BY JOHN E. JOHNSTON

Integrating Windows NT Into an Existing NetWare Network: Part II

While a great deal of thought, planning and preparation go into establishing a solid TCP/IP foundation for the Windows NT network to utilize, you can streamline your efforts by setting up a DHCP server. This will prevent you from having to manually assign and manage the TCP/IP addresses of your workstations and prepare your site for the installation of a DNS and/or WINS server.

ONE of the most important lessons I've learned since starting this project is to not implement Windows NT networking resources for the end users until a rock-solid TCP/IP environment has been established. One of the problems that plagues many NetWare administrators occurs when they inadvertently roll out a Windows NT network using the NetBEUI protocol instead of TCP/IP or IPX/SPX. NetBEUI will wreak havoc on medium- and large-scale networks. For speed of implementation, many network administrators will also roll out Windows NT resources without first establishing a WINS, DNS, or DHCP server. If you do this, you will find yourself going back to each workstation to clean up the mess you made.

In Part I (*Technical Support*, March 1998), I discussed the implementation of a DNS under Windows NT Server. In this article I will demonstrate how to establish a DHCP server under Windows NT.

IMPLEMENTING DHCP UNDER WINDOWS NT SERVER 4.0

You should implement a DHCP server early in the process of implementing a Windows NT network. The DHCP server can perform the following functions for your TCP/IP environment:

♦ automatically assign TCP/IP addresses for your workstations
♦ automatically assign DNS entries for your workstations
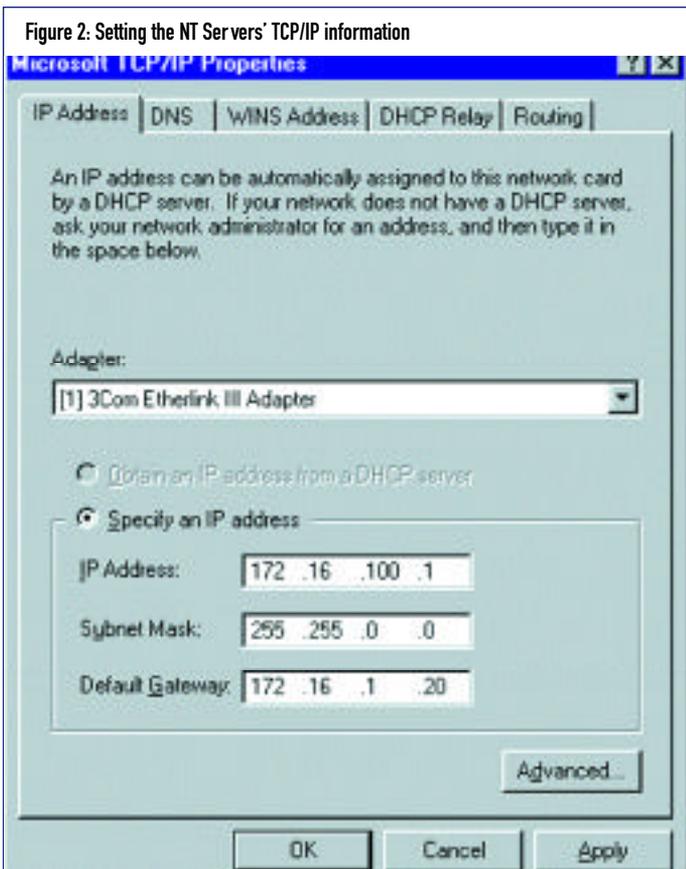♦ automatically assign WINS server address(es) for your workstations

Even if you do not currently have a DNS or WINS server attached to your network, you should implement a DHCP server, using it solely to administer TCP/IP addresses to your workstations. When you do decide to implement a DNS and/or WINS server you can simply modify the DHCP server so that it passes the IP addresses of these machines to your workstations. This will save you the headache of modifying the network settings on all of your workstations when you add the DNS and/or WINS servers.

