PCI/PXI GIGABIT ETHERNET ADAPTERS INSTALLATION GUIDE

National Instruments gigabit Ethernet adapters are based on the Intel 82540-compatible Ethernet controller.

This document explains how to install and troubleshoot the Ethernet drivers for your PCI/PXI board. Some boards also contain additional functionality (for example, GPIB). Refer to the documentation that came with your kit to install the software for the other functionality.

Installing Your PXI Board

Complete the following steps to install the Ethernet adapter:

1. Shut down Windows, if it is running, by clicking **Start»Shut Down**.

2. Turn off your PXI or CompactPCI chassis. Keep the chassis plugged in so that it remains grounded as you install the adapter.

3. Remove the filler panel from a PXI peripheral bus master slot. The adapter requires a bus master slot to take advantage of the onboard DMA and Ethernet controllers. All PXI chassis and most CompactPCI chassis contain only bus master slots. Refer to your chassis documentation to verify you are using a bus master slot.

4. Touch a metal part on your chassis to discharge any static electricity that might be on your clothes or body.

5. Insert the adapter into the selected bus master slot. Use the injector/ejector handle to fully inject the device into place.

6. Screw the front panel of the adapter to the front panel mounting rail of the PXI or CompactPCI chassis.

Installing Your PCI Board

Complete the following steps to install the Ethernet adapter:

1. Shut down Windows, if it is running, by clicking **Start»Shut Down**.

2. Turn off the computer and unplug the power cord.

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3. Remove the cover to give yourself access to the expansion slots.

4. Choose an empty PCI slot and remove the slot cover by unscrewing the screw that secures it.

5. Insert the adapter into the PCI slot and push until it is firmly seated. Reinstall the screw you removed in step 4.

6. Replace the cover and plug in the power cord.

Connect the Network Cable

Complete the following steps to connect the network cable:

1. Connect a Twisted Pair Ethernet (TPE) network cable to the adapter as shown in Figure 1.
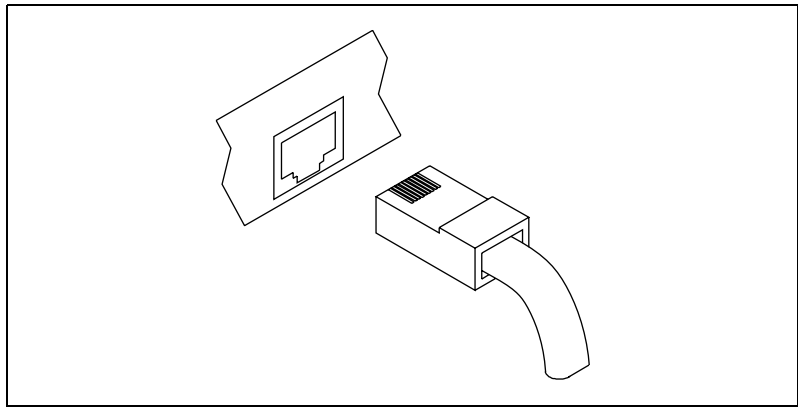

Figure 1. Connecting the Network Cable

- For 1000BaseT (gigabit over copper), use Category 5 (must be 4-pair wiring). Be sure to use Category 5 cable that complies with the TIA-568 wiring specification. For more information on this specification, refer to the Telecommunications Industry Association Web site, www.tiaonline.org.

- For 100BaseTX, use Category 5 wiring or better.

⚠ **Caution** If using less than 4-pair cabling, you *must* manually configure the speed and duplex setting of the adapter and the link partner. In addition, with 2- and 3-pair cabling, the adapter can achieve speeds of up to only 100 MB/s.

- For 10BaseT, use Category 3 wiring or better.

- To use this adapter in a residential environment (at any speed), use Category 5 wiring. If the cable runs between rooms or through walls and/or ceilings, it should be plenum rated for fire safety.

- The cable length is limited to 100 m.
- The adapter must be connected to a compatible link partner, preferably set to auto-negotiate speed and duplex.
- The PCI-8231/8232 and PXI-8231/8232 automatically accommodate either MDI or MDI-X connections. The auto-MDI-X feature allows you to directly connect two adapters without using a crossover cable.

2. To configure Ethernet for your adapter, continue with the procedure specific to your operating system outlined later in this guide.
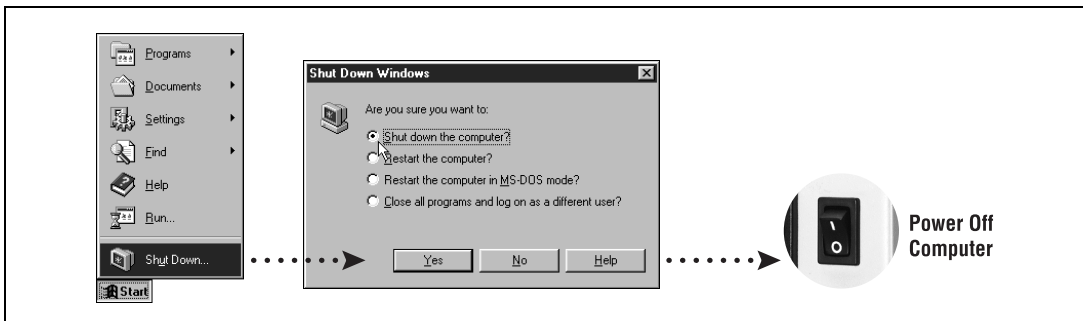
Install the Drivers

