# IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com

## User's Guide

OPTIONS
*by IBM*

# IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com

## User's Guide

**Note:** Before using this information and the product it supports, be sure to read the information in Appendix B, "Notices" on page B-1.

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# Product description

This section provides an overview of the manual and information on the product features.

## Overview

The IBM® 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com is built into your notebook computer and offers the same local area network (LAN) and modem properties that are available in a combination LAN + Modem PC Card. It is configured from the factory, ready to use, and covered by your IBM ThinkPad® computer warranty. When a connection is made, the IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com automatically determines if it is a network or modem connection.

Mini-PCI technology puts both network and modem functions right inside your computer. With Mini-PCI, you no longer need to use PC Cards for network and modem functions. The IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com is already configured to work with Microsoft® Windows® 2000, Windows 98, Windows 95, and Microsoft Windows NT® 4.0 Server. If you need information about removing or reinstalling the combination card, refer to the online *User's Guide* on your ThinkPad computer.

## Product features

The IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com comprises two separate functions built into a single circuit board: a full-function 10/100 Ethernet function and a 56K data/fax modem. LAN and modem software applications treat the single adapter as though it were two adapters:

- The Ethernet portion of the adapter is recognized as a 3Com 10/100 Mini-PCI Ethernet adapter.
- The modem portion of the adapter is recognized as a 3Com 56K V.90 Mini-PCI modem.

These names are used in the rest of this manual to identify the appropriate function.

### 3Com 10/100 Mini-PCI Ethernet adapter

This portion of the adapter supports network connections in either a 10BASE-T or 100BASE-TX network. It contains all the capabilities of a 3Com LAN PC Card, including Dynamic*Access* software, Remote Wake-Up, Wake on LAN® or Plug-In-and-Go, and Managed Boot Agent, and is already configured so that you only need to make a network connection to access your network. An RJ-45 connector is provided for industry-standard network cables. See "Network cabling requirements" on page 2-1 for more information.

### 3Com 56K V.90 Mini-PCI modem

This portion of the adapter enables you to make modem connections. It contains all the capabilities of a 3Com Modem PC Card, including V.90 connection speeds. You can use it to access the Internet, bulletin board systems or services (BBS), or to send and receive faxes. An RJ-11 connector is provided for industry-standard telephone cables.

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| | |
|---|---|
| ⚠ | The IBM 10/100 Ethernet Mini PCI Adapter with 56K Modem by 3Com is already installed in your ThinkPad computer. In some instances, however, you might have to install the combination card. Before installing a combination card, you must first tear off one of the MAC address labels found on the combination card wrap and attach it to the rear panel of your computer. For more information on installing the card, refer to the documentation that comes with your ThinkPad computer. |

# Connecting and using the 3Com 10/100 Mini-PCI Ethernet adapter

This section contains information on network connections, network software, network wake-up features, advanced network settings, device driver installation, and frequently asked questions.

## Network connections

The IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com (referred to as the 3Com 10/100 Mini-PCI Ethernet adapter in this section) provides superior LAN technology that is built into your notebook computer.

### Network cabling requirements

You must use a twisted-pair cable that complies with the Electronic Industries Association/ Telecommunications Industries Association (EIA/TIA) T568B Commercial Building Wiring Standard and the Technical Services Bulletin TSB38 standards for quality, distance, and connectors.

Twisted-pair cable consists of copper wires surrounded by an insulator. Two wires are twisted together (the twisting prevents interference problems) to form a pair, and the pair forms a circuit that can transmit data. A cable is a bundle of one or more twisted pairs surrounded by an insulator.

Unshielded twisted pair (UTP) is the most commonly used type of twisted-pair cable. Shielded twisted pair (STP) is a twisted-pair cable that provides protection against crosstalk. Twisted-pair cable is now commonly used in Ethernet, Fast Ethernet, and other network topologies.

The following table includes descriptions and the length requirements for the twisted-pair cables that work with network protocols.

| Network protocol | Twisted-pair cable category | Description | Maximum network cable length |
|---|---|---|---|
| 10BASE-T | 3 | Voice and data transmission up to 25 MHz. This type of UTP is the most common type of installed cable in older corporate wiring schemes. Supports 10BASE-T operation only. The cable typically has four pairs of wires. | 100 m (328 ft) |

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| Network protocol | Twisted-pair cable category | Description | Maximum network cable length |
|---|---|---|---|
| 10BASE-T | 4 | Voice and data transmission up to 33 MHz. This type of UTP is not very common. Supports 10BASE-T operation only. | 100 m (328 ft) |
| 10BASE-T and 100BASE-TX | 5 | Voice and data transmission up to 125 MHz. This is the most popular cable used today for new installations. Supports 10BASE-T or 100BASE-TX operation. The cable normally has four pairs of copper wire and three twists per foot. | 100 m (328 ft) |

## Connecting to the network

To connect the connector to a 10 Mbps Ethernet or 100 Mbps Fast Ethernet network, do the following:

1. Plug the RJ-45 connector on the network cable into the RJ-45 connector.
2. Connect the other end of the network cable to an active Ethernet or Fast Ethernet network connector.

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## Network software

This section contains information on network software applications.

## Dynamic*Access* software

Dynamic*Access* is software application that can be used with the 3Com 10/100 Mini-PCI Ethernet Adapter. Dynamic*Access* software adds intelligence to the network adapter by integrating the following features:

- **Distributed RMON (dRMON)** — Enables full RMON reporting on all the network segments, including switched networks, without having to place dedicated RMON probes throughout the network.
- **Traffic prioritization** — Ensures that business-critical and delay-sensitive traffic (such as multimedia applications) has priority over normal data.
- **Efficient multicast control** — Prevents flooding of switched networks by multicast applications such as video training, stock quotes, or online news.

The Dynamic*Access* software is included on the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD, and can be installed in Windows 98, Windows 95, Windows NT 4.0, or Windows 2000.

For detailed information on the Dynamic*Access* software, refer to the 3Com Web site at: http://www.3com.com/dynamicaccess

## Dynamic*Access* Managed PC Boot Agent

The Dynamic*Access* Managed PC Boot Agent comes with the 3Com 10/100 Mini-PCI Ethernet Adapter. With the PC boot agent, system administrators can accomplish a comprehensive range of management tasks or repairs from a central management station. These tasks include installing and configuring new computers, performing software upgrades, reconfiguring multiple computer systems, backing up and restoring hard disk drives, and scanning for viruses. After the PC boot agent performs these tasks, boot control is returned to the local hard disk drive on the computer.

The Dynamic*Access* managed PC boot agent increases network manageability and reduces cost because routine tasks can be performed from a central location without requiring major network changes or upgrades.

For documentation or detailed information on Dynamic*Access* managed PC boot agent, visit the 3Com Web site at:

http://www.3com.com/managedpc

## Managed Boot Agent (MBA)

Managed Boot Agent (MBA) comes with the 3Com 10/100 Mini PCI Ethernet adapter. With MBA, system administrators can accomplish, from a central management station, a comprehensive range of management tasks or repairs, such as installing and configuring new computers, performing software upgrades, reconfiguring multiple systems, backing up and restoring hard disk drives, and scanning for computer viruses. After these tasks are completed, boot control is returned to the computer local hard disk drive.

MBA increases network manageability and reduces costs, because routine tasks can be performed from a central location without requiring major network changes or upgrades.

For detailed information on MBA, visit the 3Com Web site at:

http://www.3com.com/

## DMI 2.0

DMI (Desktop Management Interface) 2.0 enables managed computers and net computers to report details about themselves and their attached devices across the network to a DMI 2.0 management application. A network administrator can use this information to assist in remotely managing and configuring computer clients and servers. The DMI 2.0 software is included on the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD.

For detailed information on DMI, refer to the 3Com Web site at:

http://www.3com.com/

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# Network wake-up features

This section contains information on the Remote Wake-up and Wake on LAN features.

## Remote Wake-up (from standby state)

The Remote Wake-up feature enables you to remotely turn on a networked computer that has gone into standby mode by sending a wake-up packet through the LAN from another computer.

**Notes:**

1. The Remote Wake-up feature is supported by Windows 2000 and Windows 98 Second Edition ACPI. If you have another version of Windows 98, check with your network administrator to see if that version supports the Remote Wake-up feature.

2. Consult your network administrator before turning on the Remote Wake-up feature. To enable the Remote Wake-up feature, you will also need to perform the following procedure:
   a. In the Device Manager window, select **3Com 10/100 Mini PCI Ethernet Adapter**.
   b. Click **Properties**.
   c. Click the **Power Management** tab.
   d. Place a check in the **Allow this device to bring the computer out of standby** check box.

You can use Remote Wake-up to awaken the computer in one of the following ways:

1. You can wake your computer through a remote management application. This application sends what is often called a magic or special packet.
2. You can use TCP/IP to “ping” the computer system through an IP address that identifies the computer.
3. You can use the Network Neighborhood settings to locate the computer and wake it up. Windows recognizes the Advanced Configuration and Power Interface (ACPI) standard, which defines the different power states for the computer. The 3Com 10/100 Mini-PCI Ethernet adapter is also compliant with the ACPI standard and provides remote wake-up capabilities through the Windows operating system.

To support Remote Wake-up, your notebook computer must have the following features:

- BIOS that supports Remote Wake-Up
- Operating system that supports Remote Wake-up
- ACPI capability

For more information on Remote Wake-up, Wake on LAN, or ACPI, refer to your Windows documentation or your network administration documentation.