Installing the DHCP Service

The implementation of the DHCP service under Windows NT Server 4.0 is relatively simple to perform. The following section will give you a step-by-step guide to implementing DHCP.

1. Click on Start > Settings > Control Panel > Network.

2. Click on the Services tab within the Network applet.

3. Click on Add then select "Microsoft DHCP Server." You will be prompted to insert the Windows NT Server CD-ROM and several files will be copied to the hard drive of your NT server.

4. You will receive a message telling you that any IP addresses configured on the servers' adapter card(s) must be changed to static addresses, as shown in Figure 1. Click on OK.

5. Click on Close in the Network panel. If your NT server already has IP addresses configured on its network adapter cards, you will be prompted to restart your computer.

Figure 1: DHCP Static Address Warning

If any adapters are using DHCP to obtain an IP address, they are now required to use a static IP address. Press Close on the Network Control Panel and the TCP/IP Property Sheet will be displayed allowing you to enter an address.

OK

Figure 2: Setting the NT Servers' TCP/IP information

Microsoft TCP/IP Properties

IP Address | DNS | WINS Address | DHCP Relay | Routing |

An IP address can be automatically assigned to this network card by a DHCP server. If your network does not have a DHCP server, ask your network administrator for an address, and then type it in the space below.

Adapter:

[1] 3Com Etherlink III Adapter

○ Obtain an IP address from a DHCP server

● Specify an IP address

IP Address: 172 .16 .100 .1

Subnet Mask: 255 .255 .0 .0

Default Gateway: 172 .16 .1 .20

Advanced...

OK   Cancel   Apply

6. If your server does not already have IP addresses assigned, the TCP/IP properties panel will be displayed. Enter the TCP/IP address, Subnet mask, and Default Gateway information in this panel. The server in this example utilizes the TCP/IP settings shown in Figure 2.

After re-booting the server, a new tool named DHCP Manager will be placed in the Administrative Tools (Common) group.

TIP: *Whenever you install a new service on a Windows NT server and files are copied from the Windows NT CD-ROM, you must re-apply the service pack to provide the latest maintenance to the new service. For example, if your NT Server has Service Pack 3 installed, then to install the DHCP service, you must re-apply Service Pack 3 after the DHCP service has been added.*

Configuring the DHCP Service

We are now ready to configure the DHCP service to meet the needs of your organization. In the following sections we will see how to configure the DHCP service to perform the following:

♦ assign TCP/IP addresses to your workstations
♦ assign DNS addresses to your workstations
♦ assign the Default Gateway to your workstations
♦ assign the WINS server(s) addresses to your workstations

Configuring the DHCP Address Range

We must define a pool of TCP/IP addresses that the DHCP service can pull from to assign TCP/IP addresses to the workstations on your network. The following steps will show you how to define this address pool:
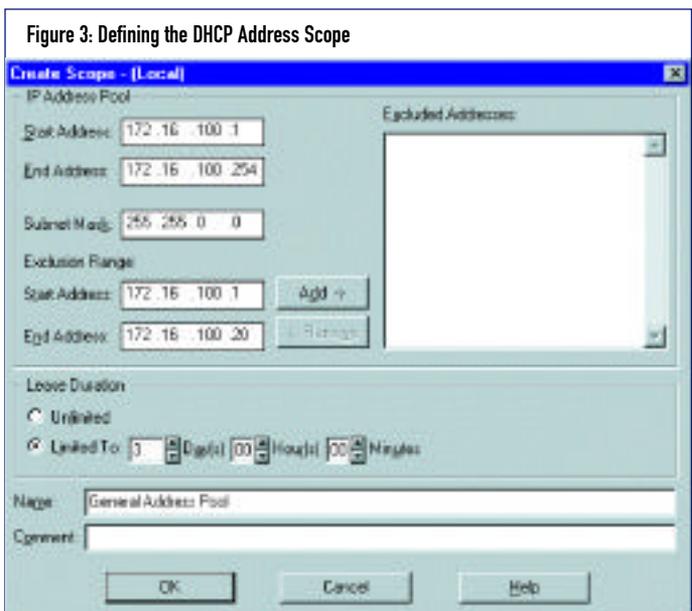
1. From the DHCP Manager, click on Scope > Create.

