Installing the Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module

This document provides information that you should know before and during the installation of the Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Modules in the Cisco 4451-X Integrated Services Router. This document contains the following sections:

Overview

The Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module (NIM) is inserted into the NIM slot of the Cisco ISR 4400 Integrated Services Routers and expands the capabilities of the router to provide data and voice (PVDM4 module required) support on T1/E1 trunks. Table 1 lists the network interface modules.

Table 1   Description of the Cisco Network Interface Modules

Network Interface Module SKU	Description
NIM-1CE1T1-PRI	1-port channelized data module. Supports 24 channel groups for T1 or 31-channel groups for E1 per port.
NIM-2CE1T1-PRI	2-port channelized data module. Supports 24 channel groups for T1 or 31-channel groups for E1 per port.

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Table 1   Description of the Cisco Network Interface Modules (continued)

Network Interface Module SKU	Description
NIM-8CE1T1-PRI	8-port channelized data module. Supports 24 channel groups for T1 or 31-channel groups for E1 per port.
NIM-1MFT-T1/E1	1-port clear channel data and voice T1/E1 module. Supports two channel groups per port.
NIM-2MFT-T1/E1	2-port clear channel data and voice T1/E1 module. Supports two channel groups per port.
NIM-4MFT-T1/E1	4-port clear channel data and voice T1/E1 module. Supports two channel groups per port.
NIM-8MFT-T1/E1	8-port clear channel data and voice T1/E1 module. Supports two channel groups per port.

Recommended Practices for Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module

This section describes recommended practices for safe and effective installation of the hardware described in this document.

Safety warnings included in this section apply to the Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Modules that are used on Cisco 4451-X Integrated Services Router.

Safety Recommendations

To prevent hazardous conditions, follow these safety recommendations while working with this equipment:

- Keep tools away from walk areas where you or others could fall over them.
- Do not wear loose clothing around the router. Fasten your tie or scarf and roll up your sleeves to prevent clothing from being caught in the chassis.
- Wear safety glasses when working under any conditions that might be hazardous to your eyes.
- Locate the emergency power-off switch in the room before you start working. If an electrical accident occurs, shut the power off.
- Before working on the router, turn off the power and unplug the power cord.
- Disconnect all power sources before doing the following:
    - Installing or removing a router chassis
    - Working near power supplies
- Do not work alone if potentially hazardous conditions exist.

- Always check that power is disconnected from a circuit.

- Remove possible hazards from your work area, such as damp floors, ungrounded power extension cables, or missing safety grounds.

- If an electrical accident occurs, proceed as follows:

  - Use caution; do not become a victim yourself.

  - Turn off power to the room using the emergency power-off switch.

  - Determine the condition of the viction and send another person to get medical aid or call for help.

  - Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

Preventing Electrostatic Discharge Damage

Electrostatic discharge can damage equipment and electrical circuitry. Electrostatic discharge occurs when electronic printed circuit cards, such as those used in Cisco service modules and network modules, are improperly handled and can result in complete or intermittent equipment failure. Always observe the following electrostatic discharge damage (ESD) prevention procedures when installing, removing, or replacing any electronic printed circuit cards:

- Make sure that the router chassis is electrically connected to earth ground.

- Wear an ESD-preventive wrist strap, and make sure that it makes good contact with your skin.

- Connect the wrist strap clip to an unpainted portion of the chassis frame to channel unwanted ESD voltages to ground.

⚠️
Caution The wrist strap and clip must be used correctly to ensure proper ESD protection. Periodically confirm that the resistance value of the ESD-preventive wrist strap is between 1 and 10 megohms (Mohm).

- If no wrist strap is available, ground yourself by touching the metal part of the router chassis.

General Maintenance Guidelines

The following maintenance guidelines apply to the Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module:

- Keep the router chassis area clear and dust-free during and after installation.

- If you remove the chassis cover for any reason, store it in a safe place.

- Do not perform any action that creates a hazard to people or makes equipment unsafe.

- Keep walk areas clear to prevent falls or damage to equipment.

- Follow installation and maintenance procedures as documented by Cisco Systems, Inc.

Safety Warnings

The following safety warning statements apply to all hardware procedures involving the Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module for Cisco 4451-X Integrated Services Router. Translations of these warnings are available in the *Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information* document, which ships with all individual Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module orders, and is also available online.

Warning   **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Warning   **Read the installation instructions before connecting the system to the power source.** Statement 1004

Warning   **To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.** Statement 1023

Warning   **This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028

Warning   **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning   **Do not use this product near water; for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.** Statement 1035

Warning   **Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.** Statement 1036

Warning   **Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.** Statement 1037

Warning   **Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.** Statement 1038

Warning   **To report a gas leak, do not use a telephone in the vicinity of the leak.** Statement 1039

Warning   **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

Warning   **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046

The following warnings apply in Australia:

Warning   **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.** Statement 43

Warning   **Because invisible laser radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to laser radiation and do not stare into open apertures.** Statement 125

Warning   **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

Warning   **To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Both LAN and WAN ports may use RJ-45 connectors. Use caution when connecting cables.** Statement 1021

