



99 Ling Rd  
Rochester NY 14612-1965  
800 733-9473 Fax: 877 275-0400  
<http://www.whirlwindusa.com>

## TCP/IP ASSIGNMENTS IN WHIRLWIND DCS88 COBRANET® DEVICES

### TCP/IP

TCP/IP (**T**ransfer **C**ontrol **P**rotocol / **I**nternet **P**rotocol) is a suite of communications protocols originally designed to facilitate communications between groups of computers and also between groups of computer networks. It was the development of TCP/IP that made possible the connection of computers around the world into the “network of networks” that we now know as the Internet.

The **IP** portion is a protocol responsible for sending packets of data from node to node on the network. This routing is based on a 4-section address (the IP Address) that uniquely identifies the sender and receiver of the data. Each of the four digits of the IP address can be from 0 to 255. IP addresses are written as four numbers separated by periods, such as 169.254.1.1.

The **TCP** (Transfer Control Protocol) portion detects lost data or errors in transmission and triggers retransmission of that data until the information has been passed completely and without errors.

### MAC Address

Manufacturers assign a unique six-byte identification number to every hardware device designed for use on Ethernet networks. This number is called the **MAC** address (**M**edia **A**ccess **C**ontrol). These addresses are regulated by the Institute of Electrical and Electronics Engineers (IEEE) to ensure that no two devices in the world may have the same MAC address. Local area networks use both MAC addresses and IP to facilitate communications between applications and the physical network hardware.

### CobraNet Communication

CobraNet uses standard Ethernet hardware with their unique MAC addresses and switches as its means of identifying and communicating to each node on the network. CobraNet also uses audio “bundle” assignments to control which devices receive any particular channels of audio. It does not use IP. (Please refer to <http://www.peakaudio.com/CobraNet/FAQ.html> for more information about CobraNet.)

When using a computer with CobraNet Discovery (DISCO) to monitor the network, IP addresses are required and are assigned by Discovery (see Windows 2000 and Windows XP below).

### **Controlling Whirlwind DCS devices with a PC**

Whirlwind devices have the built in capability to receive and process control commands generated through **SNMP** (Simple Network Management Protocol), but to accomplish this, each unit, including the PC, must first have a unique IP address assigned to it.

In a regular Windows network, the handling of IP address assignments is accomplished through a **DHCP** (Dynamic Host Configuration Protocol) server and thus is transparent to the user. You just boot-up, login and all of the IP configurations are handled in the background. DHCP assigns the IP address and makes sure that these addresses are not duplicated. Since the CobraNet network has no DHCP Server available to handle the assignment of IP addresses, the user must intervene manually.

### **Ethernet Switches and Hubs**

There are two types of similar looking devices used to connect computers together into a network, **hubs** and **switches**. They both feature multiple RJ45 jacks for connecting CAT-5 computer cables. There is, however, an important difference.

A hub takes packets of information sent to any one of its ports and routes every packet out to every other port. This means that all network traffic entering the hub is broadcast to every other device and it is up to each destination to accept what is intended for it and to ignore the rest. This is inherently inefficient – just as if a copy of every piece of mail in your neighborhood had to be delivered to every house and it was up to you to sort out what was really yours. It would certainly take a lot longer.

A **switch** is a more intelligent hub that “learns” and keeps a table of the addresses that are connected to its ports in its internal memory. When a packet arrives, the switch finds the destination address in its table and only routes that packet to the port for which it is intended. This greatly improves network efficiency and bandwidth. For this reason, it is recommended that CobraNet networks be configured with Ethernet switches instead of hubs.

### **Necessary Hardware and Software**

Whirlwind DCS CobraNet audio transceiver(s)

100Mbs Ethernet switch

Whirlwind Control Software

CobraNet Discovery Software (DISCO)

A PC running Windows 2000 or XP Professional with the Internet Protocol (TCP/IP) installed

### **Connecting**

The following procedures will guide you through the steps necessary to successfully

