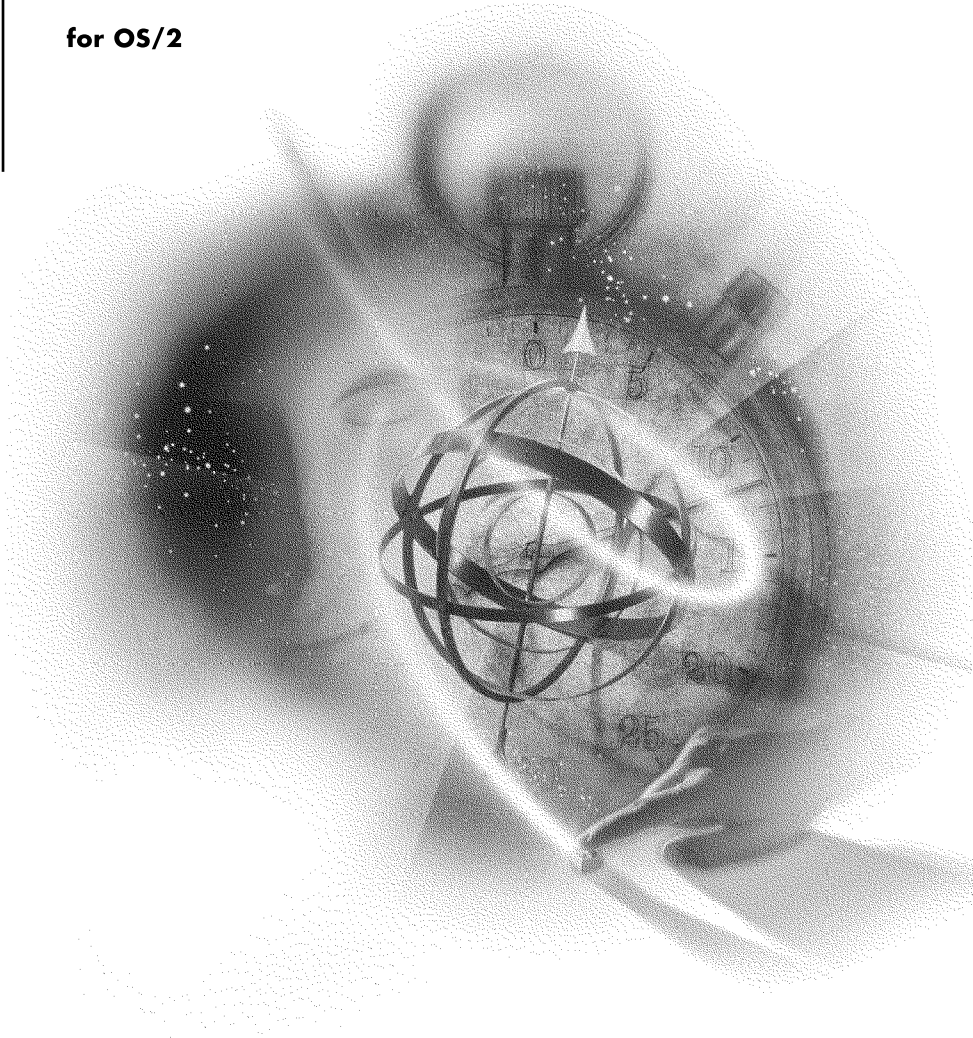


**NetWare Workstation**

**for OS/2**



**NetWare® 3.12**  
NETWORKING SOFTWARE

**Novell®**

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Novell, Inc.  
122 East 1700 South  
Provo, UT 84606  
U.S.A.

[www.novell.com](http://www.novell.com)

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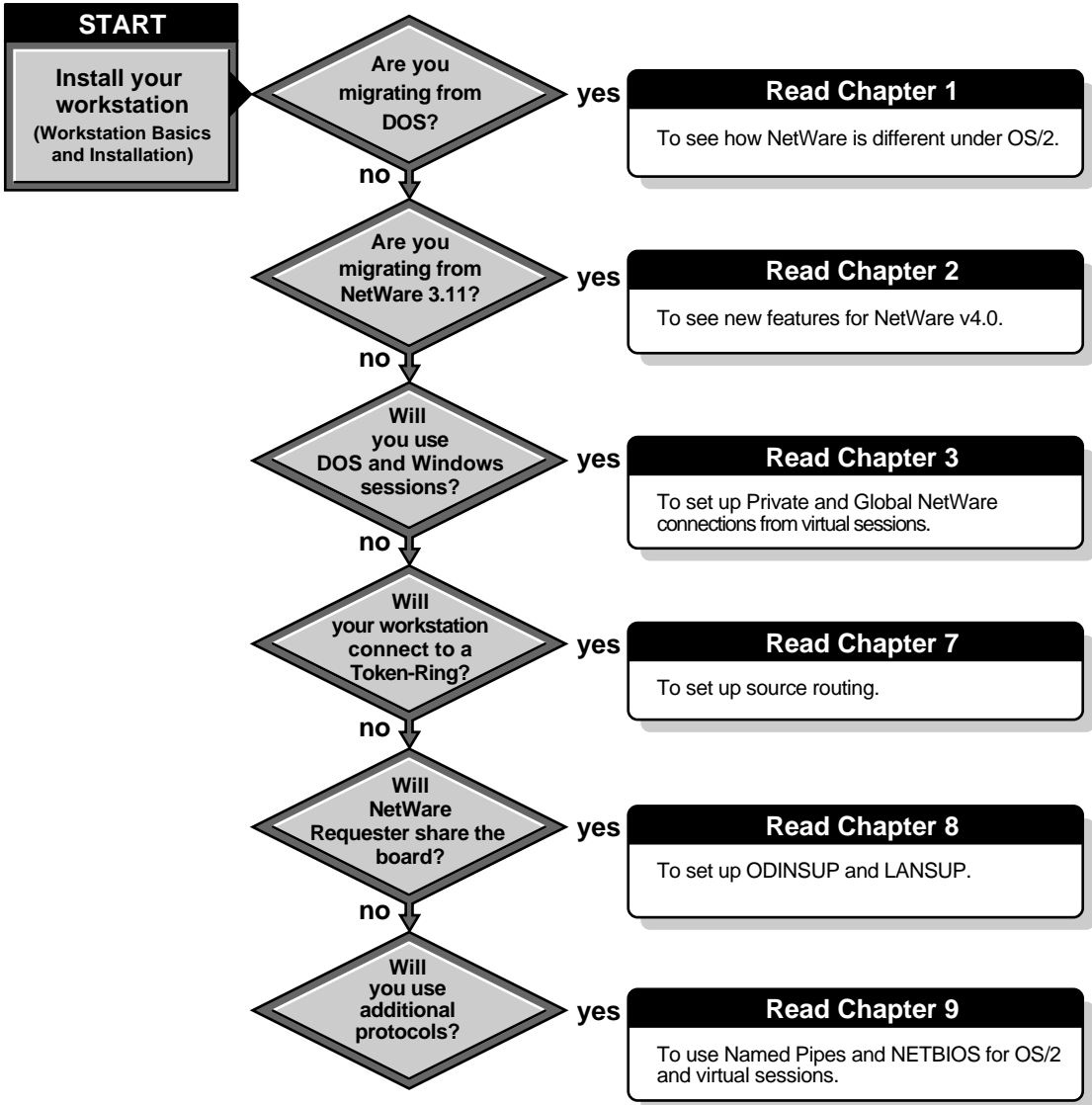
# How to Use This Manual

Before using this manual, use the *Workstation Basics and Installation* manual to install the NetWare Requester for OS/2.

This manual explains how to configure your network connection for your OS/2 workstation. Follow the chart on **Figure 1 on page 2** to determine which parts of the manual to use.

This manual is also accompanied by a quick reference card. This card provides an overview of the installation process and a list of all NET.CFG options.

Figure 1 How to use this manual



# 1

## Information for DOS Users Migrating to OS/2

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**Topic**

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“ODI LAN Drivers” on page 4

“IPX” on page 4

“NET.CFG File” on page 5

“Logging In” on page 5

“Utilities” on page 6

“Drive Mappings and Search Drives” on page 6

“Other Protocols” on page 7

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This chapter explains the basic differences between using NetWare from an OS/2 workstation and using NetWare from a DOS workstation.

For information about OS/2, see the *OS/2 Installation Guide* or the online “Master Help Index.”

After you install the NetWare Requester on your workstation, you can connect to a NetWare network and perform basic network tasks.

The NetWare Workstation for OS/2 kit also provides the same protocol support that the NetWare Workstation for DOS and Windows kit provides:

- ♦ IPX
- ♦ SPX
- ♦ Named Pipes
- ♦ NetBIOS emulation

## ODI LAN Drivers

ODI LAN drivers used by the Requester serve the same purpose and follow the same technical specifications as ODI LAN drivers used by the NetWare Workstation for DOS and Windows software.

OS/2 ODI drivers have the same filenames as DOS ODI drivers, except they have a .SYS extension instead of a .COM extension.

OS/2 ODI drivers are loaded in the CONFIG.SYS file, whereas the DOS ODI drivers are loaded in the AUTOEXEC.BAT. (For OS/2, network drivers are always loaded in CONFIG.SYS. AUTOEXEC.BAT is not used in OS/2. OS/2 requires all device drivers to be loaded in the CONFIG.SYS. file).

## IPX

The NetWare Requester uses the IPX protocol to connect to NetWare servers. For OS/2, IPX is a .SYS file and is loaded in the CONFIG.SYS file with the other NetWare drivers.

If you use virtual DOS sessions in OS/2, those sessions use a virtualized version of IPX.SYS, called VIPX.SYS. VIPX talks to IPX to allow DOS sessions to communicate on the network. In a virtual DOS session, you run VIPX provided with the Requester rather than the IPX provided in the NetWare Workstation for DOS and Windows kit.

When you install the NetWare Requester, lines to load IPX and VIPX are loaded automatically in CONFIG.SYS.



# NET.CFG File

The NET.CFG file serves the same purpose under OS/2 as it does under DOS: it allows you to configure your network connection.

The NET.CFG file for OS/2 has options and settings just as the NET.CFG file in DOS does. However, the options and settings are somewhat different. Some of them use different syntax and configure different software components.

Because of this, you cannot just copy a NET.CFG from a DOS workstation to an OS/2 workstation and expect it to work. You should instead create a new NET.CFG file for the OS/2 workstation (if NET.CFG is required).

In OS/2, the NET.CFG file is created and edited with the NetWare Requester installation program. This program contains online help showing the syntax of all options.

In DOS, the NET.CFG file is created and edited with a text editor.

You can put both DOS and OS/2 NET.CFG options into the same NET.CFG file on your OS/2 workstation. Then, when you run a private virtual DOS session, the NetWare Workstation for DOS and Windows software will use the DOS options. The NetWare Requester for OS/2 ignores the DOS options.

## Logging In

When you boot your workstation, the NetWare Requester automatically maps drive L: to the SYS:LOGIN directory. This mapping combines with the L:\OS2 mapping the Requester installation puts in your path, and gives you a search path to the login utilities. You do not have to change to drive L: in order to log in.

The NetWare Requester for OS/2 does not support a LASTDRIVE setting in the NET.CFG file.

You can log in from any OS/2 session or the desktop, and your login applies to all other OS/2 sessions. For example, if you logged in from the command line of an OS/2 session and then you went to the desktop and used the NetWare Tools, you would already be logged in to the location you logged in to at the command line.

**NOTE:** You cannot login to the network from the NetWare Tools.

You can also log in to the network from virtual DOS sessions running on OS/2. You can set up virtual sessions so that each session can support its own

login to the network (private sessions), or so that all sessions—including OS/2—share a single login to the network (global sessions).

Network support from virtual DOS sessions works much the same as network support from regular DOS workstations. You will use a NETX.EXE shell and a virtualized version of IPX, VIPX.SYS. [Chapter 3, “Network Access from Virtual DOS and Windows,”](#) on page 19 explains more about setting up virtual sessions.

**NOTE:** When logging in from virtual sessions, you do not have NetWare Directory Services support. This means that you can only log in to a NetWare v4.0 network that has bindery emulation. If you boot a DOS session from a real DOS kernel instead of the one shipped with OS/2, you can run the NetWare Workstation for DOS software and obtain NetWare v4.0 functionality.

## Utilities

NetWare utilities for OS/2 have the same names as NetWare utilities for DOS. However, OS/2 utilities are different executable files than DOS utilities.

NetWare OS/2 utilities are in the SYS:PUBLIC\OS2 and SYS:LOGIN\OS2 directories so they do not overlap with NetWare DOS utilities in the SYS:PUBLIC and SYS:LOGIN directories. If you run a NetWare DOS utility in OS/2, OS/2 will try to start a DOS session to run that utility.

Because the OS/2 utilities may not be installed on all servers, the NetWare Requester installation program copies LOGIN, NLIST, MAP, and CX to the \NETWARE directory where the Requester files are located. This allows you to access other servers where OS/2 utilities are installed.

## Drive Mappings and Search Drives

Search drives are not used in OS/2. Instead, the search functionality to the NetWare utilities and other programs is set up with PATH, LIBPATH, and DPATH statements in the CONFIG.SYS file. The *OS/2 Installation Guide* contains more information about PATH, LIBPATH, and DPATH.

### Mapping to Login Utilities

When you boot your workstation, the NetWare Requester connects to the first server it finds and maps drive L: to the SYS:LOGIN directory. This mapping combines with the L:\OS2 mapping the Requester installation puts in your path, and gives you a search path to the login utilities. Once you log in, the L: mapping disappears.

## Mapping to Public Utilities

The NetWare v4.0 default login script for OS/2 contains the following line mapping drive P: to the utilities:

```
MAP P: =SYS:PUBLIC
```

This mapping combines with the P:\OS2 mapping the Requester installation puts in your path and gives you a search path to the SYS:PUBLIC\OS2 directory. When you type a utility name from any drive other than P:, the utility from the \OS2 subdirectory will be executed.

**IMPORTANT:** Even though your search path gets set to SYS:PUBLIC\OS2 by default, your P: drive stays mapped to SYS:PUBLIC. If you change to the P: drive, you will be in the SYS:PUBLIC directory, not the SYS:PUBLIC\OS2 subdirectory. If you type a utility name while at the P: drive, the DOS version of the utility will be executed.

If you go to drive P: and then change to the \OS2 subdirectory, your search path will no longer be valid. Your search path will be expecting to find an \OS2 subdirectory to the P: drive. Since drive P: will be mapped to SYS:PUBLIC\OS2, the OS/2 path command will be looking for a directory with the following name:

```
SYS:PUBLIC\OS2\OS2
```

Chapter 3, "Creating Login Scripts and Menus," in *Supervising the Network* and Chapter 4, "Create Login Scripts," in *Installation and Upgrade* explain more about login scripts.

## Other Protocols

The NetWare Workstation for OS/2 kit provides support for the following protocols:

- ◆ SPX
- ◆ NetBIOS emulation
- ◆ Named Pipes

These protocols are used to support OS/2 clients and servers on a distributed application network. SPX is also used to support some NetWare printing utilities.

The protocols included with the NetWare Requester can only be run on OS/2 workstations. Separate programs are provided in the NetWare Workstation for DOS and Windows kit to support these protocols on DOS and Windows workstations.

Named Pipes and NetBIOS on an OS/2 workstation can connect to the DOS Named Pipes Extender TSR and NetBIOS.EXE TSR, respectively, running on a DOS workstation.

You can select support for these protocols in the NetWare Requester Installation program. The protocols you selected are loaded in the CONFIG.SYS file.

To access SPX, NetBIOS, and Named Pipes support from virtual DOS and Windows sessions on OS/2, you must load some programs provided with the NetWare Requester. [Chapter 9, “Setting Up Named Pipes and NetBIOS Protocols,” on page 113](#) explains more about using protocols from virtual DOS and Windows sessions.

# 2

## Information for NetWare v2.x and v3.x Users Upgrading to NetWare v4.0

If you used the NetWare Requester for OS/2 v2.0 with NetWare v3.x and v2.x servers, you should be aware of differences in NetWare v4.0.

Significant changes have been made in the following areas:

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**Topic**

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[“Default Frame Type for Workstation ODI Drivers” on page 9](#)

[“Selecting a Preferred Server” on page 10](#)

[“Logging In to the Network” on page 11](#)

[“Mappings in Default Login Script” on page 12](#)

[“Mapping to the Public Utilities” on page 13](#)

[“Login Scripts” on page 14](#)

[“Virtual DOS and Windows Sessions” on page 15](#)

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### Default Frame Type for Workstation ODI Drivers

The default frame type for Ethernet ODI drivers (such as NE2000.SYS) has changed. In NetWare v3.x and NetWare v2.x, Ethernet drivers defaulted to Ethernet\_802.3. In NetWare v4.0, they default to Ethernet\_802.2.

NetWare v4.0 server drivers for Ethernet also default to Ethernet\_802.2. Servers and workstations use the same frame type to communicate with each other.

Routers on the network also have to support the frame type or your workstation often will not be able to get a connection. Some routers currently in use on your network may not support the new Ethernet\_802.2 default.

**IMPORTANT:** Your workstation may not be able to connect to a network expecting Ethernet\_802.3 if you use the Ethernet\_802.2 default.

To eliminate a potential conflict, you can define both frame types (Ethernet\_802.2 and Ethernet\_802.3) on your network. For the workstation, define frame types in the NET.CFG file. Include a line similar to the following, replacing *NE2000* with the name of your ODI driver:

```
link driver ne2000
    frame ethernet_802.2
    frame ethernet_802.3
```

The first frame defined is the only one used for the initial Get Nearest Server request. Therefore, if you have some servers that are using only one frame type, such as Ethernet\_802.3, put that frame type first. That way your workstation will be able to make a default connection to those servers.

The setting “[frame](#)” on [page 207](#) explains more about setting a frame type in your NET.CFG file.

## Selecting a Preferred Server

NetWare v4.0 uses trees and contexts rather than servers to identify what you log in to. "NetWare Directory Services" in *Concepts* explains more about trees and contexts.

A new NET.CFG setting called "preferred tree" has been created. You can use "preferred tree" the same way you used "preferred server," except you specify a tree name rather than a server name. "Preferred tree" is only for sites that have more than one Directory tree.

For example, to initially connect to a tree called Novell, you would type the following lines in your NET.CFG file:

```
netware requester
    preferred tree novell
```

Chapter 4, "Setting Up Workstations to Log In to the Network," of *Workstation Basics and Installation* explains more about putting the "preferred tree" setting in your NET.CFG file.

"Preferred server" is still a supported setting; however, the syntax has changed. You now type the word *server* as well as a server name. For example:

```
netware requester
    preferred server fs1
```

Regardless of what you have in your NET.CFG file, the Requester will first try to establish a default connection to an NDS server when you turn your machine on. This connection is made to the first directory services server that responds to the Requester.

If the Requester succeeds in connecting to an NDS server, it will then look for a preferred tree. Once it connects to a preferred tree, it will check to see if you have a preferred server specified. If that server is in the current context, it will connect to that server.

If the Requester cannot connect to a NetWare Directory Services server, it will try to establish a default connection to a bindery server. If it connects to a bindery server, it will first look for a preferred server, ignoring any preferred tree line you have specified.

## Logging In to the Network

When you log in under NetWare v4.0, you log in to a network rather than a server. This means you log in to a location in the Directory (called a context) rather than a server on the network. "NetWare Directory Services" in *Concepts* explains more about the Directory.

## Logging In from the OS/2 Command Line

You use the NetWare v4.0 LOGIN utility to log in from a command line. This utility is copied to your hard drive when you install the Requester, and it is also located in the SYS:LOGIN\OS2 directory.

With the LOGIN utility, you can specify a context in the Directory tree. For example, to log in to a NetWare v4.0 network, type:

```
LOGIN .JOHN.SALES_MKTG
```

*JOHN* is the User object. *SALES\_MKTG* is the Organization object.

You can use the NetWare v4.0 LOGIN utility to log in to NetWare v3.11 servers. Use the same login syntax you used for the NetWare v3.11 utility and add the /B option. For example, you would type

```
LOGIN SALES_MKTG/NANCY /B
```

"Bindery Emulation" and "NetWare Directory Services" in *Concepts* explain more about the bindery and the Directory. Chapter 4, "Setting Up Workstations to Log In to the Network," of *Workstation Basics and Installation* explains more setting up a workstation for logging in. Chapter 5, "Workstation Login," of *Workstation Basics and Installation* explains more about logging in.

## Logging In from the Desktop

You should log in from the command line rather than from the OS/2 "Network" icon on your desktop.

If you log in from the "Network" icon on your desktop, you will be logged in as a bindery emulation client, not a NetWare Directory Services client. Your login script will not be run and you will not be authenticated to the Directory.

The attachment from NetWare Tools is not a login. It does not run a login script or disconnect you from previous logins. However, it does authenticate you to the Directory. We suggest you log in from the command line before using the Attach feature in NetWare Tools.

## Mappings in Default Login Script

In NetWare v2.x and 3.x, a default login script was executed if you had no other login script of any kind.

In NetWare v4.0, the default login script still exists. Unless the system administrator specifies otherwise with a parameter in the system login script, it is executed any time a user login script does not exist. In NetWare v4.0, the default login script is executed even when a system login script exists. This is a change from NetWare v3.x.

The NetWare v4.0 default login script contains the following line mapping drive P: to the utilities:

```
MAP P: =SYS:PUBLIC
```

This mapping combines with the P:\OS2 mapping the Requester installation puts in your path, and gives you a search path to the SYS:PUBLIC\OS2 directory. When you type a utility name from any drive other than P:, the utility from the \OS2 subdirectory will be executed.

**IMPORTANT:** Even though your search path gets set to SYS:PUBLIC\OS2 by default, your P: drive stays mapped to SYS:PUBLIC. If you change to drive P:, you



will be in the SYS:PUBLIC directory, not the SYS:PUBLIC\OS2 subdirectory. If you type a utility name while at the P: drive, the DOS version of the utility will be executed.

If you go to drive P: and then change to the \OS2 subdirectory, your search path will no longer be valid. Your search path will be expecting to find an \OS2 subdirectory to the P: drive. Since the P: drive will be mapped to SYS:PUBLIC\OS2, the OS/2 path command will be looking for a directory with the following name:

```
SYS:PUBLIC\OS2\OS2
```

## Mapping to the Public Utilities

When setting up system or user login scripts for OS/2 users, always map drive P: to SYS:PUBLIC, as shown:

```
MAP P: =SYS:PUBLIC
```

Chapter 3, "Creating Login Scripts and Menus," of *Supervising the Network* explains more about mapping drives in login scripts.

### Why Drive P:

This mapping combines with the P:\OS2 directory the Requester installation puts in your path. The combination gives you a search path to the SYS:PUBLIC\OS2 directory.

If you use another mapping besides P:, that mapping will not combine with the P:\OS2 directory the Requester automatically puts in your path. In this case, you won't have a search path to the utilities.

When you type a utility name from any drive other than P:, the utility from the \OS2 subdirectory will be executed.

### Why SYS:PUBLIC and not SYS:PUBLIC\OS2

Do not map the P: drive to SYS:PUBLIC\OS2.

The NetWare utilities for OS/2 need to find language-specific files in the parent directory of the directory from which they were executed. For example, a utility executed from SYS:PUBLIC\OS2 expects to find an \NLS subdirectory in the SYS:PUBLIC directory.

If the drive allowing access to the utilities is mapped to SYS:PUBLIC\OS2, that directory becomes the root of the drive, since all network drives mapped in OS/2 are root drives. This means that OS/2 does not recognize that there is a parent directory for the utilities. When the utilities try to locate the \NLS subdirectory in their own parent directory, they are returned an error by OS/2, and your utility will not run.

**IMPORTANT:** If you change to the P: drive, you will be in the SYS:PUBLIC directory, not the SYS:PUBLIC\OS2 subdirectory. If you type a utility name while at the P: drive, the DOS version of the utility will be executed.

If you go to drive P: and then change to the \OS2 subdirectory, your search path will no longer be valid. Your search path will be expecting to find an \OS2 subdirectory to the P: drive. Since drive P: will be mapped to SYS:PUBLIC\OS2, the OS/2 path command will be looking for a directory with the following name:

`SYS:PUBLIC\OS2\OS2`

## Login Scripts

You can log in from

- ◆ An OS/2 session
- ◆ A global or private DOS or Windows session
- ◆ A global session booted from a real DOS kernel and running VSHELL
- ◆ A private session booted from a real DOS kernel and running the NetWare v4.0 DOS Requester

The following table shows what login script is executed for which type of login, and how to edit those login scripts.

**Table 1** How to edit login scripts for each type of session

If you log in from	Login script run	How login script is edited
OS/2 session	NetWare v4.0 Login Profile object	With the NetWare Administrator for OS/2 utility. See <i>Utilities Reference</i> .
Private DOS/Windows session	NetWare v3.11 DOS login script	From a text editor. Edit the SYS:MAIL\user\ID\LOGIN file.  Or use a NetWare v3.11 utility, such as SYSCON.

If you log in from	Login script run	How login script is edited
Global DOS/Windows session	NetWare v3.11 DOS login script	From a text editor. Edit the SYS:MAIL\userID\LOGIN file.  Or use a NetWare v3.11 utility, such as SYSCON.
Global session booted from real DOS kernel and running VShell	NetWare v3.11 DOS login script	From a text editor. Edit the SYS:MAIL\userID\LOGIN file.  Or use a NetWare v3.11 utility, such as SYSCON.
Private session booted from real DOS kernel and running v4.0 DOS Requester	NetWare v4.0 Login Profile object	With the NetWare Administrator for OS/2 utility. See <i>Utilities Reference</i> .

## Virtual DOS and Windows Sessions

With the NetWare Requester v2.01, you have full NetWare v3.11 functionality from both Private and Global sessions. However, you do not have NetWare Directory Services (NetWare v4.0) functionality.

This means that you can run NetWare v4.0 DOS utilities from a DOS session, but you will not have access to NetWare Directory Services. To a NetWare v4.0 server, you will appear as a NetWare v3.11 bindery emulation client. "Bindery Emulation" in *Concepts* explains more about bindery emulation clients.

You can obtain NetWare Directory Services functionality by booting from a different DOS kernel than the one included with OS/2 and loading the NetWare v4.0 DOS Requester software. Boot from a real DOS kernel by using the DOS\_STARTUP\_DRIVE setting. The OS/2 online "Master Help Index" explains how to do this.

Sessions booted from a real DOS kernel can have either private or global support. Global sessions booted with a real DOS kernel have NetWare v3.11 support. Private sessions booted with a real DOS kernel can have NetWare v4.0 support if you load the NetWare v4.0 DOS Requester.

**Chapter 3, "Network Access from Virtual DOS and Windows," on page 19** explains more about setting up virtual DOS and Windows sessions.

Figure 2 on page 17 shows what NetWare functionality you have under all types of virtual sessions.

## Changes to Global NetWare Support

Global support has been enhanced to provide full NetWare v3.11 functionality. Applications or utilities that did not run in a Global session with Requester v2.0 should run properly under v2.01.

## Changes to Private NetWare Support

**NOTE:** The instructions in this section apply to DOS and Windows sessions already set up under the NetWare Requester v2.0. For sessions not set up yet, you will need to read [Chapter 3, "Network Access from Virtual DOS and Windows,"](#) on [page 19](#) instead of doing these steps.

NETX.COM has changed to NETX.EXE. This means you must open the DOS Settings Notebook for each session and make the following changes:

### Procedures

- 1** For the DOS\_VERSION setting, change the line that includes NETX.COM to read:  
**NETX.EXE, 5, 00, 214**
- 2** For the DOS\_FILES setting, change 255 to 214.

**Figure 2 NetWare support in DOS/Windows sessions**

NetWare feature	OS/2 sessions	Private Virtual DOS sessions	Global Virtual DOS sessions	Private Virtual Windows sessions	Global Virtual Windows sessions	Private sessions using a real DOS kernel & running 4.0 DOS Requester	Global sessions using a real DOS kernel <sup>1</sup>
Access to NetWare v4.0 as an NDS client	Yes	No	No	No	No	Yes	No
Access to NetWare v3.11 as a bindery client	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Access to NetWare v4.0 network administration utilities	Yes <sup>2</sup>	No	No	No	No	Yes <sup>3</sup>	No
Ability to manage print jobs	Yes	Yes <sup>4</sup>	Yes <sup>4</sup>	No	No	Yes <sup>5</sup>	No
Access to v4.0 NetWare Tools	Yes <sup>6</sup>	No	No	No	No	Yes <sup>7</sup>	No
Access to NetWare v4.0 electronic documentation (ElectroText)	No	No	No	Yes	Yes	No	No

1. You cannot run the v4.0 DOS Requester on a Global session that uses a real DOS kernel. Your NetWare support comes from VSHELL instead. VSHELL is NetWare v3.11-compliant.
2. Use the NetWare Administrator for OS/2.
3. Use NETADMIN for DOS.
4. You can use NetWare v4.0 printing utilities for DOS to manage print jobs form a regular DOS session However, you will only be able to see queues that are in the bindery context of NetWare v3.11 server objects.
5. In a DOS session that uses a real DOS kernel, you can use NetWare v4.0 printing utilities for DOS with full v4.0 functionality. You will see all queues rather than just bindery context queues.
6. Use NetWare Tools for OS/2.
7. Use NETUSER for DOS.



