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CPE INSTALLATION MANUAL

Software Version S2.3.0

Chapter 3 revision 2.1 25-Sep-01

TOPICS:

ANTENNA INSTALLATION:

CAUTION: THE ANTENNA ASSEMBLY MUST BE INSTALLED BY AN AUTHORIZED, APPROVED CONTRACTOR IN ACCORDANCE WITH STATE AND LOCAL BUILDING AND ELECTRICAL CODES.

RF EXPOSURE FOR ACCESSIBLE ANTENNA

WARNING: For compliance with the RF exposure requirements regulated by the FCC (Federal Communications Commission), the vertical separation distance of more than 2 meter sshall be maintained between the transmitter, and any part of the user's body.

Warning: **Changes or modifications not expressly approved by Clearwire â Equipment could void the user's authority to operate the equipment.**

Figure 3-1 High Gain Panel Antenna Installation

Figure 3-2 High Gain Reflector Antenna Installation

Typical antenna installations

WARNING:

INSTALLING ANTENNAS NEAR POWER LINES IS DANGEROUS. FOLLOW THE MANUFACTURER'S INSTRUCTIONS IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE U.S. CONSUMER PRODUCT SAFETY COMMISSION.

Antenna installation includes the following:

1. Safety Precautions:

- Check for overhead power lines before beginning installation. Stay at least twice the length of the antenna away from all power lines. TOUCHING MASTS, CABLES, METAL GUY WIRES, ANTENNAS OR ANY METAL OBJECT TO POWER LINES CAN CAUSE A FATAL SHOCK!
- If any part of the installation comes in contact with a power line, DO NOT TOUCH IT OR TRY TO REMOVE IT! Call the local power company.
- Do not use a metal ladder.
- Avoid installing antennas on a windy day.
- Properly ground the installation in accordance with state and local electrical codes.

2. Site preparation:

- Erect masts or towers with grounding systems in accordance with state and local codes.
- Drill holes as needed and prepare antenna for mounting.
- Drill and prepare RF cable access and cable run holes as needed.
- Other custom mounting accommodations as needed (fabricate custom brackets or the like).

3. Antenna Mounting:

- Mount antenna assembly on wall, mast or tower according to manufacturer's instructions.

  NOTE: The antenna must be mounted for vertical polarization.

- Point antenna toward the assigned cell site.

For all antenna locations, point the antenna towards the designated cell site identified by the Network Manager. Use the methods described in the **Site Survey** section of Chapter 2 of this manual to maximize performance and minimize interference.

4. Grounding:

- ROOFTOP INSTALLATIONS
  - Rooftop installations require 2-point grounding using #2 AWG solid copper wire. Bond to any of the following:
    - Building steel or lightning protection ground wire.
    - Cold water main.
    - Ground conductor to exit or halo down.
  - Ground the RF cable at the entry to building or cabinet.
- TOWER INSTALLATIONS
  - Ground all antennas at the top of the tower. Bond to the tower itself, or run a ground conductor down.
  - If the tower is over 200 feet tall, ground the RF cable at the middle of tower.
  - Ground the RF cable at the bottom of the tower.
  - Cadwelds underground.
  - Double lug compression above ground. Bolts must be stainless steel.
  - Kopr-Shield all mechanical interfaces.
  - 2-Point grounding to inside of building.
  - Halo ground installed at least 18 in. below grade.
  - Halo comprised of #2 AWG tinned solid copper wire.
  - Test the grounding system to prove system less than 10 ohms.
  - All grounds should "flow downstream" with minimum bend radius (6 in. for #6, 12 in. for #2).
  - Halo must have 10 ft. ground rods driven down approximately every 10 ft. Rods must be 5/8 in. steel clad with pure copper not less than 0.0012 in.

5. RF Cable Run:

- Run RF cable from antenna to IDU location, again keeping aesthetics in mind. Make it as unobtrusive as possible.
- Form a drip loop close to where the cable enters the building. Caulk and seal around the entrance.
- Connect the RF cable to the ODU and weatherproof the connection following the Installation Instructions in Chapter 2.