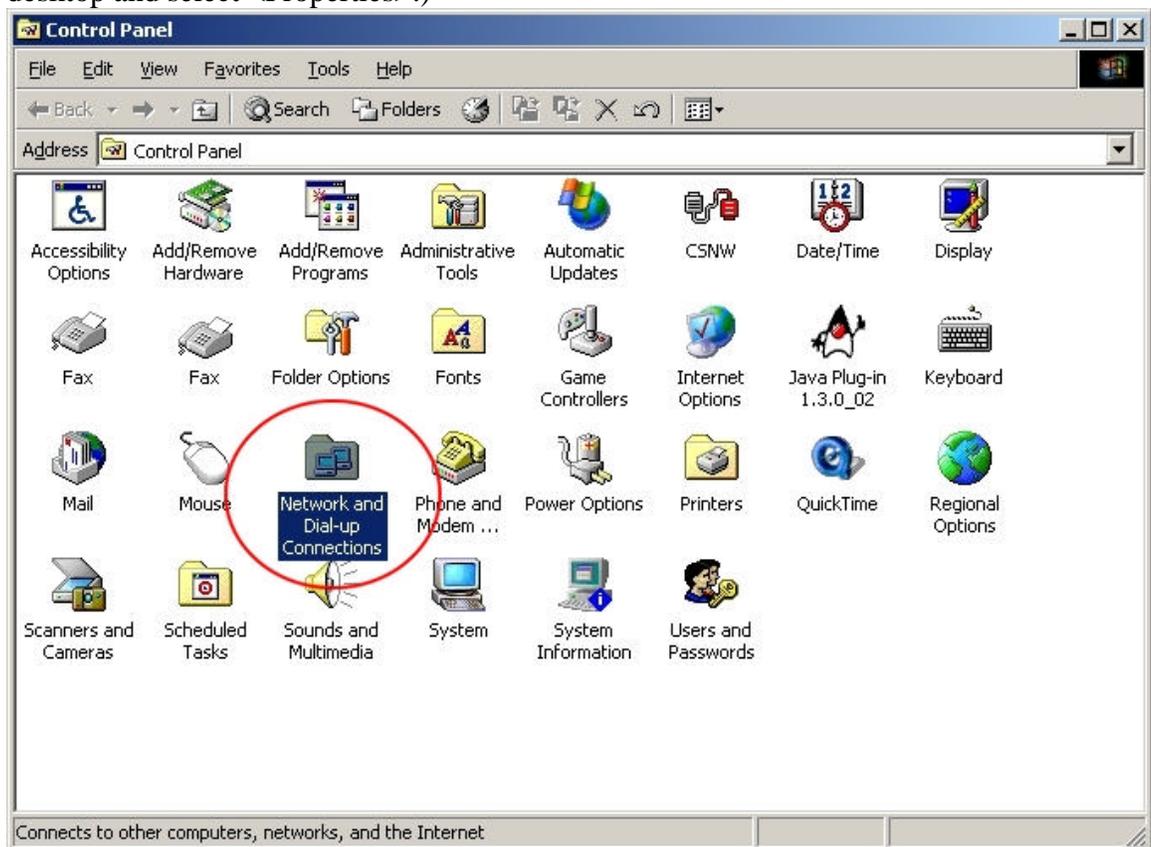
connect a PC to the Whirlwind DCS series transceivers and control them with the Whirlwind Digital Control Software.

In these instructions, text enclosed in “quotes” is to be typed without the quotes. Words enclosed in < > such as <Enter> or <OK> signify an icon or menu to be opened, a key to be pressed or dialog control to be clicked on. “Click”, means one click of the left mouse button, “Right-click” means one click of the right mouse button. Please refer to the section that pertains to your operating system.