Note: *If the Create option is grayed out, click (or double-click) the "Local Machine" entry under DHCP Servers.*
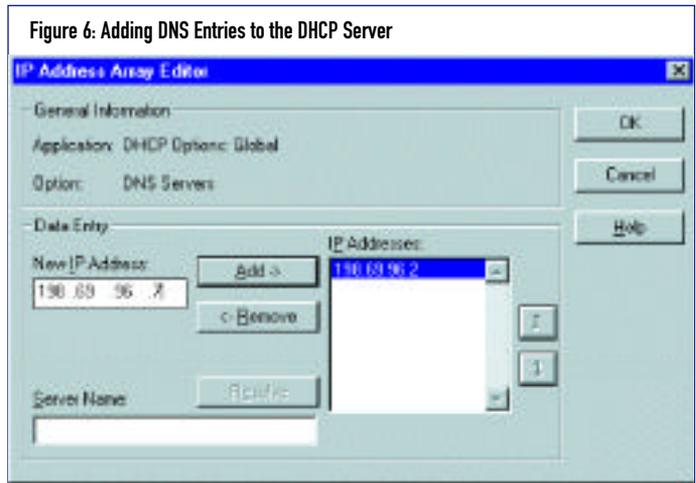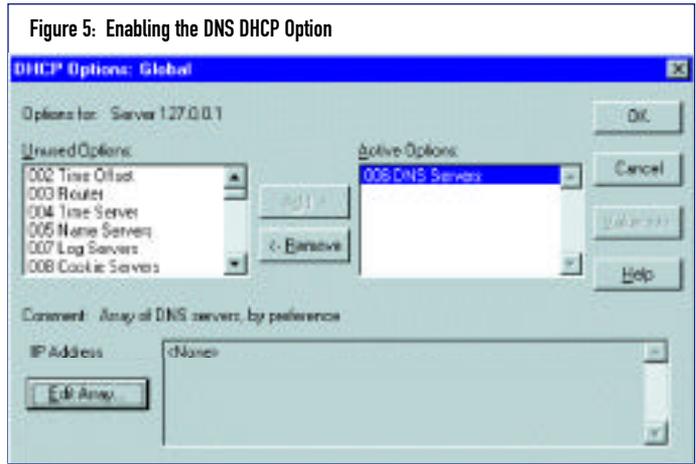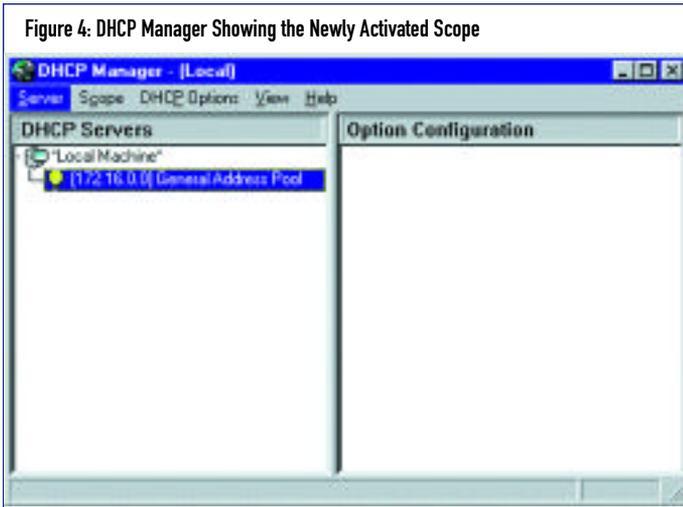
> **Even if you do not currently have a DNS or WINS server attached to your network, you should implement a DHCP server, using it solely to administer TCP/IP addresses to your workstations.**

2. The panel shown in Figure 3 will be displayed. From this panel, you can specify the range of addresses that this DHCP server manages. You can also specify an Exclusion Range. Addresses in the Exclusion Range are not "leased out" by the DHCP server.

