

Instant EtherFast® Series

EtherFast® 10/100 Managed Network Adapter



Use this guide to install: LNE100M

User Guide

LINKSYS®

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FCC STATEMENT

The EtherFast® 10/100 Managed Network Adapter has been tested and complies with the specifications 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 according to 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 is found 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 or device
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

UG-LNE100M-090602NC KL

Table of Contents

Chapter 1: Introduction	1
The EtherFast® 10/100 Managed Network Adapter	1
Features	1
Package Contents	2
Minimum Requirements	2
 Chapter 2: Getting to Know the EtherFast® 10/100 Managed Network Adapter	 3
LEDs	3
The RJ-45 Port	3
 Chapter 3: Installing the Adapter	 4
Overview	4
Installing the Adapter and Cabling	4
 Chapter 4: Installing the Adapter's Drivers with the Setup Utility CD	 7
Overview	7
Using the Setup Utility	7
 Chapter 5: Manual Installation and Setup for Windows 98SE	 10
Overview	10
Installing the Adapter's Driver	10
Network Component Configuration	14
 Chapter 6: Manual Installation and Setup for Windows Me	 19
Overview	19
Installing the Adapter's Driver	19
Network Component Configuration	22

 Chapter 7: Manual Installation and Setup for Windows NT	 27
Overview	27
Installing NT Networking and the Adapter's Driver	28
Installing the Adapter's Driver if Networking is Already Installed	33
 Chapter 8: Manual Installation and Setup for Windows 2000	 36
Overview	36
Installing the Adapter's Driver	36
 Chapter 9: Manual Installation and Setup for Windows XP	 40
Overview	40
Installing the Adapter's Newest Driver	40
 Chapter 10: Configuring the Adapter	 42
Overview	42
General Tab	43
Advanced Tab	44
Driver Tab	48
Resources Tab	49
Power Management Tab	49
 Chapter 11: Using the Adapter's NIC Control Set and Diagnostic Tools	 50
Running the Control Set	50
General Tab	51
Setting Tab	52
Statistics Tab	57
Diagnostics Tab	62

Appendix A: Troubleshooting	64
Common Problems and Solutions	64
Running the Adapter's Diagnostics	68
 Appendix B: Managing the Adapter through SNMP and the RMON Agent	 69
Overview	69
Installing SNMP for Windows 98SE and Me	69
Installing SNMP for Windows NT	72
Installing SNMP for Windows 2000 and XP	74
Adding the Adapter's SNMP Agent	76
Utilizing the Adapter's SNMP Agent	76
 Appendix C: Sharing Your Files and Printers	 78
Overview	78
Enabling File Sharing	78
Enabling Printer Sharing	79
 Appendix D: Windows 98 and Me Client for Windows Domain Server	 80
 Appendix E: Starting Over in Windows 98, Me, 2000, or XP	 82
Starting Over in Windows 98 or Me	82
Starting Over in Windows 2000 or XP	84
 Appendix F: Manually Installing the Network Components in Windows 98 and Me	 86
 Appendix G: Installing the Network Protocols for Windows 98 and Me	 88
 Appendix H: About Plug-and-Play Technology	 90
 Appendix I: Uninstalling the Drivers with the Install Wizard	 92

Appendix J: The Setup Utility CD	93
 Appendix K: Glossary	 94
 Appendix L: Specifications	 103
Environmental	103
 Appendix M: Warranty Information	 104
 Appendix N: Contact Information	 105

Chapter 1: Introduction

The EtherFast® 10/100 Managed Network Adapter

This powerful auto-negotiating 10/100 Mbps Ethernet interface card features network management functions to save you time and hassle. Configure, check error rates, and keep an inventory of your network resources from one centralized location.

The Wake-On-LAN function remotely "wakes up" any PC on the network, so you can handle maintenance chores during off-hours. The 802.1Q support lets you optimize your network traffic by dividing the network into smaller Virtual LANs, while packet delivery is prioritized using 802.1P signaling.

Features

- Easy to Use Plug-and-Play 10/100 PCI Network Adapter
- Adapter settings can be managed via SNMP using standard MIB browser
- Full Duplex Capability at Up To 200Mbps
- Connects to Both 10Mbps Ethernet and 100Mbps Fast Ethernet Networks
- Power On your PC from anywhere on the network with Wake-On-LAN Management
- Complete 802.1Q VLAN support for use in segmented networks
- Support for IP Checksum offloading built-into the adapter driver
- 802.1p tagging support for Quality of Service (QoS)
- Configuration utility allows for complete management of the network adapter settings

Package Contents



Figure 1-1

- One EtherFast® 10/100 Managed Network Adapter
- One Setup Utility CD
- One User Guide (included on the Setup Utility CD)
- One Registration Card (not shown)
- Quick Install for Windows Operating Systems (not shown)

Minimum Requirements

- 200MHz or Faster CPU
- Available PCI 2.2 Slot
- CD-ROM Drive
- Windows 98/Me/NT 4.0/2000/XP

Chapter 2: Getting to Know the EtherFast® 10/100 Managed Network Adapter



Figure 2-1

LEDs

100	<i>Yellow.</i> The 100 LED will illuminate when the Adapter is operating at 100Mbps. If the 100 LED is not illuminated and the PC is powered on, the card is operating at 10Mbps.
Link/Act	<i>Green.</i> The Link LED will illuminate when the Adapter has been successfully connected to a network and flicker when data is being transmitted or received over the network.
COL	<i>Green.</i> The COL LED will illuminate when the Adapter experiences any collisions.
FDX	<i>Green.</i> The FDX LED will illuminate when the Adapter is operating in full duplex mode.

The RJ-45 Port

The RJ-45 Port is where you will connect your Category 5 Ethernet Network Cable or better network cabling.

Chapter 3: Installing the Adapter

Overview

Each Adapter is equipped with an RJ-45 port that automatically adjusts to either 10Mbps or 100Mbps speeds, allowing your PC to attach to either Fast Ethernet (also known as 100BaseTX) or regular 10BaseT Ethernet network segments without additional hardware or software.

The Adapter should **only** be used with twisted-pair cabling. 10BaseT and 100BaseTX cabling is available in a number of different grades. For best results, use 8-wire, UTP Category 5 unshielded twisted-pair for both 10BaseT and 100BaseTX network segments, although UTP Category 3 can be used for 10BaseT segments. The cable that runs from the Adapter to your network should not exceed 100 meters (328 feet).

Installing the Adapter and Cabling

1. Power off your PC and any peripheral equipment attached to it. Unplug your PC's power cable.
2. Remove your computer's outside cover.

- Open your computer and locate the PCI slot(s) on your motherboard. PCI slots are easily identified by their beige or white color. Remove the metal slot cover on the back of the PC, then insert the Adapter into an empty PCI slot, as shown in Figure 3-1.

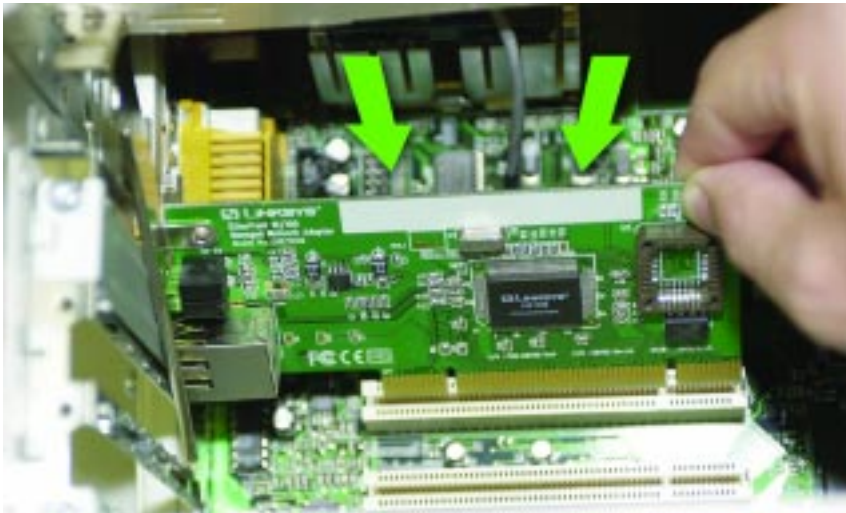
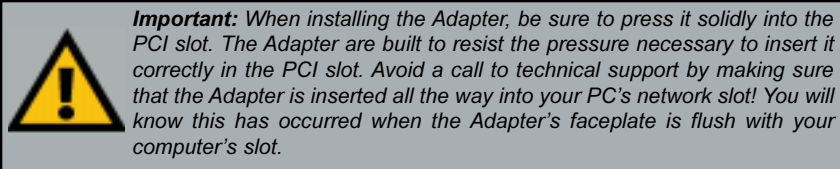


Figure 3-1

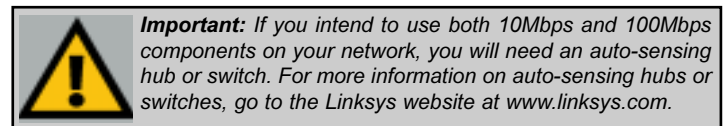
- Once the Adapter is firmly in place, secure its fastening tab to your PC's chassis with a mounting screw.
- Replace your PC's cover.

- Plug one end of a twisted-pair network cable into the Adapter's RJ-45 port, as shown in Figure 3-2.
- Plug the other end of the cable into a network device, such as a hub or switch, DSL modem, cable modem, router, etc.
- Reconnect your PC's power, then power on your computer. Your computer will automatically recognize the Adapter and assign it a unique IRQ ("interrupt") and I/O address.



Figure 3-2

The Adapter's installation is complete. Next, to install the Adapter's device drivers, turn to Chapter 4: Installing the Adapter's Drivers with the Setup Utility CD. If your operating system will not install the drivers using the Setup Utility on the CD or if you'd rather install the drivers manually, turn to the chapter appropriate to your Operating System.



Chapter 4: Installing the Adapter's Drivers with the Setup Utility CD

Overview

The Adapter's drivers can easily be installed with the Setup Utility included on the Setup Utility CD after the Adapter is physically installed into your PC. This chapter will describe the steps necessary to do this.

Using the Setup Utility

The **Install Wizard** works for installing the drivers under Windows 98, Me, 2000, and XP. To manually install and setup the Adapter on a Windows NT PC, refer to Chapter 7: Manual Installation and Setup for Windows NT.

1. Start your PC. Windows will automatically detect the presence of the Adapter in your PC and bring up the *Add New Hardware Wizard* screen. Since you will be installing the drivers through the Install Wizard, click the **Cancel** button on this screen.
2. Insert the Setup Utility CD into your CD-ROM drive. The Setup Utility's *Welcome* screen, shown in Figure 4-1, will come up automatically and identify the version of Windows you are using.



Figure 4-1

3. Click the **Install** tab, as shown in Figure 4-2, and the installation process will begin.



Figure 4-2

- 4a. If you are using Windows 98, Me or 2000, the screen shown in Figure 4-3 will appear.



Figure 4-3

On this screen, you will need to type your computer's name and your group, or workgroup, name in the appropriate fields. Then, click the **Driver Install** button to continue.

- 4b. If you are using Windows 2000 or XP, the screen shown in Figure 4-4 will appear.



Figure 4-4

5. On this screen, you will need to type your computer's name in the appropriate field. Then, click the **Driver Install** button to continue. Once the driver is installed, the NIC Control Set will automatically be installed. This NIC Control Set is a utility for managing the Adapter.

6. When installation is complete, you will be asked to restart your computer. (See Figure 4-5.) Restart your computer now.



Figure 4-5

Driver installation is complete!

Chapter 5: Manual Installation and Setup for Windows 98SE

Overview



Important: The directions in this Chapter only apply if you have not already installed the drivers with the Setup Utility CD.

After physically installing the Adapter in your computer, follow these instructions to manually install the network device driver. The installation procedure for the network driver will vary depending on which version of Windows 98 you are using, and on your current system configuration. If at any time during the installation you encounter problems, refer to the **Troubleshooting** section.

Installing the Adapter's Driver

1. Start up your PC in Windows 98.
2. Windows 98 will automatically detect the presence of the Adapter in your PC.
3. Insert the Setup Utility CD into your CD-ROM drive while the *Add New Hardware Wizard* window is visible. When the screen shown in Figure 5-1 appears, click the **Next** button.

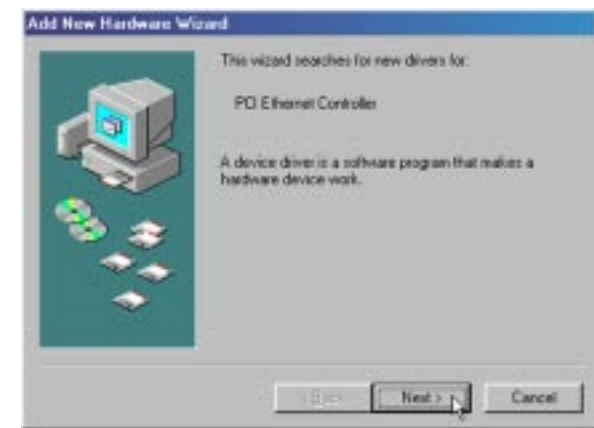


Figure 5-1

4. Select **Search for the best driver for your device (Recommended)**, as shown in Figure 5-2, and click the **Next** button.



Figure 5-2

5. Select **Specify a location** and type **D:\drivers\win98** in the drop-down box, as shown in Figure 5-3. Then, click the **Next** button.



Figure 5-3

6. A window will open, notifying you that Windows is searching for the EtherFast 10/100 Managed Network Adapter driver. When the window notifies you that it is ready to install the driver, as shown in Figure 5-4, click the **Next** button.

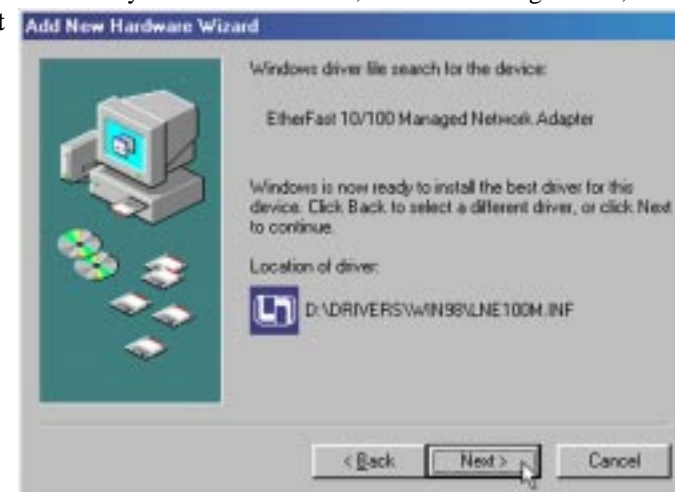


Figure 5-4

7. Windows will begin copying the Adapter's driver files to your PC. Refer to the chart below to help guide you through the process.

If you press *Skip* or *Cancel*, the drivers will not be installed!

- | | |
|--|---|
| • If your PC asks for the Linksys Setup Utility CD | <ol style="list-style-type: none"> 1. Click OK. 2. Verify that the Setup Utility CD is in your PC's CD-ROM drive. 3. Type d:\Drivers\Win98 in the "Copy files from:" box. 4. Click OK. |
| • If you are asked to supply your Windows 98 Installation Files or Disks | <ol style="list-style-type: none"> 1. Click OK. 2. If you have a Windows 98 CD-ROM, type d:\win98 in the "Copy files from:" box, where d: is your CD-ROM drive. 3. If you don't have a Windows 98 CD-ROM, type c:\windows\options\cabs. 4. Click OK. |
| • If you are asked for a file that includes "LNE100M" or "WIN-NDI.DLL" in its name | <ol style="list-style-type: none"> 1. Insert the Setup Utility CD into your PC's CD-ROM drive. 2. Type d:\Drivers\WIN98 in the "Copy files from:" box. 3. Click OK. |
| • If you receive a Version Conflict error | <ol style="list-style-type: none"> 1. Choose to keep the newest version of the file by clicking Yes. |

8. Windows will finish installing the software onto your PC. When the screen shown in Figure 5-5 appears, click the **Finish** button.



Figure 5-5

9. When asked if you want to restart your PC, as shown in Figure 5-6, remove the Setup Utility CD and click the **Yes** button. If you are using a Windows CD, leave it in your PC. You may need it later.

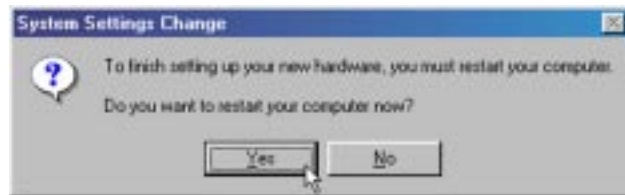


Figure 5-6

10. If Windows does not ask you to restart your PC, click the **Start** button, choose **Shut Down**, choose **Restart**, then click the **Yes** button.

The Windows 98 driver installation is complete. Please continue on to the next section, which will provide instructions for configuring Windows 98's network protocol. Consult your Windows documentation for your network configuration information if necessary.



Note: From this point on, you must provide Windows with a User name and Password every time you are prompted to do so. Remember to click the **OK** button to properly log in to Windows. If you click the **Cancel** button or press the **Escape (ESC)** key, you will not log in to the network.

Network Component Configuration

1. From the Windows 98 desktop, click on the taskbar's **Start** button, select **Settings**, choose the **Control Panel**, and double-click the **Network** icon.
2. The Network window will appear, as shown in Figure 5-7, with the **Configuration** tab selected. Confirm that the components listed here are shown:
 - *Client for Microsoft Networks*
 - *Dial-Up Adapter*
 - *Linksys LNE100M Managed Network Adapter*
 - *TCP/IP -> Dial-Up Adapter*
 - *TCP/IP -> Linksys LNE100M Managed Network Adapter*

There may be additional components listed; however, if any of the components shown are missing, you'll need to manually install them. Refer to **Appendix F: Manually Installing the Network Components in Windows 98 and Me** now.

3. Click the **File and Print Sharing** button. The File and Print Sharing window will appear.

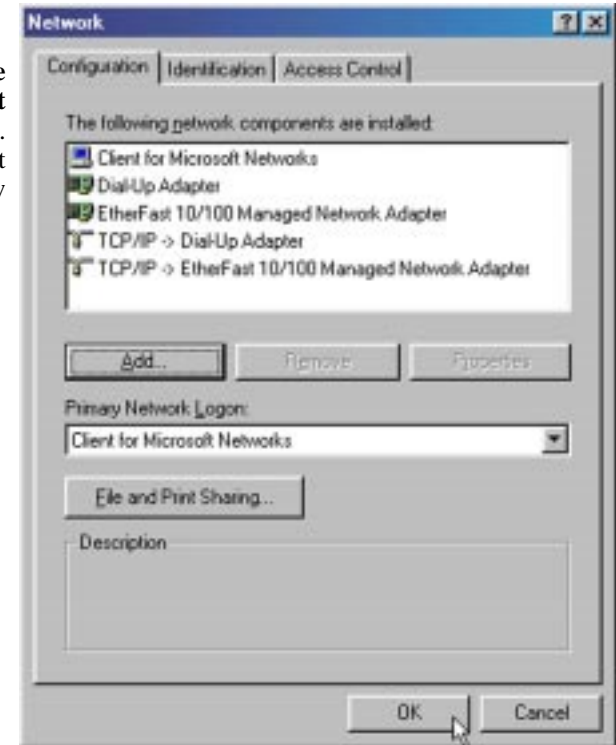


Figure 5-7

4. If you'd like others to be able to access the files on your PC's hard drive, select **I want to be able to give others access to my files** from the File and Print Sharing screen shown in Figure 5-8.