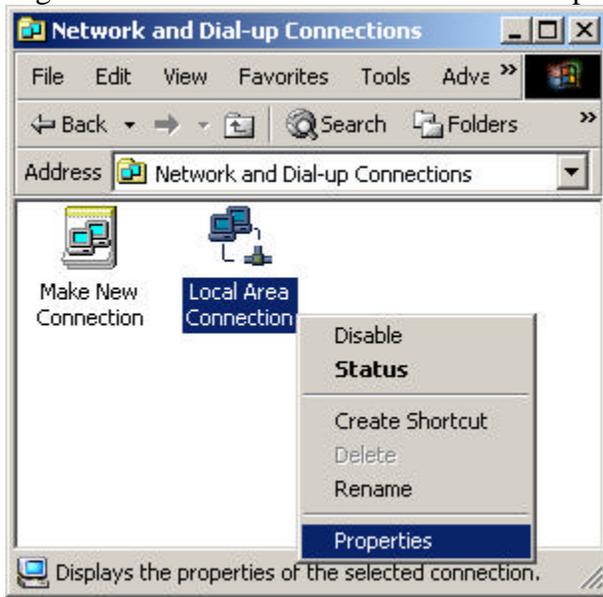
---

## Windows 2000

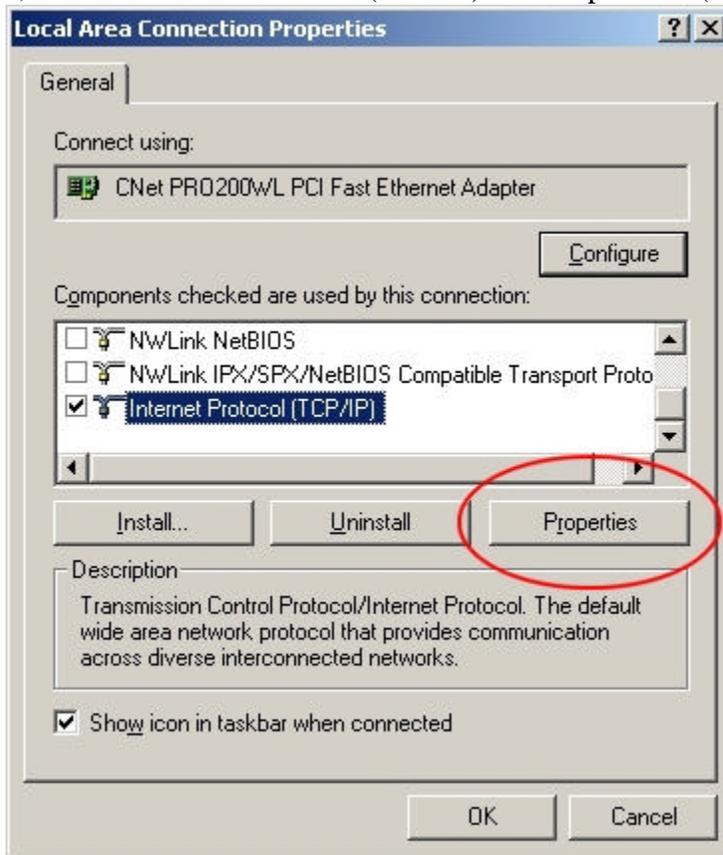
- 1) If connected to a local area network, logout and disconnect the network cable from the PC.
- 2) Connect a CAT-5 cable from the PC to a switch located on the CobraNet network.
- 3) Select <Start> - <Settings> - <Control Panel>, then <Network and Dial-up Connections> (Or alternately, right-click on <My Network Places> from the desktop and select <Properties>.)



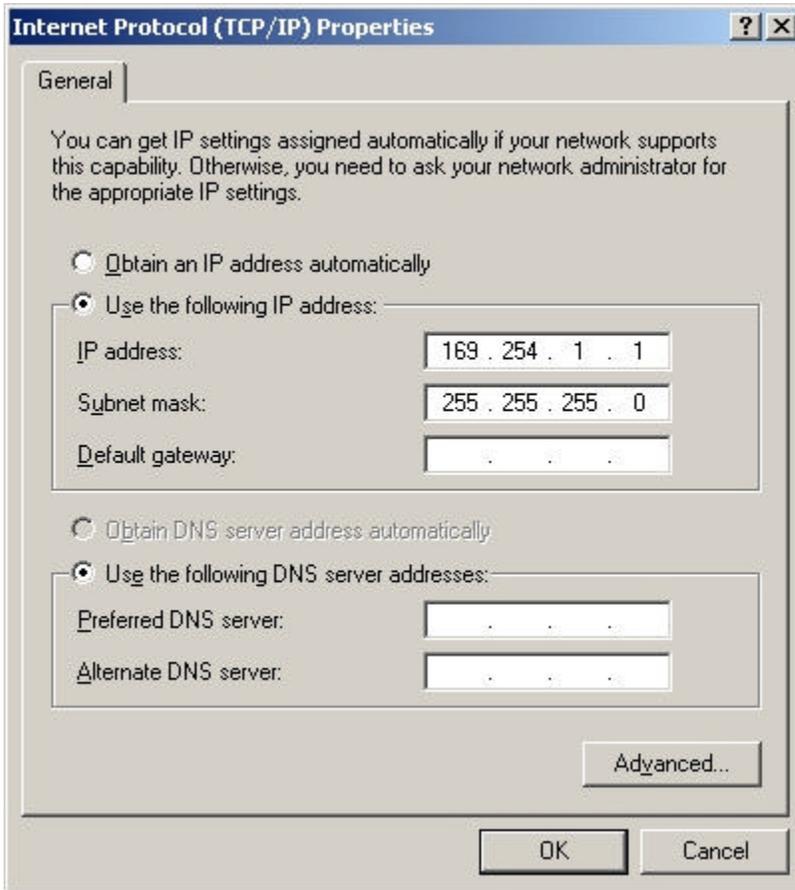
Right-click <Local Area Connection> - <Properties>



4) Click <Internet Protocol (TCP/IP)> - <Properties> (Do NOT uncheck the box.)