# 3

## Network Access from Virtual DOS and Windows

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### Topic

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[“Cautions for All Types of Sessions” on page 21](#)

[“Customizing Icons for Global Support” on page 22](#)

[“Setting Up Drive Mappings in Global Sessions” on page 25](#)

[“Customizing Icons for Private Support” on page 27](#)

[“Special Instructions for Win-OS2 Icons” on page 31](#)

[“Special Instructions for DOS\\_STARTUP\\_DRIVE Sessions” on page 33](#)

[“Disabling Network Support in Virtual Sessions” on page 35](#)

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From a virtual DOS or Windows session, you can have three kinds of NetWare support:

- ◆ Global logins

All DOS, Windows, and OS/2 sessions set up for global login support share a single login to a NetWare server. Drives that are mapped in one session apply to the other sessions. A port captured in one session is also captured in other sessions. This is useful in environments where the number of connections is carefully monitored.

- ◆ Private logins

All DOS and Windows sessions set up for private login support have their own logins to a NetWare server. Drive mappings and port captures from one session do not apply to the other sessions. This is useful in environments where users need more than one connection to a server and where users need logins from DOS or Windows sessions to be separate from logins from OS/2 sessions.

- ◆ No logins.

Sessions with network support disabled have IPX/SPX support, but no NetWare login support.

Set up NetWare support for virtual DOS and Windows in two ways:

- ◆ Set a default type of support (Global, Private, None) that applies to all existing DOS and Windows icons, as well as any new icons that are created.

If you choose this default in the NetWare Requester installation program, it is automatically loaded in the CONFIG.SYS file. To change the default support, run the NetWare Requester installation program and refer to the online help. Chapter 3, "Installing a NetWare Workstation," in *Workstation Basics and Installation* explains about running the installation.

- ◆ Customize the type of support for each DOS and Windows icon on your desktop.

All sessions started from the customized icon will have the type of support you specify. For instructions on customizing NetWare support per icon, see the sections that follow.

**HINT:** If you want to set up icons with different kinds of network support, label the icons for those sessions something that indicates the type of support. For example, you may want to create "Global DOS Full Screen" and "Private DOS Full Screen" icons.



# Cautions for All Types of Sessions

## Version of NetWare Supported

From a virtual DOS or Windows session, you can access NetWare v3.11 networks. On these networks, you can receive full NetWare support, just as if you were using an actual DOS or Windows workstation. You can also receive support for just the IPX, SPX, Named Pipes and NetBIOS protocols.

**NOTE:** You cannot access NetWare v4.0 networks from virtual DOS and Windows sessions unless those networks support bindery emulation. If a NetWare v4.0 network supports bindery emulation, your DOS or Windows session will be seen as a bindery-based client.

However, if you are booting a DOS session from a version of DOS other than the one shipped with OS/2 (using OS/2's DOS\_STARTUP\_DRIVE feature), you can access NetWare 4.0 networks from that session. See [“Special Instructions for DOS\\_STARTUP\\_DRIVE Sessions” on page 33](#).

## Accessing the Correct Version of DOS

For all virtual sessions you start, the COMSPEC variable must point to the correct version of DOS. If you are running the version of DOS included with OS/2, set the COMSPEC variable to the following location:

```
SET COMSPEC=drive:\OS2\MDOS\COMMAND.COM
```

You can set the COMSPEC variable at the command line or in a login script.

Replace *drive*: with the letter of your boot drive. If you are running another version of DOS, the COMSPEC variable should point to the location of the COMMAND.COM file for that version.

NetWare login scripts often contain a statement assigning COMSPEC to a network drive, so be sure to check—and if necessary, reset—the COMSPEC variable in your login script.

## Login Issues

[Figure 2 on page 17](#) shows what login scripts are executed from which type of session and how to edit those login scripts.

Also, when you log out from local drive in a DOS session, the drive for your login directory is the last drive (set with DOS\_LAST\_DRIVE in DOS

Settings) plus one. For example, if your last DOS drive is C:, the drive you see after logging out will be drive D:.

If you log out from a network drive, the drive remains the same.

## Customizing Icons for Global Support

### Prerequisites

- ❑ Read “[Cautions for All Types of Sessions](#)” on page 21.
- ❑ Make sure network support for virtual sessions is enabled. If not, enable it by running the Requester installation program. Chapter 3, "Installing a NetWare Workstation," of *Workstation Basics and Installation* explains how to run the Requester installation. Virtual session support is enabled by default.

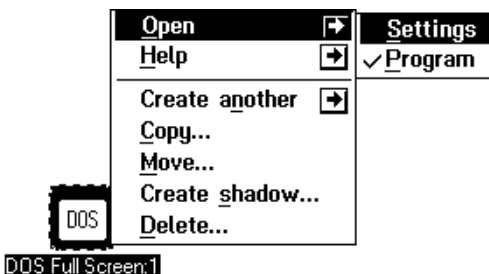
### Procedures

To set up global NetWare support for an icon, do the following:

- 1 Open the "DOS Settings" notebook for the DOS or Windows icon on your desktop.

For more information on opening DOS Settings, see "DOS Settings" in the OS/2 online "Master Help Index." [Figure 3](#) shows how to open DOS Settings.

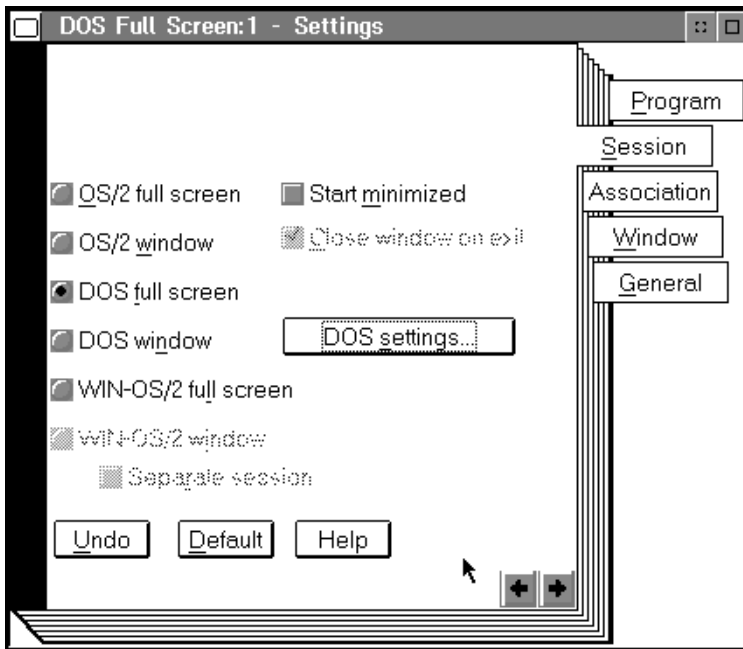
Figure 3 Opening DOS Settings



- 2 In the "DOS Settings" Notebook, choose the "Session" tab.

[Figure 4 on page 23](#) illustrates the "Session" tab page.

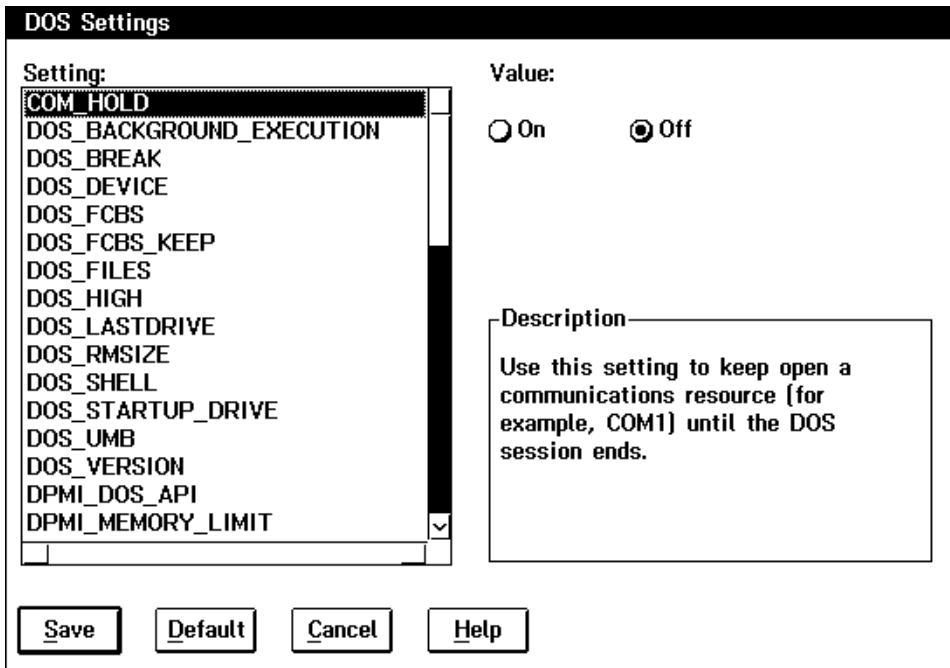
Figure 4 Choosing the "Session" Tab



**3** On the "Session" screen, choose the "DOS Settings . . ." button.

Figure 5 on page 24 illustrates the "DOS Settings" screen.

Figure 5 The DOS Settings Screen



**4** (Optional) Enable the NetWare CAPTURE feature for the session.

**4a** Select "DOS\_DEVICE" on the "DOS Settings" screen

**4b** Type the following line in the "Value" field:

*drive*: \OS2\MDOS\LPTDD.SYS

Replace *drive* with the drive letter of your boot drive. You only need to add this line if you want to use the NetWare CAPTURE command feature from the virtual session.

**NOTE:** If you want this device driver to be loaded for every virtual session you open, you can load it in the OS/2 CONFIG.SYS file instead of in the "DOS Settings" notebook. See the OS/2 online "Master Help Index" for more information on loading DOS device drivers.

**5** Specify that all drives are available to NetWare.

**5a** Select "DOS\_LASTDRIVE."

**5b** Type **Z** in the "Value" field.

This tells NetWare that all drives up through Z are available for use in the session.

**6** Choose Global NetWare support.

**6a** Select "NETWARE\_RESOURCES."

**6b** Type **GLOBAL** in the "Value" field.

You can also choose "GLOBAL" from the drop-down list box. Every session you start from this icon will have global support.

**7** Enable virtual IPX for this session.

**7a** Select "VIPX\_ENABLED."

**7b** Select "On."

**8** Save and exit "DOS Settings."

## Setting Up Drive Mappings in Global Sessions

Drive mappings in DOS differ from drive mappings in OS/2. In OS/2, all mapped drives function like root drives, so drives mapped in OS/2 sessions will show up as root drives in global DOS sessions. Root drives mapped in global DOS sessions will show up as root drives in OS/2 sessions.

Search drive mappings are not used in OS/2. Therefore, search drives mapped in global DOS sessions are ignored in OS/2 sessions. Also, search drives mapped in one DOS session do not apply to other DOS sessions. To eliminate confusion, avoid using search drives in a global environment. Instead, obtain the same functionality by setting up your environment as outlined in the procedures below.

### Procedures

**1** Decide which drives you want mapped in your global environment. Decide which of those drives need to be included in a search path.

**2** Edit your NetWare v4.0 login script (used in OS/2 sessions) and include MAP statements for all NetWare drives.

**3** Edit your NetWare v3.11 DOS login script and include MAP ROOT statements for all NetWare drives.

To edit your NetWare v3.11 DOS login script, use a text editor to edit the SYS:MAIL\*userID*\LOGIN file, or use a NetWare v3.11 utility such as SYSCON.

Use MAP ROOT rather than MAP for consistency between DOS and OS/2 sessions. For easiest maintenance, both login scripts should contain identical map statements.

- 4 Edit your OS/2 CONFIG.SYS file and include the drive letters you want searchable in your PATH statement.

This path is where OS/2 searches for .EXE, .CMD, and .COM files. For example, to include drive H: in the search path, you would add the following to your path:

```
H:\;
```

If needed, you can also include drive letters in the data path statement (DPATH). The DPATH statement is where OS/2 searches for nonexecutable, non-.DLL files.

- 5 Create a DOS.BAT file which includes a path to the same drives you included in the CONFIG.SYS file.

This path is where DOS searches for files. For example, to include drive H: in the search path, type the following line in your .BAT file:

```
SET PATH=%PATH%;h:\;
```

Note that the "%PATH%" appends whatever you type to the directories that already exist in the PATH statement.

You cannot include DPATH statements in the DOS.BAT file. DOS PATH statements are limited to 123 characters, so try to map drives to the exact directories you need and minimize the number of subdirectories you specify.

- 6 Run the .BAT file each time you open a DOS global session.

You can use "Optional Parameters" on the "Settings" notebook. In the "Optional Parameters" text entry box, type /K followed by a space and the name of the .BAT file. The file will then be executed at the start of every session opened from that icon.

For more information about PATH, DPATH, Settings, or Parameters, see the OS/2 online "Master Help Index."

# Customizing Icons for Private Support

## Prerequisites

- ❑ Read “[Cautions for All Types of Sessions](#)” on page 21.
- ❑ Make sure network support for virtual sessions is enabled. If not, enable it by running the Requester installation program. Chapter 3, "Installing a NetWare Workstation," of *Workstation Basics and Installation* explains how to run the installation. Virtual session support is enabled by default.

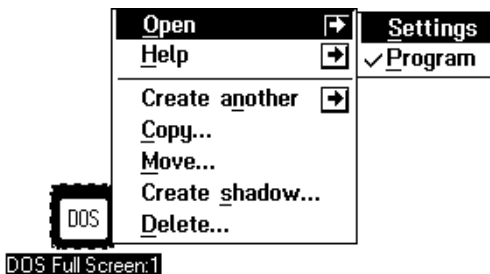
## Procedures

To set up private NetWare support for an icon, do the following:

- 1 Open the "DOS Settings" Notebook for the DOS or Windows icon on your desktop.

For more information on opening DOS Settings, see "DOS Settings" in the OS/2 online "Master Help Index." [Figure 6](#) shows how to open DOS Settings.

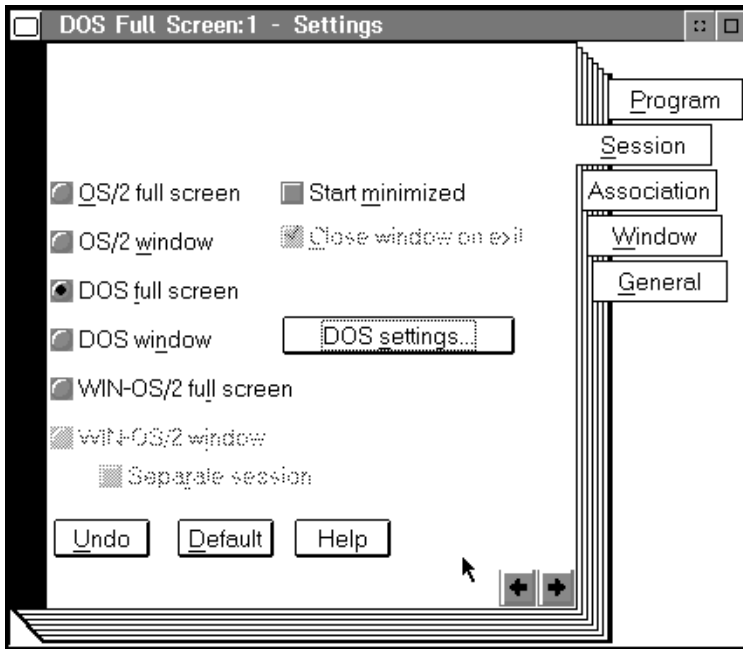
Figure 6 Opening DOS Settings



- 2 In the "DOS Settings" Notebook, choose the "Session" tab.

[Figure 7](#) on page 28 illustrates the "Session" tab page.

**Figure 7** Choosing the "Session" Tab

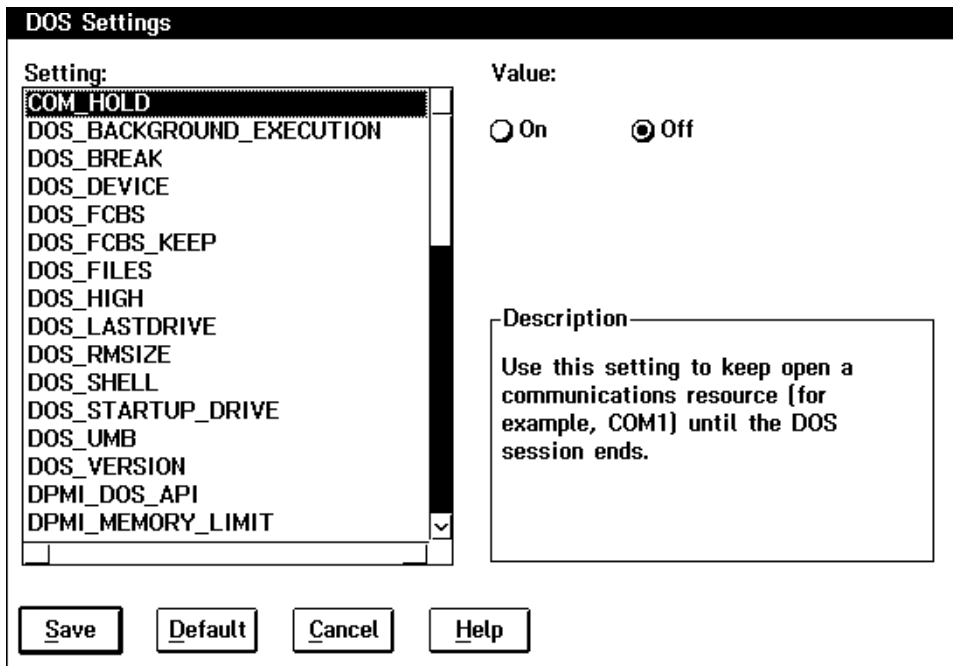


**3** On the "Session" screen, choose the "DOS Settings . . ." button.

Figure 8 on page 29 illustrates the "DOS Settings" screen.



Figure 8 The DOS Settings Screen



**4** (Optional) Enable the NetWare CAPTURE feature for the session.

**4a** Select "DOS\_DEVICE" on the "DOS Settings" screen

**4b** Type the following line in the "Value" field:

*drive*: \OS2\MDOS\LPTDD.SYS

Replace *drive* with the drive letter of your boot drive. You only need to add this line if you want to use the NetWare CAPTURE command feature from the virtual session.

**NOTE:** If you want this device driver to be loaded for every virtual session you open, you can load it in the OS/2 CONFIG.SYS file instead of in the "DOS Settings" notebook. See the OS/2 online "Master Help Index" for more information on loading DOS device drivers.

**5** Specify how many files the session can open simultaneously.

**5a** Select "DOS\_FILES."

**5b** Type 214 in the "Value" field.

**6** Specify what drives are available to NetWare.

**6a** Select "DOS\_LASTDRIVE."

**6b** Type a drive letter other than Z in the "Value" field.

All drives after this letter are available to the private NetWare connection in this session. All drives up to this letter are on your local hard drive or available for use in a global session.

**7** Specify the correct version of NETX.EXE.

**7a** Select "DOS\_VERSION."

**7b** In the "Value" field, find the line that specifies the version of NETX and replace it with the following line:

**NETX.EXE, 5, 00, 255**

**8** Choose Private NetWare support.

**8a** Select "NETWARE\_RESOURCES."

**8b** Type **PRIVATE** in the "Value" field.

You can also choose "Private" from the drop-down list box. Every session you start from this icon will have its own NetWare login.

**9** Enable virtual IPX for this session.

**9a** Select "VIPX\_ENABLED."

**9b** Select "On."

**10** Save and exit "DOS Settings."

**11** Load the NETX.EXE program in each session where you want to log in to the network.

To load NETX.EXE automatically for every session you start from a particular icon, use "Optional Parameters" on the "DOS Settings" notebook for that icon.

In the "Optional Parameters" text entry box, type /K followed by a space, the directory path, and the NETX.EXE filename. The file will then be executed at the start of every session opened from that icon. For example, to load NETX.EXE from the default location, type the following:

**/K C:\NETWARE\NETX.EXE**

For more information about optional parameters, see "Parameters, starting programs with" in the OS/2 online Master Help Index.

To load NETX.EXE automatically for all DOS and Windows sessions, put the following command in an AUTOEXEC.BAT file in the root of your boot drive:

***drive*: \path\NETX.EXE**

Replace *drive* and *path* with the location of your NETX.EXE file. By default, NETX.EXE is installed in \NETWARE with the Requester files.

**NOTE:** If you want IPX/SPX-only support, don't load NETX. If you don't load NETX.EXE, you will not be able to log in to a NetWare network, but DOS and Windows applications will be able to use the IPX protocol.

## Special Instructions for Win-OS2 Icons

These instructions apply to the Windows 3.0 support that was shipped with OS/2 v2.0.

### Prerequisites

- ❑ Read “[Cautions for All Types of Sessions](#)” on page 21.
- ❑ Complete “[Customizing Icons for Global Support](#)” on page 22 or “[Customizing Icons for Private Support](#)” on page 27 for the Win-OS2 icon.

### Procedures

You need several additional files for Win-OS2 NetWare support:

NWIPXSPX.DLL  
NETWARE.DRV  
TBMI2.COM  
NWPOPUP.EXE  
NETWARE.HLP

By default, these files are copied to the \OS2\MDOS\WINOS2\SYSTEM directory on your boot drive when you install the NetWare Requester.

The TBMI2 file must be loaded before you run any Windows programs that make IPX or SPX calls. We recommend loading it before you run any Windows programs.

To load TBMI2 automatically for all sessions started from a single icon:

- 1** Make and use a copy of a DOS icon.
- 2** Create a batch file (.BAT extension) with the following lines:

```
drive: \OS2\MDOS\WINOS2\SYSTEM\TBMI2.COM  
WINOS2.COM  
EXIT
```

Replace *drive* with the letter of your boot drive.

- 3** Save the batch file in the following directory:

```
\OS2\MDOS\WINOS2\SYSTEM
```

- 4** Open the "Settings" for the icon.
- 5** Choose the "Program" tab.
- 6** In the "Optional Parameters" field, type the following line:

```
/K drive: \OS2\MDOS\WINOS2\batchfile.bat
```

Replace *drive* with the letter of your boot drive. Replace *batchfile* with the name of your batch file.

- 7** Choose the "Session" tab.
- 8** Make sure "DOS Full Screen" is selected.

Each time you choose this icon, TBMI2 is loaded and Win-OS2 is started.

For more information about optional parameters, see "Parameters, starting programs with" in the OS/2 online "Master Help Index."

To load TBMI2.COM automatically for all DOS and Windows sessions, put the following command in an AUTOEXEC.BAT file in the root of your boot drive:

```
drive: \OS2\MDOS\WINOS2\SYSTEM\TBMI2.COM
```

Replace *drive* with the letter of your boot drive.

# Special Instructions for DOS\_STARTUP\_DRIVE Sessions

If you want to boot a version of DOS other than what shipped with OS/2, refer to the OS/2 online "Master Help Index," which explains more about the DOS\_STARTUP\_DRIVE feature.

If you are using DOS\_STARTUP\_DRIVE to boot a session, you can have global or private NetWare support, just as from a regular virtual session.

However, in a private DOS\_STARTUP\_DRIVE session, you can also run the NetWare v4.0 DOS Requester and have NetWare v4.0 support. From this kind of DOS session, you can log in as a NetWare v4.0 DOS client.

If you do not want to load (or do not have) NetWare v4.0 Workstation for DOS software, you should still load NETX.EXE, shipped with the Requester. In this case, you will have the same limitation of being only a NetWare v3.11 client as you would have from a session booted from the DOS shipped with OS/2.

The following sections explain how to set up DOS\_STARTUP\_DRIVE sessions globally or privately.

## Setting up Global DOS\_STARTUP\_DRIVE Sessions

### Prerequisites

- ❑ Read [“Cautions for All Types of Sessions” on page 21](#).
- ❑ Set up your session to boot from another version of DOS. This involves creating a boot image file, setting DOS\_STARTUP\_DRIVE, and certain other tasks using the VMDISK utility. See the OS/2 online "Master Help Index."
- ❑ Make sure network support for virtual sessions is enabled. If not, enable it by running the Requester installation program. Chapter 3 "Installing a NetWare Workstation," of *Workstation Basics and Installation* explains how to run the installation program. Virtual session support is enabled by default.
- ❑ Set up your session for global NetWare support by following the instructions in [“Customizing Icons for Global Support” on page 22](#) and [“Setting Up Drive Mappings in Global Sessions” on page 25](#).

## Procedures

Type the following lines in the CONFIG.SYS file on the DOS diskette or partition you will boot from:

```
device=drive:\os2\mdos\fsfilter.sys
device=drive:path\dosvshll.sys
device=drive:path\dosvipx.sys
lastdrive=z
```

Replace *drive* and *path* with the drive and path names where the NetWare Requester files are located.

Type the *lastdrive* line only if you want the last global drive to be something different than the last drive in use by OS/2 at the time you start the virtual session.

## Setting Up Private DOS\_STARTUP\_DRIVE Sessions

### Prerequisites

- Read [“Cautions for All Types of Sessions” on page 21](#).
- Set up your session to boot from another version of DOS. This involves creating a boot image file, setting DOS\_STARTUP\_DRIVE, and certain other tasks using the VMDISK utility. See the OS/2 online "Master Help Index."
- Make sure network support for virtual sessions is enabled. If not, enable it by running the Requester installation program. Chapter 3, "Installing a NetWare Workstation," of *Workstation Basics and Installation* explains how to run the Requester installation. Virtual session support is enabled by default.
- Set up your session for private NetWare support by following the instructions in [“Customizing Icons for Private Support” on page 27](#).

### Procedures

- 1** Type the following lines in the CONFIG.SYS file on the DOS diskette or partition you will boot from:

```
device=drive:\os2\mdos\fsfilter.sys
device=drive:path\dosvipx.sys
files=214
lastdrive=letter
```

Replace *drive:* and *path* with the drive and path names where the NetWare Requester files are located. Replace *letter* with the last local drive accessible to the session. NetWare drives start after this letter.

The FSFILTER.SYS driver provided by OS/2 gives the DOS\_STARTUP\_DRIVE session access to OS/2 HPFS drives and Named Pipes support. See the OS/2 documentation for more information about FSFILTER.SYS.

**2** Load the NetWare Workstation for DOS software.

**2a** To load NetWare v4.0 DOS Requester, follow the directions in NetWare Workstation for DOS and Windows. Use the software on the DOS Requester diskette, *WSDOS\_1*.

**2b** To load NETX.EXE for NetWare v3.11 support, follow the instructions in **Step 11 on page 30**. Use the software on the OS/2 Requester diskette, *WSOS2\_1*.

Any network drives mapped in an OS/2 session will show up as local drives in a private DOS\_STARTUP\_DRIVE session.

## Disabling Network Support in Virtual Sessions

To disable all network support, run the NetWare Requester installation program and deselect "Support for DOS and Windows Sessions." Then reboot your machine. This keeps VIPX.SYS and VSHELL.SYS from loading.

To reenable support, run the install and select "Support for DOS and Windows Sessions."

Chapter 3, "Installing a NetWare Workstation," in *Workstation Basics and Installation* explains how to run the Requester installation program.

For a technical diagram of NetWare support in a virtual DOS/Windows session, see **Appendix C, "Architecture Diagrams," on page 247**.





# 4

## How to Configure Your Workstation

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**Topic**

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[“When Is Configuration Required” on page 37](#)

[“Procedures” on page 39](#)

[“NET.CFG Format Requirements” on page 42](#)

[“Quick Reference List of NET.CFG Options” on page 43](#)

---

This chapter contains instructions for configuring the NetWare Requester for OS/2 v2.01.

Complete information for the configuration options is found in the help screens in the NetWare Requester installation program, and in [Appendix B, “NET.CFG Options Reference,” on page 201](#).