Follow the installation instructions for your operating system. The adapter works with the following operating systems:

- Windows Me/98
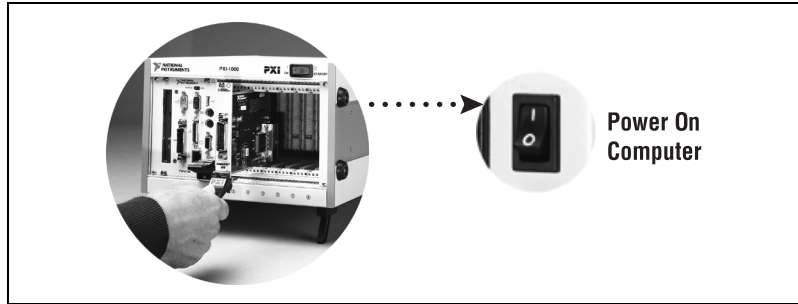- Windows 2000/XP
- Windows NT 4.02

Windows Me/98

To install the drivers, complete the following steps:

1. Shut down, then power off the computer as shown in the following figure.

2. Install the hardware and cables, then power on the computer as shown in the following figure.

Power On Computer
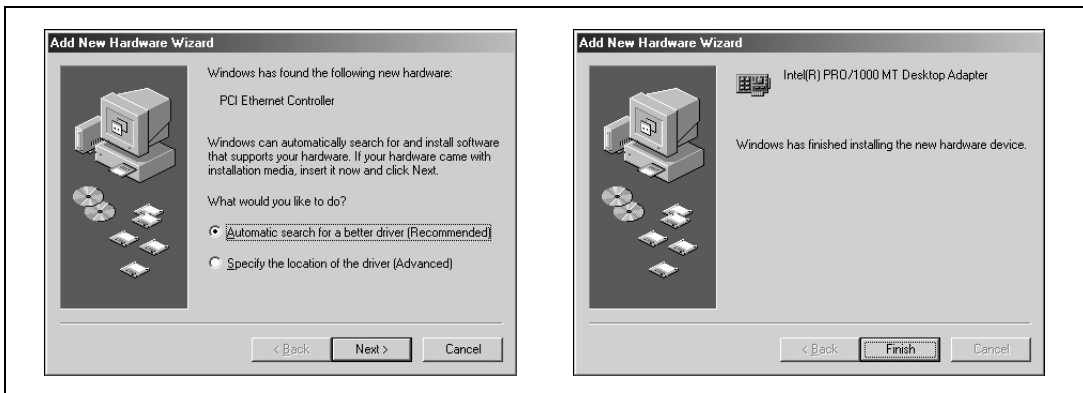
3. Install the PCI-PCI bridge driver.

   Windows automatically detects the new hardware.

   Follow the prompts in the Wizard. Select the recommended options when given a choice. If Windows asks where to search for a new driver, clear all checkboxes and click **Next**.

4. Install the Windows Me/98 Ethernet drivers.

   Windows Me

   Windows automatically detects the new hardware and displays an **Add New Hardware Wizard** window, as shown in the following figure. Insert the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM and follow the instructions. Choose the **Recommended** options when given a choice and click **Next**.
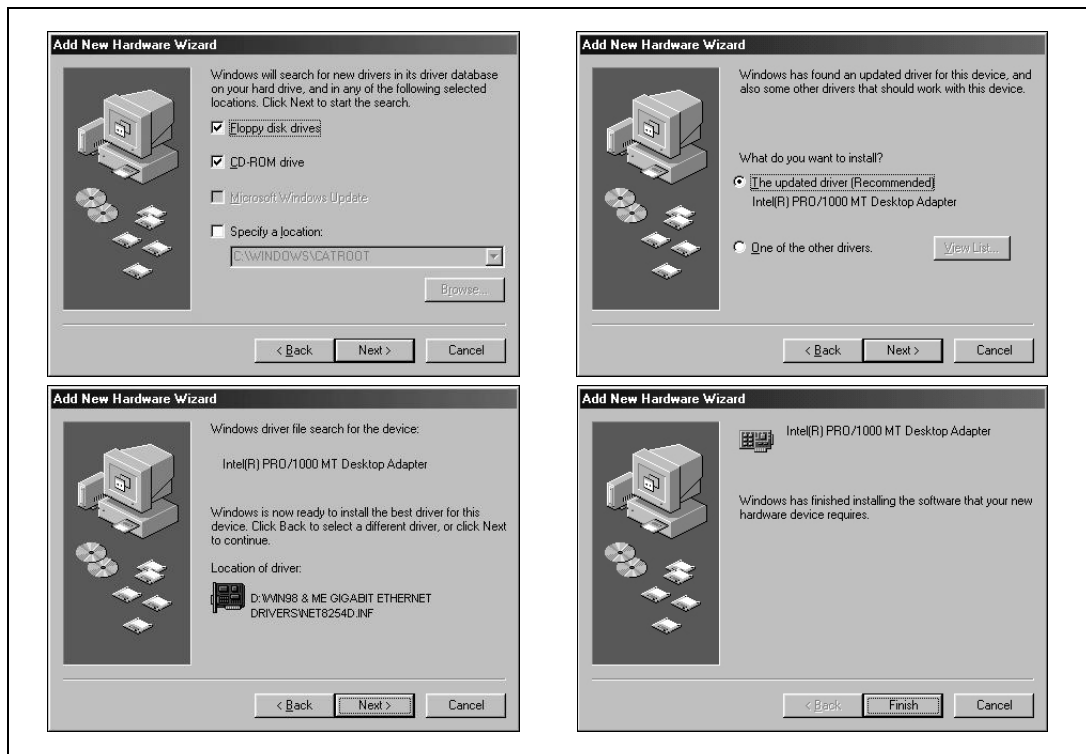

