Wireless PCMCIA / PCI Card User's Guide

Version 2.0

October 2001

Federal Communications Commission Statement

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

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

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

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

The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Manufacturer's Disclaimer Statement

The information in this document is subject to change without notice and does not represent a commitment on the part of the vendor. No warranty or representation, either expressed or implied, is made with respect to the quality, accuracy or fitness for any particular purpose of this document. The manufacturer reserves the right to make changes to the content of this document and/or the products associated with it at any time without obligation to notify any person or organization of such changes. In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages arising out of the use or inability to use this product or documentation, even if advised of the possibility of such damages.

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Table of Contents

Chapter 1 – About the I-O Wireless Cards

I-O Wireless offers two types of internal cards for IEEE 802.11b wireless networking. The first is a PCMCIA card normally used in laptop computers and the second is a PCI card used in desktop computers.

The I-O Wireless PCMCIA Card is compatible with any standard Type II or Type III PCMCIA slot. As a Plug-and-Play device, Windows 95/98/ME will automatically recognize the PCMCIA card and initiate the installation process.

The I-O Wireless PCI Card is a combination of the I-O Wireless PCMCIA card and a PCMCIA to PCI card adapter. This set plugs into a PCI slot in the desktop system and is seen by Windows as one card. The set is Plug-and-Play compatible. Windows 95/98/MEwill automatically recognize the set and initiate the installation process.

Upon successful installation the PCMCIA or PCI cards will communicate seamlessly with other I-O Wireless cards or other IEEE 802.11b home and office networking products. I-O Wireless cards can be used to create a stand-alone wireless network, or they may be used in conjunction with an 802.11b compatible access point to provide a wireless extension to an Ethernet (wired) local area network.

1-1 Product Kit

I-O Wireless kits include the following items. Ensure that the items in the following list have been included. If any of the listed items are missing, please contact your local dealer.

- I-O Wireless PCMCIA Card and/or PCI adapter card in various combinations
- I-O Wireless Installation CD
- Start up Guide
- Network Configuration Worksheet

1-2 How to Contact I-O Wireless

- By phone at 877-471-9933
- By e-mail at sales@iowireless.com or support@iowireless.com
- By Web site at www.iowireless.com

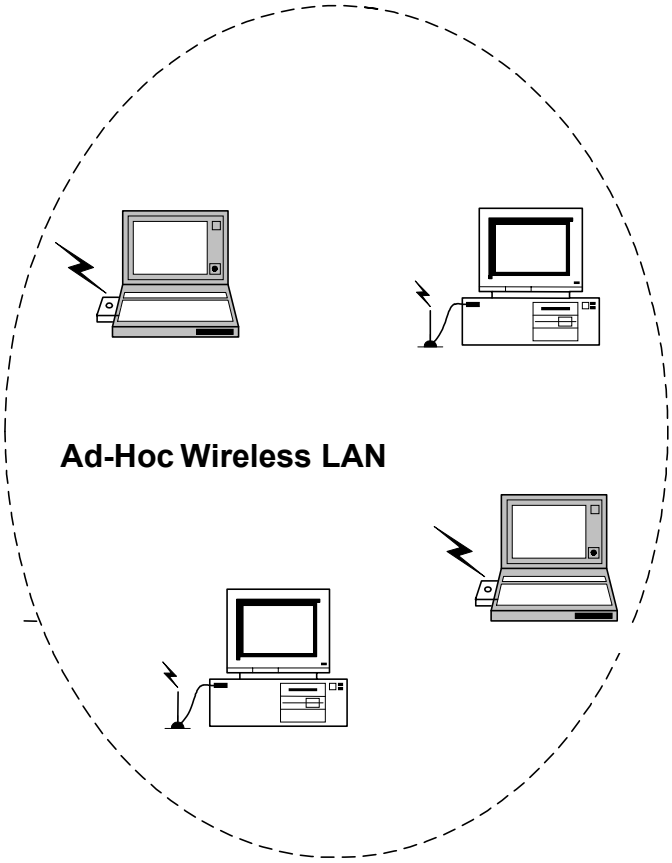
Chapter 2 – Network Modes

I-O Wireless cards can be configured to operate in either an ad-hoc or infrastructure network mode.

I-O Wireless cards support legacy Ethernet LAN network configuration options as defined by the IEEE 802 standards committee.

2-1 AD-HOC NETWORK

An *ad-hoc* wireless network is a group of computers; each equipped with a wireless card, connected as an independent (stand-alone) wireless network. An ad-hoc wireless network is not attached to a wired network, and each computer communicates directly with any other computer as soon as the wireless hardware and drivers are installed.



Ad-Hoc networks are most commonly used in small offices or homes where no wired network exists, or where it would be advantageous to replace a wired network with the flexibility of a wireless network.

There are a number of configuration issues that must be defined to properly configure an ad-hoc network. By following the Startup Guide, Network Configuration Worksheet, and I-O Wireless Installation Wizard instructions your ad-hoc network will be created without the need of networking expertise.

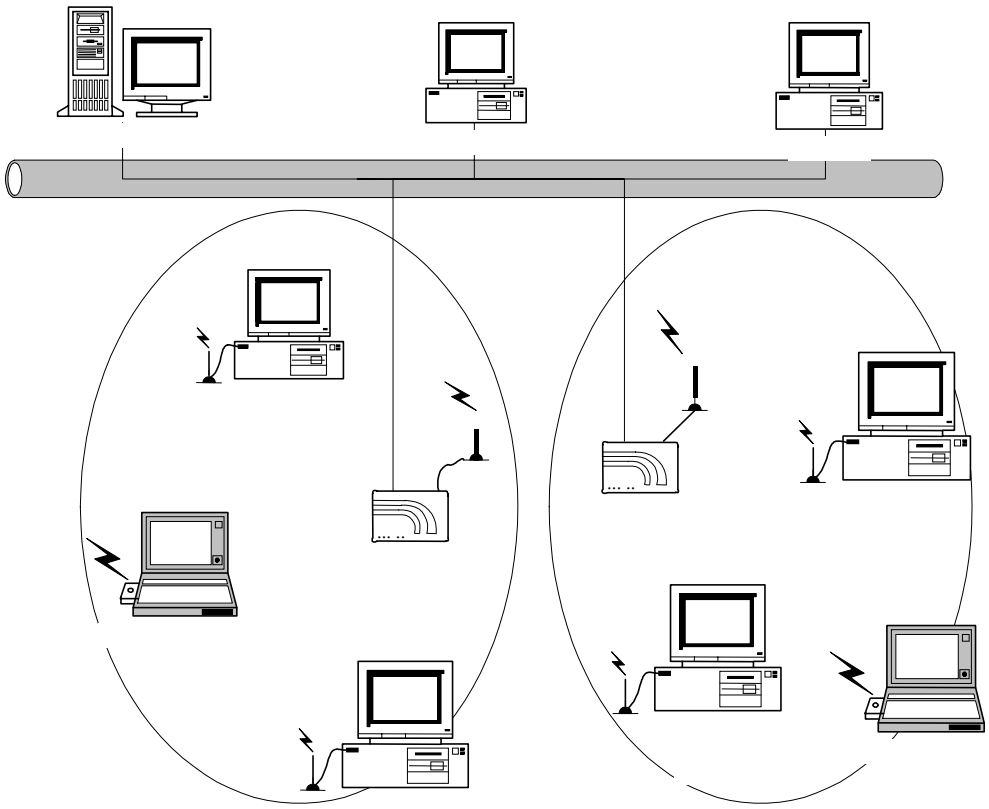
Once your wireless network installation is complete your network provides the following benefits:

- Drive and Folder sharing: you may access the drives and folders of any computer attached to the network. You set access control to allow full or read only access
- Printer sharing: any printer on your network becomes available as a resource to any computer on your network.
- Internet sharing: any computer on your network may access the Internet through one physical connection, appearing as if each computer was directly attached to the Internet.

2-2 INFRASTRUCTURE NETWORK

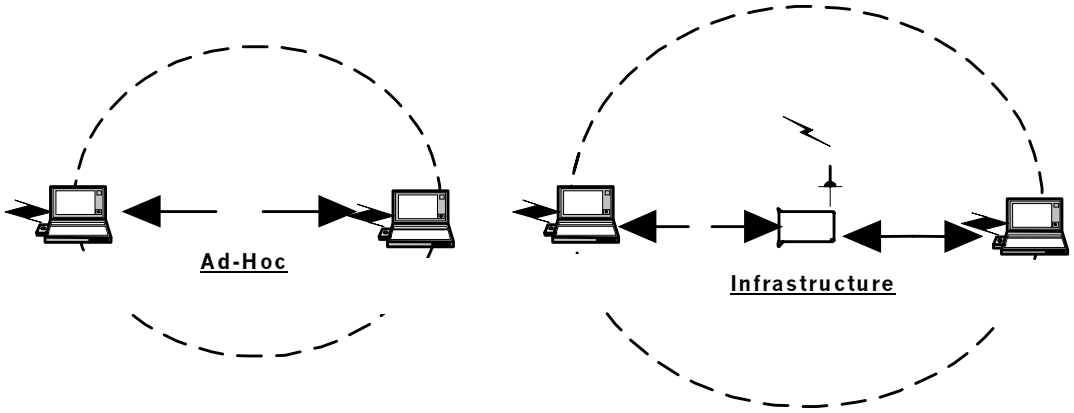
An integrated wireless and wired LAN is called an *Infrastructure* network. The wireless computers access the wired LAN through a device attached to the wired (Ethernet) LAN called an access point.

Each I-O Wireless device can talk to any computer in the wired LAN or other wireless computers, via the access point. Similarly, any computer attached to the wired network can talk to the wireless devices via the access point.



Infrastructure Wireless LAN

An infrastructure configuration extends the accessibility of a wired LAN by providing wireless extensions to a wired LAN in locations where an access point is installed. An infrastructure network might be used in larger enterprise operations where a wired LAN already exists and mobile employees who take their laptop computer out of the office want easy access to the company LAN when they are working in the office.



An infrastructure configuration also extends the distance between two wireless computers.

2-3 CHANGING NETWORK MODES

You can easily change your computer network mode, allowing one computer to move between different wireless networks (i.e. between wireless networks at home and work).

To change between ad-hoc and infrastructure network modes is easily accomplished using two I-O Wireless utility programs, I-O Management Central and the Wireless LAN Configuration Utility. Specifically, you will change the name of the network, the network mode, the IP Address and sub-net mask to match the settings required for wireless network you wish to connect.

Chapter 3 – Installation Guide

To enjoy the benefits of mobility, file sharing, printer sharing, and Internet sharing you must:

- create a wireless network structure associating your computers,
- install wireless hardware and software on each computer, and
- define resources to be shared across the network.

Network installation can be complex and is unlike other simple software or hardware installations.

By following the I-O Wireless installation instructions and you will create a functioning wireless network without the need for Windows networking expertise. Through simple questions, prompts and instructions the I-O Wireless Installation Wizard will set up and configure your network. The I-O Management Central utility will easily guide you through sharing drives, folders, printers, and Internet access. These two I-O Wireless utilities make a complex process simple.

3-1 INSTALLATION PROCESS OVERVIEW

The process to create a functioning I-O Wireless network is comprised of the following steps:

Preparation

1. Collect the necessary materials
2. Plan your network configuration

After general preparation you need to do the following for each computer in your network:

Network Configuration

3. Install the wireless hardware
4. Install software and set up the network computer

Share Network Resources

5. Identify which drives/folders and printers to share among network computers
6. Install BrowseGate Internet sharing software on the one computer that will share its Internet connection. For all other computers, the Web browser will be configured access the Internet via the Internet sharing software.
7. Map shared drives/folders, and map shared printers.

   (This last step is done after I-O Wireless is installed on all computers and their drives, folders and printers have been shared. Mapping attaches shared resources from one network computer so they are available for direct access by another network computer.)

3-2 SYSTEM REQUIREMENTS

Desktop computers:

- An unused PCI 2.1/2.2 slot
- Windows 95(SR2), 98, ME, 2000
- A CD-ROM drive
- 10 Mbytes free disk space for utility and driver installation

Laptop computers:

- A PCMCIA Type II or Type III slot
- PCMCIA revision 2.10 compliant card and socket services
- Windows 95(SR2), 98, ME, 2000
- A CD-ROM drive
- 10 Mbytes free disk space for utility and driver installation

To determine what version of Windows is running on your computer, right click on the My Computer icon on your desktop. Click Properties. Under the section called System you will find listed what version of Windows is installed.

For Windows 95(SR2), the number on the next line must read “4.00.950B”. If it is not, you will need to upgrade your Windows 95.

3-3 YOU WILL NEED THE FOLLOWING

Before continuing your network installation please make sure you have the following:

- I-O Wireless card
- I-O Wireless Installation CD
- Microsoft Windows (or Recovery) CD
- Tools to open a desktop PC (screwdriver, hardware manual, etc.)
- A functioning Internet connection on one computer (if you want other wireless computers to access the Internet via this computer)
- Network Configuration Worksheet completed

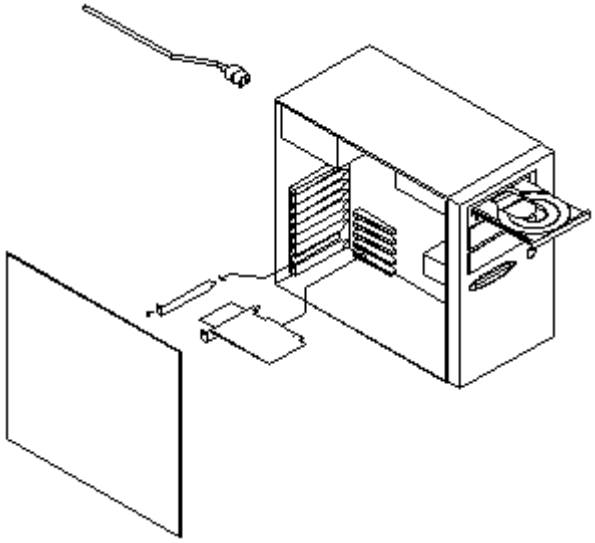
The information you enter on the Network Configuration Worksheet will be referred to throughout the installation process. *Do not proceed* with the installation until you have completed the worksheet.

3-4 INSTALL THE I-O WIRELESS HARDWARE

Desktop Computers:

Note: If you are unsure about this process, please refer to your computer hardware reference guide for additional help.

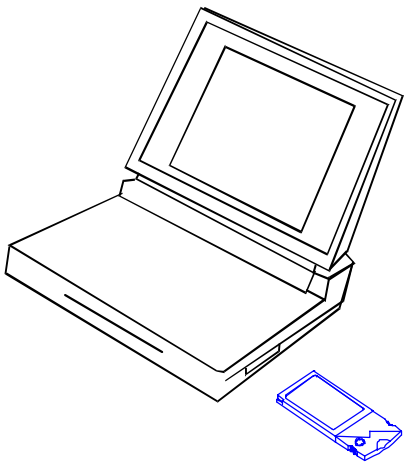
1. Make certain the computer is turned off and remove the cover from the case.
2. Touch any bare metal in the case, and disconnect the power cord.
3. Remove an adapter card mounting bracket cover from the case next to an open PCI slot in the motherboard.



4. Remove the PCI card from its anti-static bag and insert the PCI card into the PCI slot on the motherboard. (Handle the card by its edges, but don't touch the gold fingers along the edge that slides into the PCI slot.)
5. Replace the system unit's cover, connect the power cord, and power up the PC.
6. Proceed to the next section to install the drivers.

Laptop Computers:

1. With the laptop computer powered off, insert the I-O Wireless PCMCIA Card in a Type II or Type III slot.
2. Power up the laptop computer.
3. Proceed to the next section to install the drivers.



Note: Laptop computers will allow you to insert a PCMCIA card when Windows is running. If your laptop is already running, you do not need to power it off.

3-5 I-O WIRELESS DRIVER INSTALLATION

The installation of the drivers for the I-O Wireless card is accomplished through Microsoft Windows Add New Hardware Wizard. The actual steps of the Add New Hardware Wizard will vary with each Windows version.

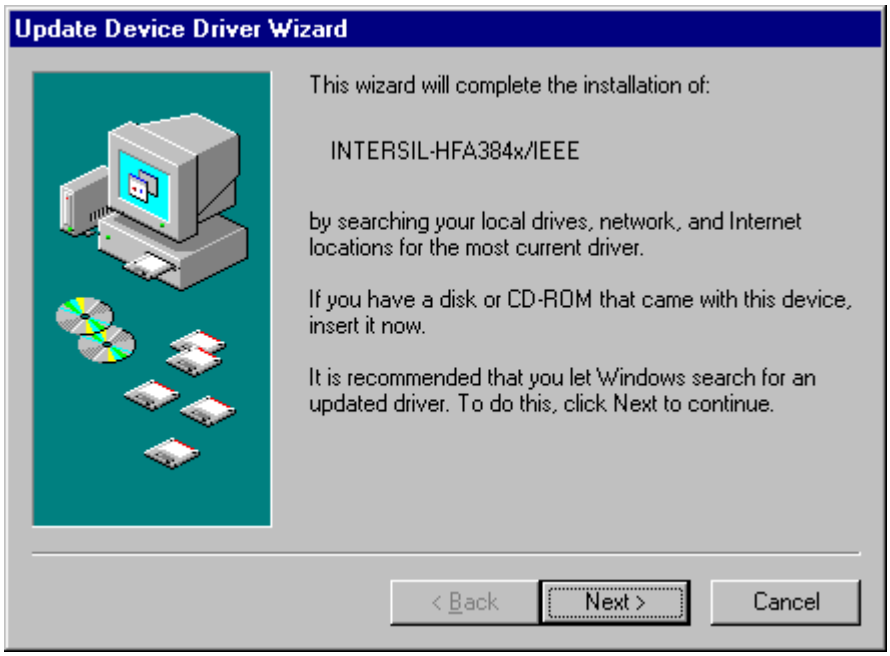
Proceed to the instructions in this section for the appropriate version of Windows installed on your computer.

If your computer currently is attached to a wired network using Novell Netware, Windows will require you to insert your Netware Client CD during the driver installation process.

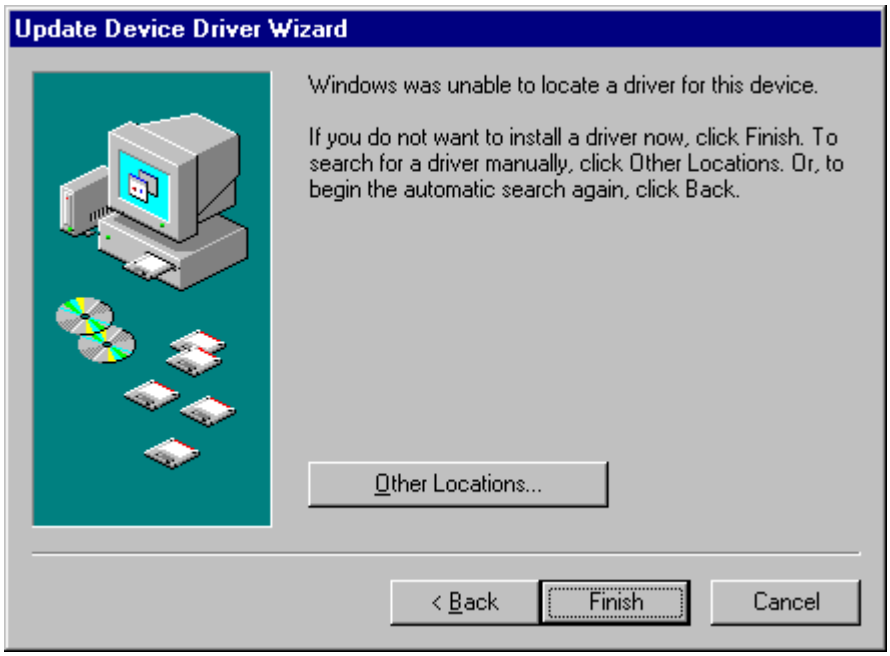
Note: Due to the unique combinations of hardware and software on some computers, there may be slight variations to installation steps documented here.

3-5-1 Windows 95(SR2)

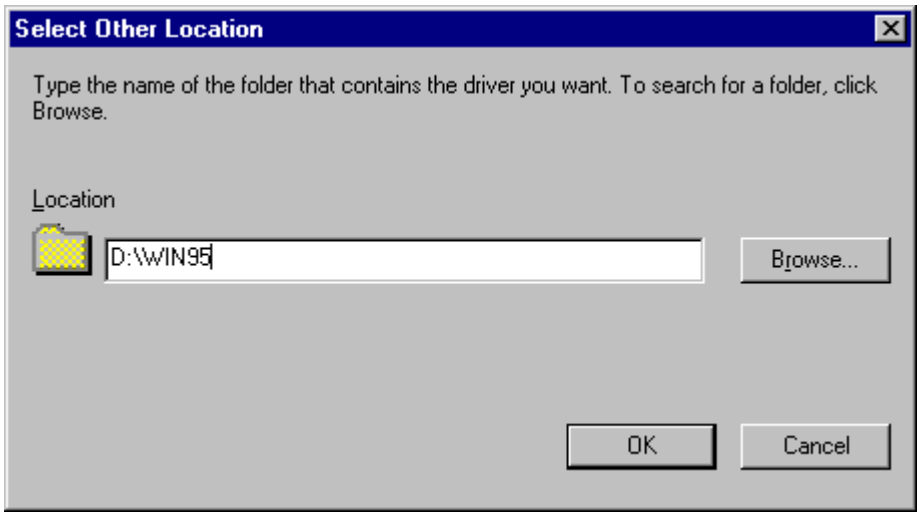
1. On power up the Windows Add New Hardware Wizard started.
2. Insert the I-O Wireless Installation CD in your CD-ROM drive. Wait a few seconds for the CD to be read before proceeding, then click the *Next* button.



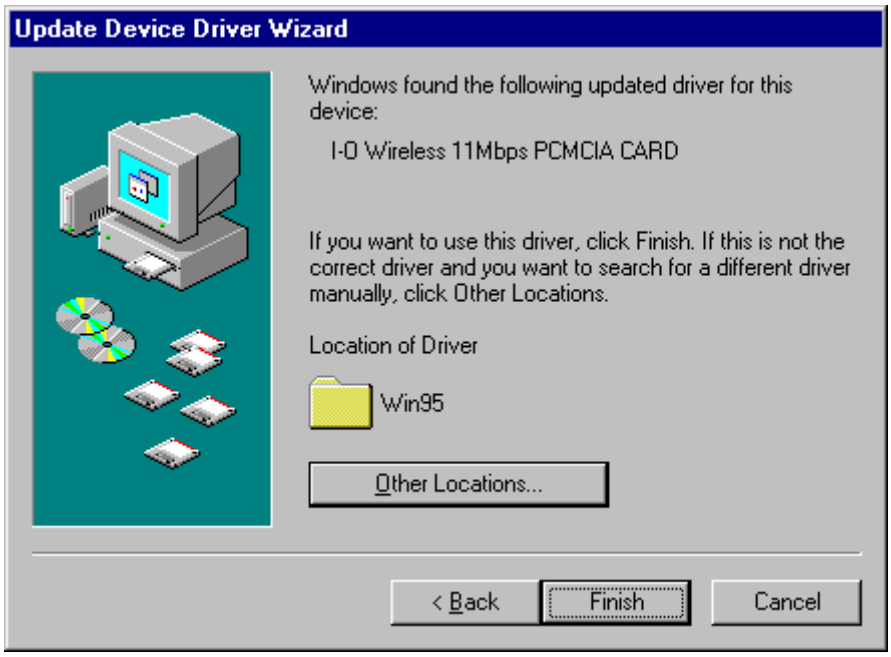
3. Windows will search for a driver then tell you it cannot find the driver. Click the "*Other Locations*…" button.