If you'd like to share your printer with other users on the network, select **I want to be able to allow others to print to my printer(s)** from the File and Print Sharing screen shown in Figure 5-8.



Figure 5-8



Note: If you do not enable File and Printer Sharing, your PC will be invisible on the network, inaccessible by anyone.

5. Click the **OK** button. *File and Printer Sharing for Microsoft Networks* should now appear in the list of installed components, as shown in Figure 5-9.



Figure 5-9

6. After ensuring that all of the listed network components are installed on your system, select **Client for Microsoft Networks** from the *Primary Network Logon* pull-down menu.
7. Click on the **Identification** tab, shown in Figure 5-10. Type the name of your computer in the **Computer Name** box. Choose a name that is unique from the other computer names on the network.
8. Type the **name of your workgroup** in the *Workgroup* box. The Workgroup name should be the same Workgroup name in use by all of the other PCs on the network. Use the same Workgroup name that is in use on your other computers for ease of use.
- 8a. (Optional) Enter a **description of your computer** in the *Computer Description* box. This box may be left blank.



Figure 5-10



Note: Your Computer Name and Workgroup Name must both be fewer than 15 characters, and should only consist of numbers and letters.

9. Choose the **Access Control** tab, as shown in Figure 5-11. Verify that **Shared-level access control** is selected.



Figure 5-11

10. Click the **OK** button. Your system may ask you for your Windows 98 CD-ROM or the location of the Windows 98 installation files. If it does, direct Windows to the appropriate location, (i.e., **D:\win98**, where D is the letter of your CD-ROM drive, making sure you have inserted the Windows 98 CD-ROM, or **C:\windows\options\cabs**).
11. Once Windows has copied the necessary files, the System Settings Change window appears. Remove all disks from your PC and click the **Yes** button to restart your PC. If you don't see this window, simply shut down Windows 98 and restart your PC. Remember to remove any disks prior to rebooting.
12. A Logon window will appear, requiring you to enter a **User name** and **Password**. Enter your user name and password and click the **OK** button. Do not click the **Cancel** button or press the **Escape** key. Clicking either of these buttons will prevent you from logging in to the network. If the logon does not appear or if it does not allow you to log on, refer to the **Troubleshooting** section.

13. Once you are at the Windows 98 desktop, double-click on the **Network Neighborhood** icon. You should see one icon for the entire network and the names of the other PCs on the network.

If you can see your computer along with all the other computers on the network in Network Neighborhood, then the Windows 98 network configuration is complete. Continue with Appendix C: Sharing Your Files and Printers if you want your PC's data or printer to be available to others on the network. You may stop here, however, if you wish to configure File and Printer Sharing at a later time.

Refer to the **Troubleshooting** section if:

- You don't see anything at all in Network Neighborhood and have pressed the **F5** key on your keyboard a few times to refresh the screen.
- You only see your own computer in Network Neighborhood.
- You see all computers on the network except yours and have tried pressing the **F5** key a few times.
- You only see computers that are running the same operating system as you and you don't see any others.

Chapter 6: Manual Installation and Setup for Windows Me

Overview



Important: The directions in this Chapter only apply if you have not already installed the drivers with the Setup Utility CD.

After physically installing the Adapter in your computer, follow these instructions to manually install the network device driver. If at any time during the installation you encounter problems, consult the **Troubleshooting** section.

Installing the Adapter's Driver

1. Start up your PC in Windows Me.
2. Windows Me will automatically detect the presence of the PCI Ethernet Controller hardware in your PC.



Important: Do not click **Cancel** or **Skip** at any time during the installation. Doing so will prevent your driver from being properly installed on your PC.

3. Insert the Setup Utility CD into your CD-ROM drive while the *Add New Hardware Wizard* window, shown in Figure 6-1, is visible. Click the **Specify the location of the driver (Advanced)** radio button. Click the **Next** button.



Figure 6-1

4. Click the **Search for the best driver for your device (Recommended)** radio button and select **Specify a location**. Type **D:\drivers** in the drop-down box and click the **Next** button.



Figure 6-2

5. A window will open, notifying you that Windows is searching for the EtherFast 10/100 Managed Network Adapter driver. When the window notifies you that it is ready to install the driver, as shown in Figure 6-3, click the **Next** button.



Figure 6-3

6. Windows Me will begin copying the Adapter's driver files onto your PC. If Windows Me files are requested, click **OK** and direct Windows to the proper location, e.g. **C:\windows\options\install**, or **D:\win9x** (where "D:" represents your CD-ROM drive).
7. If Windows asks you to supply any drivers beginning with "lne" or "lne100m", re-direct Windows to the Setup Utility CD-ROM (**D:\drivers**).
8. Windows will finish installing the software onto your PC. When the screen shown in Figure 6-4 appears, click the **Finish** button.



Figure 6-4

9. When asked if you want to restart your PC, remove any disks from your PC and click the **Yes** button. If Windows does not prompt you to restart, do so manually. Click the **Start** button, and select **Shutdown**. Choose the **Restart** option and click the **OK** button.

Network Component Configuration

1. Once you are back at the Windows Me desktop, click on your taskbar's **Start** button, select **Settings**, then **Control Panel**, and then double-click the **Network** icon.
2. The Network window will appear, as shown in Figure 6-5, with the **Configuration** tab selected. Confirm that the components listed here are shown:
 - *Client for Microsoft Networks*
 - *Dial-Up Adapter*
 - *Linksys LNE100M Managed Network Adapter*
 - *TCP/IP -> Dial-Up Adapter*
 - *TCP/IP -> Linksys LNE100M Managed Network Adapter*

There may be additional components listed; however, if any of the components shown are missing, you'll need to manually install them. Refer to **Appendix F: Manually Installing the Network Components in Windows 98 and Me** now.

3. Click the **File and Print Sharing** button. The File and Print Sharing window will appear.

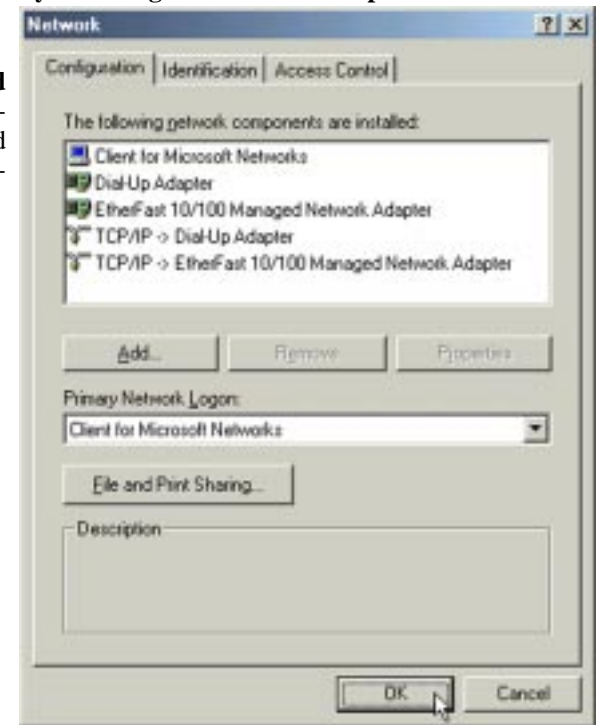


Figure 6-5

4. If you'd like others to be able to access the files on your PC's hard drive, select **I want to be able to give others access to my files** from the File and Print Sharing screen shown in Figure 6-6.

If you'd like to share your printer with other users on the network, select **I want to be able to allow others to print to my printer(s)** from the File and Print Sharing screen shown in Figure 6-6.



Figure 6-6



Note: If you do not enable File and Printer Sharing, your PC will be invisible on the network, inaccessible by anyone.

5. Click the **OK** button. *File and Printer Sharing for Microsoft Networks* should now appear in the list of installed components, as shown in Figure 6-7.

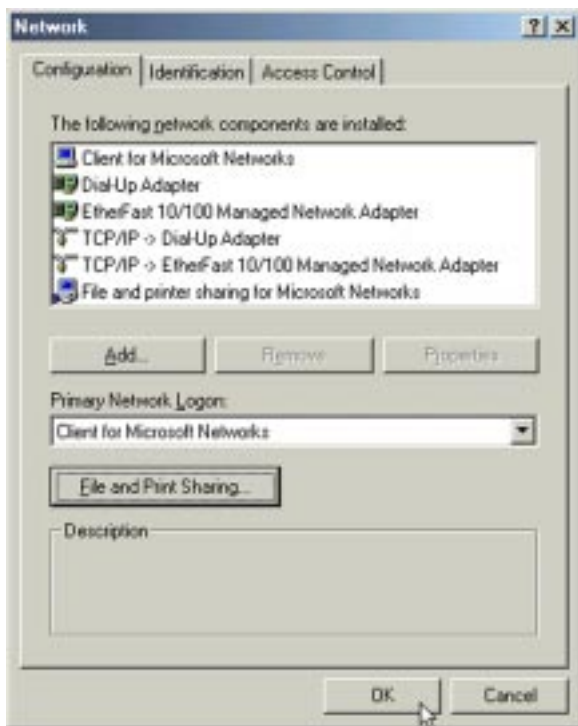


Figure 6-7

6. After ensuring that all of the listed network components are installed on your system, select **Client for Microsoft Networks** from the *Primary Network Logon* pull-down menu.
7. Click on the **Identification** tab, shown in Figure 6-8. Type the name of your computer in the **Computer Name** box. Choose a name that is unique from the other computer names on the network.
8. Type the **name of your workgroup** in the *Workgroup* box. The Workgroup name should be the same Workgroup Name in use by all of the other PCs on the network. Use the same Workgroup Name that is in use on your other computers for ease of use.
- 8a. (Optional) Enter a **description of your computer** in the *Computer Description* box. This box may be left blank.



Figure 6-8



Note: Your Computer Name and Workgroup Name must both be fewer than 15 characters, and should only consist of numbers and letters.

9. Choose the **Access Control** tab, as shown in Figure 6-9. Verify that **Shared-level access control** is selected.



Figure 6-9

10. Click the **OK** button. Your system may ask you for your Windows Me CD-ROM or the location of the Windows Me installation files. If it does, direct Windows to the appropriate location, (i.e., **D:\win9x**, where D is the letter of your CD-ROM drive, making sure you have inserted the Windows Me CD-ROM, or **C:\windows\options\cabs**).
11. Once Windows has copied the necessary files, the System Settings Change window appears. Remove all disks from your PC and click the **Yes** button to restart your PC. If you don't see this window, simply shut down Windows Me and restart your PC. Remember to remove any disks prior to rebooting.
12. A Logon window will appear, requiring you to enter a **User name** and **Password**. Enter your user name and password and click the **OK** button. Do not click the **Cancel** button or press the **Escape** key. Clicking either of these buttons will prevent you from logging in to the network. If the logon does not appear or if it does not allow you to log on, refer to the **Troubleshooting** section.

13. Once you are at the Windows Me desktop, double-click the **My Network Places** icon, the **Entire Network** icon, and then the **Your Workgroup** icon. You should see one icon for the entire network and the names of the other PCs on the network.

If you can see your computer along with all the other computers on the network in Network Neighborhood, then the Windows Me network configuration is complete. Continue with Appendix C: Sharing Your Files and Printers if you want your PC's data or printer to be available to others on the network. You may stop here, however, if you wish to configure file and printer sharing at a later time.

Refer to the **Troubleshooting** section if:

- You don't see anything at all in Entire Network and have pressed the **F5** key on your keyboard a few times to refresh the screen.
- You only see your own computer in Entire Network.
- You see all computers on the network except yours and have tried pressing the **F5** key a few times.
- You only see computers that are running the same operating system as you and you don't see any others.

Chapter 7: Manual Installation and Setup for Windows NT

Overview

The following instructions will set up the Adapter in a computer running NT 4.0 Server/Workstation. You should have your original Windows NT CD-ROM available during the installation, as you might be asked to supply it. Always consult your NT documentation if you have questions.



Important: If you have installed any Service Packs, you will need to reinstall them after installing and setting up the Adapter.

To manually install the network driver for an NT 4.0 Server or Workstation:

1. Log in to Windows NT as an administrator.
2. Click the **Start** button, select **Settings**, open the **Control Panel**, and double-click on the **Network** icon.
3. If you have not previously installed Windows NT networking on your computer, the message shown in Figure 7-1 will appear.

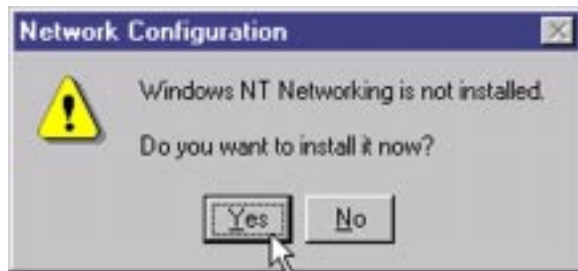


Figure 7-1

- If you see this message, click the **Yes** button to install NT networking along with the Adapter's driver, and continue with step one on the following page.
- If you don't see this message, NT networking is already installed. Skip to the **Installing the Adapter's Driver if Networking is Already Installed** section.

Installing NT Networking and the Adapter's Driver

1. After clicking on the **Yes** button, the *Network Setup Wizard* window will appear.
2. When the screen shown in Figure 7-2 appears, put a checkmark next to **Wired to the network** and then click the **Next** button.

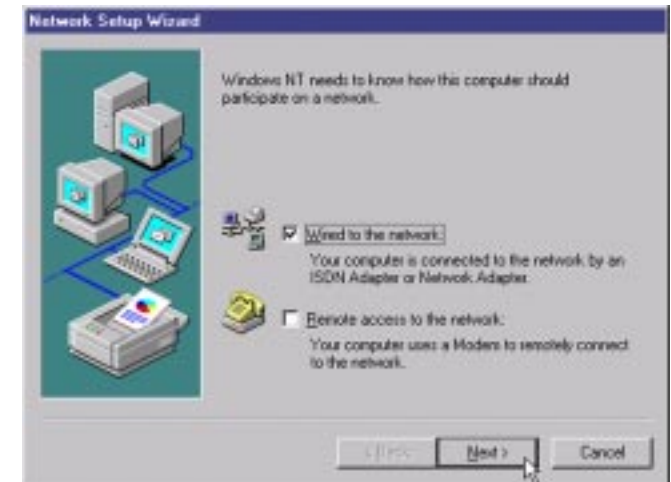


Figure 7-2

3. Click the **Select from list...** button to select the network adapter. (See Figure 7-3)



Figure 7-3

4. At the *Select Network Adapter* screen, shown in Figure 7-4, click the **Have Disk** button and insert the Setup Utility CD into your CD-ROM drive.

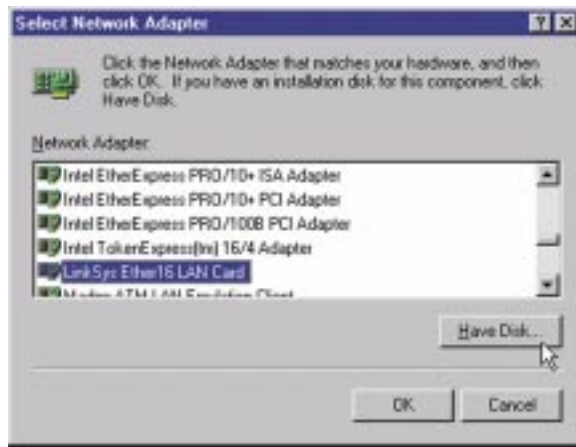


Figure 7-4

5. At the *Insert Disk* screen, shown in Figure 7-5, type **D:\drivers\winnt** into the field on your screen and click the **OK** button.

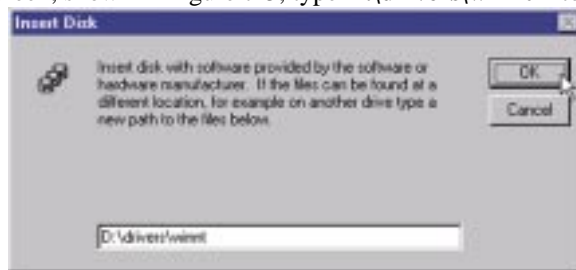


Figure 7-5

6. Highlight the **EtherFast 10/100 Managed Network Adapter Driver** entry in the window that appears, shown in Figure 7-6, and click the **OK** button.

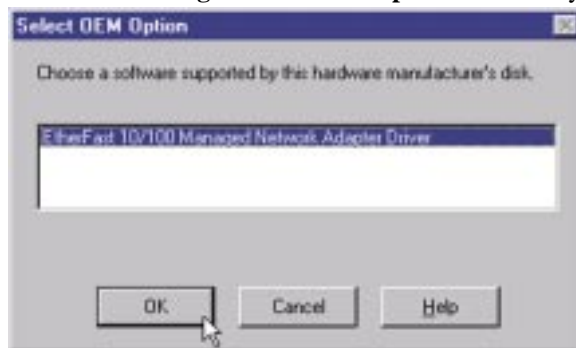


Figure 7-6

7. The adapter will be added to the list of Network Adapters on the Network Setup Wizard screen, shown in Figure 7-7. Click the **Next** button.



Figure 7-7

8. Make sure that on the following screen, shown in Figure 7-8, there is a **check mark** beside **TCP/IP Protocol**. Uncheck any others that may be checked, then click the **Next** button to continue.



Note: If you install the **TCP/IP protocol**, refer to your Windows NT documentation when installation steps appear that aren't listed in this User Guide. Linksys does not provide technical support for the configuration or troubleshooting of the TCP/IP protocol.



Figure 7-8

9. Click the **Next** button to proceed through the subsequent screens. If you are asked to supply your original Windows NT CD-ROM or setup disks, place your Windows NT CD-ROM in your CD drive. If the CD-ROM loads a pop-up window, close it. Type **D:\i386** (where D: represents your CD-ROM drive) in the field at the bottom of the window, as shown in Figure 7-9. Click the **Continue** button.

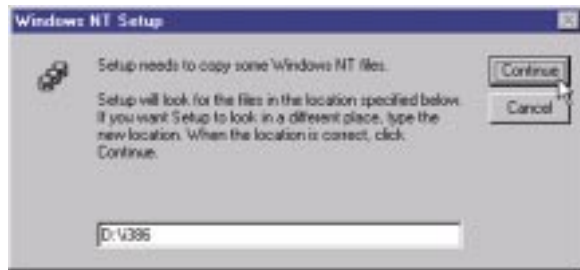


Figure 7-9

10. You may be asked if there is a DHCP Server on your network. Verify if there is, and whether you wish to use DHCP. Click the **Yes** or **No** button on the following screen, accordingly.