### Wake on LAN (from power-off state)

**Attention:** The Wake on LAN or Plug-In-and-Go feature can be enabled only by a network administrator, because it is used to remotely administer to the notebook computer.

Wake on LAN (WOL), also called Plug-In-and-Go (PIG), enables a remote management application to send a magic packet to remotely start your notebook computer. When WOL is enabled and ac power applied, a computer can be turned off and then remotely turned on when it receives a magic packet. The WOL feature is usually used by network administrators to provide system services to the network during non-peak hours.

## Advanced network settings

This section provides information on adjusting the following advanced network settings in the 3Com 10/100 Mini-PCI Ethernet Adapter window:

- **Network Link Selection**. You can use this setting to select the speed (10BASE-T or 100BASE-TX) and duplex settings (half-duplex or full-duplex) for your link. Auto Negotiation, the default, enables your notebook computer to sense and set the current connection speed.
- **Wake on Link**. The default for this setting is On. If this setting is enabled, your site can initiate a remote wake-up upon connecting to the network.
- **Wake on Magic**. The default for this setting is On. If this setting is enabled, your site can initiate a remote wake-up when it receives a magic packet.
- **Wake on Pattern**. The default for this setting is On. If this setting is enabled, your site can initiate a remote wake-up when it receives a packet pattern.
- **LAN Function**. In Windows NT 4.0, you can disable the LAN to conserve battery power. The LAN function setting options include:
  - LAN Enabled (default)
  - LAN Disabled (power savings)

## Adjusting advanced network settings in Windows 98 or Windows 95

To use the Advanced Settings feature to adjust settings in Windows 98 or Windows 95:

1. Click **Start**.
2. Select **Settings**; then click **Control Panel**.
3. Double-click the **Network** icon.
4. Double-click **3Com 10/100 Mini PCI Ethernet Adapter**. The 3Com 10/100 Mini-PCI Ethernet Adapter window opens.
5. Click the **Advanced** tab so that you can adjust the Network Link or Wake on LAN settings.

## Adjusting advanced network settings in Windows NT 4.0

To use the Advanced Settings feature to adjust settings in Windows NT 4.0:

1. Click **Start**.
2. Select **Settings**; then click **Control Panel**.
3. Double-click the **Network** icon.
4. Click the **Adapters** tab.
5. Double-click **3Com 10/100 Mini PCI Ethernet Adapter** to open the Setup window that contains the Advanced Settings tab for Windows NT 4.0.

## Adjusting advanced network settings in Windows 2000

To use the Advanced Settings feature to adjust settings in Windows 2000:

1. Click **Start**.
2. Select **Settings**; then select **Network and Dial-up Connections**.
3. Right-click the **Local Area Connection** icon and click **Properties**.
4. Click **Configure**. The 3Com 10/100 Mini PCI Ethernet Adapter window opens.
5. Click the **Advanced** tab so that you can adjust the Network Link or Wake on LAN settings.

## Setting up the network adapter

This section contains information on using the device drivers for Windows 98, Windows 95, Windows NT 4.0, and Windows 2000 to set up the network adapter.

## Windows 98 device drivers

This section contains information on installing, uninstalling, and updating the device drivers for Windows 98.

The device driver for Windows 98 is already installed on your notebook computer. This section provides the installation procedure, if you need to reinstall the device driver.

Before you install the device driver:

- Make sure that the 3Com network adapter is connected to the network.
- If the Windows 98 installation files are not on your hard disk drive, be sure that you have the Windows 98 installation CD or diskette.

### Installing the device driver for Windows 98

To install the 3Com 10/100 Mini-PCI Ethernet adapter device driver for Windows 98:

1. Insert the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD that comes with your notebook computer into the CD-ROM drive.
2. Find and open the LANSETUP folder that is on the CD.
3. Double-click the SETUP.EXE file.
4. Follow the on-screen instructions. When you are prompted to do so, restart the computer.
5. After the computer restarts and the `Insert Disk` message displays, click **OK**.
6. In the Copying Files window, type `C:\WINDOWS\OPTIONS\CABS`, and then click **OK**.
7. In the Systems Setting Change window, click **Yes** to restart the computer. If you are reinstalling the device driver, the reinstallation is complete. If you are installing the device driver for the first time, go to the next step.
8. If this is the first time that networking is being installed on your computer, you will be prompted to enter the following information in the **Identification** tab window:
    - **Computer Name**—Identifies the computer on the network for other users. This entry must be a unique name of 15 characters or fewer, containing no spaces.
    - **Workgroup**—Identifies the group (for example, your department name) to which your computer belongs. If you belong to a peer-to-peer network, this entry must be the same for all the computers in your network.
    - **Computer Description** (optional)—Displays additional details about this computer to other users. For example, you could specify that the computer has a printer attached.
9. If the Windows 98 installation files are on your hard disk drive, click **OK**. In the **Copy files from entry** box, type the directory (usually `C:\WINDOWS\OPTIONS\CABS`), and then click **OK**. The installation is complete when you are prompted to click **Finish**.

10. If you do not have the Windows 98 installation files on your hard disk drive, remove the CD you inserted in Step 1 and insert the Windows 98 installation CD or diskette into the CD-ROM drive or the diskette drive; then click **OK**.
11. Click **Finish.** When you are prompted to do so, restart your computer to complete the installation.
12. If there is a CD in the CD-ROM drive or a diskette in the diskette drive, remove it.
13. Click **Yes** to restart the computer.
14. After Windows restarts, double-click the **Network** icon in the Windows **Control Panel** and make sure that the configuration settings meet the requirements of your network environment. Contact your system administrator for assistance.

### Uninstalling the device driver for Windows 98

Sometimes previous or incomplete installations leave problems that can affect the operation of the network adapter. Possible problems might be indicated if:

- The 3Com 10/100 Mini-PCI Ethernet adapter is not working.
- Windows 98 does not detect the 3Com 10/100 Mini-PCI Ethernet adapter.

If the device driver installation is unsuccessful for any reason, try removing the software and repeating the device driver installation procedures. If you followed the installation steps in “Installing the device driver for Windows 98” on page 2-6, the existing device drivers were uninstalled prior to the installation. However, you can also use the following steps to uninstall a device driver:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **Network** icon.
3. Select **3Com 10/100 Mini PCI Ethernet Adapter**, and then click **Remove**.
4. Click **OK**, and then restart the computer and reinstall the device driver using instructions given in “Installing the device driver for Windows 98” on page 2-6.

### Updating the device driver in Windows 98

You might need to update your network device driver if another version of the network device driver becomes available. To update your network device driver in Windows 98:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **System** icon.
3. Click the **Device Manager** tab. A list of devices displays, arranged by type.
4. Double-click **Network Adapters**.
5. Double-click **3Com 10/100 Mini PCI Ethernet Adapter**. The 3Com 10/100 Mini PCI Ethernet Adapter Properties window opens.
6. Click the **Driver** tab.
7. Click **Update Driver** and provide the path to the updated device driver.

### Confirming proper installation in Windows 98

To confirm that your network is connected in Windows 98:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **System** icon.
3. Click the **Device Manager** tab. A list of devices displays, arranged by type.

4. Double-click **Network Adapters**. The **3Com 10/100 Mini PCI Ethernet Adapter** displays, confirming successful installation.
5. Double-click **3Com 10/100 Mini PCI Ethernet Adapter** to display a description of the network connection and its current status. The device status will display the `This device is working properly.` message.

If a red X or a yellow exclamation point (!) displays next to the name of the network adapter, the installation was not successful. You might also find the network adapter with a yellow exclamation point (!) next to it in the Other Devices list. If your installation was not successful, go to the next section, “Troubleshooting the Windows 98 device driver installation” for problem-solving information.

### Troubleshooting the Windows 98 device driver installation

| **Symptom** | **Possible solutions** |
|---|---|
| Basic troubleshooting: Applicable for all problem situations | Inspect all the cables and the connections.<br>Verify that you have the latest BIOS for your computer. If not, visit the Web site for your computer and follow the BIOS upgrade instructions.<br>Use **Control Panel/System/Device Manage**r to inspect the status of your 3Com network adapter.<br>In **Control Panel/Network application**, make sure that you have installed the correct clients and protocols. |
| At installation, the Update Device Driver window does not open. | The 3Com network adapter might have already been installed.<br>The 3Com network adapter might have been installed as “Other Devices” because of a previous faulty installation. |
| The network adapter does not work. The connector LED is off or does not match the real network speed. | Click **Control Panel** → **System** → **Device Manager** to inspect the status of your 3Com network adapter.<br>If you see a red "X", enable the 3Com network adapter by placing a check in the appropriate check box in the Properties window.<br>If you see a yellow exclamation mark (**!**), click the icon to see what the conflict is. Verify that there are adequate system resources. Try to free system resources (for example, disable the infrared port); then remove and reinstall the device driver using instructions given in “Installing the device driver for Windows 98” on page 2-6. |
| Windows 98 stops responding after startup. | By default, Windows 98 installs TCP/IP with DHCP enabled. If your network does not have a DCHP server, the service will eventually time out and return an error. Contact your MIS manager to determine how TCP/IP is configured for your site. |

| **Symptom** | **Possible solutions** |
|---|---|
| Installation was successful, but you are still unable to browse Network Neighborhood. | Make sure that the peer networking protocol NetBEUI is installed and used on your network. Click **Start** → **Find** → **Find Computer** and type the name of a computer on the network.<br>File Sharing must be set in Windows 9x before the network recognizes it. In the **Network Properties/File and Print Sharing** window, place a check in the **I want to be able to give others access to my files** check box. |
| Unable to log on to Netware servers. | This symptom can occur when NetWare servers are running the IPX/SPX protocol. Windows 9x defaults to automatically sense the frame type. You might need to force your frame type to match the frame type used on the server. Examples of valid frame types include Ethernet 802.2 and Ethernet 802.3 |

## Windows 95 device drivers

The Windows 95 device driver is already installed on your notebook computer. The device driver installation procedure is provided in this section if you need to reinstall the device driver.