4. In the Location field, enter “D:\WIN95” (assuming d: is your CD-ROM drive). Click *OK*.

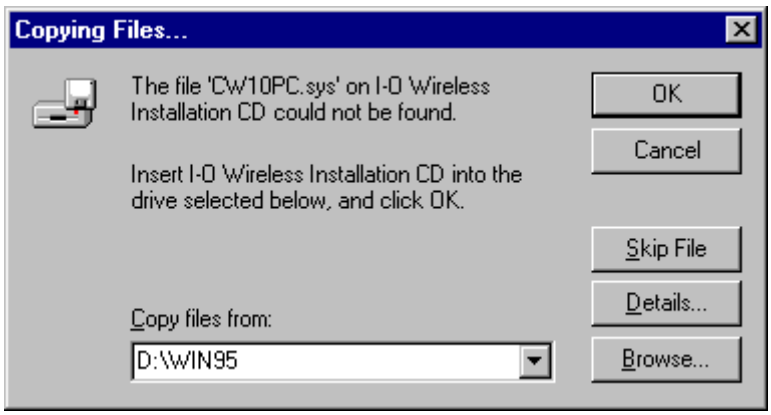


5. Windows will now confirm it has found the I-O Wireless driver. Click *FINISH*.



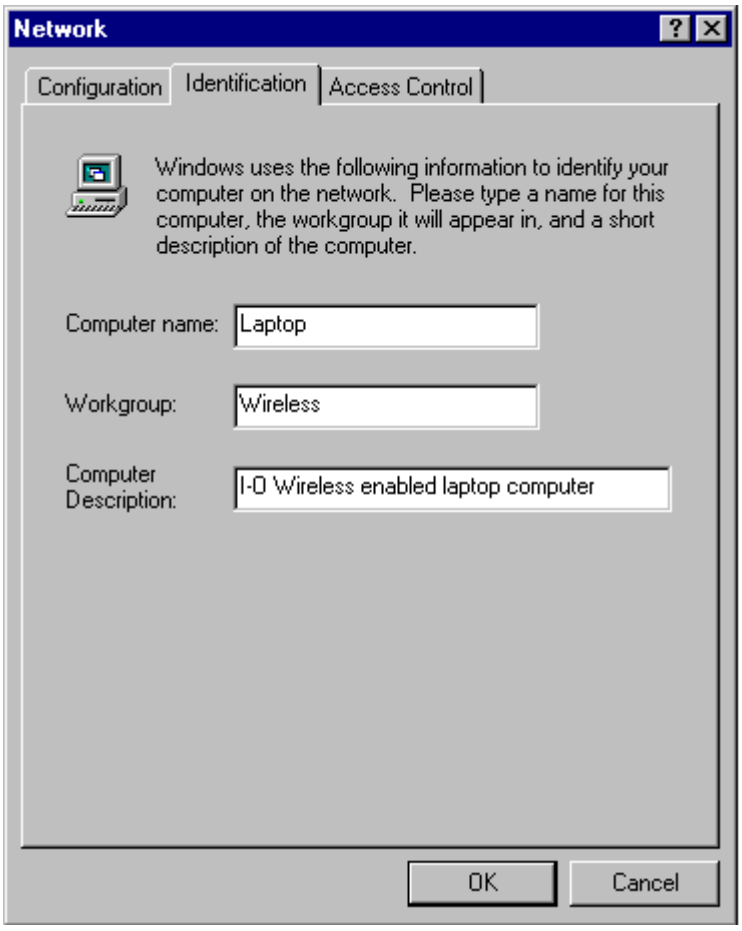
6. Click *OK* when instructed to insert the I-O Wireless Installation CD (even though it is already in the CD-ROM drive).

If you receive a “file…cannot be found…” message, you will need to tell Windows the location of the I-O Wireless Installation CD by entering “D:\WIN95” (assuming d: is your CD-ROM drive) and clicking *OK*.



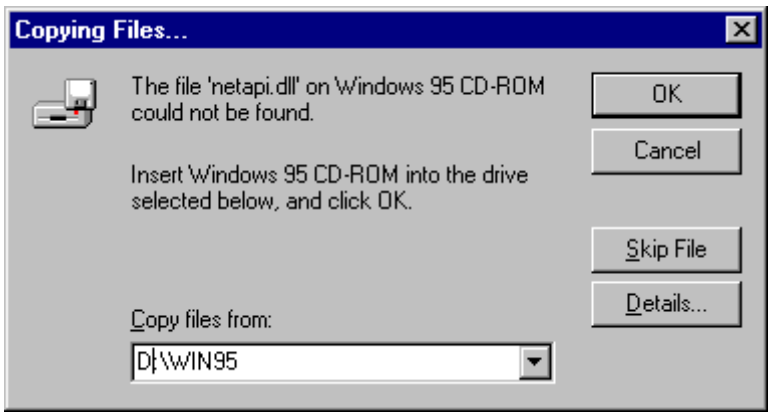
7. . If you receive a message telling you that you must provide Windows a computer and workgroup name, click *OK*.

Under the Identification Tab enter the name of this computer (refer to Network Configuration Worksheet). In the workgroup field enter "Wireless". Click *OK*.

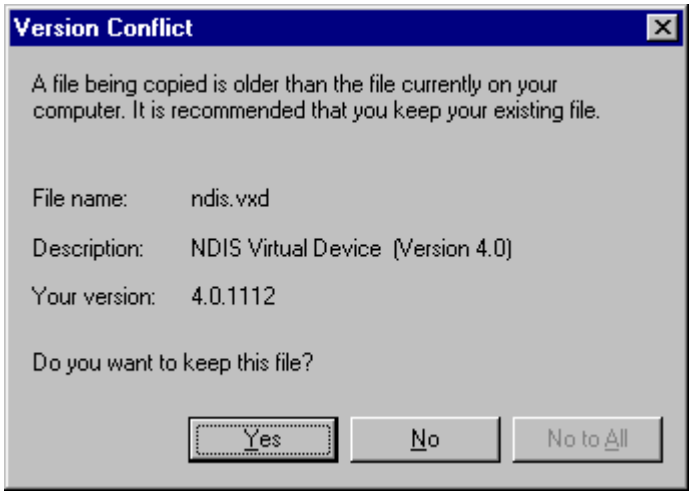


8. a. If requested, insert your Microsoft Windows CD. Wait a few seconds, then click *OK*.

If you receive a “file…cannot be found…” message, enter the location of your Windows Installation files in the “Copy File From” field (refer to your Network Configuration Worksheet). Click *OK*.



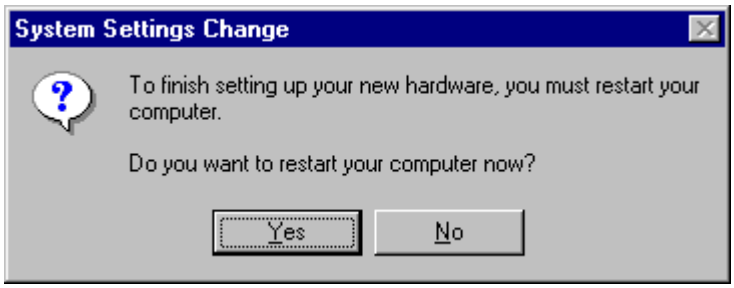
If you receive a “file is being copied that is older….” message, click *Yes*.



9. Re-insert the I-O Wireless Installation CD if it was removed. Wait a few seconds for the CD to be read before proceeding.

   If a screen indicates it has finished installing the software or hardware device, click *Finish*.

10. Click *NO* when Windows asks, “Do you want to restart your computer now?”. Windows may pause and do some work in the background (please be patient this may take a minute). If you are asked this question a second time, click *NO* again.



- You have completed the driver installation.
- Proceed to section 3.6 Install Utility Software and Configure the Network.
- Have your Network Configuration Worksheet ready for reference.

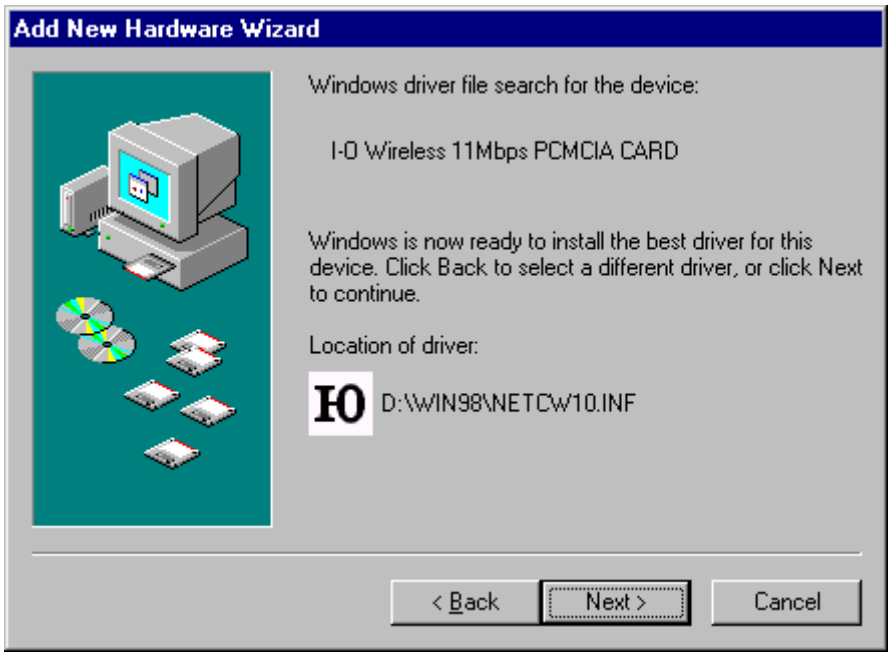
3-5-2 Windows 98

1. On power up the Windows Add New Hardware Wizard started.
2. Insert the I-O Wireless Installation CD in your CD-ROM drive. Wait a few seconds for the CD to be read before proceeding, then click the *Next* button.

3. Select the “Search for the best driver for your device” option. Click *Next*.

4. Select the “Specify a location” option. All other boxes should not be checked. Enter “D:\WIN98” in the location field (assuming d: is your CD-ROM drive). Click *Next*.

5. Click the *Next* button on the following screen where the location of the driver is confirmed.



6. If requested, insert your Microsoft Windows CD. Wait a few seconds, then click OK.

7. If you receive a “file…cannot be found…” message, enter the location of your Windows Installation files in the “Copy File From” field (refer to your Network Configuration Worksheet). Click *OK*.

8. When a screen indicates it has finished installing the software or hardware device, re-insert the I-O Wireless Installation CD if it was removed. Wait a few seconds for the CD to be read before proceeding. Click *Finish.*

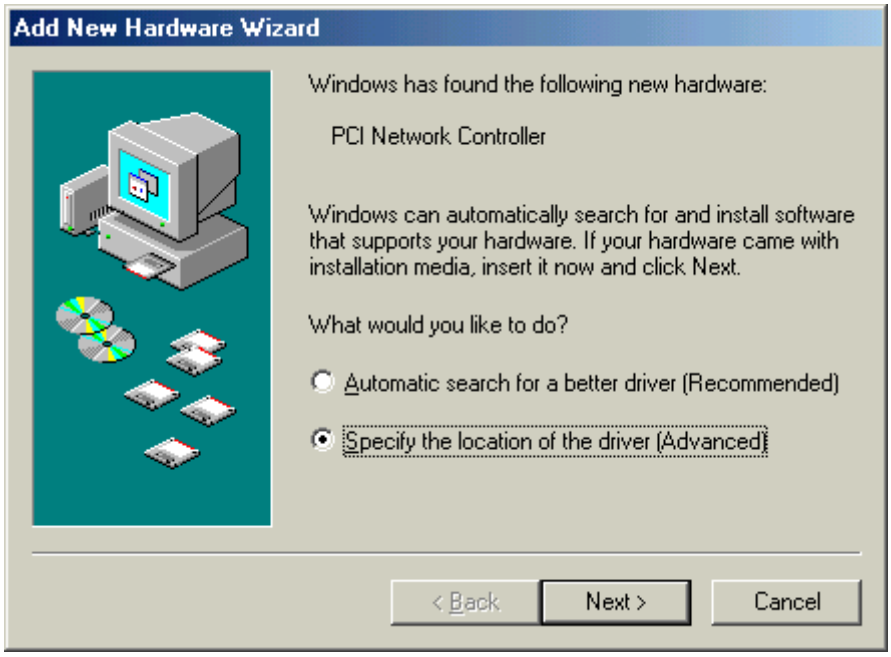
9. Click *NO* when Windows asks, “Do you want to restart your computer now?”. Windows may pause and do some work in the background (please be patient this may take a minute). If you are asked this question a second time, click *NO* again.

- You have completed the driver installation.
- Proceed to section 3.6 Install Utility Software and Configure the Network.
- Have your Network Configuration Worksheet ready for reference.

3-5-3 Windows Me

1. On power up the Windows Add New Hardware Wizard will start, saying it has found new hardware. Windows will then pause while it searches for new drivers in the background.

2. When Windows gives you the choice of automatically searching for software or specifying the location of the drivers, check the "Specify a location of the driver" box. Click *Next*.

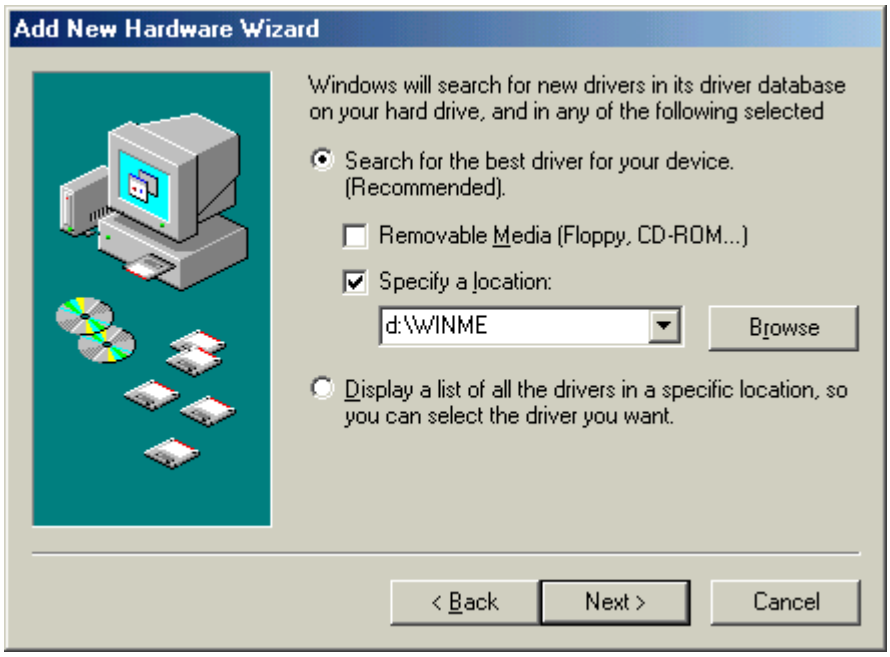


3. Select the "Search for best driver…." radio button option.

   Uncheck the "Removable media…" box.

   Check the "Specify a location…" box, and enter "D:\WINME" in the location field (assuming d: is your CR-ROM drive).

   Insert the I-O Wireless Installation CD in your CD-ROM drive. Wait a few seconds for the CD to spin up. Click *Next*.



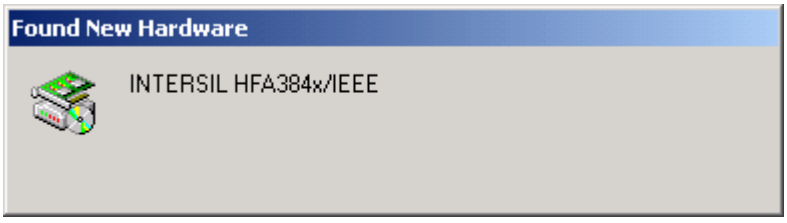
4. Windows may pause while it does some background work and then will confirm the location of the driver. Click *Next*.

5. When a screen indicates it has finished installing the software or hardware device, click *Finish*.

- You have completed the driver installation.
- Proceed to section 3.6 Install Utility Software and Configure the Network.
- Have your Network Configuration Worksheet ready for reference.

3-5-4 Windows 2000

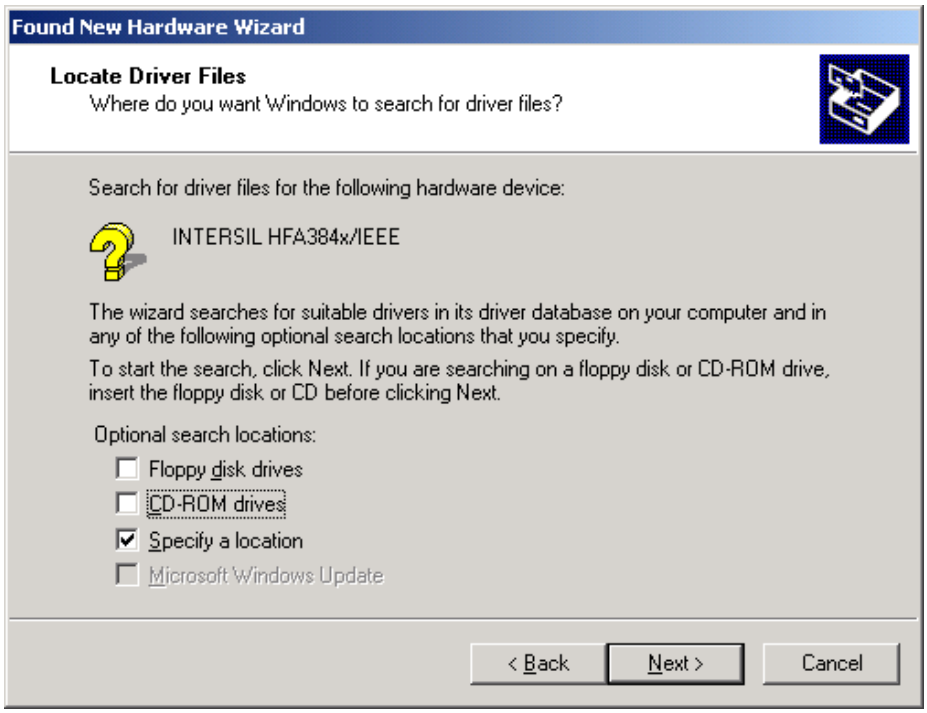
1. On power up the Windows Found New Hardware Wizard will start, saying it has found new hardware. Windows will then pause while it searches for new drivers in the background.



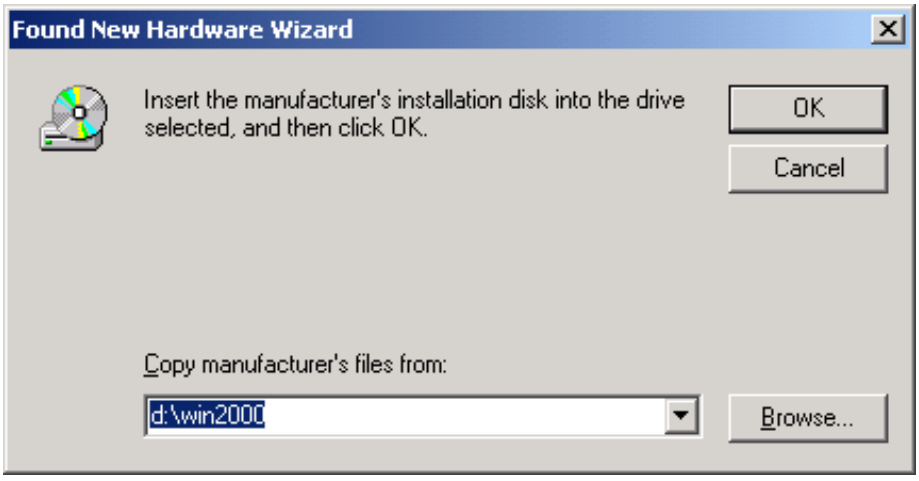
2. Click *Next*.

3. Click the “Search for suitable driver ….” radio button. Click *Next*.

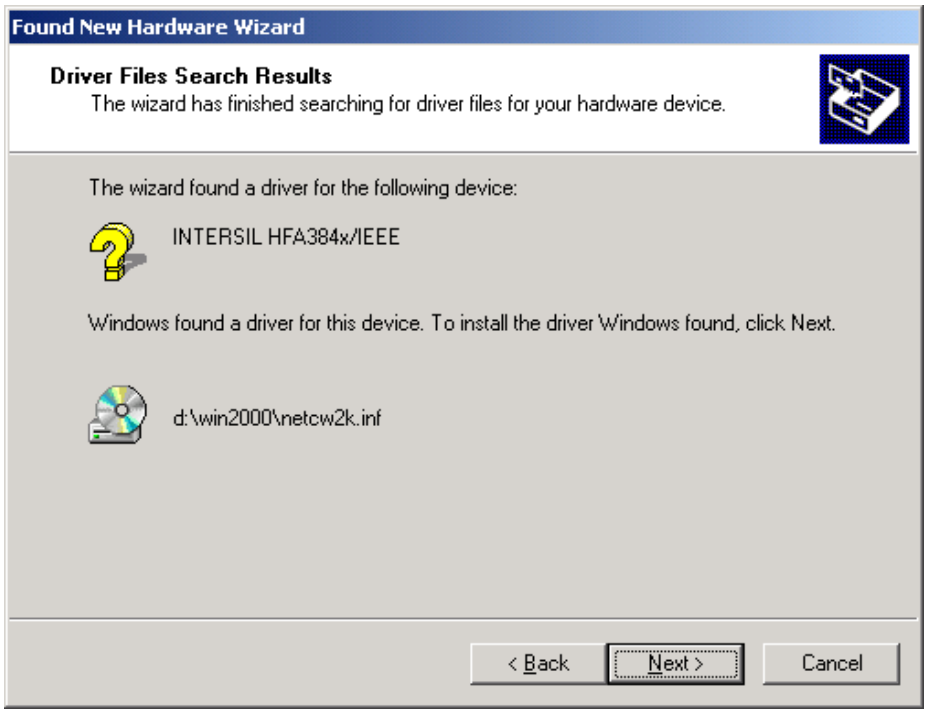
4. Check the “Specify a location” box. Click *Next*.



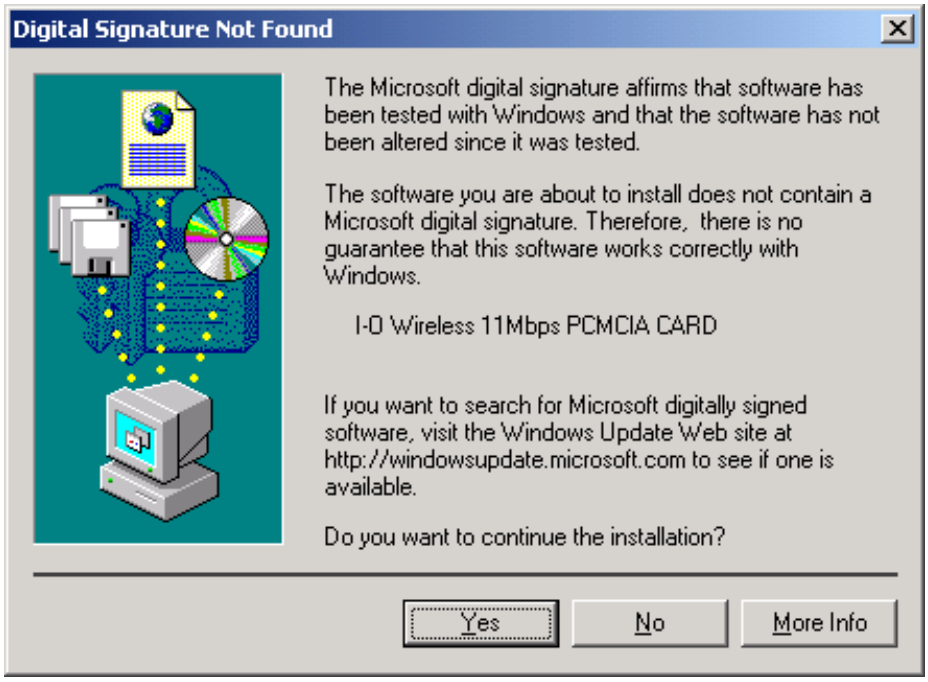
5. Enter “d:\win2000” in the “Copy manufacturer’s files from:” field (d:\ is the location of your CD-ROM drive). Then, insert the I-O Wireless Installation CD in your CD-ROM drive. Wait a few seconds for the CD to spin up. Click Next



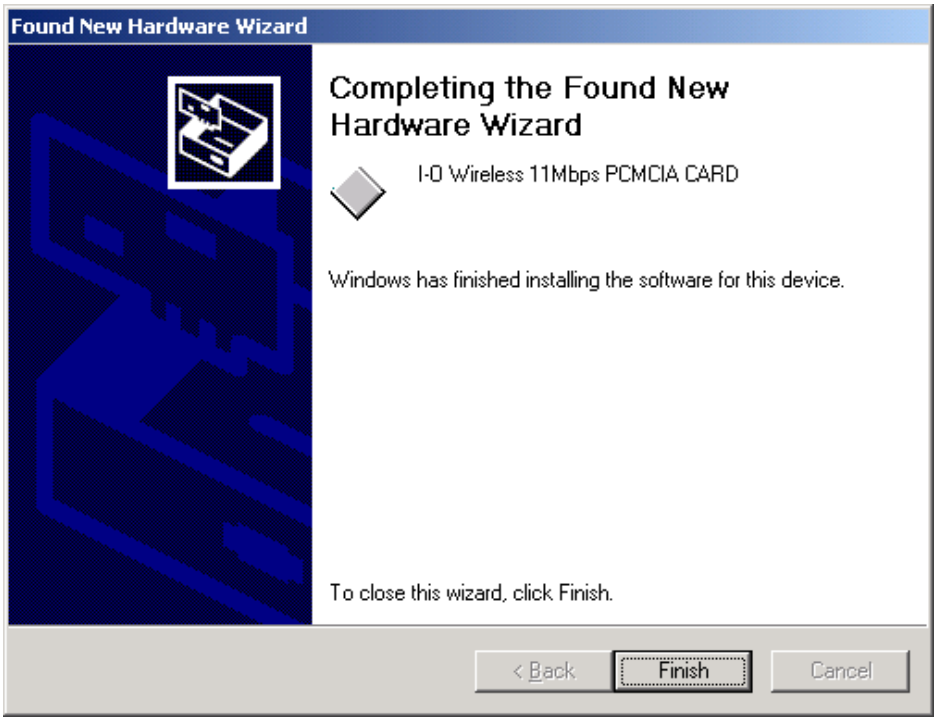
6. Windows will search the CD for the drivers then confirm it has found the drivers. Click *Next*.