IDU INSTALLATION:

Once the antenna assembly is installed and the RF cable is run, install the IDU as follows.

1. Connect the RF cable to the IDU RF connector.
2. Plug the subscriber Ethernet LAN connector into the IDU LAN port. When connecting to the LAN via a hub, use a straight through cable (standard). When connecting directly to a PC, use a crossover cable.
3. Connect the power supply output to the IDU DC PWR connector.
4. Install JET (Java Ethernet Terminal Program) on the PC in accordance with the JET procedure listed below, and start the program.
5. Plug the power supply into an AC outlet to power up the IDU. Check the IDU Indicator LEDs. The PWR and CPU LEDs should be lit, and blinking (blue), and FAULT LEDs (red) should be off, and the LINK LED should be lit (yellow). (Note: The equipment may require up to 3 minutes to establish the link.)
6. Configure the IDU (using JET) with the proper IDU IP Address and Ethernet Host Address (if using NAT) in accordance with the procedure below
7. Once a link is established, contact the network manager to confirm the link and complete the IDU configuration.

CONFIGURATION:

Before beginning normal operation you should perform a communications test. You then must perform, the PC configuration, and the IDU configuration.

PC Communications:

Each participating PC on the subscriber LAN must be properly configured for connection to the Internet using Clearwire® Wireless. Table 3-1 lists the information you'll need before configuring each PC. Obtain this information from your ISP Direct network manager.

Table 3-1 - PC Configuration Information

Site Name

IP Address of Clearwire® G2CPE IDU (Gateway)

Available IP range for this site (Subnet)

IP Address of DNS Server

IP Address of Gateway (same as ISP Direct)

If Nat is used the following is required:

The internal (Intranet) IP Address

The internal (Intranet) IP Range (Subnet)

Before you configure each PC, verify that it has a network interface card (NIC) and is able to communicate with the G2CPE IDU. The best way to do is to use ping utility. At the DOS prompt, type:

C:\> **ping <**IP address of the Clearwire® G2CPE IDU>

If there is a connection problem, you will see a **request timed out** message. This indicates that you don't have the proper TCP/IP connection locally.

- Check the Status Indicator LEDs on the IDU front panel. It should be lit (blue and blinking. There should be no indication of red or yellow LEDs.
- If running NAT (Network Address Translation) in the IDU, make sure that the IP Addresses for your PC and the IDU are within the smallest subnet mask of either PC or IDU. (To be sure, set the IP of the PC is within a +/- 1 count of the internal (Intranet) address of the IDU.
- If not running NAT, make sure that the IP Addresses for your PC and the IDU are within the smallest subnet mask either PC or IDU. (To be sure, set the IP of the PC is within a +/- 1 count of the (Internet or IP address of the Gateway) address of the IDU.
- Make sure your routing tables are set to allow pings to be sent (consult the LAN administrator).

If the ping is successful you'll see this: **Reply from a.b.c.d. bytes= x time=y ms TTL=2**.

After a successful ping, proceed with IDU configuration.

IDU Configuration:

Local configuration of each IDU will give each IDU sufficient information to establish a session with a Master Unit. Each IDU must be configured with the proper IDU IP Address, Subnet Mask, Server, Cell ID, and Maintenance Mode setting. This can be accomplished either before installation or on site. On site programming of the unit will use a PC running the Java Ethernet Terminal (JET) emulation application.

Once a session is established, all configurations can be done remotely from the network manager.

> NOTE: JET will only work with software releases B13x in Gen1 and S230 in Gen2 and greater. Therefore, before going any further, ensure that you are running a release that meets this requirement. Also confirm that the radio is functioning correctly and is in run-time mode.

Establishing a connection to the IDU:

- IDU installation should be completed and the unit should be in the run-time mode at this time.
- Use of NAT should be established at this time.
- If the PC being used has previously been used to communicate with the IDU, start up JET and then reboot the radio (this can be done by cycling power on the IDU). Every time the radio is booted, it will attempt to establish a connection with the Java Ethernet Terminal, based on the data that is contained within the JET.INI file. This file will contain both the IP address of the PC running JET and the port that it will be listening for radios to connect on. In this method the radio will establish a connection with JET just prior to displaying the Device Parameter Menu. As soon as the connection is established, the radio will redirect I/O to the socket and this will allow for the handling of all I/O by JET.