   Windows 98

   Windows automatically detects the new hardware and displays an **Add New Hardware Wizard** window, as shown in the following figure. Insert the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM and follow the instructions presented. Choose the **Recommended** options when given a choice.
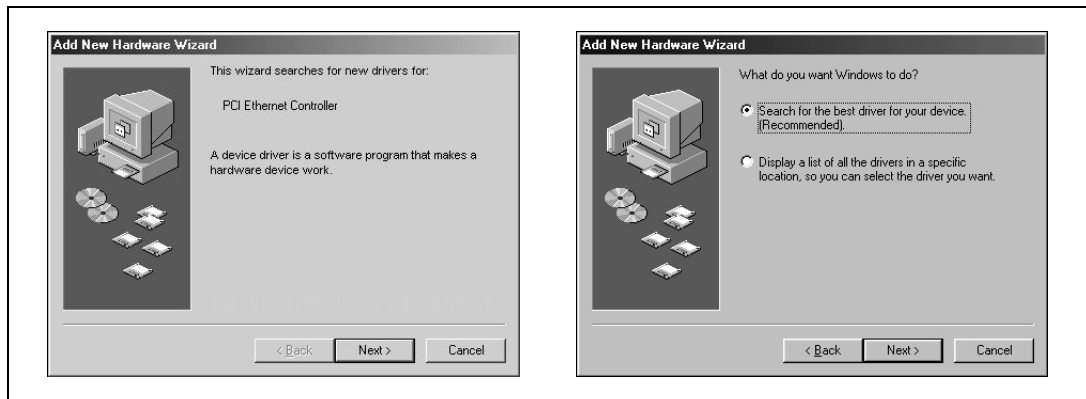
If Windows asks where to search for a new driver, make sure the box next to **CD-ROM Drive** is checked and click **Next**, as shown in the following figure.


Tip If Windows displays a dialog box saying it cannot locate the file on the *Intel PRO Adapter* CD-ROM, insert the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM and tell Windows to copy files from the Win98Me directory of the CD-ROM drive (typically d:\Win98Me\).

Tip If Windows displays a dialog box indicating it cannot locate a file on the Windows 98 CD-ROM, try inserting the *Windows 98 Installation* CD-ROM and tell Windows to copy files from either the top directory or the `win98` directory of the CD-ROM drive (typically `d:\` or `d:\win98\`).
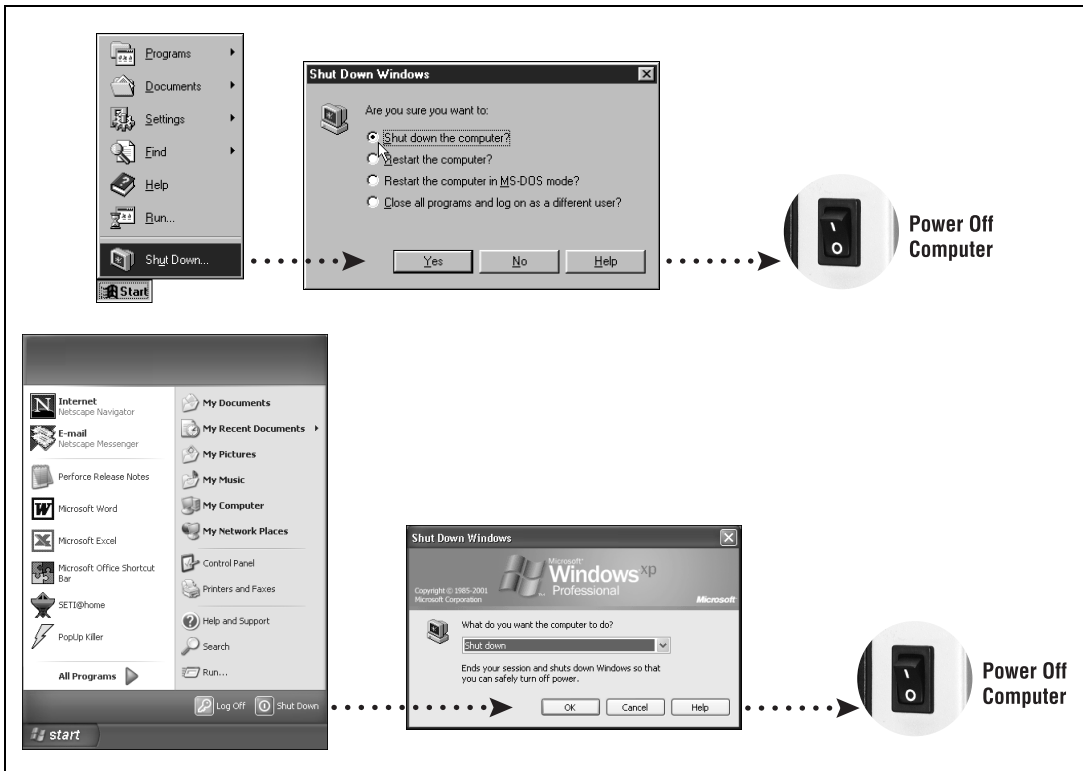
5. Restart the computer as shown in the following figure, then connect to your network.
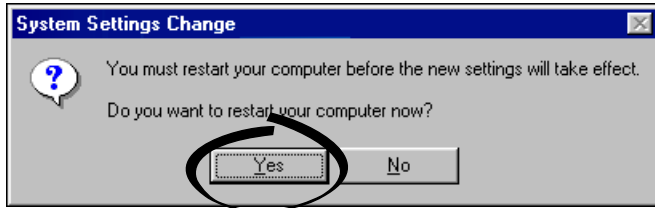
Windows 2000/XP