Warning   **Hazardous network voltages are present in WAN ports regardless of whether power to the router is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the router first.** Statement 1026

Warning   **Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages.** Statement 1041

Warning   **The telecommunications lines must be disconnected 1) before unplugging the main power connector and/or 2) while the housing is open.** Statement 1043

Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module

Figure 1 shows the front panel of the 8-port network interface module, and Figure 2 shows the front panel of the 2-port network interface module.
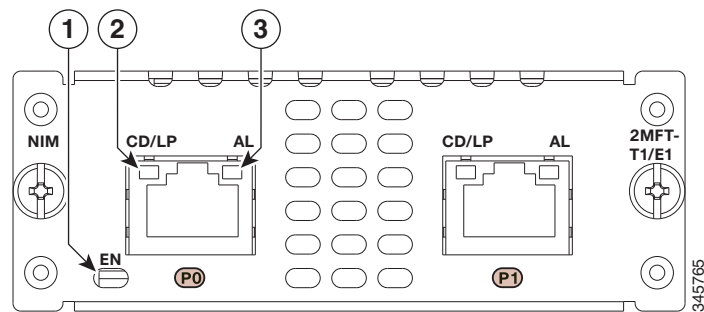
The LEDs for each port can be located at the top or bottom depending on the orientation of the port. The CD/LP LED is a bi-color LED, and the AL LED is a single-color LED. The LEDs are described in Table 2 on page 8.

Figure 1   8-Port Network Interface Module: Front Panel
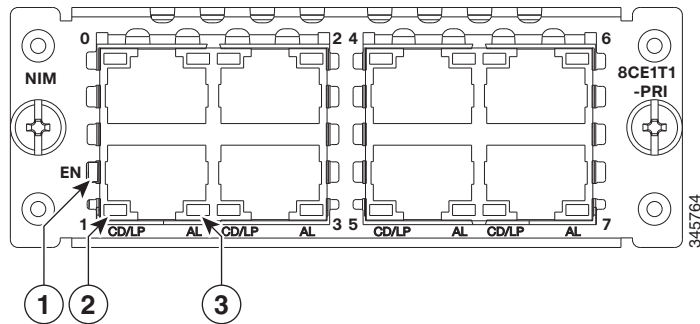
1	EN LED	**2**	CD/LP LED
3	AL LED		

Figure 2   2-Port Network Interface Module: Front Panel


1	EN LED	**2**	CD/LP LED
3	AL LED		

Note   The SKU for this product is identified by combining the three letters on the left side of the face plate "NIM", followed by a dash "-", and then followed by the remaining product identification on the right. For example, NIM-8CE1T1-PRI or NIM-2MFT-T1/E1.

Figure 3 shows the 8-port network interface module with support for multitrunk voice.

Figure 3   ***8-Port Network Interface Module***
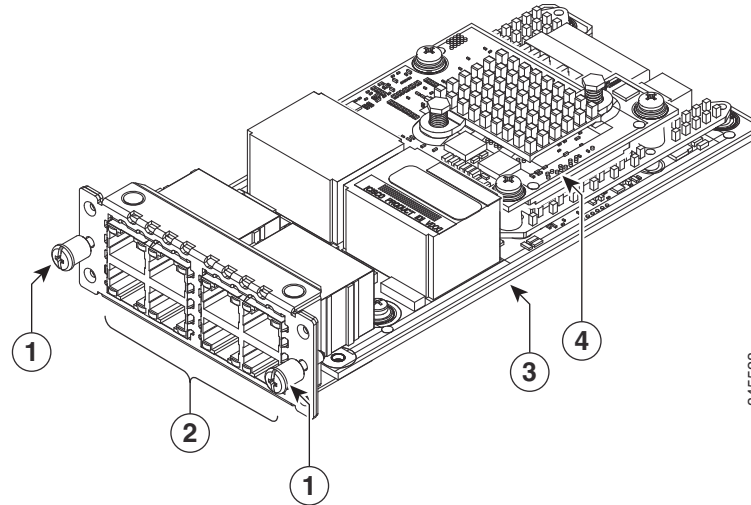
1	Screws	**2**	Ports
3	Network interface module	**4**	PVDM4

Figure 4 shows the exploded view of the PVDM4 on the network interface module. For more information on installing a PVDM4, see the *Installing PVDM4* document.