TIP: *You should specify several addresses in the Exclusion Range. The addresses in this range can then be manually assigned to servers and other network nodes that require a static IP address.*

3. You should also set the Lease Duration field. There are several schools of thought about DHCP lease durations. Some say a

Figure 3: Defining the DHCP Address Scope

Create Scope - [Local]

IP Address Pool

Start Address: 172 .16 .100 .1

End Address: 172 .16 .100 .254

Subnet Mask: 255 .255 .0 .0

Excluded Addresses:

Exclusion Range:

Start Address: 172 .16 .100 .1   Add ->

End Address: 172 .16 .100 .20   <- Remove

Lease Duration

○ Unlimited

● Limited To: 3 Day(s) 00 Hour(s) 00 Minutes

Name: General Address Pool

Comment:

OK   Cancel   Help

Figure 4: DHCP Manager Showing the Newly Activated Scope

Figure 5: Enabling the DNS DHCP Option

Figure 6: Adding DNS Entries to the DHCP Server

short lease is preferable, while other say a long lease is better. The choice between a long or short lease depends upon your particular environment.

4. When you finish defining the scope, click on OK. A message will be displayed asking if you wish to activate the new scope. Click on Yes. Your DHCP Manager screen should now resemble the panel shown in Figure 4.

Configuring the DHCP to Assign DNS Addresses

The DHCP service can assign DNS addresses for your workstations to use. This is very handy when you add or remove DNS servers from your network as your workstations will pick up these changes from your DHCP. Without this function you would be required to modify each workstation on your network whenever you added or removed a DNS server.

From the DHCP Manager, click on the DHCP Options menu item. You will notice that three options are present: Scope, Global, and Default. In the example shown in this article, only one scope is defined for a single subnet. You could add scopes for other subnets within the DHCP setup. When you add options under the Global DHCP options, these parameters apply to all subnets defined in the DHCP server. This is used for settings, such as the DNS addresses, that do not change from subnet to subnet. If you are managing a multi-subnetted network, you may wish to specify a different Default Gateway address for each subnet. This is done using the Scope DCHP option.

Let's add our DNS parameters to the DHCP server. We will be using all Global DHCP options since we are only dealing with a single subnet.

1. Click on DHCP Options > Global from the DHCP Manager.
2. We must now activate the DNS Servers option from the Unused Options list, as shown in Figure 5, by highlighting DNS Servers from the Unused Options list, then clicking on Add.
3. Click on Value, then click on Edit Array.
4. Add your DNS entries as shown in Figure 6. Click on OK.

Configuring the DHCP to Assign Default Gateway Addresses

The DHCP service can also be used to assign the Default Gateway for your workstations to use. The following steps are

required to configure the DHCP service to assign the Default Gateway address to your workstations:

1. From the DHCP Manager, click on DHCP Options > Global. As stated earlier, Global defines parameters used by all subnets defined in the DHCP server. You may need to specify a different Default Gateway for each subnet defined in your server, in which case you would use the Scope option.

2. We must now activate the Router option by highlighting Router from the Unused Options list and clicking on Add.

3. Click on Value, then click on Edit Array.

4. Add your Default Gateway as shown in Figure 7 and click on OK.

Configuring the DHCP to Assign a WINS Address

The DHCP service can also be used to assign the WINS server address(es) for your workstations to use. The following steps are required to configure the DHCP service to assign the WINS server address(es) to your workstations:

1. From the DHCP Manager, click on DHCP Options > Global.
2. Activate the following two options from the Unused Options:
```
WINS/NBT
WINS/NBT Node Type
```