To install the drivers, complete the following steps:

1. Shut down and power off the computer, as shown in the following figure.

2. Install the hardware and cables, then power on the computer as shown in the following figure.

Power On
Computer
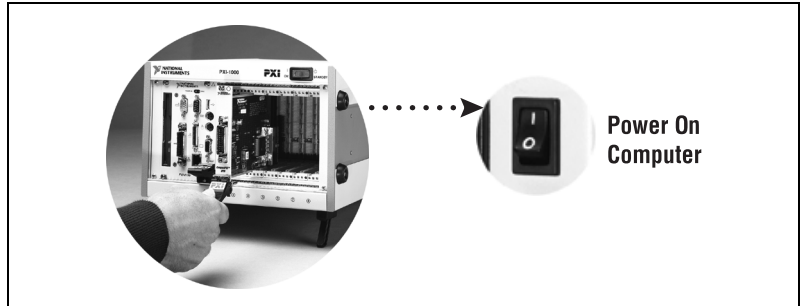
3. Install the Windows 2000/XP Ethernet drivers.

Windows 2000

Windows automatically detects the new hardware and displays a **Found New Hardware Wizard** window, as shown in the following figure. Insert the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM and follow the directions. Choose the **Recommended** options when given a choice.
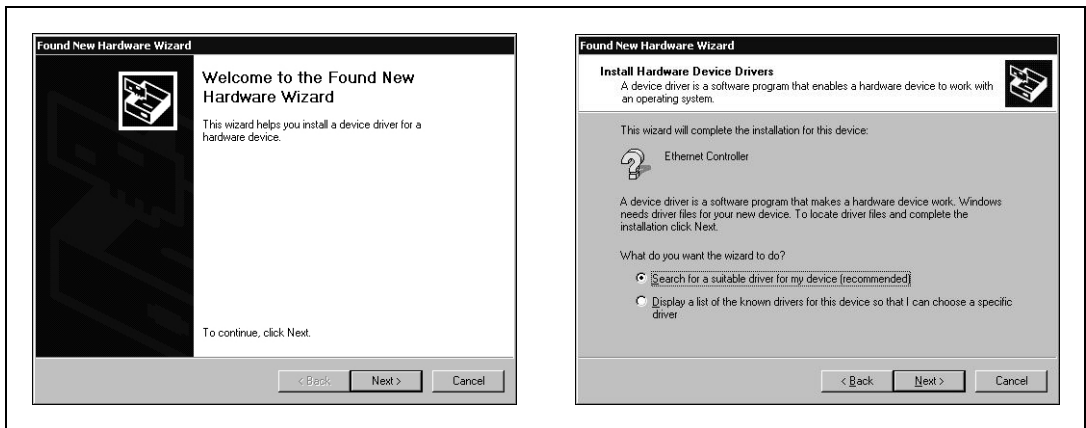
If Windows asks where to search for a new driver, make sure the box next to **CD-ROM Drive** is checked and click **Next**.
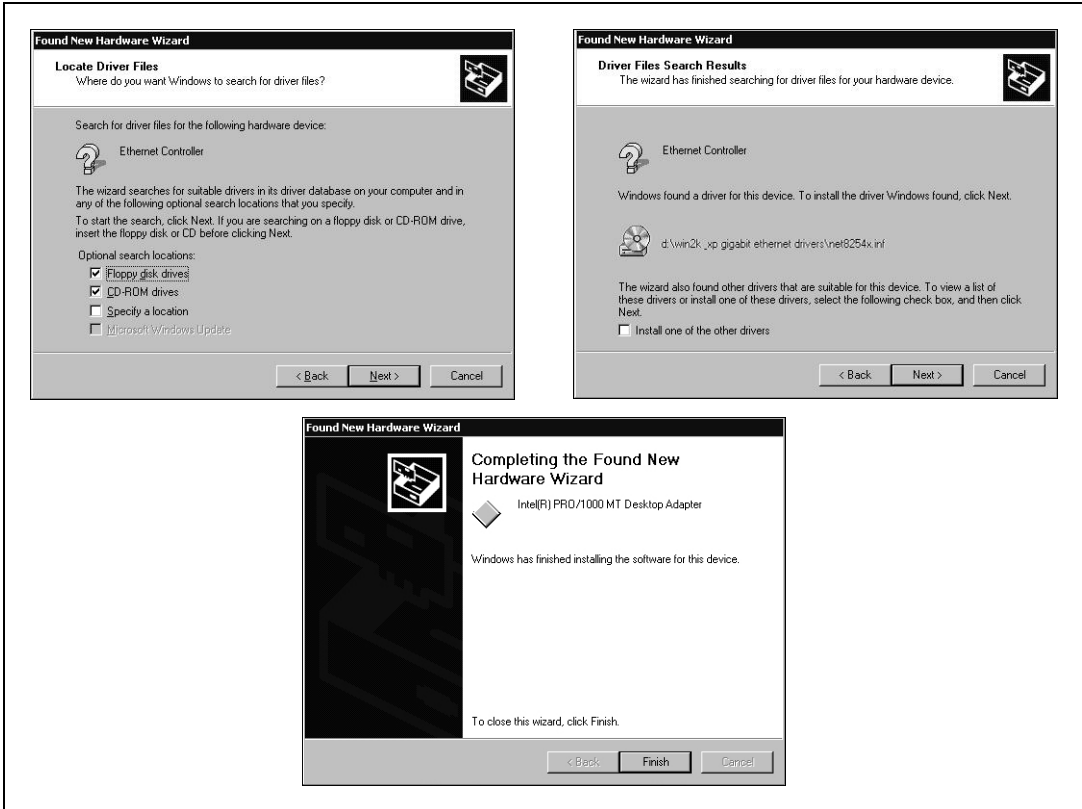
Windows XP