### When Is Configuration Required

Read the table below to decide if you must configure the workstation before the NetWare Requester will run.

**Table 2**      **Situations when configuration is required**

<b>You must configure if</b>	<b>For information, go to</b>
Your workstation has more than one network board	<a href="#">Chapter 5, “Network Boards and Drivers,” on page 47</a>

---

<b>You must configure if</b>	<b>For information, go to</b>
Your workstation has a single board, but the board is not using the factory default settings	<a href="#">Chapter 5, "Network Boards and Drivers," on page 47</a>
Your network uses an Ethernet frame type other than Ethernet_802.2	<a href="#">Chapter 5, "Network Boards and Drivers," on page 47</a>
The NetWare Requester will share a network board with other software	<a href="#">Chapter 8, "Sharing a Network Board with IBM Software," on page 73</a>

Configuration may be useful in other circumstances shown in the table below. These circumstances are described in detail in the remaining chapters of this manual.

**Table 3 Other situations when configuration might be useful**

<b>You may want to configure if</b>	<b>For information, go to</b>
You want to change the default packet signature security level	<a href="#">Chapter 6, "Improving Speed and Security," on page 59</a>
You want to turn off Packet Burst or Large Internet Packet transmissions	<a href="#">Chapter 6, "Improving Speed and Security," on page 59</a>
Your workstation will connect to a Token-Ring network using Source Routing	<a href="#">Chapter 7, "Using OS/2 Workstations on a Token-Ring Network," on page 67</a>
Your workstation will need to use the NetBIOS or Named Pipes protocols	<a href="#">Chapter 9, "Setting Up Named Pipes and NetBIOS Protocols," on page 113</a>
You want your workstation to connect to a preferred server	The "preferred server" on <a href="#">page 230</a> and the "preferred tree" on <a href="#">page 231</a>
You are setting up remote booting workstations	<a href="#">Chapter 11, "Remote-Booting OS/2 Workstations," on page 157</a>

## Procedures

Configuration options for the NetWare Requester are stored in the NET.CFG file. When you start up your workstation, the NetWare Requester searches for NET.CFG in the directories specified in the DPATH line in the CONFIG.SYS file. If the Requester does not find a NET.CFG file, it starts up using the default configuration values built into the Requester.

The NET.CFG file is located in the root directory of your boot drive. If you have previously configured the Requester, a NET.CFG file already exists for your workstation. Change the current configuration by modifying and saving the existing file.

Reinstalling the NetWare Requester will not overwrite an existing NET.CFG file; instead, the existing NET.CFG file will appear in the installation program for you to edit.

If you have not configured the Requester before, a NET.CFG file does not exist for your workstation. You must create this file in order to configure the Requester.

To create or edit NET.CFG, you can use either of the following:

- ♦ The NetWare Requester installation program. Use the online help in the program to determine what to include in the file.
- ♦ A text editor. Use the format requirements in this chapter and the reference pages in [Appendix B, "NET.CFG Options Reference," on page 201](#) to determine what to include in the file.

To edit or create NET.CFG with the installation program:

- 1** Start the NetWare Requester installation program.

Choose the "Installation" icon in the "Novell" group window on your desktop or insert the *WSOS2\_1* diskette and type INSTALL at a command prompt. The "NetWare Requester for OS/2 Installation Utility" window appears.

- 2** Select "This workstation. . ." from the "Configuration" menu.

The "Edit NET.CFG File for This Workstation" window appears.

- 3** Check the location of the NET.CFG file. Change the location if you want.

Use the online help if necessary.

- 4** Type the NET.CFG options you want in the "Current NET.CFG File Contents" box.

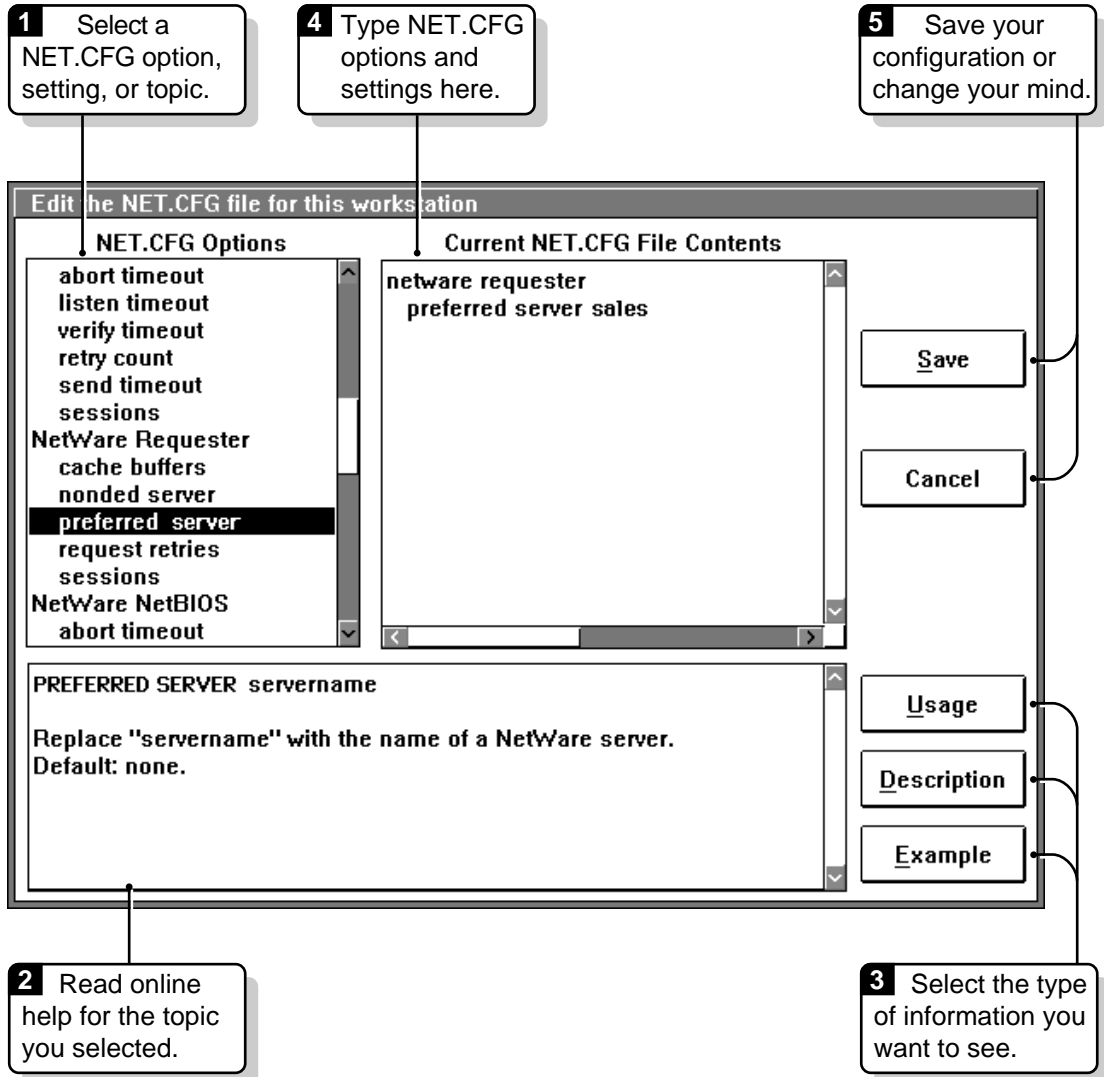
See [Figure 9 on page 41](#) for an explanation of how to edit the NET.CFG file. Read the NET.CFG format requirements from the online help or from the next section.

You can cut and paste text from the help window at the bottom of the screen to the "Current NET.CFG File Contents" window. Use the following keys:

**Table 4** Key definitions for the NET.CFG window

To do this	Use these keys
Highlight text	Click and drag with the mouse, or move the cursor with the arrow keys while holding down the <Shift> key
Copy text	<Ctrl><Insert>
Cut text (text will reappear the next time you refresh the window)	<Shift><Delete>
Paste text	<Shift><Insert>
Delete text (deleted text cannot be pasted)	<Ctrl><Delete>

Figure 9 How to edit the NET.CFG file



- 5** To save your changes to NET.CFG, choose "Save."
- 6** To exit the installation program, double-click in the upper left corner of the main window.
- 7** Use OS/2's "Shutdown" feature to reboot your workstation.  
Installation and configuration changes will not take effect until you reboot.

# NET.CFG Format Requirements

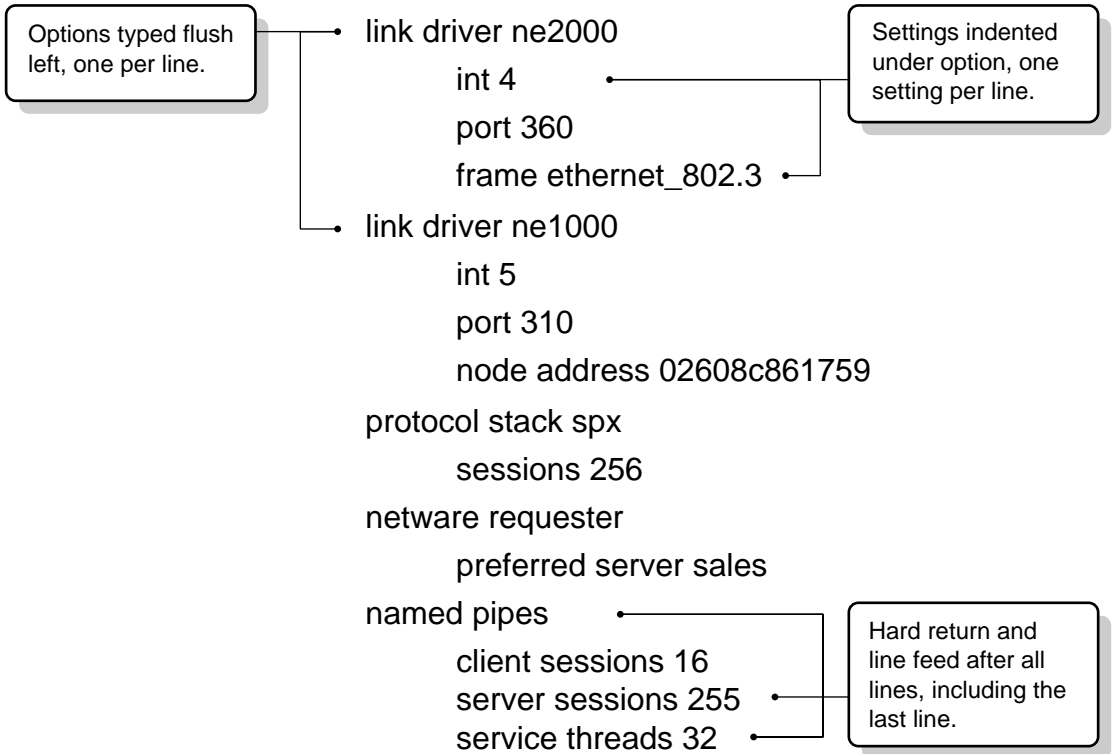
Each NET.CFG option has several settings. In this chapter, these settings are alphabetized under the option to which they apply. Options and settings do not have to be alphabetized in the NET.CFG file.

Use the following rules to create or modify a NET.CFG file:

- ◆ Type options at the left margin of the file with no spaces before or after them. Options are not case-sensitive.
- ◆ Type one option per line.
- ◆ Type settings, one per line, on the lines following the option to which they apply. When editing the NET.CFG from the installation program, use the Space bar rather than the <Tab> key to indent these settings. The <Tab> key moves to the next field on the screen. Indent settings at least one space. Settings are not case sensitive.
- ◆ Place a hard return at the end of every line in the file, *including the last line*. Blank lines are not necessary and are ignored.  
**WARNING:** If you don't put a return at the end of the last line, the line will be ignored.
- ◆ Precede comments with a semicolon.

Figure 10 on page 43 illustrates NET.CFG format.

Figure 10 NET.CFG format



## Quick Reference List of NET.CFG Options

Figure 11 on page 44 and Figure 12 on page 45 list all NET.CFG options and settings, as well as the default value for each option or setting. More detailed information is in Appendix B, “NET.CFG Options Reference,” on page 201.

Figure 11 NET.CFG quick reference

NetWare Configuration Options	
Options and Settings	Defaults
<b>daemon configuration</b>	
<b>message timeout</b> <i>number</i> .....	<i>messages do not timeout</i>
<b>displayharderrors</b> <i>no</i> .....	
	<i>messages display</i>
<b>link driver</b> <i>name</i> .....	
	<i>none</i>
<b>dma</b> [ <i>index</i> ] <i>channel</i> .....	[#1], set by driver
<b>frame</b> <i>name</i> .....	set by driver
<b>int</b> [ <i>index</i> ] <i>irq</i> .....	[#1], set by driver
<b>mem</b> [ <i>index</i> ] <i>starting_address</i> [ <i>size</i> ]..	[#1], set by driver, [set by driver]
<b>node address</b> <i>number</i> .....	preset on board
<b>port</b> [ <i>index</i> ] <i>starting_port</i> [ <i>number</i> ] ...	[#1], set by driver, [set by driver]
<b>protocol</b> <i>name id frame</i> .....	IPX, 0, Ethernet_802.2
<b>slot ?</b> .....	slot ?
<b>slot number</b> .....	slot ?
<b>link support</b>	
<b>buffers</b> <i>number</i> [ <i>buffer_size</i> ] .....	20, [1514]
<b>named pipes</b>	
<b>client sessions</b> <i>number</i> .....	16
<b>server sessions</b> <i>number</i> .....	32
<b>service threads</b> <i>number</i> .....	3
<b>netware netbios</b>	
<b>abort timeout</b> <i>number</i> .....	30,000
<b>broadcast count</b> <i>number</i> .....	internet on:4, internet off:2
<b>broadcast delay</b> <i>number</i> .....	internet on:2,000, internet off:1,000
<b>commands</b> <i>number</i> .....	32
<b>internet [on/off]</b> .....	on
<b>listen timeout</b> <i>number</i> .....	6,000
<b>names</b> <i>number</i> .....	24
<b>retry count</b> <i>number</i> .....	20



Figure 12 NET.CFG quick reference (cont'd.)

<b>NetWare Configuration Options (continued)</b>	
<b>Options and Settings</b>	<b>Defaults</b>
<b>retry delay</b> <i>number</i> .....	500
<b>sessions</b> <i>number</i> .....	16
<b>verify timeout</b> <i>number</i> .....	3,000
<b>netware requester</b>	
<b>cache buffers</b> <i>number</i> .....	8
<b>large internet packets</b> <b>off</b> .....	<i>on</i>
<b>name context</b> <i>context</i> .....	<i>none</i>
<b>packet burst</b> <b>off</b> .....	<i>on</i>
<b>preferred server</b> <i>servername</i> .....	<i>none</i>
<b>preferred tree</b> <i>treename</i> .....	<i>none</i>
<b>request retries</b> <i>number</i> .....	20
<b>sessions</b> <i>number</i> .....	8
<b>signature level</b> <i>number</i> .....	1
<b>protocol odinsup</b>	
<b>bind driver</b> [ <i>number</i> ] .....	<i>none, [first one found]</i>
<b>protocol stack ipx</b>	
<b>bind name</b> .....	<i>first driver in CONFIG.SYS</i>
<b>router mem</b> <i>size</i> .....	450
<b>sockets</b> <i>number</i> .....	64
<b>protocol stack spx</b>	
<b>abort timeout</b> <i>number</i> .....	30,000
<b>listen timeout</b> <i>number</i> .....	6,000
<b>retry count</b> <i>number</i> .....	20
<b>send timeout</b> <i>number</i> .....	<i>determined by SPX</i>
<b>sessions</b> <i>number</i> .....	16
<b>verify timeout</b> <i>number</i> .....	3,000
<b>protocol route</b>	
<b>source route</b> <i>def gbr mbr nodes n board n</i> .....	16, 1



# 5

## Network Boards and Drivers

This chapter explains network board and driver issues. For basic information about boards and drivers, see the documentation for your network board.

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**Topic**

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[“Matching Driver Settings with Board Settings” on page 47](#)

[“Specifying Frame Types for a Driver” on page 48](#)

[“Why Have More Than One Network Board” on page 51](#)

[“Setting Up Two Network Boards” on page 53](#)

---

### Matching Driver Settings with Board Settings

Network boards come with factory defaults for such hardware settings as:

- ◆ Direct memory access channel (DMA)
- ◆ Interrupt line (IRQ)
- ◆ Input/output port
- ◆ Memory range
- ◆ Node address

These factory defaults can usually be changed by moving jumpers or setting switches.

The NetWare Requester for OS/2 expects each board to be using the default settings. Therefore, if you change the factory default for any of the hardware

settings listed above, you must tell the OS/2 ODI driver what the new setting is.

To do this, use the "Link Driver" option in the NET.CFG file. The "Link Driver" option allows you to set the following hardware-related settings:

```
link driver name
  dma [index] channel
  int [index] irq
  mem [index] starting_address [size]
  node address number
  port [index] starting_port [number]
```

Chapter 4, "How to Configure Your Workstation," on page 37 explains more about putting options in the NET.CFG file. "Link Driver" on page 205 explains more about using these settings.

## Shortcut for EISA and Micro Channel Boards

If you are using an EISA or Micro Channel board, you do not have to specify the hardware settings shown above. The OS/2 ODI driver scans the board and automatically determines what settings are in use.

You just have to tell the NetWare Requester what slot the network board you're using is in, or tell it to scan all slots. Do this with the "Link Driver" option and the "slot" setting in the NET.CFG file:

```
link driver name
  slot number
```

Replace *number* with the number of the slot, or replace *number* with a question mark to tell the Requester to scan all slots. The section "slot" on page 215 explains more about using the "slot" setting.

## Specifying Frame Types for a Driver

All communications on a network consist of packets of information being sent between computers.

There are different kinds of packets, distinguished from each other mainly by the order of the information in the packet. Each kind of packet follows its own set of rules. This set of rules is called a *frame type*.

When a computer sends and receives a particular kind of packet, then that computer is transmitting with that particular frame type.

By default, each network driver uses only one kind of frame type. However, most drivers also support other frame types. For example, an NE2000 driver supports Ethernet\_802.2, Ethernet\_802.3, Ethernet\_II, and Ethernet\_SNAP.

The following table lists some common network boards and the frame types supported by each. This list is not comprehensive.

**Table 5** List of frame types and drivers

Frame type	Network board driver
Ethernet_802.3	NE1000, NE2000, NE2100, NE2, NE2-32, 3C501, 3C503, 3C505, 3C523, EXOS205, EXOS215, ODINSUP
Ethernet_802.2	NE1000, NE2000, NE2100, NE2, NE2-32, 3C501, 3C503, EXOS205, EXOS215, ODINSUP, LANSUP
Ethernet_II	NE1000, NE2000, NE2100, NE2, NE2-32, 3C501, 3C503, 3C505, 3C523, EXOS205, EXOS215, ODINSUP
Ethernet_SNAP	NE1000, NE2000, NE2100, NE2, NE2-32, 3C501, 3C503, EXOS205, EXOS215, ODINSUP, LANSUP
Token-Ring	ODINSUP, TOKEN, LANSUP
Token-Ring_SNAP	ODINSUP, TOKEN, LANSUP
IBM_pcn2_802.2	PCN2, PCN2L, LANSUP
IBM_pcn2_snap	PCN2, PCN2L, LANSUP
Novell_rx-net	TRXNET, TRXNET2

You can use the "Link Driver" option in the NET.CFG file to tell the driver what frames types you want used. You can only specify frame types supported by that driver.

```
link driver name
      frame name
```

Replace *name* with the name of the frame type. To specify more than one frame type, you can type additional frame type lines.

Chapter 4, “How to Configure Your Workstation,” on page 37 explains more about how to put options in the NET.CFG file. The section “frame” on page 207 explains more about using the "frame" setting.

## Cautions When Changing Frame Type

The default frame type for Ethernet ODI drivers has changed. In NetWare v2.x and NetWare v3.x, Ethernet drivers defaulted to Ethernet\_802.3. In NetWare v4.0, they default to Ethernet\_802.2.

NetWare v4.0 server drivers for Ethernet also default to Ethernet\_802.2. Servers and workstations must use the same frame types to communicate with each other.

Routers on the network also have to support the frame types or your workstation often will not be able to get a connection. Some routers currently in use on your network may not support the new Ethernet\_802.2 default.

**IMPORTANT:** Your workstation may not be able to connect to a network expecting the old default if you use the new Ethernet\_802.2 default.

To eliminate potential conflict, you can define both frame types (Ethernet\_802.2 and Ethernet\_802.3) on your network. For the workstation, define frame types in the NET.CFG file. Include a line similar to the following, replacing *ne2000* with the name of your ODI driver:

```
link driver ne2000
    frame ethernet_802.3
    frame ethernet_802.2
```

The first frame defined is the only one used for the initial Get Nearest Server request. Therefore, if you have some servers that are using only one frame type, such as Ethernet\_802.3, put that frame type first. That way your workstation will be able to make a default connection to those servers.

The section “frame” on page 207 explains more about setting a frame type in your NET.CFG file.

# Why Have More Than One Network Board

When using the NetWare Requester, there are only two conditions where you benefit from having more than one network board in your computer:

- ◆ When each board supports a different communications software package.
- ◆ When each board is connected to a physically separate network, but those networks are connected with one or more routers.

In this case, a second board may be useful. Additional boards after the second will be completely ignored.

**IMPORTANT:** If you have two network boards, you must be aware of some configuration issues, discussed in the following sections.

## Two or More Communications Packages

You may want to use two or more network boards when each board supports its own communications software package.

For instance, you may want to have Communications Manager use one board and NetWare Requester use another. Or you may want NetWare for OS/2 to use one board and for NetWare Requester to use another.

In these cases, each package provides the driver for its own board, and the setup for NetWare Requester is just as if only one board existed. There are no additional steps to set up the second board, since that board is entirely controlled by the other communications package.

**NOTE:** In most cases, the NetWare Requester can share a board with other communication packages so that you do not need to purchase two boards. To have the NetWare Requester share a board with Extended Services or LAN Services, see [Chapter 8, "Sharing a Network Board with IBM Software," on page 73](#). To have NetWare Requester share a board with NetWare for OS/2, see *NetWare v4.0 Installation Supplement for OS/2 Servers*.

## Two Connected Networks

You may want to use two network boards when each board is connected to a physically separate network, but those networks are connected with one or more routers.

If your two networks are physically connected, your second board may serve as a backup route if the connection to your first board fails.

If the networks are not physically connected, the second board will not be able to act as a backup.

## Why Do the Networks Have to Be Connected

When the workstation boots, the IPX protocol binds to all network boards that have OS/2 ODI drivers loaded. Whenever IPX needs to find a new destination on the network, it queries the network for possible routes to that destination.

*IPX only sends out a destination query on the primary network board.* It never queries the secondary (or other) board for a route.

If IPX does not find the destination using the primary board, you see a connection error, even if the destination could be found if IPX were to use the second board.

**IMPORTANT:** If each board is connected to a physically separate network, destinations on the second board's network will never be found. Only destinations on the first board's network will be locatable.

## How is The Second Board a Backup

Once IPX finds a destination using the primary network board, it stores the route to that destination in a router table and makes the connection.

After the connection is made, IPX checks all networks that are connected to that destination for any other possible routes from your OS/2 workstation to the destination.

If it finds a secondary route, IPX rebuilds the router tables and stores that route. If the primary connection fails, IPX will use the secondary route to continue transmissions to that destination.

**IMPORTANT:** The destination always has to be available initially from the primary board. However, once the destination is found through the primary board and the connection is made, a route from the secondary board may be used to continue transmission if the primary connection fails.

## What Happens If the Primary Connection Is Broken

If IPX is using a route through the second board, the primary connection can be broken without causing the secondary connection to fail.

However, the secondary board does not ever become the primary board even when the primary board fails. This means that if IPX needs to find a new destination while the primary connection is down, it will not be able to query for the destination, since queries are only sent on the primary board.

**IMPORTANT:** To allow IPX to find new destinations, you will have to restore the primary connection.



# Setting Up Two Network Boards

If you have two network boards in your computer, you may need to

- ◆ Load an additional ODI driver. See “[Loading the Driver for an Additional Board](#)” on page 53.
- ◆ Change which board IPX uses as primary. See “[Changing Which Board Is Primary](#)” on page 54.
- ◆ Define hardware settings and frame type for each board. See “[Setting Hardware Settings and Frame Type for Each Board](#)” on page 57.

## Loading the Driver for an Additional Board

The NetWare Requester installation program allows you to specify an ODI driver. That driver is then loaded automatically in the CONFIG.SYS file.

You may need to load an additional ODI driver manually in the CONFIG.SYS file if

- ◆ You have two network boards, and
- ◆ Those boards use different ODI drivers.

**IMPORTANT:** If the boards use the same ODI driver (for example, two NE2000 boards), simply load the driver once when you install the Requester, then go to “[Specifying Primary with Two Boards of the Same Type](#)” on page 55. Do not complete the steps in this section.

### Prerequisite

- Install the NetWare Requester with one of the ODI drivers. It does not matter which one. Chapter 3, “Installing a NetWare Workstation,” in *Workstation Basics and Installation* explains how to install the Requester.

### Procedures

- 1** Open the CONFIG.SYS file in a text editor.

For example, to use the OS/2 System Editor at the OS/2 command line, type:

```
E C:\CONFIG.SYS
```

CONFIG.SYS is generally located in the root of your boot drive.

- 2** In the NetWare Requester lines, find the line loading the first ODI driver.

For a list of common ODI drivers, see [Table 5, “List of frame types and drivers,” on page 49.](#)

**3** Decide which driver you want IPX to recognize as primary.

The driver for the primary board is the only one IPX uses to query the network for a route. The driver for the secondary board is never queried. [“Why Have More Than One Network Board” on page 51](#) explains more about primary and secondary boards.

**4** Type new line to load an additional driver.

To load a driver as primary, type the line above the existing driver line. To load a driver as secondary, type the line below the existing line.

The first driver loaded in the CONFIG.SYS file is the primary driver. You can also specify a primary driver with the "Protocol Stack IPX bind" setting in the NET.CFG file.

Type the correct path to the driver in the line. If you are using a Novell-supplied driver, the driver is located where your other Requester files were installed, usually in C:\NETWARE.

For example, to load an NE2000 driver from the default location, type the following:

```
C:\NETWARE\NE2000.SYS
```

**NOTE:** If you have two boards using the same driver name (such as two NE1000 boards), do not load the driver twice.

**5** Save and exit the CONFIG.SYS file.

**6** Reboot your machine to load the additional drivers.

## Changing Which Board Is Primary

The board whose driver loads first in the CONFIG.SYS file is the primary board. You can change which board is primary by

- ♦ Reordering drivers in the CONFIG.SYS file.

The previous section, [“Loading the Driver for an Additional Board” on page 53](#), explains how to edit the CONFIG.SYS file.

- ♦ Using a NET.CFG option to bind IPX to a different driver.

To change which board IPX views as primary, use the "Protocol Stack IPX" option in the NET.CFG file:

```
protocol stack ipx  
bind drivervname
```

Replace *drivername* with the name of the driver that controls the board, and indent the "Bind" setting. For example, to set a Token-Ring board as primary, type:

```
protocol stack ipx
    bind token
```

“Protocol Stack IPX” on page 236 explains more about using this option.

## Specifying Primary with Two Boards of the Same Type

If you have two boards using the same type of ODI driver (such as two NE2000 boards), do not load the same driver twice in the CONFIG.SYS file and do not specify a "Protocol Stack IPX" option.

Instead, use the "Link Driver" option in the NET.CFG file to specify that the driver is used twice. Do this by placing two "Link Driver" sections in your NET.CFG file, each one specifying the driver name and the hardware settings used by that board.

The hardware settings for at least one of the boards must be specified, since you cannot have two boards of the same type both using the default hardware settings.

“Matching Driver Settings with Board Settings” on page 47 explains more about specifying hardware settings with the "Link Driver" option.

For example, if you have two NE2000 boards, you may include the following lines in your NET.CFG file:

```
link driver ne2000
    frame ethernet_802.3
    frame ethernet_802.2
    int 5
    port 360
link driver ne2000
    frame ethernet_802.3
    frame ethernet_802.2
    int 4
    port 320
```

Putting two occurrences of "link driver ne2000" loads the NE2000 driver twice. If you do not specify two "Link Driver" sections, a driver will not be loaded for the second board, and the second board will be ignored entirely.