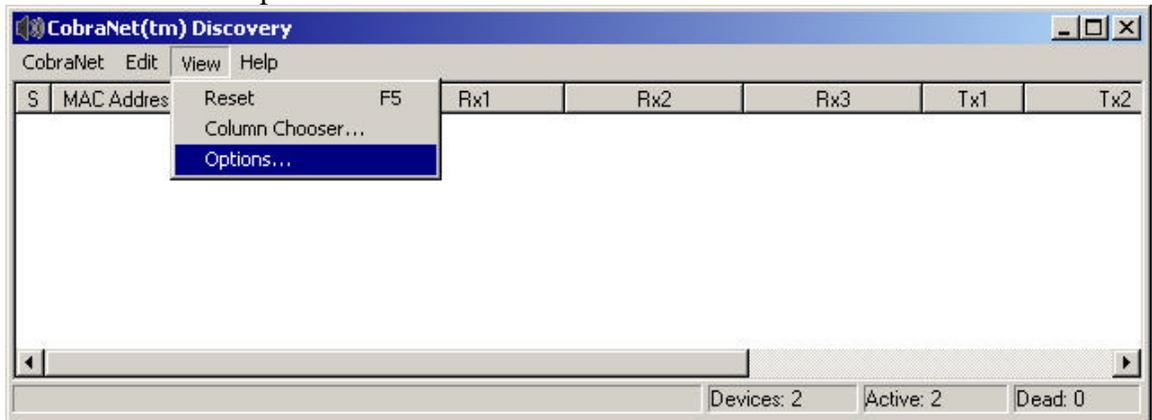
- 5) Select <Use the following IP address> and enter “169.254.1.1” into the IP address box. Enter “255.255.255.0” into the Subnet mask. Leave the Default gateway blank. <OK>



This should set the computer to the static IP address of 169.254.1.1. This can be verified by selecting <Start> - <Run> - type “cmd /K ipconfig” - <OK>. This will open a DOS like window and list the IP address and Subnet Mask.

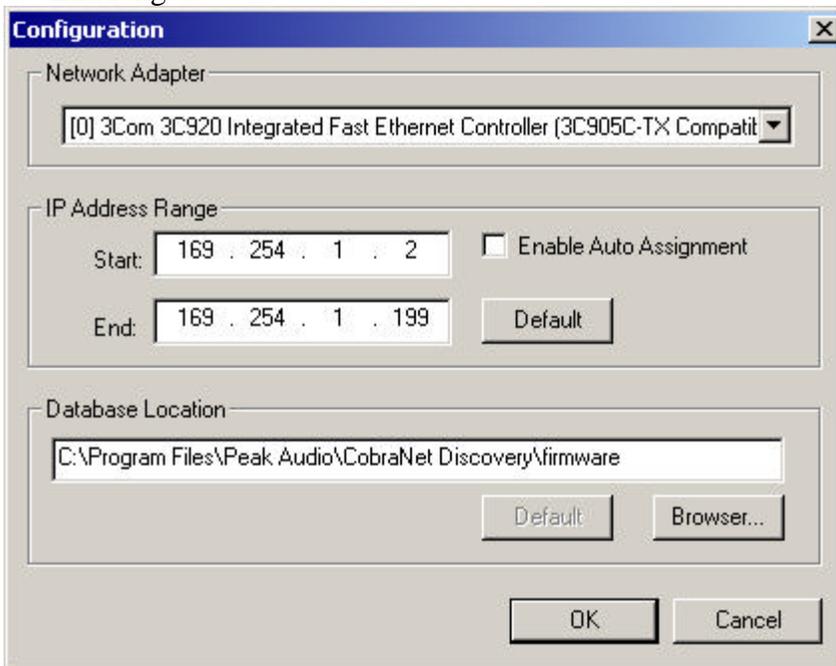
- 6) Open CobraNet Discovery (DISCO).

7) Select <View> - <Options>

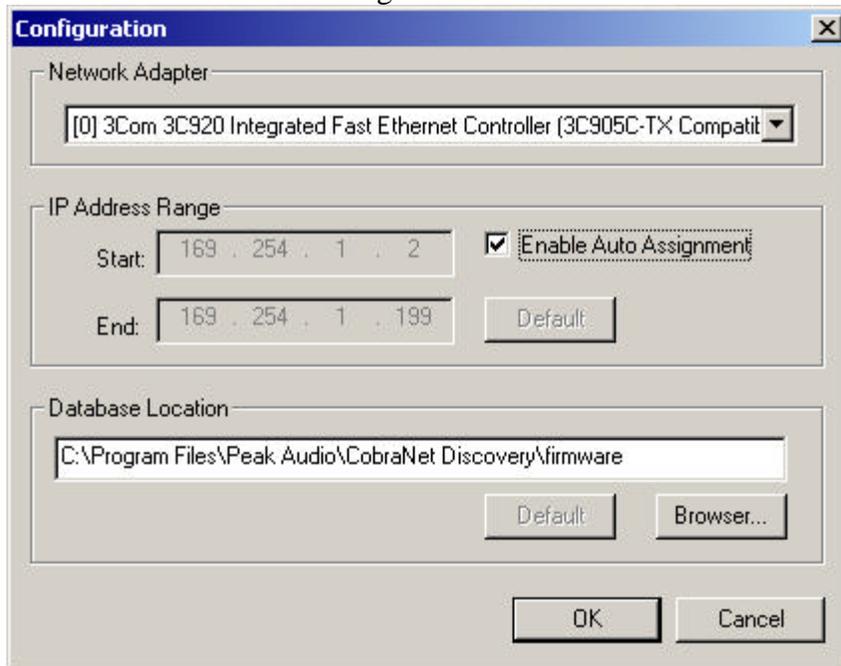


8) Select the network adapter that is connected to the CobraNet network.