Windows automatically detects the new hardware and displays a **Found New Hardware Wizard** window, as shown in the following figure. Insert the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM and follow the directions. Choose the **Recommended** options when given a choice and click **Next**.
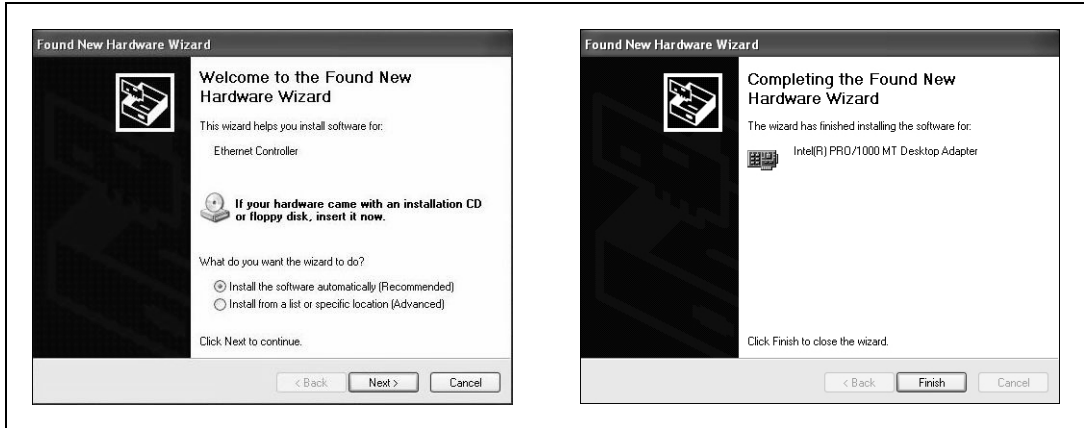
Tip If Windows displays an **Insert Disk** dialog box or indicates it cannot locate a file on the *Intel PRO Adapter* CD-ROM, insert the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM and tell Windows to copy files from the `Win2kXP` directory of the CD-ROM drive (typically `d:\Win2kXP\`).

4. Restart the computer as shown in the following figure, then connect to your network (Windows 2000 only).
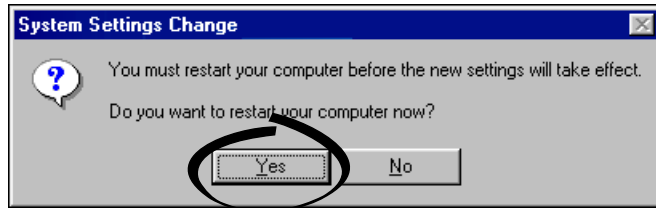
Windows NT 4.02

To install the drivers, complete the following steps:

1. Shut down, then power off the computer as shown in the following figure.



2. Install the hardware and cables, then power on the computer as shown in the following figure.
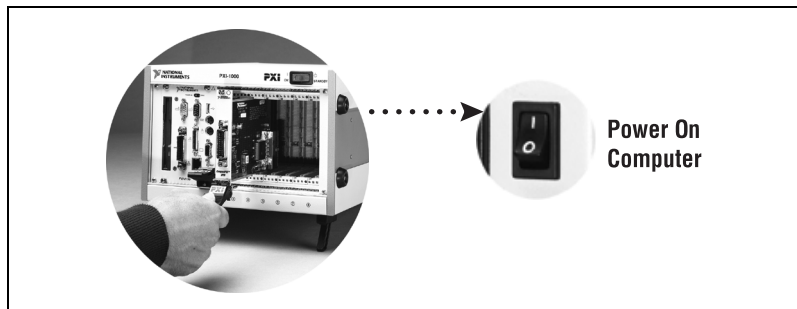
3. Install the Windows NT 4.0 Ethernet drivers.