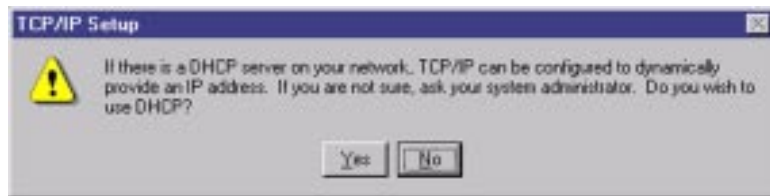


Figure 7-10

11. NT will copy the necessary network drivers to your PC. When the copying is complete, you will see a list of installed bindings. These bindings are appropriate to the Adapter you are installing. Click the **Next** button to go through these two screens.



Note: For information and help on bindings, services and protocols, check your Windows NT documentation.

12. When you reach the screen shown in Figure 7-11, choose either **Workgroup** or **Domain**, depending on the type of network you're setting up. (Your Microsoft documentation explains the difference between Workgroups and Domains.) Click the **Next** button to continue.

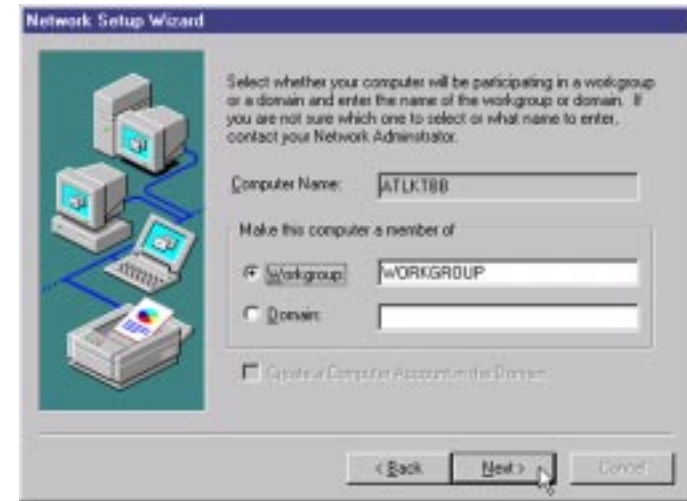


Figure 7-11

13. On the next screen, click the **Finish** to complete installation. When asked if you want to restart your computer, remove the Setup Utility CD and click the **Yes** button.
14. Once your PC has rebooted and you are logged in, double-click the **Network Neighborhood** icon on your desktop. Make sure that you have access to the network. If you do, the Adapter has been properly installed.



Note: If you need to install the TCP/IP Protocol, consult your Windows NT documentation. Linksys does not provide technical support for TCP/IP configuration or troubleshooting.



Important: If you had previously installed any NT service packs, you must re-install them. Otherwise, you may receive Not Enough Service Storage Space errors in the Event Viewer.

The Windows NT Installation and Setup of the Adapter is complete. Do not continue on with the next set of instructions. They are for NT users who already had their networking configured.

Installing the Adapter's Driver if Networking is Already Installed

The following steps are for NT PCs that have networking already installed according to the Windows NT documentation. If you have not already installed networking onto your NT PC, please refer to your Windows documentation. These steps will install the Adapter's driver software on your PC, enabling your PC to properly communicate with the Adapter. Remember that **you must be logged on as a network administrator to continue**.

1. Click the **Start** button, and select **Settings**. Then, open the **Control Panel**, and double-click on the **Network** icon.
2. When the networking window (shown in Figure 7-12) appears, choose the **Adapters** tab and click the **Add** button.



Figure 7-12

3. When the list of available network adapters appears, as shown in Figure 7-13, click the **Have Disk** button.

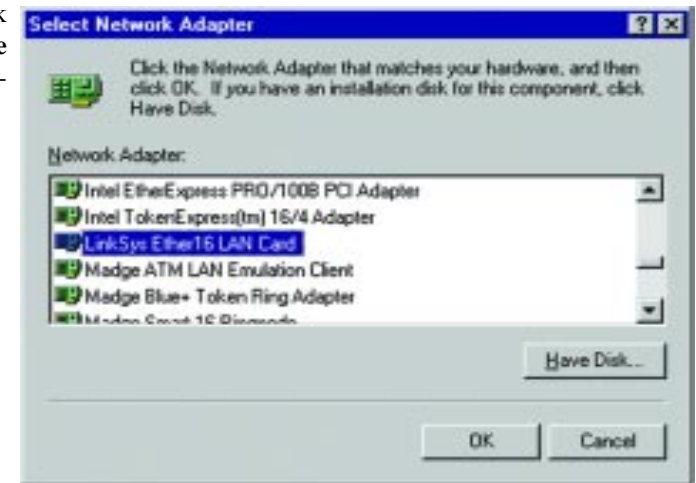


Figure 7-13

4. At the Insert Disk screen, shown in Figure 7-14, insert the Setup Utility CD-ROM and type **D:\drivers\winnt** into the field on your screen and click the **OK** button.

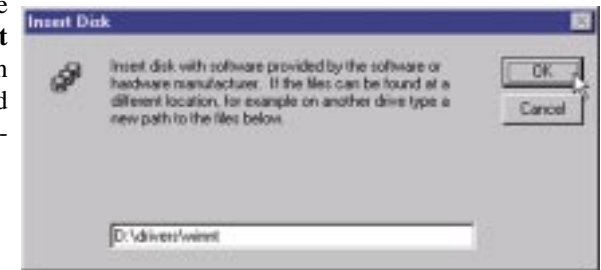


Figure 7-14

5. Highlight the **EtherFast 10/100 Managed Network Adapter Driver** entry in the window that appears, shown in Figure 7-15, and click the **OK** button.

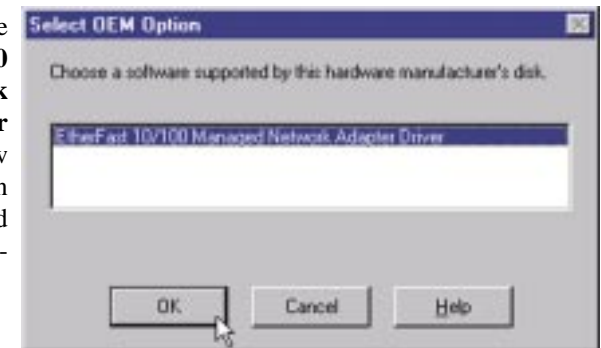


Figure 7-15

6. If Windows NT asks you to supply your original Windows NT CD-ROM or setup disks, direct Windows NT to the proper location (most likely **D:\i386**, where D represents the letter of your CD-ROM drive). (See Figure 7-16.)

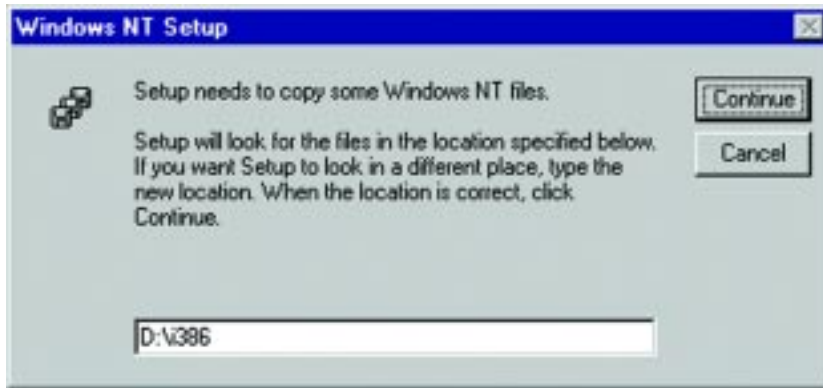


Figure 7-16

7. When the screen shown in Figure 7-17 appears, remove any disks and click the **Yes** button to restart your PC.



Figure 7-17

8. Once your PC has rebooted, double-click the **Network Neighborhood** icon on your desktop. Make sure that you have access to the network. If you do, the Adapter has been properly installed.

The Windows NT Installation and Setup of the Adapter is complete.



Note: If you need to install the TCP/IP Protocol, consult your Windows NT documentation. Linksys does not provide technical support or troubleshooting for TCP/IP configuration.



Important: If you had previously installed any NT service packs, you must re-install them. Otherwise, you may receive Not Enough Service Storage Space errors in the Event Viewer.

Chapter 8: Manual Installation and Setup for Windows 2000

Overview



Important: The directions in this Chapter only apply if you have not already installed the drivers with the Setup Utility CD.

After physically installing the Adapter in your computer, follow these instructions to manually install the network device driver. The installation procedure for the network driver will vary slightly depending on which version of Windows 2000 you are using, and on your current system configuration. If at any time during the installation you encounter problems, consult the **Troubleshooting** section.



Note: Prior to proceeding, ensure that you are operating Windows 2000 with administrative rights. If you log in to Windows 2000 without administrative rights, you may run into problems during the installation.

Installing the Adapter's Driver

1. Start and log on to your Windows 2000 PC.



Important: Do not click **Cancel** or **Skip** at any time during the installation. Doing so will prevent your driver from being properly installed on your PC.

2. Windows will display the *Found New Hardware Wizard* box, as shown in Figure 8-1. Click the **Next** button to continue.



Figure 8-1

3. The *Install Hardware Device Drivers* dialog box will appear, as shown in Figure 8-2. When *Ethernet Controller* is displayed, select **Search for a suitable driver for my device (Recommended)** and click the **Next** button.



Figure 8-2

4. The *Locate Driver Files* dialog box will appear, as shown in Figure 8-3. Select **Specify a location** and click the **Next** button.



Figure 8-3

5. When the *Found New Hardware Wizard* box appears, insert the Setup Utility CD into your CD-ROM drive. In the *Copy manufacturer's files from* field, type **D:\drivers\win2000** (as shown in Figure 8-4) and click the **OK** button.

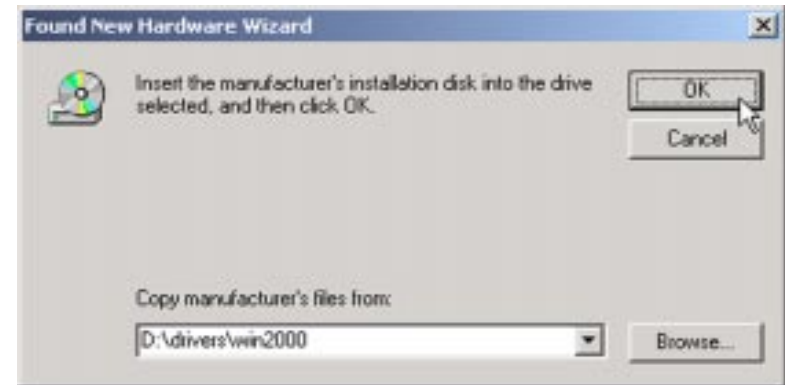


Figure 8-4

6. The *Driver File Search Results* dialog box will appear, as shown in Figure 8-5. Click the **Next** button to continue.

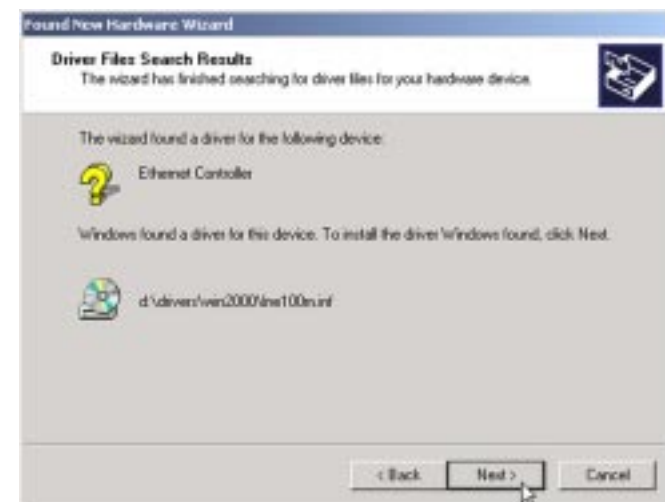


Figure 8-5

7. The *Completing the Found New Hardware Wizard* dialog box will appear, as shown in Figure 8-6. Click the **Finish** button to complete the installation.



Figure 8-6

8. Remove any disks from your drives.

The Windows 2000 driver installation is complete. If you want to share files or printers, refer to your Windows 2000 documentation.

Chapter 9: Manual Installation and Setup for Windows XP

Overview



Important: The directions in this Chapter only apply if you have not already installed the drivers with the Setup Utility CD.

After physically installing the Adapter in your computer, follow these instructions to manually install the network device driver. Windows XP has a driver for the Adapter. After physically installing the Adapter into your PC, Windows XP will automatically install the Adapter's driver.

If you want to use the new driver on the Setup Utility CD, you must update the driver for this device as shown in this chapter.

Installing the Adapter's Newest Driver



Important: Prior to proceeding, verify that you are operating Windows XP with administrative rights. If you log into Windows XP without administrative rights, you may run into problems during the installation.

1. Power up your PC and start Windows XP.



Important: Do not click **Cancel** or **Skip** at any time during the installation. Doing so will prevent your driver from being properly installed on your PC.

2. Insert the Setup Utility CD-ROM. The *Found New Hardware Wizard* screen will appear, as shown in Figure 9-1. Select **Install from a list or specific location (Advanced)**, and click **Next** to continue.



Figure 9-1

3. On the next screen, as shown in Figure 9-2, select **Search for the best driver in these locations**. Check the box next to **Include this location in the search** and type the driver location of **D:\drivers\winxp** in the drop-down field beneath. Make sure the *Search Removable Media* box is not checked. Then, click **Next**.

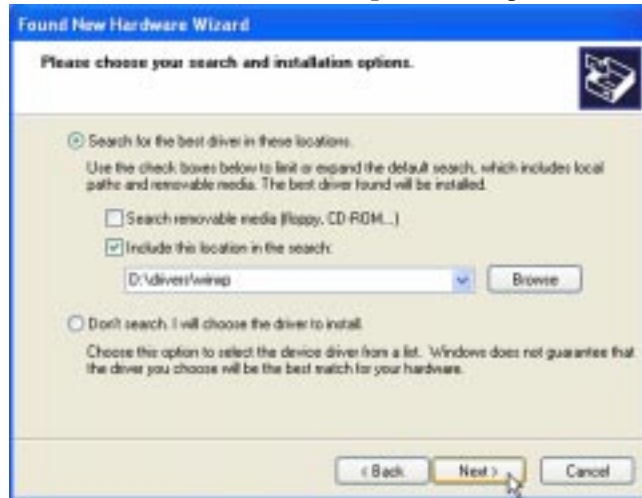


Figure 9-2

4. The driver will now install. When the screen shown in Figure 9-3 appears, click the **Finish** button.



Figure 9-3

The Windows XP driver installation is complete. If you want to share files or printers, refer to your Windows XP documentation.

Chapter 10: Configuring the Adapter

Overview

Configuration of the Adapter is handled through the PC's Device Manager within the control panel. Instructions will differ depending upon your operating system.

For Windows NT

Click the **Start** button, select **Settings**, and open the **Control Panel**. Double-click the **Network** icon, select the **Adapters** tab, highlight the **Adapter** and click **Properties**.

For Windows 98SE and Me Click the **Start** button, select **Settings**, and open the **Control Panel**. Double-click the **System** icon, click the **Device Manager** tab, select the **Adapter** and click **Properties**.

For Windows 2000 and XP Click the **Start** button, select **Settings**, and open the **Control Panel**. Double-click the **System** icon and select the **Hardware** tab. Click the **Device Manager** tab, select the **Adapter** and click **Properties**.

The Properties screen displays five tabs: General, Advanced, Driver, Resources, and Power Management. These five tabs are described in this section. As these are Windows screens, some of the information differs by operating system.

General Tab

The General Tab, shown in Figure 10-1, shows some general information about the Adapter and allows you to enable or disable it.

Device Type	This shows the type of device; in this case a Network Adapter.
Manufacturer	This shows that you are using a Linksys Network Adapter.
Location	This shows in which PCI slot the Adapter has been installed.
Device Status	This will show if the Adapter is functional. If it is not, this will show you the problem.
Troubleshooter	If there is a problem with the Adapter, caused by Windows, clicking this button to run the Windows Troubleshooter may help.
Device Usage	From this pull-down menu, you can enable or disable use of the Adapter.

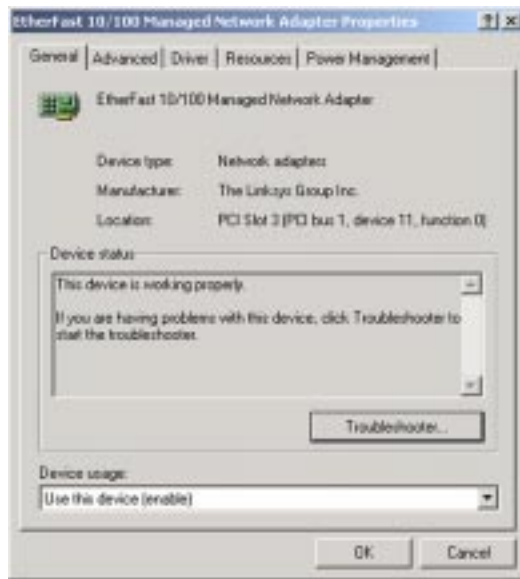


Figure 10-2

Advanced Tab

From the Advanced tab, all of the Adapter's settings can be modified.

802.1p/Q Tagging

Shown in Figure 10-2, enabling this feature allows for quality of service packet tagging when connected to a network switch that supports quality of service. Therefore, this feature should only be enabled when connecting to such a switch. If connecting to a switch that does not support quality of service, disable this feature.

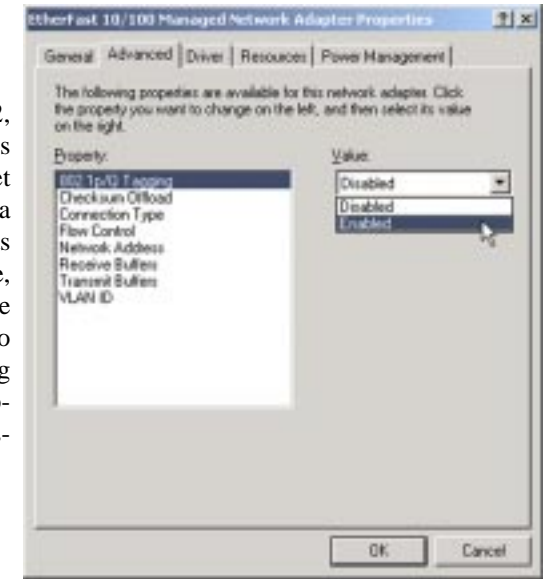


Figure 10-2

Checksum Offload

Enabling Checksum Offload (shown in Figure 10-3) allows the Adapter to calculate the IP Checksum, rather than having the operating system perform this computation. This provides a slight increase in PC performance.