Figure 4   **Exploded View of the PVDM4 Module on the Network Interface Module**
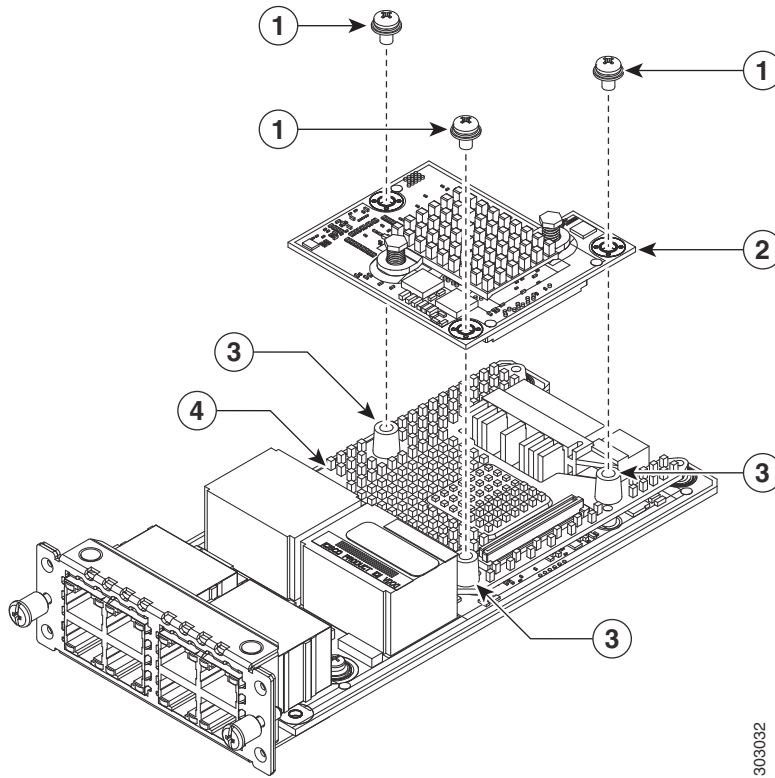
1	Screws	2	PVDM4
3	Standoffs	4	Heatsink

LEDs

The LEDs for each port are located on the front panel and are described in Table 2.

Table 2   **LEDs**

LEDs	Color	Description
CD/LP	Green or Yellow	Off: No Carrier Detected.
		Green On: Carrier Detected.
		Yellow On: Port is in loopback.

Table 2 *LEDs (continued)*

LEDs	Color	Description
AL	Yellow	Off: No Alarms.
		On: Alarm.
EN	Green or Yellow	Off: Card is not enabled.
		Green On: Card is enabled.
		Yellow On: Card is resetting/rebooting.

Installing Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Modules

This section describes the following installation tasks for Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Modules.

- Tools and Equipment Required During Installation
- Installing a Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module in the Cisco 4451-X Integrated Services Router
- Removing a Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module from the Cisco 4451-X Integrated Services Router

Tools and Equipment Required During Installation

You will need the following tools and equipment while working with the Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module:

- Number 1 Phillips screwdriver or a small flat-blade screwdriver
- ESD-preventive wrist strap

Warning **No user-serviceable parts inside. Do not open.** Statement 1073

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Installing a Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module in the Cisco 4451-X Integrated Services Router

Step 1 Shut down the electrical power to the slot in the router either by turning off the electrical power to the router or by issuing the online insertion and removal (OIR) commands. Leave the power cable plugged in to channel ESD voltages to ground. For more information on OIR, see the "Managing Cisco Enhanced Services and Network Interface Modules" chapter in the *Software Configuration Guide for the Cisco 4451-X Integrated Services Router*.

Step 2 Remove all network cables, including telephone cables, from the rear panel of the router.

Step 3 Remove the blank faceplates installed over the network interface module slot that you intend to use.

Tip Save blank faceplates for future use.

Step 4 Align the module with the guides in the chassis walls or slot divider and slide it gently into the NIM slot on the router.

Step 5 Push the module into place until you feel the edge connector seat securely into the connector on the router backplane. The module faceplate should contact the chassis rear panel.

Step 6 Using a number 1 Phillips or flat-blade screwdriver, tighten the captive screws on the network interface module.

Step 7 Connect the module to the network and re-enable the power to the slot in the router.

Tip See the "Related Documents" section on page 11 for information on locating additional hardware documentation.

Removing a Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module from the Cisco 4451-X Integrated Services Router

Step 1 Shut down the electrical power to the slot in the router either by turning off the electrical power to the router or by issuing the online insertion and removal (OIR) commands. Leave the power cable plugged in to channel ESD voltages to ground. For more information on OIR, see the "Managing Cisco Enhanced Services and Network Interface Modules" chapter in the *Software Configuration Guide for the Cisco 4451-X Integrated Services Router*.

Step 2 Remove all network cables, including telephone cables, from the rear panel of the router.

Step 3 Using a number 1 Phillips or flat-blade screwdriver, loosen the captive screws on the network interface module.

Step 4 Slide the network interface module out.

Step 5 If you are not replacing the module, install a blank faceplate over the empty slot to ensure proper air flow.

Related Documents

Related Topic	Document Title
Information on the Cisco 4451-X Integrated Services Router	*Hardware Installation Guide for the Cisco 4451-X Integrated Services Router*
Information on configuring Cisco 4451-X Integrated Services Routers	*Software Configuration Guide for the Cisco 4451-X Integrated Services Router*
Information about installing PVDM4	*Installing the Cisco PVDM4*
Information about configuring the Cisco network interface module	*Configuring the Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module*
Comprehensive command reference information for Cisco IOS voice commands	*Cisco Unified Border Element (SP Edition) Command Reference: Unified Model*
Configuration guides for different voice and video applications, H.332 networks, SIP devices, and Cisco Voice Gateway Routers.	*Cisco Unified Border Element Configuration Guide Library, Cisco IOS XE Release 3S*
Regulatory compliance and safety information	*Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information*