   Select **Start»Settings»Control Panel»Network»Adapters** and click **Add** as shown in the following figure. Click **Have Disk** and insert the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM. You may also be prompted for the original Windows NT CD-ROM.
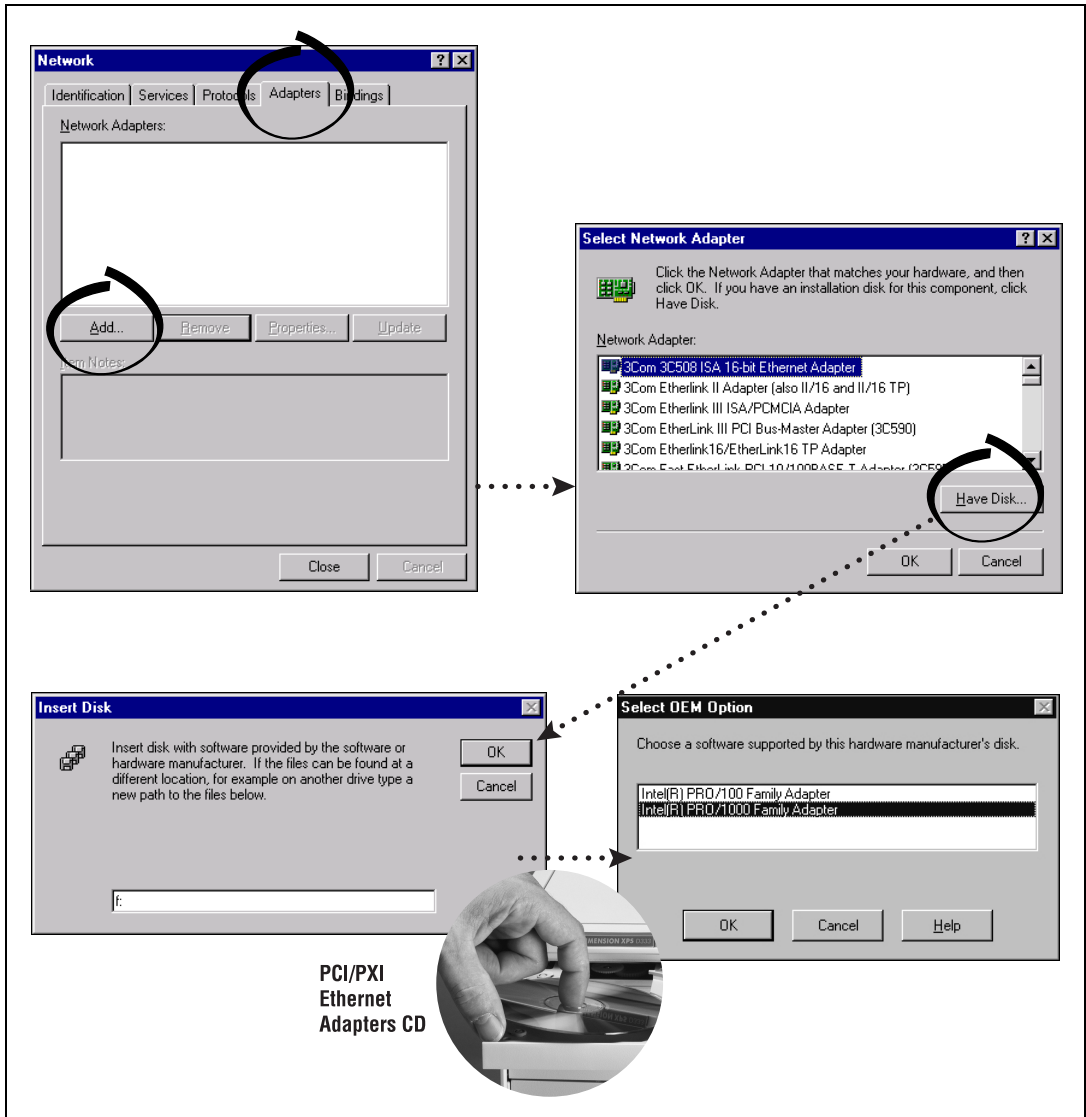
Note Service Pack 5 or later is required for Ethernet driver installation. Advanced features require Service Pack 6a or later.

Note When installing adapters on a Windows NT system that does not have any other adapters installed, you must install Networking support.