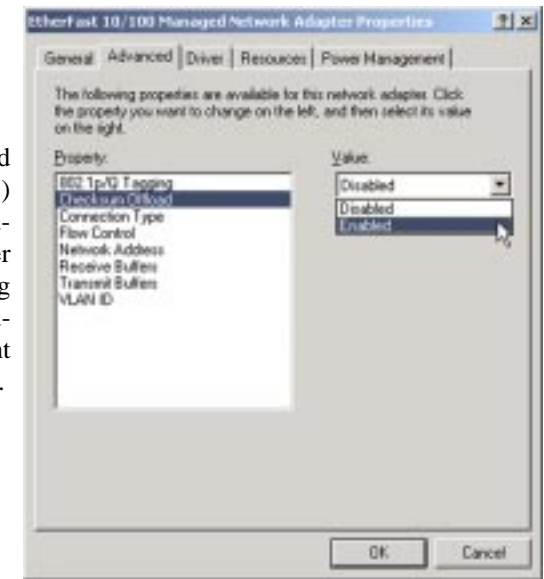


Figure 10-3

Connection Type

Shown in Figure 10-4, this allows you to choose the speed at which your network is running. If connecting to an auto-sensing network, where data is transmitted at different speeds, select **Auto-Negotiation**.



Figure 10-4

Network Address

Shown in Figure 10-6, the Network Address selection is set to Not Present by default. This setting is the Adapter's MAC Address and should only be changed when no other device with the same MAC Address is present in the network.

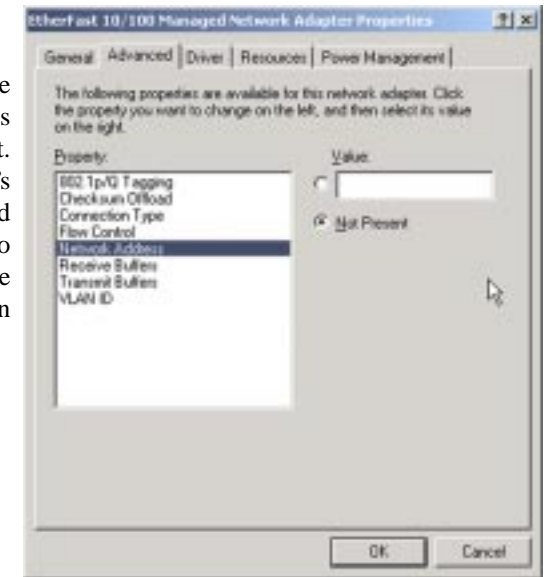


Figure 10-6

Flow Control

This allows for more efficient transfer of data and should only be selected when connected to networking devices that support flow control. The third option provided, **Hardware Default** (shown in Figure 10-5), allows the Adapter to automatically detect if it is connected to such a networking device.

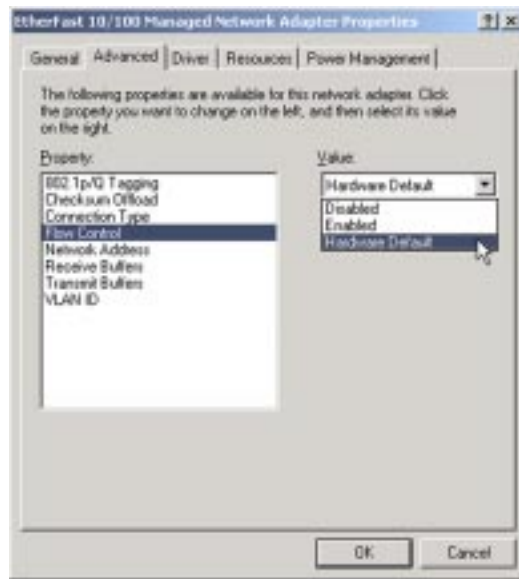


Figure 10-5

Receive Buffers

The Receive Buffer (Figure 10-7) is used to regulate the flow of data frames between adapters and protocol stacks. Although the default setting of 64 is usually acceptable, increasing the number may improve performance if network traffic is heavy, but it will also use system memory.



Figure 10-7

Transmit Buffers

The Transmit Buffer (shown in Figure 10-8) is used to regulate the flow of data frames between adapters and protocol stacks. Although the default setting of 64 is usually acceptable, increasing the number may improve performance if network traffic is heavy, but it will also use system memory.



Figure 10-8

VLAN ID

As shown in Figure 10-9, VLAN ID is used when setting up virtual LANs on your network. By assigning the ID, this PC will access other PCs within the VLAN. Up to 4,096 VLANs can be identified by the Adapter.



Figure 10-9

Driver Tab

The Driver Tab, shown in Figure 10-10, provides information about the Adapter's drive and allows the user to uninstall and update the driver.

Driver Provider This displays the source of the driver used for the Adapter.

Driver Date This shows the date when the driver was last updated.

Driver Version This shows the version of the driver currently installed.

Digital Signer This digital signature shows that the driver is from a safe source, adding an additional level of security in the use of driver software.

Driver Details For further information about the driver, click this button.

Uninstall Click this button to uninstall the driver. Drivers can also be uninstalled via the method explained in Appendix I: Uninstalling the Drivers with the Install Wizard.

Update Driver Before clicking this button to update the Adapter's drivers, make sure that you've downloaded the new driver from www.linksys.com.



Important: Do not update the Adapter's driver unless you are experiencing a problem with the Adapter. Adapter performance is not improved with a newer driver.

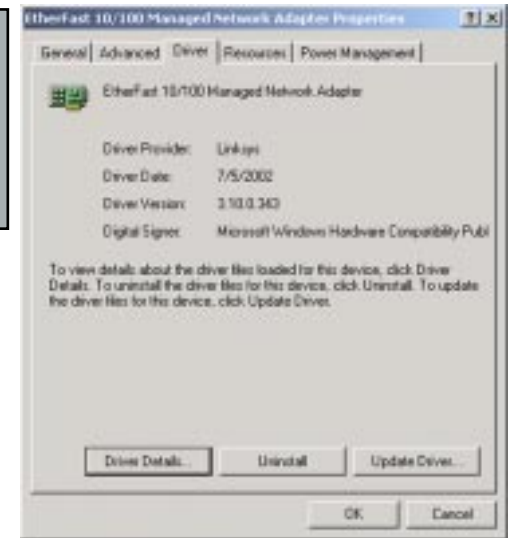


Figure 10-10

Resources Tab

The Resources Tab displays resources assigned to the Adapter by your Windows operating system and any IRQ conflicts that might exist.

Power Management Tab

The Driver Tab, shown in Figure 10-11, allows the Adapter to save power when not in use. There are two ways in which the Adapter does this.



Figure 10-11

Allow this device to bring the computer out of standby. Any PC equipped with the Adapter, that is in Standby mode, will come out of Standby mode to receive packets sent to it from the network.

All the computer to turn off this device to save power. After the Adapter is unused for a few minutes, this setting will allow your computer to power down the Adapter to save power.

Chapter 11: Using the Adapter's NIC Control Set and Diagnostic Tools

Running the Control Set

This chapter describes how to use NIC Control Set, a window interface program, to set up configurations for the Adapter and diagnose the Adapter's status.



Important: The NIC Control Set will NOT run under Windows NT. To configure the Adapter under Windows NT, follow the instructions in Chapter 10: Configuring the Adapter.

If you haven't already installed the utility, as mentioned in Chapter 4: Installing the Adapter's Drivers with the Setup Utility CD, do so now. Insert the Setup Utility CD, right click your CD-ROM drive from **My Computer**, and select **Explore**. Double-click the **autorun** folder to open it. Then, double-click the **utility** folder to open that. Finally, double-click the **NICControlSet.exe** icon to install the Control Set. When the installation is complete, restart your computer.

You can run the Control Set by double-clicking the icon in your system tray, shown in Figure 11-1.



Figure 11-1

Right-clicking will open a menu, shown in Figure 11-2. Select **Launch NIC Control Set** to run the Control Set.

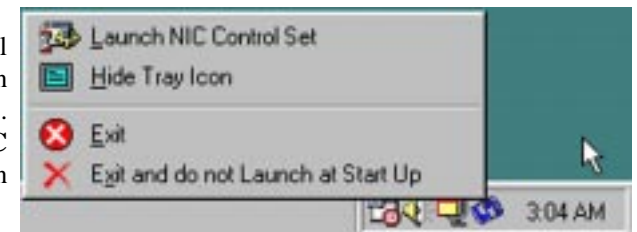


Figure 11-2

You can also run the Control Set from the Start menu by clicking **Start**, selecting **Programs**, selecting **Linksys NIC Control Set**, and clicking **NIC Control Set**, as shown in Figure 11-3.

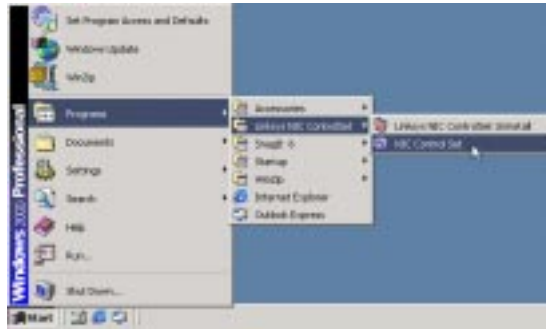


Figure 11-3

This will open the Control Set's main screen, indicating the general information of your computer, including Computer Name, User Name, Network Group, Operating System, and OS Version, as shown in Figure 11-4. Click the Adapter (EtherFast 10/100 Managed Network Adapter) to continue.

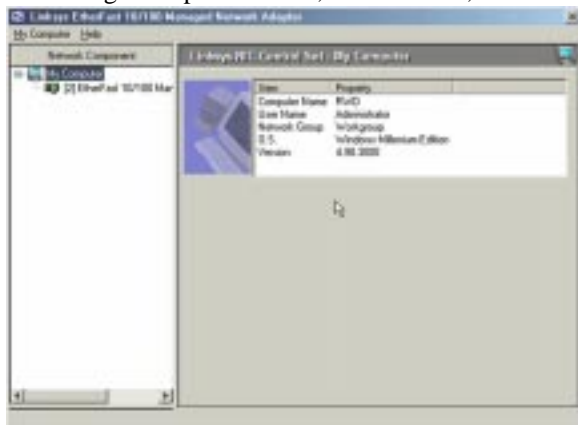


Figure 11-4

There are four tabs through which the Control Set is used: General, Setting, Statistics, and Diagnostics. Each tab is described in this chapter.

General Tab

The General Tab will display the Adapter's current functions and settings.

In the window at the top of the screen, the Adapter's settings are shown: MAC Address, IP Address, Link Speed, and Duplex Speed. In the screen shown in Figure 11-5, the Adapter was not connected to a network. In all other circumstances, the Link Speed and Duplex Speed would show the Adapter's data transfer rate in megabits per second (Mbps).

In the window at the bottom of the screen, a graphic display of the Adapter's functions will appear, showing both send and receive rates.

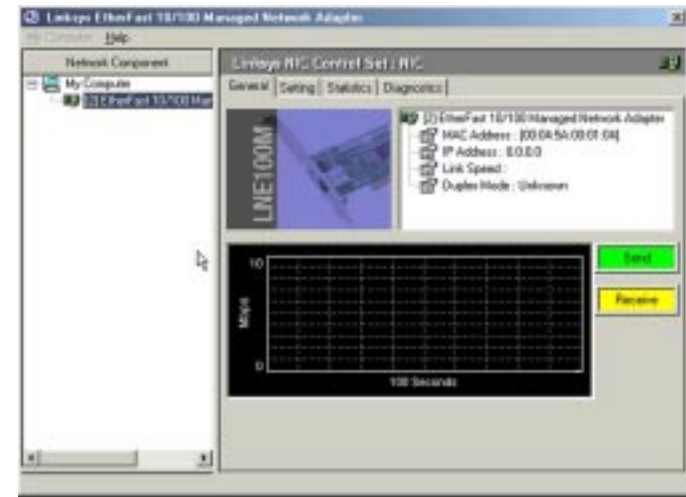


Figure 11-5

Setting Tab

The Setting Tab will show all of the Adapter's current settings. From the field at the top of the screen, each setting can be modified by first selecting the setting and changing the display in the window.

These settings, shown in Figure 11-6 include 802.1p/Q Tagging, Connection Type, Driver Initial Delay, Flow Control, Network Address, Receive Buffers, Transmit Buffers, and VLAN ID.

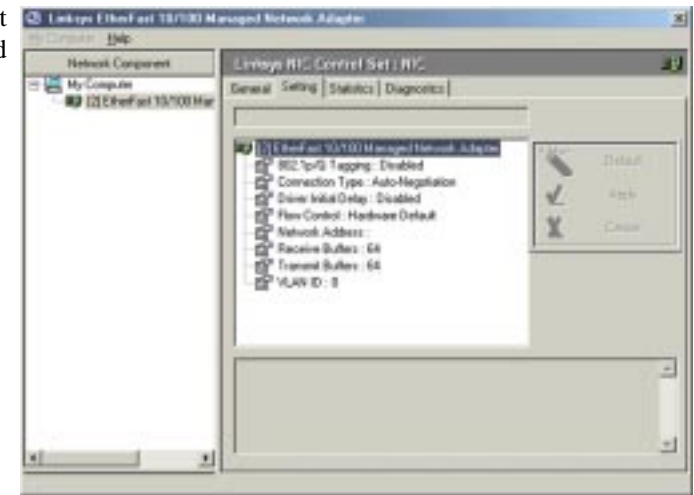


Figure 11-6

802.1p/Q Tagging

Shown in Figure 11-7, enabling this feature allows for quality of service packet tagging when connected to a network switch that supports quality of service. Therefore, this feature should only be enabled when connecting to such a switch. If connecting to a switch that does not support quality of service, disable this feature.

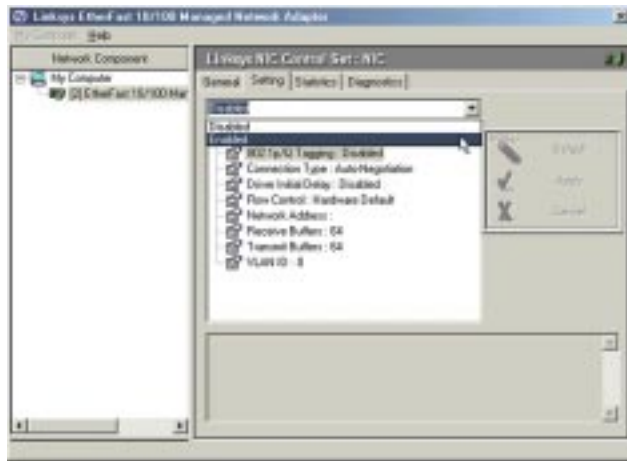


Figure 11-7

Connection Type

Shown in Figure 11-8, this allows you to choose the speed at which your network is running. If connecting to an auto-sensing network, where data is transmitted at different speeds, select Auto-Negotiation.

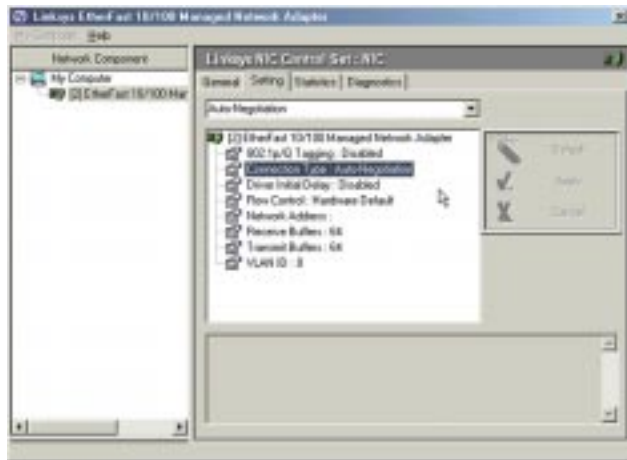


Figure 11-8

Driver Initial Delay

Enabling the Driver Initial Delay option, shown in Figure 11-9, will increase the speed of packet transmission.

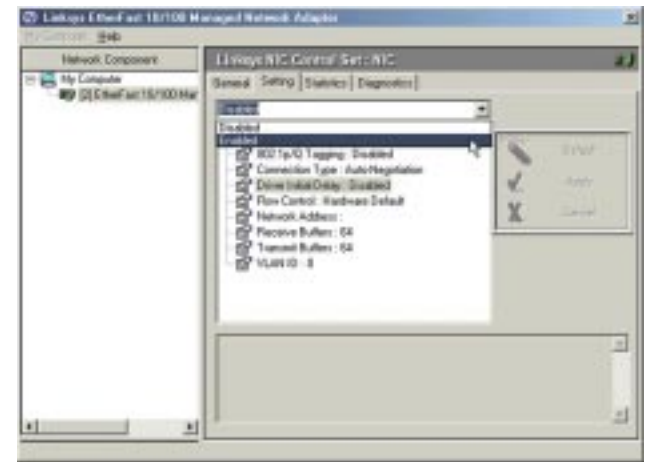


Figure 11-9

Flow Control

This allows for more efficient transfer of data and should only be selected when connected to networking devices that support flow control. The third option provided, Hardware Default (shown in Figure 11-10), allows the Adapter to automatically detect if it is connected to such a networking device.

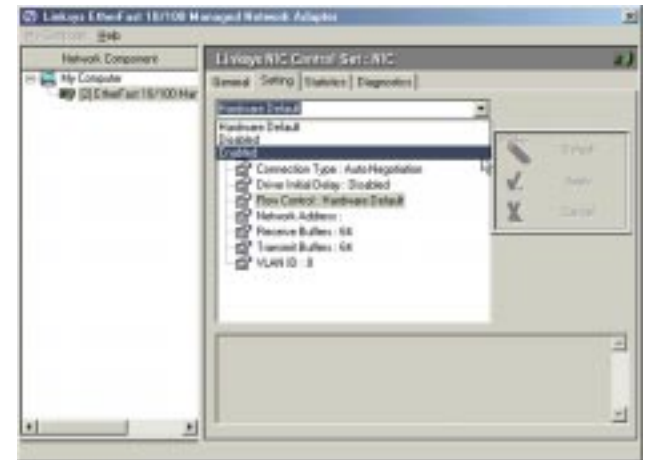


Figure 11-10

Network Address

Shown in Figure 11-11, the Network Address selection is set to Not Present by default. This setting is the Adapter's MAC Address and should only be changed when no other device with the same MAC Address is present in the network.

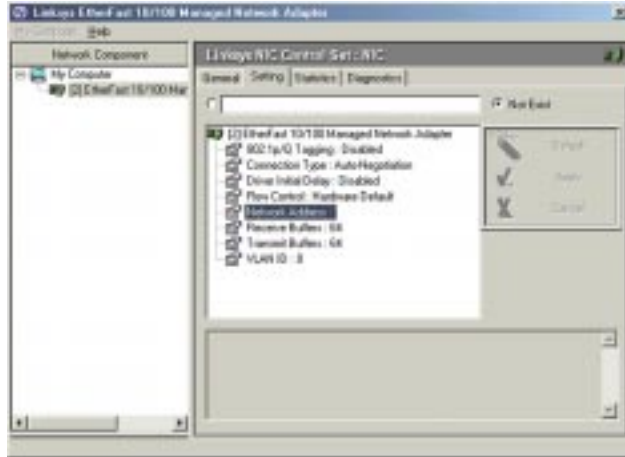


Figure 11-11

Receive Buffers

The Receive Buffer (Figure 11-12) is used to regulate the flow of data frames between adapters and protocol stacks. Although the default setting of 64 is usually acceptable, increasing the number may improve performance if network traffic is heavy, but it will also use system memory.