Or

- If the PC has not been used to previously communicate with the IDU, or if the unit is to be used with NAT, start up JET and use the Control → Connect to… option provided in JET. Enter the IP address of the radio you are trying to connect to, in the text field labeled “IP Address” on the Connect to Client screen. The IP Address will be in dotted decimal notation, for example 192.168.100.5. After doing so, press the connect button to start the process. This prompts JET to send a message to the radio, indicating that there is a JET up and running, and it is looking to connect to it. The radio must be on the same sub-network as the PC. (If the subnet is unknown, try setting the PC IP address to one above or one below that of the IDU.)

Once communication is established the following screen will appear:

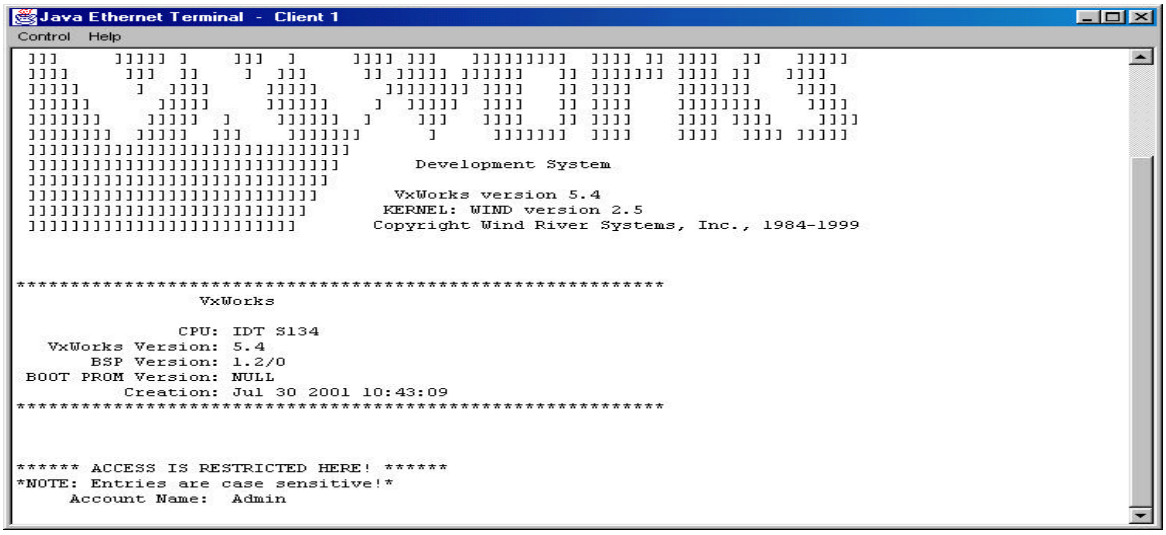

Figure 3-3 VX Works Prompt Screen

- Enter the Account Name for the unit
- The Password entry screen will appear – enter the Password for this unit.

  Note: Entries are case sensitive!
- When User and Password are accepted the Device Parameter menu will appear.