Before you begin:

- Make sure that the 3Com network adapter is connected to the network.
- If the Windows 95 installation files are not on your hard disk drive, be sure that you have the Windows 95 installation CD or diskette.

### Installing the device driver for Windows 95

To install the 3Com 10/100 Mini-PCI Ethernet adapter device driver for Windows 95:

1. Insert the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD that comes with your notebook computer into the CD-ROM drive.
2. Find and open the LANSETUP folder that is on the CD.
3. Double-click the SETUP.EXE file.
4. In the 3Com 10/100 Mini-PCI Ethernet Adapter Has a ROM window, place a check in the **Device can be removed safely** check box, and then click **Test**.
5. Click **Finish** to restart the computer.
6. After the system restarts and the `Insert Disk` message displays, click **OK**.
7. In the New Hardware Found window, type `C:\WINDOWS\OPTIONS\CABS`, and then click **OK**. If you are reinstalling the device driver, the reinstallation is complete. If you are installing the device driver for the first time, go to the next step.
8. If this is the first time that networking is being installed on your computer, you will be prompted to enter the following information in the Identification window:

- **Computer Name**–Identifies the computer on the network for other users. This entry must be a unique name of 15 characters or fewer, containing no spaces.
- **Workgroup**–Identifies the group (for example, your department name) to which your computer belongs. If you belong to a peer-to-peer network, this entry must be the same for all the computers in your network.
- **Computer Description** (optional)–Displays additional details about this computer to other users on the network. For example, you can specify that the computer has a printer attached.

9. If the Windows 95 installation files are on your hard disk drive, click **OK**. In the **Copy files from entry** box, type the directory (usually `C:\WINDOWS\OPTIONS\CABS`), and then click **OK**.
10. If you do not have the Windows 95 installation files on your hard disk drive, remove the CD you inserted in Step 1 and insert the Windows 95 installation CD or diskette into the CD-ROM drive or the diskette drive; then click **OK**.
11. When you are prompted to do so, click **Yes** to restart the computer and complete the installation.
12. If there is a CD in the CD-ROM drive or a diskette in the diskette drive, remove it.
13. After Windows restarts, double-click the **Network** icon in the Windows **Control Panel** and verify that the configuration settings meet the requirements of your network environment. Contact your system administrator for assistance.

### Uninstalling the device driver for Windows 95

Sometimes previous or incomplete installations might leave problems that can affect the operation of the network adapter. Possible problems might be indicated if:

- The 3Com 10/100 Mini-PCI Ethernet Adapter is not working.
- Windows 95 does not detect the 3Com 10/100 Mini-PCI Ethernet Adapter.

If the device driver installation is unsuccessful for any reason, try removing the software and repeating the device driver installation procedures. If you followed the installation steps in the “Installing the device driver for Windows 95” section, the existing device driver was uninstalled prior to the installation. However, you can also use the following steps to uninstall a device driver:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **Network** icon.
3. Select the **3Com 10/100 Mini PCI Ethernet Adapter,** and then click **Remove**.
4. Click **OK**; then restart the computer and reinstall the device driver using instructions given in “Installing the device driver for Windows 95” on page 2-9.

### Updating the device driver for Windows 95

You might need to update your device driver for Windows 95 if another version of the network device driver is made available. To update the device driver for Windows 95:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **Network** icon.
3. Click the **Device Manager** tab. A list of devices displays, arranged by type.
4. Double-click **Network Adapters**.

5. Double-click **3Com 10/100 Mini PCI Ethernet Adapter**. The 3Com 10/100 Mini-PCI Ethernet Adapter Properties window opens.
6. Click the **Driver** tab.
7. Click **Update Driver** and provide the path to the updated device driver.

### Confirming the proper installation in Windows 95

To confirm that your network is connected in Windows 95:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **System** icon.
3. Click the **Device Manager** tab. A list of devices displays, arranged by type.
4. Double-click **Network Adapters**. If **3Com 10/100 Mini PCI Ethernet Adapter** is in the displayed list, the installation was successful.
5. Double-click **3Com 10/100 Mini PCI Ethernet Adapter** to display a description of the network connection and its current status. The device status displays the `This device is working properly.` message.
6. If a red X or a yellow exclamation point (!) displays next to the name of the network adapter, the installation was not successful. You might also find the network adapter with a yellow (!) next to it in the Other Devices list. If your installation was not successful, go to the next section “Troubleshooting your Windows 95 device driver installation” for problem-solving information.

### Troubleshooting the Windows 95 device driver installation

| **Symptom** | **Possible solutions** |
|---|---|
| Basic troubleshooting: Applicable for all problem situations | Inspect all the cables and the connections.<br>Verify that your computer has the latest BIOS. If your computer does not have the latest BIOS, visit the Web site for your computer and follow the BIOS upgrade instructions.<br>Click **Control Panel** → **System** → **Device Manage**r to inspect the status of your 3Com network adapter.<br>In **Control Panel/Network application**, be sure that you have the correct clients and protocols installed. |
| At installation, the Update Device Driver window does not open. | The 3Com network adapter might have been already installed.<br>The 3Com network adapter might have been installed as **Other Devices** because of a previous faulty installation. |

| **Symptom** | **Possible solutions** |
|---|---|
| The network adapter does not work. The LED on the connector is off or mismatches the real network speed. | Click **Control Panel** → **System** → **Device Manager** to inspect the status of your 3Com network adapter.<br>If there is a red x next to it, enable the 3Com network adapter by placing a check in the appropriate check box in the Properties window.<br>If you see a yellow exclamation mark, click the icon to view conflict information. Verify that there are adequate system resources. Try freeing system resources (for example, disable the infrared port); then remove and reinstall the device driver using instructions given in “Installing the device driver for Windows 95” on page 2-9. |
| Installation was successful but still unable to browse **Network Neighborhood** | Make sure that the peer networking protocol NETBEUI is installed and on your network. Click **Start** → **Find** → **Find Computer** and type the name of a computer on the network.<br>File Sharing must be set in Windows 9x before the network recognizes it. In the **Network Properties/File and Print Sharing** window, place a check in the **I want to be able to give others access to my files** check box. |
| Unable to log on to Netware servers. | This symptom can occur when Netware servers are running the IPX/SPX protocol. Windows 9x defaults to automatically sense the frame type. You might need to force your frame type to match the frame type used on the server. Examples of valid frame types include Ethernet 802.2 and Ethernet 802.3. |

## Windows NT 4.0 device drivers

The Windows NT device driver is already installed. This section provides the device driver installation procedure if you need to reinstall the device driver.

Before setting up the adapter, you will need obtain the following information:

- Your network file server name, network account user name, and password.
- Protocol used in the Microsoft Windows network (NWLink IPX/SPX Compatible transport, TCP/IP protocol, NetBEUI protocol)
- NT Server domain or workgroup to which you belong
- Your IP address (unless you are using DHCP)

The Windows NT installation procedure that you use depends on whether networking has already been installed on your computer. Verify with your MIS department the network device driver installation instructions that you will need to use.  If networking has not been installed on your computer, go to “Installing the device driver for Windows NT 4.0 with no networking installed” on page 2-13. If networking has already been installed on your computer, go to “Installing the device driver for Windows NT 4.0 with networking installed” on page 2-14.

### Installing the device driver for Windows NT 4.0 with no networking installed

To install the 3Com 10/100 Mini-PCI Ethernet adapter device driver in Windows NT 4.0 with no networking installed:

1. Insert the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD that comes with your notebook computer into the CD-ROM drive.
2. Find and open the LANSETUP folder that is on the CD.
3. Double-click the SETUP.EXE file.
4. Follow the on-screen instructions.
5. Double-click **Network** in the **Control Panel**.
6. When the `Windows NT Networking is not installed. Do you want to install it now?` prompt displays, click **Yes** to open the Network Setup Wizard window.
7. Place a check in the **Wired to the network** check box, and then click **Next**.
8. When you are prompted to search for a network adapter, click **Select from List**.
9. Click **Have Disk**. Insert the Windows NT installation diskette into the diskette drive, and then click **OK**.
10. Select **3Com 10/100 Mini PCI Ethernet Adapter**, and then click **OK**. The Network Adapters list displays a check mark next to the 3Com network adapter.
11. Click **Next** to continue.
12. In the Network Protocols list, place a check mark next to each network protocol required for your site, and then click **Next**.
13. In the Network Services window, there are four default options. Unless you are following specific guidelines from your MIS department, select the default settings.
14. Click **Next** to install the selected components.
15. When you are prompted to do so, type the name of the directory that contains the Windows NT installation files (`C:\WINNT\OPTIONS\CABS`), and then click **Continue**.
16. When the computer prompts you again for the Windows NT installation files, click **Continue**.
17. In the 3Com Network Adapter window, accept the default settings, and then click **Continue**. Values are automatically assigned.
18. When the window for enabling or disabling protocols opens, click **Next**.
19. When Windows NT is ready to start the network, click **Next** to copy the network files.
20. When you are prompted to do so, provide your computer name and workgroup or domain name.
21. When the system displays the `Networking has been installed on your computer` message, click **Finish**.