7. Click Yes to continue with the installation when Windows presents you with a digital signature screen.



8. After Windows has copied the files from the CD, it will present a screen informing you that the driver software has been installed. Click *Finish*.

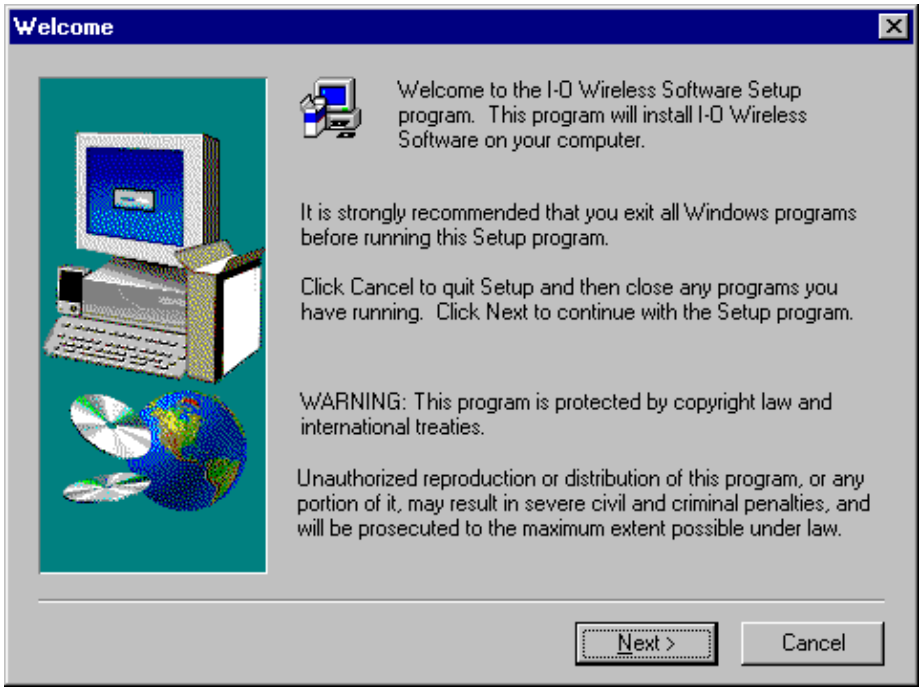


- You have completed the driver installation.
- Proceed to section 3.6 Install Utility Software and Configure the Network.
- Have your Network Configuration Worksheet ready for reference.

3-6 INSTALL UTILITY SOFTWARE & CONFIGURE THE NETWORK

The I-O Wireless Installation Wizard will now install the I-O Wireless LAN Configuration Utility, I-O Management Central, and missing Windows networking components. The Wizard will also guide you through the network configuration of this computer. You will need to refer to your Network Configuration Worksheet throughout this process.

1. At the Welcome screen, click *Next*.

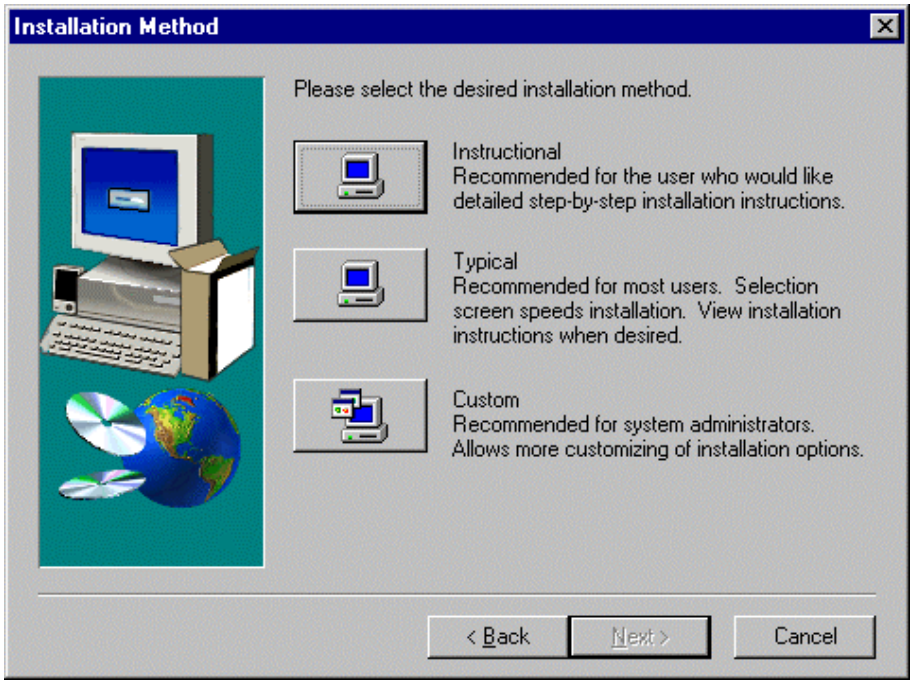


2. The Installation Wizard includes three options for installing and configuring your wireless network. *Click the option* that best fits your needs.

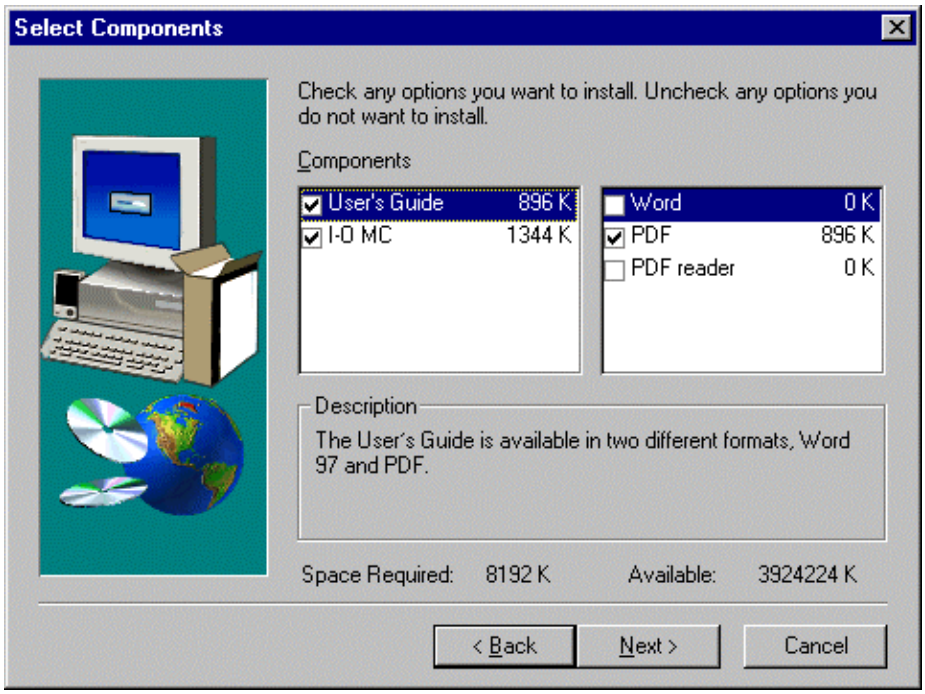
   - Instructional – for the user who would like step-by-step instructions and guidance.

     Choosing this option will take you through the installation and configuration process with instruction screens being presented either before each step of the process or as a part of the process step. When you are finishing the last wireless computer, a short tutoiral will guide you through the steps to use I-O Management Central to map the shared resources that you setup during the configuration of each wireless computer. Having been guided through the use of Management Central, you will then return to each wireless computer and complete the mapping of available shared resources using Management Central. At that point, your wireless network will ready to use.

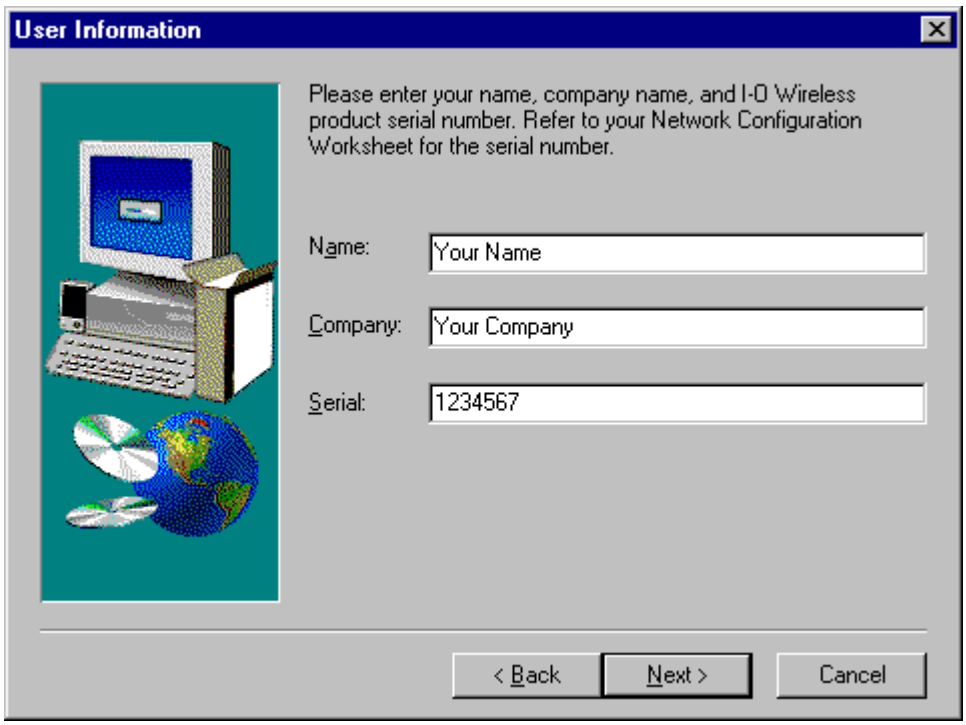
- Typical – for the user who is familiar with installing Windows applications. Help screens are available to provide additional information.
- Custom – for the user or system administrator who want to select or deselect whether to install the user's guide, the reader, and I-O Management Central. After making your selections, the installation and configuration process follows the Typical approach.



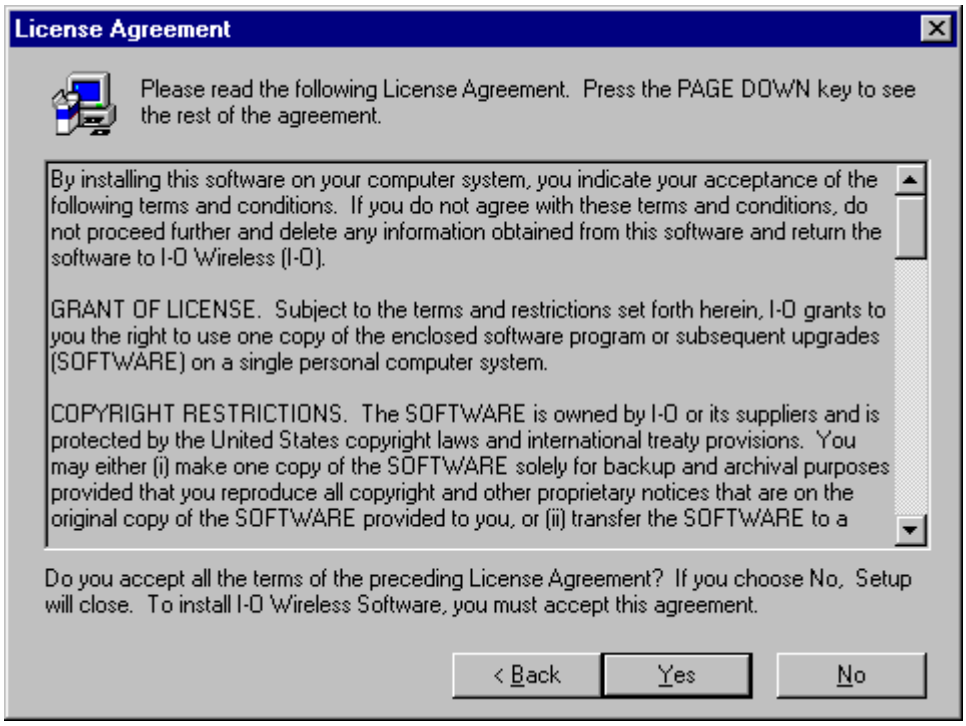
3. If you choose the Custom approach, you will be presented with an options screen. Clear or check the option. The description for each option and its use is presented in the description area. Click Next when you have made all your selections.



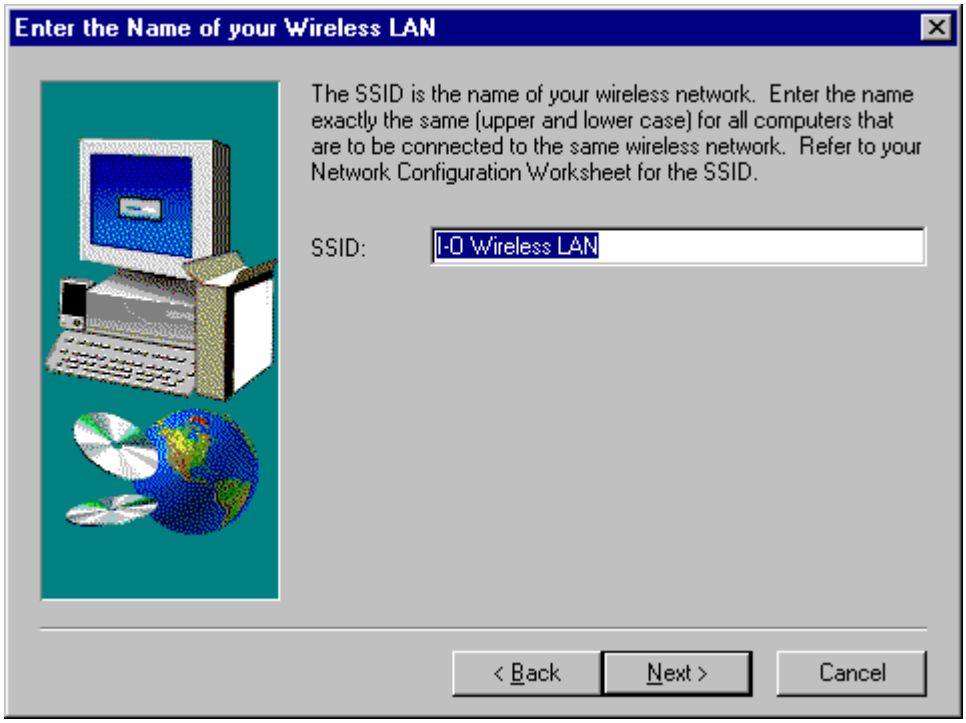
4. Enter your name, company name if applicable, and the serial number for the I-O Wireless product. This number will be found on the I-O Wireless Installation CD. Refer to the Network Confirguration Worksheet. Click *Next*.



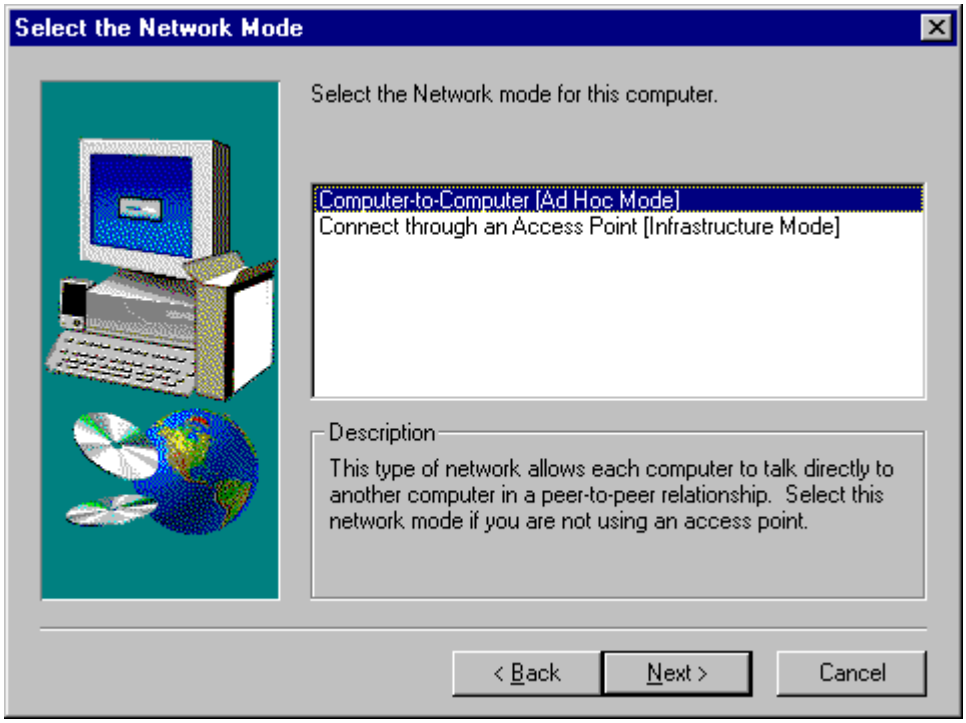
5. Review the License Agreement. Click *Yes* when ready to continue with the installation.

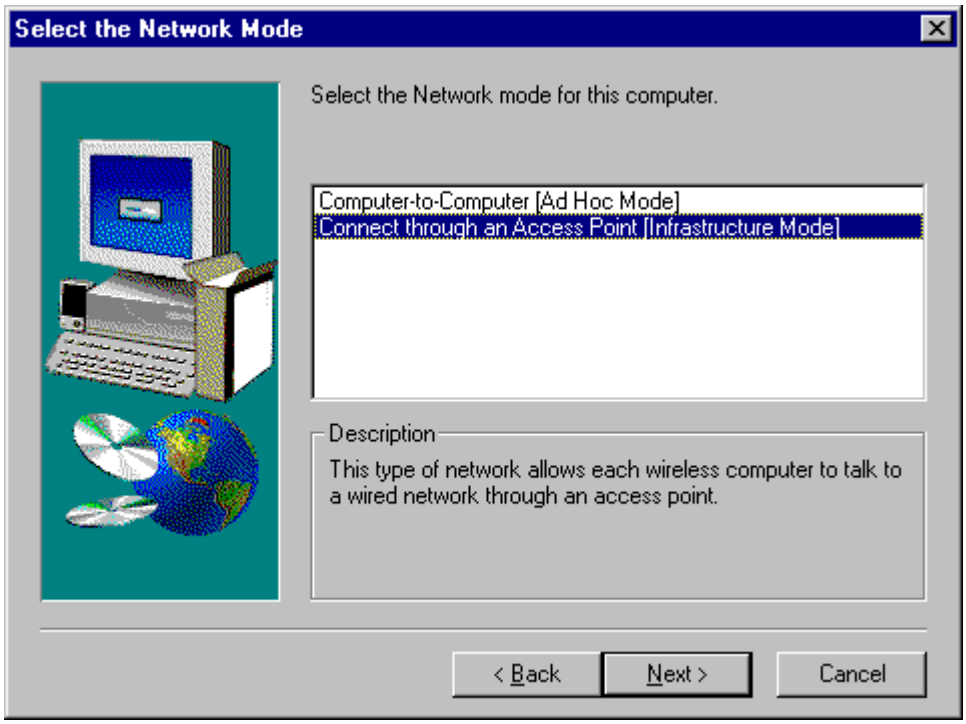


6. Enter the name of your wireless network. This name is the same for all computers to be connected in a wireless network. If an access point is used, both the computer and the access point must have this same name. Refer to the Network Configuration Worksheet. Click *Next*.

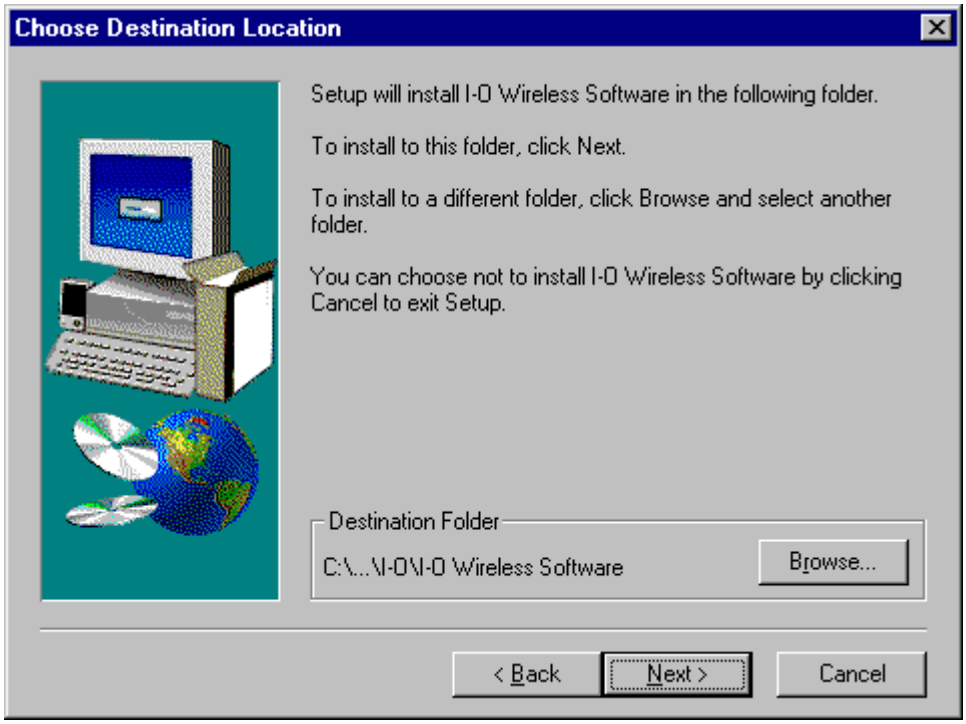


7. Choose the type of network. In a home or a small office arrangement where two or more computers will be connected to each other in a peer-to-peer arrangement, choose “Ad-Hoc”. For larger offices where an access point is used as a central connection device to the wired network, choose “infrastructure”. Click *Next*.





8. The destination folder for copying the wireless files will be displayed. To change this location, click Browse and select another folder of your choice. Otherwise, click Next

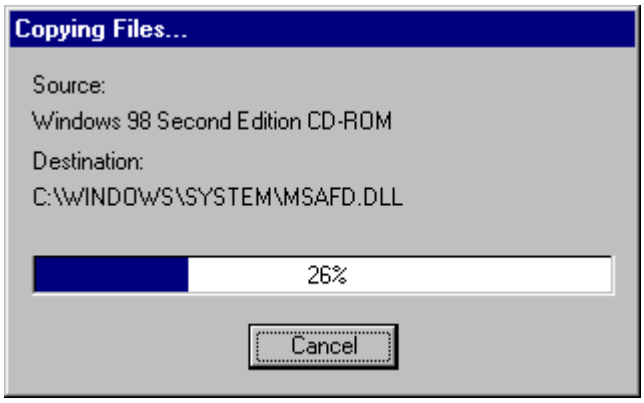


9. At this point, several screens will appear indicating that files are being copied from the I-O Wireless Installation CD.

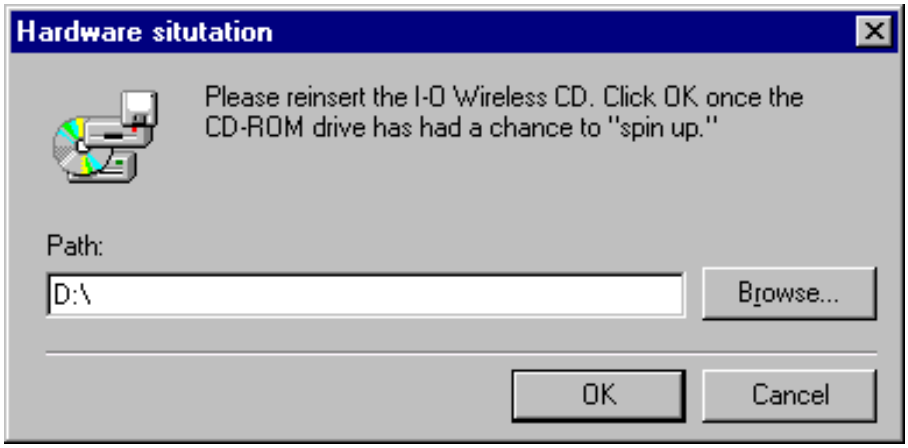
10. If requested, insert your Microsoft Windows CD. Wait a few seconds for the CD to be read, then click *OK*.

If you received a “file…cannot be found…” message, then enter the location of your Windows Installation files in the “Copy File From” field. See the Network Configuration Worksheet for this location. Click *OK*.

Windows will copy a number of files and do some background work. Be patient, this may take a minute.



After the Windows files have been copied, you will be prompted to reinsert the I-O Wireless Installation CD. Wait a few seconds before proceeding. Click *OK.*



11. If Internet Explorer has not been installed on your computer, you may receive an error message that reads “This DHCP client was

unable to obtain an IP address from a DHCP server. Do you want to see future DHCP messages?" Click *No*. **Note:** If you do not receive this message, skip this step.

A new error message will then appear that reads "Could not create window." Click *OK*.

Another message screen will tell you that Windows will restart. Depending upon your computer's configuration prior to the I-O Wireless installation, you may not have been asked to log in before. If this is the first time, select a name and password (optional) that you want to use for this computer. Please remember your log in name and password as you will use them each time you enter Windows. Click *OK*.