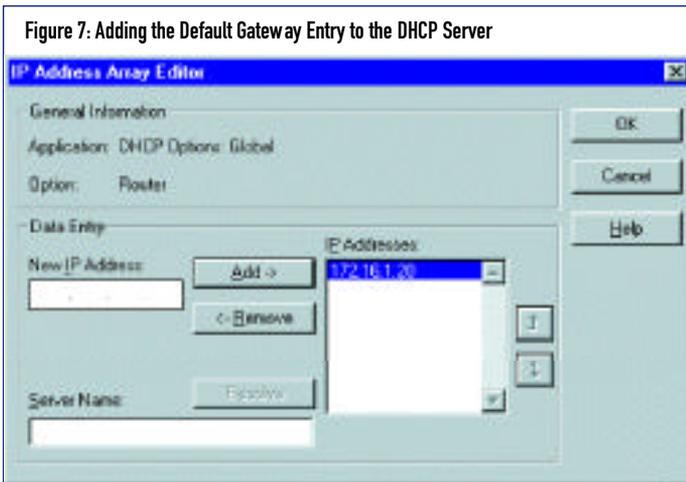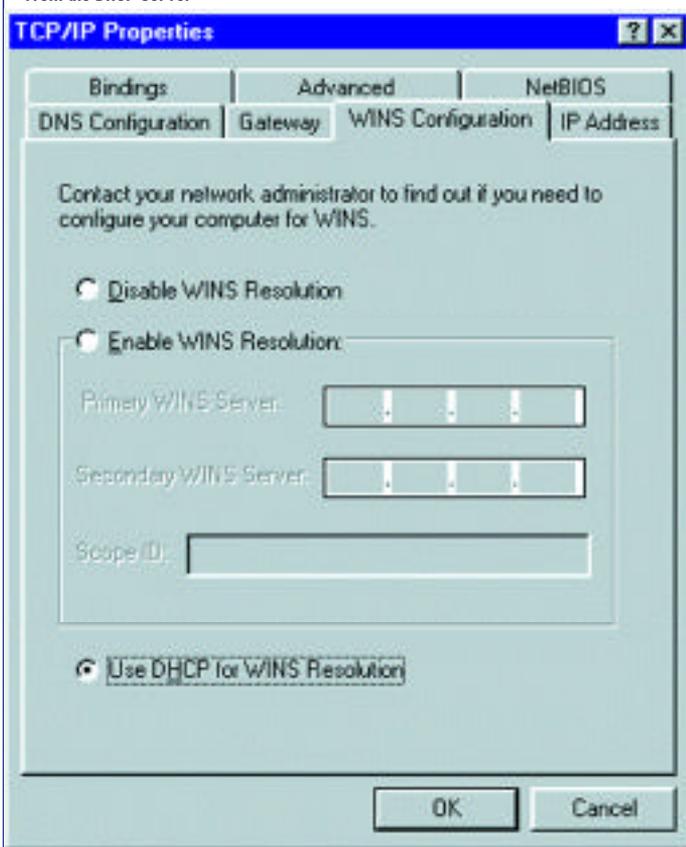Figure 7: Adding the Default Gateway Entry to the DHCP Server

Figure 8: Directing a Windows NT Workstation to Obtain its WINS Address(es) From the DHCP Server

3. Change the value for the WINS/NBTNode Type to 0x8 using the Value and Edit Array buttons.

4. Add your WINS servers' IP address in the WINS/NBT option using the Value and Edit Array buttons.

MODIFYING YOUR WORKSTATIONS TO USE THE DHCP

Once you have your DHCP server up and configured, you are ready to configure your workstations to use the DHCP. In this section, I will show you how to configure a Windows NT 4.0 Workstation and a Windows 95 workstation to use the DHCP service.

Modifying a Windows NT Workstation

The following steps can be used to configure a Windows NT 4.0 Work-station to use the DHCP service created and configured previously:

1. Click on Start > Settings > Control Panel > Network.

2. Click on the Protocols tab.

3. Double-click on the TCP/IP Protocol.

4. Click on the radio button: Obtain an IP address from a DHCP Server.

5. Check your DNS and WINS network settings. If you configured your DHCP to provide these addresses, you should remove any information in these fields.