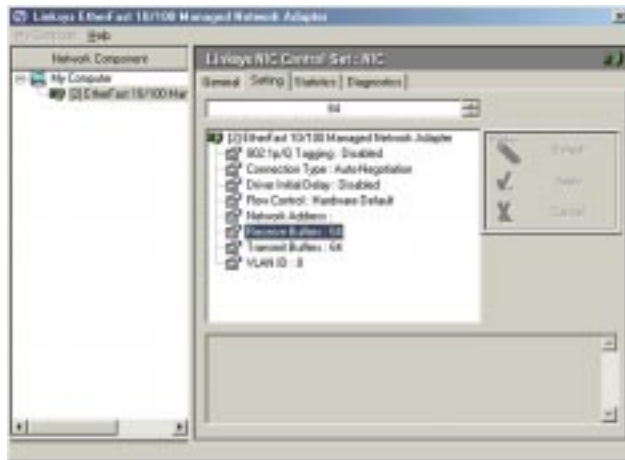


Figure 11-12

Transmit Buffers

The Transmit Buffer (shown in Figure 11-13) is used to regulate the flow of data frames between adapters and protocol stacks. Although the default setting of 64 is usually acceptable, increasing the number may improve performance if network traffic is heavy, but it will also use system memory.

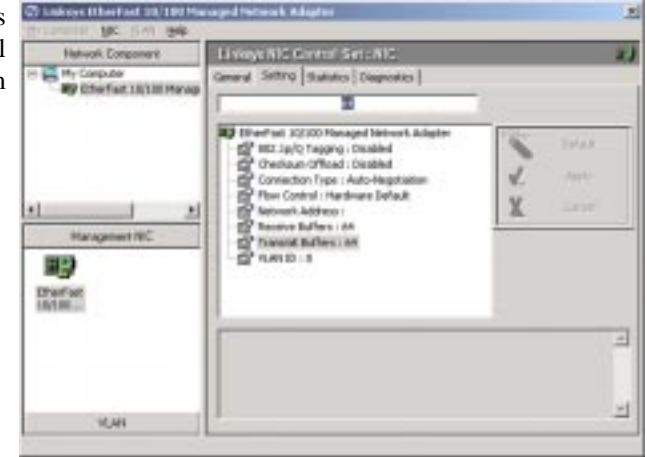


Figure 11-13

VLAN ID

As shown in Figure 11-14, VLAN ID is used when setting up virtual LANs on your network. By assigning the ID, this PC will access other PCs within the VLAN. Up to 4,096 VLANs can be identified by the Adapter.

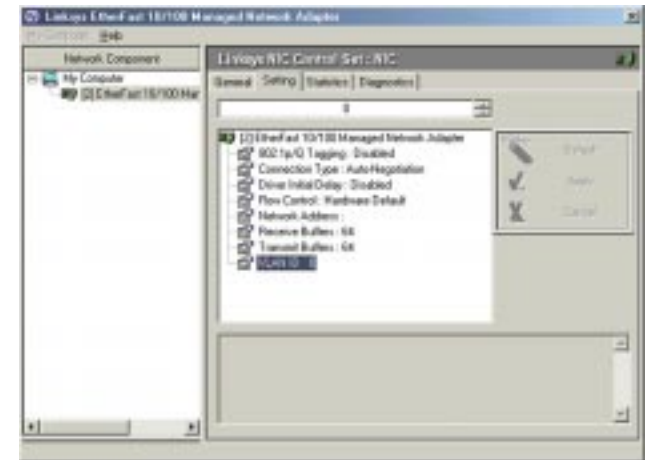


Figure 11-14

Statistics Tab

The Statistics Tab will show how, in a smaller screen, the Adapter is functioning. This tab consists of three sub-tabs: General, IEEE 802.3, and Others. These are described in this section.

GENERAL

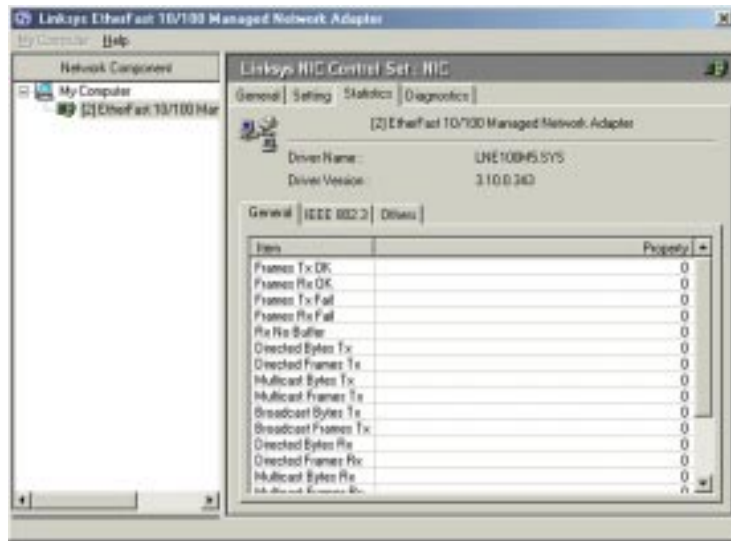


Figure 11-15

Shown in Figure 11-15, the “General” statistics are as follows:

Frames Tx OK	This shows the amount of frames transmitted successfully.
Frames Rx OK	This shows the amount of frames received successfully.
Frames Tx Fail	This shows the amount of frames transmitted that did not reach the destination successfully.
Frames Rx Fail	This shows the amount of frames that were not received correctly.
Rx No Buffer	This specifies the number of frames that the Adapter cannot receive due to lack of receive buffer space.

Directed Bytes Tx	This is the amount of bytes transmitted across the network to one node.
Directed Frames Tx	This is the amount of frames transmitted across the network to one node.
Multicast Bytes Tx	This is the amount of bytes transmitted across the network to several nodes.
Multicast Frames Tx	This is the amount of frames transmitted across the network to several nodes.
Broadcast Bytes Tx	This is the amount of bytes transmitted across the network to all nodes.
Broadcast Frames Tx	This is the amount of frames transmitted across the network to all nodes.
Directed Bytes Rx	This is the amount of bytes received across the network from one node.
Directed Frames Rx	This is the amount of frames received across the network from one node.
Multicast Bytes Rx	This is the amount of bytes received across the network from several nodes.
Multicast Frames Rx	This is the amount of frames received across the network from several nodes.
Broadcast Bytes Rx	This is the amount of bytes received across the network from all nodes.
Broadcast Frames Rx	This is the amount of frames received across the network from all nodes.
Rx CRC Error	This shows the amount of incoming packets that failed the cyclical redundancy check.
Tx Packets Queued	This shows the amount of packets scheduled to be transmitted based on queue configuration.

IEEE 802.3

Shown in Figure 11-16, the “IEEE 802.3” statistics are as follows:

Frames Rx with Alignment Error	This shows the amount of packets received with frame alignment errors.
Frames Tx with one Collision	This shows the amount of frames transmitted that have received an initial collision with other frames.
Frames Tx with more than one Collision	This shows the amount of frames transmitted that have received multiple collisions with other frames.
Frames Tx after Deferral	This shows the number of frames successfully transmitted after the Adapter defers transmission at least once.
Frames Tx Fail (Max Collision)	This shows the number of frames not transmitted due to excessive collisions.
Frames Rx Fail (Overrun)	This shows the number of frames not received due to overrun errors on the Adapter.
Frames Tx Fail (Underrun)	This shows the number of frames not transmitted due to underrun errors on the Adapter.
Frames Tx without detection of the collision-detect heartbeat	This shows the number of frames successfully transmitted without detection of the collision-detect heartbeat.
Frames Tx CRS Lost	This shows the number of times the CRS signal has been lost during packet transmission.
Late Collisions on Frames Tx	This shows the number of collisions detected after the normal window.

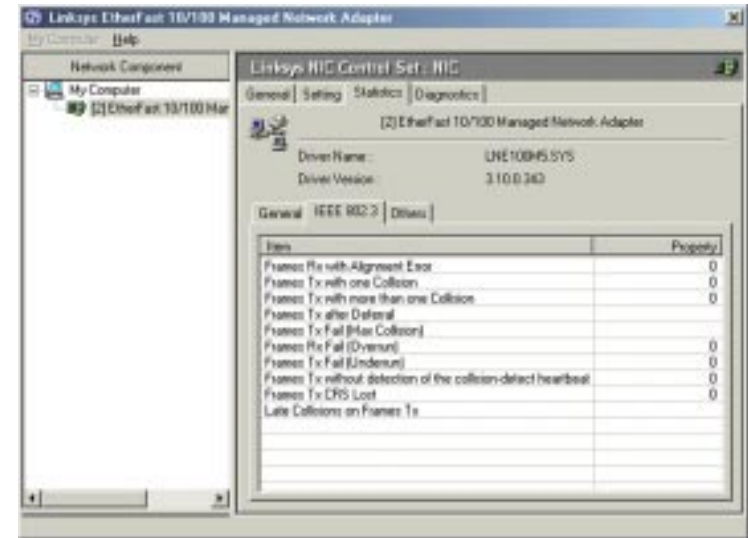


Figure 11-16

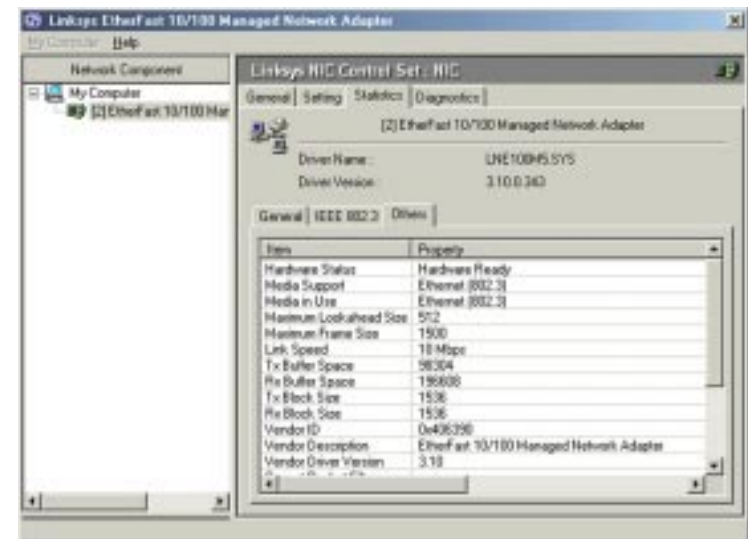


Figure 11-17

OTHERS

Shown in Figure 11-17, the “Others” statistics are as follows:

Hardware Status	This shows the Adapter’s present status.
Media Support	This displays the media type(s) supported by the Adapter.
Media in Use	The shows the media type presently in use by the Adapter.
Maximum Lookahead Size	This is maximum number of bytes that the Adapter can provide as lookahead data.
Maximum Frame Size	This is the maximum network packet size, in bytes, that the Adapter supports.
Link Speed	This displays the Adapter’s maximum speed.
Tx Buffer Space	This shows the amount of memory available in the transmit buffer.
Rx Buffer Space	This shows the amount of memory available in the receive buffer.
Tx Block Size	This displays the minimum number of bytes that a single net packet occupies in the Adapter’s transmit buffer space.
Rx Block Size	This shows the amount of storage, in bytes, that a single packet occupies in the Adapter’s receive buffer space.
Vendor ID	This is a three-byte code followed by a single byte to identify a particular Adapter.
Vendor Description	This is a short text string describing the Adapter.
Vendor Driver Version	This show the currently driver version utilized by the Adapter.

Vendor Driver Version	This show the currently driver version utilized by the Adapter.
Current Packet Filter	This displays the types of packets for which a protocol receives indications from the Adapter’s driver.
Current Lookahead Size	This shows the number of bytes of received packet data that will be indicated to the protocol driver.
Driver NDIS Version	This shows the NDIS version in use by the Adapter’s driver.
Maximum Total Size	This is the maximum total packet length, in bytes, the Adapter supports.
MAC Option	This shows the underlying properties of the driver.
Media Connect Status	This shows the present status of the Adapter’s connection.
Maximum Send Packets	This shows the maximum number of send packet descriptors in the Adapter’s driver.

Diagnostics Tab

The Diagnostics Tab, shown in Figure 11-19, will allow you to test the Adapter’s functionality. Simply check the function to be tested in the checkbox beside the name and click the **Start Diagnose** button. Select the number of tests you wish to run from the bar on the bottom of the screen or check the **Continuous** box for constant testing. The pass rate will appear under Pass/Fail on the right.

As shown in Figure 11-18, you will be cautioned once you start your test(s) that the Adapter will cease to function while testing.

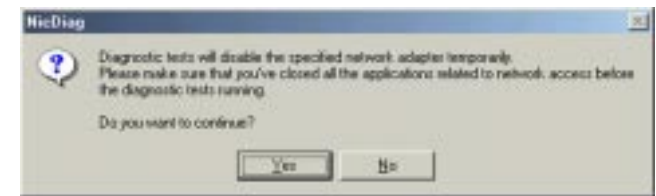


Figure 11-18

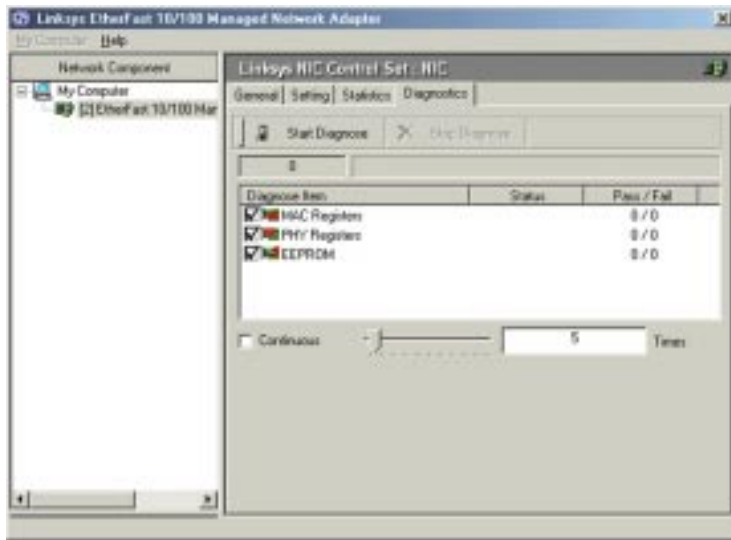


Figure 11-19

MAC Registers	This tests the Registers of the MAC for such things as reading and writing to the MAC chip and getting its feedback value and time.
PHY Registers	This tests the Register inside of the Phyceiver for such things as reading and writing to the MAC chip and getting its return value to verify function.
EEPROM	This reads and writes a value to the EEPROM, testing that the return value is not the same as the writing value.

Appendix A: Troubleshooting

This section provides possible solutions to problems regarding the Adapter's installation and operation. If you can't find an answer here, check the Linksys website at www.linksys.com. Troubleshooting hints for Windows can be found below. If you are using Windows NT, or another network operating system, skip to the Adapter Diagnostics instructions in this section.

Common Problems and Solutions

- Windows doesn't detect new hardware with the Adapter installed, or it continues to detect the Adapter each time you restart your PC.
 - You might not have inserted the Adapter correctly or securely into the appropriate slot of your computer. Check that the Adapter is securely inserted into the appropriate slot.
 - Try inserting the Adapter into an alternate PCI slot.
 - You may have previously aborted a new hardware setup. Follow the directions in the **Appendix E: Starting Over in Windows 98, Me, 2000 or XP**.
 - The motherboard in your system might not be Plug-and-Play compatible, your PC's Plug-and-Play settings may not be enabled, or the motherboard may have Plug-and-Play options not supported by Windows 98, 2000, Me or XP. If you are not sure, contact your PC's manufacturer.
- Windows can't locate the Adapter's driver.
 - You may have inserted the wrong CD into your PC's CD-ROM drive.
 - The CD may be defective or files may be missing. Make sure the CD has a few files starting with lne100 in a folder called Win98 for Windows 98, Win2000 for Windows 2000, or WinXP for Windows XP.
- The Windows Logon screen doesn't appear after you restart your computer.
 - Click the **Start** button, select **Shut Down**, and choose **Close All Programs and Logon as a Different User**. (In Windows 98 or Me, select **Log Off**.) If this doesn't solve the problem, your PC may have "Microsoft Family Logon" installed. Remove this to enable network logon.

4. After entering a username and password, a window appears that reads, "No Domain Server could be found to validate your Username and Password."
 - Click the **Start** button, select **Settings**, and open the **Control Panel**. Double-click on the **Network** icon and select the **Configuration** tab. Under "The Following Network Components are Installed" box, highlight **Client for Microsoft Networks** and click on the **Properties** button. Once you are in the Client For Microsoft Networks Properties window, make sure that **Log on to Windows NT Domain** is unchecked. Once you have made sure that it is unchecked, click on the **OK** button and restart your computer.
5. On the Access Control Tab, User Level Access is selected, but Shared Level Access is grayed out and not accessible.
 - You previously had your primary network logon set to *Client for NetWare Networks*. On the **Configuration** tab of the *Network Properties* window, verify that your primary network logon is set to *Client for Microsoft Networks*.
 - Your personal web server PC or Microsoft Front Page may require you to choose a user level for security reasons.
6. In Network Neighborhood, you can only see yourself and no other computers on the network.
 - Make sure that the cables are connected correctly. Make sure you are getting Link or Activity lights on both the Adapter and the network device to which it is connected. Try using a new cable that you know is working.
 - Your workgroup name may be different from other computers on your network. Make sure each PC on the network is using the same workgroup name and protocol.
 - Try using the Find Computer function.
7. In Network Neighborhood, you can see all other computers on the network but not yourself, and all other computers can see each other and not your computer.
 - You may not have enabled File and Printer Sharing. To do so, go to the Network Component Configuration sections in Chapter 5: Manual Installation and Setup for Windows 98SE.
 - The Adapter might not be set up properly. Try reinstalling the Adapter's drivers. To clean your system of the old installation, go to the **Appendix E: Starting Over in Windows 98, Me, 200 or XP** and then re-install.

8. "Network Neighborhood" or "Entire Network" is Empty.
 - For "Network Neighborhood", verify that your Microsoft Client is installed. Refer to Chapter 5: Manual Installation and Setup for Windows 98SE for directions. Verify that you have logged in correctly. Refresh the screen by pressing **F5** several times.
 - For "Entire Network", verify that your Microsoft Client is installed. Refer to Chapter 6: Manual Installation and Setup for Windows Me for directions. Verify that you have logged in correctly. Refresh the screen by pressing **F5** several times.
9. You receive DHCP Errors in Windows.
 - If you are connecting to a DHCP server, check your cabling and connection. If you require TCP/IP to be configured, check with your network administrator or your Windows documentation for proper settings.
 - If you don't have a DHCP server on your network and your network setup doesn't require TCP/IP, you may remove the TCP/IP component from Windows' networking. To do this, click on the **Start** button, select **Settings**, open the **Control Panel**, and double-click on the **Network** icon. Click once on the **component entry** with the words TCP/IP and Linksys or TCP/IP on its own, then click on the **Remove** button. Click **OK** when finished and restart your PC. If the problem persists, try running the diagnostics.
10. In Network Neighborhood you can only see computers running the same operating system as your computer (i.e., your PC is running Windows Me and it can only see other Windows Me computers and not any computer running Windows 98).
 - Click the **Start** button, select **Find**, choose **Computer** and type the name of the computer in the window that appears. Then, click the **Find Now** button.
 - Now make sure that you are using the same protocol(s) and workgroup name on Windows 98 computers. To do this, click the **Start** button, select **Settings**, and open the **Control Panel** on two computers running different Windows operating systems. Click on the **Network** icon, choose the **Configuration** tab, and click on the **Identification** tab for Workgroup name. Compare the protocols on both computers and make sure that they are the same. If any protocols are missing, refer to the **Appendix F: Manually Installing Network Components in Windows 98 and Me** to install any needed protocol(s).