Tip If Windows displays an **Insert Disk** dialog box or indicates it cannot locate a file on the *Intel PRO Adapter* CD-ROM, insert the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM and tell Windows to copy files from the `WinNT` directory of the CD-ROM drive (typically `d:\WinNT\`).
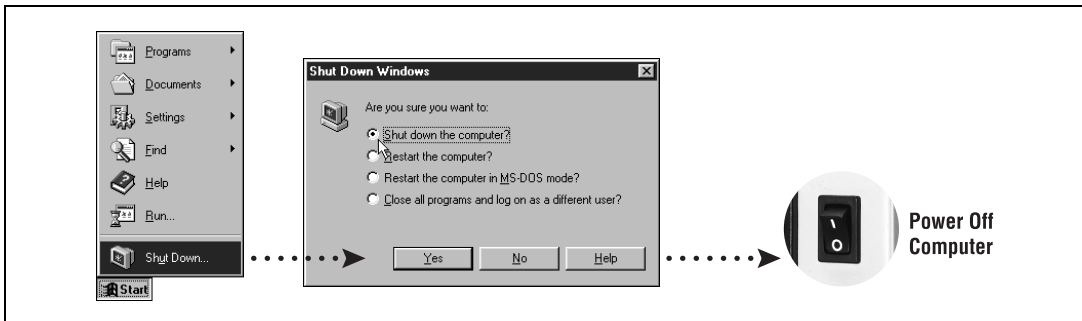
4. Restart the computer as shown in the following figure, then connect to your network.
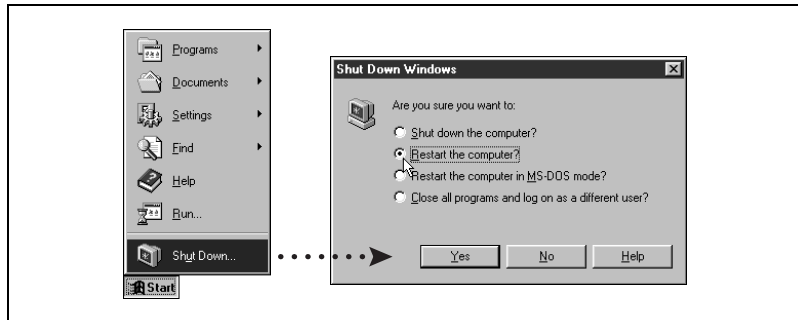
Alternative Driver Installation Options for the PXI-8231/8232

The installation instructions illustrated for each operating system in this document are appropriate for most users. However, if your PXI chassis does not contain a CD-ROM drive, try one of the following alternatives to load the Ethernet driver.

*   If you have an existing Ethernet connection in your PXI chassis, download the Intel Ethernet driver from the National Instruments Web site. Access the **Drivers and Downloads** page at `ni.com/download`.

*   Connect an external CD-ROM, such as a USB CD-ROM, and load the Ethernet driver directly from the *PCI/PXI Gigabit Ethernet Drivers* CD-ROM.

*   Use another computer that has a CD-ROM to copy the Ethernet driver onto a 3.5 in. floppy disk:

    1. Open a DOS command window.

    2. Change to the directory on the CD-ROM that matches the OS you want to use with the diskette.

    3. Change to the `\MAKEDISK` directory.

    4. Depending on your OS, enter: `MAKE2KXP`, `MAKENT`, or `MAKE98ME` `[destination` (optional; `A:` if not specified)`]`.

Troubleshooting

Windows NT Troubleshooting

If Windows NT reports an error or you cannot connect to the network, try the following suggestions first. If you are still having trouble, refer to the additional topics in this section.

- Service Pack 5 or later is required for driver installation. Advanced features require Service Pack 6a or later.

- When installing adapters on a Windows NT system with no other adapters installed, you must install Networking support. To successfully install Networking and the adapter drivers, you can either:

  – Copy the required Windows NT 4.0 Networking files to the hard drive and use the Intel CD-ROM to install the adapter driver, or

  – Use the Windows NT 4.0 CD-ROM to install Networking and create setup disks to complete driver installation. To create setup disks, click **Create Install Disk** in the Autorun screen.

- Make sure you are using the drivers provided on the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM.

- Make sure the drivers are loaded and the protocols are bound. Check the settings in the **Network/Bindings** dialog box in the Control Panel.

- Check the Windows NT Event Viewer for error messages.

- Make sure **Plug and Play OS** is set to NO in your computer's BIOS.

- Test the adapter with the PROSet 2 advanced configuration utility that was installed on your system when you installed the drivers. To start PROSet, double-click the **PROSet 2** icon in the Windows Control Panel. To run diagnostics, select the adapter and click the **Diagnostics** tab, then click **Run Tests**.

- If you do not see the **ProSet 2** icon, refer to the *Additional Troubleshooting Tools* section.

Testing the Adapter

Test the adapter by running diagnostics. To test the Ethernet functionality, run PROSet 2 by double-clicking the **PROSet 2** icon in the Control Panel. Select the adapter and click the **Diagnostics** tab, then click **Run Tests**.

If your board has GPIB functionality, run the NI-488.2 Getting Started Wizard to verify your hardware and software installation.