22. When you are prompted to restart the computer, click **Yes**.
23. If you had Service Pack 3 or later installed prior to setting up the network adapter, reinstall it after Windows NT has completed the computer restart.

### Installing the device driver for Windows NT 4.0 with networking installed

To install the 3Com 10/100 Mini-PCI Ethernet Adapter device driver in Windows NT 4.0 with networking installed:

1. Insert the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD that comes with your notebook computer into the CD-ROM drive.
2. Find and open the LANSETUP folder that is on the CD.
3. Double-click the SETUP.EXE file.
4. Follow the on-screen instructions.
5. In the **Control Panel**, double-click **Network**.
6. Click the **Adapter** tab, and then click **Add**.
7. Click **Have Disk**. Type `C:\WINNT\OPTIONS\CABS`, and then click **OK**.
8. Select **3Com 10/100 Mini PCI Ethernet Adapter,** and then click **OK**.
9. In the 3Com network adapter window, accept the default settings and click **Continue**. Values are automatically assigned.
10. After Windows copies the required files, it displays the network adapter name, `3Com 10/100 Mini PCI Ethernet Adapter`. Click **Close**. Depending on your current network settings, the Microsoft TCP/IP Properties window might open.
11. When you are prompted to restart the computer, click **Yes**.
12. If you had Service Pack 3 or later installed prior to setting up the network adapter, reinstall it after Windows NT has completed the computer restart.

### Uninstalling the device driver for Windows NT 4.0

Sometimes previous or incomplete installations leave problems that can affect the operation of the network adapter. Possible problems might be indicated if the 3Com 10/100 Mini PCI Ethernet Adapter is not working.

If the device driver installation is unsuccessful for any reason, try removing the software and repeating the device driver installation procedures. If you followed the steps in the Windows NT 4.0 device driver installation section, the existing device driver was uninstalled prior to the installation. However, you can also use the following steps to uninstall a device driver:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **Network** icon.
3. Click the **Adapters** tab.
4. Select **3Com 10/100 Mini PCI Ethernet Adapter**, and then click **Remove**.
5. Click **OK**, and then restart the computer and reinstall the device driver.

**Note:** If you remove all of the networking components after performing the preceding procedure, be sure to reinstall the device driver using the procedure listed in “Installing the device driver for Windows NT 4.0 with no networking installed” on page 2-13. If you do not remove all of the networking components, reinstall the device driver using instructions given in “Installing the device driver for Windows NT 4.0 with networking installed” on page

2-14. Be sure to reinstall Service Pack 3 or later after reinstalling the network adapter.

### Updating the device driver for Windows NT 4.0

You might need to update your network device driver if another version of the network device driver is made available for Windows NT 4.0. To update your network device driver for Windows NT 4.0:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **Network** icon.
3. Select the **Adapters** tab.
4. Select **3Com 10/100 Mini PCI Ethernet Adapter**.
5. Click **Update** and provide the path to the updated device driver.

### Confirming proper installation in Windows NT 4.0

To confirm that your network is connected in Windows NT 4.0:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **Network** icon.
3. Select the **Adapters** tab.
4. Make sure that the **3Com 10/100 Mini PCI Ethernet Adapter** displays in the list of network adapters.

If the 3Com 10/100 Mini-PCI Ethernet adapter does not display in the list of network adapters, the installation was not successful. For problem-solving information, go to the next section, "Troubleshooting the Windows NT 4.0 device driver installation".

### Troubleshooting the Windows NT 4.0 device driver installation

| **Symptom** | **Possible solutions** |
|---|---|
| Basic troubleshooting, applicable for all problem situations. | Inspect all cables and connections.<br>Verify that your computer has the latest BIOS. If your computer does not have the latest BIOS, visit the Web site for your computer and follow the BIOS upgrade instructions.<br>The event log lists problems found during system operation. To check the event log for errors, click **Start**, and then click **Programs** → **Administrative Tools** → **Event Viewer**. |
| The network interface is not working. | Open Windows NT Diagnostics. From the **Start** menu, click **Programs** → **Administrative Tools** → **Windows NT Diagnostic**s.<br>Check for resource conflicts and be sure that the settings for the 3Com network adapter are valid. |

## Windows 2000 device drivers

The Windows 2000 device driver is already installed on your notebook computer. This section contains the device driver installation procedure if you need to reinstall the device driver.

### Installing the device driver for Windows 2000

To install the 3Com 10/100 Mini PCI Ethernet adapter device driver for Windows 2000:

**Note:** Before reinstalling the device driver, make sure that the computer is connected to the network.

1. Insert the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD into the CD-ROM drive.
2. Find the LANSETUP folder that is on the CD.
3. Double-click the SETUP.EXE file.
4. Follow the on-screen instructions. When you are prompted to do so, restart the computer.
5. After the system restarts, the Files Needed window opens.
   If Windows 2000 was added to your computer, type `C:\WINDOWS\OPTIONS\CABS` in the Files Needed window, and then click **OK**.

   If Windows 2000 is the original operating system on your computer, type `C:\WINNT\OPTIONS\CABS` in the Files Needed window, and then click **OK**.
6. Double-click the **Network** icon in the Windows **Control Panel** and make sure that the configuration settings meet the requirements of your network environment. Contact your system administrator for assistance.

### Uninstalling the device driver for Windows 2000

Sometimes previous or incomplete installations leave problems that can affect the operation of the network adapter. Possible problems might be indicated if:

- The 3Com 10/100 Mini-PCI Ethernet adapter is not working.
- Windows 2000 does not detect the 3Com 10/100 Mini-PCI Ethernet adapter.

If the device driver installation is unsuccessful for any reason, try removing the software and repeating the device driver installation procedures. When you follow the steps listed in "Installing the device driver for Windows 2000", the existing device driver is uninstalled prior to the installation. However, you can also use the following steps to uninstall a device driver:

1. Click **Start** → **Settings** → **Network and Dial-up Connections**.
2. Click **Network and Dial-up Connections**.
3. Right-click the **Local Area Connection** icon, and then select **Properties**.
4. Click **Configure**. The 3Com 10/100 Mini PCI Ethernet Adapter window opens.
5. Click the **Driver** tab, and then click **Uninstall**.
6. Click **OK**; then restart the computer and reinstall the device driver using directions given in “Installing the device driver for Windows 2000” on page 2-16.

### Updating the device driver for Windows 2000

If another version of the network device driver is made available, you might need to update your network device driver. To update your device driver for Windows 2000:

1. Click **Start** → **Settings** → **Network and Dial-up Connections**.
2. Right-click the **Local Area Connection** icon and select **Properties**.
3. Click **Configure.** The 3Com 10/100 Mini PCI Ethernet Adapter window opens.
4. Click the **Driver** tab.
5. Click **Update Driver** and provide the path to the updated network device driver.

### Confirming proper installation in Windows 2000

To confirm your network is connected in Windows 2000:

1. Right-click the **My Computer** icon, and then click **Properties**.
2. Click the **Hardware** tab, and then, in the middle panel, click **Device Manager**. A list of devices displays, arranged by type.
3. Double-click **Network Adapters**. If **3Com 10/100 Mini PCI Ethernet Adapter** is in the displayed list, the installation was successful.
4. Double-click **3Com 10/100 Mini PCI Ethernet Adapter** to display a description of the network connection and its current status. The device status displays the `This device is working properly` message.
5. If a red X or a yellow exclamation point (!) displays next to the name of the network adapter, the installation was not successful. You might also find the network adapter with a yellow (!) next to it in the Other Devices list. If your installation was not successful, go to the next section, "Troubleshooting the Windows 2000 device driver installation" for problem-solving information.

### Troubleshooting the Windows 2000 device driver installation

| **Symptom** | **Possible solutions** |
|---|---|
| Basic: Applicable for all problem situations | Inspect all cables and connections.<br>Verify that your computer has the latest BIOS. If your computer does not have the latest BIOS, visit the Web site for your computer and follow the BIOS upgrade instructions.<br>Click **Control Panel** → **System** → **Hardware** → **Device Manager** to check the status of your 3Com network adapter.<br>In **Control Panel/Network** and **Dial-up Connections**, make sure that you have the correct clients and protocols installed. |

## Frequently asked questions

*What is a Mini-PCI adapter?*

Mini-PCI technology provides built-in network and modem functions for your notebook computer. With Mini-PCI, you no longer need to use separate computer adapters for network and modem functions. Your notebook computer comes configured with both functions and is ready to operate when you start it.

*Why are two device driver names used for one product?*

The IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com is the product name. However, there are two separate device drivers for network and modem functions. The network device driver is identified as the 3Com 10/100 Mini-PCI Ethernet adapter, while the modem device driver is identified as the 3Com 56K V.90 Mini-PCI Modem.

*Do I need anything for my operating system?*

The IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com is already configured to work with Windows 2000, Windows 98, Windows 95, and Windows NT 4.0.

*What network connections can I make?*

You can connect your notebook computer to the 10BASE-T Ethernet or the 100BASE-TX Fast Ethernet network.

# Connecting and using the 3Com V.90 Mini-PCI modem

The IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com (referred to as the 3Com 56K V.90 Mini-PCI modem in this section) provides built-in superior modem technology for your notebook computer.