Running the Adapter's Diagnostics

If you suspect that there may be a problem with the Adapter, or if you need to identify the Adapter's MAC address, you can use the DIAG diagnostic program on the Setup Utility CD.

To run the program, start up your computer in DOS. The program only works in standard "real DOS mode" DOS – it will not work in a Windows DOS window. To get into "real DOS mode" in Windows 98, start your computer (No *Starting Windows...* message will appear). Immediately and rapidly press the **F8** key until you get the *Microsoft Window Startup Menu*.

1. Choose the **Safe mode command prompt only** option. Press **Enter** on the keyboard.
2. Insert the Setup Utility CD into your CD-ROM drive. Enter the appropriate commands after the following prompts:

- When "C:\>" appears, type **d:** then press **Enter**.
- When "D:\>" appears, type **cd diag** then press **Enter**.
- When "D:\diag>" appears, type **diag** then press **Enter**.

You can also copy the software to your local (c:\) drive and run DIAG from your hard disk.

3. The *Fast Ethernet Diagnostics Program* will appear, providing a display of the Adapter's basic information (Ethernet Address, IRQ, I/O Port and Media Type). Press **Enter** to begin the testing cycle. If the Adapter isn't found, power off the PC and verify that the Adapter is properly seated in the PCI slot.
4. The word "passed" will appear next to each successful test. If the Adapter fails the Peer-to-Peer, Ping, or Bandwidth tests, any network problems that you are experiencing are external to the Adapter. Check your cabling and network device connections. If the Adapter fails the Loopback or Register tests, check your computer's settings, then contact Linksys Customer Support for help.

- If all computers are using the same protocol(s) and Workgroup name, and Windows Me computers still can't see Windows 98 computers, enable NetBIOS on all the computers using Windows Me and 98 as follows:

The IPX/SPX-compatible protocol should be installed on all Windows computers (see **Appendix F: Manually Installing Network Components in Windows 98 and Me** if you need to add this protocol). Bring up the properties of the IPX/SPX-compatible protocol by clicking the **Start** button, selecting **Settings**, opening the **Control Panel**, then double-clicking the **Network** icon. Choose the **Configuration** tab and highlight **IPX/SPX-compatible Protocol**. Click on the **Properties** button. To install NetBIOS, click on the **NetBIOS** tab. Put a check next to **I want to enable NetBIOS over IPX/SPX**. Click the **OK** button, and then click the **OK** button again. Windows will copy the appropriate files to your computer. When asked to restart your PC, remove any disks and click the **OK** button. Be sure to do this on all of your computers that are having trouble seeing your entire network.

11. The workgroup, protocols, cabling and driver are all working properly, but the PC uses an AMD processor and it can only see itself in Network Neighborhood.
 - In some instances with PCs using AMD processors, the IRQ assigned to the Adapter by the BIOS (as it gets listed on the boot up screens of most PCs) doesn't correspond to the IRQ assigned by Windows. This can be fixed by disabling the IRQ holder for PCI Steering in the Windows Device Manager. Refer to your PC's documentation for instructions or you can follow the suggested instructions below. Keep in mind that this procedure could vary depending on your computer's configuration.
 - Click on the **Start** button, select **Settings**, open the **Control Panel**, and double-click the **System** icon. Click on the **Device Manager** tab. Open **System Devices**, then open **PCI Bus**.
 - Click on the **IRQ Steering** tab. Remove the check from **Use IRQ Holder** and click the **OK** button. Windows will ask you to restart the PC (if it doesn't ask you, then reboot the PC manually).
 - After the computer boots up, Windows will try to re-detect the PCI Steering. Continue rebooting the PC until Windows stops detecting new hardware and settings for PCI Steering. This normally takes a total of four reboots.
12. While installing the Driver, an error message states that Setup cannot find OEMSETUP.INF or OEMSETNT.INF.
 - Make sure that the Setup Utility CD is in your computer's CD-ROM drive, and click the **OK** button.
 - Enter the correct path name as shown in the section of this user guide, detailing installation for the operating system you are using.

Appendix B: Managing the Adapter through SNMP and the RMON Agent

Overview

SNMP (Simple Network Management Protocol) is the protocol governing network management and the monitoring of network devices and their functions. RMON (Remote Network Monitoring) provides standard information that a network administrator can utilize to monitor, check and troubleshoot an array of local area networks (LANs). This appendix describes how to install and utilize these programs.

To utilize RMON, SNMP must already be installed on your system. Follow the instructions below to install SNMP for your operating system.

Installing SNMP for Windows 98SE and Me

1. Click the **Start** button, select **Settings**, and open the **Control Panel**. Double-click on the **Network** icon. From the **Configuration** tab, click the **Add...** button to install network components. (See Figure B-1.)



Figure B-1

2. From the screen shown in Figure B-2, select **Service** and click the **Add...** button to install the network component.

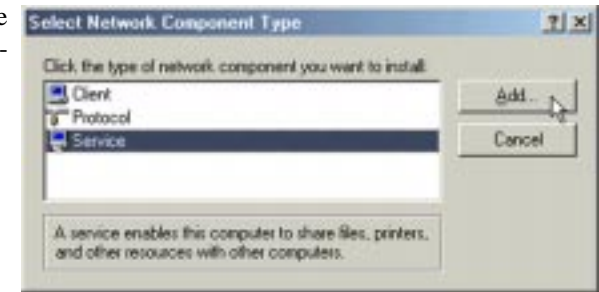


Figure B-2

3. In the next window that appears, shown in Figure B-3, click the **Have Disk...** button.

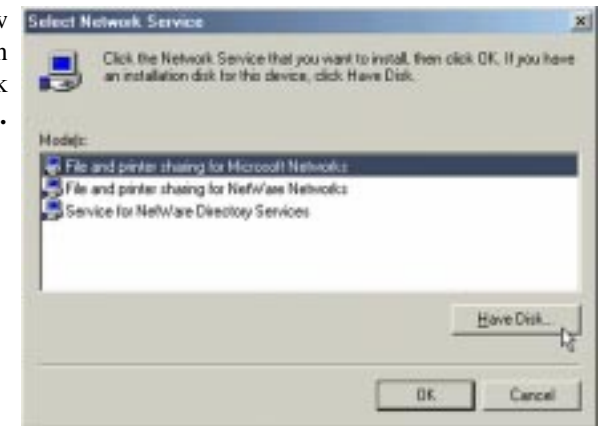


Figure B-3

4. When the next screen appears, shown in Figure B-4, insert your Windows CD into your CD-ROM drive and click the **Browse...** button.

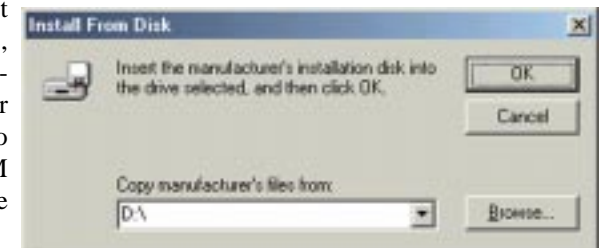


Figure B-4

5. Browse to your CD-ROM drive (shown as “d:” in Figure B-5). Open the **Resource Kit** folder. Open the **netadmin** folder. Open the **snmp** folder. Within this folder, select the file named **snmp.inf** and click the **OK** button.

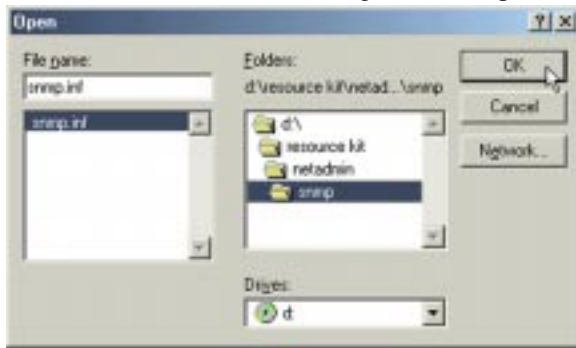


Figure B-5

6. The next screen, shown in Figure B-6, will show the path you have chosen to select the snmp.inf file. Click the **OK** button.

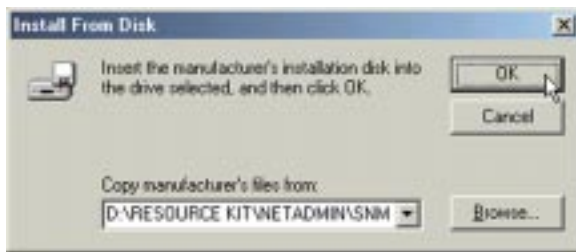


Figure B-6

7. From the Select Network Service screen, shown in Figure B-7, select **Microsoft SNMP agent** and click the **OK** button.



Figure B-7

8. Having returned to the Configuration tab of the Network screen (shown in Figure B-8), verify that Microsoft SNMP agent is listed and click the **OK** button.

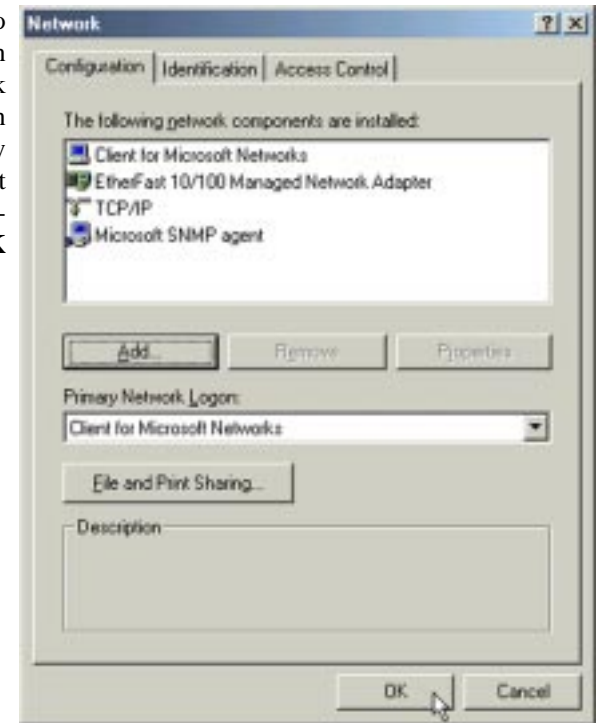


Figure B-8

9. Windows will now ask you to restart your computer. Click **Yes** to restart now.

SNMP has now been added for Windows 98SE and Me. Now, proceed to **Adding the Adapter's SNMP Agent** in this appendix.

Installing SNMP for Windows NT

These installation instructions are for PCs running Windows NT, service pack 6, only. Screens will appear different and the installation may not work if performed under a different version of Windows NT.

1. Click the **Start** button, select **Settings**, and open the **Control Panel**. Double-click the **Network** icon and select the **Services** tab (shown in Figure B-9). Then, click the **Add...** button.



Figure B-9

2. Select **SNMP Service** and click the **OK** button. (See Figure B-10.)

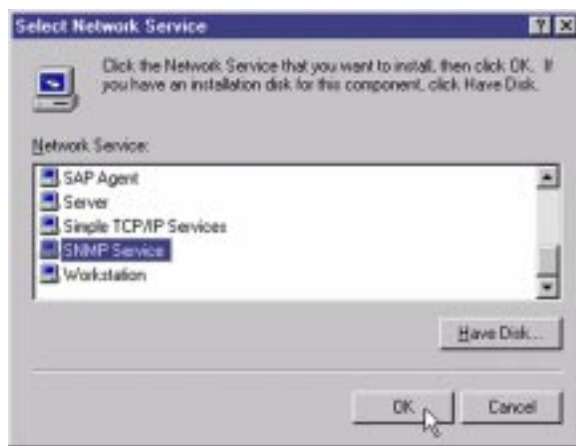


Figure B-10

3. Insert your Windows NT CD into your CD-ROM and type the correct location of the snmp file into the field on the Windows NT Setup screen (as shown in Figure B-11). Then, click the **Continue** button.

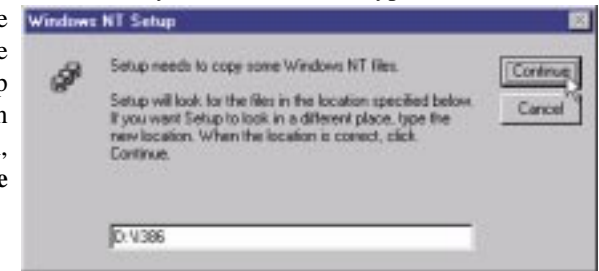


Figure B-11

4. Click the **OK** button on the SNMP Services screen and the **Close** button on the Network screen. When asked to restart your computer, click the **Yes** button.

SNMP has now been added for Windows NT. Now, proceed to **Adding the Adapter's SNMP Agent** in this appendix.

Installing SNMP for Windows 2000 and XP

These installation instructions are for PCs running Windows 2000 or Windows XP in Classic Mode only. If you are not running Windows XP in Classic mode, change it to Classic mode while installing SNMP. Otherwise, screens will appear different and the installation may not work as described.

1. Click the **Start** button, select **Settings**, and open the **Control Panel**. Then, double-click the **Add/Remove Programs** icon, as shown in Figure B-12.

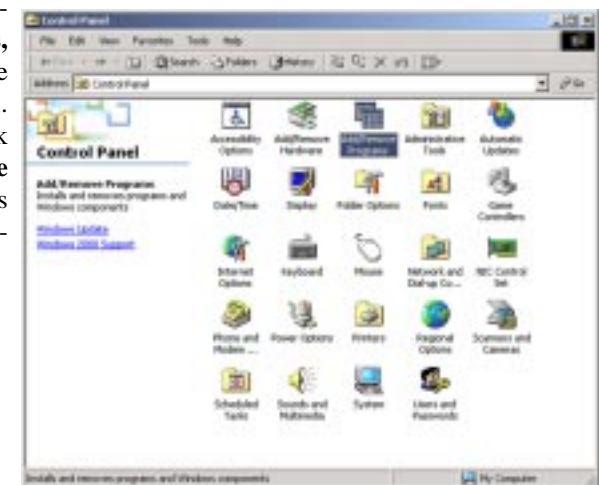


Figure B-12

2. Click the **Add/Remove Windows Components** button. (See Figure B-13.)

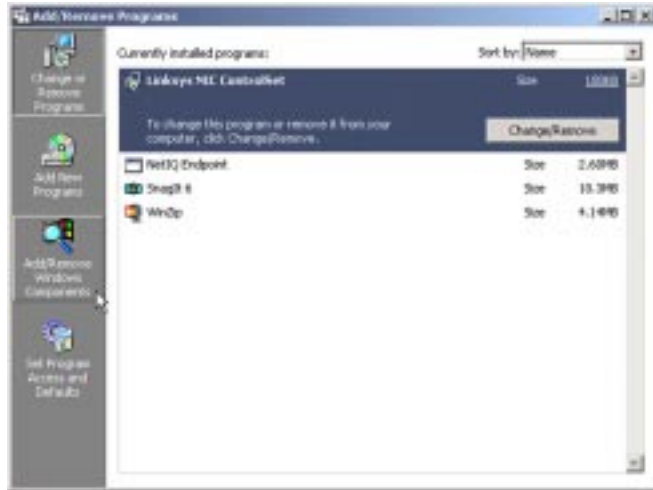


Figure B-13

3. Click the box beside **Management and Monitoring Tools** to select that component (as shown in Figure B-14) and click the **Next** button to continue.

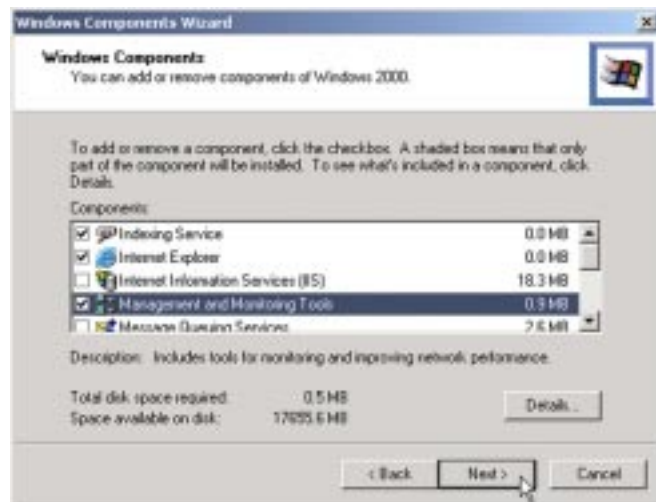


Figure B-14

4. When the Insert Disk screen appears, as shown in Figure B-15, insert your Windows CD into your CD-ROM and click the **OK** button.



Figure B-15

5. When the installation is completed, click the **Finish** button.

SNMP has now been added for Windows 2000 and XP. Now, proceed to **Adding the Adapter's SNMP Agent** in this appendix.

Adding the Adapter's SNMP Agent

Once SNMP has been added for Windows in the instructions above, and you have rebooted your computer, you will need to add the Adapter's SNMP Agent.

The Adapter's SNMP agent is located on the Setup Utility CD by opening the Autorun folder and opening the Utility folder within. Double-click the NicSNMP icon.

The Adapter's SNMP agent will install and you will be asked to restart your computer. Reboot at this time.

Now, proceed to **Utilizing the Adapter's SNMP Agent** in this appendix.

Utilizing the Adapter's SNMP Agent

In order to utilize SNMP functions, you must use a third-party SNMP application that includes a MIB browser, such as HP-Openview or SNMPC.

You may see the screens shown in Figures B-16 and B-17, indicating the current statistics and information of RMON counter, depending upon the MIB browser you use.