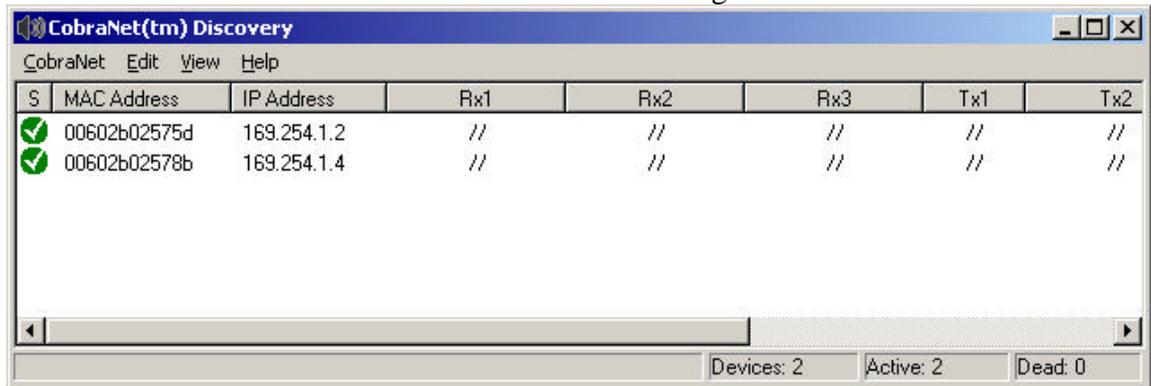
9) Uncheck <Enable Auto Assignment>. If the correct IP range is not filled in, click on <Default Range>. This should automatically assign a range of 169.254.1.2 to 169.254.1.199. If it does not, manually enter these two figures into the Start and End ranges.



10) Re-check <Enable Auto Assignment> <OK>



11) DISCO should find the devices on the network and assign valid IP addresses.



12) Open Whirlwind Control Software (WCS)

13) If an <Options> window opens automatically, select the network adapter but do not enter an IP range at this time. <OK>