The 3Com 56K V.90 Mini-PCI modem is configured and ready to use. This section includes information on the following topics:

- Connecting the cable
- Configuring communications software
- Transmitting data and faxes
- Modem features
- Installing the device driver in Windows 95 or Windows 98
- Installing the device driver in Windows NT 4.0
- Installing the device driver in Windows 2000
- Modem AT commands
- Modem S Registers
- Modem messages
- Troubleshooting
- Frequently asked questions

## Connecting the modem cable

To connect the telephone line to the modem, follow these steps:

1. Plug the RJ-11 jack on the modem cable into the RJ-11 connector.
2. If you are not using an adapter specific to your country or region, go to the next step. If you are using an adapter specific to your country or region, connect it to the wall jack. The modem uses a universal Direct Access Arrangement (DAA) that supports multiple countries or regions. However, some countries or regions require an adapter between the modem cable and the wall jack. You can purchase an adapter for most countries or regions from your local electronics store. If you need to purchase an adapter specific to your country or region, visit the IBM TeleAdapt support Web site at http://www.teleadaptusa.com/nme/order_ibm.htm
3. If you are not required to use an adapter specific to your country or region, plug the modem cable into a standard telephone wall jack.

## Configuring communications software

Your modem might come with communications software. However, any data or fax communications software package will work with your modem if it is correctly installed.

In your data or fax communications software settings, wherever you have an option:

- Select the highest transmission speed or baud rate listed.
- Select fax class 1.
- Select NONE for parity.
- Select a word length of 8.
- Set the stop bits to 1.
- Select RTS/CTS (hardware) flow control

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- In the modem installation section of your communications software, select the 3Com 56K V.90 Mini-PCI Modem.

## Transmitting data and faxes

Your modem enables you to use your communications software to send and receive data and fax files. Your modem can also be used for data communications with an online service, the Internet, an electronic Bulletin Board Service (BBS), or another modem, at up to V.90 speeds.

Your modem can connect at speeds up to 56,000 bits per second (bps), and send or receive faxes at speeds up to 14,400 bps. With V.90 technology, your modem is capable of receiving data at up to 56 Kbps and sending data at up to 31.2 Kbps. Actual download speeds might be lower due to varying line conditions. A compatible phone line and server equipment are required for data and fax transmissions.

Your modem supports class 1 and class 2.0 faxing. The default is class 1.

If problems occur when you are faxing, you might need to change the fax class.

### Transmitting data

Because your modem is optimized for Windows, it uses the Windows interface and the capabilities of your notebook computer to make data transfers faster than a regular modem.

### Terminal emulation protocols

You might be required to designate a terminal emulation protocol to use for data transmission. Various computer systems use different types of terminal emulation, such as TTY or ANSI. To determine the type of emulation to use for the modem connection, contact the system operator for the host modem you are using. If the system operator is unknown, try using the ANSI terminal emulation protocol.

### File transfer protocols

File transfer is the ability to transport files between two computers using two modems. The modem must use a file transfer protocol (ftp), which can correct errors in transmission and begin the file transfer process. Both modems must use the same file transfer protocol.

When you set up a file transfer, your communications software prompts you to designate an ftp. The most common file transfer protocols are described in the following table.

| **File transfer protocol** | **Description** |
|---|---|
| ZMODEM | This ftp transfers files in a streaming protocol, making it very fast even with error correction. It also provides an automatic receive function that saves you steps when receiving data. |
| YMODEM | This is an error-correcting ftp that sends information in 1024-byte (1k) blocks. Checksums are done on each block and the result is sent with the block. If the result does not check out at the receiving end, a NAK (negative acknowledgement) is sent to retransmit that block. If the block checks out, an ACK (acknowledgement) is sent. |
| YMODEM-G | This ftp is a variation of YMODEM that is designed for modems that support error control. It does not provide error correction or recovery, but relies on the modem to provide it. If any block is unsuccessfully transferred, the entire transfer is canceled. |
| XMODEM | This is an error-correcting ftp that sends information in 128-byte blocks. Checksums are done on each block and the result is sent with the block. If the result does not check out at the receiving end, a NAK (negative acknowledgement) is sent to retransmit that block. If the block checks out, an ACK (acknowledgement) is sent. |
| KERMIT | This is a reliable asynchronous ftp that can communicate successfully with almost any system. This portability significantly reduces throughput. |
| ASCII | This ftp sends TEXT ONLY files directly to the computer screen, and is very slow. ASCII protocol cannot transfer binary or graphics files. |

## Guidelines for using file transfer protocols

**Attention:** When you share files, you risk getting a computer virus. Use virus scanning software to ensure that the files you receive and send do not contain computer viruses.

For best results when sending or receiving a file, use the following guidelines:

- Use the ZMODEM ftp if both computer systems support it.
- Both the sending and receiving modem must use the same ftp. BBS or online services usually inform you which protocols are available.
- Most communications software packages must be informed of the name of the sending (uploading) or receiving (downloading) file before a file transfer can begin, and when a file transfer is about to occur. For more information on file transfers, refer to your communications software manual.

## Sending data

Every communications software application includes an automatic dialing feature. For instructions on automatic dialing, refer to your software documentation.

To manually dial another modem, go into the terminal mode in your communications software, and type `ATDT` followed by a space and the telephone number.

When you are dialing a number, enter the same information you would if you were calling someone on the phone. For example, when you are dialing a long distance number, dial a 1, the area code, and then the number. If you are dialing from a telephone system that requires a 9 for an outside line, dial 9 before dialing the telephone number. You might need to place a comma or two after the 9 (`9,,`) to allow enough pause time to access the outside line (each comma designates a two-second delay).

## Receiving a data transmission

A modem can answer a call in one of the following ways:

- **Host mode** is a feature of the software (although it is not available in all communications software packages) that allows the modem to answer the phone and place the caller into a “host” mode, allowing the caller to download files, upload files, and chat with you while the modem is connected. For instructions on how to use the host mode feature, refer to your software documentation. To answer cellular calls in host mode, be sure `AT&F6` is included in the answer string.
- **Auto-answer** answers an incoming call without user intervention. The AT command for auto-answer is `ATS0=`*n*, where *n* is the number of rings before the incoming call is answered. For example, the `ATS0=2` command instructs the modem to answer after the second ring.
- **Manual answer** instructs the receiving modem not to answer when the phone rings. ATS0 must be set to 0 (`ATS0=0`) when you are using manual answer. When the phone rings while you are in the terminal mode in your communications software, the word `RING` displays on the computer screen. You must then type `ATA` to command the modem to answer. If the phone rings when you are not in the terminal mode, you will not hear or see any indication that a call is being received. If ATS0 is set to a number other than 0, the auto-answer feature will be activated after the specified number of rings.

## Faxing

Your modem can send and receive faxes at speeds up to 14,400 bps when used with fax communications software programs. This section provides information on faxing with your modem.

## Creating a fax cover page

You might be able to use your software to create a fax cover page. Some fax software packages provide an option to customize a cover page. A cover page usually provides information about the fax, the sender, and the transmission. Most regulatory agencies require the following information to be displayed on the top or the bottom of at least the first faxed page:

- Your name
- Your phone number
- Your fax number

- Date and time

You can also include the following information:

- The name of the fax recipient
- The phone number of the recipient
- The fax number of the recipient
- The number of fax pages, including the cover sheet
- Your company, if applicable

## Sending a fax

Each software package processes faxing differently. Before you send a fax, check the software documentation to determine the faxing procedure used by the software.

Opening the fax software installs the device driver and prepares the modem to send the fax. If you are faxing from another application, you might have to "create" the fax and then go into the print setup menu to select the fax device driver.

When you enter a fax number, enter the same information that is required for making a phone call. For example, when you fax to a long distance number, dial a 1, the area code, and then the number. If you are faxing from a telephone system that requires a 9 for an outside line, dial 9 before dialing the fax number. You might want to add one or two commas after the 9 (`9,,`) to allow enough time to access the outside line. (Each comma places a two-second delay into your dialing string.)

## Receiving a fax

**Attention:** To receive a fax, your fax software must be open and a fax device driver must be installed.

For information on how your software processes incoming faxes, refer to your fax software manual.

A fax device driver must be installed to receive a fax. If you enabled the auto receive feature, opening the fax software program installs the fax device driver and prepares the modem to receive a fax. The fax communications software must be open.

You can open and minimize Windows fax packages so that you can receive a fax while you are working in another program.

## Guidelines for successful faxing

- Avoid installing more than one fax software application at a time on your computer. Conflicts occur frequently if more than one fax program is installed because all fax software applications use the same types of files for operation.

- Because many fax device drivers keep possession of the COM port after being installed, you might need to uninstall the fax device driver to use other modem functions. For instructions about uninstalling the fax device driver, consult your communications software manual.

- In many Windows application packages, the fax device driver is displayed in a list of the printer selections. To send a fax, direct the fax to the fax device driver. To receive a fax, direct the fax to your normal printer selection. For more information on using fax software to send and receive faxes, refer to the documentation that comes with your fax software application.

## Modem features

Your 3Com 56K V.90 Mini-PCI modem can connect at speeds up to 56,000 bps and send or receive faxes at speeds up to 14,400 bps. Actual download speeds might be lower due to varying line conditions. Compatible phone line and server equipment are required. This section contains information on the modem features.