Windows will then restart and you will need to log in. The Wizard will then continue with the next step.

12. Each computer in the network must have a unique IP address and network computer name.

    Enter a unique IP address in the format of 192.168.0.???. Give each computer a different number in the ??? field. As your network grows, or if you are in a larger network, this IP Address will probably be something totally different than suggested here. Refer to your Network Configuration Worksheet for this address.

    The following ranges of IP addresses are available for use (unless you have been assigned a specific IP address by the IANA group):

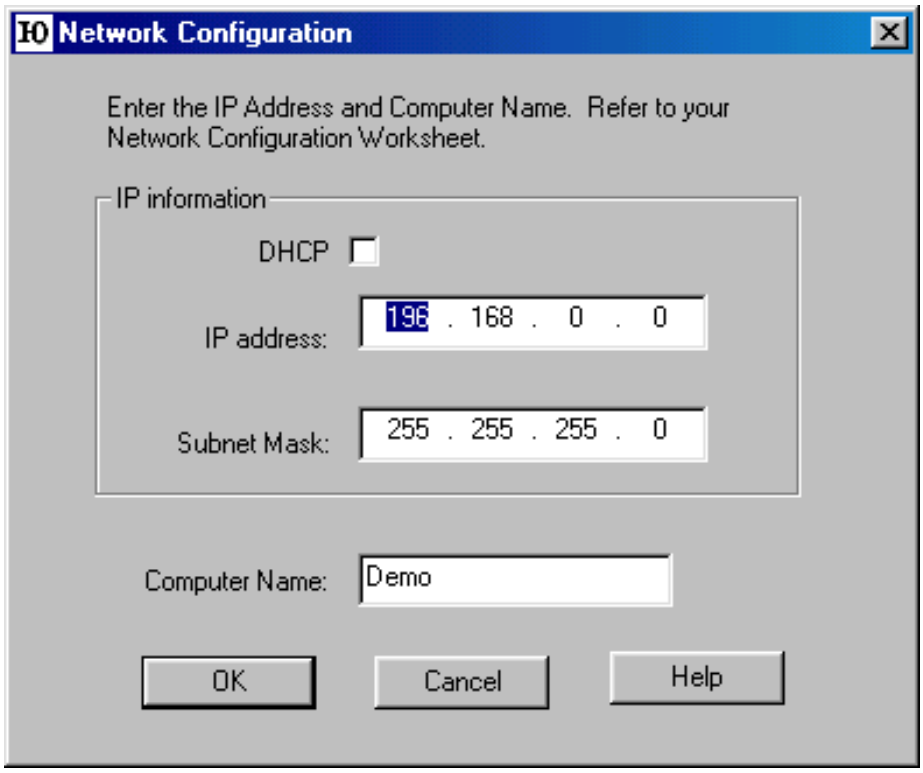
10.0.0.0	-	10.255.255.255
172.16.0.0	-	172.31.255.255
192.168.0.0	-	192.168.255.255

    Enter the name that this computer will use in the network. Refer to the Network Configuration Worksheet.

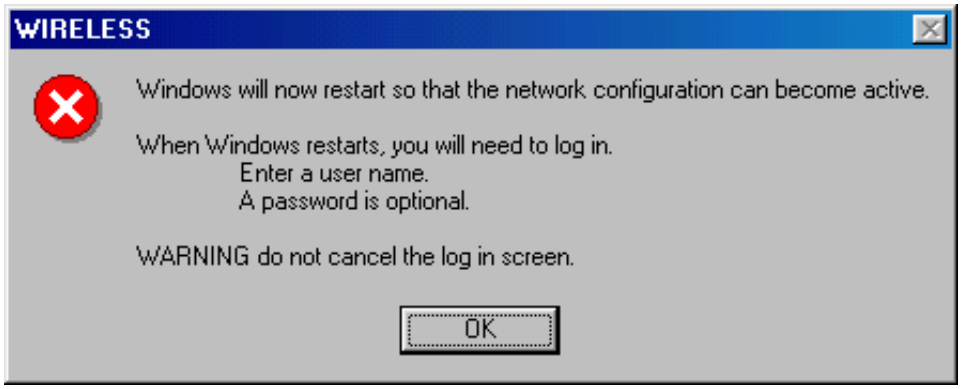
    Checking the DHCP box causes Windows to search for a DHCP server on the network and obtain an IP Address for this computer. Unless you have been instructed by your network administrator, do not check this box.

    The Subnet Mask is used to divide a very large network into smaller LANs. Unless you have been instructed by your network administrator, do not change this number.

    Click *OK*.



13. You will need to restart your computer so that the I-O Wireless installation can become active. Click *OK*.



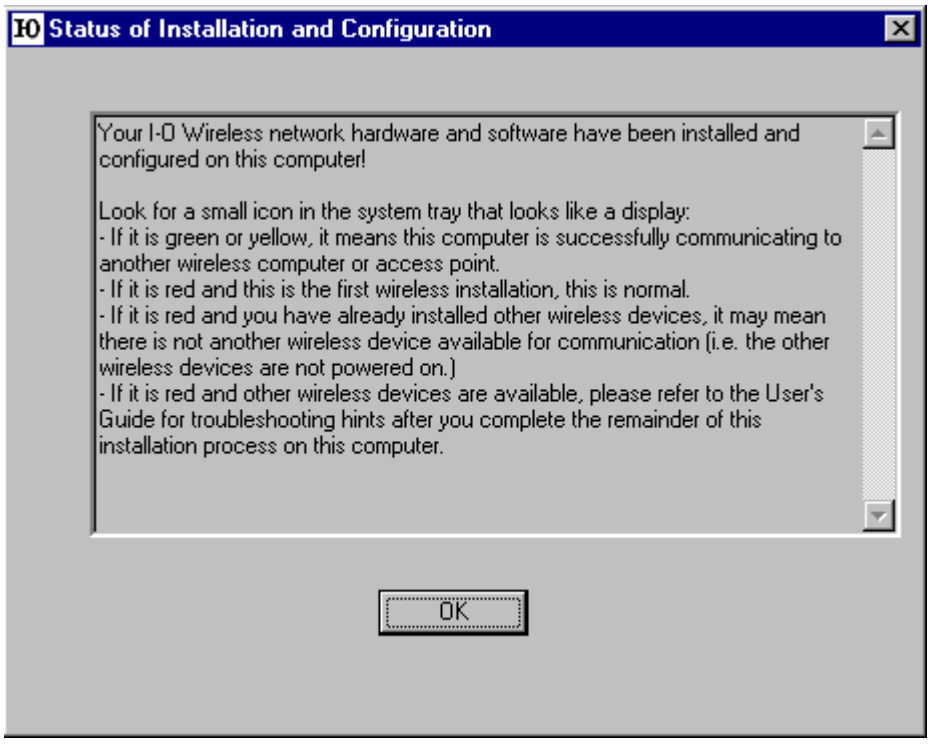
14. When Windows restarts a log in screen will appear. Depending upon your computer's configuration prior to the I-O Wireless installation, you may not have been asked to log in before. If this is the first time, select a name and password (optional) that you want to use for this computer. Please remember your log in name and password as you will use them each time you enter Windows.

    WARNING: Do not cancel the log in screen. Windows will not allow you to use your network unless you log in.

15. After Windows restarts and you have logged in, you should now see a small icon in the system tray that looks like a display.

- If it is green or yellow, it means this computer is successfully communicating to another wireless computer or access point.
- If it is red and this is the first wireless installation, this is normal.
- If it is red and you have already installed other wireless devices, it may mean there is not another wireless device available for communication (i.e. the other wireless devices are not powered on.)
- If it is red and other wireless devices are available, refer to the troubleshooting section after you complete the remainder of the installation process on this computer.

Instructional Approach Note: The following Status of Installation and Configuration screen will appear after you have logged in. Click *OK* to continue.



• You have completed installing the utility software and have configured the network.

• Proceed to the next section, 3.7 Sharing Drives, Folders and Printers.

3-7 SHARING DRIVES, FOLDERS, AND PRINTERS

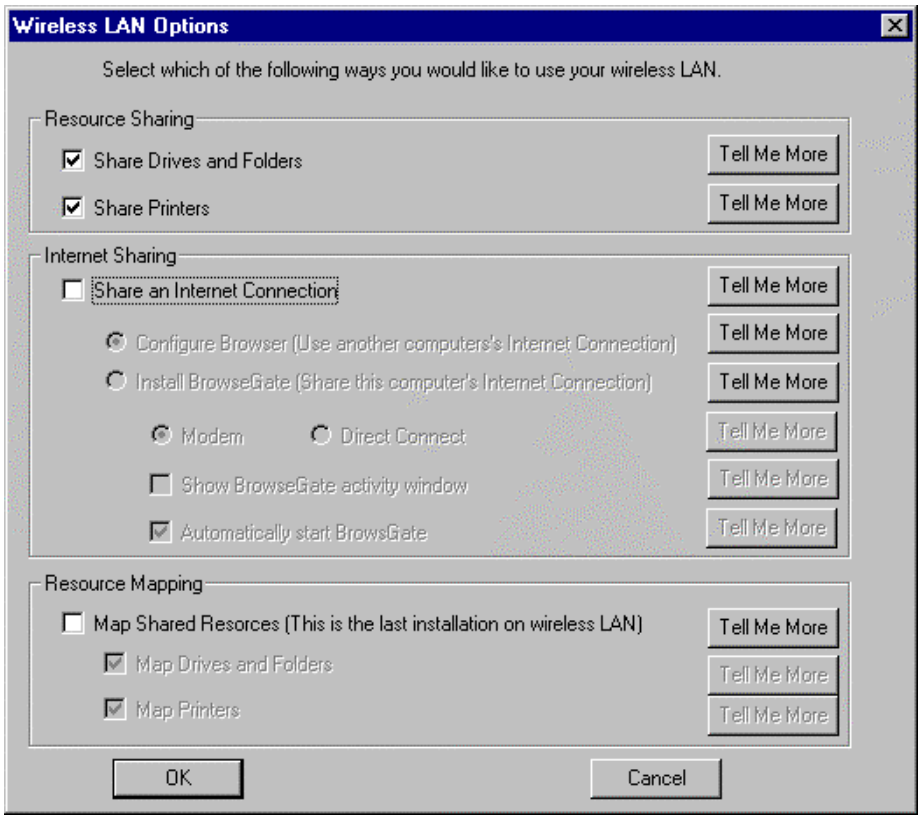
Earlier in the installation process, you were given three options to use for the installation and configuration of your wireless network. From below, select the set of instructions that corresponds to the installation approach you selected.

3.7.1 Typical and Custom Installation Approach

After the system reboots and you have signed in as explained in the previous section, you will be presented with a Wireless LAN Options screen. From this screen you will select whether to share drives, folders and printers.

Choices for Internet sharing as well as mapping are also made on this screen. Sections 3.8 and 3.10 will describe the Internet sharing and mapping processes.

To use this screen, simply check the appropriate option. Additional information is available by clicking on the Tel Me More buttons. After you have made all of your selections, click on *OK*. The Installation Wizard will then proceed presenting you with new screens applicable to each configuration and installation function.



• You have completed the sharing of drives, folders and printers.

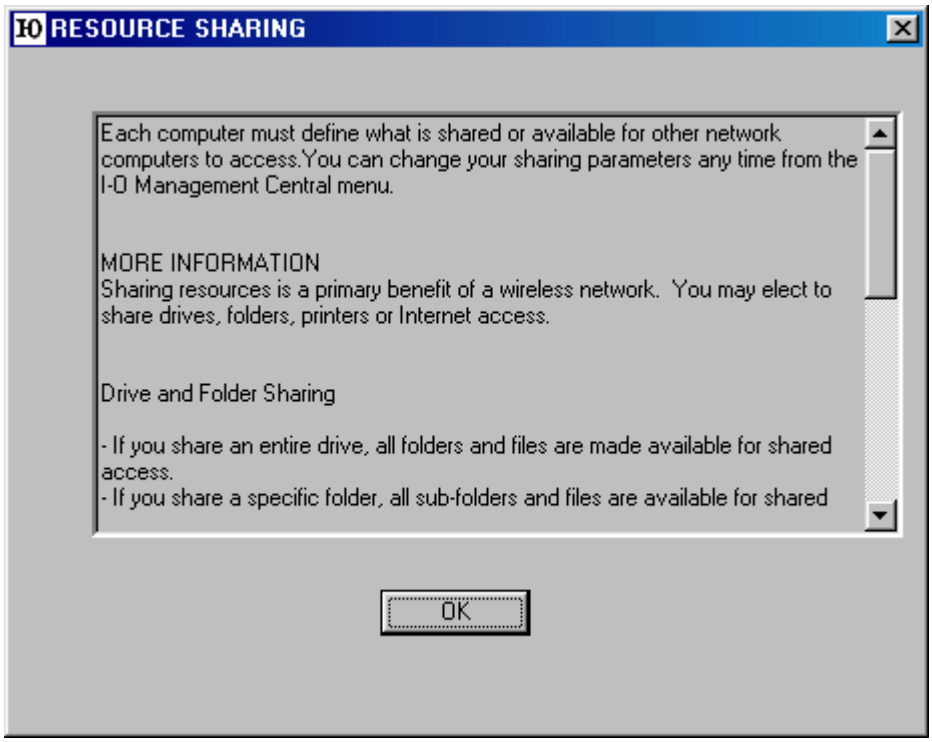
• Proceed to section 3.8 Internet Sharing for instructions on how to setup this computer to share the Internet.

3.7.2 Instructional Approach

The I-O Wireless Installation Wizard will now guide you through the process selecting the drives, folders and printers on this computer that you will allow other computers to access.

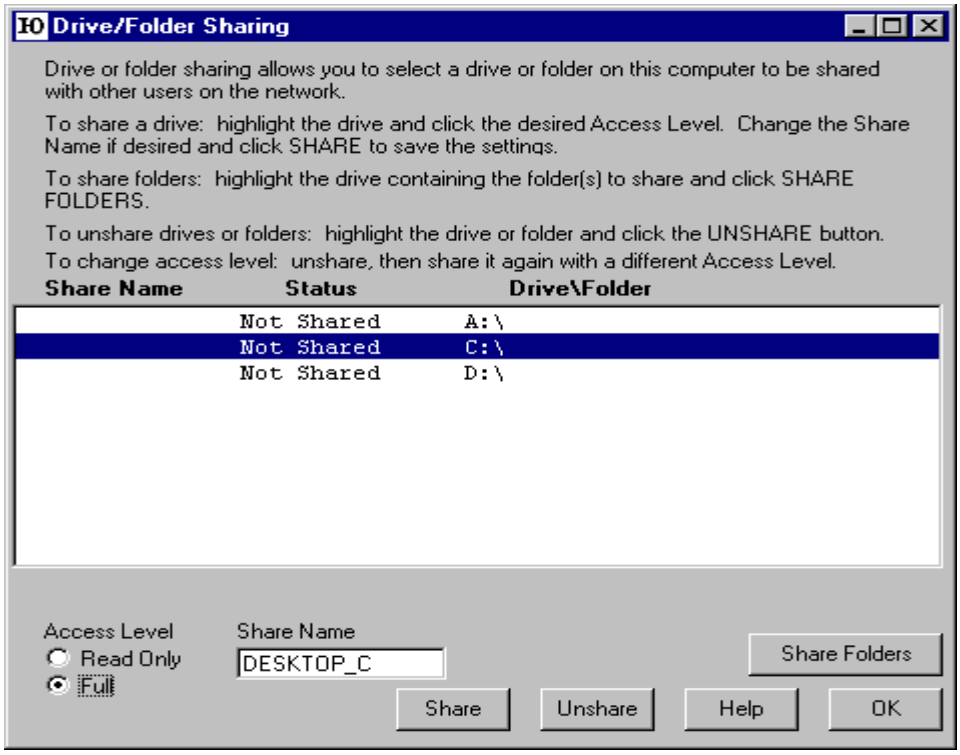
Select the sharing options that fit your needs. You may change, rename, delete, or enable any of the sharing options at a later time from the I-O Management Central menu.

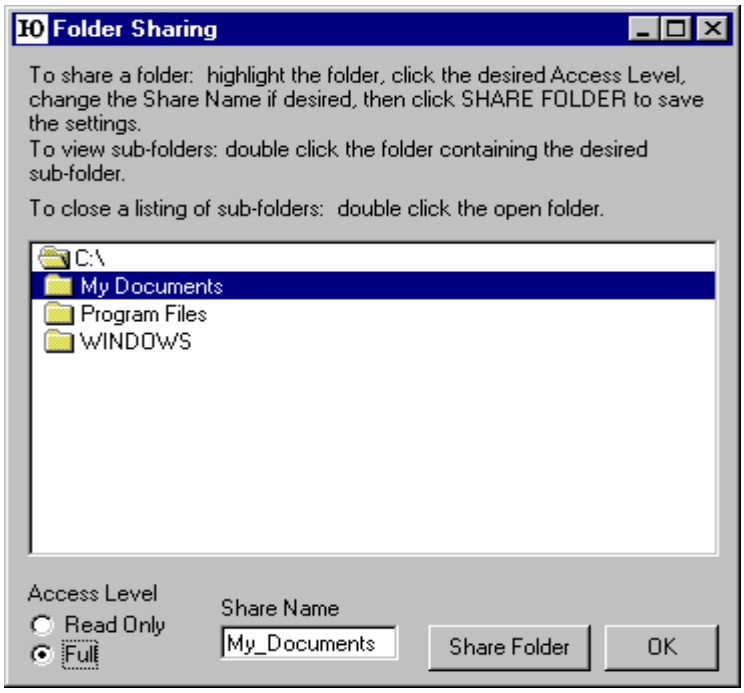
1. Choose OK to continue.



2. The Drive and Folder Sharing screens allow you to select an entire disk, or just specific folders to be shared. Follow the on screen instructions and use the Help button for more information.

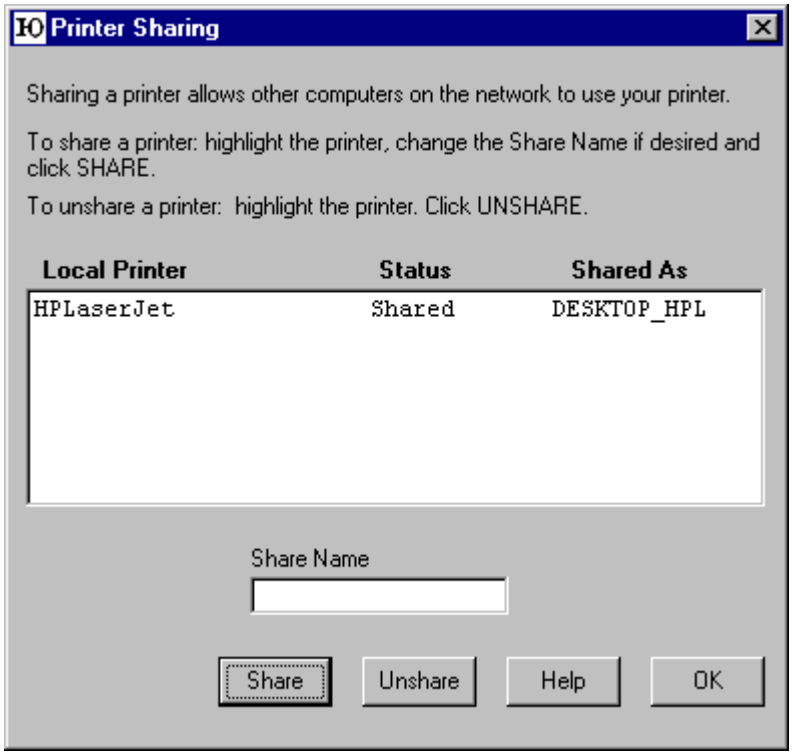
   When your are satisfied with your selections, click *OK* to continue.





3. The Printer Sharing screen allows you to share your locally attached printer with other computers on the network. Follow the on screen instructions and use the Help button for more information.

   When your are satisfied with your selections, click *OK* to continue.



- You have completed sharing your drives, folders and printers.
- The I-O Wireless Installation Wizard will continue and guide you through sharing the Internet. Proceed to the next section, 3.8 Internet Sharing.
- Have your Network Configuration Worksheet ready for reference.

3-8 INTERNET SHARING

Sharing the Internet involve two separate processes:

1. Installing the Internet sharing software on the computer that has a modem, DSL or cable connection to the Internet. This computer and sharing software become the Internet "proxy server".
2. Configuring your Internet Explorer or Netscape browser to connect to the proxy server to access the Internet.

The Internet sharing software that you will be installing is called BrowseGate[LITE]. It is a two-user package that you may freely use without charge. You will need to register it within 15 days after installation. If you want more than two computers to share one Internet connection you may purchase and install additional BrowseGate software licenses.

If you choose not to perform Internet Sharing at this time, you may skip this process. Later, using I-O Management Central, you can perform these functions.

Earlier in the installation process, you were given three options to use for the installation and configuration of your wireless network. From below, select the set of instructions that corresponds to the installation approach you selected.

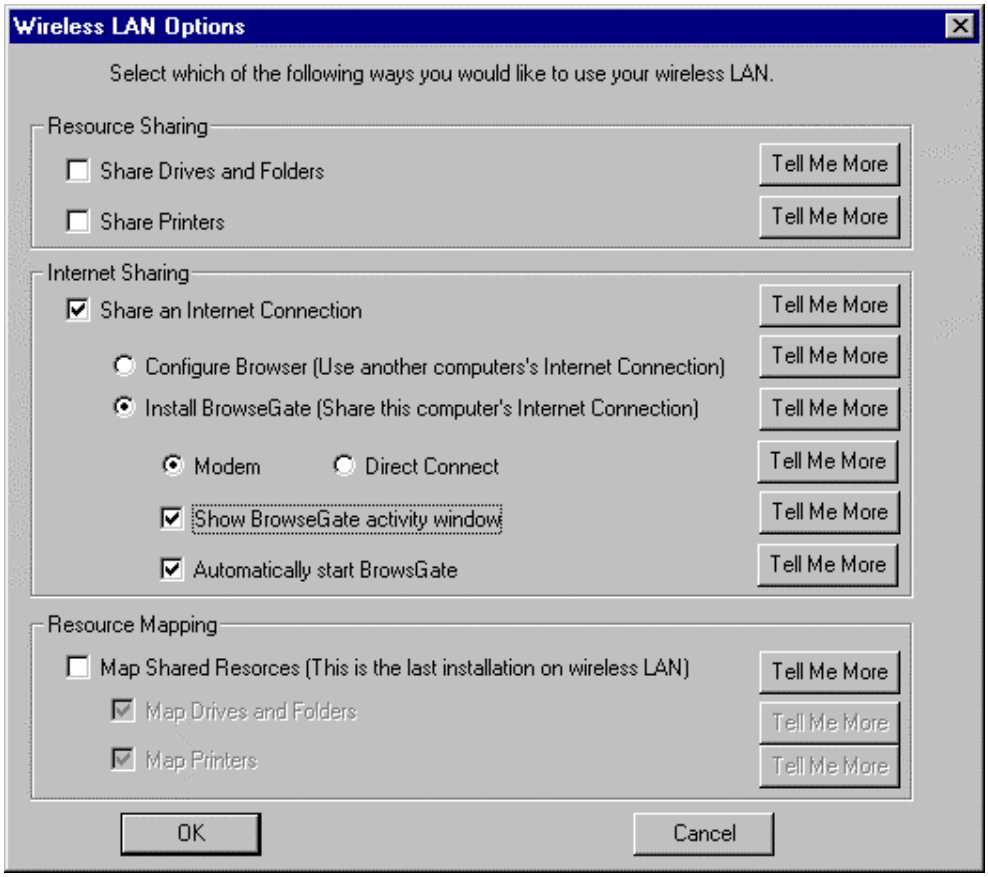
3.8.1 Typical and Custom Installation Approach

The Wireless LAN Options screen allows you to select what resources you want to share.

From this screen, you will select whether to install the BrowseGate Internet Sharing software or whether to configure this computer's browser to access the Internet through another computer which has BrowseGate installed on it.

The previous section, 3.7 Sharing Drives, Folders and Printers, covers the process of designating drives, folder and printers for sharing. Choices for mapping are also made on this screen. Section 3.10 will describe the mapping processes.

To use this screen, simply check the appropriate option. Additional information is available by clicking on the Tel Me More buttons. After you have made all of your selections, click on *OK*. The Installation Wizard will then proceed presenting you with new screens applicable to each configuration and installation function.



