> <ul style="list-style-type: none"> diagnostic —Loops the transmit signal back to receive. |

| | Command or Action | Purpose |
|-----------------------|---|---|
| | | <ul style="list-style-type: none"> • local —Puts the interface into local loopback mode at the payload or line level. • remote —Puts the interface into remote loopback mode through an inband bit oriented code (iboc) or, for T1 only, remote esf , which uses fdl codes to set payload or line levels. |
| <p>Step 10</p> | <p>Do one of the following: cablelength long <i>db-loss-value</i> or cablelength short <i>length</i></p> <p>Example:</p> <pre>Router(config-controller)# cablelength short 110</pre> | <p>T1 only.The cablelength long command attenuates the pulse from the transmitter using pulse equalization and line build-out. This command applies to cables longer than 660 feet. Loss values are:</p> <ul style="list-style-type: none"> • 0db • -7.5db • -15db • -22.5db <p>Default attenuation is 0db.</p> <p>The cablelength short command sets transmission attenuation for cable lengths of 660 feet or less. When you use the cablelength short command, specify the length as follows:</p> <ul style="list-style-type: none"> • 110 for cable lengths from 0 to 110 feet • 220 for cable lengths from 111 to 220 feet • 330 for cable lengths from 221 to 330 feet • 440 for cable lengths from 331 to 440 feet • 550 for cable lengths from 441 to 550 feet • 660 for cable lengths from 551 to 660 feet <p>There is no default cable length.</p> |
| <p>Step 11</p> | <p>channel group <i>channel-group-number</i> {<i>timeslots range</i> [<i>speed kbps</i>] unframed}</p> <p>Example:</p> <pre>Router(config-controller)# channel group 1 timeslots 1-4</pre> | <p>Configures the serial WAN on a T1 or E1 interface by specifying channels and their timeslots.</p> <p>For T1, values are as follows:</p> <ul style="list-style-type: none"> • channel-group-number is from 0 to 23. • timeslots range is from 1 to 24. |

| | Command or Action | Purpose |
|----------------|---|---|
| | | <ul style="list-style-type: none"> • Default value of speed for T1 is 64 kbps. Configuration of speed is optional. <p>For E1, values are as follows:</p> <ul style="list-style-type: none"> • channel-group-number is from 0 to 30. • timeslots range is from 1 to 31. • Default value of speed for E1 is 64 kbps. Configuration of speed is optional. • unframed (E1 only) specifies that all 31 timeslots are to be used for data and that none are to be used for framing signals. |
| Step 12 | national reserve <i>N sa4 sa5 sa6 sa7 sa8</i> Example: <pre>Router(config-controller)# national reserve 0 1 1 1 1 0</pre> | E1 only. Sets the six required national bits in E1 in the G.751 frame. Default is 1 1 1 1 1 1. |
| Step 13 | crc-threshold <i>value</i> Example: <pre>Router(config-controller)# crc-threshold 500</pre> | T1 only. Defines a severely errored second by specifying the number of CRC errors that must occur in one second to reach the severely errored second state. Default is 320. |
| Step 14 | yellow { generation detection } Example: <pre>Router(config-controller)# no yellow detection</pre> | <p>Enables generation and detection of yellow alarms. Default condition is that generation and detection of yellow alarms are enabled.</p> <p>Use the no form of the command to disable yellow alarm detection.</p> |
| Step 15 | bert pattern <i>pattern interval time</i> Example: <pre>Router(config-controller)# bert pattern 2^11 interval 1440</pre> | <p>(Optional) Activates the BERT with the chosen test pattern for a specified duration. Configure BERT patterns on the T1/E1 network interface modules as follows:</p> <ul style="list-style-type: none"> • When the linecode is AMI, use patterns 2¹¹, 2¹⁵, or 2²⁰-QRSS. • When the linecode is b8zs or hdb3, use patterns 2¹¹, 2¹⁵, 2²⁰-QRSS, or 2²⁰-O.153. • The interval time is from 1 to 14,400 minutes. |

Example of T1/E1 Network Interface Module Configuration

The following example shows the configuration of the router with the T1/E1 NIM installed and configured for data.

```
card type t1 0 2
controller T1 0/2/0
framing esf
linecode b8zs
cablelength long 0db
channel-group 0 timeslots 1
channel-group 1 timeslots 2
channel-group 2 timeslots 3
interface Serial0/2/0:0
 ip address 1.1.1.1 255.255.255.0
!
interface Serial0/2/0:1
 ip address 2.2.2.1 255.255.255.0
!
interface Serial0/2/0:2
 ip address 3.3.3.1 255.255.255.0
```