14) Select to <Preferences> - <Options>

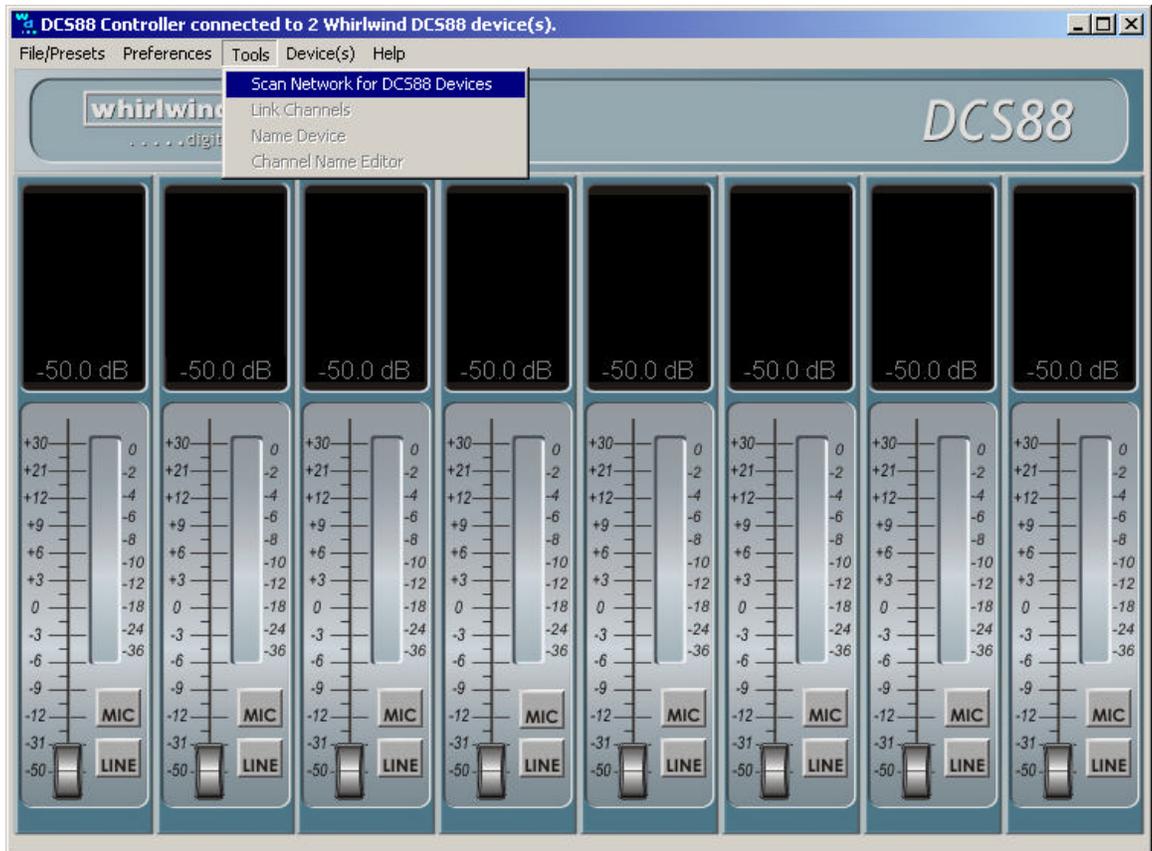


15) Verify that the correct network adapter is selected. If the IP range that was previously entered in DISCO is not filled in, click <Suggest IP Range>. If this still

doesn't fill in the correct IP range, enter the range manually. <OK>

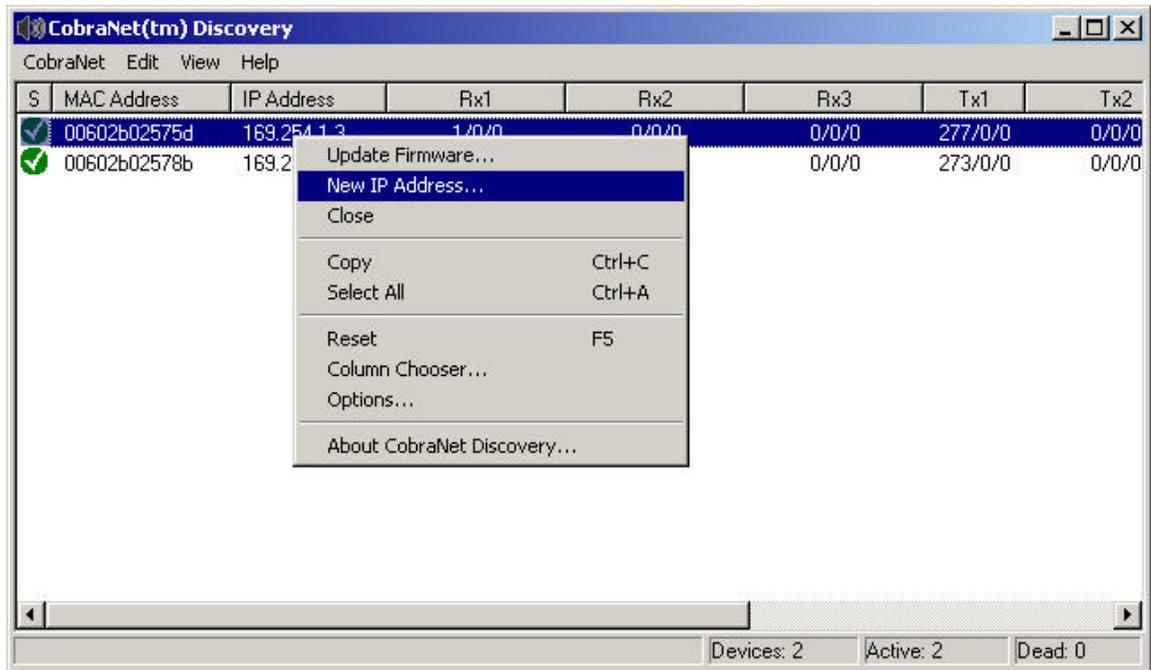
The image shows a screenshot of a software dialog box titled "Options" with a close button (X) in the top right corner. The dialog box has a blue header bar. In the center, there is a logo for "whirlwind" in a stylized font, with "..... digital" underneath it. Below the logo, there are three tabs: "IP Address" (which is selected and has a dotted border), "User Preferences", and "Meter Decay". Under the "IP Address" tab, there is a "Network Adapter(s)" dropdown menu showing "[0] 3Com 3C920 Integrated Fast Ethernet Controller (E)". Below this, there is a checked checkbox labeled "Auto Assign IP Address". Underneath the checkbox, there are two input fields: "Start Range" with the value "169.254.1.2" and "End Range" with the value "169.254.1.199". To the right of these fields is a button labeled "Suggest IP Range". At the bottom of the dialog box, there are two buttons: "Ok" and "Cancel".