6. Restart your Windows NT Workstation to pick up the changes just made.

7. After your workstation re-boots, check the TCP/IP settings to ensure that the DHCP process is correctly assigning your IP address, DNS settings, and WINS address.

To check your settings on a Windows NT 4.0 Workstation, perform the following:

1. Open the Command Prompt application by clicking on Start > Programs > Command Prompt.

2. Type ipconfig /all and press ENTER. You should see the following information:

♦ your workstation's IP address
♦ the subnet mask
♦ DNS address(es)
♦ WINS address(es)
♦ lease obtained date
♦ lease expired date

Modifying a Windows 95 Workstation

We are now ready to modify the setting of our Windows 95 workstation(s) to utilize the DHCP server that we set up previously.

1. Click on Start > Settings > Control Panel > Network.

2. Click on the Protocols tab.

3. Double-click on the TCP/IP Protocol.

4. From the IP Address tab, click on the radio button: Obtain an IP address from a DHCP Server.

5. If you set up your DHCP server to assign the WINS address(es), click on the WINS Configuration tab, then click on the radio button for Use DHCP for WINS Resolution, as shown in Figure 8.

Figure 9: Disabling the Windows 95 DNS Parameters to Allow DHCP to Supply Same
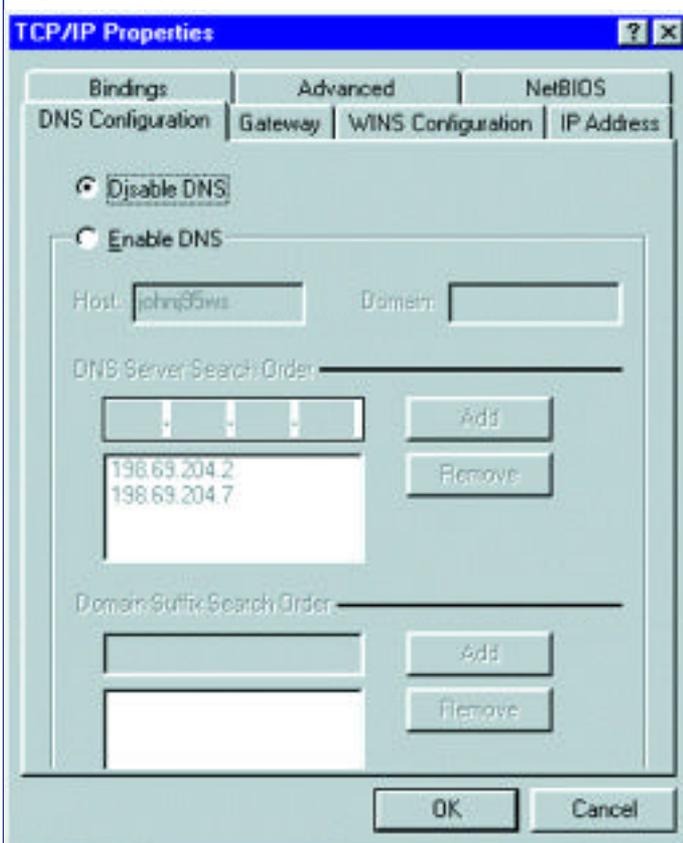