**IMPORTANT:** The board whose line comes first in the NET.CFG file is the one IPX uses as primary.

## Shortcut for Multiple EISA and Micro Channel Boards

If you are using two EISA or Micro Channel boards that use the same driver (such as NE3200 or 3C523), you still must specify a "Link Driver" section for each board.

However, instead of specifying the hardware settings used on the board, you can specify the "slot" setting. The "slot" setting tells the ODI driver which slot a network board is in. The driver then scans the board and automatically determines what hardware settings are in use.

For example, for two NE3200 boards, type:

```
link driver ne3200
  frame ethernet_802.3
  frame ethernet_802.2
  slot 2
link driver ne3200
  frame ethernet_802.3
  frame ethernet_802.2
  slot 1
```

In this example, the board in slot 2 becomes the primary board because the driver for it was loaded first.

To change which board is primary, reorder the "Link Driver" sections. For example, to set the board in slot 1 as primary, type:

```
link driver ne3200
  frame ethernet_802.3
  frame ethernet_802.2
  slot 1
link driver ne3200
  frame ethernet_802.3
  frame ethernet_802.2
  slot 2
```

The section ["slot" on page 215](#) explains more.

## Why Change Which Board Is Primary

There are two scenarios in which you may want to change which board is primary.

### Scenario 1: Faster queries on networks connected with a router

Suppose your primary board is attached to a network and your secondary board is attached to a network. The two networks are connected with a router.

Because of the router, IPX can reach a destination on the second network by going through the first network, then the router, and then the second network.

However, IPX may have been able to find the destination faster if it was querying from the second network board rather than the first. In this case, you may want to use the NET.CFG option to change the secondary board to primary and have IPX use it for queries.

If you did this, queries would not be sent on the former primary board.

### **Scenario 2: Switching the board in use on unconnected networks**

Suppose you have two network boards, each connected to a physically separate network. Since IPX only queries the primary board, you will only have access to the first network unless you change which board is primary.

In this case, you may want to change the NET.CFG option and reboot whenever you want to access the other network.

Or it may be easier to

- ♦ Unplug your cable from one board and connect it to the other board, or
- ♦ Connect the networks with a router

## **Setting Hardware Settings and Frame Type for Each Board**

The requirements for setting hardware settings and frame type in the NET.CFG file are the same whether you have one board or two boards.

The only difference is if you have more than one board, you may need to specify a "Link Driver" section for each board.

To see how to set hardware settings or frame type using "Link Driver," see [“Matching Driver Settings with Board Settings” on page 47](#) and [“Specifying Frame Types for a Driver” on page 48](#).

For example, if you have an NE2000 and a Token-Ring board, you might type

```
link driver ne2000
  frame ethernet_802.3
  frame ethernet_802.2
  int 5
  port 360
link driver token
  frame token-ring
  frame token-ring_snap
  slot 2
```

If you have two boards with the same driver name (such as NE2000), see [“Specifying Primary with Two Boards of the Same Type”](#) on page 55 for information about using the "Link Driver" option.

# 6

## Improving Speed and Security

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### Topic

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[“Improving Speed with Packet Burst” on page 59](#)

[“Improving Speed by Using Large Internet Packets” on page 60](#)

[“Improving Security by Using Packet Signature” on page 61](#)

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You can use three features to improve speed and security on your network:

- ◆ Packet Burst
- ◆ Large Internet Packets
- ◆ Packet Signature Level

### Improving Speed with Packet Burst

Packet Burst is a protocol that speeds the transfer of multiple-packet NCP reads and writes. Packet Burst eliminates the need to sequence and acknowledge each packet. With Packet Burst, the server or client sends a whole set (or burst) of packets before it requires an acknowledgment.

Packet Burst reduces network traffic by allowing multiple packets to be acknowledged. Packet Burst also monitors dropped packets and retransmits only the missing packets.

At connection time, maximum burst sizes are negotiated with each server. Since Packet Burst is established with each connection, it's possible to "burst" with one server but not with another.

Once you establish a Packet Burst connection between a workstation and a server, the workstation automatically uses Packet Burst whenever an application requests to write more than three times the maximum packet size of data. This means that an application doesn't have to be aware of Packet Burst.

## Disabling Packet Burst

Packet Burst is enabled at the workstation by default. You can disable it by adding the following line to the workstation's NET.CFG file:

```
netware requester
    packet burst off
```

See the [“packet burst off” on page 230](#) for information on Packet Burst.

## Improving Speed by Using Large Internet Packets

Large Internet Packet (LIP) functionality allows the internet packet size to be increased from the default 576 bytes. By allowing the NetWare packet size to be increased, LIP enhances transmission over bridges and routers.

In NetWare v4.0, the workstation requests an acceptable packet size. However, unlike previous versions of NetWare, the NetWare server doesn't default to 576 bytes when a router is detected.

Instead, the workstation attempts to send larger packets to the NetWare server. The largest packet size that the NetWare server accepts is the packet size used to communicate.

## Disabling Large Internet Packets

LIP functionality is enabled by default on the workstation. To disable it, enter the following lines in the NET.CFG file:

```
netware requester
    large internet packets off
```



# Improving Security by Using Packet Signature

NCP Packet Signature is an enhanced security feature that protects servers and clients using the NetWare Core Protocol by preventing packet forgery.

Without the NCP Packet Signature installed, a network client can pose as a more privileged client to send a forged NCP request to a NetWare server. By forging the proper NCP request packet, an intruder could gain Supervisor rights and access to all network resources.

NCP Packet Signature prevents packet forgery by requiring the server and the client to "sign" each NCP packet. The packet signature changes with every packet.

NCP packets with incorrect signatures are discarded without breaking the client's connection with the server. However, an alert message about the invalid packet is sent to the error log, the affected client, and the server console. The alert message contains the login name and the station address of the affected client.

A two-part process between the client and the NetWare server determines the NCP Packet Signature:

- ◆ At login, the server and the client determine a shared, secret key known as the session key.
- ◆ For each request or response packet, the server and the client calculate a signature based on the session key, a "fingerprint" algorithm, and the previous packet's signature. The unique signature is appended to the NCP packet.

If NCP Packet Signature is installed correctly on the server and all of its clients, it is virtually impossible to forge a valid NCP packet.

**NOTE:** The Packet Burst loadable module, PBURST.NLM, must be loaded on NetWare servers in order for NCP Packet Signature to work. However, using Packet Burst to transfer data between servers and clients is optional.

## Packet Signature Options

Because the packet signature process consumes CPU resources and slows performance, both for the client and the NetWare server, NCP Packet Signature is optional.

Several signature options are available, ranging from never signing NCP packets to always signing NCP packets. NetWare servers and clients both have four settable signature levels.

The signature options for servers and clients combine to determine the level of NCP Packet Signature on the network.

**NOTE:** Some combinations of server and client packet signature levels may slow performance. However, low CPU-demand systems may not show any performance degradation. Network supervisors can choose the packet signature level that meets both their performance needs and their security requirements.

## Server Levels

Server packet signature levels are assigned by a new SET parameter. See *Utilities Reference* for more information.

## Client Levels

Packet signature levels at the workstation are assigned by using the following NET.CFG option:

```
netware requester
    signature level number
```

Replace *number* with 0, 1, 2, or 3. The default is 1.

**Table 6** NCP Packet Signature levels

Number	Explanation
0	Client does not sign packets
1	Client signs packets <i>only</i> if the server requests it (server option is 2 or higher)
2	Client signs packets if the server is capable of signing (server option is 1 or higher)
3	Client signs packets and requires the server to sign packets (or login will fail)

## Effective Packet Signature

The packet signature levels for the server and the client interact to create the "effective" packet signature. Some combinations of server and client levels do not allow logging in.

**Table 7** shows the interactive relationship between the server packet signature levels and the client signature levels.

**Table 7**      **Effective Packet Signature of server and client**

IF	Server = 0	Server = 1	Server = 2	Server = 3
Client = 0	No packet signature	No packet signature	No packet signature	<i>No login</i>
Client = 1	No packet signature	No packet signature	Packet signature	Packet signature
Client = 2	No packet signature	Packet signature	Packet signature	Packet signature
Client = 3	<i>No login</i>	Packet signature	Packet signature	Packet signature

## When to Use NCP Packet Signature

NCP Packet Signature is not required for every installation. Some network supervisors may choose not to use NCP Packet Signature because they can tolerate certain security risks.

You may not need to use NCP Packet Signature if:

- ◆ Only executable programs reside on the server.
- ◆ All workstation users on the network are known and trusted by the supervisor.
- ◆ Data on the NetWare server is not sensitive; loss or corruption of this data will not impact operations.

You may want to use NCP Packet Signature if:

- ◆ An untrustworthy user uses a workstation on the network.
- ◆ Someone can easily access the network cabling system.
- ◆ There is an unattended, publicly accessible workstation on the network.

The default NCP Packet Signature level is 1 for clients and 2 for servers. In general, this setting provides the most flexibility while still offering protection from forged packets. Below are some examples of using different signature levels.

### **All Information on the Server Is Sensitive**

If an intruder gains access to any information on the NetWare server, it could damage the company.

The network supervisor sets the server to level 3 and all clients to level 3 for maximum protection.

### **Sensitive and Nonsensitive Information Reside on the Same Server**

The NetWare server has a directory for executable programs and a separate directory for corporate finances.

The network supervisor sets the server to level 2, and the clients that need access to corporate finances to level 3. All other clients remain at the default, level 1.

### **Users Often Change Locations and Workstations**

The network supervisor is uncertain which employees will be using which workstations, and the NetWare server contains some sensitive data.

The network supervisor sets the server to level 3. Clients remain at the default, level 1.

### **Workstation Is Publicly Accessible**

An unattended workstation is set up for public access to non-sensitive information, but another server on the network contains sensitive information.

The network supervisor sets the sensitive server to level 3 and the unattended client to level 0.

## Packet Signature Troubleshooting Tips

This section describes some solutions to problems that may be associated with using NCP Packet Signature.

### Clients Are Not Signing Packets

Make sure each OS/2 workstation has NetWare Requester v2.01 installed.

Make sure that NCP Packet Signature is not turned off in the NET.CFG file.

### Clients Cannot Log In

Make sure each workstation has NetWare Requester v2.01 installed.

The following situations do not allow logging in:

- ◆ Server packet signature = 3, client signature = 0
- ◆ Server packet signature = 0, client signature = 3
- ◆ Utilities are old and do not support NCP Packet Signature
- ◆ The Requester is old and does not support NCP Packet Signature.

### "Error Receiving From the NetWork" Appears

The client is using an old LOGIN.EXE file that does not include NCP Packet Signature. Make sure the new LOGIN.EXE and other new utilities are installed in the \OS2 subdirectory on all servers on the network.

### Insecure Clients Log In to Secure Server

The clients are using an old LOGIN.EXE file that does not include NCP Packet Signature. Make sure the new LOGIN.EXE and other new utilities are installed in the \OS2 subdirectory on all servers on the network. Add a preferred server statement to the NET.CFG file for all clients that have access to secure servers (level 3).



# 7

## Using OS/2 Workstations on a Token-Ring Network

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**Topic**

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[“Installing Source Routing on the Server” on page 68](#)

[“Installing Source Routing on the Workstation” on page 68](#)

[“Configuring Source Routing on the Workstation” on page 69](#)

---

If your Token-Ring network includes IBM source-routing bridges, computers use source routing to communicate across those bridges.

If you do not use source-routing bridges, skip this chapter.

This chapter explains how to install and configure source routing on NetWare servers and OS/2 workstations. NetWare Workstation for DOS and Windows explains how to configure source routing on DOS workstations.

If your network requires source routing, you must install source-routing software on both workstations and servers. Novell's source-routing software includes:

- ◆ ROUTE.NLM (for servers)
- ◆ ROUTE.SYS (for OS/2 workstations)

This software routes only IPX packets.

# Installing Source Routing on the Server

## Procedures

- 1 At the server console, load ROUTE.NLM by typing

```
LOAD ROUTE
```

ROUTE.NLM is located in the SYS:SYSTEM directory. You can load it with command line parameters. Utilities Reference explains more about the parameters.

You can also load ROUTE.NLM in a startup file.

- 2 (Conditional) Load ROUTE.NLM again if you have two network boards in your server.

Use the "board" parameter to specify a board number. For example, type

```
LOAD ROUTE BOARD=02
```

You can change a source-routing parameter after ROUTE is loaded. Type the LOAD ROUTE command followed by the parameter you want to change.

# Installing Source Routing on the Workstation

## Prerequisites

- Install the Netware Requester with a TOKEN ODI driver. Chapter 3, "Installing a NetWare Workstation," in *Workstation Basics and Installation* explains how to install the Requester.
- Install source routing on all NetWare servers on the same network as source-routing bridges by following the instructions in [“Installing Source Routing on the Server” on page 68](#).
- Understand source routing. The *September 1990 Novell Application Notes* contains a thorough explanation of source routing.

## Procedures

- 1 Open the CONFIG.SYS file in a text editor.

For example, to use the OS/2 System Editor at an OS/2 command line, type:

```
E C:\CONFIG.SYS
```



CONFIG.SYS is generally located in the root of your boot drive.

- 2 In the NetWare Requester lines, find the line loading your TOKEN ODI driver.

If you are using Novell-supplied ODI drivers, the driver will be called TOKEN.SYS.

**NOTE:** If you are using LANSUP.SYS and an NDIS driver, you will not have an ODI driver loaded. In this case, find LANSUP.SYS. [“Setting Up LANSUP” on page 94](#) explains more about LANSUP.

- 3 Following the line that loads the TOKEN ODI driver, type a new line to load the ROUTE.SYS driver.

Specify the correct location of ROUTE.SYS in this line. ROUTE.SYS is located where your other Requester files are, usually in C:\NETWARE.

For example, to load ROUTE.SYS from the default location, type:

```
C:\NETWARE\ROUTE.SYS
```

- 4 Save and exit the CONFIG.SYS file.
- 5 Use the OS/2 "Shutdown" feature to reboot your machine.

## Configuring Source Routing on the Workstation

Follow the procedures in this section to

- ♦ Determine whether you need to configure source routing, and
- ♦ Configure source routing, if needed.

### Prerequisites

- Install the NetWare Requester. Chapter 3, "Installing a NetWare Workstation," in *Workstation Basics and Installation* explains how to install the Requester.
- Install source routing on the server. See [“Installing Source Routing on the Server” on page 68](#).
- Install source routing on the workstation. See [“Installing Source Routing on the Workstation” on page 68](#).
- Understand source routing thoroughly. This section does not explain source-routing terminology or how packets are routed. You can read IBM publications (such as *IBM Token-Ring Network Architecture Reference*) or the *September 1990 Novell Application Notes*.

# Procedures

- 1 Start the NetWare Requester Installation program.

You can choose the "Installation" icon from the "Novell" group on your desktop.

- 2 Choose "This workstation . . ." from the "Configuration" menu.

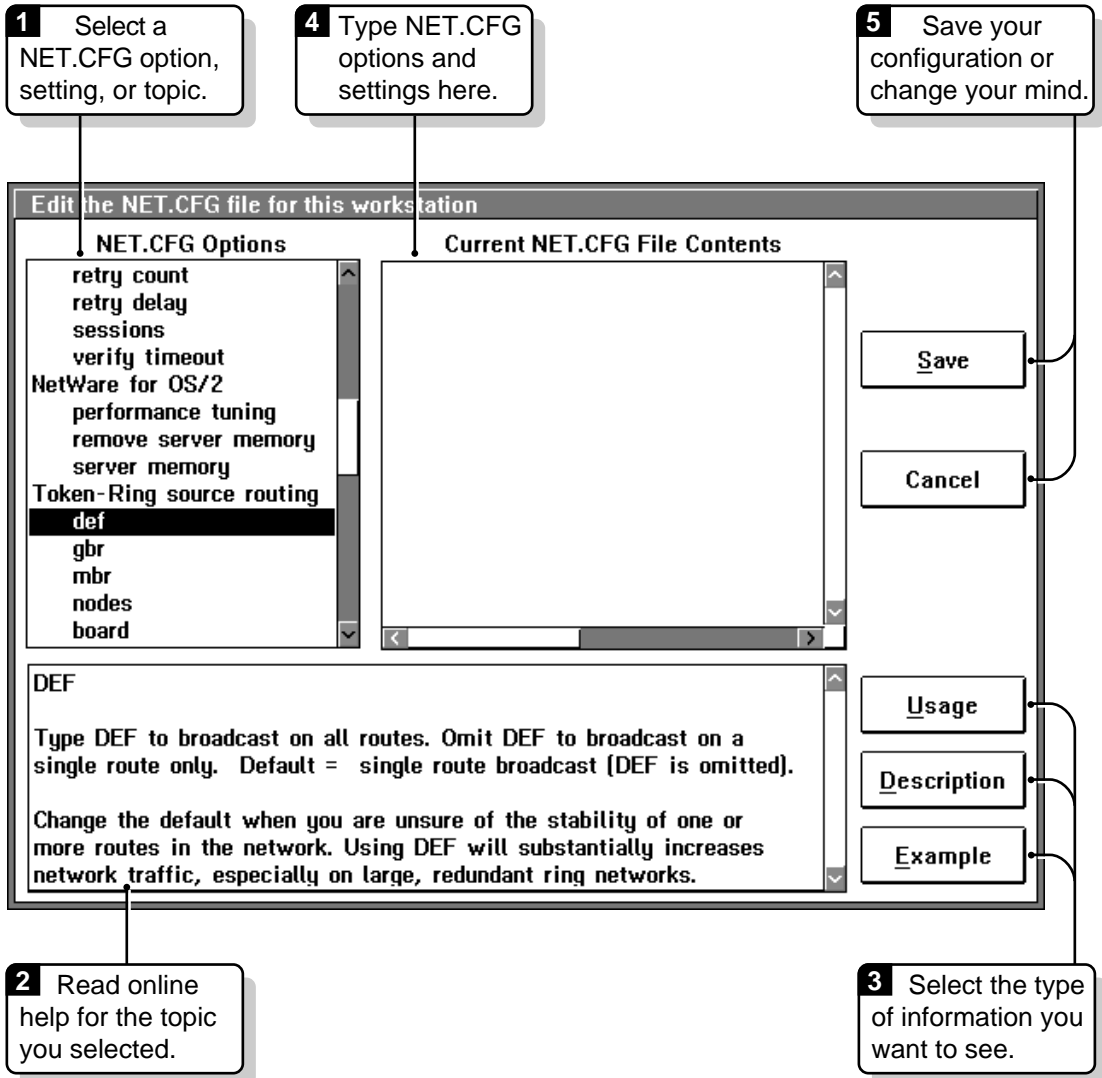
- 3 Verify the location of the NET.CFG file and choose "Edit."

The "Edit NET.CFG" window appears. See [Figure 13 on page 71](#). You can cut and paste text from the help window at the bottom of the screen to the "Current NET.CFG File Contents" window. Use the following keys:

**Table 8** Key definitions for the NET.CFG window

To do this . . .	Use these keys . . . .
Highlight text	Click and drag with the mouse, or move the cursor with the arrow keys while holding down the <Shift> key
Copy text	<Ctrl><Insert>
Cut text (text will reappear the next time you refresh the window)	<Shift><Delete>
Paste text	<Shift><Insert>
Delete text (deleted text cannot be pasted)	<Ctrl><Delete>

Figure 13 Editing NET.CFG for source routing



- 4** Select "Token-Ring source routing" from the "NET.CFG Options" box on the left of your screen.
- 5** Determine whether to change the configuration for the "def", "gbr", "mbr", "nodes," and "board" settings under "Token-Ring source routing."
  - 5a** Select one of the five settings.  
Example: select "def"

- 5b** Read the help window at the bottom of the screen to determine whether to change the configuration for the setting.

You can choose the "Usage," "Description" and "Example" buttons on the right of the window to see more information about the setting you've selected.

- 5c** (Optional) If you decide to change the configuration, type the configuration lines (as shown in the "Usage" help window) in the "Current NET.CFG File Contents" box.

**IMPORTANT:** You *must* follow the format requirements explained in the "Format of NET.CFG Options" topic. To see these requirements, select this topic from the "NET.CFG Options" box and choose the "Usage" button.

Repeat steps 5a through 5c for each setting.

- 6** Choose "Save."
- 7** Exit the NetWare Requester Installation program and use the OS/2 "Shutdown" feature to reboot your computer.

# 8

## Sharing a Network Board with IBM Software

Use this chapter if you want the NetWare Requester to share a network board with one or more of the following IBM software products:

- ◆ Extended Services
- ◆ LAN Server
- ◆ LAN Requester

---

**Topic**

---

[“How Board Sharing Is Possible” on page 73](#)

[“Setting Up ODINSUP” on page 74](#)

[“Setting Up LANSUP” on page 94](#)

---

**NOTE:** If you have Extended Services or LAN Services, you may also want to set up the NetBIOS protocol. After doing the steps in this chapter, you can see [“Setting Up NetBIOS for OS/2” on page 125](#).

### How Board Sharing Is Possible

The NetWare Requester uses protocol drivers and network drivers written to the ODI (Open Data-Link Interface) specification.

Extended Services and LAN Services use protocol drivers and network drivers written to the NDIS specification.

Even though NetWare Requester uses a different driver specification than Extended Services and LAN Services, the NetWare Requester can still share

a network board with these products. This is possible because of two drivers that Novell provides:

- ◆ ODINSUP.SYS

The ODINSUP driver lets Extended Services and LAN Services use ODI network drivers. Use ODINSUP when you want the ODI network driver to control the board. See [“Setting Up ODINSUP” on page 74](#).

- ◆ LANSUP.SYS

The LANSUP driver lets the NetWare Requester use NDIS network drivers. Use LANSUP when you want the NDIS driver to control the board. See [“Setting Up LANSUP” on page 94](#).

## Setting Up ODINSUP

**NOTE:** Except where noted, the instructions in this section apply whether you have Extended Services, LAN Services, or both. However, the sample configuration files shown differ depending on what IBM software you have. Be sure to refer to the correct files for your environment.

ODINSUP installation involves three parts, all done in a text editor. Each part sets up a different configuration file. You must do all three parts.

---

### Part

---

[“Part A: Binding ODI Drivers in PROTOCOL.INI” on page 75](#)

[“Part B: Loading ODINSUP in CONFIG.SYS” on page 78](#)

[“Part C: Configuring ODINSUP in NET.CFG” on page 80](#)

[“Sample Configuration Files for ODINSUP” on page 85](#)

---

ODINSUP supports Ethernet and Token-Ring compatible ODI drivers. It does not support ARCnet or PC Network II drivers.

## Part A: Binding ODI Drivers in PROTOCOL.INI

In this section, you edit the PROTOCOL.INI file in a text editor to do the following:

- ◆ Bind the NDIS protocol stack to the ODI drivers
- ◆ Remove the line binding the NDIS protocol stack to the NDIS MAC drivers

**NOTE:** These instructions are for LAN Server and LAN Requester v2.x.

### Prerequisites

- ❑ Install Extended Services on the workstation. If you have an NDIS driver for the network board in your computer, verify that you can get a Communications Manager or Database Manager connection. See the documentation for Extended Services.
- ❑ Install LAN Server or LAN Requester on the workstation. If you have an NDIS driver for the network board in your computer, verify that you can get connections properly on your LAN Server network. See the documentation for LAN Services.
- ❑ After installing all IBM software, install the NetWare Requester v2.01 as instructed in Chapter 3, "Installing a NetWare Workstation," in *Workstation Basics and Installation*. Using the ODI driver for the board, verify that you can get connections properly on your NetWare network. Chapter 5, "Workstation Login" in *Workstation Basics and Installation* explains about logging in to a NetWare network.

**NOTE:** Once you install the NetWare Requester, Extended Services and LAN Services will not be able to use the network board to make connections until you have completely set up ODINSUP as instructed in this chapter.

### Procedures

- 1** Open the PROTOCOL.INI file in a text editor.

For example, to use the OS/2 System Editor at the command line, type:

```
E C:\IBMCOM\PROTOCOL.INI
```

PROTOCOL.INI is located in the \IBMCOM directory on your boot drive.

- 2** Find all occurrences of the lines that bind the NDIS MAC drivers.

You can search for "Bindings = NDIS MAC driver."

If you don't know the name of the NDIS driver to look for, see your Extended Services or LAN Services documentation.

For example, to search for a Token-Ring NDIS driver, find the following line:

```
Bindings = IBMTOK_NIF
```

Bindings lines may be in any of the following sections, depending on whether you have Extended Services or LAN Services installed:

```
[NETBEUI_nif]
[LANDD_nif]
```

**3** Use a semicolon to remark out all Bindings lines found in Step 2.

For example, your PROTOCOL.INI for a Token-Ring driver might look as follows:

```
[LANDD_nif]
.
.
; Bindings = IBMTOK_NIF
```

**4** After each remarked-out Bindings line, add a line to bind the NDIS protocol to an ODI driver.

Follow the same syntax as the line you remarked out, using the ODI driver name instead of the NDIS driver name.

For example, to add a line for the TOKEN.SYS ODI driver:

```
[LANDD_nif]
.
.
; Bindings = IBMTOK_NIF
Bindings = TOKEN
```

Since driver names in the PROTOCOL.INI file cannot start with a number, place an *X* before 3Com drivers and other drivers that start with a number (Example: Bindings = X3C503).

**HINT:** If you do not know which ODI driver name to use, you can reboot your machine. An error message will appear, displaying the name of the ODI driver that should be used. If you do this, be sure to reopen the PROTOCOL.INI file and return to this step of the procedure.

**5** (Conditional) Type an instance number to bind the NDIS protocol to a particular occurrence of a board.



If you have two or more network boards using the same ODI driver, the NDIS protocol uses the first network board of that type.

To have NDIS use a board other than the first one found, you can specify an instance number. Type the instance number at the end of the driver name, with no space between the driver name and the instance number.

For example, if you have two Token-Ring network boards, have NDIS use the second board by typing an instance number for the second board, as shown:

```
[LANDD_nif]
.
.
; Bindings = IBMTOK_NIF
Bindings = TOKEN2
```

**6** (Conditional) Bind the NDIS protocol to additional ODI drivers.

To bind the NDIS protocol to more than one ODI driver, type both driver names on the same line, separated by a comma.

For example, to bind to both an NE2000 driver and an NE1000 driver, type:

```
Bindings=ne2000,ne1000
```

**7** Add an empty header for the ODI drivers.

**7a** Locate the MAC SECTION of the PROTOCOL.INI file.

You can search for *MAC SECTION*.

**7b** At the end of the MAC section, type a header for each ODI driver you specified in a Bindings line in Steps 4 through 6.

Use the ODI driver name. For example, for a Token ODI driver, type the following line:

```
[TOKEN]
```

Put a blank line before and after the header section. If the driver name starts with a number, you do not need an *X* in front of the number for this step.

This ODI driver header is a place holder so that if you configure with the LAPS program in the future, the Bindings information will not be erased.

**8** Save and exit the PROTOCOL.INI file.

Do not exit the text editor. Go to **“Part B: Loading ODINSUP in CONFIG.SYS” on page 78.**

## Part B: Loading ODINSUP in CONFIG.SYS

In this section, you edit the CONFIG.SYS file in a text editor to do the following:

- ◆ Load the ODINSUP driver
- ◆ Prevent the NDIS network driver (MAC) from loading

### Prerequisite

- Follow the instructions in “[Part A: Binding ODI Drivers in PROTOCOL.INI](#)” on page 75.

### Procedures

- 1** Open the CONFIG.SYS file in a text editor.

CONFIG.SYS is located in the root of your boot drive.

- 2** Find the lines that load the NDIS MAC drivers.

For example, for a token driver, search for the following line:

```
DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2
```

If you don't know the name of your NDIS driver, see your Extended Services or LAN Services documentation.

- 3** Remark out the NDIS MAC driver that is equivalent to the ODI driver you are using.

For example, to remark out a Token-Ring NDIS MAC driver, place a **REM** command in front of the line that loads it, as shown:

```
REM DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2
```

If you have network boards and NDIS drivers for other communications software, do not remark out the lines to load those drivers.

- 4** In the NetWare Requester lines, find the line loading the ODI driver.

- 5** On a new line underneath the ODI driver, insert a line to load the ODINSUP protocol.

ODINSUP is located in the directory where you installed the NetWare Requester files (\NETWARE by default).

For example, to load the ODINSUP protocol from the default location, type:

```
DEVICE=C:\NETWARE\ODINSUP.SYS
```

**NOTE:** If you have the Source-Routing driver, ROUTE.SYS, loaded after the ODI driver, put the ODINSUP line after the ROUTE.SYS line.

- 6** Verify that your file meets the load order requirements shown in the table below.