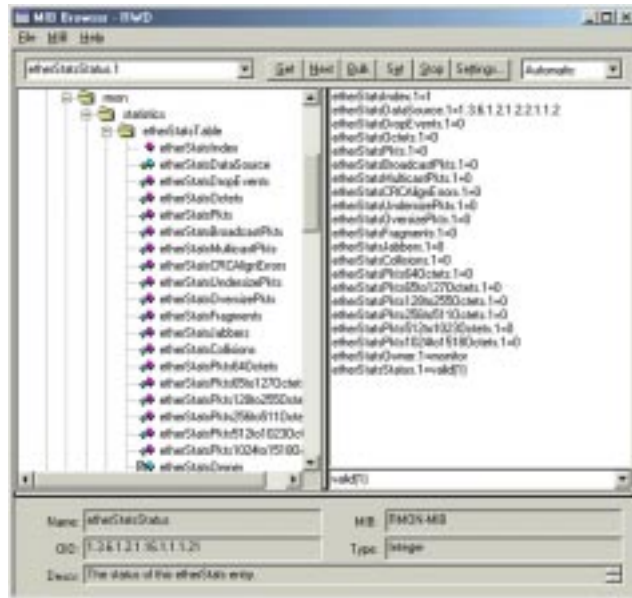


Figure B-16

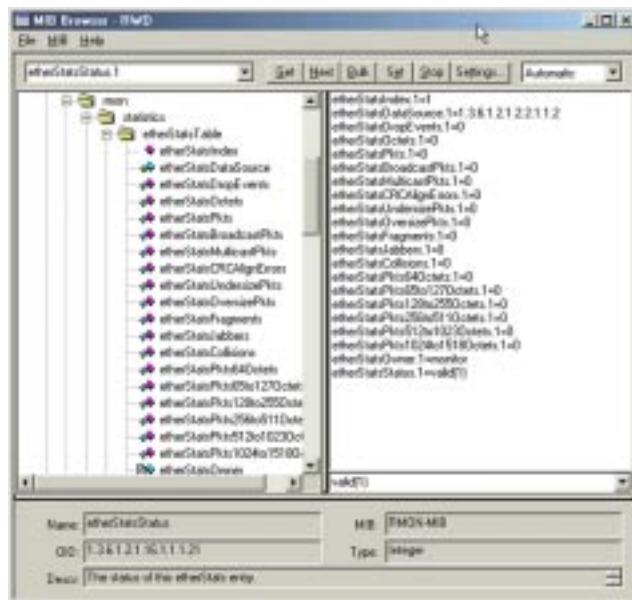


Figure B-17

Appendix C: Sharing Your Files and Printers

Overview

By sharing your files and printers, other PCs on your network will be able to access the resources on your PC.

Before sharing your files and printers, you should prepare your computer to be used with any file servers that may be on the network. If you are **not** using Windows 98 or Me with an NT, 2000 or XP file server, or if you are not sure if you have a file server, continue below.

If you are using an NT or 2000 domain server, refer to Appendix D: Windows 98 and Me Client for Windows Domain Server for client setup.

Enabling File Sharing

1. Double-click the **My Computer** icon. A window of available disk drives will appear.
2. Right-click once on the drive or folder that you want to make available to other users.



Note: If you are only using your PC to access the Internet, it is highly recommended that you create passwords for your shares.

3. Click on **Sharing**, select the **Sharing** tab. Click on **Share As**.
4. In the Share Name box, enter a name for the drive or folder you are sharing. This can be any drive on your PC—floppy drive, hard drive, CD drive, zip drive, etc.
5. Decide on the type of access that you want to give other users.
 - **Read-Only access** allows other users to view the files on the selected drive.
 - **Full access** allows other users to create, change, or delete files on the selected drive.
 - **Depends on Password** allows other users to have Read-Only and/or Full access to the selected drive, depending on the password that you decide to give them.

6. If you want to assign access passwords, type the passwords into the Password boxes.
7. When you're done, click on the **Apply** button. Then, click the **OK** button. Repeat steps 1-7 for any drive or folder you desire to share on the network.

You have successfully enabled File Sharing on your PC. Your selected drives or folders can now be accessed by other network users. If a user tries to access one of your password-protected drives or folders, he or she will be asked for the appropriate Read-Only or Full-Access password. Continue on if you wish to share your PC's printer over the network.

Enabling Printer Sharing



Note: Not all printers may be shared on the network. Others may require special instructions. Refer to your printer's user guide or contact your printer's manufacturer if you think this may be the case with your printer.



Important: Any printer you wish to share from your PC must be physically connected to your PC.

1. Double-click on the **My Computer** icon.
2. Double-click the **Printers** folder. A window of available printers will appear.
3. Right click on the printer that you want to share with other users. Click on **Sharing**, and select the **Sharing** tab.
4. Click on **Share As**. In the Share Name box, give a name to the printer you want to share. If you want to assign a password to the printer so that only certain users can access it, type a password in the Password box.
5. Click on the **Apply** button. Then, click the **OK** button. Your printer(s) are now shared.

The Printer Sharing setup and installation is complete. Your printer can now be accessed by other network users. The printer's driver may have to be installed on other PCs. Consult your printer's documentation.

Appendix D: Windows 98 and Me Client for Windows Domain Server

If you are installing the Adapter in a Windows 98 or Me PC that you plan on logging in to a Windows NT or 2000 domain server, follow the directions below.

1. Start up Windows. Click on the **Start** button, select **Settings**, and open the **Control Panel**. Double-click on the **Network** icon. The Network window appears with several tabs. Among these are tabs labeled Configuration and Access Control.
2. Click on the **Configuration** tab. Select **Client for Microsoft Networks** in the Installed Components box and click the **Properties** button. Verify that **Log on to Windows NT domain** is selected in the Logon validation box. For the Windows NT domain, enter the proper domain name (in the example below, **DOMAIN** is entered). Under Network logon options, select **Logon and restore network connections**. Click the **OK** button.

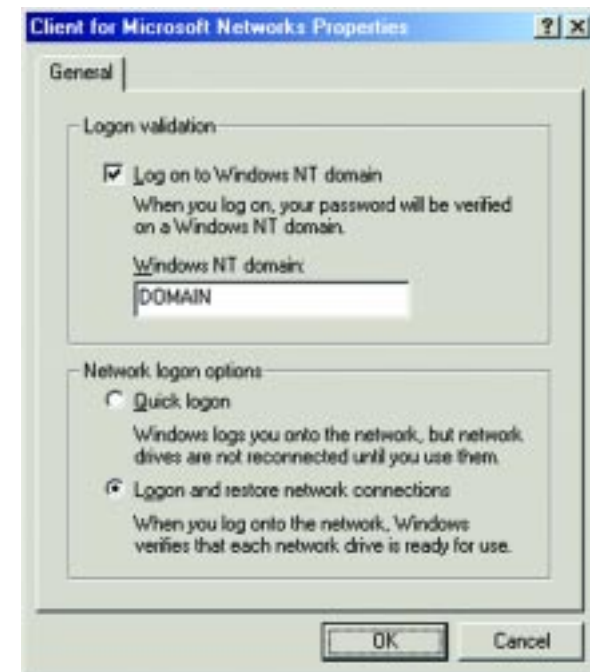


Figure D-1

3. *Optional:* Click on the **Access Control** tab. Make sure that **Share-level access control** is selected; do not choose User-level access control. If Access Control is grayed out and cannot be selected, refer to the **Troubleshooting** section.
4. When you're done, click the **OK** button. When asked if you want to restart your PC, do so.

The Windows Domain portion of the Windows setup is complete.

Appendix E: Starting Over in Windows 98, Me, 2000, or XP

If you experience installation difficulties, you may need to re-install all of the Windows networking components. The instructions below explain how to give your PC a clean sweep so that you can retry the Adapter's driver installation.

Starting Over in Windows 98 or Me

1. From the desktop click on the **Start** Button, highlight **Settings**, and open the **Control Panel**.
2. Double-click on the **Network** Icon. (See Figure E-1.)
3. If the Configuration box has a component called Dial-Up Adapter, skip forward to step five. If it doesn't, continue with step four.



Figure E-1

4. Remove any instance of the name Linksys in the box. This includes *IPX/SPX...Linksys*, *NetBEUI...Linksys*, and *TCP/IP...Linksys*. Also remove *Client for Microsoft Networks*, *Client for NetWare Networks*, and *File and Printer Sharing for Microsoft Networks*.

In some cases, removing one of these components may in turn automatically remove other components as well. If this happens, skip ahead to step six.

5. For PCs with Dial-Up Networking and/or an AOL adapter, remove any instance of the name Linksys, all IPX/SPX protocols, all NetBEUI, all Clients, and File and Printer Sharing for Microsoft Networks. Do **not** remove *Dial-Up Adapter*, *AOL Adapter*, *TCP/IP-Compatible Protocol-AOL Adapter* or *TCP/IP-Compatible Protocol-Dial-Up Adapter*.
6. When you have completed the removal of all unnecessary components, click the **OK** button. When asked to restart, click the **No** button.
7. Return to the Windows Control Panel. Double-click on the **System** Icon. The System Properties window will appear. Click on the **Device Manager** tab.
8. Scroll down to the **Network Adapters** listing and expand it by clicking on the **plus** sign.
9. Remove all devices with the name Linksys in its description. (If at any point you are asked to restart the computer, Click the **No** button.)
10. Scroll down to the **Other Devices** listing. Click the **plus** sign. Remove *PCI Ethernet Controller*, *PCI Ethernet Adapter* or *Managed Network Adapter*. (If Other Devices is not listed, proceed to the next step.)
11. Click the **Close** button and restart your computer.
12. After your computer has restarted, refer to the chapters for Windows 98 or Windows Me for setup instructions.

Starting Over in Windows 2000 or XP

1. Click the **Start** button, choose **Settings**, open the **Control Panel**, and double-click the **System** icon. The System Properties window will open.
2. Choose the **Hardware** tab, as shown in Figure E-2

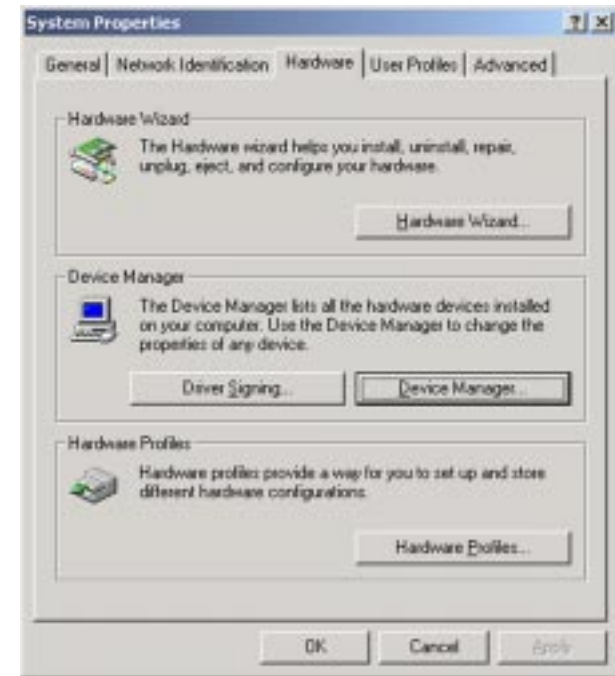


Figure E-2

3. Click the **Device Manager** button. The Device Manager window will open.
4. Click the **plus sign** beside Network Adapters. The Managed Network Adapter listing should appear.

- Right-click on **EtherFast 10/100 Managed Network Adapter** and select **Uninstall....**, as shown in Figure E-3.

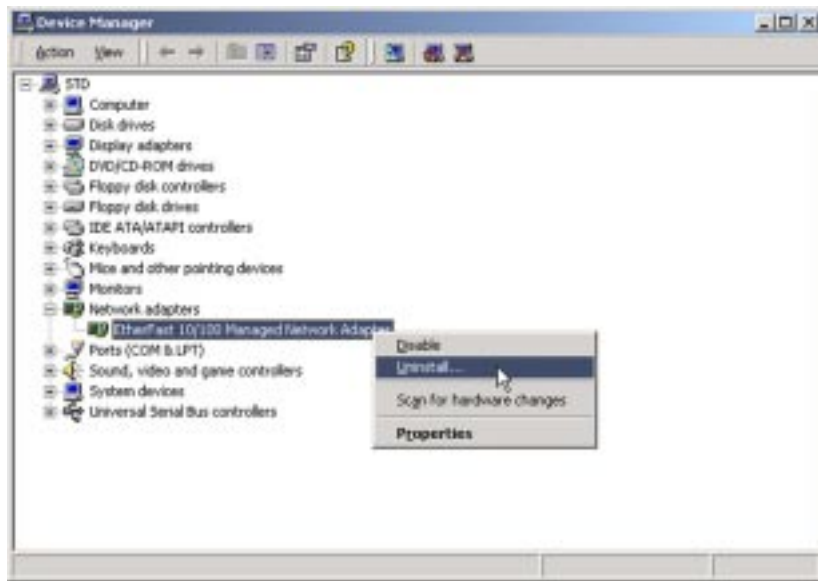


Figure E-3

- The **Confirm Device Removal** screen, shown in Figure E-4, will ask if you want to remove the Adapter. Click the **OK** button.



Figure E-4

- Once the Adapter is removed, restart your computer.

Appendix F: Manually Installing the Network Components in Windows 98 and Me

There may be times when you will need to manually install missing Windows networking components.

- Click on the **Start** button, select **Settings**, and open the **Control Panel**.
- Double-click the **Network** icon.
- Click the **Configuration** tab. Make sure that the following network components are installed.

- Client for Microsoft Networks*
- EtherFast® 10/100 Managed Network Adapter*
- IPX/SPX-compatible Protocol*
- NetBEUI*
- TCP/IP*

There may be other components listed in addition to the ones shown above. If any of the above components are missing, add them as follows.



Note: You will likely need your Windows CD-ROM to install network components. If your CD-ROM isn't available, try directing Windows to "c:\windows\options\cabs" when asked for a file location, providing you have Windows files loaded to this location.

Client for Microsoft Networks

If you plan on connecting to an NT, 2000 or XP file server or peer-to-peer network, click the **Add** button. Highlight *Client* and click **Add**. Choose **Microsoft** as the manufacturer in the *Network Client* box. Highlight *Client for Microsoft Networks* and click **OK**. The computer will begin copying files to your system. When the installation is complete, you will be asked if you want to reboot. Click **OK**.

IPX/SPX-compatible Protocol

Click the **Add** button. Choose *Protocol* and click the **Add** button. Select *Manufacturer* and choose **Microsoft**. Under the *Network Protocol* box, highlight *IPX/SPX-compatible protocol*. Click **OK**. The computer will begin copying files to your system. When the installation is complete, you will be asked if you want to reboot. Click **OK**.

NetBEUI

Click the **Add** button. Select *Protocol*, then click **Add**. Under *Manufacturer*, highlight **Microsoft**. Under *Network Protocol*, highlight **NetBEUI**. Click **OK**. The computer will begin copying files to your system. When the installation is complete, you will be asked if you want to reboot. Click **OK**.

TCP/IP

Click the **Add** button. Select *Protocol*, then click **Add**. Under *Manufacturer*, highlight **Microsoft**. Under *Network Protocol*, highlight **TCP/IP**. Click **OK**. The computer will begin copying files to your system. When the installation is complete, you will be asked if you want to reboot. Click **OK**.

Appendix G: Installing the Network Protocols for Windows 98 and Me

1. From the **Start** Menu, select **Settings** and open the **Control Panel**. From the Control Panel, shown in Figure G-1, double-click on the **Network** icon.



Figure G-1

2. Select EtherFast 10/100 Managed Network Adapter from the list, as shown in Figure G-2, and click the **Add** button.

From this screen, you can also press the **Properties** button. You can then verify that the drivers are working under Enhanced Mode on the **Driver Type** tab, or reconfigure the Adapter on the **Advanced** tab.

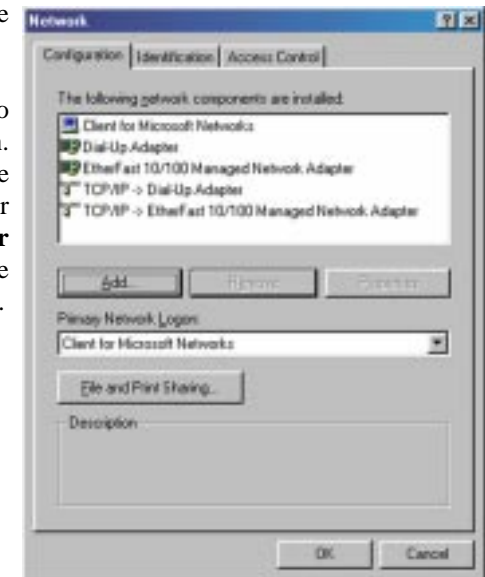


Figure G-2



Important: Before adding any network protocols, verify that the protocol is not already installed. Never install duplicate protocols.

- Highlight **Protocol**, as shown in Figure G-3, and click the **Add** button.

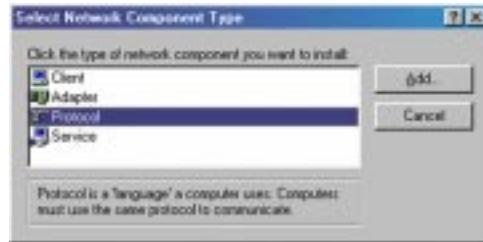


Figure G-3

- Select **Microsoft** from the list of "Manufacturers" and **TCP/IP** from the list of "Network Protocols", as shown in Figure G-4, and click the **OK** button.

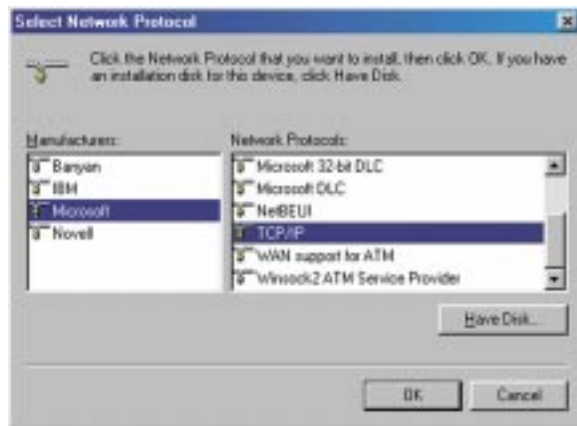


Figure G-4

- Repeat steps two through four to install other protocols such as NetBEUI or IPX/SPX.

At this point, you must restart your computer. Installation is complete.

Appendix H: About Plug-and-Play Technology

The Adapter is designed to run in a 32-bit desktop computer equipped with PCI expansion slots. The Adapter is built to the PCI 2.2 standard.

Short for **Peripheral Components Interconnect**, PCI is a technology that allows special Plug-and-Play expansion cards to be automatically configured by a computer's **BIOS** (Basic Input/Output System) once they have been installed. (Refer to your computer's user guide for more information about its BIOS.)

When a PCI card is used in a computer that supports Plug-and-Play, the Adapter is automatically configured each time the computer is booted. The card's IRQ, I/O address, and other operating parameters are automatically assigned.

There is no easy way to change a Plug-and-Play card's IRQ and other settings outside of the BIOS menu(s) that your computer provides. If the resources that are assigned to the Adapter seem to conflict with other devices in your computer, you will need to use your system's BIOS to resolve the conflicts. If you have problems configuring your BIOS or resolving IRQ or other hardware conflicts, consult your computer's manual or contact your PC's manufacturer for BIOS setup and configuration directions. Here are some general guidelines to follow when installing a PCI card (such as the Adapter) into your computer:

1. The Adapter should be used in a 32-bit PCI slot that supports PCI Bus Mastering. It cannot be plugged into a PCI Bus Slave slot. Consult your motherboard's documentation for more information on master and slave slots.
2. When using NT, set your system's PnP OS option in the BIOS settings to **MANUAL** or **DISABLE**. NT is not a Plug-and-Play OS, and will not usually recognize LAN cards if they are set to be automatically detected and configured.