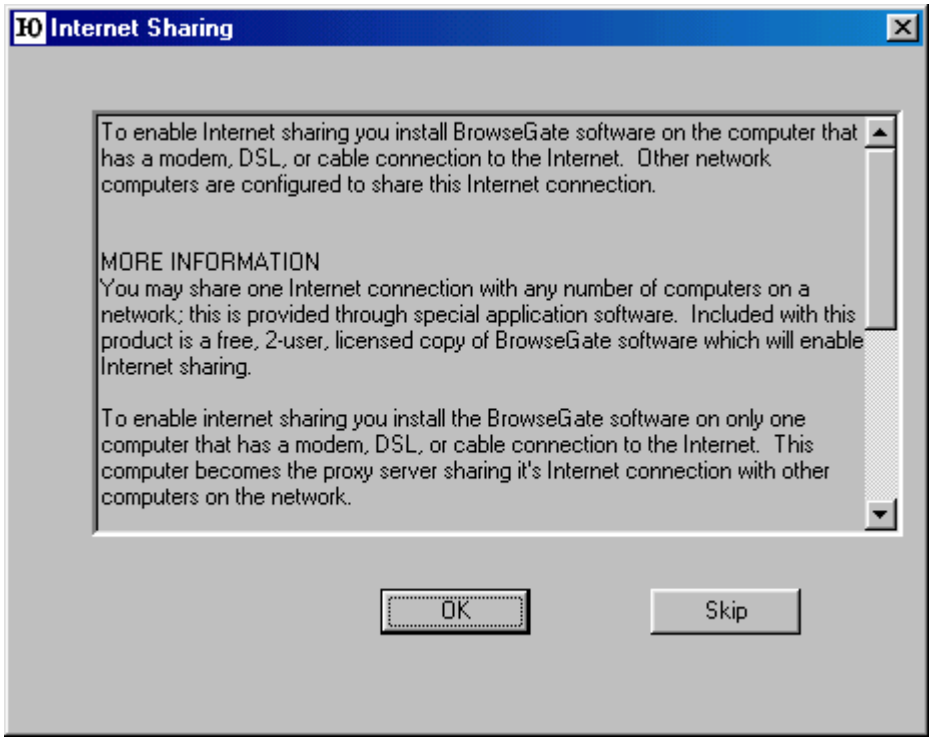
- You have completed the Internet Sharing section.
- Proceed to section 3.9 Do It All Again.

3.8.2 Instructional Approach

The following steps describe the Instruction approach for setting up Internet Sharing.

1. Choose *OK* to continue.

   Choose *Skip* to by pass this module. Proceed to the next section, Do It Again.

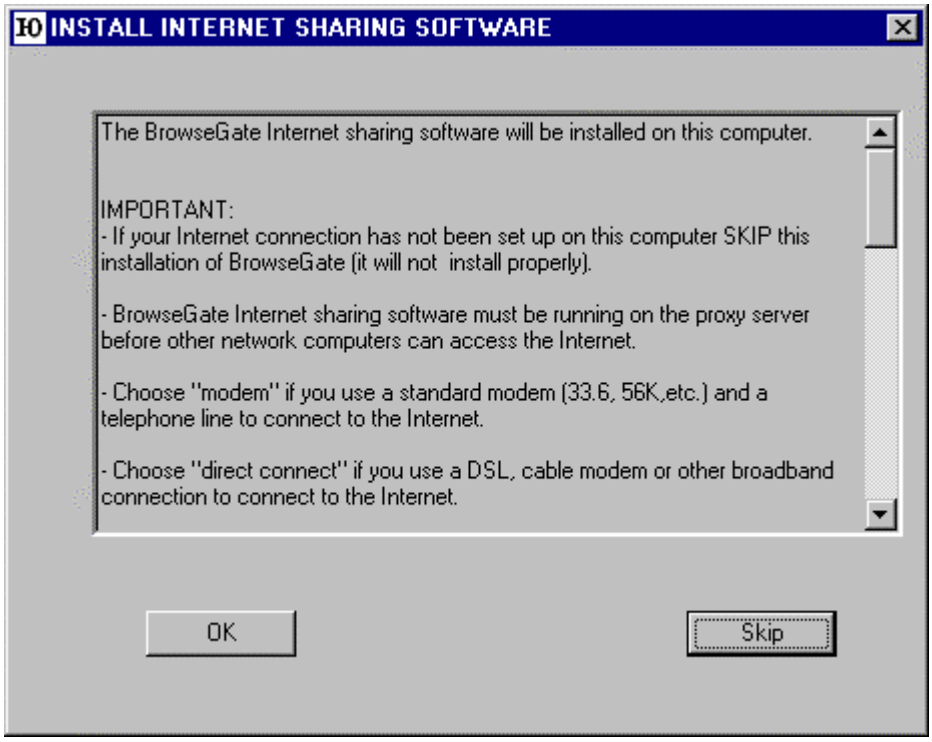


2. Click *Yes* if this computer is the computer that has the modem, DSL or cable connection to the Internet, and you want all other computers in the network to use this computer's Internet connection. BrowseGate will be installed on this computer. *Proceed to Section 3.8.2.1 Installing the Internet Sharing Software.*

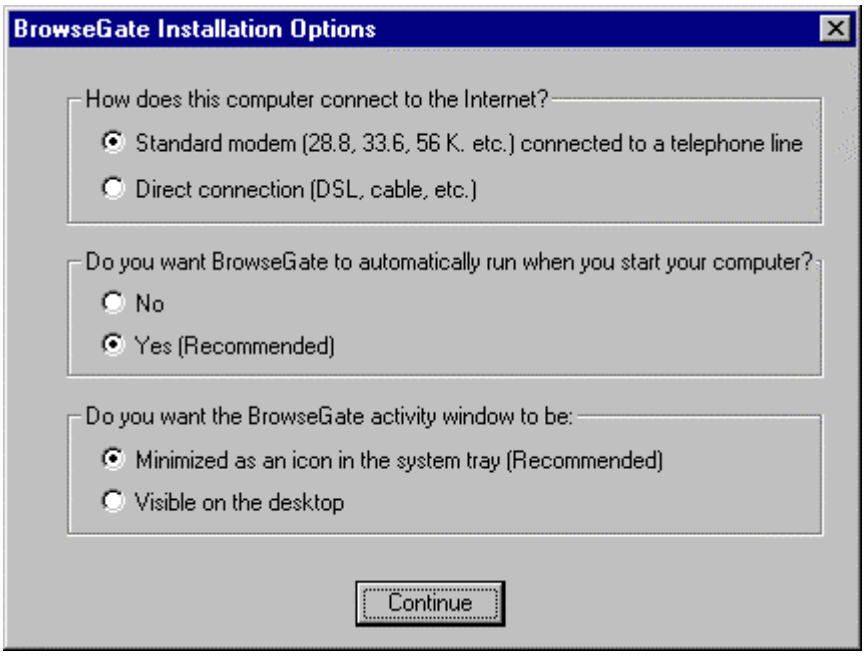
   Click *No* if this computer will access the Internet through another computer that has had BrowseGate installed on it. *Proceed to Section 3.8.2.2 Configuring the Browser for Internet Sharing .*

3.8.2.1 Installing the Internet Sharing Software

1. You will now be given specific information on installing the Internet software. Please scroll the screen down to read all the information. Click OK only after you have read all the information



2. From this screen, select how this computer will be connecting to the Internet, whether you want BrowseGate to automatically start whenever you start this computer, and whether you want BrowseGate's activity windows to be displayed on the desktop or minimized as an icon in the system tray. Click Continue after you have made all the selections.



WARNING: If you use a dial-up modem to access the Internet, make certain that it is not currently connected. BrowseGate searches for a pre-configured modem connection and automatically configures itself to use the same connection. If the modem is connected during the BrowseGate installation, BrowseGate will not be able to properly configure itself.

If you run into problems or have questions about the installation, configuration and operation of the BrowseGate Internet sharing software, please contact NetcPlus at:

727-391-8966 (voice)

727-392-3216 (fax)

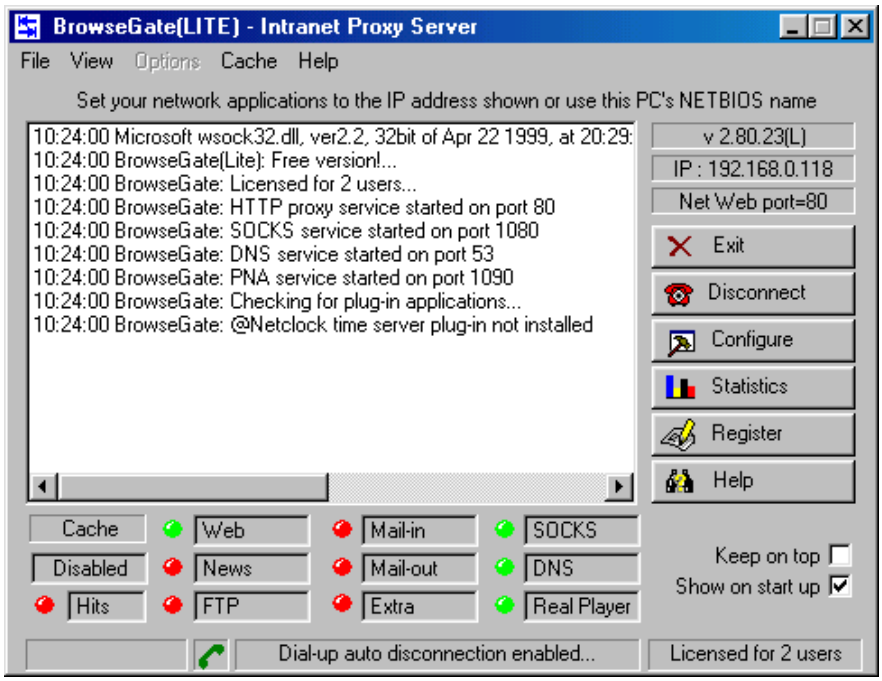
bglite@netcplus.com

www.netcplus.com

3. During the BrowseGate installation, a number of screens will be presented. Please read all the information on these screens.

   If you have chosen to leave the BrowseGate(LITE) – Intranet Proxy Server activity screen visible on the desktop, you will need to, *minimize* the screen to continue with the I-O Wireless installation process (otherwise the screen will hide some of the Installation Wizard's screens).

   Note: BrowseGate must be running before other network computers can access the Internet. Please do not exit BrowseGate at this time.



- You have completed the Internet Sharing section.
- The I-O Wireless Installation Wizard will continue and guide you through the final process of mapping shared resources.
- Proceed to section 3.9 Do It All Again.

3.8.2.2 Configure the Browser for Internet Sharing

1. You will need to configure the browser on this computer to access the Internet through the BrowseGate Internet proxy server that is installed on another computer.

   Once you have completed the installation, to access the Internet from this computer, you simply run your browser. The browser will connect to the proxy server which connects to the Internet.

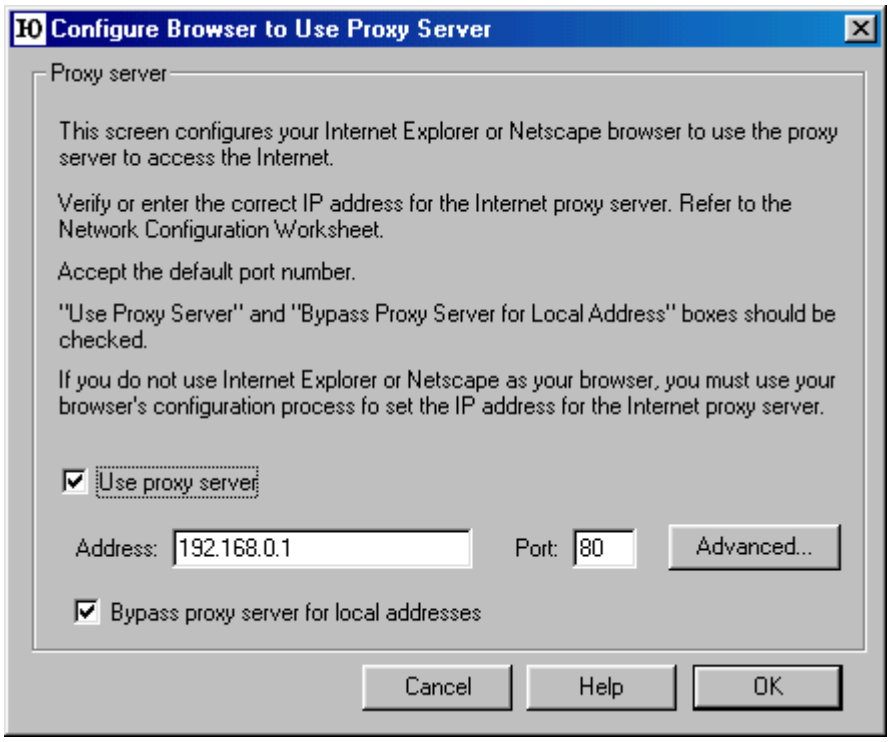
   This process requires that your Internet Explorer or Netscape browser be Version 4.0 or newer.

   If you have a different browser installed, cancel this step and use that browser's own configuration process to set up access to the proxy server.

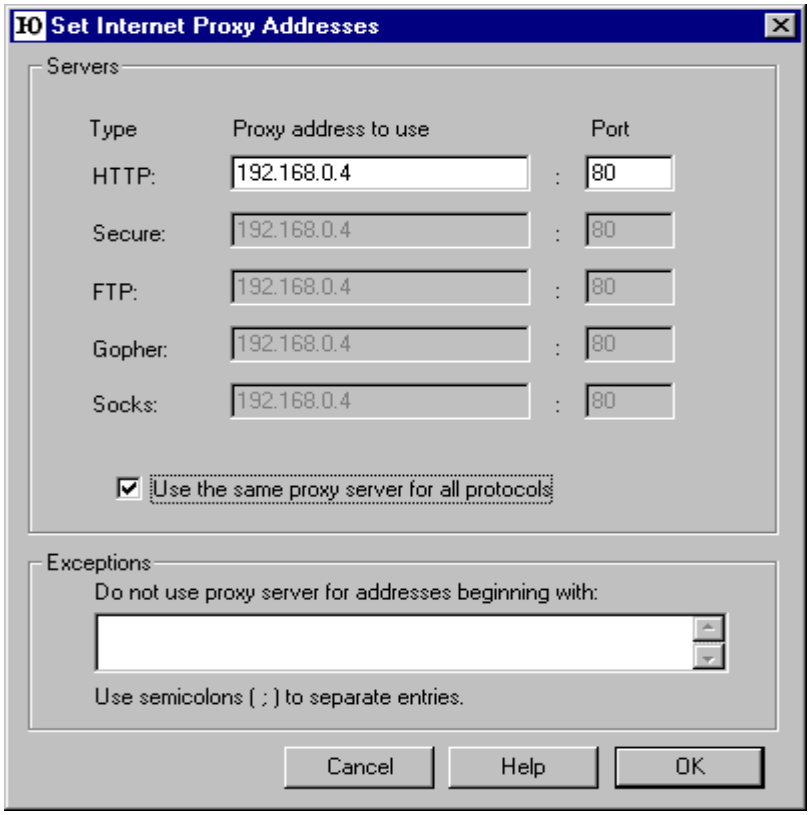
   Enter the IP Address of the computer with the BrowseGate Internet proxy server software installed on it. Follow the on screen instructions and use the Help button for more information.

   Click *OK* when done.

   Click *Cancel* to bypass this process. Proceed to the next section, Do It Again.



   If you clicked the Advanced button, you will see the following screen. It is suggest you accept all defaults at this time. If you wish to change any of these settings, you may use I-O Management Central later.



- You have completed Internet Sharing.
- The I-O Wireless Installation Wizard will continue and guide you through the final process of mapping shared resources.
- Proceed to the next section, 3.9 Do It Again.

3-9 DO IT AGAIN

The I-O Wireless network installation process is nearly complete.

If there are other computers to receive an I-O Wireless card, on each computer you will need to repeat the installation process starting with the Install the I-O Wireless Hardware section. As you complete the wireless installation on each computer leave the computer powered on and proceed to the next installation.

When you have installed and configured the last computer on your network, the Wizard will take you to the final step, Mapping Shared Drives, Folders and Printers. You will then return to each network computer and perform the mapping process using I-O Management Central.

Earlier in the installation process, you were given three options to use for the installation and configuration of your wireless network. From below, select the set of instructions that corresponds to the installation approach you selected.

3.9.1 Typical and Custom Installation Approach

The following screen will be presented at the end of the installation process. If you selected the options to map drives, folders and printers on the Wireless LAN Options screen, this screen will be presented only after the mapping process is complete.

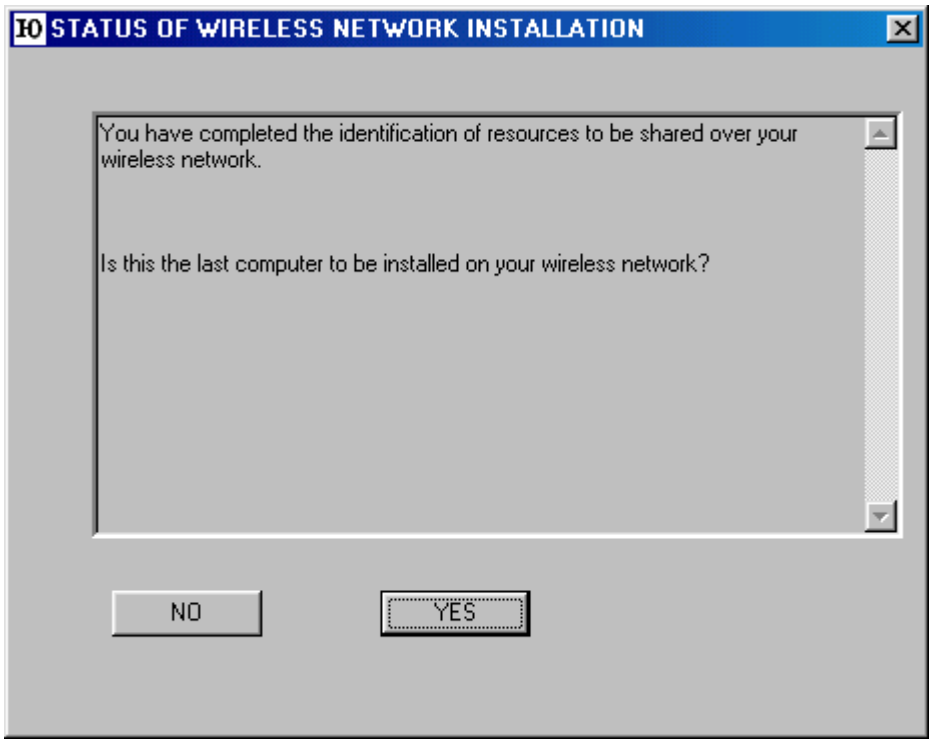
If you selected to map resources, proceed to Section 3.10 Mapping Drives, Folders and Printers. Otherwise the Installation Wizard has completed the installation and configuration processes and it is time to move onto the next computer to receive a wireless card.

- You have completed the installation of I-O Wireless on this computer.
- Remove the I-O Wireless Installation CD.
- Go to the next computer, and begin the installation process again.

3.9.2 Instructional Approach

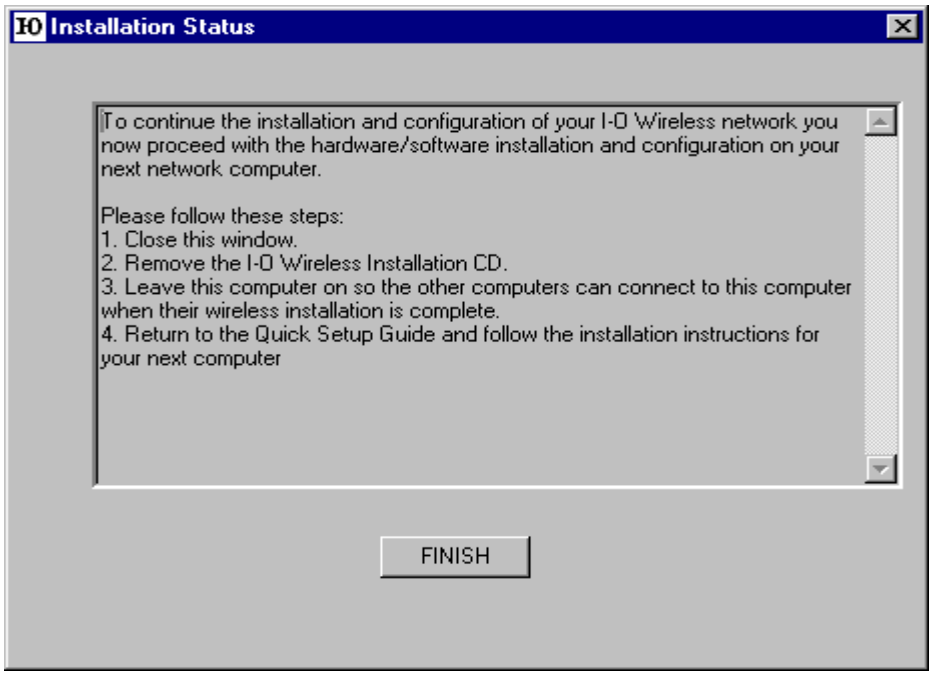
1. Click *NO* if this is not the last computer to be installed in the wireless network. *Proceed to Step 2 in this section*.

   Click *YES* if this is the last computer in the network. *Proceed to the next section, 3.10 Mapping Drives, Folders and Printers*.



2. This screen appears if you clicked No on the previous screen.

   Click *Finish* to conclude the installation process.



- You have completed the installation of I-O Wireless on this computer.
- Remove the I-O Wireless Installation CD.
- Go to the next computer, and begin the installation process again.

Mapping of other computer's shared drives and folders is the process of assigning a drive letter shortcut to the shared drive or folder. This speeds up accessing files from within applications like Word or Excel.

Mapping of printers sets up a link to the computer that has the shared printer. To your computer, the shared printer acts like it is directly attached to your computer.

Earlier in the installation process, you were given three options to use for the installation and configuration of your wireless network. From below, select the set of instructions that corresponds to the installation approach you selected.

3.10.1 Typical and Custom Installation Approach

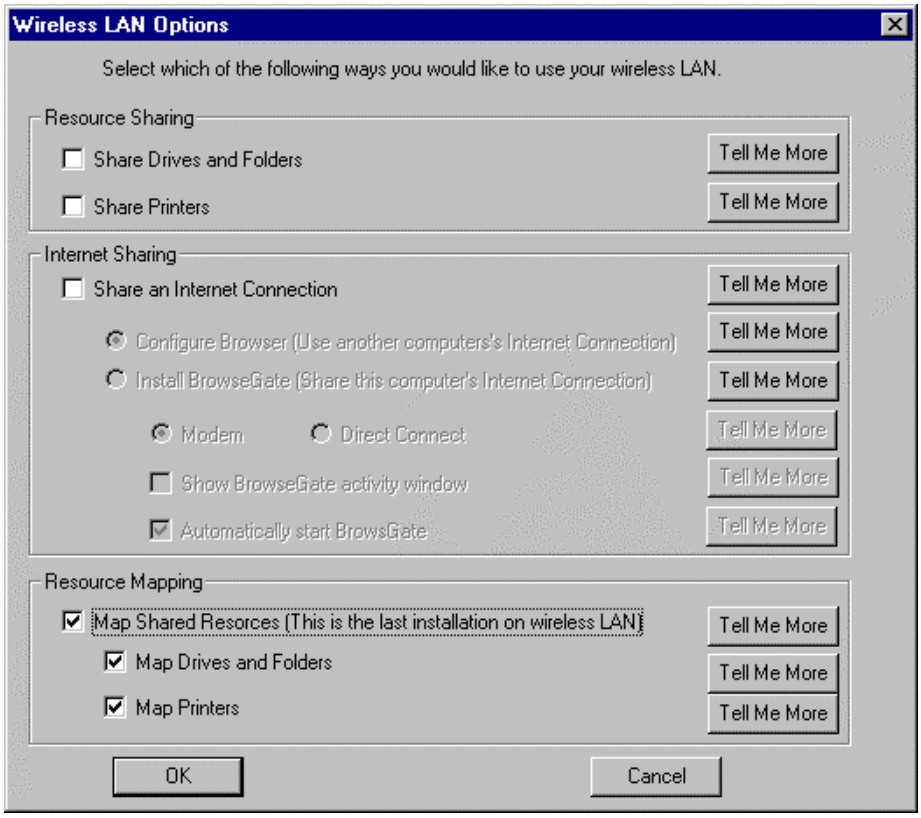
The Wireless LAN Options screen allows you to select what resources you want to share.

From this screen, you will select whether to map the shared drives, folders and printers on other network computers.

A previous section, 3.7 Sharing Drives, Folders and Printers, covers the process of designating drives, folder and printers for sharing.

To use this screen, simply check the appropriate option. Additional information is available by clicking on the Tel Me More buttons. After you

have made all of your selections, click on *OK*. The Installation Wizard will then proceed presenting you with new screens applicable to each configuration and installation function.