### Automatic calling-card dialing

When you make a calling-card call, your modem detects the “bong” that sounds prior to entering your calling card number. You can set up your modem to enter your calling-card number and automatically place your call by entering the following string in your communications software or in the terminal mode:

```
ATDT <phone#>&<calling card#>
```

### Call progress detection

An optional set of result codes informs you when:

- The telephone number you have dialed is busy
- The line has been picked up, but a modem is not answering the call
- There is no dial tone on the telephone line
- A call is coming in

These result codes, and the commands that enable or disable them are controlled by the ATXn command. See ATXn in the Modem Commands listing, and the Result Codes listing.

### Dialing stored phone numbers

Your modem can store up to four of your most frequently called numbers (AT&Z0 through AT&Z3). See AT&Z for storing that number and ATDS for dialing stored phone numbers in the ATCOMS.TXT file on the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD.

For example, if you are dialing a phone number of 123-4567, and it is the first number in a list that you want to store, enter `AT&Z0=1234567` to store the number, and enter `ATDS0` to dial it. To dial the second phone number in the list, enter `AT&Z1=`*`xxxxxxx`*, where *xxxxxxx* is the second phone number, to store it, and enter `ATDS1` to dial it.

### Digital line guard

Your modem must use an analog line. If you are in an office and you do not know the type of line that you are connecting to, check with your telephone company or telephone administrator. If that is not possible, use a line that is connected to a fax machine or another modem. If you have only a digital line, you might be able to request a data line from your telephone company or telephone administrator.

If you are transmitting from a hotel, request a room with a data or standard analog telephone line.

The 3Com 56K V.90 Mini-PCI modem is equipped with a digital line guard to protect it if you accidentally connect to a digital phone line. If, after you connect the cables and enter the communications software, you hear a sound and the following message displays

```
SEE MODEM USER REFERENCE
```

PHONE LINE NOT VALID

`"DIGITAL LINE ERROR"`

disconnect your telephone cable immediately. The modem is connected to the wrong kind of telephone line, such as a line from a digital PBX system. To use your modem, determine if your digital PBX or telephone has a data connection or look for a separate analog modem or fax line that you can use.

## Wake on ring

Your computer can be awakened through the modem when it receives a ring. Windows 2000, Windows 98, Windows 95, and Windows NT 4.0 support Wake on Ring (WOR) which wakes up your notebook computer when any incoming ring, such as an e-mail or fax, is received. For example, WOR enables your computer to go into sleep mode and wake up on an incoming fax. Your modem line must be connected and your communications application must be open for WOR to work properly.

## International use

If you travel outside of your country, you might find that you cannot insert your RJ-11 modem jack into the telephone wall socket. In this case, you must obtain an adapter specific to the telephone system in the area where you are located. For information on purchasing an adapter specific to your country or region, visit the IBM TeleAdapt support Web site at http://www.teleadaptusa.com/nme/order_ibm.htm

Connecting a modem cable in different countries or regions might require trial and error until you determine exactly what you need because a particular country or region might have multiple telephone exchange systems that require different software or hardware configurations.

## Selecting a country or region using Windows dialing properties

If you travel to a different country or region, you can use Windows to easily change the country or region configuration for your modem. For more information about selecting countries or regions and using the Windows TAPI Selector, refer to your Windows operating system documentation.

## Selecting a country or region in Windows 95 and Windows 98

1. Click **Start** → **Programs** → **3Com Utilities**.
2. Select **Country Select** to open the Dialing Properties window.
3. In the Dialing Properties window, select the country or region from which you are dialing in the **I am In** selection box. The new country or region setting is activated when the modem goes off-line and then back on-line again.

## Selecting a country or region in Windows 2000

1. Click **Start** → **Programs** → **3Com Utilities**.
2. Select **Country Select** to open the Phone and Modem Options window.
3. Select **Edit**.
4. Select the country or region from which you are dialing. The new country or region setting is activated when the modem has goes off-line and then back on-line again

## Selecting a country or region in Windows NT 4.0

1. Click **Start** → **Programs** → **Control Panel**.

2. Double-click the **Modems** icon.
3. Select **Dialing Properties**.
4. Select the country or region from which you are dialing. The new country or region setting is activated when the modem goes off-line and then back on-line again.

## Connecting from foreign hotels

To prevent problems when making a connection or faxing from foreign hotels, obtain the following information before dialing:

1. Check the line type (analog or digital). Your modem must use an analog line. Check with your hotel to determine the type of line that is available to you.

2. Check for pulse or tone dialing. Check with your hotel to determine the type of dialing that it uses. You can easily check the dialing type by picking up the phone and dialing a few digits. Listen for clicks (pulses) or tones to determine whether to select pulse or tone dialing in your fax or data software.

3. Issue the ATX1 command to instruct your modem to ignore the dial tone. Instructing your modem to ignore the dial tone is called “blind dialing.” To blind dial in Windows 98, Windows 95, or Windows NT 4.0:

   a. Click **Start** → **Programs** → **Control Panel**.
   b. Click **Control Panel**.
   c. Double-click **Modems**.
   d. Select your modem.
   e. Click **Properties**; then click the **Connection**s tab.
   f. Remove the check from the **Wait for dial tone before dialing** check box.

   The next time you dial, the modem will ignore all dial tones when attempting to connect.

4. If you still have problems, verify that the telephone number is correct and that the remote modem is answering your call by dialing the number of the remote modem from the telephone. Carefully note the exact digits you need for the country or region you are calling. Wait for the telephone to connect to the modem and listen for the connection sounds.

## Redialing the last dialed number

Your modem stores each dialed number until another number is dialed. When you issue the ATDL command (see the list of commands in the ATCOMS.TXT file on the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD), the modem redials the last number dialed.

---

# Modem device drivers

This section contains information on the modem device drivers for Windows 98, Windows 95, Windows NT 4.0, and Windows 2000

## Windows 98 and Windows 95 device drivers

This section contains information on installing and uninstalling the Windows 98 and Windows 95 device drivers.

### Installing the device driver in Windows 98 and Windows 95

The Windows 95 or Windows 98 modem device driver is already installed. This section includes the installation procedure if you need to reinstall a device driver:

1. Insert the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD that comes with your notebook into the CD-ROM drive.
2. Find and open the MDMSETUP folder that is on the CD.
3. Double-click the SETUP.EXE file.
4. Follow the on-screen instructions. When you are prompted to do so, restart the computer.
5. After the computer restarts and the `Insert Disk` message displays, click **OK**.
6. In the **Copy files from** box, type `C:\WINDOWS\OPTIONS\CABS`, and then click **OK**.
7. Your computer will go through a brief installation process. When the installation completes, your modem will be reinstalled.

### Uninstalling the device driver in Windows 95 and Windows 98

Sometimes previous or incomplete installations leave problems that can affect the operation of the network adapter. If the device driver installation is unsuccessful for any reason, try removing the software and repeating the device driver installation procedures. Any changes to the system files made between the installation and the uninstallation will be lost because the files that existed before the installation will be restored.

If you followed the installation procedure steps in the “Installing the device driver for Windows 95 and Windows 98” section, the existing device driver was uninstalled prior to the installation. However, you can also use the following steps to uninstall a device driver:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click **Add/Remove Programs**.
3. Select the **3Com 56K V.90 Mini PCI Modem**.
4. Click **Add/Remove**.

   When the uninstallation completes, restart your computer.

## Windows NT 4.0 device drivers

This section contains information on installing and uninstalling the device driver for Windows NT 4.0.

### Installing the device driver in Windows NT 4.0

The modem device driver is already installed. This section contains the installation procedure if you need to reinstall the device driver after a catastrophic failure.

1. Insert the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD that comes with your notebook computer into the CD-ROM drive.
2. Find and open the MDMSETUP folder that is on the CD.
3. Double-click the SETUP.EXE file.
4. Follow the on-screen instructions.
5. In the Modem Setup window, select **Install**.
6. Click **OK**.

### Uninstalling the device driver in Windows NT 4.0

Sometimes previous or incomplete installations leave problems that can affect the operation of the network adapter. If the device driver installation is unsuccessful for any reason, try removing the software and repeating the device driver installation procedures.

Any changes to the system files made between the installation and the uninstallation will be lost because the files that existed before the installation will be restored.

If you followed the installation procedure steps in the "Installing the device driver for Windows NT 4.0" section, the existing device driver was uninstalled prior to the installation. However, you can also use the following steps to uninstall a device driver:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click **Add/Remove Programs**.
3. Select the **3Com 56K V.90 Mini PCI Modem**.
4. Click **Add/Remove**.

   When the uninstallation completes, restart your computer.

## Windows 2000 device drivers

This section contains information on installing and uninstalling the device driver for Windows 2000.

### Installing the device driver in Windows 2000

The Windows 2000 modem device driver is already installed. This section provides the installation procedure if you need to reinstall a device driver.

1. Insert the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD that comes with your notebook computer into the CD-ROM drive.

2. Find and open the MDMSETUP folder that is on the CD.

3. Double-click the SETUP.EXE file.

4. Follow the on-screen instructions. When you are prompted to do so, restart the computer.

5. After the computer restarts, the Files Needed window opens.
   If Windows 2000 was added to your computer system, type `C:\WINDOWS\OPTIONS\CABS` in the Files Needed window, and then click **OK**.

   If Windows 2000 is the original operating system on your computer, type `C:\WINNT\OPTIONS\CABS` in the Files Needed window, and then click **OK.**

### Uninstalling the device driver for Windows 2000

Sometimes previous or incomplete installations leave problems that can affect the operation of the network adapter. If the device driver installation is unsuccessful for any reason, try removing the software and repeating the device driver installation procedures. Any changes to the system files made between the installation and the uninstallation will be lost because the files that existed before the installation will be restored.