If you need to configure your PC's BIOS in order to resolve an IRQ or other conflict with the Adapter, there are a few possibilities:

No Changes Allowed: Your PC may not allow you to change the IRQ value(s) of the PCI slot(s). In this case, you will **ONLY** be able to use the IRQ and I/O values that have been pre-assigned to each slot. The popular BIOS from Phoenix, for example, does not generally allow you to modify BIOS-assigned IRQ settings.

Jumper Changes: You may be able to change the IRQ & I/O values for a given PCI slot by setting jumpers on your PC motherboard. Please refer to your PC's motherboard user guide for specific instructions.

Menu Changes: Your PC may allow you to change the IRQ & I/O values for a given PCI slot by accessing the PC's BIOS setup menu. Please refer to your PC's user guide for specific details. AMI's BIOS and Award's BIOS are fully customizable from their BIOS menus, for example.

Appendix I: Uninstalling the Drivers with the Install Wizard

1. Insert the Setup Utility CD into your CD-ROM drive. The Install Wizard's Welcome screen will come up automatically and identify the version of Windows you are using.



Figure I-1

2. Move your cursor over the **Uninstall** tab and the Uninstall screen will appear, as shown in Figure I-1. Click the **Uninstall** button.

3. The Confirm File Deletion screen (Figure I-2) will ask if you want to uninstall the drivers. Click the **Yes** button.

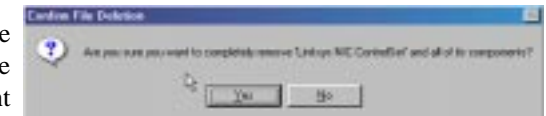


Figure I-2

4. The drivers will be uninstalled automatically. When this process is complete, you will be asked to restart your computer, as shown in Figure I-3. Click the **Yes** button to restart.

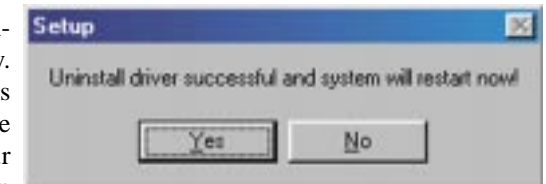


Figure I-3

Driver uninstall complete.

Appendix J: The Setup Utility CD

The Setup Utility CD that comes with the Adapter contains all the tools you'll need to install and use the Adapter. (See Figure J-1.)



Figure J-1

INSTALL	The install utility is covered in detail in Chapter 4: Installing the Adapter's Drivers with the Setup Utility CD. This Utility will install the drivers under Windows 98, Me, 2000, and XP. To manually install and setup the Adapter on a Windows NT PC, refer to Chapter 7: Manual Installation and Setup for Windows NT.
UNINSTALL	To uninstall the drivers under Windows 98, Me, 2000, and XP, refer to Appendix I: Uninstalling the Drivers with the Install Wizard.
DIAGNOSTIC	Select this tab to run the diagnostic tools described in Chapter 11: Using the Adapter's NIC Control Set and Diagnostic Tools.
USER'S GUIDE	Selecting this tab brings up a PDF version of this user guide.
CONTACT US	Linksys contact information for sales and technical support is available by selecting this tab.
EXIT	To close the Setup Utility, click this tab.

Appendix K: Glossary

10BaseT - An Ethernet standard that uses twisted wire pairs.

100BaseTX - IEEE physical layer specification for 100 Mbps over two pairs of Category 5 UTP or STP wire.

Architecture - The total design and implementation of the network. It includes the network's topology, transmission technologies and communications protocols, management and security systems, and any other attributes that give a network a particular set of capabilities and functionalities.

Backbone - The part of a network that connects most of the systems and networks together and handles the most data.

Bandwidth - The transmission capacity of a given facility, in terms of how much data the facility can transmit in a fixed amount of time; expressed in bits per second (bps).

Bit - A binary digit. The value - 0 or 1-used in the binary numbering system. Also, the smallest form of data.

Boot - To cause the computer to start executing instructions. Personal computers contain built-in instructions in a ROM chip that are automatically executed on startup. These instructions search for the operating system, load it and pass control to it.

Browser - A browser is an application program that provides a way to look at and interact with all the information on the World Wide Web or PC. The word "browser" seems to have originated prior to the Web as a generic term for user interfaces that let you browse text files online.

Bus Mastering - A bus design that allows the peripheral controllers (plug-in boards) to access the computer's memory independently of the CPU. It allows data transfers to take place between the peripheral device and memory while the CPU is performing other tasks.

Cable Modem - A device that connects a computer to the cable television network, which in turn connects to the Internet. Once connected, cable modem users have a continuous connection to the Internet. Cable modems feature asymmetric transfer rates: around 36 Mbps downstream (from the Internet to the computer), and from 200 Kbps to 2 Mbps upstream (from the computer to the Internet).

CPU (Central Processing Unit) - The computing part of the computer. Also called the "processor," it is made up of the control unit and ALU.

CSMA/CD (Carrier Sense Multiple Access/Collision Detection) - The LAN access method used in Ethernet. When a device wants to gain access to the network, it checks to see if the network is quiet (senses the carrier). If it is not, it waits a random amount of time before retrying. If the network is quiet and two devices access the line at exactly the same time, their signals collide. When the collision is detected, they both back off and each wait a random amount of time before retrying.

Database - A database is a collection of data that is organized so that its contents can easily be accessed, managed, and updated.

DHCP (Dynamic Host Configuration Protocol) - A protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet's set of protocol (TCP/IP), each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

DHCP uses the concept of a "lease" or amount of time that a given IP address will be valid for a computer. The lease time can vary depending on how long a user is likely to require the Internet connection at a particular location. It's especially useful in education and other environments where users change frequently. Using very short leases, DHCP can dynamically reconfigure networks in which there are more computers than there are available IP addresses.

DHCP supports static addresses for computers containing Web servers that need a permanent IP address.

Domain - A subnetwork comprised of a group of clients and servers under the control of one security database. Dividing LANs into domains improves performance and security.

Download - To receive a file transmitted over a network. In a communications session, download means receive, upload means transmit.

Driver - A workstation or server software module that provides an interface between a network interface card and the upper-layer protocol software running in the computer; it is designed for a specific NIC, and is installed during the initial installation of a network-compatible client or server operating system.

DSL (Digital Subscriber Line) - A technology that dramatically increases the digital capacity of ordinary telephone lines into the home or office and, by employing unused bandwidth, still allows for normal phone usage. DSL provides "always-on" operation, eliminating the need to dial in to the service.

Ethernet - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium. Has a transfer rate of 10 Mbps. Forms the underlying transport vehicle used by several upper-level protocols, including TCP/IP and XNS.

Fast Ethernet - A 100 Mbps technology based on the 10Base-T Ethernet CSMA/CD network access method.

Firmware - Programming that is inserted into programmable read-only memory (programmable read-only memory), thus becoming a permanent part of a computing device.

FTP (File Transfer Protocol) - A protocol used to transfer files over a TCP/IP network (Internet, UNIX, etc.). For example, after developing the HTML pages for a Web site on a local machine, they are typically uploaded to the Web server using FTP.

FTP includes functions to log onto the network, list directories and copy files. It can also convert between the ASCII and EBCDIC character codes. FTP operations can be performed by typing commands at a command prompt or via an FTP utility running under a graphical interface such as Windows. FTP transfers can also be initiated from within a Web browser by entering the URL preceded with ftp://.

Unlike e-mail programs in which graphics and program files have to be "attached," FTP is designed to handle binary files directly and does not add the overhead of encoding and decoding the data.

Full Duplex - The ability of a device or line to transmit data simultaneously in both directions.

Half Duplex - Data transmission that can occur in two directions over a single line, but only one direction at a time.

Hardware - Hardware is the physical aspect of computers, telecommunications, and other information technology devices. The term arose as a way to distinguish the "box" and the electronic circuitry and components of a computer from the program you put in it to make it do things. The program came to be known as the software.

HTTP (HyperText Transport Protocol) - The communications protocol used to connect to servers on the World Wide Web. Its primary function is to establish a connection with a Web server and transmit HTML pages to the client browser.

Hub - The device that serves as the central location for attaching wires from workstations. Can be passive, where there is no amplification of the signals; or active, where the hubs are used like repeaters to provide an extension of the cable that connects to a workstation.

IEEE - The Institute of Electrical and Electronics Engineers. The IEEE describes itself as "the world's largest technical professional society -- promoting the development and application of electrotechnology and allied sciences for the benefit of humanity, the advancement of the profession, and the well-being of our members."

The IEEE fosters the development of standards that often become national and international standards. The organization publishes a number of journals, has many local chapters, and several large societies in special areas, such as the IEEE Computer Society.

IP Address - In the most widely installed level of the Internet Protocol (Internet Protocol) today, an IP address is a 32-binary digit number that identifies each sender or receiver of information that is sent in packet across the Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requestor or the e-mail sender and can respond by sending another message using the IP address it received.

IPX (Internetwork Packet EXchange) - A NetWare communications protocol used to route messages from one node to another. IPX packets include network addresses and can be routed from one network to another.

IRQ (Interrupt ReQuest) - A hardware interrupt on a PC. There are 16 IRQ lines used to signal the CPU that a peripheral event has started or terminated. Except for PCI devices, two devices cannot use the same line.

ISP - An ISP (Internet Service Provider) is a company that provides individuals and companies access to the Internet and other related services such as Web site building and virtual hosting.

LAN - A local area network (LAN) is a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building).

MAC (Media Access Control Address) - A unique number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level.

Mbps (MegaBits Per Second) - One million bits per second; unit of measurement for data transmission.

Motherboard - A motherboard is the physical arrangement in a computer that contains the computer's basic circuitry and components.

NetBEUI (NetBIOS Extended User Interface) - The transport layer for NetBIOS. NetBIOS and NetBEUI were originally part of a single protocol suite that was later separated. NetBIOS sessions can be transported over NetBEUI, TCP/IP and SPX/IPX protocols.

NetBIOS - The native networking protocol in DOS and Windows networks. Although originally combined with its transport layer protocol (NetBEUI), NetBIOS today provides a programming interface for applications at the session layer (layer 5). NetBIOS can ride over NetBEUI, its native transport, which is not routable, or over TCP/IP and IPX/SPX, which are routable protocols.

NetBIOS computers are identified by a unique 15-character name, and Windows machines (NetBIOS machines) periodically broadcast their names over the network so that Network Neighborhood can catalog them. For TCP/IP networks, NetBIOS names are turned into IP addresses via manual configuration in an LMHOSTS file or a WINS server.

There are two NetBIOS modes. The Datagram mode is the fastest mode, but does not guarantee delivery. It uses a self-contained packet with send and receive name, usually limited to 512 bytes. If the recipient device is not listening for messages, the datagram is lost. The Session mode establishes a connection until broken. It guarantees delivery of messages up to 64KB long.

Network - A system that transmits any combination of voice, video and/or data between users.

NIC (Network Interface Card) - A board installed in a computer system, usually a PC, to provide network communication capabilities to and from that computer system. Also called an adapter.

Node - A network junction or connection point, typically a computer or work station.

Notebook (PC) - A notebook computer is a battery-powered personal computer generally smaller than a briefcase that can easily be transported and conveniently used in temporary spaces such as on airplanes, in libraries, temporary offices, and at meetings. A notebook computer, sometimes called a laptop computer, typically weighs less than five pounds and is three inches or less in thickness.

Packet - A unit of data routed between an origin and a destination in a network.

PCI (Peripheral Component Interconnect) - A peripheral bus commonly used in PCs, Macintoshes and workstations. It was designed primarily by Intel and first appeared on PCs in late 1993. PCI provides a high-speed data path between the CPU and peripheral devices (video, disk, network, etc.). There are typically three or four PCI slots on the motherboard. In a Pentium PC, there is generally a mix of PCI and ISA slots or PCI and EISA slots. Early on, the PCI bus was known as a "local bus."

PCI provides "plug and play" capability, automatically configuring the PCI cards at startup. When PCI is used with the ISA bus, the only thing that is generally required is to indicate in the CMOS memory which IRQs are already in use by ISA cards. PCI takes care of the rest.

PCI allows IRQs to be shared, which helps to solve the problem of limited IRQs available on a PC. For example, if there were only one IRQ left over after ISA devices were given their required IRQs, all PCI devices could share it. In a PCI-only machine, there cannot be insufficient IRQs, as all can be shared.

Ping - (Packet INternet Groper) An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response.

Plug-and-Play - The ability of a computer system to configure expansion boards and other devices automatically without requiring the user to turn off the system during installation.

Port - A pathway into and out of the computer or a network device such as a switch or router. For example, the serial and parallel ports on a personal computer are external sockets for plugging in communications lines, modems and printers.

Print Server - A hardware device that enables a printer to be located anywhere in the network.

RJ-11 (Registered Jack-11) - A telephone connector that holds up to six wires. The RJ-11 is the common connector used to plug a telephone into a wall.

RJ-45 (Registered Jack-45) - A connector similar to a telephone connector that holds up to eight wires, used for connecting Ethernet devices.

RMON (Remote MONitoring) - RMON provides comprehensive network monitoring capabilities. It eliminates the polling required in standard SNMP, and can set alarms on a variety of traffic conditions, including specific error types.

Router - Protocol-dependent device that connects subnetworks together. Routers are useful in breaking down a very large network into smaller subnetworks; they introduce longer delays and typically have much lower throughput rates than bridges.

Server - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.

SNMP (Simple Network Management Protocol) - A widely used network monitoring and control protocol. Data is passed from SNMP agents, which are hardware and/or software processes reporting activity in each network device (hub, router, bridge, etc.) to the workstation console used to oversee the network. The agents return information contained in a MIB (Management Information Base), which is a data structure that defines what is obtainable from the device and what can be controlled (turned off, on, etc.).

Software - Instructions for the computer. A series of instructions that performs a particular task is called a "program." The two major categories of software are

"system software" and "application software." System software is made up of control programs such as the operating system and database management system (DBMS). Application software is any program that processes data for the user.

A common misconception is that software is data. It is not. Software tells the hardware how to process the data.

Storage - The semi-permanent or permanent holding place for digital data.

STP (Shielded Twisted Pair) - Telephone wire that is wrapped in a metal sheath to eliminate external interference.

Switch - 1. A data switch connects computing devices to host computers, allowing a large number of devices to share a limited number of ports. 2. A device for making, breaking, or changing the connections in an electrical circuit.

TCP (Transmission Control Protocol) - A method (protocol) used along with the Internet Protocol (Internet Protocol) to send data in the form of message units between computers over the Internet. While IP takes care of handling the actual delivery of the data, TCP takes care of keeping track of the individual units of data (called packet) that a message is divided into for efficient routing through the Internet.

TCP/IP (Transmission Control Protocol/Internet Protocol) - is the basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network (either an intranet or an extranet). When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.

Throughput - The amount of data moved successfully from one place to another in a given time period.

Topology - A network's topology is a logical characterization of how the devices on the network are connected and the distances between them. The most common network devices include hubs, switches, routers, and gateways. Most large networks contain several levels of interconnection, the most important of which include edge connections, backbone connections, and wide-area connections.

Upgrade - To replace existing software or firmware with a newer version.

Upload - To transmit a file over a network. In a communications session, upload means transmit, download means receive.

URL (Uniform Resource Locator) - The address that defines the route to a file on the Web or any other Internet facility. URLs are typed into the browser to access Web pages, and URLs are embedded within the pages themselves to provide the hypertext links to other pages.

USB (Universal Serial Bus) - A "plug and play" interface between a computer and add-on devices (such as audio players, joysticks, keyboards, telephones, scanners, and printers). With USB, a new device can be added to your computer without having to add an adapter card or even having to turn the computer off.

USB supports a data speed of 12 megabit per second, accommodating a wide range of devices.

Since October, 1996, the Windows operating systems have been equipped with USB driver or special software designed to work with specific I/O device types. USB is integrated into most Windows operating systems.

UTP - Unshielded twisted pair is the most common kind of copper telephone wiring. Twisted pair is the ordinary copper wire that connects home and many business computers to the telephone company. To reduce crosstalk or electromagnetic induction between pairs of wires, two insulated copper wires are twisted around each other. Each signal on twisted pair requires both wires. Since some telephone sets or desktop locations require multiple connections, twisted pair is sometimes installed in two or more pairs, all within a single cable.

Wake-on-LAN - Wake on LAN is a technology that allows a network professional to remotely power on a computer or to wake it up from sleep mode.

Workgroup - Two or more individuals that share files and databases.

Appendix L: Specifications

System:	PCI 2.2 compliant PC
Standards:	IEEE 802.3, IEEE 802.3u, PCI 2.2, ACPI
Protocol:	CSMA/CD
Ports:	One RJ-45
Speed:	
<i>Full Duplex</i>	20/200Mbps
<i>Half Duplex</i>	10/100Mbps
Cabling:	Category 5 Ethernet Cable
Topology:	Star
LED Status Lights:	Link & Activity (Link/Act), 100Mbps (100), Collision, FDX

Environmental

Dimensions:	7 .3" x 6" x 1.8" (186 mm x 154 mm x 48 mm)
Unit Weight:	2.4 oz. (.07 kg)
Power:	5W Maximum
Certifications:	FCC Class B, CE Class B, VCCI Class B
Operating Temperature:	0°C to 50°C (32°F to 122°F)
Storage Temperature:	-40°C to 70°C (-40°F to 158°F)
Operating Humidity:	20% to 95% Non-Condensing
Storage Humidity:	20% to 95% Non-Condensing

Appendix M: Warranty Information

BE SURE TO HAVE YOUR PROOF OF PURCHASE AND A BARCODE FROM THE PRODUCT'S PACKAGING ON HAND WHEN CALLING. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE.

IN NO EVENT SHALL LINKSYS'S LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE, OR ITS DOCUMENTATION. LINKSYS DOES NOT OFFER REFUNDS FOR ANY PRODUCT.

LINKSYS OFFERS CROSS SHIPMENTS, A FASTER PROCESS FOR PROCESSING AND RECEIVING YOUR REPLACEMENT. LINKSYS PAYS FOR UPS GROUND ONLY. ALL CUSTOMERS LOCATED OUTSIDE OF THE UNITED STATES OF AMERICA AND CANADA SHALL BE HELD RESPONSIBLE FOR SHIPPING AND HANDLING CHARGES. PLEASE CALL LINKSYS FOR MORE DETAILS.

Appendix N: Contact Information

For help with the installation or operation of this product, contact Linksys Technical Support at one of the phone numbers or Internet addresses below.

Sales Information	800-546-5797 (LINKSYS)
Technical Support	888-326-7114
RMA Issues	949-261-1288
Fax	949-261-8868
Email	support@linksys.com
Web	http://www.linksys.com
FTP Site	ftp.linksys.com

Linksys does not provide technical support for **Linux, BSD**, or other freeware and open source operating systems. Although many Linksys products have been proven to perform well under Linux and other freeware operating systems, technical support for setup and troubleshooting is not provided. For information on where to find device drivers and setup instructions for Linux and other freeware operating systems, visit the support pages and FAQ files on the Linksys website at **www.linksys.com**.

In addition, Linksys does not provide technical support for Beta operating systems.



<http://www.linksys.com>

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