16) Select <Tools> - <Scan Network for DCS88 Devices>

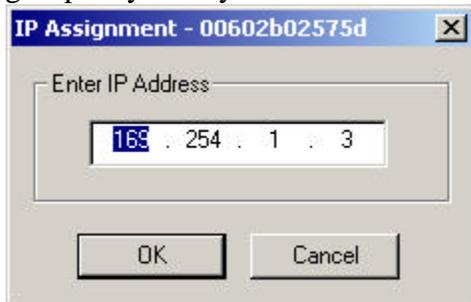


(If a dialog box appears with the message 'System detected DCS88 devices with IP addresses outside of the range. Check device that you want to Auto Assign a valid IP address.', check all devices and click <OK>. Confirm re-assignment at the next screen.)

17) WCS should find the devices and list them under the <Devices> menu. If devices still cannot be found, open DISCO and manually assign a unique IP within the specified range to each device. To do this manual assignment, right-click on the device in the DISCO screen, select <New IP Address>.



Type a unique IP address that is within the specified range for each device. This means that the first three groups of numbers in the range will remain the same; the last group may be any number from 2 to 199. Addresses may NOT be duplicated. <OK>



DISCO will assign and display the new IP address for that device. Repeat this step for each device listed in DISCO, then return to Whirlwind Control Software and rescan for devices as in [Step 16](#).

### **IMPORTANT!**

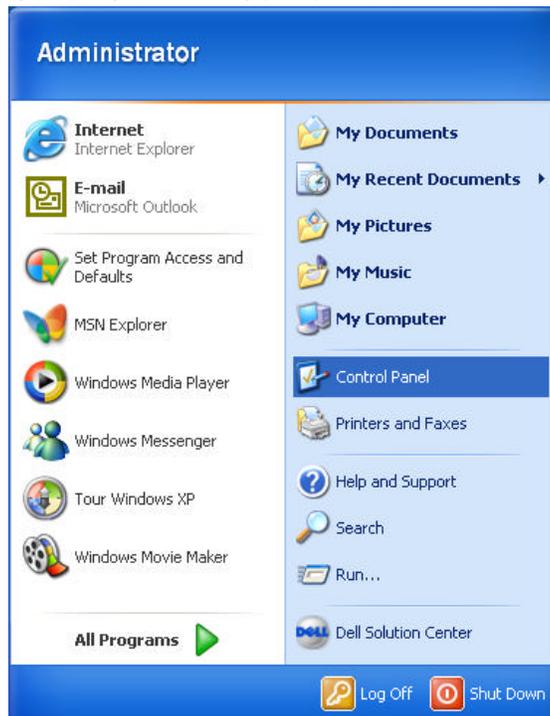
If this Windows 2000 computer is to be reintroduced into a DHCP Server environment, be sure to reset the Internet Protocol (TCP/IP) properties to “Obtain IP Address Automatically” before reconnecting to that network. Failure to do so may cause inability to connect to the network or result in two computers on a network with the same IP address. See your network administrator for details on your specific network settings.

## Windows XP Professional

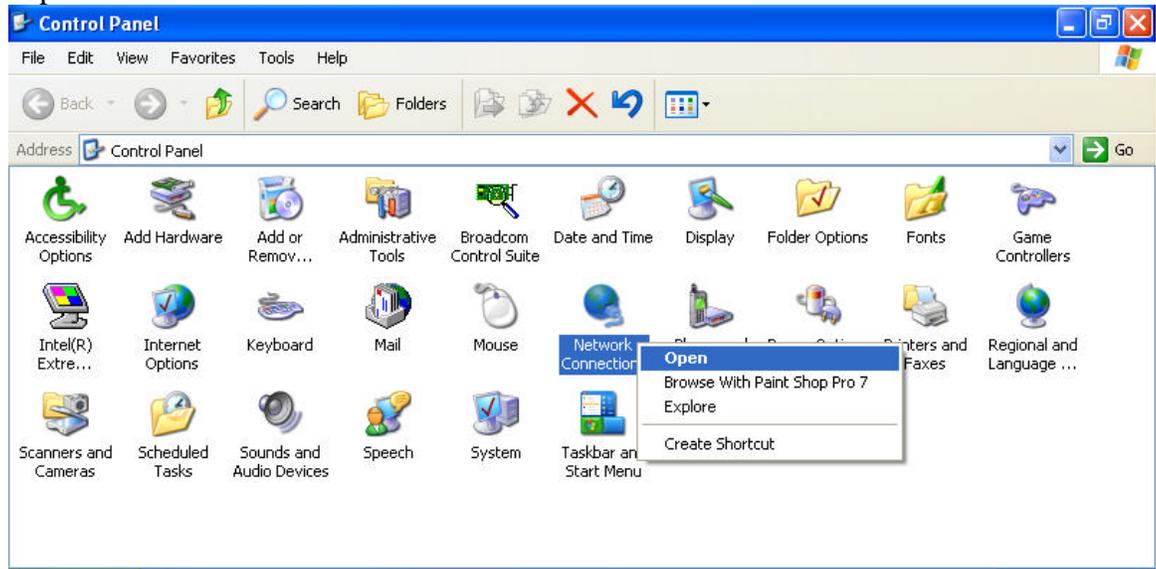
Windows XP Professional has a feature called "Alternate IP Configuration" which allows the PC to automatically select a default static IP address when it is not connected to a network with a DHCP server.