If you followed the installation procedure steps in the "Installing the device driver for Windows 2000" section on page 3-10, the existing device driver was uninstalled prior to the installation. However, you can also use the following steps to uninstall a device driver:

1. Click **Start**.
2. Select **Settings**.
3. Click **Control Panel**.
4. Select **Add/Remove Programs**.
5. Select **3Com 56K V.90 Mini PCI Modem**.
6. Click **Add/Remove**.

When the uninstallation completes, restart your notebook computer.

## Modem AT commands

**Attention:** In most cases, your modem will work using the factory-set defaults. If you are not experienced in using modems, do not change the settings.

To view a list of available modem AT commands and their functions, open the ATCOMS.TXT file on the *IBM10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD.

You can issue AT commands from several places, but it is the most common to issue AT commands while in the terminal mode of your communications software.

Follow these guidelines when you issue AT commands:

- Type commands in all upper-case letters or all lower-case letters, but not in a combination of cases.
- You can enter up to 60 characters, not counting AT, carriage returns, or spaces. You are not required to enter spaces. However, entering spaces makes a long string of AT commands easier to read.
- If you leave the number off of a command, zero is assumed. For example, if you type `ATE`, `ATE0` is assumed.
- You must prefix every command except `A/` and `+++` with `AT` and issue the command by pressing Enter.
- The modem responds with `OK`, `ERROR`, or another result code. For more information on result codes, open the ATCOMS.TXT file on the CD that comes with your notebook computer.

For example, use the following steps if you want to view the version of firmware used in your modem.

1. Find the AT command (I3) that controls viewing firmware information in the ATCOMS.TXT file on the *IBM10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD. The file contains an alphabetical list of the AT command functions.
2. Open your communications software.
3. Access Terminal mode.
4. Most commands to the modem require the AT prefix. Type `ATI3`, and then press Enter. The firmware version displays.

## Modem S-Registers

To view a list of available S-Registers and their functions, open the SREG.TXT file on the *IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD.

The AT command settings are stored in the S-Registers. S-Register values can be changed by issuing an AT command or by entering the new value of the S-Register, preceded by AT. For example:

```
ATSn=v
```

is an AT command where *n* is the number of the S-Register you want to change and *v* is the new value of that S-Register.

To change from manual answer (when you answer the call) to auto-answer (where the modem picks up the call after a certain number of rings), and have the call answered after three rings, use the following steps:

1. Open the SREG.TXT file on the CD to find the S-Register that controls answering.
2. Open your communications software.
3. Access Terminal mode.
4. Type `ATS0=3` and press Enter.

   The modem will now answer a call after three rings.

## Modem messages

To view a list of available result codes, open the RESCODES.TXT file on the *IBM10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD.

Result codes are displayed messages that inform you of the status of modem actions or when an error has occurred. The result codes that display depend on the setting of the ATXn command. For more information, open the ATCOMS.TXT file on the CD that comes with your computer.

### Troubleshooting modem messages

| **Message or symptom** | **Possible solutions** |
|---|---|
| `ERROR` | If you are typing from the command line in terminal mode, try retyping the command.<br>Make sure that you issued the correct AT command. |
| `Modem Communication Error or Modem not found.` | If you are using fax software, make sure the correct fax class (Class 1) is selected.<br>Check the computer BIOS setup. If the BIOS requires specific settings for modems, be sure to enable those settings.<br>Make sure that you selected the correct COM port in the software setup. |
| `NO DIAL TONE` | Make sure that the cable connections are secure. The connection to the phone line might be incomplete or the phone cable might be bad.<br>Make sure that the telephone line is not being used by someone else.<br>Make sure that a standard analog telephone line is being used. If the connection being attempted is to a digital phone system or a private branch exchange (PBX), an error message might display.<br>Make sure that the phone line is working by connecting a standard telephone and listening for a dial tone. |

| **Message or symptom** | **Possible solutions** |
|---|---|
| `DIGITAL LINE ERROR` | The modem is trying to connect to a digital phone system (see Modem Features on page 3-6), a public branch exchange (PBX), or another invalid line. Change lines to connect to a standard analog telephone line. |
| You cannot hear modem or speaker | Make sure that the modem speaker is turned on (use the ATM1 command).<br>Make sure that the computer speaker is turned on. For instructions on turning on the computer speaker, refer to the computer manual |
| Modem not responding | Check the computer BIOS setup. If the BIOS requires specific settings for modems, be sure that those settings have been enabled. |
| Modem does not dial correctly | If the dialing directory is being used, make sure that the telephone number that you dialed is correct.<br>If you dialed in terminal mode, make sure that the number that you dialed is correct.<br>If you are dialing a long distance number, make sure that you dialed 1 before dialing the number.<br>Make sure that you dialed a prefix (such as 9), if the prefix is required.<br>The other line might be busy or not answering. Make sure it is available to answer before calling.<br>If you are dialing internationally, the modem might not recognize the dial tone. Try blind dialing using the ATX1 command (see AT Commands) and the telephone number.<br>If you have Call Waiting, disable it. (Usually pressing *70 disables Call Waiting.) |
| Modem does not dial | Check the phone line and cable connections.<br>Make sure that no other phone extension has been picked up on the same line.<br>Make sure that you are using a standard analog telephone line. An error can occur if you are trying to connect to a digital phone system or a PBX.<br>Listen for a normal dial tone on the line. If there is no dial tone or the dial tone sounds unusual, use another telephone line. |

| **Message or symptom** | **Possible solutions** |
|---|---|
| Modem does not fax | Make sure that you selected fax Class 1.<br>Make sure that no other communications programs are open.<br>Be sure that you selected the correct printer device driver.<br>Turn off all the computer power-management features. |
| Modem does not connect | If the modem is having trouble communicating with only one line, the problem might be with the modem on the other end.<br>Disable the error correction (see &M0 in the ATCOMS.TXT file on the *IBM10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD) and the data compression (see &K0 in the ATCOMS.TXT file on the *IBM10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD) and try connecting the modem again. |
| Modem connects, but characters are garbled | Make sure the parity, modem speed, word length, and stop bits are the same on both the sending and the receiving modems.<br>Disable error correction (see &M0 in the ATCOMS.TXT file on the *IBM10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD) and data compression (see &K0 in the ATCOMS.TXT file on the *IBM10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD) and try connecting the modem again. |
| Modem clicks repeatedly, but no connection is made | A `DIGITAL LINE ERROR` message usually displays, but if the electrical current is below 100mA, the modem clicks repeatedly and the message does not display.<br>The cable might not be seated securely. Check all the cable connections. |

## Frequently asked questions

*What is a Mini-PCI Card?*

Mini-PCI technology provides built-in network and modem functions for your notebook computer. With Mini-PCI you do need to use separate PC Cards for network and modem functions. Your notebook comes configured with both functions and is ready to operate when started.

*Why are two device driver names used for one product?*

The IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com is the product name. However, the adapter uses two separate device drivers. It uses a device driver for

LAN functionality and a device driver for modem functionality. The network device driver is identified as the 3Com 10/100 Mini PCI Ethernet Adapter while the modem device driver is identified as the 3Com 56K V.90 Mini PCI Modem. These are the names your operating system displays under Device Manager. To avoid confusion, this manual refers to both names.

*Do I need anything for my operating system?*

The IBM 10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com is already configured to work with Windows 2000, Windows 95, Windows 98, and Windows NT 4.0.

*Is my Mini-PCI modem as fast as a PC Card modem?*

Your Mini-PCI modem can connect at speeds up to 56,000 bps and send and receive faxes at speeds up to 14,400 bps. With V.90 technology, your modem is capable of receiving data at up to 56 Kbps and sending data at up to 31.2 Kbps. These are the same speeds as a PC Card modem.

*If my notebook computer is preconfigured, do I ever need to install a device driver?*

If there is a catastrophic event, you might need to reinstall the device drivers. All normal installation instructions for each operating system are included in this manual. Both the network and modem device drivers are included on the *IBM10/100 Ethernet Mini-PCI Adapter with 56K Modem by 3Com* CD that comes with your notebook computer.

# Appendix A. Help and service information

This section contains information on how to obtain online and telephone technical support.

## Online technical support

Online technical support is available during the life of your product. Online assistance can be obtained through the Personal Computing Support Web site and the IBM Automated Fax System.

During the warranty period, assistance for replacement or exchange of defective components is available. In addition, if your IBM option is installed in an IBM computer, you might be entitled to service at your location. Your technical support representative can help you determine the best alternative.

| **Online technical support** | |
|---|---|
| IBM Personal Computing Support Web Site | http://www.ibm.com/pc/support |
| IBM Automated Fax System | 1-800-426-3395 (U.S. and Canada) |

## Telephone technical support

Marketing, installation, and configuration support through the HelpCenter will be withdrawn or made available for a fee, at IBM's discretion, 90 days after the option has been withdrawn from marketing. Additional support offerings, including step-by-step installation assistance, are available for a nominal fee.

To assist the technical support representative, have available as much of the following information as possible:

1. Option name
2. Option number
3. Proof of purchase
4. Computer manufacturer, model, serial number (if IBM), and manual
5. Exact wording of the error message (if any)
6. Description of the problem
7. Hardware and software configuration information for your system

If possible, be at your computer. Your technical support representative might want to walk you through the problem during the call.