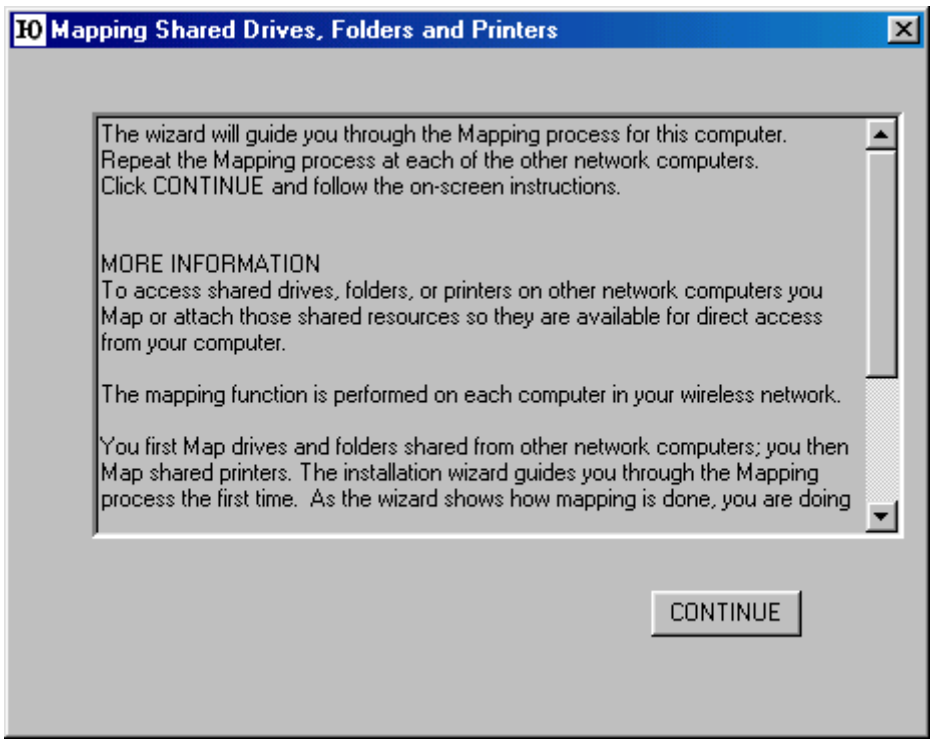
- Return to each wireless computer and perform the mapping function. When you have completed mapping on all wireless computers, your I-O Wireless network is complete.
- Congratulations!

3.10.2 Instructional Approach

1. The following steps are used only for the last computer installed in the wireless network

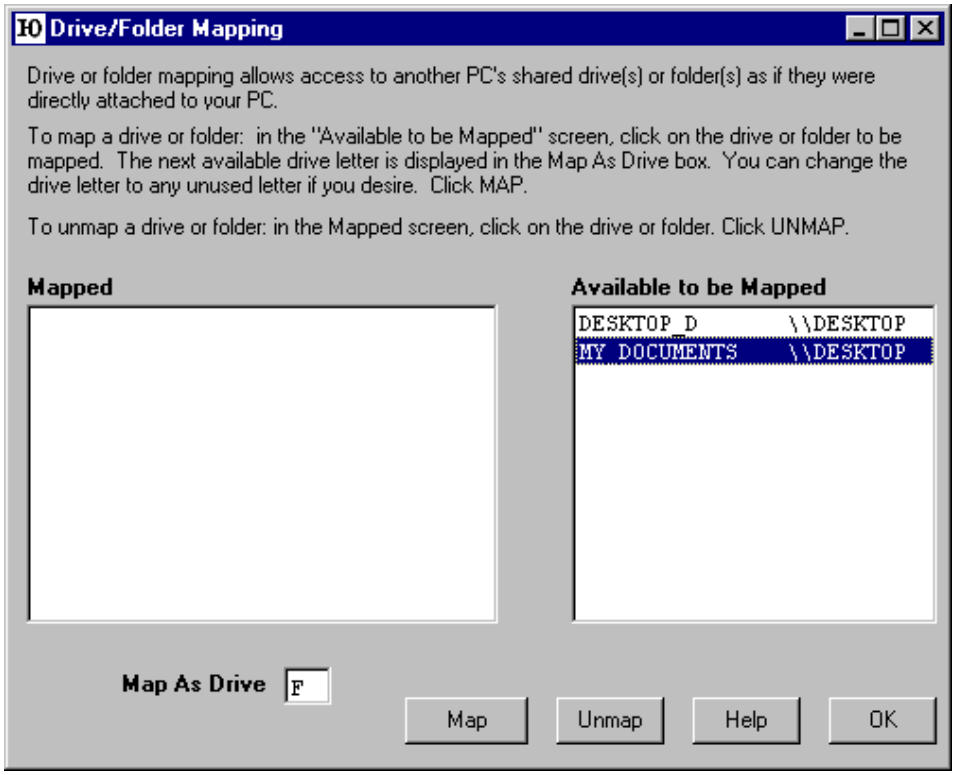
   These steps will guide you through the process of how to use I-O Management Central for mapping the shared drives, folders and printers of the other computers previously installed in the wireless network.

   Follow the on-screen instructions and you will be guided through the mapping process. Click *Continue*.

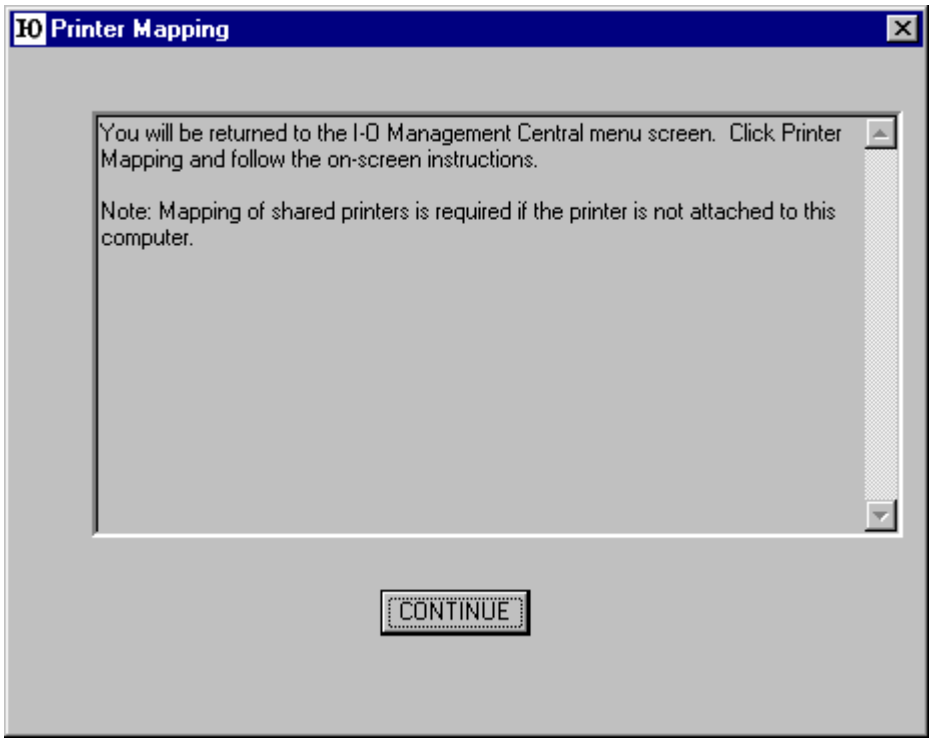


2. The Wizard will present a sample of the I-O Management screen. Click the *Drive/Folder Mapping* button to continue.

3. You will now be presented with a screen that will show all the available drives and folders that have been shared on the other computers in the network. Follow the on-screen instructions and use the Help button for more information on mapping. When done, click *OK.*

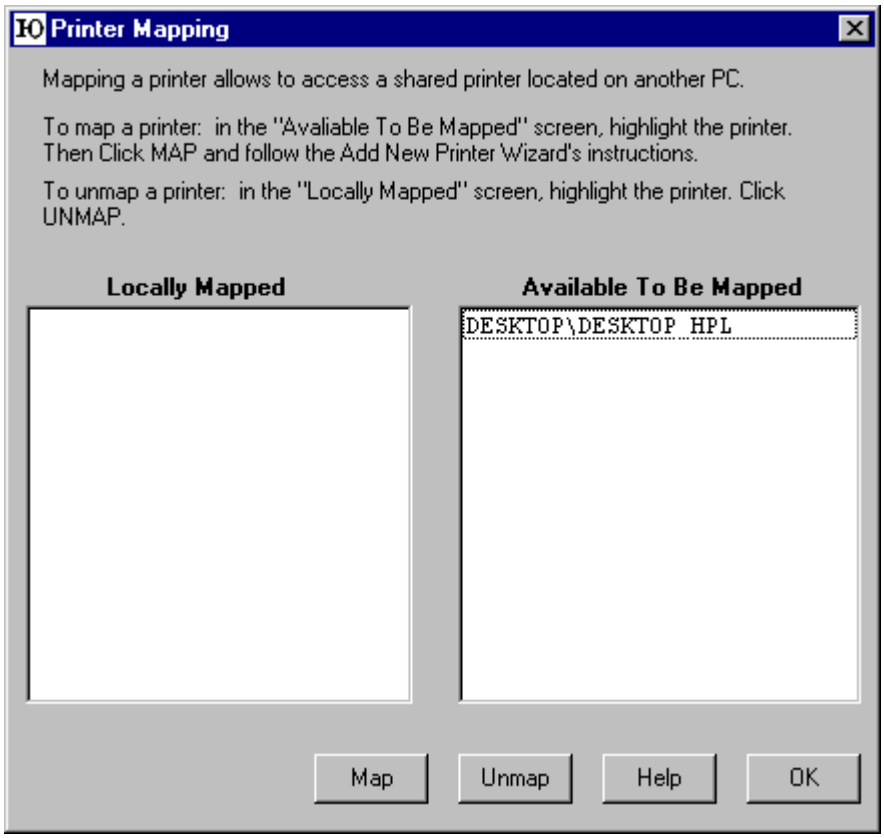


4. The next screen gives you instructions for the next step in mapping printers. Click *Continue*.



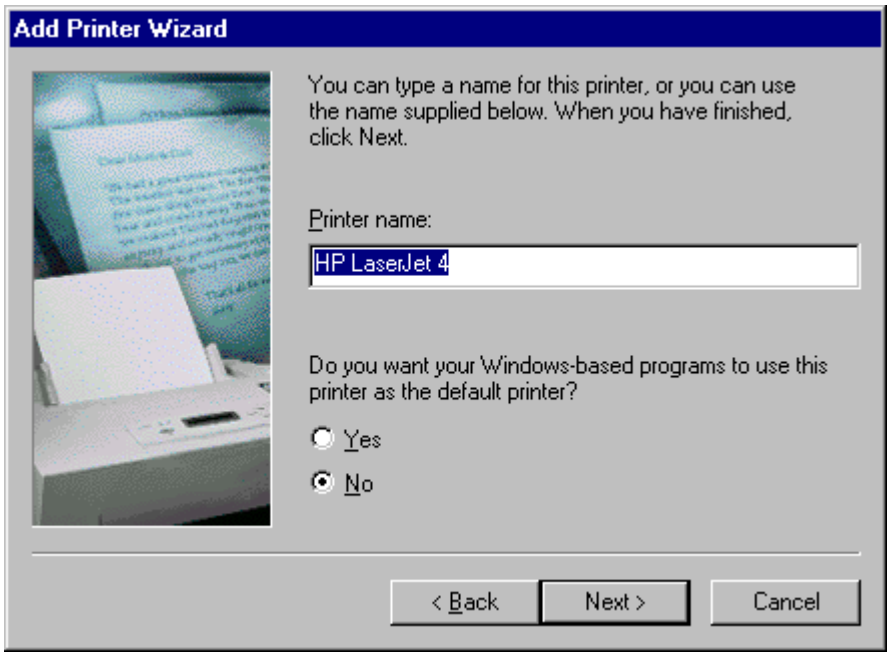
5. The Wizard will present a sample of the I-O Management screen. Click the *Printer Mapping* button to continue

6. This screen will present all the available shared printers located on other computers in the network that you can access from this computer. You only need to map to this computer the printers that you want to share. Follow the on screen instructions and use the Help button for more information. When done, click *OK*.

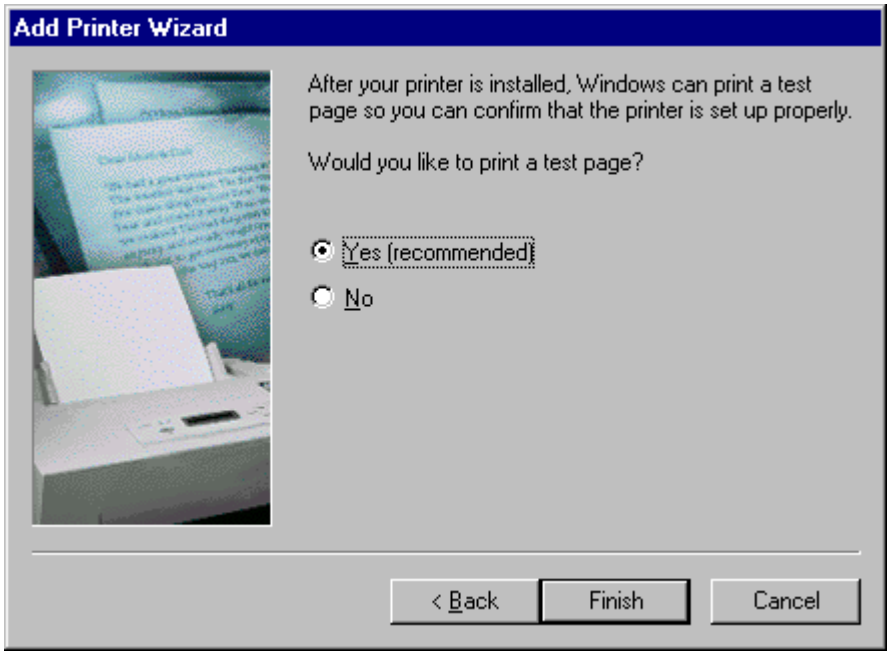


7. When you map a printer, the print drivers for that printer must be resident on this computer. The Installation Wizard will check to see if they are, and if not will launch the Windows Add New Printer Wizard to add these drivers.

   Enter the printer name and make any other selections desired. Click *Next* to continue.



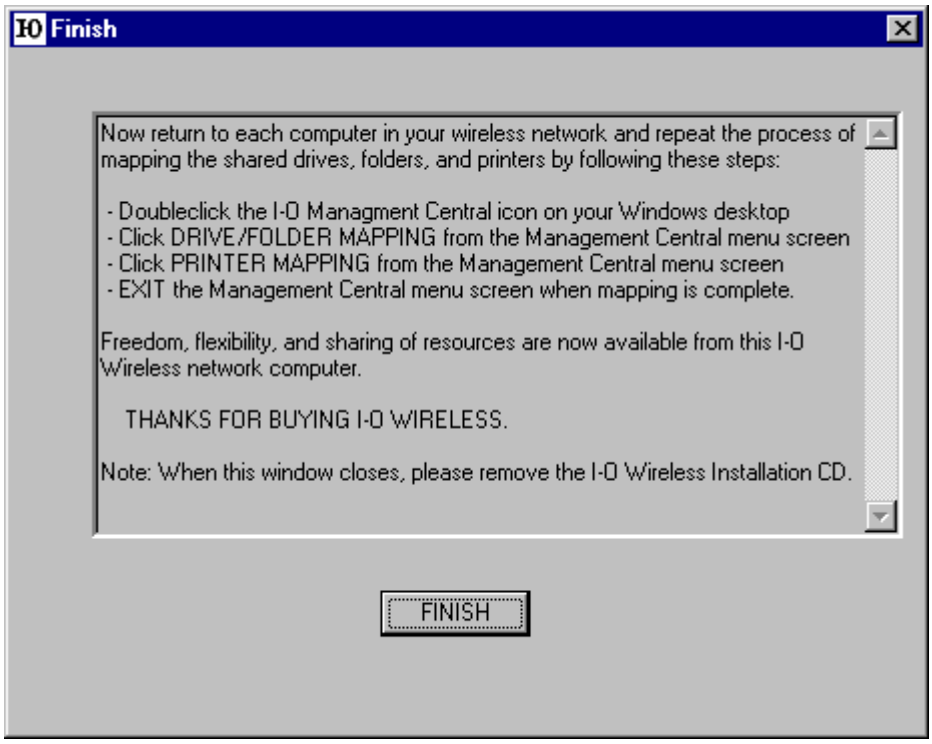
Printing a test page to test your printer installation. Click *Finish*..



After the Add New Printer Wizard screen has closed, click *OK* to continue.

8. To finish this installation process, close this final screen by clicking on the *Finish* button, then remove the I-O Wireless Installation CD.

   You will need to return to each computer previously installed and map the drives, folders and printers using I-O Management Central. This is done by clicking on the I-O Management Central shortcut on the desktop of each computer. Then you will use the Drive/Folder Mapping or the Printer Mapping buttons to perform the mapping. Once you have completed the mapping on all previously installed computers, your I-O Wireless network installation is complete.



• Return to each wireless computer and perform the mapping function. When you have completed mapping on all wireless computers, your I-O Wireless network is complete.

• Congratulations!

Chapter 4 – Wireless LAN Configuration Utility

The following section describes the various functions of the Wireless LAN Configuration Utility. This utility provides quick access to all wireless card settings.

After installation is complete, a Wireless LAN Configuration Utility icon (a small computer and display with an antenna coming out the top) will appear in the “Quick-Launch” menu in the lower right hand corner of the screen, near the clock.

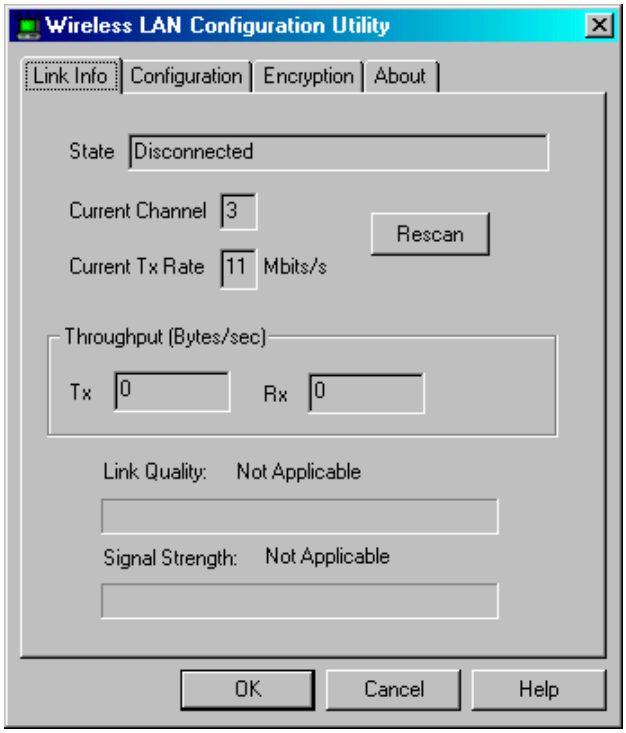
Double clicking the Wireless LAN Configuration Utility icon in the Quick Launch bar will open the Wireless LAN Configuration Utility main menu, providing quick access to all card settings. The utility provides the user with the information about how well the wireless network is communicating as well as allows the user to change configuration parameters.

4-1 ABOUT SCREEN

The About Screen shows version numbers for the wireless product, the utility and the driver.

4-2 LINK INFO

The Link Info menu provides information about whether the wireless card is connected or disconnected, the current channel being used, the transmitting rate, and when operating in an Infrastructure environment, the throughput of the current link between the card and the access point. A graphical representation of the quality of the link and the strength of the signal is also presented.



State: This field will indicate the current connection status of this station with either the access point or the Ad-Hoc network. If this station is connected to an access point, the MAC address of the access point will be displayed. If this station is connected to other wireless stations in Ad-Hoc mode, this will display a series of zeroes.

Current Channel: This field indicates the channel number that is currently being used to connect with other wireless devices or the access point.

Rescan: You may click on the *Rescan* button to cause the wireless card to search out another channel if the current link with the access point is weak or disconnected.

Current Tx Rate: This field will show at which rate the wireless card is communicating. If the connection quality drops too low, the card will automatically switch to a lower rate (5.5, 2 or 1 Mbps).

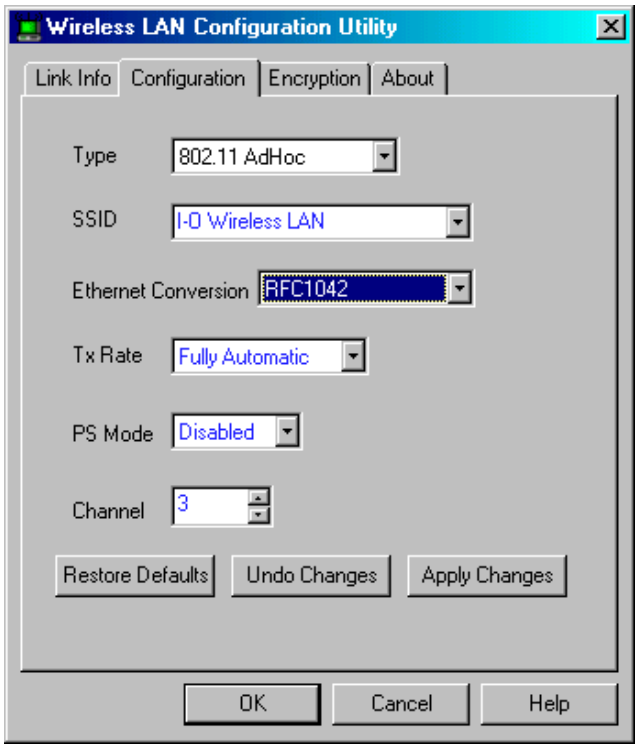
Throughput: These two fields show the actual bytes per second that are being transmitted (Tx) and received (Rx) by this station.

Link Quality: This is an indicator of how good of a connection exists between this station and other wireless stations or the access point. When the indication is excellent, this station should be able to communicate with disturbance. Good indicates that you may experience some interruptions in communications. Poor indicates that limited communication may occur. A graphical representation is also shown to give you a general feeling of the link quality.

Signal Strength: This is the measurement of the signal level being received by this station. A graphical representation is also shown to give you a general feeling of the link quality.

4-3 CONFIGURATION SCREEN

Selecting the Configuration tab opens the “Configuration” menu. Here you will find options for configuring the wireless card. A description of each setting follows.



Type: The Type (or mode) setting determines the architecture of your wireless LAN. Choose Ad-Hoc or Infrastructure mode depending on your network type.

- **802.11 Ad-Hoc:** This mode is included for backwards compatibility with older wireless cards. It is also used in situations where wireless devices of based upon different chip sets are used. For example, there are wireless devices based upon Intersil, Lucent, and Atmel being used in a peer-to-peer network, then this selection would be used.
- **Ad-Hoc:** This mode is used for a simple peer-to-peer network (where all wireless devices are based upon the Intersil chipset such as the I-O Wireless WA-100 and WP-100 models). This type of network allows the sharing of local resources only between wireless clients without a wireless access point.
- **Infrastructure**: This mode allows a wireless LAN to be integrated into an existing wired network through an access point. Infrastructure type networks also permit roaming between Access Points while maintaining connection to all network resources.

Infrastructure mode provides additional features, such as WEP security, power saving and extended range.

When moving a laptop computer from one environment to another, you will need to change the type to match the new environment.

SSID: An acronym for Service Set Identifier, SSID is the unique name shared among all stations (computers) and access points in a wireless network. The SSID must be identical for all stations or access points participating in the same network. The SSID is case sensitive and must not exceed 30 characters.

When moving a laptop computer from one environment to another, you will need to change the SSID to match the new network environment.

Ethernet Conversion: The RFC1042 mode is the 802.11 standard conversion method and is selected by default. If compatibility with older wireless LAN systems is necessary select another conversion implementation (such as encapsulated or 802.1h) from the drop-down list.

Tx Rate: The transmit rate selects the allowable transfer rates of the wireless client. To optimize performance and range, the Tx Rate should be set to Fully Automatic, which will automatically adjust the transfer speed for best performance and longest range. Fixed 11 Mb/s is the preferred "Value" for environments where the client has line of sight access and is a short distance away from the AP. Fully Auto is the recommended setting for clients that are farther away from the access point and where there may be interference between the client and the AP

Note that the Tx Rate setting must be set the same for all stations and access points.

PS Mode: Power Saving Mode enables or disables the power saving features of your wireless card. When enabled on a laptop, the power saving mode can reduce power consumption by the wireless card and extend the battery life of your laptop. This setting is only implemented in a network operating in Infrastructure mode.

To allow uninterrupted data communication, choose "Disabled". Choosing "Enabled" allows your laptop to enter "sleep" mode, however, this will interrupt data communication. Consult your System Administrator to find out the best setting for your network type.

The PS Mode on your card is set to "Disabled" by default. To change the setting, select "Enabled" from the drop-down list, click "OK" and wait a few seconds. The screen is then updated and will show the current Connection Status, Link Quality and Signal Strength.

Channel: This setting specifies the channel used between the wireless clients and access point. When using Ad-Hoc mode, each client must be set to the same channel in order to communicate and share resources. For networks operating in Infrastructure mode, all clients scan for a channel – it is set automatically for you.

The following table presents the operational channel frequency for several countries.

Regulatory Channel Frequency

Channel	Frequency (MHZ)	USA FCC	Canada	Europe ETSI	France	Spain	Japan
1	2412	X	X	X			
2	2417	X	X	X			
3	2422	X	X	X			
4	2427	X	X	X			
5	2432	X	X	X			
6	2437	X	X	X			
7	2442	X	X	X			
8	2447	X	X	X			
9	2452	X	X	X			
10	2457	X	X	X	X	X	
11	2462	X	X	X	X	X	
12	2467			X		X	
13	2472			X		X	
14	2484						X

4-4 ENCRYPTION

WEP, an acronym for Wired Equivalent Privacy, is an encryption scheme used to protect your wireless data communications. WEP uses security keys to provide access control to your network and encryption security for data transmission. To decode a data transmission, each wireless station on the network must use an identical key.

