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. • Enter your password if prompted.

	Command or Action	Purpose
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enter global configuration mode.
Step 3	**card type** {**t1**|**e1**} *slot subslot* **Example:** `Router(config)# card type t1 0 2`	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> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enter global configuration mode.
Step 3	**no card type** {**t1**|**e1**} *slot subslot* **Example:** `Router(config)# no card type t1 0 2`	(Optional) Removes the previous configuration.
Step 4	**card type** {**t1**|**e1**} *slot subslot* **Example:** `Router(config)# card type e1 0 2`	Specifies T1 or E1 connectivity for the network interface module.
Step 5	**exit** **Example:** `Router(config)# exit`	Exits the card configuration mode and returns to global configuration mode.
Step 6	**write** **Example:** `Router(config)# write`	Rebuilds the router configuration.
Step 7	**reload** **Example:** `Router(config)# reload`	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. • 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. • 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:** `Router(config-controller)# fdl both`	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
		(ATT TR54016), the ANSI standard (ANSI T1.403), or both standards. Default is **ansi** . To disable fdl, enter the **no fdl** command.
Step 7	**clock source** {**internal** | **line** [**primary** | **secondary**] | **network**} **Example:** `Router(config-controller)# clock source network`	Specifies the clock source. The options are as follows: • internal—Sets the controller framer as the clock master. The **clock source i nternal** command is only applicable with the **channel-group** command and the **pri-group** (for data) command. **Note** The **pri-group** command is supported on the NIM-xCE1T1-PRI for data without the keyword **voice-dsp** . • 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. Default is line.
Step 8	**line-termination** {**75-ohm**|**120-ohm**} **Example:** `Router(config-controller)# line-termination 75-ohm`	E1 only. Sets the line termination on an E1 controller. • **75-ohm** specifies 75-ohm unbalanced termination. • **120-ohm** specifies 120-ohm balanced termination.
Step 9	**loopback** {**diagnostic** | **local** {**payload** | **line** } | **remote** {**iboc** | **esf** {**payload** | **line** }}} **Example:** `Router(config-controller)# loopback remote esf line`	Sets the loopback method for testing the interface. Options are: • **diagnostic** —Loops the transmit signal back to receive.

	Command or Action	Purpose
		• **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.
Step 10	Do one of the following: **cablelength long** *db-loss-value* or **cablelength short** *length* **Example:** `Router(config-controller)# cablelength short 110`	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: • 0db • -7.5db • -15db • -22.5db Default attenuation is 0db. 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: • **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 There is no default cable length.
Step 11	**channel group** *channel-group-number* {**timeslots** *range* [**speed** *kbps*] | **unframed**} **Example:** `Router(config-controller)# channel group 1 timeslots 1-4`	Configures the serial WAN on a T1 or E1 interface by specifying channels and their timeslots. For T1, values are as follows: • channel-group-number is from 0 to 23. • **timeslots** range is from 1 to 24.

	Command or Action	Purpose
		• Default value of **speed** for T1 is 64 kbps. Configuration of **speed** is optional. For E1, values are as follows: • 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** *N sa4 sa5 sa6 sa7 sa8* **Example:** `Router(config-controller)# national reserve 0 1 1 1 1 0`	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** *value* **Example:** `Router(config-controller)# crc-threshold 500`	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:** `Router(config-controller)# no yellow detection`	Enables generation and detection of yellow alarms. Default condition is that **generation** and **detection** of yellow alarms are enabled. Use the **no** form of the command to disable yellow alarm detection.
Step 15	**bert pattern** *pattern* **interval** *time* **Example:** `Router(config-controller)# bert pattern 2^11 interval 1440`	(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: • When the linecode is AMI, use patterns 2^11, 2^15, or 2^20-QRSS. • When the linecode is b8zs or hdb3, use patterns 2^11, 2^15, 2^20-QRSS, or 2^20-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
```