For the support telephone number and support hours by country, refer to the following table or to the enclosed technical support insert. If the number is not provided, contact your IBM reseller or IBM marketing representative. Response time may vary depending on the number and nature of the calls received.

| **Support 24 hours a day, 7 days a week** | |
|---|---|
| Canada | 1-800-565-3344 |
| U.S.A./Puerto Rico | 1-800-772-2227 |

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# Appendix B. Notices

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IBM
ThinkPad
Wake on LAN

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## Electronic emissions notices

## Regulatory Compliance

Manufacturer's U.S. FCC Part 15 Declaration of Conformity

Responsible Party:

3Com Corporation

605 North 5600 West

Salt Lake City, UT 84116-3738

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(800) 527-8677

Declares that the product:

Date: 8 September 1999

Brand Name:3Com Corporation

Model Number: 3CN3ACx556B

Equipment Type: Mini PCI Internal 10/100 Mbps LAN +56K Fax/Modem Combo Card

Complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

3Com Corporation  3CN3ACx556B

Tested To Comply

With FCC Standards

FOR HOME OR OFFICE USE

U.S. FCC Part 15 Class B Verification Statement

3Com Corporation

Model No: 3CN3ACx556B

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- this device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.

**WARNING**: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from the one which the receiver is connected to.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet prepared by the Federal Communications Commission helpful:

*The Interference Handbook*

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 004-000-00345-4.

**Note:** In order to maintain compliance with the limits of a Class B digital device, 3Com requires that you use quality interface cables when connecting to this device. Changes or modifications not expressly approved by 3Com could void the user's authority to operate this equipment. Refer to the manual for specifications on cabling types.

## Industry Canada (IC) Emissions Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

## Avis de Conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe B est conform à la norme NMB-003 du Canada.

## VCCI Statement

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

## U.S. FCC Part 68 Statement

The modem complies with Part 68 of the Federal Communications Commission (FCC) rules. On the computer is a label that contains the FCC registration number and Ringer Equivalence Number (REN) for this device. If requested, this information must be provided to the telephone company

Equipment Manufacturer

3Com Corporation

5400 Bayfront Plaza

Santa Clara, CA 95052-8145

Model No: 3CN3ACx556B

FCC Registration Number:See identification number for modem marked on computer label.

Ringer Equivalency Number:See “REN” number marked on computer label.

The Ringer Equivalence Number (REN) is used to determine the quantity of devices which may be connected to the telephone line. Excessive REN’s on a telephone line may result in the devices not ringing in response to an incoming call. In most areas, the sum of REN’s should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total REN’s, contact the local telephone company.

An FCC compliant telephone line cord with a modular plug is required for use with this device. The modem is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant. See installation instructions for details.

If this device causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. The telephone company may request that you disconnect the equipment until the problem is resolved.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of this equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

This equipment cannot be used on telephone company provided coin service. Connection to party line service is subject to state tariffs. Contact the state public utility commission or public service commission for information.

When programming and/or making test calls to emergency numbers:

- Remain on the line and briefly explain to the dispatcher the reason for the call.
- Perform such activities in the off-peak hours such as early morning or late evenings.

**Note:** The United States Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device to send any message via a telephone fax machine unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business or other entity, or other individual sending the message and the telephone number of the sending machine or such business, other entity, or individual. Refer to your fax communication software documentation for details on how to comply with the fax-branding requirement.

If trouble is experienced with this equipment or for repair or warranty information, please contact 3Com Corporation. Contact details can be found in the main body of this manual.

## Industry Canada (IC) Notice

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operation, and safety requirements. The Department does not guarantee the equipment will operate to the users' satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**CAUTION**: Users should not attempt to make electrical ground connections by themselves, but should contact the appropriate inspection authority or an electrician, as appropriate.

**NOTICE**: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface.  The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

## European Community - CE Notice

Marking by the symbol **CE0344X** indicates compliance of this equipment to the EMC Directive 89/336/EEC,  the Low Voltage Directive 73/23/EEC amended by 93/68/EEC and the Telecom Terminal Equipment and Satellite Earth Stations Directive 98/13/EC. Such marking is indicative that this equipment meets or exceeds the following technical standards:

- EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment. (CISPR 22 Class B)
- EN 50082-1 - Electromagnetic compatibility - Generic immunity standard Part 1: Residential, commercial, and light industrial.
- EN60950 (1992) - Safety of information technology equipment, including electrical business equipment.
- CTR 21 (1998) - Attachment requirements for pan-European approval for connection to the analogue Public Switched Telephone Networks (PSTNs) of TE (excluding TE supporting voice telephony services) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signaling

**WARNING**: Although this equipment can use either loop disconnect (Pulse) or DTMF (Tone) signaling, only the performance of the DTMF signaling is subject to regulatory requirements for correct operation. It is therefore strongly recommended that the equipment is set to use DTMF signaling for access to public or private emergency services. DTMF signaling also provides faster call set up.

This equipment has been approved to Council Decision 98/482/EC--"CTR 21" for Pan-European single terminal connection to the Public Switched Telephone Network (PSTN). However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN termination point. In the event of problems, you should contact your equipment supplier in the first instance.

This equipment has been designed to interwork with Public Switched Telephone Networks in the following countries in Europe: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland & United Kingdom.

The safety status of the ports on this modem is as follows:

Line Interface Port- TNV

Mini-PCI Bus connector to PC- SELV

Note that only SELV ports should be connected to other SELV ports or TNV ports to other TNV ports. Interconnection of ports with different safety status may invalidate the approval. If in doubt about making such a connection, advice should be sought from a competent engineer.

The user should ensure that the power drawn by the modem, together with the host and any auxiliary apparatus drawing power from the host is within the rating of the power supply.

The modem power requirements are:@ 215mA and +3.3Vaux @ 160mA

The user should be aware that it is the modem and not the host that is approved.

When the modem is supplied along with a host machine, the modem user instructions must also be supplied. Failure to do so will invalidate the modem approval.

Please consult the supplier or maintainer of the modem, not the network operator, if operational difficulties are experienced.

## New Zealand

Not all phones connected to the phone port will respond to incoming ringing. Do not report this as a fault unless the same phone will not respond to ringing when connected to a standard phone socket.

This equipment shall not be set up to make automatic calls to the Telecom 111 Emergency Services.

The grant of a Telepermit for a device in no way indicates Telecom acceptance of responsibility for the correct operation of that device under all operating conditions. In particular, higher speeds at which this modem is capable of operating depend on a specific network implementation which is only one of many ways of delivering high quality voice telephony to customers. Failure to operate should not be reported as a fault to Telecom.

In addition to satisfactory line conditions a modem can only work properly if:

it is compatible with the modem at the other end of the call and, the application using the modem is compatible with the application at the other end of the call – e.g. accessing the Internet requires suitable software in addition to a modem.

This equipment should not be used in a manner which could constitute a nuisance to other Telecom customers.

Some parameters required for compliance with Telecom’s PTC Specifications are dependent on the equipment (PC) associated with this modem. The associated equipment shall be set up to operate within the following limits for compliance with Telecom specifications:

There shall be no more than 10 call attempts to the same number within any 30 minute period for a single manual call initiation

The equipment shall go back on-hook for a period of not less than 30 seconds between the end of one call attempt and the beginning of the next.

Automatic calls to different numbers shall be not less than 5 seconds apart.

When used in the Auto-Answer mode, the S0 register must be set with a value between 2 and 5. This ensures:

A person calling your modem will hear a short burst of ringing before the modem answers. This confirms that the call has been successfully switched through the network.

Caller identification information (which occurs between the first and second ring cadence) is not destroyed.

This equipment does not meet Telecom’s impedance requirements. Performance limitations may occur when used in conjunction with some parts of the network. Telecom will accept no responsibility should difficulties arise in such circumstances

The code for Call Waiting disable is *52 on the Telecom New Zealand telephone network.

## Australia

Compliance Warning

Applications software shall be configured so that no more than 3 attempts are made to establish a connection to a given number. (**Note**: If the modem can detect service tones, up to ten attempts can be made.) There must be at least 2 seconds between call attempts. If the call sequence is unsuccessful, there shall be a delay of at least 30 minutes before attempting to call the number again.

Failure to set the modem and any application software used with the modem, to facilitate the above, will result in the modem being operated in a non-compliant manner. Consequently, there would be no permit in force for this equipment and the Telecommunications Act 1991 prescribes a penalty of $12,000 for the connection of non-permitted equipment.

Interconnecting Ports

Interconnection circuits should be such that the equipment continues to comply with the requirements of AS3260 1.2.8.5 for SELV circuits.

Compliance Information

Australian EMC Frameworks Compliance

This product conforms to the EMC Frameworks and meets:

AS/NZS3548 Australian / New Zealand Limits and Methods of Measurement of Radio Interference. This equipment conforms to the Class B limits.

Australian Safety Frameworks Compliance

This product conforms to Safety Frameworks and meets:

TS001 & AS/NZS3260 Australian / New Zealand standard for Safety of Information Technology Equipment Including Electrical Business Equipment."

Safety Compliance Statement

This modem has been tested and certified according to the following safety standards and is intended for use only in Information Technology Equipment which has been tested and certified to these or other equivalent standards:

UL Standard 1950 / CSA C22.2 No. 950

IEC 60950

EN 60950

Part Number:
File Number:

Printed in the United States of America
on recycled paper containing 10&
recovered post-consumer fiber.