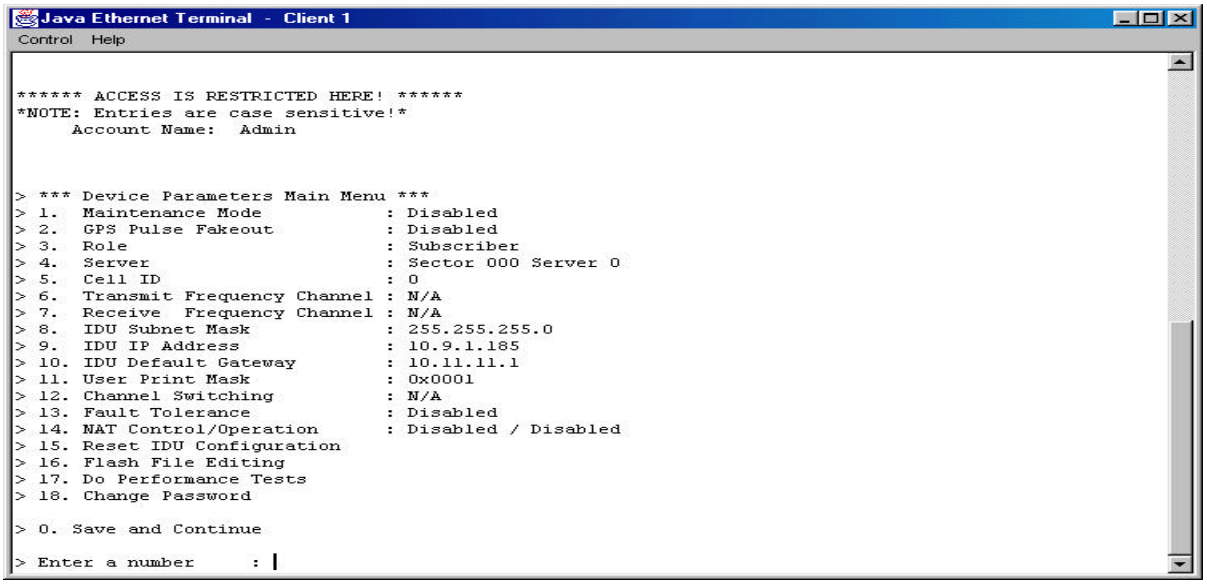

Figure 3-4 Device Parameter Menu

IDU Configuration:

NOTE: The Masters and the Router must be on the same subnet.

- Figure 3-4 shows the Device Parameters Menu.
- In the Device Parameters Menu screen, press the appropriate number to change each parameter. Follow the on screen menu to set or change the Parameter selected.
- Set Maintenance Mode to Disable
- Set Server to the appropriate Server being used
- Set Cell ID to the proper ID
- Set IDU IP Address to the proper Address
- Set the IDU IP Submask to the proper Address

- Press **0** to quit when done.

PC Configuration:

1. Using either Windows 95®, 98® or Windows NT®, select **Start | Settings | Control Panel.** (see Figure 3-5)

2. Open the **Network** (Figure 3-6) property window.

NOTE: For Windows 3.1® or lower, you'll need to use other TCP/IP software, such as Novell®. For other operating systems, such as MAC or Unix, consult the manufacturer for TCP/IP setup procedures.