WOL558.VXD Missing or Not Found (Windows 98 Only)

This error can occur in Windows 98 if an `.inf` file already installed on the system interferes with the driver installation. Complete the following steps to manually install the Ethernet adapter:

1. Open Windows Explorer.
2. Select **Views»Folder Options**.
3. Select the **View** tab.
4. Select **Show all files** and click **OK**.
5. Delete `net557.inf` and `net557.pnf` in the `Windows/inf` folder.
6. Double-click the **System** icon from the Control Panel.
7. Select the **Device Manager** tab and double-click **Network Adapters**.
8. Select the **Intel PRO/1000 MT Desktop Adapter** and click **Remove**.
9. Restart your computer.
10. Follow the instructions given previously in the *Windows Me/98* section to install the Windows 98 drivers.

Adapter Cannot Connect to the Network

1. Make sure the cable is installed properly.

   The network cable must be installed properly at both the adapter and the hub. The maximum distance for the cable is 100 m. If the cable is connected properly and within the allowed distance, try another cable.

2. Check the LEDs on the adapter.

   The adapter has two LEDs located on the RJ-45 connector.
   The following table lists the function of each LED.

LED Color	Function	Indication	Meaning
Green	Action/Link	On	The adapter is receiving power. The cable connection is good.
		Off	The adapter is not sending or receiving network data. The adapter is not receiving power. The cable connection is bad or you have a driver problem.
		Flashing	The adapter is sending and receiving network data.
Yellow/Green	Speed	Yellow	The adapter is operating at 1,000 Mb/s.
		Green	The adapter is operating at 100 Mb/s.
		Off	The adapter is operating at 10 Mb/s.

3. Make sure you are using the correct drivers.

    Verify that you are using the drivers that came with the adapter.

Computer Hangs when Drivers Are Loaded

Change the PCI BIOS interrupt settings. Refer to the *PCI/PXI Installation Tips* section for more information.

Diagnostics Pass, but Connection Fails or Errors Occur

- Check the responding link partner.
- Make sure the cable is securely attached, is the proper type, and does not exceed the recommended lengths.
- Try another cable.
- Make sure the duplex mode and speed setting on the adapter matches the setting on the switch.

Link LED Does Not Light

- Make sure the network drivers are loaded.
- Check the cable connection.

ACT LED Does Not Light

- Make sure the correct network drivers are loaded.
- The network may be idle.

Adapter Has Stopped Working

- Run the diagnostics. Refer to the *Additional Troubleshooting Tools* section.
- Try reseating the adapter in the PCI/PXI slot or try a different slot.
- The network drivers may be corrupt or missing. Try removing and reinstalling the drivers.
- Try rebooting the computer.
- Try another cable.
- Try a different adapter.

Link LED Is Not Lit when Computer Is Shut Down and Power Is Connected

Make sure the network cable is attached.

PCI/PXI Installation Tips

PCI/PXI computers are designed to automatically configure add-in boards each time the computer starts. The PCI/PXI computer sets the I/O address and IRQ level for the peripheral boards when the computer starts. The network drivers cannot change these values. If you experience problems when the computer starts, you may have to follow additional steps.

On some computers, manual configuration is possible through the computer's BIOS setup utility. Refer to the documentation that came with your computer. You may need to verify or change some BIOS settings.

The following common solutions may correct your problem:

- Make sure you have installed the adapter in a bus master-enabled slot. On some computers, not all slots are bus master enabled by default. Check your BIOS settings. Enable PCI/PXI bus mastering, if your BIOS has such an option.

- Reserve interrupts (IRQ) and/or memory addresses for ISA adapters. This prevents PCI/PXI boards from using the same settings ISA boards are using. Try changing some of the interrupts that are reserved for ISA, but not being used, to reserved for PCI/PXI.

- Update your BIOS. Sometimes updating the BIOS will correct some configuration problems.

- Configure the PCI/PXI slot for level-triggered interrupts instead of edge-triggered interrupts in BIOS.

Additional Troubleshooting Tools

The *PCI/PXI Gigabit Ethernet Adapters* CD-ROM contains an Intel utility for troubleshooting the gigabit Ethernet adapter.

To install the tool, complete the following steps:

1. Navigate to the appropriate directory for your operating system on the *PCI/PXI Gigabit Ethernet Adapters* CD-ROM.

2. Run the setup.exe program.

3. Start the tool by double-clicking the **Ethernet Adapter** icon in the system tray.

Ethernet Adapter Specifications

Dimensions

    PXI-8232/8231................................ 16.0 by 9.9 cm
    (6.3 by 3.9 in.)

Power requirements

    PXI-8232.. 3.0 W at +3.3 VDC typical
    PXI-8231.. 2.6 W at +3.3 VDC typical

Operating environment

    Ambient temperature .... 0 to 55 °C
    Relative humidity........................... 10 to 90%, noncondensing

Storage environment

    Temperature .... −20 to 70 °C
    Relative humidity........................... 5 to 90%, noncondensing

Compliance and Certification

    FCC Class A Certified
    CE

I/O connectors

    GPIB (PCI/PXI-8232 only) .... IEEE 488 Standard 24-pin
    Ethernet... RJ-45

LEDs

    Green... Activity/Link
    Yellow/Green................................. Speed

Ethernet data rate mode......................... 10 Mb/s, 100 Mb/s, or 1,000 Mb/s