By default, these load order requirements will be met.

If you have rearranged your CONFIG.SYS, it may violate the load order requirements.

**Table 9 Load order requirements for ODINSUP CONFIG.SYS file**

These components . . .	Must load BEFORE these components . . .
PROTMAN.OS2 (in OS/2 section right after path statements)	The ODINSUP protocol
LSL.SYS (in NetWare Requester section)	The ODI driver The ODINSUP protocol
The ODI driver (in NetWare Requester section)	The ODINSUP protocol
NWIFS.IFS (in NetWare Requester section)	NETWKSTA.200 (only in LAN Services configurations)

**6a** If your file meets load order requirements, go to [Step 8](#).

**6b** If your file violates load order requirements, go to [Step 7](#).

- 7** Rearrange your CONFIG.SYS file to meet load order requirements for ODINSUP.

We suggest you make your file match the sample file shown for your environment. See [“Sample Configuration Files for ODINSUP” on page 85](#) for a list of sample configuration files.

After rearranging your CONFIG.SYS file, go on to [Step 8](#).

- 8** Save and exit the CONFIG.SYS file.

Do not exit the text editor. Go to [“Part C: Configuring ODINSUP in NET.CFG” on page 80](#).

## Part C: Configuring ODINSUP in NET.CFG

**IMPORTANT:** A NET.CFG file is required to use ODINSUP.

In this section, you edit or create a NET.CFG that does the following:

- ◆ Enables frame types for ODINSUP.
- ◆ Specifies to ODINSUP the node address known by Extended Services and the format in which that address is transmitted.
- ◆ Binds ODINSUP to an ODI driver or drivers.
- ◆ Increases the size of the packet that can be transmitted through the Link Support layer (if necessary.)

### Prerequisites

- Follow the instructions in “[Part A: Binding ODI Drivers in PROTOCOL.INI](#)” on page 75.
- Follow the instructions in “[Part B: Loading ODINSUP in CONFIG.SYS](#)” on page 78.

### Procedures

- 1** Open the NET.CFG text file in the text editor.

NET.CFG is located in the root of your boot drive. If the NET.CFG file does not exist, create a new file by that name.

- 2** Enable frame types for ODINSUP.

- 2a** Type the following line at the top of the file:

```
link driver drivername
```

Replace *drivername* with the name of your ODI driver. For example, for a Token-Ring driver, type:

```
link driver token
```

- 2b** Under the Link Driver line, type the lines to enable frame types.

Enable all frame types supported by the board.

Use the *frame* setting to do this. The setting “[frame](#)” on page 207 explains more about frame types and the frame setting.

For example, to enable all frame types for Token-Ring, type the following:

```
link driver token
    frame token-ring
    frame token-ring_snap
```

To enable all frame types for Ethernet, type the following:

```
link driver ne2000
    frame ethernet_802.3
    frame ethernet_802.2
    frame ethernet_ii
    frame ethernet_snap
```

The first frame defined is the only one used for the initial Get Nearest Server request. Therefore, if you have some servers that are using only one frame type, such as Ethernet\_802.3, put that frame type first. That way your workstation will be able to make a default connection to those servers.

**IMPORTANT:** Whenever you edit the NET.CFG file, you *must* indent settings, as well as follow the other format requirements explained in “NET.CFG Format Requirements” on page 42.

- 3 Read the following chart to determine whether you need to specify a node address in the NET.CFG file.

If you are using . . .	Do this. . .
Extended Services or LAN Services set up for universally-administered addresses	You do not need to specify a node address. Go to <a href="#">Step 5</a> .
Extended Services or LAN Services set up for locally administered addresses	You must specify a node address. Use the address shown in the "NetAddress" parameter in the PROTOCOL.INI file. Remove the T first. For example, if the PROTOCOL.INI file shows the line  <code>NetAddress = "T400000007030"</code>  the address you specify in NET.CFG is  <code>400000007030</code>  Go to <a href="#">Step 4</a> .

**4** Type a line specifying the node address.

Type this line under the "Link Driver" option, above or below the lines enabling frame types. The node address must be a 6-byte hexadecimal number (12 characters). Use the address you located in **Step 3**.

For example, to set a node address for a Token-Ring board in an Extended Services environment, type:

```
node address 400000007030
```

If your board supports octet bit reversal, you can specify the address in either canonical (least significant bit first) or non-canonical (most significant bit first) format.

By default, the following frames are non-canonical (MSB):

- ◆ Token-Ring
- ◆ PC Network II

Ethernet frames are canonical (LSB).

If you specify the address in the format that is not default, you must type an *M* (most significant bit first) or *L* (least significant bit first) at the end of the address to tell ODINSUP which format you used.

For example, for a Token-Ring environment using the default format for the node address, the "Current NET.CFG file contents" box should contain lines similar to the following:

```
link driver token
  frame token-ring
  frame token-ring_snap
  node address 400000007030
```

Note that an *M* after the node address is not needed because the address is specified most significant bit first, the default format for Token-Ring.

For a Token-Ring environment using the non-default format for the same node address, the "Current NET.CFG file contents" box should contain lines similar to the following:

```
link driver token
  frame token-ring
  frame token-ring_snap
  node address 02000000E0CL
```

In this case, an *L* after the node address is needed because the address is specified in least significant bit first format, the format which is not the default for Token-Ring.

For an Ethernet Extended Services environment, the NET.CFG file should now contain lines similar to the following:

```
link driver ne2000
    frame ethernet_802.3
    frame ethernet_802.2
    frame ethernet_ii
    frame ethernet_snap
    node address 00001B1B055C
```

**NOTE:** If you do not know the node address, you can type a "dummy" address and go to the next step. When you reboot your machine, an error message showing the correct address will be displayed. At that point, you can edit the NET.CFG file again and insert the address that was displayed at boot time.

## 5 Bind ODINSUP to one or more ODI drivers.

When ODINSUP is bound to a driver, the network board for that driver is used for Extended Services and LAN Services transmissions.

### 5a Type the following lines:

```
protocol odinsup
    bind drivername
```

Replace *drivername* with the name of the ODI driver you installed with the Requester.

For example, for a Token-Ring ODI driver, type

```
protocol odinsup
    bind token
```

### 5b (Conditional) Specify an instance number if you have two or more boards using the same ODI driver.

If you have two or more network boards using the same ODI driver, ODINSUP searches the network board slots in order and binds only to the first board of that type it finds.

To have ODINSUP bind to a board other than the first one found, you can specify an instance number.

ODINSUP can be bound to a maximum of four boards.

For example, if you have two Token-Ring network boards, bind ODINSUP to both boards by typing an instance number for the second board, as shown:

```
protocol odinsup
    bind token
    bind token 2
```

“Protocol ODINSUP” on page 234 explains more about the "Protocol Odinsup" option.

- 6 (Optional) Increase the size of the packet transmitted through the Link Support Layer.

Increasing the packet size may improve transmission speed if you are using a Token-Ring 16/4 board.

For other kinds of board, see the board documentation to determine the maximum packet size supported by the board. If the board supports a packet size larger than 1,514 (the Link Support default), transmission speed may improve if you increase the Link Support Layer default to the board's maximum allowed size.

To increase the default:

- 6a Under the Link driver lines, type the following line:

```
link support
```

- 6b Under the Link Support line, type the following line:

```
buffers number size
```

Indent the line. Replace *number* with a number of buffers greater than 1. Replace *buffer\_size* with a number of bytes greater than 576.

The Requester cannot use more than 64 KB of memory for communication buffers. Header information takes 5 KB. This means that the buffer number multiplied by the buffer size (plus the header information) cannot be greater than 65,536 bytes. For example, 20 buffers multiplied by 1,514 bytes equals 30,280 bytes.

“Link Support” on page 216 explains more information about using this option.

For example, you might type

```
link support
  buffers 14 4202
```

**IMPORTANT:** For Token-Ring 16/4 boards, the NetWare Requester will probably have maximum performance if you specify 14 buffers, each with a size of 4,202 bytes, as shown in the example above.

- 7 Save your changes and exit the NET.CFG file.
- 8 Exit the text editor.
- 9 Choose "Shutdown" from the OS/2 System menu to reboot your machine.



When your machine starts again, ODINSUP support will be completely set up. NetWare Requester and Extended Services/LAN Services will then use the same ODI driver and board to transmit on the network.

## Sample Configuration Files for ODINSUP

This section contains sample CONFIG.SYS, NET.CFG, and PROTOCOL.INI files for both Extended Services and LAN Requester environments.

**NOTE:** If you follow the steps in “Setting Up ODINSUP” on page 74, your configuration files will look like the ones shown. We recommend following the steps rather than just referring to these sample files.

---

### Sample Files

---

“LANSUP Files from an Extended Services Environment” on page 103

“Extended Services Token-Ring PROTOCOL.INI file for ODINSUP” on page 86

“Extended Services Token-Ring CONFIG.SYS file for ODINSUP (part 1)” on page 87

“Extended Services Token-Ring CONFIG.SYS file for ODINSUP (part 2)” on page 88

“Extended Services Token-Ring NET.CFG file for ODINSUP” on page 89

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“LANSUP Files from a LAN Requester Environment” on page 107

“LAN Requester Token-Ring PROTOCOL.INI file for ODINSUP (part 1)” on page 90

“LAN Requester Token-Ring PROTOCOL.INI file for ODINSUP (part 2)” on page 91

“LAN Requester Token-Ring CONFIG.SYS file for ODINSUP (part 1)” on page 92

“LAN Requester Token-Ring CONFIG.SYS file for ODINSUP (part 2)” on page 93

“LAN Requester Token-Ring NET.CFG file for ODINSUP” on page 94

---

## ODINSUP Files from an Extended Services Environment

These files came from a computer with the following software installed:

- ◆ OS/2 v2.0
- ◆ Extended Services v1.0 (locally-administered addresses)
- ◆ NetWare Requester v2.01 with ODINSUP.

The computer used Communications Manager to make a LAN connection to an IBM host.

Figure 14 illustrates a PROTOCOL.INI file for this environment.

Figure 14 Extended Services Token-Ring PROTOCOL.INI file for ODINSUP

```
[PROT_MAN]
  DRIVENAME = PROTMAN$
```

```
[IBMLXCFG]
  LANDD_nif = LANDD.NIF
  IBMTOK_nif = IBMTOK.NIF
```

```
[LANDD_nif]
  DRIVENAME = LANDD$
; BINDINGS = IBMTOK_nif
  BINDINGS = TOKEN
  Links = 41
  Users = 4
  Max_Saps = 4
  NetAddress = "T400000007030"
```

```
[IBMTOK_nif]
  DRIVENAME = IBMTOK$
```

```
[TOKEN]
```

Remark out this line binding the NDIS TOKEN driver.

Add this line binding the ODI TOKEN driver.

This node address must be specified in the NET.CFG.

Include this line at the end of the file. Put a blank line before and after it.

Figure 15 and Figure 16 illustrate a CONFIG.SYS file for the example Extended Services environment.

Figure 15 Extended Services Token-Ring CONFIG.SYS file for ODINSUP (part 1)

```
.  
.
LIBPATH=.;D:\OS2\DLL;D:\MUGLIB\DLL;D:\OS2\MDOS;D:\CMLIB\DLL;D:\
D:\OS2\APPS\DLL;D:\IBMCOM\DLL;D:\NETWARE;
SET
PATH=D:\OS2;D:\MUGLIB;D:\OS2\SYSTEM;D:\OS2\MDOS\WINOS2;D:\
CMLIB;D:\CMLIB\APPN;D:\OS2\INSTALL;D:\;D:\OS2\MDOS;D:\OS2\APPS;
L:\OS2;P:\OS2;D:\NETWARE;
SET
DPATH=D:\OS2;D:\MUGLIB\DLL;D:\CMLIB;D:\CMLIB\APPN;D:\OS2\
SYSTEM;D:\OS2\MDOS\WINOS2;D:\OS2\INSTALL;D:\;D:\OS2\BITMAP;D:\
OS2\MDOS;D:\OS2\APPS;D:\IBMCOM;L:\OS2;D:\NETWARE;
.
.
DEVICE=D:\ibmcom\lanmsgdd.os2 /I:D:\ibmcom
DEVICE=D:\ibmcom\protman.os2 /I:D:\ibmcom
DEVICE=D:\ibmcom\protocol\LANDD.OS2
DEVICE=D:\ibmcom\protocol\LANDLLDD.OS2
.
.
DEVICE=D:\CMLIB\ACSLDLAN.SYS
RUN=D:\OS2\EPW.EXE
RUN=D:\ibmcom\protocol\landll.exe
RUN=D:\ibmcom\protocol\netbind.exe
RUN=D:\ibmcom\lanmsgex.exe rem
DEVICE=D:\IBMCOM\MACS\IBMTOK.OS2
DEVICE=D:\CMLIB\APPN\CMKFMDE.SYS
.
.
```

Protocol Manager is loaded by Extended Services.

You must remark out the NDIS TOKEN driver.

**Continued on next page.**

Figure 16 Extended Services Token-Ring CONFIG.SYS file for ODINSUP (part 2)

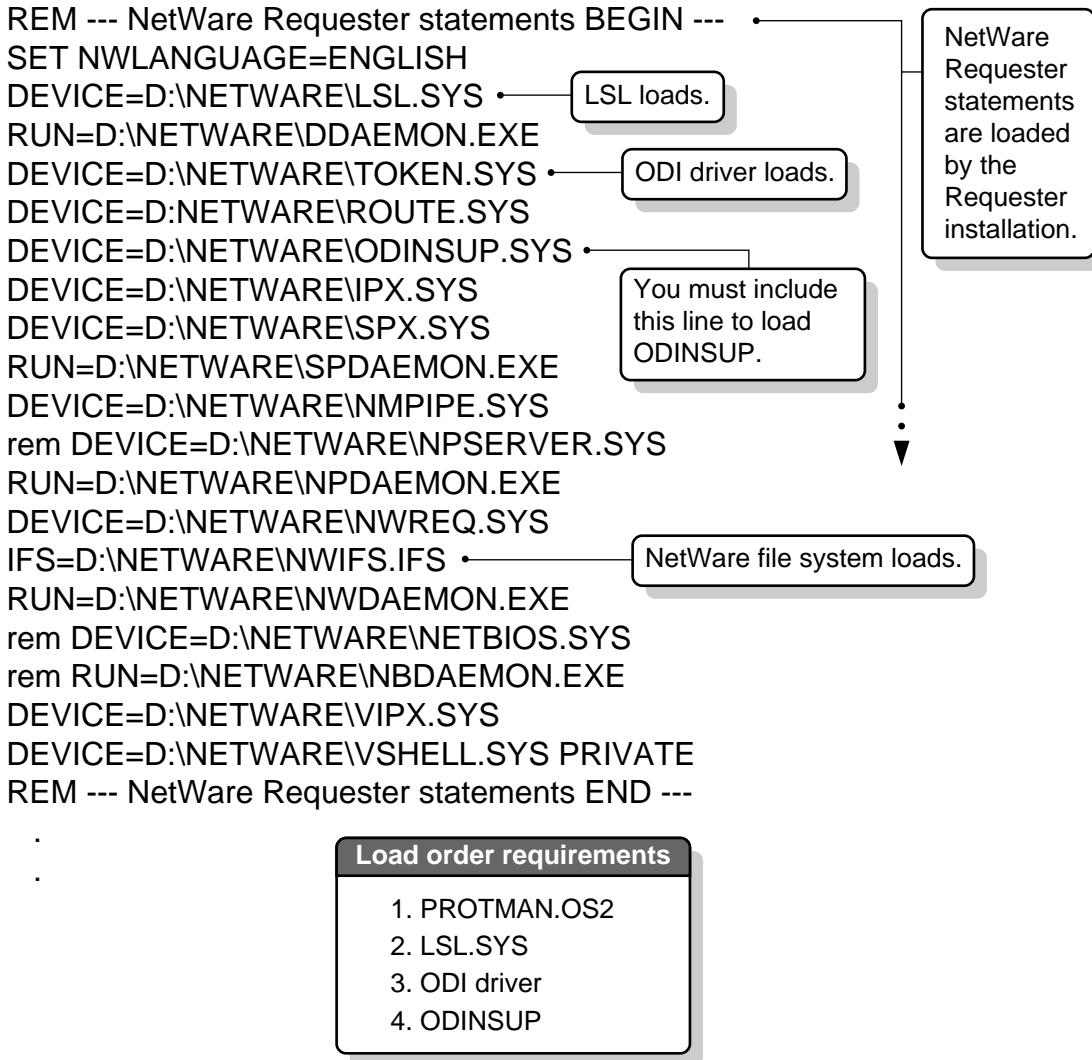
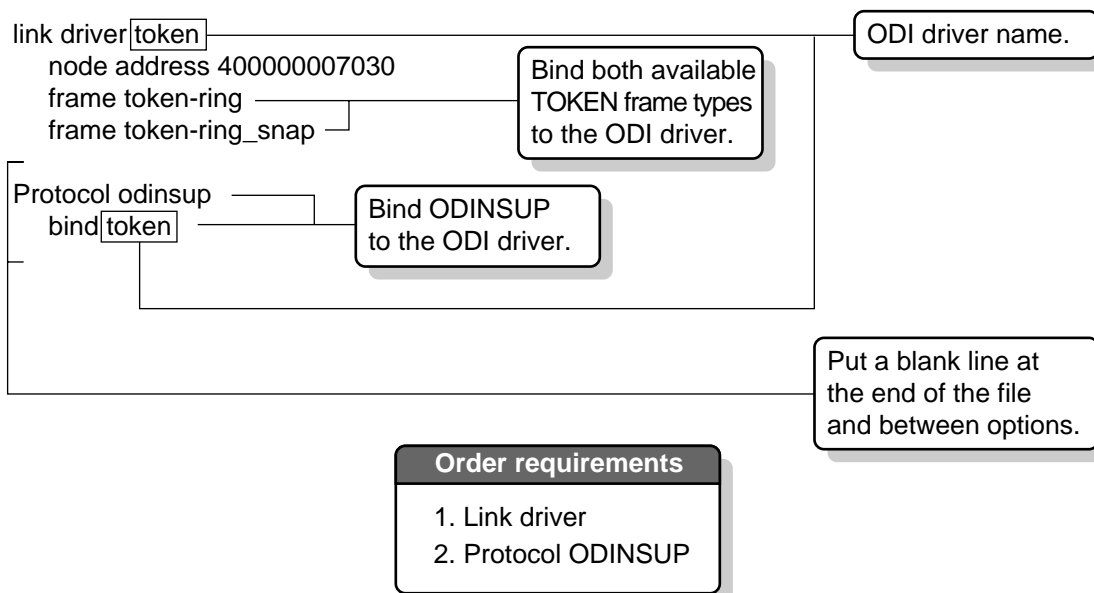


Figure 17 illustrates a NET.CFG file for the example Extended Services environment.

Figure 17 Extended Services Token-Ring NET.CFG file for ODINSUP



### ODINSUP Files from a LAN Requester Environment

These files came from a computer with the following software installed:

- ◆ OS/2 v2.0
- ◆ LAN Requester v2.0
- ◆ NetWare Requester v2.01 with ODINSUP

Figure 18 and Figure 19 illustrate a Protocol.INI for the example LAN Requester environment.

Figure 18 LAN Requester Token-Ring PROTOCOL.INI file for ODINSUP (part 1)

```
[PROT_MAN]
  DriverName = PROTMAN$
[IBMLXCFG]
  IBMTOK_nif = IBMTOK.nif
  NETBEUI_nif = NETBEUI.nif
  LANDD_nif = LANDD.nif

;*-----*
;*----- PROTOCOL SECTION -----*
;*-----*
```

```
[NETBEUI_nif]
  DriverName = netbeui$
; Bindings = IBMTOK_nif
  Bindings = TOKEN
  ETHERAND_TYPE = "I"
  USEADDRREV = "YES"
  SESSIONS = 40
  NCBS = 95
  NAMES = 21
  SELECTORS = 5
  USEMAXDATAGRAM = "NO"
  ADAPTRATE = 1000
  WINDOWERRORS = 0
  T1 = 30000
  T1 = 500
  T2 = 200
  MAXIN = 1
  MAXOUT = 1
  NETBIOS_TIMEOUT = 500
  NETBIOS_RETRIES = 8
  NAMECACHE = 0
  PIGGYBACKACKS = 1
  DATAGRAM_PACKETS = 2
  PACKETS = 350
  PIPELINE = 5
  MAX_TRANSMITS = 6
  MIN_TRANSMITS = 2
  DLC_RETRIES = 5
```

Comment out this line binding the NDIS TOKEN driver.

Add this line binding the ODI TOKEN driver.

*Continued on next page.*

Figure 19 LAN Requester Token-Ring PROTOCOL.INI file for ODINSUP (part 2)

```
[LANDD_nif]
  DriverName = LANDD$
; Bindings = IBMTOK_nif
  Bindings = TOKEN
  ETHERAND_TYPE = "I"
  SYSTEM_KEY = 0x0
  OPEN_OPTIONS = 0x2000
  TRACE = 0x0
  LINKS = 8
  MAX_SAPS = 3
  MAX_G_SAPS = 0
  USERS = 3
  TI_TICK_G1 = 255
  T1_TICK_G1 = 15
  T2_TICK_G1 = 3
  TI_TICK_G2 = 255
  T1_TICK_G2 = 25
  T2_TICK_G2 = 10
  IPACKETS = 250
  UIPACKETS = 100
  MAXTRANSMITS = 6
  MINTRANSMITS = 2
  TCBS = 64  GDTS = 30
  ELEMENTS = 800
```

Comment out this line binding the NDIS TOKEN driver.

Add this line binding the ODI TOKEN driver.

```
..*-----*
;
;*----- MAC SECTION -----*
;
;*-----*
```

```
[IBMTOK_nif]
  DriverName = IBMTOK$
  PRIMARY
  MAXTRANSMITS = 12
  RECVBUFS = 2
  RECVBUFSIZE = 256
  XMITBUFS = 1
```

```
[TOKEN]
```

You must include this line. Put a blank line before and after it.

Figure 20 and Figure 21 illustrate a CONFIG.SYS file for the example LAN Requester environment.

Figure 20 LAN Requester Token-Ring CONFIG.SYS file for ODINSUP (part 1)

```
.
LIBPATH=C:\MUGLIB\DLL;C:\IBMLAN\NETLIB;.;C:\OS2\DLL;C:\OS2\MDOS;C:\;C:\OS2\
APPS\DLL;C:\NETWARE;C:\ibmcom\dll;
SET
PATH=C:\IBMLAN\NETPROG;C:\MUGLIB;C:\OS2;C:\OS2\SYSTEM;C:\OS2\MDOS \
WINOS2;C:\OS2\INSTALL;C:\;C:\OS2\MDOS;C:\OS2\APPS;L:\OS2;P:\OS2; C:\NETWARE;
SET
DPATH=C:\IBMLAN\NETPROG;C:\IBMLAN;C:\MUGLIB;C:\OS2;C:\OS2\SYSTEM; C:\OS2\
MDOS\WINOS2;C:\OS2\INSTALL;C:\;C:\OS2\BITMAP;C:\OS2\MDOS;C:\OS2\APPS;L:\OS2
C:\NETWARE;C:\ibmcom;
.
DEVICE=C:\ibmcom\lanmsgdd.os2 /I:C:\ibmcom
DEVICE=C:\ibmcom\protman.os2 /I:C:\ibmcom
DEVICE=C:\ibmcom\protocol\LANDD.OS2
DEVICE=C:\ibmcom\protocol\LANDLLDD.OS2
.
CODEPAGE=437,850
DEVINFO=KBD,US,C:\OS2\KEYBOARD.DCP
DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
REM DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2
DEVICE=C:\IBMLAN\NETPROG\RDRHELP.200
```

Protocol Manager is loaded by LAN Services.

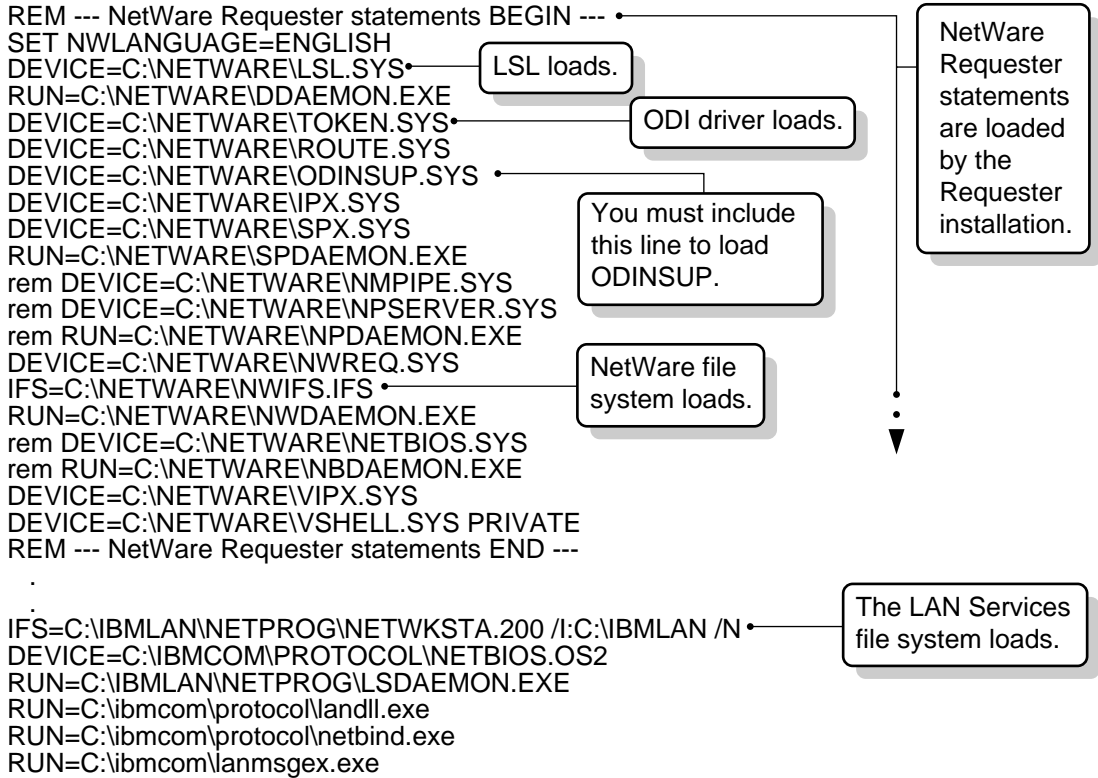
The LAN Services NETBIOS driver loads.

You must remark out the NDIS TOKEN driver.

*Continued on next page.*



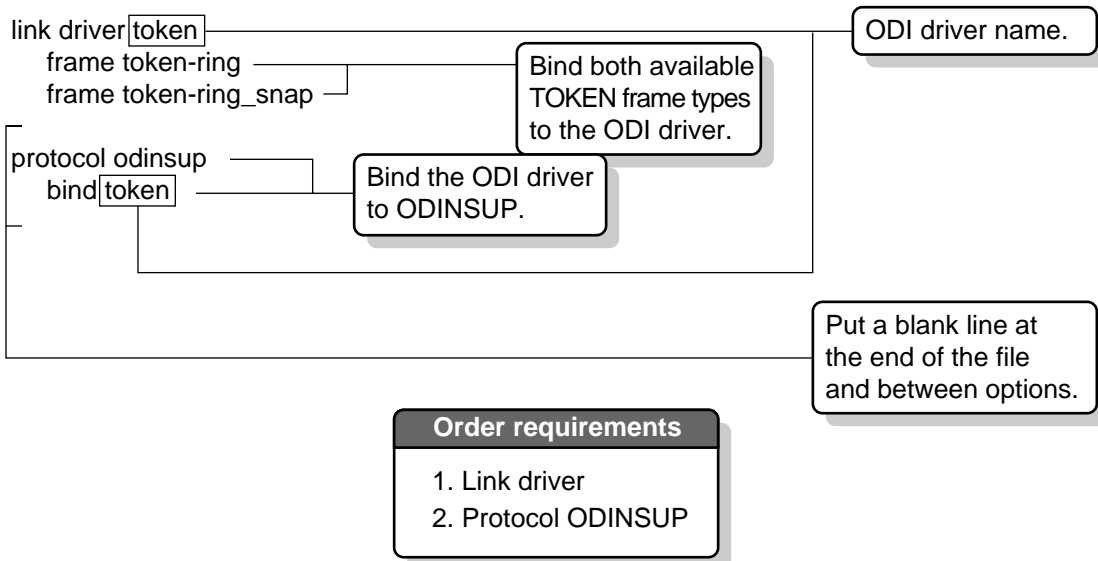
Figure 21 LAN Requester Token-Ring CONFIG.SYS file for ODINSUP (part 2)



- Load order requirements**
- 1. PROTMAN.OS2
  - 2. LSL.SYS
  - 3. ODI driver
  - 4. ODINSUP
  - .....
  - 1. NWIFS.IFS
  - 2. NETWKSTA.200

Figure 22 illustrates a NET.CFG file for the example LAN Requester environment.