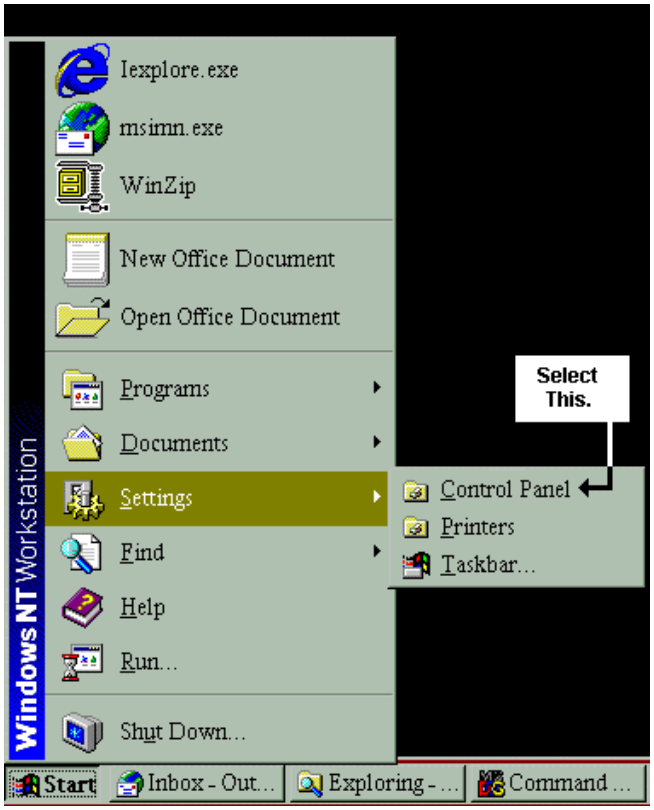

Figure 3-5

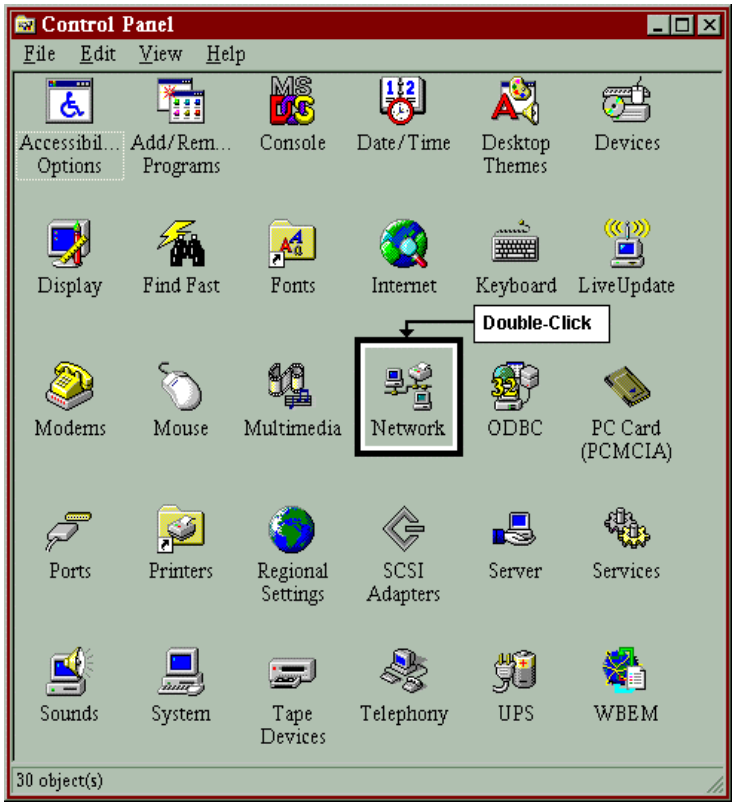

Figure 3-6

3. Open the TCP/IP Properties window.

   a. For Windows 95® or 98®: Select **Configuration| TCP/IP| Properties**. (Figure 3-7)

   b. For Windows NT®: Select **Protocols| TCP/IP Protocol| Properties**. (Figure 3-8)