To set the Windows XP Professional Alternate IP address:

1. If connected to a local area network, logout and disconnect the network cable from the PC.
2. Connect a CAT-5 cable from the PC to a switch located on the CobraNet network.
3. Go to <Start> - <Control Panel>.



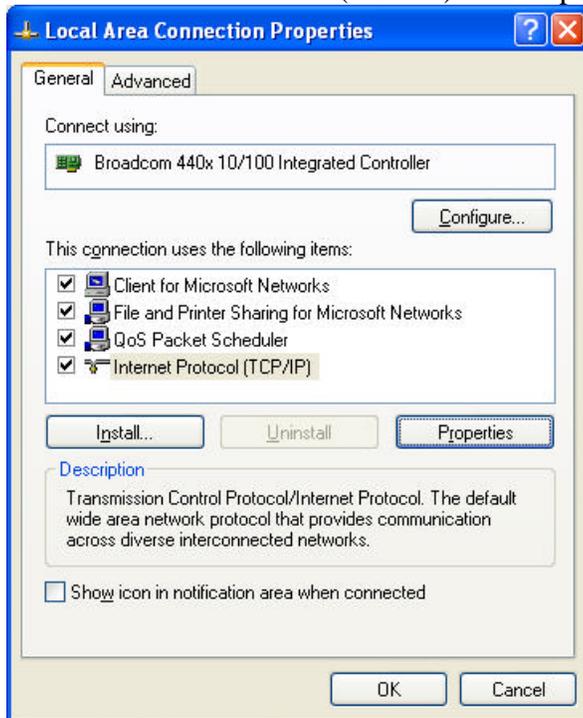
4. Open <Network Connections>



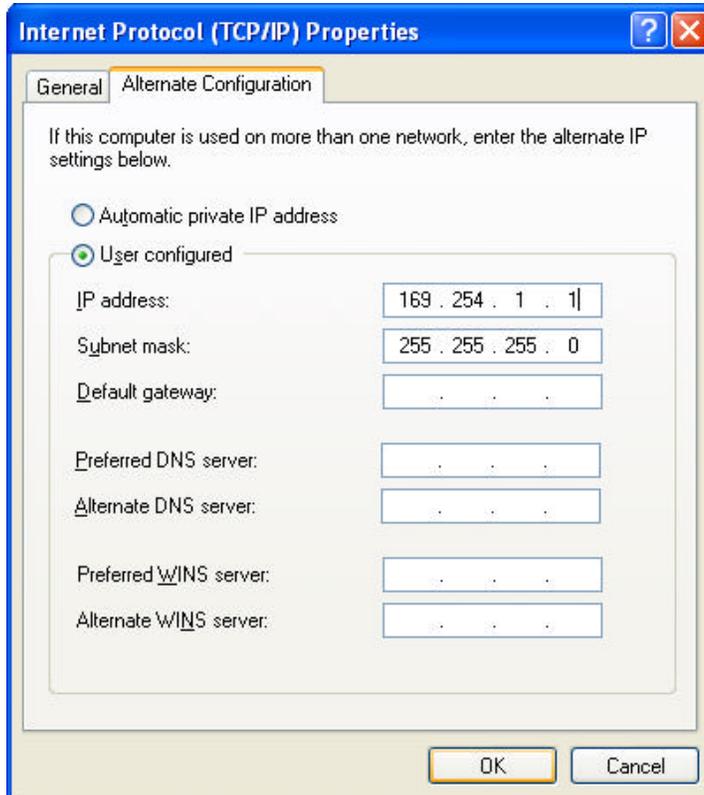
5. Right-click < Local Area Connection> - <Properties>



6. Select <Internet Protocol (TCP/IP)> - <Properties>



7. Choose the Alternate Configuration tab. Enter “169.254.1.1” in the IP address field and “255.255.255.0” in the Subnet mask. <OK> - <OK>



The computer is now still set up to automatically receive an IP address from a DHCP server but in the event that it doesn't get one, it will default to this static IP address. (This can be verified by selecting <Start> - <Run> - type "cmd" - <OK>, a DOS like command window opens. Type "ipconfig" <Enter>. This will list the IP address and Subnet Mask.)

### **Connecting to Whirlwind DCS88 transceivers with Whirlwind Control Software**

Go to [Step 6](#) in the Windows 2000 instructions and continue.