Figure 22 LAN Requester Token-Ring NET.CFG file for ODINSUP



## Setting Up LANSUP

**NOTE:** Except where noted, the instructions in this section apply whether you have Extended Services, LAN Services, or both. However, the sample configuration files shown differ depending on what IBM software you have. Be sure to refer to the correct files for your environment.

Setting up LANSUP involves three parts. The first two parts are required; the third is optional. The parts and their page numbers are shown in the following table:

Part
<a href="#">“Part A: Loading LANSUP in CONFIG.SYS” on page 95</a>
<a href="#">“Part B: Configuring LANSUP in NET.CFG” on page 96</a>
<a href="#">“Part C: Increasing Packet Size for LANSUP (Optional)” on page 101</a>
<a href="#">“Sample Configuration Files for LANSUP” on page 103</a>

Novell's LAN Support (LANSUP) device driver replaces the CMGRLAN and TOKENEE modules used in the NetWare Requester v1.3. CMGRLAN and TOKENEE are not supported in the NetWare Requester v2.01.

LANSUP works with NDIS drivers for PC Network II, Ethernet, and Token-Ring network boards.

## Part A: Loading LANSUP in CONFIG.SYS

In this section, you use the NetWare Requester installation program to load LANSUP in the CONFIG.SYS file.

If you have not yet installed the NetWare Requester, you can install the Requester at the same time as you install LANSUP.

**NOTE:** These instructions are for LAN Server and LAN Requester v2.x.

### Prerequisites

- Install Extended Services on the workstation. Verify that you can get a Communications Manager or Database Manager connection. See the documentation for Extended Services.
- Install LAN Server or LAN Requester on the workstation. Verify that you can get a connection on your LAN Server network. See the documentation for LAN Services.

### Procedures

- 1** Start the NetWare Requester Installation program.

If the Requester is not installed, you can start the program from your *WSOS2\_1* diskette. Type **INSTALL**. You can install the Requester with this procedure.

If the Requester is already installed, you can start the program by choosing the "Installation" icon from the "Novell" group on your desktop.

- 2** Choose "Requester on Workstation" from the "Installation" menu.
- 3** Verify the target and source directory and choose "OK."
- 4** Select an action from the "Requester Installation" screen based on whether the Requester is installed:
  - 4a** If the Requester is not installed, select "Edit CONFIG.SYS and Copy All Files . . ." and choose "OK."

**4b** If the Requester is already installed, select "Only Edit CONFIG.SYS . . ." and choose "OK."

**5** Select LANSUP as the ODI driver for your network board and choose "Continue . . ."

Selecting LANSUP inserts the following line in the correct place in your CONFIG.SYS file:

```
DEVICE=drive: \NETWARE\LANSUP.SYS
```

**6** Select your preferences for NetWare support for DOS and Windows applications and choose "Continue . . ."

**7** Select your preferences for optional protocol support and choose "Save . . ."

**8** Verify the filename and location and choose "OK."

If you have not installed the Requester, the "Copy Requester Files" screen appears. Continue with [Step 9](#).

If you have installed the Requester, the main installation menu appears. Go to ["Part B: Configuring LANSUP in NET.CFG" on page 96](#).

**9** Choose "Copy" and follow the screens to finish installing the Requester.

When the main menu returns, go to ["Part B: Configuring LANSUP in NET.CFG" on page 96](#).

## Part B: Configuring LANSUP in NET.CFG

**IMPORTANT:** A NET.CFG file is required to use LANSUP.

In this section, you edit or create a NET.CFG file that does the following:

- ◆ Enables frame types for LANSUP
- ◆ Specifies to LANSUP the node address used by the network board and the format that address is transmitted in

In this section, you also decide whether to increase the size of the packet that can be transmitted through LANSUP.

### Prerequisite

- Install the NetWare Requester with LANSUP by following the instructions in ["Part A: Loading LANSUP in CONFIG.SYS" on page 95](#).

## Procedures

- 1 Choose "This workstation . . ." from the "Configuration" menu of the NetWare Requester installation program.

If the NetWare Requester installation program is not running, complete the steps in [“Part A: Loading LANSUP in CONFIG.SYS” on page 95](#) and then return here.

- 2 Verify the location of the NET.CFG file and choose "Edit."

The "Edit NET.CFG" window appears.

You can choose a topic in the "NET.CFG Options" box on this screen to get information about a topic. Then read the help window at the bottom of the screen.

Choose the "Usage," "Description" and "Example" buttons on the right of your screen to see more information about the topic you've selected.

For example, to see what frame types are supported for Token-Ring drivers, choose "frame" from under "Link Driver" in the "NET.CFG Options" box. Then read the information in the help window.

- 3 In the "Current NET.CFG File Contents" box, type the following line:

```
link driver lansup
```

- 4 Under the Link Driver line, type lines to enable at least one frame type.

LANSUP can be used with Ethernet, Token-Ring, and PCNet boards.

[Table 10](#) lists the supported frame types for LANSUP:

**Table 10** List of frame types supported by LANSUP

Board	Frame types supported
Token-Ring	TOKEN-RING TOKEN-RING_SNAP
Ethernet	ETHERNET_802.2 ETHERNET_SNAP
PCNet	IBM_PCN2_802.2 IBM_PCN2_SNAP

For example, to enable a frame type for Token-Ring, type the following:

```
link driver lansup
    frame token-ring
```

To enable both frame types for Ethernet, type the following:

```
link driver lansup
    frame ethernet_802.2
    frame ethernet_snap
```

The first frame defined is the only one used for the initial Get Nearest Server request. Therefore, if you have some servers that are using only one frame type, such as Ethernet\_802.3, put that frame type first. That way your workstation will be able to make a default connection to those servers.

**IMPORTANT:** Use the Space bar to indent the lines. The <Tab> key moves you to the next box on the screen. Put a blank line at the end of the file.

You *must* follow these and other format requirements explained in the "Format of NET.CFG Options" topic. To see these requirements, select this topic from the "NET.CFG Options" box and choose the "Usage" button. Then read the information in the help window at the bottom of the screen.

**5** Read the following chart to determine what node address you should use.

If you are using . . .	Get the node address from here . . .
Extended Services or LAN Services set up for universally- administered addresses	Use the address assigned to the board by the vendor.
Extended Services or LAN Services set up for locally administered addresses	Use the address shown in the "NetAddress" parameter in the PROTOCOL.INI file. Remove the T first. For example, if the PROTOCOL.INI file shows the line  NetAddress = "T400000007030"  the address you specify in NET.CFG is  400000007030

**6** In the "Current NET.CFG File Contents" box, type a line to specify the node address.

Type this line under the "Link Driver" option, above or below the lines enabling frame types. The node address must be a 6-byte hexadecimal number (12 characters).

For example, to set a node address for a Token-Ring board in a LAN Services environment, type:

```
node address 10005a8c62d4
```

If your board supports octet bit reversal, you can specify the address in either canonical (least significant bit first) or non-canonical (most significant bit first) format.

By default, the following frames are non-canonical (MSB):

- ◆ Token-Ring
- ◆ PC Network II

Ethernet frames are canonical (LSB).

If you specify the address in the format that is not default, you must type an *M* (most significant bit first) or *L* (least significant bit first) at the end of the address to tell ODINSUP which format you used.

For example, for a Token-Ring environment using the default format for the node address, the "Current NET.CFG file contents" box should contain lines similar to the following:

```
link driver lansup
  frame token-ring
  node address 10005a8c62d4
```

Note that an *M* after the node address is not needed because the address is specified most significant bit first, the default format for Token-Ring.

For a Token-Ring environment using the non-default format for the same node address, the "Current NET.CFG file contents" box should contain lines similar to the following:

```
link driver lansup
  frame token-ring
  node address 08005A31462BL
```

In this case, an *L* after the node address is needed because the address is specified in least significant bit first format, the format which is not the default for Token-Ring.

For an Ethernet environment, the "Current NET.CFG file contents" box should contain lines similar to the following:

```
link driver lansup
    frame ethernet_802.2
    frame ethernet_snap
    node address 00001B1B055C
```

**NOTE:** If you do not know the node address, you can type a "dummy" address and go to the next step. When you reboot your machine, an error message showing the correct address will be displayed. At that point, you can edit NET.CFG again and insert the address that was displayed at boot time.

**7** Decide whether to increase the size of the packet transmitted to the NDIS driver by LANSUP.

Increasing the packet size may improve transmission speed if you are using a Token-Ring 16/4 board.

For other kinds of board, see the board documentation to determine the maximum packet size supported by the board. If the board supports a packet size larger than xxx, (the Link Support default), transmission speed may improve if you increase the Link Support Layer default to the board's maximum allowed size.

**7a** If you want to increase the packet size, go to **“Part C: Increasing Packet Size for LANSUP (Optional)”** on page 101.

**7b** If you do not want to increase the packet size, go to **Step 8**.

**8** Choose "Save . . ."

**9** Exit the NetWare Requester Installation program.

**10** Choose "Shutdown" from the OS/2 System menu to reboot your machine.

When your computer starts again, LANSUP support will be set up. The NetWare Requester and Extended Services or LAN Services will then use the same NDIS driver and board to transmit on the network.



## Part C: Increasing Packet Size for LANSUP (Optional)

Only do this section if you were directed to come here in [Step 7a on page 100](#).

In this section, you

- ◆ Edit the NET.CFG file to increase the size of the packet that can be transmitted through LANSUP.
- ◆ Edit the PROTOCOL.INI to increase the size of the packet that can be transmitted through the NDIS drivers.

### Prerequisites

- ❑ Install the NetWare Requester with LANSUP by following the instructions in [“Part A: Binding ODI Drivers in PROTOCOL.INI” on page 75](#).
- ❑ Follow the instructions in [“Part B: Configuring LANSUP in NET.CFG” on page 96](#).

### Procedures

- 1** Select "Link support" in the "NET.CFG Options" box on the left of your screen.

If the Requester installation program is not open to the "Edit NET.CFG Window", complete the steps in [“Part B: Configuring LANSUP in NET.CFG” on page 96](#). Then come back to this step.

- 2** Select "buffers" under "Link Support."
- 3** Read the information in the help window at the bottom of the screen to see how to set the Link Support buffers.

You can choose the "Usage," "Description," and "Example" buttons on the right of your screen to see more information about Link Support.

- 4** In the "Current NET.CFG File Contents," type lines to change the "Link Support buffers" setting.

Follow the usage requirements shown in the help window.

Indent the line. Replace *number* with a number of buffers greater than 1. Replace *buffer\_size* with a number of bytes greater than 576.

The Requester cannot use more than 64 KB of memory for communication buffers. Header information takes 5 KB. This means that the buffer number multiplied by the buffer size (plus the header

information) cannot be greater than 65,536 bytes. For example, 20 buffers multiplied by 1,514 bytes equals 30,280 bytes.

“[Link Support](#)” on [page 216](#) explains more information about using this option.

For example, you might type:

```
link support
  buffers 14 4202
```

**IMPORTANT:** For Token-Ring 16/4 boards, the NetWare Requester will probably have maximum performance if you specify 14 buffers, each with a size of 4,202 bytes, as shown in the example above.

- 5** Choose "Save . . ."
- 6** Exit the NetWare Requester installation program.

Without rebooting your machine, go to Step 7.

- 7** Run the IBM LAPS program to edit PROTOCOL.INI..
- 8** Change the transmit buffer size to a number 6 bytes larger than the number you set for the Link Support buffer size in [Step 4](#).

The value you specify must be a multiple of 8. See your LAPS documentation for more information about changing the transmit buffer size.

**IMPORTANT:** Use a 4208 transmit buffer size if you are using Token-Ring 16/4 boards.

The LAPS program inserts the following line in NDIS MAC driver section of your PROTOCOL.INI:

```
XMITBUFSIZE = 4208
```

- 9** Exit the LAPS program.
- 10** Choose "Shutdown" from the OS/2 System menu to reboot your machine.

When your machine starts again, LANSUP support will be set up.

NetWare Requester and Extended Services/LAN Services will transmit to the network from the same NDIS driver and network board.

## Sample Configuration Files for LANSUP

This section contains sample CONFIG.SYS, NET.CFG, and PROTOCOL.INI files for both Extended Services and LAN Requester environments.

**NOTE:** If you follow the steps in “[Setting Up LANSUP](#)” on page 94, your configuration files will look like the ones shown. We recommend following the steps rather than just referring to these sample files.

---

### Sample Files

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“[LANSUP Files from an Extended Services Environment](#)” on page 103

“[Extended Services Token-Ring CONFIG.SYS file for LANSUP \(part 1\)](#)” on page 104

“[Extended Services Token-Ring NET.CFG file for LANSUP](#)” on page 105

“[Extended Services Token-Ring PROTOCOL.INI file for LANSUP \(part 1\)](#)” on page 106

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“[LANSUP Files from a LAN Requester Environment](#)” on page 107

“[LAN Requester Token-Ring CONFIG.SYS file for LANSUP \(part 1\)](#)” on page 108

“[LAN Requester Token-Ring NET.CFG file for LANSUP](#)” on page 110

“[LAN Requester Token-Ring PROTOCOL.INI file for LANSUP \(part 1\)](#)” on page 111

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### LANSUP Files from an Extended Services Environment

These files came from a computer with the following software installed:

- ◆ OS/2 v2.0
- ◆ Extended Services v1.0 (locally administered addresses)
- ◆ NetWare Requester v2.01 with LANSUP.

The computer used Communications Manager to make a LAN connection to an IBM host. [Figure 23](#) and [Figure 24](#) illustrate a CONFIG.SYS file.

Figure 23 Extended Services Token-Ring CONFIG.SYS file for LANSUP (part 1)

```
LIBPATH=.;C:\OS2\DLL;C:\MUGLIB\DLL;C:\OS2\MDOS;C:\CMLIB\DLL;C:\OS2\APPS\
DLL;C:\NETWARE;C:\ibmcom\dll;
SET
PATH=C:\OS2;C:\MUGLIB;C:\OS2\SYSTEM;C:\OS2\MDOS\WINOS2;C:\CMLIB;C:\CMLIB\
APPN;C:\OS2\INSTALL;C:\OS2\MDOS;C:\OS2\APPS;L:\OS2;P:\OS2;C:\NETWARE;
SET
DPATH=C:\OS2;C:\MUGLIB\DLL;C:\CMLIB;C:\CMLIB\APPN;C:\OS2\SYSTEM;C:\OS2\
MDOS\WINOS2;C:\OS2\INSTALL;C:\OS2\BITMAP;C:\OS2\MDOS;C:\OS2\APPS;L\
OS2;C:\NETWARE;C:\ibmcom;
```

```
DEVICE=C:\ibmcom\lanmsgdd.os2 /I:C:\ibmcom
DEVICE=C:\ibmcom\protman.os2 /I:C:\ibmcom
DEVICE=C:\ibmcom\protocol\LANDD.OS2
DEVICE=C:\ibmcom\protocol\LANDLLDD.OS2
```

Protocol Manager is loaded by Extended Services.

```
DEVICE=C:\CMLIB\ACSLDLAN.SYS
RUN=C:\OS2\EPW.EXE
DEVICE=C:\IBMCOMM\MACS\IBMTOK.OS2
RUN=C:\ibmcom\protocol\landll.exe
RUN=C:\ibmcom\protocol\netbind.exe
RUN=C:\ibmcom\lanmsgex.exe
DEVICE=C:\CMLIB\APPN\CMKFMDE.SYS
```

NDIS TOKEN driver is loaded by Extended Services.

```
REM --- NetWare Requester statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=C:\NETWARE\LSL.SYS
RUN=C:\NETWARE\DDAEMON.EXE
DEVICE=C:\NETWARE\LANSUP.SYS
DEVICE=C:\NETWARE\ROUTE.SYS
DEVICE=C:\NETWARE\IPX.SYS
```

LSL loads.

LANSUP loads.

NetWare Requester statements are loaded by the Requester installation.

*Continued on next page.*

Figure 24 Extended Services Token-Ring CONFIG.SYS file for LANSUP (part 2)

```

DEVICE=C:\NETWARE\SPX.SYS
RUN=C:\NETWARE\SPDAEMON.EXE
DEVICE=C:\NETWARE\NMPIPE.SYS
rem DEVICE=C:\NETWARE\NPSEVER.SYS
RUN=C:\NETWARE\NPDAEMON.EXE
DEVICE=C:\NETWARE\NWREQ.SYS
IFS=C:\NETWARE\NWIFS.IFS
RUN=C:\NETWARE\NWDAEMON.EXE
rem DEVICE=C:\NETWARE\NETBIOS.SYS
rem RUN=C:\NETWARE\NBDAEMON.EXE
DEVICE=C:\NETWARE\VIPX.SYS
DEVICE=C:\NETWARE\VSHELL.SYS PRIVATE
REM --- NetWare Requester statements END ---

```

NetWare file system loads.

Figure 25 illustrates a NET.CFG for the example Extended Services environment.

Figure 25 Extended Services Token-Ring NET.CFG file for LANSUP

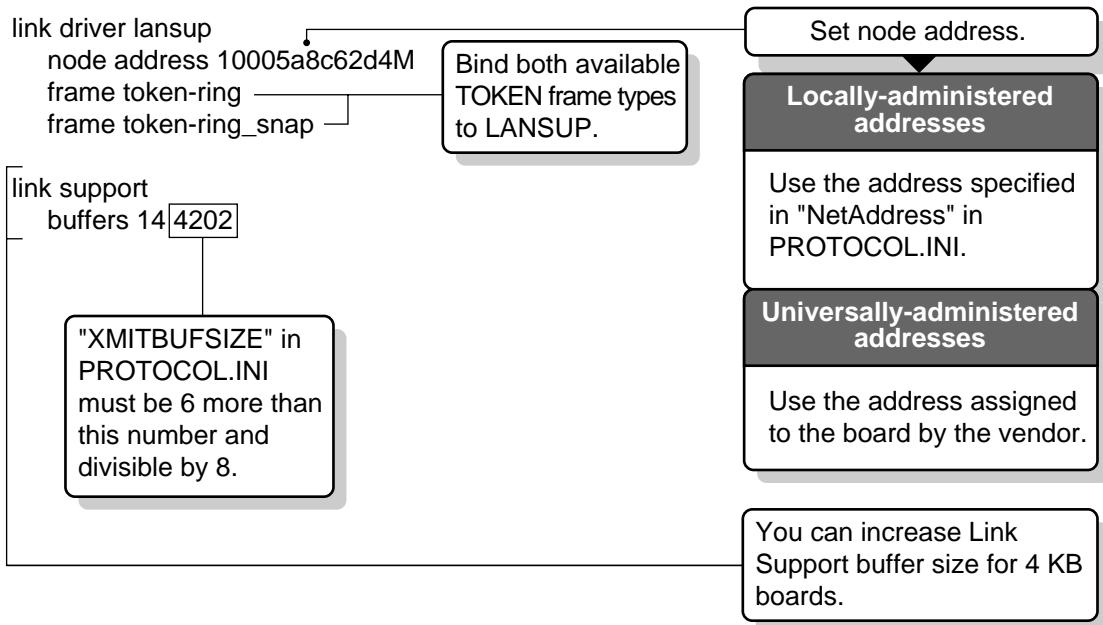


Figure 26 and Figure 27 illustrate a PROTOCOL.INI for the example Extended Services environment.

Figure 26 Extended Services Token-Ring PROTOCOL.INI file for LANSUP (part 1)

```
[PROT_MAN]
  DriverName = PROTMAN$
```

```
[IBMLXCFG]
  IBMTOK_nif = IBMTOK.NIF
  LANDD_nif = LANDD.NIF
```

```
. *-----*
;
; *----- PROTOCOL SECTION -----*
;
; *-----*
```

```
[LANDD_nif]
  DriverName = LANDD$
  Bindings = IBMTOK_nif
  ETHERAND_TYPE = "I"
  SYSTEM_KEY = 0x0
  OPEN_OPTIONS = 0x2000
  TRACE = 0x0
  LINKS = 41
  MAX_SAPS = 4
  MAX_G_SAPS = 0
  USERS = 4
  TI_TICK_G1 = 255
  T1_TICK_G1 = 15
  T2_TICK_G1 = 3
  TI_TICK_G2 = 255
  T1_TICK_G2 = 25
  T2_TICK_G2 = 10
  IPACKETS = 250
  UIPACKETS = 100
  MAXTRANSMITS = 6
  MINTRANSMITS = 2
  TCBS = 64
  GDTS = 30
  ELEMENTS = 800
```

NDIS TOKEN  
driver is bound.

*Continued on next page.*

Figure 27 Extended Services Token-Ring PROTOCOL.INI file for LANSUP (part 2)

```
. *-----*  
,  
. *----- MAC SECTION -----*  
,  
. *-----*  
,
```

```
[IBMTOK_nif]  
  DriverName = IBMTOK$  
  PRIMARY  
  MAXTRANSMITS = 12  
  RECVBUFS = 2  
  RECVBUFSIZE = 256  
  XMITBUFS = 1  
  XMITBUFSIZE = 4208
```

For Token-Ring 16/4 boards, "Link Support buffer size" in NET.CFG must be 6 bytes less than this number.

**Note:** This example uses universally-administered addresses, so a node address is not specified in PROTOCOL.INI.

### LANSUP Files from a LAN Requester Environment

These files came from a computer with the following software installed:

- ◆ OS/2 v2.0
- ◆ LAN Requester v2.0
- ◆ NetWare Requester v2.01 with LANSUP

Figure [Figure 28](#) and [Figure 29](#) illustrate a CONFIG.SYS file for this environment.

Figure 28 LAN Requester Token-Ring CONFIG.SYS file for LANSUP (part 1)

```
.
LIBPATH=C:\MUGLIB\DLL;C:\IBMLAN\NETLIB;.;C:\OS2\DLL;C:\OS2\MDOS;C:\;C:\OS2\
APPS\DLL;C:\NETWARE;C:\ibmcom\dll;
SET
PATH=C:\IBMLAN\NETPROG;C:\MUGLIB;C:\OS2;C:\OS2\SYSTEM;C:\OS2\MDOS\WINOS2
;C:\OS2\INSTALL;C:\;C:\OS2\MDOS;C:\OS2\APPS;L:\OS2;P:\OS2;C:\NETWARE;
SET
DPATH=C:\IBMLAN\NETPROG;C:\IBMLAN;C:\MUGLIB;C:\OS2;C:\OS2\SYSTEM; C:\OS2\
MDOS\WINOS2;C:\OS2\INSTALL;C:\;C:\OS2\BITMAP;C:\OS2\MDOS;C:\OS2\APPS;L:\OS2
C:\NETWARE;C:\ibmcom;
.
DEVICE=C:\ibmcom\lanmsgdd.os2 /I:C:\ibmcom
DEVICE=C:\ibmcom\protman.os2 /I:C:\ibmcom
DEVICE=C:\ibmcom\protocol\LANDD.OS2
DEVICE=C:\ibmcom\protocol\LANDLLDD.OS2
.
CODEPAGE=437,850
DEVINFO=KBD,US,C:\OS2\KEYBOARD.DCP
DEVICE=C:\IBMCOM\PROTOCOL\NETBEUI.OS2
DEVICE=C:\IBMCOM\MACS\IBMTOK.OS2
DEVICE=C:\IBMLAN\NETPROG\RDRHELP.200
```

Protocol Manager is loaded by LAN Services.

For TOKEN LANSUP environments, you must run the IBM LAPS program and install 802.2 support to load these components.

The LAN Services NETBIOS driver loads.

NDIS TOKEN driver loads.

*Continued on next page.*



Figure 29 LAN Requester Token-Ring CONFIG.SYS file for LANSUP (part 2)

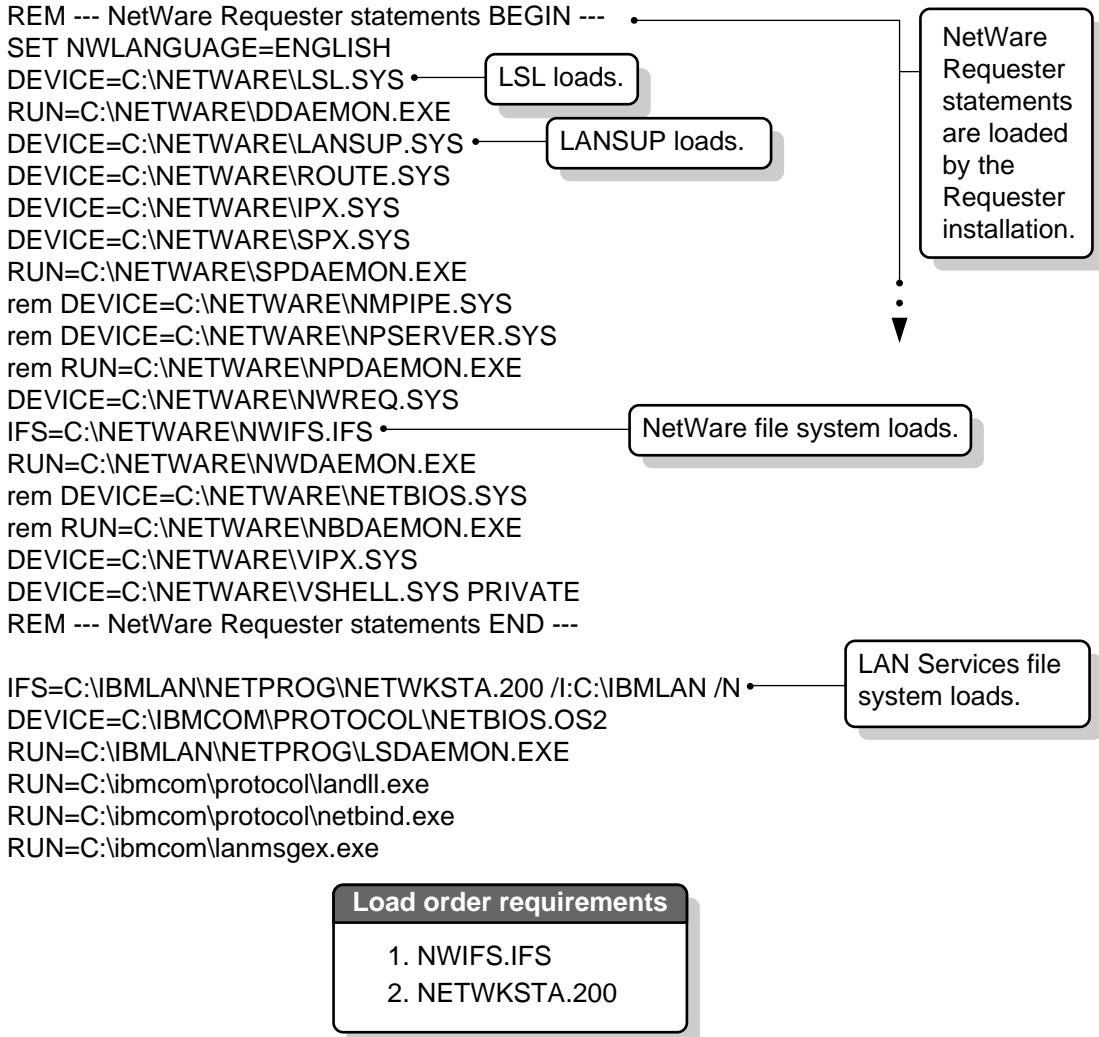


Figure 30 illustrates a NET.CFG for the example LAN Requester environment.

Figure 30 LAN Requester Token-Ring NET.CFG file for LANSUP

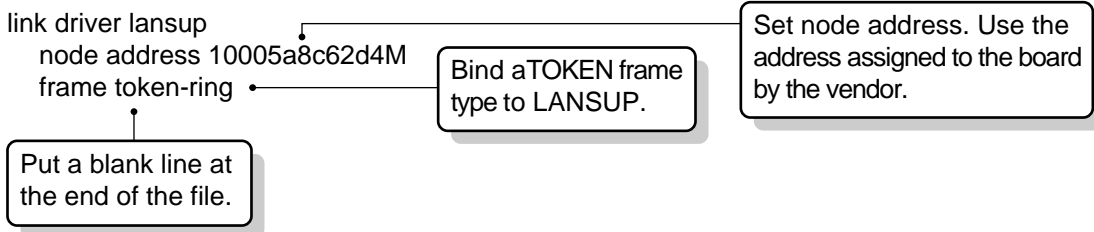


Figure 31 and Figure 32 illustrate a PROTOCOL.INI for the example LAN Requester environment.