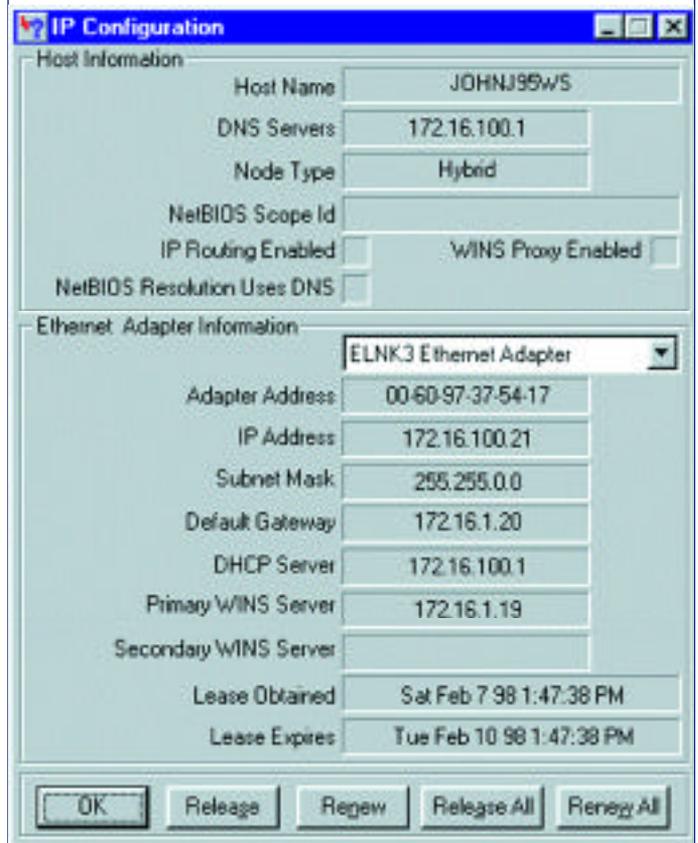Figure 10: Checking the Windows 95 Workstation IP Settings Using the WINIPCFG Command

Figure 11: DHCP Manager Showing All Active Workstations That Have Been Serviced by the DHCP Server

Disable DNS radio button on and your DHCP server is configured to hand out the DNS addresses, your DNS settings will be supplied from the DHCP server.

7. Restart your Windows 95 workstation to pick up the changes just made.

8. After your workstation re-boots, check the TCP/IP settings to ensure that the DHCP process is correctly assigning your IP address, DNS settings, and WINS address.

To check your settings on a Windows 95 workstation, perform the following:

1. Click on Start > Run and enter WINIPCF.

2. When the WINIPCFG program start click on the More Info button.

3. A panel similar to the one shown in Figure 10 will be displayed. Notice that the DNS Server, IP address, Subnet Mask, Default Gateway, and WINS server address are already configured. Notice that you are also given the IP address of the DHCP server that provided these addresses. The Lease Obtained and Lease Expires fields are also displayed for your information, as well.

USING DHCP MANAGER TO MONITOR DHCP ADDRESS ASSIGNMENTS

You may wish to periodically monitor the status of the TCP/IP addresses assigned by your DHCP server. To do this, perform the

6. Check your DNS settings by clicking on the DNS Configuration tab. If you configured your DHCP to provide your DNS address(es), you should click on the Disable DNS radio button, as shown in Figure 9. This may seem a contradictory, but here is how it works: If you have the Enable DNS option specified in the Windows 95 DNS Configuration tab, your workstation will use the settings supplied on this panel. If you have the

following from the Windows NT Server that is running your DHCP process:

1. Click on Start > Programs > Administrative Tools (Common) > DHCP Manager.

2. Double-click on the Local Machine entry.

3. Double-click on the General Address Pool entry. A panel similar to the one shown in Figure 11 will be displayed, showing all of the active clients that have been serviced by the DHCP. In this example, only one workstation is active.

CONCLUSION

As you can see, a great deal of thought, planning and preparation must be performed to establish a solid TCP/IP foundation for the Windows NT network to utilize. You can implement a Windows NT network without performing any of the steps illustrated in this article, but you will be flirting with disaster if you do so. If you are under extreme pressure to get your Windows NT network established in a very short time frame, do yourself a favor and at least set up a DHCP server. This will prevent you from having to manually assign and manage the TCP/IP addresses of your workstations and will also position you for the eventuality of installing a DNS and/or WINS server.

Part III will discuss the Windows NT browsing service. I will also demonstrate how to install and configure a WINS server under Windows NT Server 4.0. **ts**

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