Cautions on the use of Wep: The following are suggestions for increasing the security of your network.

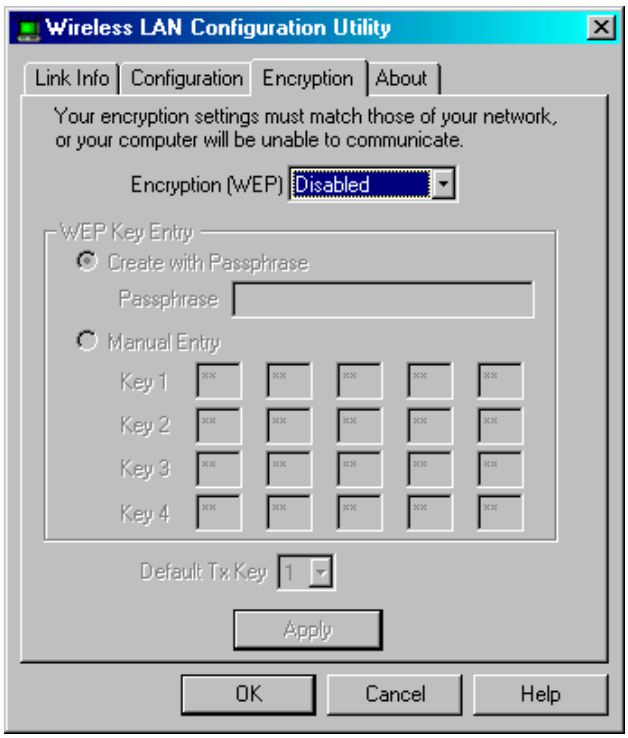
- ✓ Do not use the default SSID!
- ✓ Use Wep encryption!
- ✓ Do not use the default key.
- ✓ Change the keys regularly.
- ✓ Don't tell anyone the key.
- ✓ Connect all wireless devices outside the firewall.
- ✓ Use IPsec, VPNs or other secure end-to-end protocols.
- ✓ Conduct audits of wireless devices regularly to insure that wireless connections are not inadvertently established within the firewall.

WEP keys are generated from a "passphrase" that the user enters. A passphrase is any text string up to a maximum of 32 characters. Each station in the wireless network must use the same passphrase.

WEP is available in 64-bit or 128-bit mode. When using 64-bit WEP, up to four keys can be created. Each computer in the network must use the same mode and key. For 128-bit WEP, only one key is available.

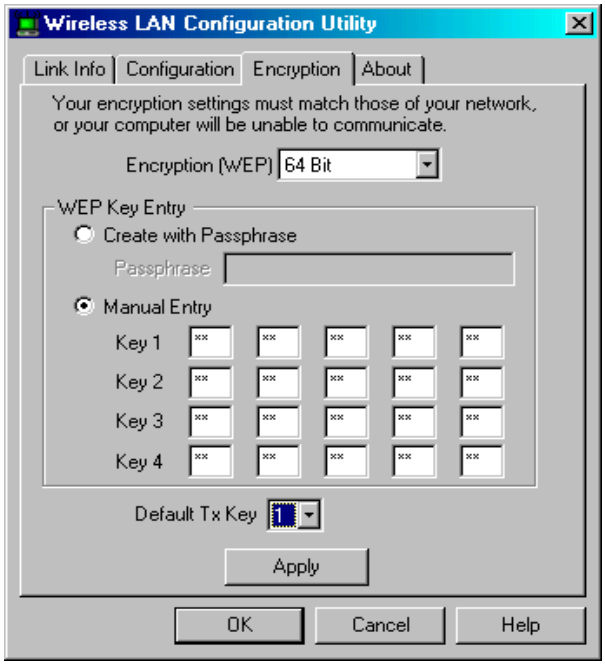
Note: This feature is only available in infrastructure mode. All stations and access points in the network must be set the same (i.e., all disabled, all using 64-bit and using the same default key, or all using 128-bit WEP) as well as have the same passphrase or manually entered keys.

From the *Encryption (WEP)* drop-down box, select whether to enable 64-bit, 128-bit or disable this feature.



The steps to generate encryption keys for 64-bit and 128-bit WEP are the same except that 128-bit WEP only has one key. To generate encryption keys for each station communicating in the wireless network, complete the following steps.

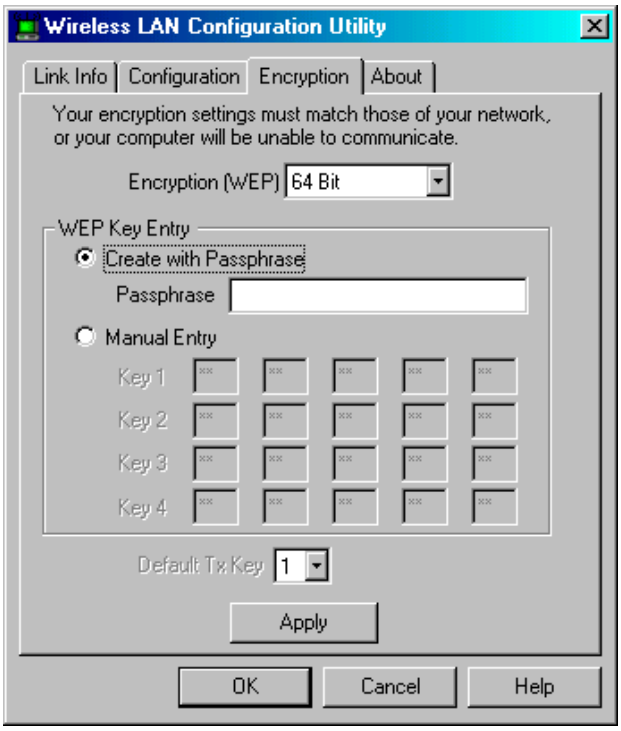
1. Click on the “Create with Passphrase” radio button.



2. Type the exact same text (in the same case) into the “Passphrase” field for each station.
3. Click, *Apply* to create the encryption keys. The Passphrase then generates four (4) unique keys.

4. Select the same “Default Tx Key” in the drop-down box for each client. This is the key the clients will use to encrypt data. This key must be the same for all clients and access points in the network.

You may also enter your own key values, but these must be duplicated exactly at each client in the network. Click on the “Manual Entry” radio button, and enter a value into each field. Click *Apply* to save the values.



Chapter 5 – I-O Management Central

I-O Management Central is an easy to use utility that allows you to easily perform a number of more complex Windows functions without the hassle of drilling down into various screens to find a particular configuration setting.

With Management Central, you can do the following:

- Designate which drives and folders are to be shared with other computers on the network.
- Create shortcuts (mapping) to easily access other computer's drives
- Designate which printers attached to your computer you will allow others to share.
- Map other computer's printers on the network for your use.
- Change the IP address of your computer.
- Change your computer's sharing name that others know your computer as.
- Change the IP address of the proxy server in your Internet Explorer or Netscape browser to a different address.
- Install the BrowseGate[LITE] Internet proxy server software.

A brief description of each of these functions is given here. Refer to the Help function within Management Central for specific information.

To use Management Central, either click the shortcut on the desktop or navigate to the I-O Wireless folder, and select Management Central. When you see the main menu, click on the button for the desired function. Each screen will present you with instructions to perform that function. A *Help* button will also be available to give you more information.

5-1 DRIVE SHARING

Drive Sharing allows you to share a drive with other computers on the network. You may allow other users to just "read" the files, or give them "full" access (change, delete or create new files).

To help other users easily identify your shared drives, a "share name" is assigned to each drive. You may customize this name or accept the default.

To make your drives available to other computers, click on the drive. Then select the sharing level you want others to have to that drive by clicking on the desired access level radio button. If you desire a different share name, enter the new name in the Share Name field. Click the *SHARE* button to save the settings.

5-2 DRIVE MAPPING

Drive Mapping lets you use another computer's shared drive as if it were directly attached to your computer.

Mapping sets up a drive letter on your computer that points to the shared drive of another computer. This new drive letter becomes a shortcut so you can quickly access the other computer's shared drive.

For example, on a desktop computer located in the study, drive C has been shared. The share name for the drive has been assigned as "Study\C". On your computer (a laptop located in the front room), you have mapped Study\C as "S". From your computer, you want to open a Word document on the computer located in the study. In Word, you change to drive S, navigate to the appropriate folder, and select the desired document from the list the documents.

To map the drives of other computers in the network, in the Not Mapped screen, click on the drive to be mapped. The next available drive letter (starting from F) will appear in the small box between the Mapped and Available to be Mapped screens. You may change this drive letter to any unused drive letter. You cannot assign A, B, C, D or any other drive letter that is reserved by Windows or already assigned to another drive. To complete the mapping, click on the *MAP* Button. The new drive will be moved from the Available to be Mapped screen to the Mapped screen.

To remove the mapping of a drive, in the Mapped screen, click on the drive. Click on the *UNMAP* button. The drive will be moved from the Mapped screen to the Available to be Mapped screen.

To change the mapping of a drive, you need to remove the mapping and then reassign it.

5-3 PRINTER SHARING

Printer Sharing allows you to share the printers attached to your computer with other computers on the network.

To help other users easily identify your shared printers, a "share name" is assigned to each printer. You may customize this name or accept the default.

To make your printers available to other computers, click on the printer. If you desire a different share name, enter the new name in the Share Name field. Click *SHARE* to save the settings.

To change a printer from being shared to not shared, click on the printer, then click on the *UNSHARE* button. Other computers in the network will no longer have access to this printer.

5-4 PRINTER MAPPING

Mapping a printer allows you to access a shared printer located on another computer.

All shared printers on other computers in the network will appear in the "Available to be Mapped" screen. From this screen, you will select the printer(s) you want to access over the network.

In order for you to send print jobs to a mapped printer, your computer will need to have the drivers for that mapped printer installed on your computer. When you select a printer and click on the *MAP* button, the Windows Add New Printer Wizard will guide you through the process of installing the appropriate drivers. The wizard will check to see if the drivers are already installed on your computer. If they are not installed, the wizard will instruct you to insert the Windows CD and then will install the appropriate drivers. You may unmap a printer and later map the printer again. The wizard will not reinstall the drivers as they are already there.

To map a printer that uses custom installation software, first manually install the printer software on each computer that will use the printer.

To change a printer from being mapped to unmapped, select the printer in the "Mapped" screen, and click on the *UNMAP* button. The printer will disappear from the Mapped screen and reappear on the Available to be Mapped screen.

5-5 IP ADDRESSING AND COMPUTER NAME

Each computer in the network must have a unique IP address. The address can be assigned automatically by a DHCP server that is located on the network, or it can be assigned manually. During the installation process you were given the option of selection automatic address assignment or manually enter the address. You may change that address here.

IP addresses are structured in four sets of three numbers, each set separated by a period (such as 192.168.0.1). Each set of numbers may be from one to three in length, ranging from 0 to 999. Generally, the first, second and sometimes the third set of numbers is the same for a network. The last set is usually what is changed as each computer in the network must have a unique IP address.

The following ranges of IP addresses are available for use (unless you have been assigned a specific IP address by the IANA group):

10.0.0.0	-	10.255.255.255
172.16.0.0	-	172.31.255.255
192.168.0.0	-	192.168.255.255

Associated with the IP address is a subnet mask. The subnet mask is used to associate a group of computers together within a larger network. This address is structured similar to the IP address. See your system administrator for this number.

Each computer in a network needs a name that will be used by other computers to access your computers resources (drives, printers, etc.).

When moving a laptop computer from one environment to another, you may need to change the IP address and subnet mask to match the new environment.

5-6 INTERNET SHARING

Included on the I-O Wireless is a free two-user Internet sharing software package called BrowseGate[LITE]. This software is installed on the computer with a modem that is used to access the Internet. The computer with modem and Internet sharing software are called a proxy server. The Internet sharing software allows other computers in the network access to the Internet by sharing the modem with them.

Each computer in the network that wants to access the Internet through the proxy server needs to configure their browser. This is done by entering the IP address of the proxy server into the browser's connections configuration screen.

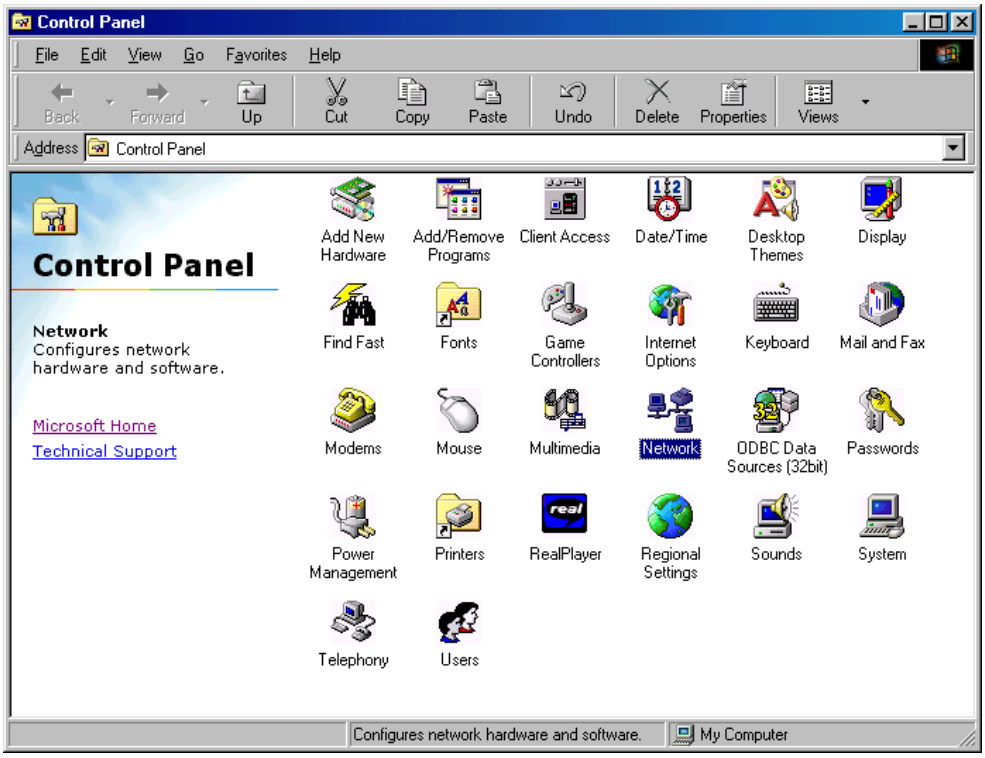
If you did not install the free Internet sharing software when running the I-O Wireless Installation Wizard, you may do so from this option. You will need to insert the I-O Wireless Installation CD to complete this process. Select the Install BrowseGate button and follow the on screen instructions.

To configure your Internet Explorer or Netscape browser to use the proxy server, select the Configure Browser button. Follow the on screen instructions.

Chapter 6 – Advanced Card Properties Configuration

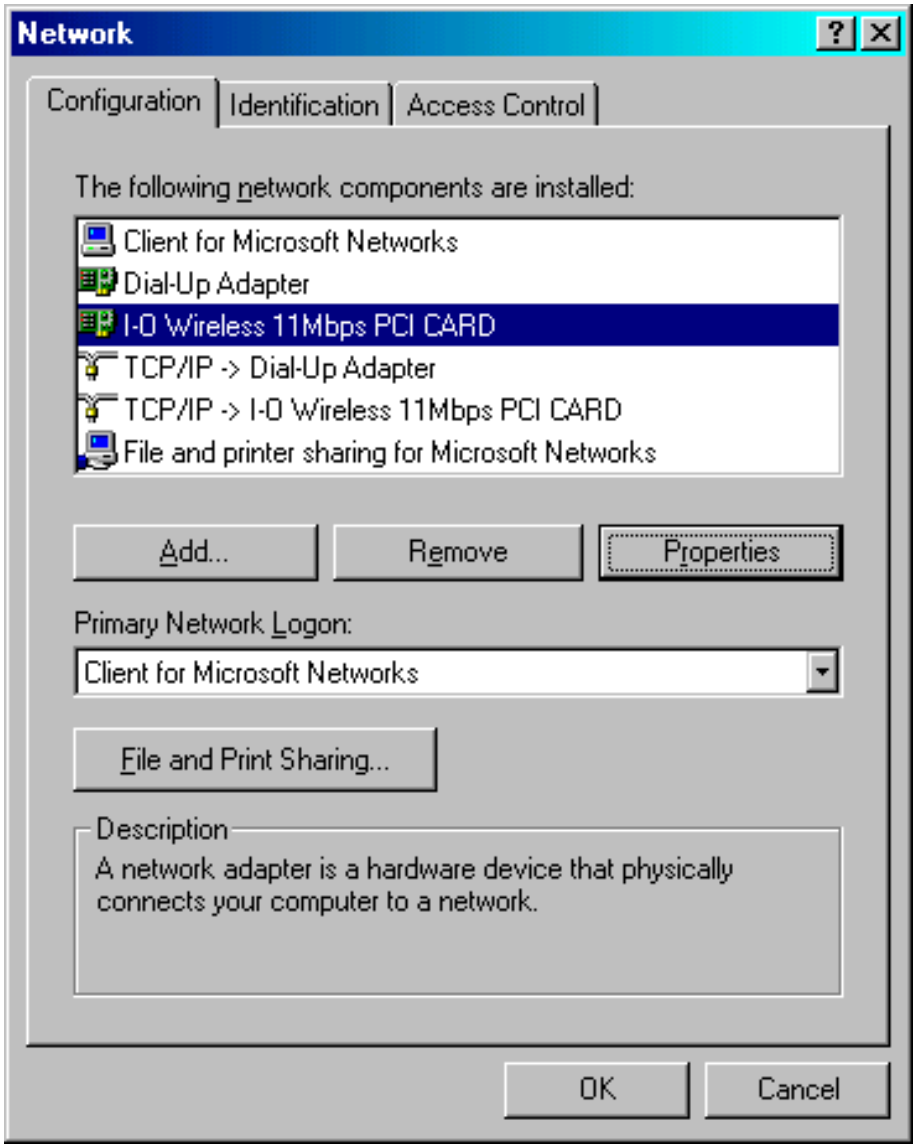
You may need to change the default settings of the I-O Wireless card properties. This can be done two different ways – using the Wireless LAN Configuration Utility, or through changing the wireless card's advanced properties parameters as explained in this section. Most configuration options can be changed using both methods. However, certain configuration parameters can only be set using the wireless card advanced properties. These advanced configuration parameters will be described in this section.

1. From the Control Panel, double-click the *Network* icon

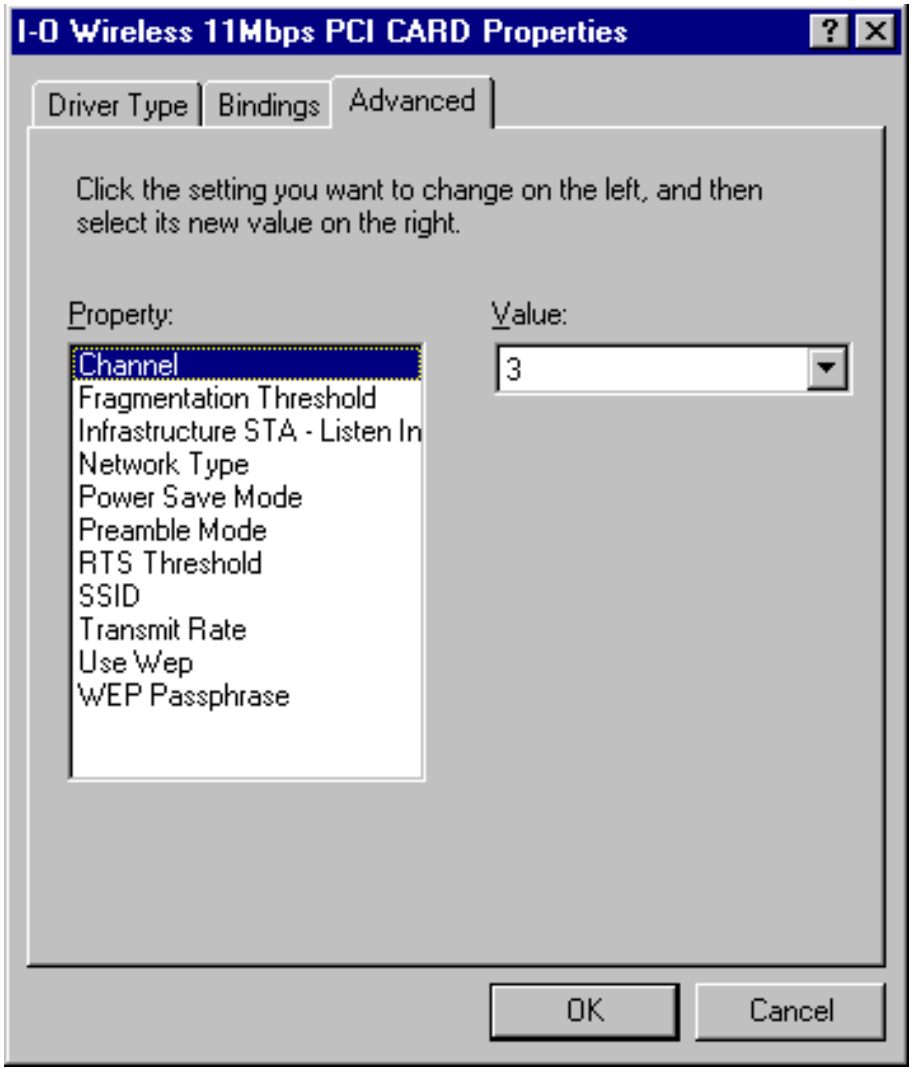


2. Select "I-O Wireless 11Mbps PCMCIA CARD" or "I-O Wireless 11Mbps PCI CARD" from the list and click on the *Properties* button.

   Note: If your computer has another network card (such as another network interface card or even a modem), you will see more than one entry for the I-O Wireless card. If this is the case, pick the I-O Wireless card that is associated with the TCP/IP protocol. It will show up in the dialog box as something like "TCP/IP -> I-O Wireless 11Mbps PCI Card".



3. Click on the “Advanced” tab. Here you will be able to select a wireless card property and change the value for that property. As you highlight each property, its current setting will be displayed in the value field. You may click the drop-down arrow in the value field to display all options for that property. A description of each property and options follows below.



Authentication Algorithm: Authentication is the process of positively validating the identify of a sending station. Authentication is used only in infrastructure mode. There are two types of authentication:

- **Open System**: The station can connect or associate with any access point and listen to all the data that is being sent. This is usually implemented where ease-of-use is the main issue, and the network administrator does not want to deal with security at all.
- **Shared Key**: This involves a shared secret key to associate the station to the access point. Each station and the access point must have the same secret key in order to communicate. The network administrator must set up the same secret key on each station. Note: In order to use shared key authentication, WEP must also be used.

Channel: This setting specifies the default 802.11 channel used by the wireless LAN communication. When using Ad-Hoc mode, each client must be set to the same channel in order for them to communicate and

share resources. For networks operating in Infrastructure mode, all clients scan for a channel – it is set automatically for you.

Network Type: The Type (or mode) setting determines the architecture of your wireless LAN. Choose Ad-Hoc or Infrastructure mode depending on your network type.

- **802.11 Ad-Hoc:** This mode is included for backwards compatibility with older wireless cards. It is also used in situations where wireless devices of based upon different chip sets are used. For example, there are wireless devices based upon Intersil, Lucent, and Atmel being used in a peer-to-peer network, then this selection would be used.
- **Ad-Hoc:** This mode is used for a simple peer-to-peer network (where all wireless devices are based upon the Intersil chipset such as the I-O Wireless WA-100 and WP-100 models). This type of network allows the sharing of local resources only between wireless clients without a wireless access point.
- **Infrastructure**: This mode allows a wireless LAN to be integrated into an existing wired network through an access point. Infrastructure type networks also permit roaming between Access Points while maintaining connection to all network resources. Infrastructure mode provides additional features, such as WEP security, power saving and extended range.

PS Mode: Power Saving Mode enables or disables the power saving features of your wireless card. When enabled on a laptop, the power saving mode can reduce power consumption by the wireless card and extend the battery life of your laptop. This setting is only implemented in a network operating in Infrastructure mode.

To allow uninterrupted data communication, choose “Disabled”. Choosing “Enabled” allows your laptop to enter “sleep” mode, however, this will interrupt data communication. Consult your System Administrator to find out the best setting for your network type.

RTS Threshold: This value is used to help deal with hidden nodes in an infrastructure network. Using RTS/CTS improves performance when there is a high probability of hidden stations. Setting a small value can overload the network with overhead if there is a low probability of hidden station conditions.

SSID: An acronym for Service Set Identifier, SSID is the unique name shared among all stations (computers) and access points in a wireless network. The SSID must be identical for all stations or access points participating in the same network. The SSID is case sensitive and must not exceed 30 characters.

Use Wep: Selecting this option allows you to disable, select 64 or 128-bit encryption. If you select 64 or 128-bit encryption, you will also need to generate the security keys. This is done through the Wireless LAN Configuration Utility described elsewhere in this User’s Guide.

Appendix A – Troubleshooting

This section addresses some of the most common issues I-O Wireless users have with their wireless networks.