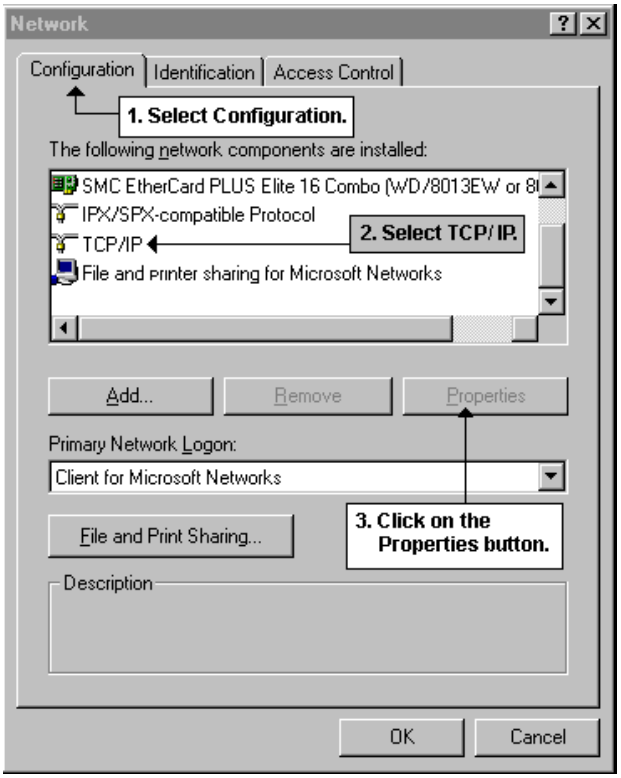

Figure 3-7 Windows 9x â

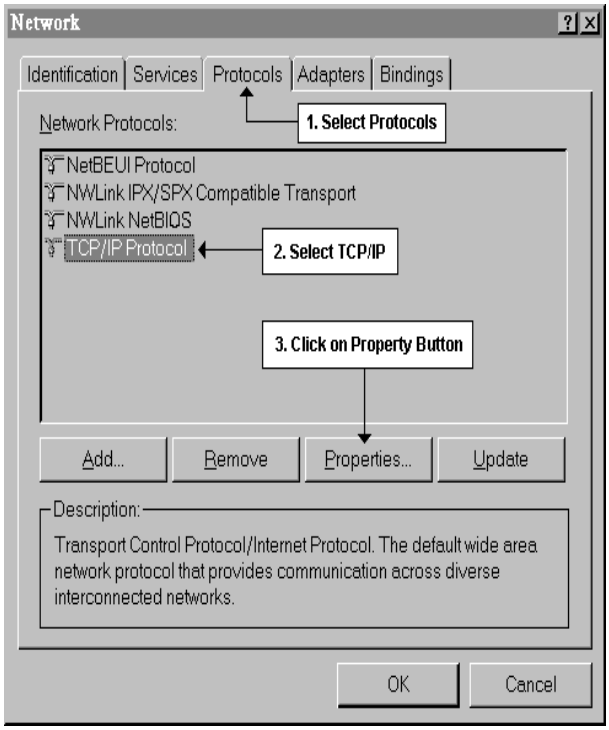

Figure 3-8 Windows NT â

4. Enter the IP and Gateway Address. The Gateway Address is the default intermediate destination for IP packets.

a. For Windows 9x®or NT®: (Figure 3-9)

1) Select the **IP Address** tab.

2) Check the **Specify IP Address** button.

3) Enter the IP Address for the PC.

4) Enter the subnet mask. (255.255.255.0 for most cases. Consult the LAN administrator for exceptions.)

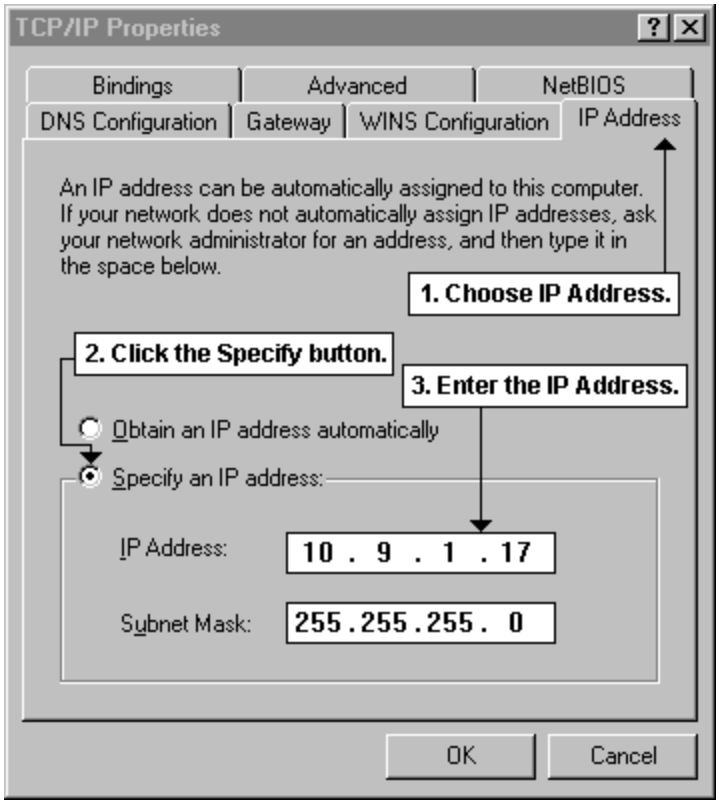

Figure 3-9

5) Select the **Gateway** tab.