Figure 31 LAN Requester Token-Ring PROTOCOL.INI file for LANSUP (part 1)

```
[PROT_MAN]
  DriverName = PROTMAN$
[IBMLXCFG]
  IBMTOK_nif = IBMTOK.nif
  NETBEUI_nif = NETBEUI.nif
  LANDD_nif = LANDD.nif
```

```
;-----*
;-----*
;-----*
;-----*
;-----*
```

```
[NETBEUI_nif]
  DriverName = netbeui$
  Bindings = IBMTOK_nif
  ETHERAND_TYPE = "I"
  USEADDRREV = "YES"
  SESSIONS = 40
  NCBS = 95
  NAMES = 21
  SELECTORS = 5
  USEMAXDATAGRAM = "NO"
  ADAPTRATE = 1000
  WINDOWERRORS = 0
  T1 = 30000
  T1 = 500
  T2 = 200
  MAXIN = 1
  MAXOUT = 1
  NETBIOS_TIMEOUT = 500
  NETBIOS_RETRIES = 8
  NAMECACHE = 0
  PIGGYBACKACKS = 1
  DATAGRAMPACKETS = 2
  PACKETS = 350
  PIPELINE = 5
  MAXTRANSMITS = 6
  MINTRANSMITS = 2
  DLCRETRIES = 5
```

NDIS TOKEN driver is bound.

LAN Services NetBIOS protocol is configured.

*Continued on next page.*

Figure 32 LAN Requester Token-Ring PROTOCOL.INI file for LANSUP (part 2)

```
[LANDD_nif]
  DriverName = LANDD$
  Bindings = IBMTOK_nif
  ETHERAND_TYPE = "I"
  SYSTEM_KEY = 0x0
  OPEN_OPTIONS = 0x2000
  TRACE = 0x0
  LINKS = 8
  MAX_SAPS = 3
  MAX_G_SAPS = 0
  USERS = 3
  TI_TICK_G1 = 255
  T1_TICK_G1 = 15
  T2_TICK_G1 = 3
  TI_TICK_G2 = 255
  T1_TICK_G2 = 25
  T2_TICK_G2 = 10
  IPACKETS = 250
  UIPACKETS = 100
  MAXTRANSMITS = 6
  MINTRANSMITS = 2
  TCBS = 64  GDTS = 30
  ELEMENTS = 800
```

NDIS TOKEN driver is bound.

```
..*-----*
;
;*----- MAC SECTION -----*
;
;*-----*
```

```
[IBMTOK_nif]
  DriverName = IBMTOK$
  PRIMARY
  MAXTRANSMITS = 12
  RECVBUFS = 2
  RECVBUFSIZE = 256
  XMITBUFS = 1
```

**Note:** You are not required to change anything in PROTOCOL.INI to set up LANSUP.

# 9

## Setting Up Named Pipes and NetBIOS Protocols

---

### Topic

---

[“About the Protocol Support in the NetWare Requester” on page 113](#)

[“Setting Up Named Pipes for OS/2” on page 116](#)

[“Setting Up Named Pipes for DOS and Windows” on page 123](#)

[“Setting Up NetBIOS for OS/2” on page 125](#)

[“Setting Up NetBIOS for DOS and Windows” on page 145](#)

---

This chapter explains how to install and configure the Named Pipes and NetBIOS protocols.

### About the Protocol Support in the NetWare Requester

Novell provides four kinds of protocol support with the NetWare Requester for OS/2:

- ◆ IPX
- ◆ SPX
- ◆ Named Pipes
- ◆ NetBIOS (emulation)

NetWare servers and clients use IPX as the primary protocol to communicate with each other. They also use SPX for some communications, such as communications between a workstation running NPRINT and a NetWare print server. Support for IPX on the workstation is automatically installed when you install the NetWare workstation software.

The SPX, NetBIOS, and Named Pipes protocols are provided by Novell so that NetWare clients and servers can also function as:

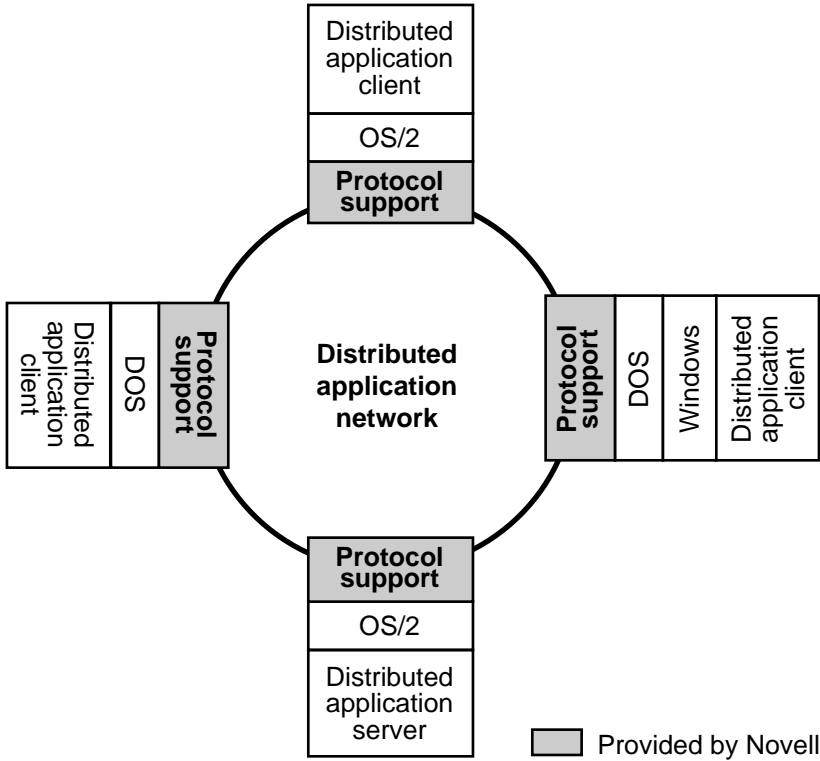
- ◆ Distributed application clients and servers
- ◆ Non-NetWare network clients and servers
- ◆ Terminals connected to mainframes or minicomputers

For example, the Lotus Notes distributed application uses NetBIOS for communications; Microsoft SQL Server uses Named Pipes. LANServer networks use NetBIOS, and many Communications Manager connections to a mainframe also use NetBIOS.

Other protocols not provided with the NetWare Workstation for OS/2 can also be used for these purposes. For example, the TCP/IP protocol provided by Novell's LAN Workplace for OS/2 is commonly used for connections to UNIX hosts. These other protocols are not discussed in this book.

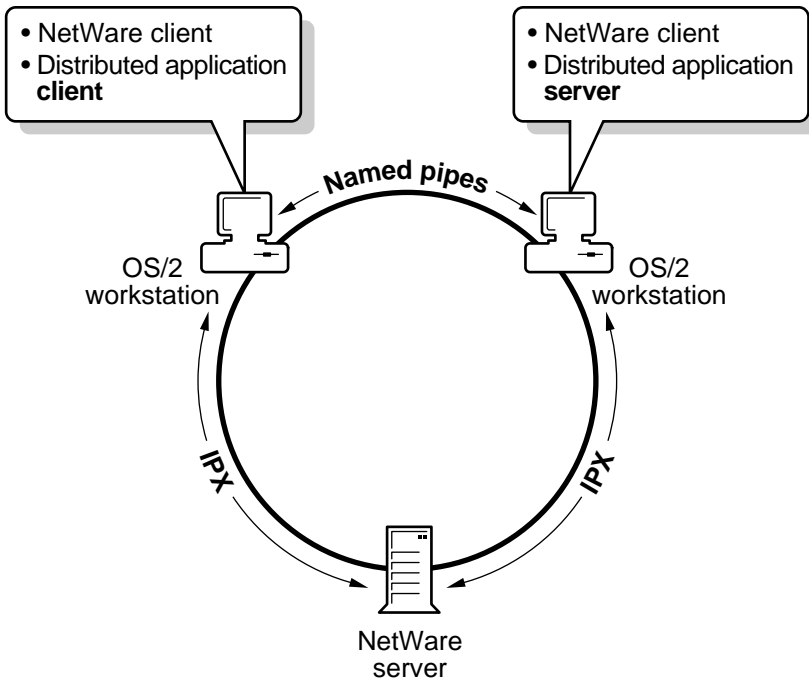
**Figure 33** illustrates the components of a distributed application network. Note that protocol support software usually must be installed independent of installing the distributed application software.

Figure 33 Protocol software is separate from distributed application software



Several different protocols can be installed on the same computer at the same time. All of these protocols can use the same network cabling, though each protocol may communicate on a completely separate logical network. [Figure 34 on page 116](#) shows how a NetWare network and a distributed application network share cabling.

Figure 34 A distributed application on a NetWare network



## Setting Up Named Pipes for OS/2

You must install the Named Pipes support you need on each computer that will use Named Pipes on the network. In most cases, you must also set certain configuration options for the protocol.

### Installing Named Pipes for OS/2

Named Pipes support between sessions on a single OS/2 workstation is provided with the OS/2 operating system.

However, if you need OS/2 sessions to communicate with other computers on the network using Named Pipes, you must install remote Named Pipes support.

[“Protocol Requests from OS/2 Sessions” on page 251](#) explains how Novell's Named Pipes support for OS/2 works.



## Prerequisite

- ❑ Install your Named Pipes distributed application. See the documentation for your application.

## Procedures

- 1** Start the NetWare Requester installation program.

If the Requester is not installed, you can start the program from your *WSOS2\_1* diskette. Type **INSTALL**. You can install the Requester at the same time as you install Named Pipes.

If the Requester is already installed, you can start the program by choosing the "Installation" icon from the "Novell" group on your desktop.

- 2** Choose "Requester on Workstation" from the "Installation" menu.
- 3** Verify the target and source directory and choose "OK."
- 4** Select an action from the "Requester Installation" screen based on whether the Requester is installed:
  - 4a** If the Requester is not installed, select "Edit CONFIG.SYS and Copy All Files . . ." and choose "OK."
  - 4b** If the Requester is already installed, select "Only Edit CONFIG.SYS . . ." and choose "OK."
- 5** Select the ODI driver for your network board and choose "Continue. . ."
- 6** Select your preferences for NetWare support for DOS and Windows applications and choose "Continue . . ."
- 7** Select "Remote Named Pipes Support."
- 8** Set up your workstation as a Named Pipes client or server.
  - 8a** Choose "Client Support Only" to set up your workstation as a Named Pipes application client.

If your workstation will be a client for the SQL Server distributed application, you must do some additional steps. After completing this section and [“Configuring Named Pipes for OS/2” on page 118](#), you will be told to go to the [“Special Instructions for SQL Client Workstations” on page 122](#).
  - 8b** Choose "Client and Server Support" and type a machine name to set up your workstation as a Named Pipes application server.

Choose "Help" to see the syntax requirements for the machine name.

- 9** Choose "Save . . ."
- 10** Verify the filename and location and choose "OK."  

If you have not previously installed the Requester, the "Copy Requester Files" screen appears. Continue with [Step 11](#).

If you have previously installed the Requester, the main installation menu appears. Go to [“Configuring Named Pipes for OS/2” on page 118](#).
- 11** Choose "Copy" and follow the screens to finish installing the Requester.  

When the main menu returns, go to [“Configuring Named Pipes for OS/2” on page 118](#).

## Configuring Named Pipes for OS/2

Novell's Named Pipes support comes with default configuration settings. You may want to customize the configuration. Follow the instructions below to

- ◆ Determine whether you need to change the default configuration for Named Pipes and SPX, and
- ◆ Change the configuration if necessary.

You can change the configuration for such features as

- ◆ Available number of client and server sessions
- ◆ Number of service threads available for Named Pipes communication
- ◆ Number of SPX sessions available for Named Pipes and other SPX communication (Named Pipes uses SPX)

### Prerequisite

- The NetWare Requester for OS/2 must be installed. If it is not installed, do the steps in [“Installing Named Pipes for OS/2” on page 116](#).

### Procedures

- 1** Start the NetWare Requester installation program.  

The program may already be running if you just installed Named Pipes support. If the program is not running, start it by choosing the "Installation" icon from the "Novell" group on your desktop.
- 2** Choose "This workstation . . ." from the "Configuration" menu.
- 3** Verify the location of the NET.CFG file and choose "Edit."

The "Edit NET.CFG" window appears. See [Figure 35 on page 120](#). You can cut and paste text from the help window at the bottom of the screen to the "Current NET.CFG File Contents" window. Use the following keys:

**Table 11** Key definitions for the NET.CFG window

To do this . . .	Use these keys . . .
Highlight text	Click and drag with the mouse, or move the cursor with the arrow keys while holding down the <Shift> key
Copy text	<Ctrl><Insert>
Cut text (text will reappear the next time you refresh the window)	<Shift><Delete>
Paste text	<Shift><Insert>
Delete text (deleted text cannot be pasted)	<Ctrl><Delete>

Figure 35 Editing NET.CFG for Named Pipes

**1** Select a NET.CFG option, setting, or topic.

**2** Read online help for the topic you selected.

**3** Select the type of information you want to see.

**4** Type NET.CFG options and settings here.

**5** Save your configuration or change your mind.

- 4** Select "Named Pipes" from the "NET.CFG Options" box on the left of your screen.
- 5** Determine whether to change the configuration for the "client sessions", "server sessions" and "service threads" settings under "Named Pipes."

If you decide not to change the configuration for a setting, no action is required for that setting.

**5a** Select one of the three settings.

For example, select "client sessions."

**5b** Read the help window at the bottom of the screen to determine whether to change the configuration for the setting.

You can choose the "Usage," "Description" and "Example" buttons on the right of your screen to see more information about the setting you've selected.

**5c** (Optional) If you decide to change the configuration, type the configuration lines (as shown in the "Usage" help window) into the "Current NET.CFG File Contents" box.

**IMPORTANT:** You *must* follow the format requirements explained in the "Format of NET.CFG Options" topic. To see these requirements, select this topic from the "NET.CFG Options" box and choose the "Usage" button.

Repeat **Step 5a** through **Step 5c** for each setting.

**6** Select "Protocol Stack SPX" from the "NET.CFG Options" box on the left of your screen.

**7** Select the "sessions" setting under "Protocol Stack SPX."

**8** Read the help window at the bottom of the screen to determine whether to change the configuration for "sessions."

You can choose the "Usage," "Description" and "Example" buttons on the right of your screen to see more information about the setting you've selected.

**9** (Optional) If you decide to change the configuration, type the configuration lines (as shown in the "Usage" help window) into the "Current NET.CFG File Contents" box.

If you decide not to change the configuration, no action is required for this step.

**IMPORTANT:** You *must* follow the format requirements explained in the "Format of NET.CFG Options" topic. To see these requirements, select this topic from the "NET.CFG Options" box and choose the "Usage" button.

**10** Choose "Save."

**11** Exit the NetWare Requester installation program.

- 11a** If your workstation will be a client for the SQL Server distributed application, close the installation program and go to “**Special Instructions for SQL Client Workstations**” on page 122. *Do not reboot yet.*
- 11b** If your workstation will not be a SQL client, close the installation program and use the OS/2 "Shutdown" feature to reboot your computer.

## Special Instructions for SQL Client Workstations

Client workstations for the SQL Server distributed application must use special versions of the NETAPI.DLL and NETOEM.DLL files. These files are contained in a \SQL directory on the *WSOS2\_1* diskette.

The \SQL NETAPI.DLL contains everything the default NETAPI.DLL contains (including the NETBIOS calls), as well as some additional function calls required by SQL clients.

Complete the following steps to copy these files to the correct location:

### Procedures

- 1** Insert the *WSOS2\_1* diskette into a floppy drive.
- 2** Copy the NETAPI.DLL and NETOEM.DLL files from the \SQL subdirectory on the diskette to the directory where the SQL front end executable is located.

For example, if you are using a Microsoft/Sybase SQL, the Novell files would need to be copied to the SQL\BINP subdirectory where SAF.EXE is located.

You can copy the files by dragging them on the desktop or by typing a command such as the following at an OS/2 command line:

```
COPY A:\SQL\*.DLL C:\SQL\BINP
```

**WARNING:** Be sure to copy the files from the \SQL directory, since there is also a NETAPI.DLL in the root directory on the diskette. The two NETAPI.DLL files are not the same.

The \SQL NETAPI.DLL emulates certain features of LAN Server support that are required for SQL clients. However, this NETAPI.DLL does not provide full LAN Server support. An application which assumes full LAN Server support if it finds any LAN Server calls may not run properly.

- 3 Open your CONFIG.SYS file in a text editor.
- 4 Type a dot and a semicolon (. ; ) as the first entry in the LIBPATH statement.

For example, the first part of your LIBPATH might read:

```
LIBPATH= . ; C : \OS2\DLL ; C : \ ; . . .
```

The dot and semicolon tell OS/2 to look for Dynamic Link Libraries (DLLs) in the current directory first.

- 5 Save and exit the CONFIG.SYS file.
- 6 Use the OS/2 "Shutdown" feature to reboot your computer.

When you execute the SAF.EXE, OS/2 will then use the NETAPI.DLL in the same directory.

## Setting Up Named Pipes for DOS and Windows

This section applies to virtual DOS and Windows sessions only. See the NetWare Workstation for DOS and Windows manual to set up Named Pipes on an actual DOS or Windows workstation.

Virtual DOS and Windows sessions can function as Named Pipes clients; they cannot function as Named Pipes servers.

If you've met the following prerequisites, you automatically have Named Pipes support for virtual DOS sessions:

### Prerequisites

- Enable IPX support for virtual sessions. [Chapter 3, "Network Access from Virtual DOS and Windows," on page 19](#) explains how to do this.
- Enable Named Pipes support for OS/2 sessions. ["Setting Up Named Pipes for OS/2" on page 116](#) explains how to do this.

**IMPORTANT:** Do not load the Named Pipes extender in virtual DOS and Windows sessions.

If you want Named Pipes support in any of the following situations, you must also see the sections shown:

If you want Named Pipes for	Go to
Virtual Windows sessions	<a href="#">“For Virtual Windows Named Pipes Clients” on page 124</a>
Sessions with the DOS_STARTUP_DRIVE feature	<a href="#">“For Sessions with DOS_STARTUP_DRIVE Set” on page 124</a>

## For Virtual Windows Named Pipes Clients

Copy the NETAPI.DLL file from the \WINDOWS.NP subdirectory on the *W/SOS2\_1* diskette to one of the following locations on your hard disk:

- ♦ The \OS2\MDOS\WINOS2 subdirectory (since this directory contains WINOS2.COM)
- ♦ The \OS2\MDOS\WINOS2\SYSTEM subdirectory (since this directory contains the Windows KERNEL.EXE)
- ♦ The directory of the application that runs Named Pipes

**WARNING:** This NETAPI.DLL is a Windows file, not an OS/2 file, and is provided specifically for Named Pipes Windows clients. Do not copy it over the NETAPI.DLL in the \NETWARE directory.

[“Protocol Requests from DOS/Windows Sessions” on page 262](#) explains how Named Pipes support works for virtual DOS and Windows clients.

## For Sessions with DOS\_STARTUP\_DRIVE Set

Sessions set with DOS\_STARTUP\_DRIVE boot from a version of DOS other than the one included in OS/2. The OS/2 online "Master Help Index" explains more about the DOS\_STARTUP\_DRIVE feature.

If you are using DOS\_STARTUP\_DRIVE to boot a session, you do not need to get your Named Pipes support from Novell. Instead, you can load the FSFILTER.SYS driver provided by OS/2.

Load the FSFILTER.SYS driver in the CONFIG.SYS file for the DOS\_STARTUP\_DRIVE session. (The CONFIG.SYS file is bound into the image file you boot the session from. See your OS/2 documentation.)



To load the FSFILTER.SYS driver, do the following:

## Procedures

**1** Open the CONFIG.SYS file for the DOS\_STARTUP\_DRIVE session in a text editor.

**2** On a new line in the file, type a line to load FSFILTER.SYS.

For example, you might type:

```
DEVICE=C:\OS2\MDOS\FSFILTER.SYS
```

**3** Save and exit the CONFIG.SYS file.

See your OS/2 documentation for more information about loading FSFILTER.SYS in your CONFIG.SYS.

**IMPORTANT:** Do not load the Novell Named Pipes Extender for DOS in the DOS\_STARTUP\_DRIVE session. It will conflict with the OS/2 Named Pipes driver.

## Setting Up NetBIOS for OS/2

Novell NetWare Requester provides a NetBIOS driver (NETBIOS.SYS) that emulates the NetBIOS protocol.

The NetBIOS provided by Novell is called an emulator because it does not transmit NetBIOS packets on the network. Instead, NetBIOS packets are encapsulated in IPX packets, and the IPX packets are transmitted.

IBM Extended Services and LAN Services provide a native NetBIOS driver (NETBEUI.OS2) rather than an emulation.

This chapter explains how to set up Novell's NetBIOS driver. It also explains how to configure your workstation for NetBIOS when you also have IBM's Extended Services or LAN Services NetBIOS installed.

[“Protocol Requests from OS/2 Sessions” on page 251](#) explains more about how Novell's NetBIOS driver works.

---

### Topics

[“Determining Which NetBIOS Drivers to Set Up” on page 126](#)

[“Setting Up the Novell NetBIOS Driver” on page 130](#)

[“Configuring NETBIOS.OS2 with PROTOCOL.INI” on page 136](#)

[“Configuring NETWKSTA.200 with IBMLAN.INI” on page 140](#)

---

## Determining Which NetBIOS Drivers to Set Up

Use this section to determine whether your application needs access to the Novell NETBIOS.SYS driver, the IBM NETBEUI.OS2 driver, or both.

Which drivers your application can access depends on

- ◆ Whether you have Extended Services or LAN Services installed on your workstation, and
- ◆ The interface used by your application.

### Your Installed IBM Software

NetBIOS support is provided with

- ◆ Extended Services

Extended Services NetBIOS support is included in the LAPS programs. NetBIOS-related pieces of LAPS are

- ◆ NETAPI.DLL
- ◆ ACSNETB.DLL
- ◆ NETBIOS.OS2
- ◆ NETBEUI.OS2
- ◆ LANPDD
- ◆ LANVDD
- ◆ LAN Services

LAN Services NetBIOS support is included in the LAPS program and in NETWKSTA.200.

Identify whether you have Extended Services, LAN Services, or both. Then go to the next section.

**NOTE:** When this section refers to the NetBIOS support available with a particular IBM product (such as Extended Services), we assume the product includes the files we list. By default, the files shown here are included in Extended Services and LAN Services packages. By default, LAPS is included in both packages, although different NetBIOS components are actually used in each package.

However, the files shown may also be included in other packages. For example, you may have received the IBM LAPS program without receiving Extended Services.

In this case, you might actually have the NetBIOS support usually provided by Extended Services without having the whole Extended Services product. Work with IBM to resolve any questions about what IBM files you have relating to NetBIOS support.

## Your Application's Interface

OS/2 NetBIOS applications use Dynamic Link Libraries (DLLs) to interface with NetBIOS drivers. Which DLL your application uses depends on which NetBIOS interface standard your application follows:

- ◆ ACSNETB.DLL

This is IBM's NetBIOS 3.0 (NB30) interface. The NB30 interface was introduced by IBM in OS/2 v2.0, so applications written before OS/2 v2.0 most likely cannot use it.

- ◆ The NETAPI.DLL

This is the original OS/2 NetBIOS Submit interface. This interface was supported by LAN Manager and LAN Server before OS/2 v2.0 was released.

You can run applications that use different interfaces at the same time, as long as you have the support for each interface installed and configured. For example, you can run an NB30 application and a NetBIOS Submit application on the same workstation.

See the documentation for your application to determine which NetBIOS interface it uses, then follow the flow charts in [Figure 36 on page 128](#) or [Figure 37 on page 129](#) to see

- ◆ Whether the IBM or Novell NetBIOS driver can be accessed by your application, and
- ◆ Where to find instructions on setting up the drivers.

Figure 36 Determine what NetBIOS support you have for NetBIOS 3.0 (NB30) applications

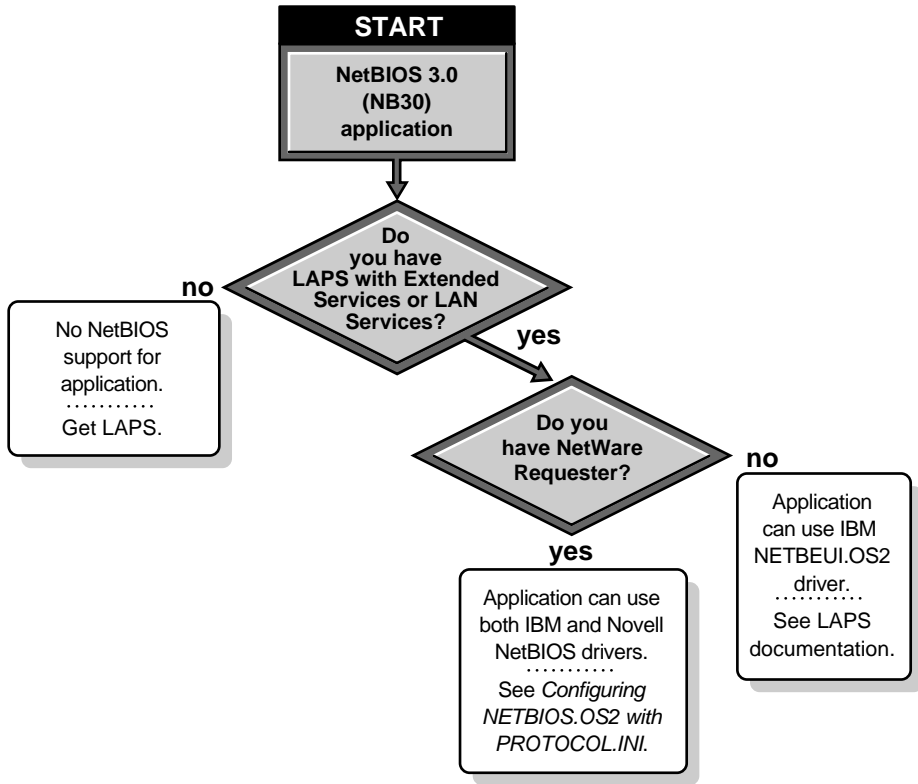
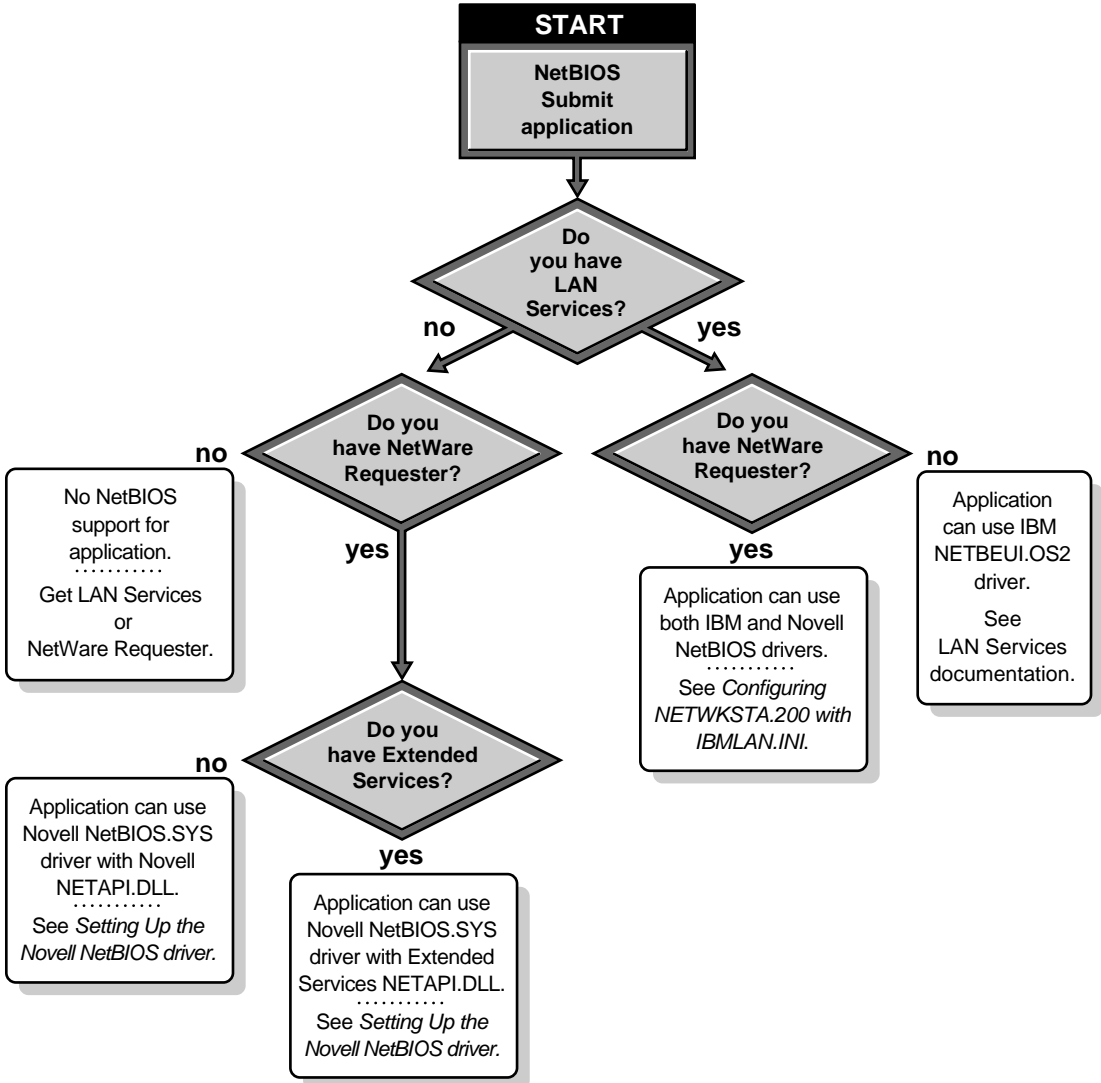


Figure 37 Determine what NetBIOS support you have for NetBIOS Submit applications



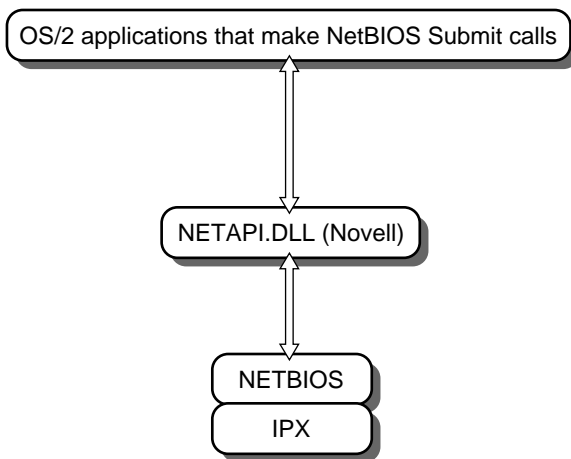
## Setting Up the Novell NetBIOS Driver

Do this section only if you were directed here from the flow chart in [Figure 37 on page 129](#) because you

- ◆ Have a NetBIOS Submit application
- ◆ Have Extended Services
- ◆ Do not have LAN Services

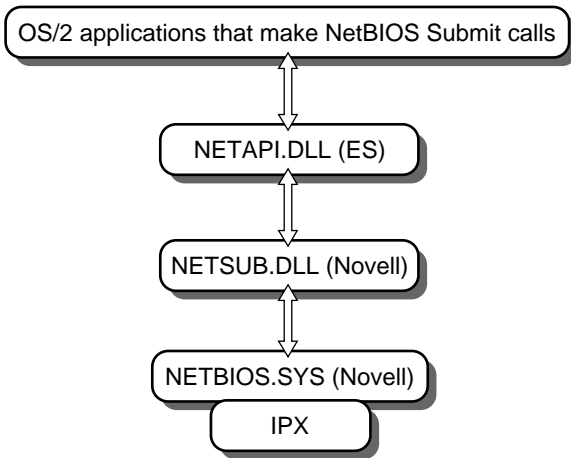
As [Figure 38](#) shows, the Novell NetBIOS driver interfaces with Novell's NETAPI.DLL file when you do not have Extended Services.