SOMETHING WENT WRONG DURING INSTALLATION

Make sure the PC and the Operating System is supported by I-O Wireless, if so try the following.

For Windows 95 only

Make sure your Windows 95 operating system is Win95 SR2. Click START / SETTINGS / CONTROL PANAL, double click the System icon, select the General tab. Under where it says system, it will say Microsoft Windows 95, under that if it is SR2 it will say 4.00.950B. If you see something different, you must upgrade your Win95 operating system before I-O Wireless will work.

Removing incompatible network cards

Previously installed network cards can create a hardware conflict. Remove any other network cards by following these steps:

Click START / SETTINGS / CONTROL PANAL, double click the System icon, select the Device Manager tab and make sure View devices by type is selected. Under Network Adapters, click the + sign to expand the list, and then click the other card to highlight it. Click Remove, then OK. Shut down your PC and remove the network card. When finished, restart your PC and continue with the steps below.

Starting the I-O Wireless set up program over

Remove any files that were loaded on the initial attempt by clicking START / FIND / Files or Folders and in the Named field searching for the following files;

cw10.inf

cw10.pnf

If both or either file is found, delete it by RIGHT clicking on the file and selecting the DELETE option.

Then, RIGHT click on the My Computer icon and select EXPLORE. Double click on the hard drive (C:), double click the PROGRAMS folder, IF there is an I-O Wireless folder double click it to see if there is a file called “uninst.isu”. If it does exist, delete it by RIGHT clicking the file and selecting the DELETE option.

Then click START / SETTINGS / CONTROL PANAL, double click the System icon, select the Device Manager tab. Under Network cards and Other devices look for I-O Wireless Mbps PCI or PCMCIA card. Highlight the card and click the remove button.

Turn off the PC, verify proper installation of the wireless card and turn on the PC to re-start the installation process. Read and follow all instructions. (Refer to the Getting Started Guide)

I CAN'T SEE A WIRELESS NETWORK PC FROM ANOTHER PC

First, make certain all PCs are on and the I-O Wireless hardware and software is properly installed. Check the system tray at the bottom right of all screens for a small RED or GREEN display icon. If it is NOT there on all screens, see 'Something went wrong during installation'. If all screens DO have the small display icon, try the following steps in order.

Make sure you are logged on to the network

Restart each PC in the network. When the Enter Network Password screen appears, enter your name and password* and click OK. DO NOT CLICK CANCEL! *Windows does not require a password, however with or without a password you must click OK

Make sure all PCs in the network can communicate

Verify the SSID and Type of network settings are the same on all PCs. Double click on the RED or GREEN display icon in the system tray of each PC. Click on the Configuration tab and make sure the first 2 fields (Type and SSID) are identical on each PC. If a change is necessary, make the change and click on the Apply button.

Compare the IP addresses and Subnet Mask on each PC by double clicking the I-O Management Central icon and clicking the Set IP Address button. For the IP address, the first three sets of numbers must be identical, with only the 4th set differing on each PC. The Subnet Mask must be identical on each PC. (See Getting Started Guide) If any changes are necessary, make the changes, click OK and re-start the PCs.

How can I use my work laptop at home?

Change the network type (ad hoc or infrastructure) to match the type being used at home.

Change the SSID to match that being used at home.

Change the IP address to work with one IP addresses at home.

Change the subnet mask to match home.

I AM TRYING TO ADD A DIFFERENT MANUFACTURER'S WIRELESS DEVICE INTO MY PEER-TO-PEER NETWORK.

I-O Wireless PCMCIA and PCI cards (models WA-100 and WP100) offer two different Ad-Hoc selections. The first selection ("Ad-Hoc") allows better use of the Intersil chip set resulting in betten connections between the wireless cards. The second selection ("802.11 Ad-Hoc") is designed for compatibility with wireless devices from other manufacturers. This second selection is also used when older 802.11 cards are added into the peer-to-peer network.

I INSTALLED A NEW DEVICE AND NOW MY NETWORK WON'T WORK

This means you have a hardware conflict. It is recommended you un-install the new device to get your network working immediately, then call the manufacturer of the new device for technical assistance. (Most common in Win95SR2)

PLAYING A MULTI-PLAYER GAME

Make sure the PC's you want to use are powered on and are connected wirelessly.

If the display icon in the system tray at the bottom right of each computer screen is GREEN, then you are connected to another PC wirelessly.

Make sure the game is installed on each PC you are using

To play a multi-player game on a network, each PC you want to use must have a copy of the game installed. Some games require a different CD for each PC. (See documentation included with your game)

Select the correct network setting for the game

Most multi-player games will ask what type of a connection you are using. You must select a connection type of TCP/IP to play over your wireless network.

MY WIRELESS CARDS AND THE ACCESS POINT DO NOT COMMUNICATE

The wireless network name must be the same.

The Access Point's ESSID must be exactly the same as the SSID assigned to the wireless computers in the wireless network.

The IP addresses must coincide.

The Access Point's IP address must coincide with the IP addresses used in both the wired Ethernet and wireless networks.

If DHCP is used to set IP addresses in the wired Ethernet network, the wireless computers in the wireless network should also have their IP addresses set using DHCP. However, the Access Point must be assigned a static IP address.

The sub-net mask must match.

The Access Point's sub-net mask must match the sub-net mask of wired Ethernet network. The sub-net mask of the wireless computers served by the Access Point must also match the wired Ethernet network.

WEP settings must match.

If WEP security is used, the keys and key used must be exactly the same for the Access Point and all wireless computers served by the Access Point.

CAUTIONS ON THE USE OF WEP

The following are suggestions for increasing the security of your network.

- ✓ Do not use the default SSID!
- ✓ Use Wep encryption!
- ✓ Do not use the default key.
- ✓ Change the keys regularly.
- ✓ Don't tell anyone the key.
- ✓ Connect all wireless devices outside the firewall.
- ✓ Use IPsec, VPNs or other secure end-to-end protocols.
- ✓ Conduct audits of wireless devices regularly to insure that wireless connections are not inadvertently established within the firewall.

Appendix B – Technical Specifications

Standard	IEEE 802.11B	
Data Transmission Rate	11, 5.5, 2, 1 Mbps	
Security	64-bit or 128-bit Wired Equivalent Privacy (WEP)	
Frequency	2.4 GHz Industrial, Scientific & Medical (ISM) Band 2400-2483.5 MHz for US & Canada 2400-2497 MHz for Japan and Europe (ETSI)	
Wireless Medium	Direct Sequence Spread Spectrum (DSSS)	
Modulation Technique	DBPSK @ 1 Mbps DQPSK @ 2 Mbps CCK @ 5.5 & 11 Mbps	
Operating Channels	11 Channels in US & Canada 13 Channels for ETSI 14 Channels for Japan	
Operating Range (Typical): 1 Mbps 2 Mbps 5.5 Mbps 11 Mbps	Outdoor: 1000 feet (305 meters) 750 feet (228 meters) 600 feet (183 meters) 400 feet (122 meters)	Indoor: 300 feet (91 meters) 240 feet (73 meters) 200 feet (61 meters) 120 feet (37 meters)
Antenna for PCMCIA & PCI cards	Built-in Diversity Antenna	
Receiver Sensitivity	-87 dBm @ 5.5 Mbps (8% PER) -84 dBm @ 11 Mbps (8% Per)	
Interface: PCMCIA Card (WP-100) PCI Card (WA-100)	 PCMCIA Type II or III, 3.3 or 5 volts PCI 2.1 Compliant Slot	
Certifications:	FCC Part 15 ETSI 300.328 ARIB STD33 & T66	
Temperature & Humidity	Temperature: 0 - 40 C Humidity: 10 - 90% RH	
PCMCIA Power Requirement	5 Volts	

Appendix C – Glossary

10/100BaseT: An IEEE standard (802.3) for operating at either 10 Mbps or 100 Mbps Ethernet networks (LANs) with twisted pair cabling and a wiring hub.

Access Point (AP) - An internetworking device that seamlessly connects wired and wireless networks together.

Ad-Hoc - An Ad-Hoc wireless LAN is a group of computers each with wireless cards, connected as an independent wireless LAN. You can immediately begin communicating between the various stations as soon as the hardware and drivers are installed. An Ad-Hoc network is not attached to a wired network (which uses an access point in an infrastructure mode). An alternative set-up (called infrastructures) is where computers communicate with each other through an access point where there is a connection with a wired network. (See Access Point and Infrastructure.)

Backbone - The core infrastructure of a network, the portion of the network that transports information from one central location to another central location. The information is then off-loaded onto a local system.

Base Station - In mobile telecommunication, a base station is the central radio transmitter/ receiver that maintains communication with the mobile radio telephone sets within range. In cellular and personal communications applications, each cell or microcell has its own base station; each base station in turn is interconnected with other cells' base.

BSS - Stands for "Basic Service Set." An Access Point associated with several wireless stations.

Client – Any computer connected to a network that requests services (files, print capability) from another member of the network.

DSS – Direct-Sequencing Spread-Spectrum. DSSS uses a radio transmitter to spread data packets over a fixed range of frequency band.

ESS - Stands for "Extended Service Set." More than one BSS can be configured as an Extended Service Set. An ESS is basically a roaming domain.

Ethernet - A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10 Mbps baseband transmission over shielded coaxial cable or over shielded twisted pair telephone wire.

Gateway – A network point that acts as an entrance to another network.

Hz (Frequency or Hertz) – The international unit for measuring frequency, equivalent to the older unit of cycles per second. One

megahertz (MHz) is one milling hertz. One gigahertz (GHz) is one billion hertz. The standard US electrical power frequency is 60 Hz, the AM broadcast radio frequency band is 0.551.6 MHz, the FM broadcast radio frequency band is 88103 MHz, and wireless 802.11 LANs operate at 2.4 GHz.

IEEE - Institute of Electrical and Electronics Engineers, New York, www.ieee.org. A membership organization that includes engineers, scientists, and students in electronics and allied fields. It has more than 300,000 members and is involved with setting standards for computers and communications.

IEEE 802.11 - IEEE 802.xx is a set of specifications for LANs from The Institute of Electrical and Electronic Engineers (IEEE). Most wired networks conform to 802.3, specification for CSMA/CD based Ethernet networks. 802.11 defines the standard for wireless LANs encompassing three incompatible (non-interoperable) technologies: Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS), and Infrared.

Infrastructure - An integrated wireless and wired LAN is called an Infrastructure configuration. As compared to Ad-Hoc Mode where computers communicate directly with each other, clients set in Infrastructure Mode all pass data through a central access point. The AP not only mediates wireless network traffic in the immediate neighbourhood, but also provides communication with the wired network. (See AD-Hoc and Access Point.)

IP - The Internet Protocol (IP) is a method or protocol by which data is sent from one computer to another on a network, i.e. the Internet. Each computer on the Internet has at least one address that uniquely identifies it from all other computers on the Internet. When you send or receive data (for example, an e-mail note or a Web page), the message gets divided into little chunks called packets. Each of these packets contains both the sender's Internet address and the receiver's address. Any packet is sent first to a gateway computer that understands a small part of the Internet. The gateway computer reads the destination address and forwards the packet to an adjacent gateway that in turn reads the destination address and so forth across the Internet until one gateway recognizes the packet as belonging to a computer within its immediate neighbourhood or domain. That gateway then forwards the packet directly to the computer whose address is specified. Because the data is divided into a number of packets, each packet can, if necessary, be sent by a different route across the Internet. A packet is treated as an independent unit of data so packets can arrive at their destination in a different order than they were sent in. Another protocol, the Transmission Control Protocol, (TCP) then reassembles the packets in the right order.

IP Address - An IP address is a 32-bit number that identifies each sender or receiver of information that is sent across the Internet. An IP

address has two parts: the identifier of a particular network on the Internet and an identifier of the particular device (which can be a server or a workstation) within that network.

LAN (Local Area Network) - A communications network that serves users within a defined geographical area. The benefits include the sharing of Internet access, files and equipment like printers and storage devices. Special network cabling (10BaseT) is often used to connect the computers together. Wireless LANs use wireless communications, in a home or office, to network all computers together so there is no need to run an extra set of cables.

PCI - A local bus standard for connecting peripherals to a personal computer. Within a computer, the bus is the transmission path on which signals and data

transfers occur between the CPU, system memory, and attached devices such as a network card, sound card, or CD-ROM drive.

PCMCIA - Personal Computer Memory Card International Association, which develops standards for PC cards, formerly known as PCMCIA cards, are available in three “types” which are about the same length and width as credit cards, but range in thickness from 3.3 mm (Type I) to 5.0 mm (Type II) to 10.5 mm (Type III). These cards can be used for many functions, including memory storage, as landline modems and as wireless LAN.

Roaming - A function that allows one to travel with a mobile end system (wireless LAN mobile station, for example) through the territory of a domain (an ESS, for example) while continuously connecting to the infrastructure. As a wireless computer moves from an area served by one AP to another AP, the connection is automatically switch from the first AP to the second AP. When the change of connection occurs, there may appear to be a loss of connection at the wireless station.

RTS Threshold – Transmitters contending for the medium may not hear each other. RTS/CTS mechanism can solve this “ Hidden Node Problem”.

SSID – An acronym for Service Set Identifier, SSID is the unique name shared among all clients and Access Points in a wireless network. The SSID must be identical for all clients or Access Points participating in the same network. The SSID is case sensitive and must not exceed 30 characters.

TCP (Transmission Control Protocol) - A protocol used along with the Internet Protocol (IP) to send data in the form of individual units (called packets) 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 packets that a message is divided into for efficient routing through the Internet. For example, when a web page is downloaded from a web server, the TCP program layer in that server divides the file into packets, numbers the packets, and then forwards them individually to the IP program layer. Although each packet has the

same destination IP address, it may get routed differently through the network. At the other end, TCP reassembles the individual packets and waits until they have all arrived to forward them as a single file.

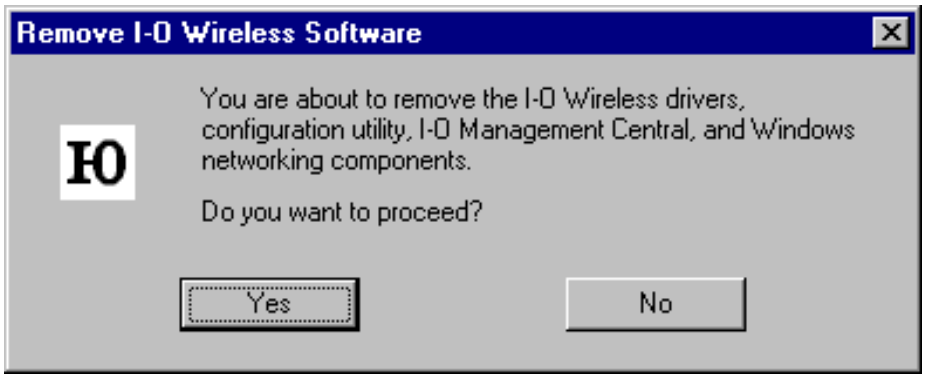
WEP (Wired Equivalent Privacy) - WEP data encryption is defined by the 802.11 standard to prevent (i) access to the network by "intruders" using similar wireless LAN equipment and (ii) capture of wireless LAN traffic through eavesdropping. WEP allows the administrator to define a set of respective "Keys" for each wireless network user based on a "Key String" passed through the WEP encryption algorithm. Access is denied by anyone who does not have an assigned key. The key, either 40 or 104 bits in length, is added to a 24-bit initialization vector resulting in a 64-bit or 128-bit key size. Each station and access point in the network must be set-up the same.

Appendix D – Remove I-O Wireless and BrowseGate

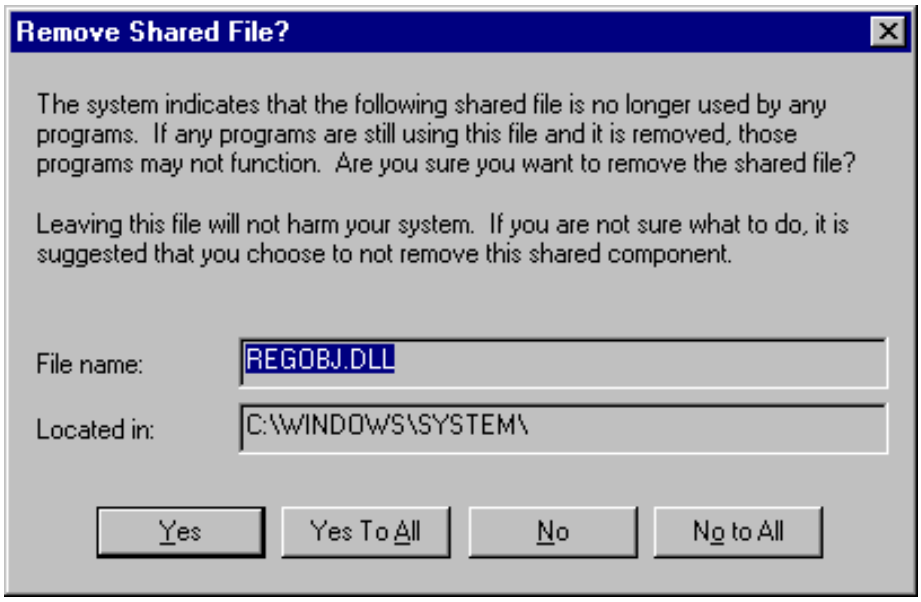
D-1 Remove the I-O Wireless Hardware & Software

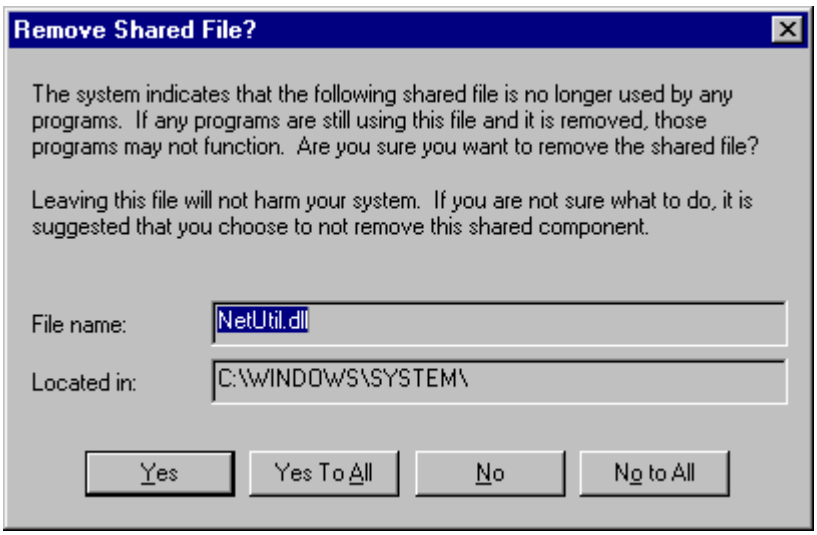
To remove the I-O Wireless Card from a computer, you will need to remove the software and the physical wireless card.

1. Click on *Start* | *Programs* | *I-O Wireless* | *Uninstaller*. The following screen will appear. Click *YES*.

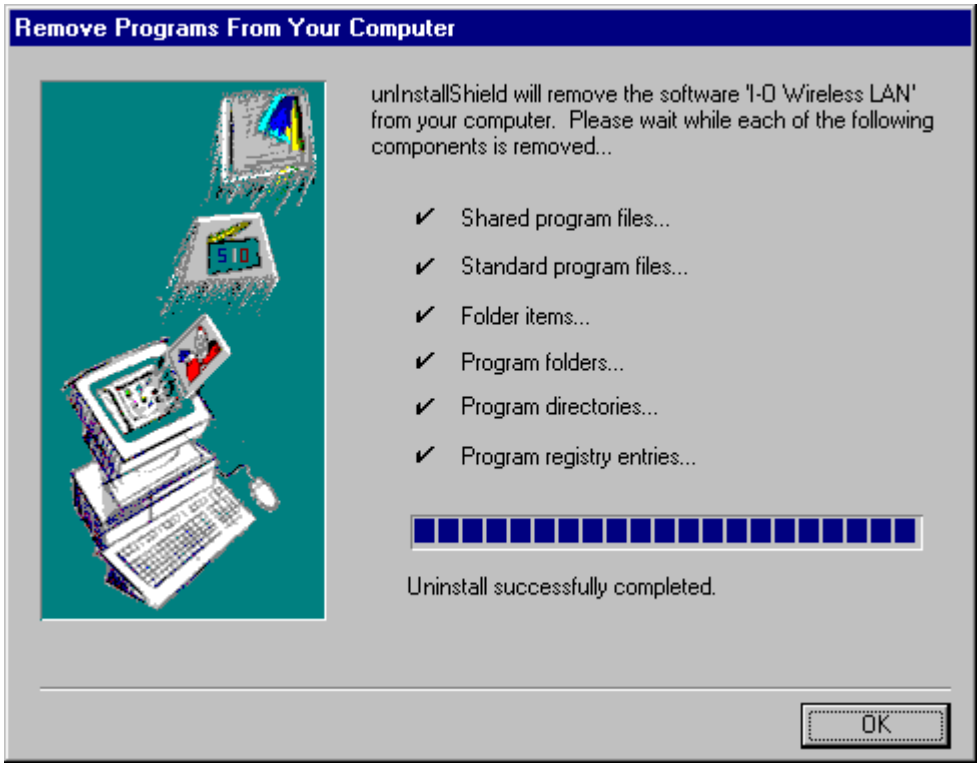


2. Windows will ask you whether to remove two files, “regobj.dll” and “netutil.dll”. Click *YES* for both files.





3. The unInstaller will then proceed to remove all the drivers, configuration and utility software and Microsoft network components that were originally installed as part of the I-O Wireless installation. Click *OK* when the process is complete.



4. When the uninstallation process is complete:
   - For laptop computers, remove the PCMCIA card.
   - For desktop computers, shut down the computer and remove the PCI card.

D-2 REMOVE BROWSEGATE

To remove the BrowseGate Internet proxy server software, you will use Windows Add/Remove Programs function.

1. Click *Start* | *Settings* | *Control Panel*.
2. Double click on the Add/Remove Programs icon.
3. Under the Install/Uninstall tab, scroll down the list until you find the BrowseGate entry.
4. Click on the BrowseGate entry.
5. Click on the *Add/Remove* button, and follow the on screen prompts.

Appendix E – One-Year Limited Hardware Warranty

I-O Wireless (I-O) warrants the hardware product against defects in material and workmanship for a period of one (1) year commencing from date of purchase by the original customer, when operated and maintained in accordance with I-O's published specifications. I-O's liability shall be limited, at its option and expense, to refund to buyer the actual amount paid by buyer or to repair or replace any defective or non-conforming product or part thereof, F.O.B. I-O's authorized repair depot. Buyer will pay reasonable labor and handling charges for each product returned for repair which is found to have no defect.

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Appendix F – Software License Agreement

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LIMITED WARRANTY. I-O warrants this SOFTWARE for a period of ninety (90) days commencing from the date of purchase by the original end-user that: (i) the SOFTWARE will substantially conform to the

applicable user documentation and (ii) that the magnetic media and the user documentation (if any) are free from defects in material and workmanship. I-O's liability shall be limited, at its option and expense, to refund to original end-user the actual amount paid by original end-user or to repair or replace any defective or non-conforming product or part thereof, F.O.B. I-O's authorized repair depot.

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Appendix G – Product Support and Warranty Administration Policy

Contact I-O Wireless™ if . . .

- You have questions about the installation or operation of your I-O Wireless product, or
- You believe your I-O Wireless product may not be working properly.

How to contact I-O Wireless

Web site address: www.iowireless.com

- Frequently asked questions, installation guides, and technical information are available for reference and assisting with self-help.
- Questions or requests may be submitted via e-mail in the "Contact Us" section.

Telephone: 1.877.471.9933 (toll-free)

- Hours of support are 12:00 noon to 8:00pm MST, Monday - Friday.
- Voice mail messages may be left outside normal hours of operation

Support:

You must have your product serial number to qualify for I-O Wireless telephone support.

Telephone support is provided at no charge for 90 days from date of purchase.

Telephone support after 90 days is billed at $15 per call, up to one year from date of purchase. Support charges after one year are $25 per call.

The following credit cards are accepted forms of payment:

- Visa
- MasterCard

No telephone support will be given without first verifying your I-O Wireless product serial number. This number was activated when your product was shipped.

Your x-digit product serial number can be found in either of the following places:

- Printed on your I-O Wireless Installation CD
- Listed on the About screen in I-O Wireless Management Central

Please have your product serial number noted before calling I-O Wireless

Self-help assistance or e-mail inquiries via the I-O Wireless web site are always free.

Returning a product

If the I-O Wireless Customer Service Representative determines that your product should be replaced under the manufacturers terms of warranty, you will be able to choose from two handling options:

- Normal Replacement: Return your product in it's original packaging, freight pre-paid, to I-O Wireless. Upon receipt of your returned unit, I-O Wireless will send you a replacement product, freight pre-paid.
- Expedited Replacement: If you require expedited replacement service, you may pay for a replacement unit that would be shipped immediately (in advance of returning your defective unit). When your original unit is returned (freight pre-paid) and received by I-O Wireless, a reversal of the replacement charge will be processed, off-setting the expedited replacement charge to zero.