6) Enter the Gateway Address (IDU IP Address).

7) Click the **Add** button to add the Gateway Address.

b. For Windows NT®:

1) Select the **IP Address** tab.

2) Choose the appropriate interface.

3) Check the **Specify an IP address** button.

4) Enter the IP Address for the PC.

5) Enter the subnet mask. (255.255.255.0 for most cases. Consult the LAN administrator for exceptions.)

6) Enter the Gateway Address (IDU IP Address).

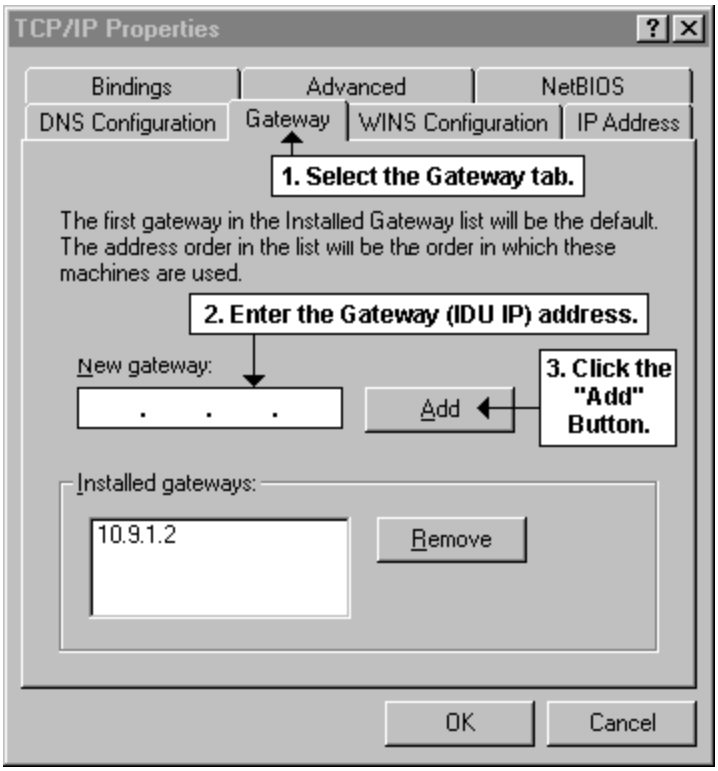

Figure 3-10 Windows 9x â

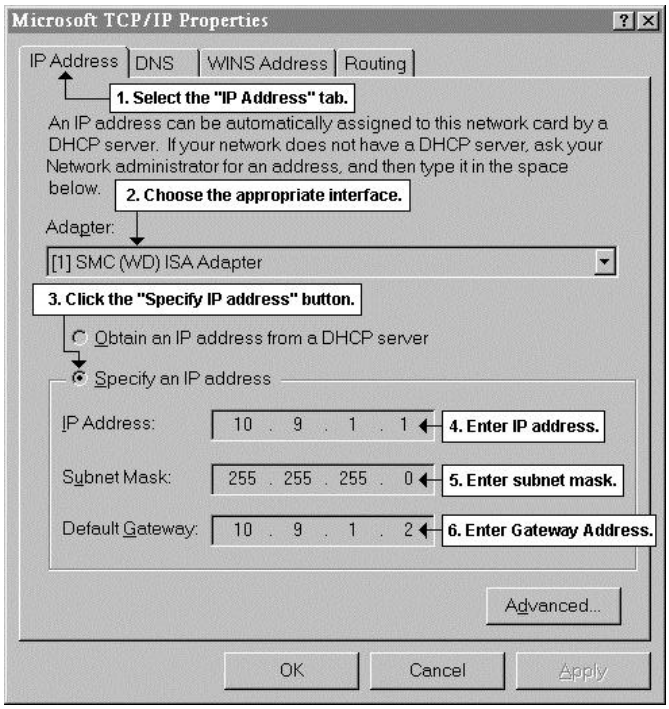

Figure 3-11 Windows NT â

5. DNS server configuration. The DNS server program that runs at the ISP side resolves domain names to IP addresses. To be connected to Internet, the PC has to know the IP address of this server in order to request IP resolution. Most ISP's have a primary and a secondary DNS server.

   a.) For Windows 95® or 98®: (see Figure 3-12)

      1.) Select the **DNS Configuration** tab.

      2.) Check the **Enable DNS** button.

      3.) Enter the DNS server IP address.

      4.) Click the **Add** button.

      5.) Repeat steps 3) and 4) for each additional DNS server IP address.

   b.) For Windows NT®:(see Figure 3-13)

      1) Select the **DNS** tab.

      2) Press the **Add** button. When prompted, enter the DNS IP address.

      3) Repeat step 2) for each additional DNS server IP address.

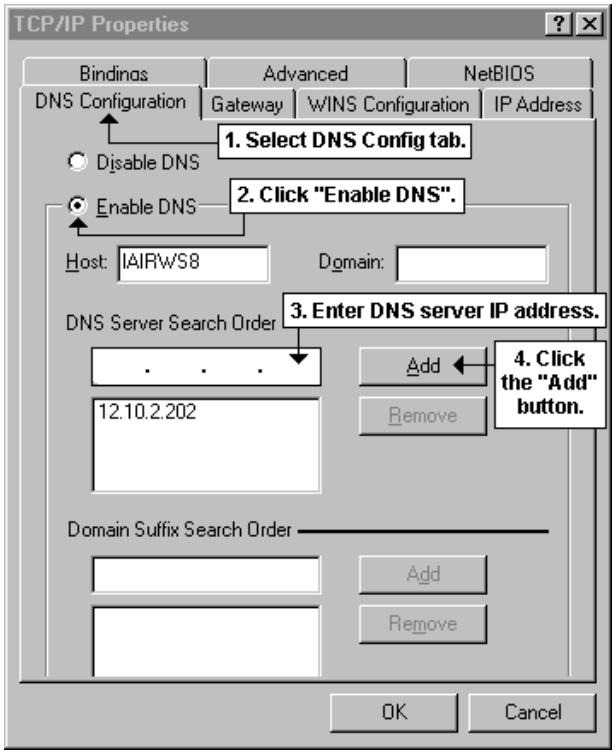

Figure 3-12 Windows 9x â

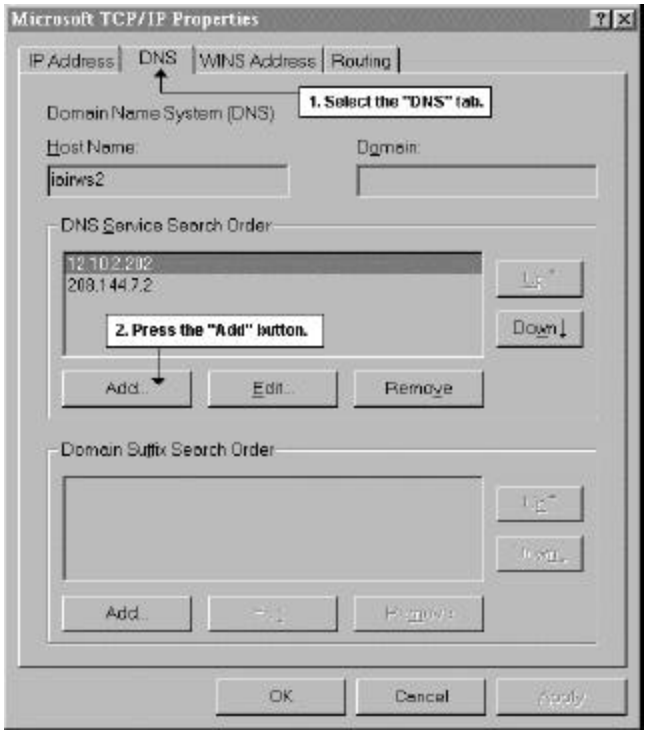

Figure 3-13 Windows NT â