**Figure 38** NetBIOS Requests through Novell's NetBIOS Driver



As [Figure 39 on page 131](#) shows, if you are using Extended Services, the NETAPI.DLL is the one from the Extended Services package. This NETAPI.DLL interfaces with a NETSUB.DLL file from Novell, which in turn works with the Novell NetBIOS driver.

Figure 39 NetBIOS Requests through Novell's NetBIOS Driver with Extended Services installed



Follow the procedures in the next section, **Installing the Driver**, to use the Novell NetBIOS driver. The procedures apply whether or not you have Extended Services.

**IMPORTANT:** If you are using Extended Services, you must get an updated NETAPI.DLL file from IBM. The one shipped with base Extended Services 1.0 does not provide the intended NetBIOS support.

## Installing the Driver

### Prerequisites

- Install Extended Services if you have it. See the IBM documentation for Extended Services.
- Install your NetBIOS application. See the documentation for your application.

### Procedures

**NOTE:** You can install the NetWare Requester from this procedure.

You must install the Novell NetBIOS driver on each computer that will use Novell NetBIOS on the network.

- 1** Start the NetWare Requester installation program.

If the Requester is not installed, you can start the program from your *WSOS2\_1* diskette. Type **INSTALL**. You can install the Requester at the same time as you install NetBIOS.

If the Requester is already installed, you can start the program by choosing the "Installation" icon from the "Novell" group on your desktop.

- 2** Choose "Requester on Workstation" from the "Installation" menu.
- 3** Verify the target and source directory and choose "OK."
- 4** Select an action from the "Requester Installation" screen based on whether the Requester is installed:
  - 4a** If the Requester is not installed, select "Edit CONFIG.SYS and Copy All Files . . ." and choose "OK."
  - 4b** If the Requester is already installed, select "Only Edit CONFIG.SYS . . ." and choose "OK."
- 5** Select the ODI driver for your network board and choose "Continue. . ."
- 6** Select your preferences for NetWare support for DOS and Windows applications and choose "Continue . . ."
- 7** Select "NetBIOS Emulation for OS/2 Sessions."
- 8** Choose "Save . . ."
- 9** Verify the filename and location and choose "OK."

If you have not previously installed the Requester, the "Copy Requester Files" screen appears. Continue with **“Choose "Copy" and follow the screens to finish installing the Requester.” on page 132.**

If you have previously installed the Requester, the main installation menu appears. Go to **“Configuring the Driver” on page 132.**

- 10** Choose "Copy" and follow the screens to finish installing the Requester. When the main menu returns, go to **“Configuring the Driver” on page 132.**

## Configuring the Driver

Novell's NetBIOS driver comes with default configuration settings. You may want to customize the configuration. Follow the instructions below to

- ♦ Determine whether you need to change the default configuration for NetWare NetBIOS, and
- ♦ Change the configuration if necessary.



You can change the configuration to manage such features as

- ◆ Names
- ◆ Sessions
- ◆ Commands

If you do not know what NetBIOS names, sessions, and commands are, see the documentation for your NetBIOS application.

### Prerequisite

- The NetWare Requester for OS/2 must be installed. If it is not installed, do the steps in [“Installing the Driver” on page 131](#).

### Procedures

- 1** Start the NetWare Requester Installation program.

The program may already be running if you just installed the NetBIOS driver.

If the program is not running, start it by choosing the "Installation" icon from the "Novell" group on your desktop.

- 2** Choose "This workstation . . ." from the "Configuration" menu.

- 3** Verify the location of the NET.CFG file and choose "Edit."

The "Edit NET.CFG" window appears. See [Figure 40 on page 134](#). You can cut and paste text from the help window at the bottom of the screen to the "Current NET.CFG File Contents" window. Use the following keys:

**Table 12** Key definitions for the NET.CFG window

To do this . . .	Use these keys . . . .
Highlight text	Click and drag with the mouse, or move the cursor with the arrow keys while holding down the <Shift> key
Copy text	<Ctrl><Insert>
Cut text (text will reappear the next time you refresh the window)	<Shift><Delete>

To do this . . .	Use these keys . . .
Paste text	<Shift><Insert>
Delete text (deleted text cannot be pasted)	<Ctrl><Delete>

Figure 40 Editing NET.CFG for NetBIOS

**1** Select a NET.CFG option, setting, or topic.

**2** Read online help for the topic you selected.

**3** Select the type of information you want to see.

**4** Type NET.CFG options and settings here.

**5** Save your configuration or change your mind.

- 4** Select "NetWare NetBIOS" from the "NET.CFG Options" box on the left of your screen.
- 5** Determine whether to change the configuration for the settings under "NetWare NetBIOS."

If you decide not to change the configuration for a setting, no action is required for that setting.

- 5a** Select one of the settings.

For example, select "abort timeout."

- 5b** Read the help window at the bottom of the screen to determine whether to change the configuration for the setting.

You can choose the "Usage," "Description," and "Example" buttons on the right of your screen to see more information about the setting you've selected.

- 5c** (Optional) If you decide to change the configuration, type the configuration lines (as shown in the "Usage" help window) into the "Current NET.CFG File Contents" box.

**IMPORTANT:** You *must* follow the format requirements explained in the "Format of NET.CFG Options" topic. To see these requirements, select this topic from the "NET.CFG Options" box and choose the "Usage" button.

Repeat **Step 5a** through **Step 5c** for each setting.

- 6** Choose "Save."
- 7** Exit the NetWare Requester installation program.

If your NetBIOS application will not access the IBM NetBIOS driver, use the OS/2 "Shutdown" feature to reboot your computer.

If your NetBIOS application will access the IBM NetBIOS driver, do not reboot. Instead, configure the IBM driver as instructed in one of the following sections:

- ♦ ["Configuring NETBIOS.OS2 with PROTOCOL.INI" on page 136](#)
- ♦ ["Configuring NETWKSTA.200 with IBMLAN.INI" on page 140](#)

If you do not know which of these two sections to read, go to ["Determining Which NetBIOS Drivers to Set Up" on page 126](#).

# Configuring NETBIOS.OS2 with PROTOCOL.INI

Do this section only if you were directed here from the flow chart in [Figure 36 on page 128](#) because you

- ◆ Have the LAPS program, and
- ◆ Have a NetBIOS 3.0 application.

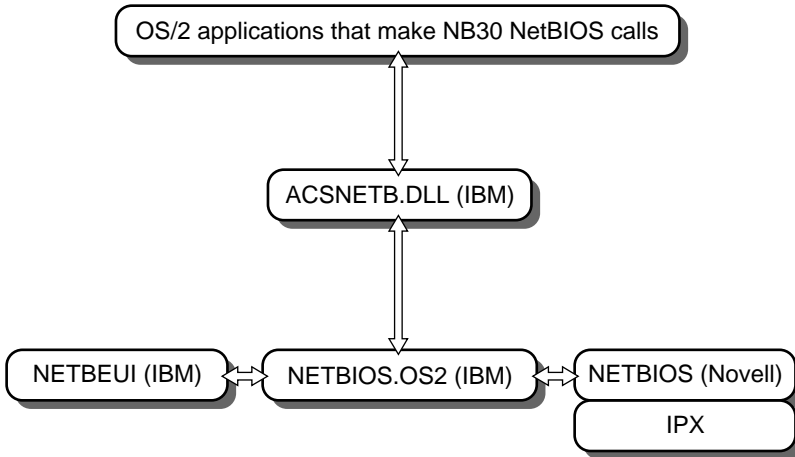
As [Figure 41](#) shows, IBM's ACSNETB.DLL interfaces with NETBIOS.OS2, also provided by IBM. NETBIOS.OS2 can be configured to pass NetBIOS requests to either

- ◆ NETBEUI.OS2, IBM's NetBIOS driver, or
- ◆ NETBIOS.SYS, Novell's NetBIOS driver

This section explains how to configure NETBIOS.OS2 to support both NetBIOS drivers simultaneously or to support only Novell's driver.

If you only want to use IBM's NetBIOS driver, you do not need to configure. By default, NETBIOS.OS2 talks only to NETBEUI.OS2.

**Figure 41** NetBIOS Requests through NETBIOS.OS2



## Prerequisites

- ❑ Install Extended Services with NetBIOS support. Verify that you can get a NetBIOS connection.
- ❑ Install LAN Services (NetBIOS support is installed by default). Verify that you can get a LAN connection.
- ❑ Do the steps in “[Setting Up the Novell NetBIOS Driver](#)” on page 130 to install the NetWare Requester with the Novell NetBIOS driver.

## Procedures

In this procedure, you edit the PROTOCOL.INI file to define a virtual adapter for the Novell and IBM NetBIOS drivers.

- 1** Open the PROTOCOL.INI file in a text editor.

For example, to use the OS/2 System Editor at the command line, you would type:

```
E C:\IBMCOM\PROTOCOL.INI
```

PROTOCOL.INI is located in the \IBMCOM directory.

- 2** Find the following line:

```
[NETBIOS]
```

If the [NETBIOS] line does not exist, type the line at the end of the PROTOCOL.INI file, exactly as shown.

- 3** On a new line under [NETBIOS], type the following line:

```
DriverName = NETBIOS$
```

The line must be indented at least one space and must follow other formatting requirements for IBMLAN.INI. NETBIOS\$ is the device name of NETBIOS.OS2.

If the line already exists, go to the next step.

- 4** On a new line under the DriverName line, type lines assigning adapter numbers to the IBM and Novell NetBIOS drivers.

To allow NB30 NetBIOS applications to use only Novell's NetBIOS driver, add a line for Novell's NetBIOS.

To allow NB30 applications to use both Novell and IBM drivers, add another line for IBM's NetBIOS.

**NOTE:** When you define the Novell NetBIOS network, your default definition for the IBM NetBIOS network is no longer defined. So, if you are going to use IBM NetBIOS driver, you will also need to add a line for the IBM network.

Each line you add should look similar to the following:

**ADAPTER***a* = *b*, *c*, *sessions*, *commands*, *names*

**NOTE:** If you have existing ADAPTER lines, leave them.

Replace the variables in the line with values shown in the following chart:

**Table 13** Parameters for defining dual NetBIOS in PROTOCOL.INI

Variable	Meaning of variable
ADAPTER	Adapter is a key word for NETBIOS.OS2. It is not case-sensitive.
<i>a</i>	<p>Replace <i>a</i> with a number from 0 to 3. This is the adapter number used by the application.</p> <p>When specifying an adapter number:</p> <ul style="list-style-type: none"><li>◆ Do not use the same number that is used in any other adapter statements. Each adapter number can only be defined to one NetBIOS driver.</li><li>◆ Do not skip adapter numbers. For example, if you have an existing adapter statement that uses ADAPTER0, use ADAPTER1 for your next adapter statement.</li></ul>
<i>b</i>	<p>Replace <i>b</i> with the device name for the NetBIOS driver. NETBIOS.OS2 recognizes this name when determining which driver to pass NetBIOS calls to.</p> <ul style="list-style-type: none"><li>◆ Replace <i>b</i> with IPXNB\$ for the Novell NetBIOS driver.</li><li>◆ Replace <i>b</i> with NETBEUI\$ for the IBM NetBIOS driver.</li></ul>
<i>c</i>	<p>Replace <i>c</i> with a number from 0 to 3. This number is the virtual adapter number used by the target NetBIOS driver.</p> <ul style="list-style-type: none"><li>◆ For Novell's NetBIOS driver, always specify 0.</li><li>◆ For IBM's NetBIOS driver, specify whichever virtual adapter you want used. See the Extended Services documentation on NETBEUI.OS2 for more information on how it uses virtual adapters.</li></ul>

Variable	Meaning of variable
<i>sessions</i>	<p>Replace <i>sessions</i> with the number of NetBIOS sessions you want allocated to NetBIOS 3.0 applications. This number specifies the maximum number of sessions that can be active between NETBIOS.OS2 and Novell's NetBIOS driver.</p> <p>Novell's NetBIOS driver is configured with the sessions setting in the NET.CFG file. The number of sessions actually allocated to the application is either the NET.CFG value or the value on this line of the PROTOCOL.INI, whichever is lowest.</p> <p>For example, if you set 64 sessions in NET.CFG, and the value on this line is only 48, NetBIOS 3.0 applications will only be able to use 48 sessions.</p> <p>If you set 30 sessions in NET.CFG and the value on this line is 50, NetBIOS 3.0 applications will only be able to use 30 sessions.</p>
<i>commands</i>	<p>Replace <i>commands</i> with the number of NetBIOS commands you want allocated to the NB30 NetBIOS application. This number specifies the maximum number of commands that can be active between NETBIOS.OS2 and Novell's NetBIOS driver.</p> <p>Novell's NetBIOS driver is configured with the commands setting in the NET.CFG file. The number of commands actually allocated to the application is either the NET.CFG value or the value on this line of the PROTOCOL.INI, whichever is lowest.</p> <p>For example, if you set 128 commands in NET.CFG, and the value on this line is only 100, the application will only be able to use 100 commands.</p> <p>If you set 80 commands in NET.CFG and the value on this line is 95, the application will only be able to use 80 commands.</p>
<i>names</i>	<p>Replace <i>names</i> with the number of NetBIOS names you want allocated to the NB30 application. This number specifies the maximum number of names that can be active between NETBIOS.OS2 and Novell's NetBIOS driver.</p> <p>Novell's NetBIOS driver is configured with the names setting in the NET.CFG file. The number of names actually allocated to the application is either the NET.CFG value or the value on this line of the PROTOCOL.INI, whichever is lowest.</p> <p>For example, if you set 128 names in NET.CFG, and the value on this line is only 100, the application will only be able to use 100 names.</p> <p>If you set 80 names in NET.CFG and the value on this line is 95, the application will only be able to use 80 names.</p>

For example, to enable applications to use both the Novell or the IBM NetBIOS driver, the lines in your PROTOCOL.INI file might read:

```
[NETBIOS]
  DriverName = NETBIOS$
  Adapter0 = ipxnb$,0,16,16,8
  Adapter1 = netbeui$,0,32,14,8
```

For more information about defining adapters in NETBIOS.OS2, see your Extended Services documentation.

- 5** Insert a blank line at the end of the file.
- 6** Save the PROTOCOL.INI file and exit your text editor.
- 7** Use the "Shutdown" feature from the OS/2 system menu to reboot your computer.

When your computer restarts, your NB30 NetBIOS applications will be able to use each driver you defined with an Adapter line.

## Configuring NETWKSTA.200 with IBMLAN.INI

Do this section only if you were directed here from the flow chart on [Figure 37 on page 129](#) because you

- ♦ Have a NetBIOS Submit application, and
- ♦ Have LAN Services

As [Figure 42 on page 141](#) shows, NETAPI.DLL interfaces with IBM's NETWKSTA.200. The NETAPI.DLL file used is the one provided with LAN Services. This happens by default, since the \MUGLIB\DLL directory which stores the LAN Services NETAPI.DLL comes earlier in the path than the \NETWARE directory which contains the NetWare Requester NETAPI.DLL.

NETWKSTA.200 can be configured to pass NetBIOS requests to either

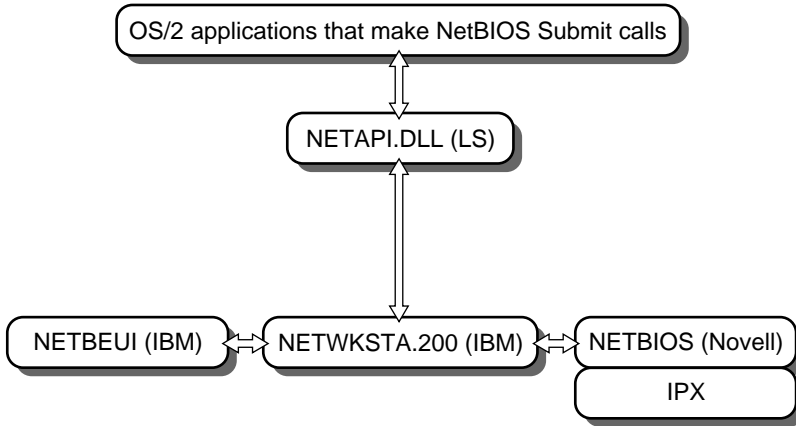
- ♦ NETBEUI.OS2, IBM's NetBIOS driver, or
- ♦ NETBIOS.SYS, Novell's NetBIOS driver

This section explains how to configure NETWKSTA.200 to support both NetBIOS drivers simultaneously or to support only Novell's driver.

If you only want to use IBM's NetBIOS driver, you do not need to configure. By default, NETWKSTA.200 talks only to NETBEUI.OS2.



Figure 42 NetBIOS Requests through NETWKSTA.200



## Prerequisites

- Install Extended Services if you have it.
- Install LAN Services (NetBIOS support is installed by default). Verify that you can get a LAN connection.
- Do the steps in [“Setting Up the Novell NetBIOS Driver” on page 130](#) to install the NetWare Requester with the Novell NetBIOS driver.

## Procedures

- 1** Open the IBMLAN.INI file in a text editor.

For example, to use the OS/2 System Editor at the command line, you would type:

```
E C:\IBMLAN\IBMLAN.INI
```

IBMLAN.INI is located in the \IBMLAN directory on your boot drive.

- 2** Find the following line:

```
[networks]
```

Underneath the [networks] line, you should see a line similar to the following defining a particular network as the one using IBM's NetBIOS driver, NETBEUI.OS2:

```
net1 = NETBEUI$,1,LM10,32,50,14
```

This line defines net1 as the network using the IBM NetBIOS driver.

**3** If the IBM driver is defined to net1, change the 1 to a 2.

The line should look like the following:

```
net2 = NETBEUI$, 1, LM10, 32, 50, 14
```

You must change the IBM driver because the Novell driver has to be defined to net1 in order for dual NetBIOS to work.

**4** Underneath any existing net statements, type a line assigning network number 1 to the Novell NetBIOS driver.

**NOTE:** A network for IBM NetBIOS is defined by default in both LAN Requester and LAN Server. If you want NetBIOS Submit applications to only use Novell's NetBIOS driver, comment out the line for the IBM driver with a semicolon.

The line must be indented at least one space and must follow other formatting requirements for IBMLAN.INI.

The Novell line you add should look similar to the following:

```
net a = b, c, LM10, sessions, commands, names
```

Replace the variables in the line with values shown in the following table:

**Table 14** Parameters for defining dual NetBIOS in IBMLAN.INI

Variable	Meaning of variable
NET	NET is a standard key word for NETWKSTA.200. It is not case-sensitive.
<i>a</i>	<p>Replace <i>a</i> with a number from 1 to 4. This is the number of the network you want NETBIOS.OS2 to use when sending NetBIOS requests to a NETBIOS driver. Each NetBIOS driver must have its own network number.</p> <p>When specifying a network number:</p> <ul style="list-style-type: none"><li>◆ Use 1 for the Novell NetBIOS driver and 2 for the IBM NetBIOS driver.</li><li>◆ Do not use the same number that is used in any other net statements. Each network number can only be defined to one NetBIOS driver.</li><li>◆ Do not skip numbers. For example, if you have an existing net statement that uses NET1, use NET2 for your next statement.</li></ul>
<i>b</i>	<p>Replace <i>b</i> with the device name for the NetBIOS driver. NETWKSTA.200 recognizes this name when determining which driver to pass NetBIOS calls to.</p> <p>Replace <i>b</i> with IPXNB\$ for the Novell NetBIOS driver.</p> <p>(NETBEUI\$ is the device name for the IBM NetBIOS driver.)</p>

Variable	Meaning of variable
LM10	LM10 is the name of the protocol that enables NETWKSTA.200 to communicate with more than one NetBIOS driver. Type it exactly as it appears.
c	<p>Replace <i>c</i> with a number from 1 to 4. This number is the virtual adapter number used by the target NetBIOS driver to receive NetBIOS requests from NETWKSTA.200.</p> <ul style="list-style-type: none"> <li>◆ For Novell's NetBIOS driver, always specify 1.</li> <li>◆ For IBM's NetBIOS driver, specify whichever virtual adapter you want used. See the Extended Services documentation on NETBEUI.OS2 for more information on how it uses virtual adapters.</li> </ul>
<i>sessions</i>	<p>Replace <i>sessions</i> with the number of NetBIOS sessions you want allocated to the NetBIOS Submit application. This number specifies the maximum number of sessions that can be active between NETWKSTA.200 and Novell's NetBIOS driver.</p> <p>Novell's NetBIOS driver is configured with the <i>sessions</i> setting in the NET.CFG file. The number of sessions actually allocated to the application is either the NET.CFG value or the value on this line of the IBMLAN.INI, whichever is lowest.</p> <p>For example, if you set 64 sessions in NET.CFG, and the value on this line is only 48, the application will only be able to use 48 sessions.</p> <p>If you set 30 sessions in NET.CFG and the value on this line is 50, the application will only be able to use 30 sessions.</p>
<i>commands</i>	<p>Replace <i>commands</i> with the number of NetBIOS commands you want allocated to the NetBIOS Submit application. This number specifies the maximum number of commands that can be active between NETWKSTA.200 and Novell's NetBIOS driver.</p> <p>Novell's NetBIOS driver is configured with the <i>names</i> setting in the NET.CFG file. The number of names actually allocated to the application is either the NET.CFG value or the value on this line of the IBMLAN.INI, whichever is lowest.</p> <p>For example, if you set 128 commands in NET.CFG, and the value on this line is only 100, the application will only be able to use 100 commands.</p> <p>If you set 80 commands in NET.CFG and the value on this line is 95, the application will only be able to use 80 commands.</p>

Variable	Meaning of variable
<i>names</i>	<p>Replace <i>names</i> with the number of NetBIOS names you want allocated to the NetBIOS Submit application. This number specifies the maximum number of names that can be active between NETWKSTA.200 and Novell's NetBIOS driver.</p> <p>Novell's NetBIOS driver is configured with the names setting in the NET.CFG file. The number of names actually allocated to the application is either the NET.CFG value or the value on this line of the IBMLAN.INI, whichever is lowest.</p> <p>For example, if you set 128 names in NET.CFG, and the value on this line is only 100, the application will only be able to use 100 names.</p> <p>If you set 80 names in NET.CFG and the value on this line is 95, the application will only be able to use 80 names.</p>

For example, to enable applications to use both the Novell or the IBM NetBIOS driver, the lines in your IBMLAN.INI file might read:

```
[networks]
net1 = IPXNB$,1,LM10,32,16,8
net2 = NETBEUI$,1,LM10,16,16,8
```

For more information about defining networks for NETWKSTA.200, see your LAN Services documentation.

**5** If your computer is a LAN Server, do the following:

**5a** Find the [server] line in your IBMLAN.INI file.

**5b** At the end of the [server] section, find the following line:

```
srvnets = neta
```

**5c** Add the Novell NetBIOS network to the line.

Separate the Novell net from any existing nets with a comma.

For example, if Novell's NetBIOS driver was net2:

```
srvnets = NET1,NET2
```

The line must be indented at least one space and must follow other formatting requirements for IBMLAN.INI.

This line tells LAN Services what network to send NetBIOS calls for servers on.

**6** If your computer is a LAN Requester, do the following:

**6a** Find the [requester] line in your IBMLAN.INI file.

**6b** At the end of the [requester] section, find the following line:

```
wrknets = neta
```

**6c** Add the Novell NetBIOS network to the line.

Separate the Novell net from any existing nets with a comma.

For example:

```
wrknets = NET1,NET2
```

The line must be indented at least one space and must follow other formatting requirements for IBMLAN.INI.

This line tells LAN Services what network to send NetBIOS calls for workstations on.

**7** Save the IBMLAN.INI file and exit your text editor.

**8** Use the "Shutdown" feature from the OS/2 system menu to reboot your computer.

When your computer restarts, your NetBIOS Submit applications will be able to use both the Novell and the IBM NetBIOS driver.

**NOTE:** NETWKSTA.200 must be started before any kind of NetBIOS connection will work. You can start it automatically on booting or with the LAN Services NETSTART command at a command line. See your LAN Services documentation for more information.

## Setting Up NetBIOS for DOS and Windows

This section applies to virtual DOS and Windows sessions under OS/2 only. See the NetWare Workstation for DOS and Windows documentation to set up NetBIOS on an actual DOS or Windows workstation.

NetWare Requester and the IBM LAPS program both support the NetBIOS protocol in a virtual session. However, the type of support is different.

### NetWare NetBIOS Support

NetWare NetBIOS support is not virtualized. This means that the session will not use the same NetBIOS driver that is used by OS/2 sessions.

Instead, you must load the NETBIOS.EXE TSR program in the session, just as you would to get NetBIOS support on an actual DOS workstation.

When you use the NETBIOS.EXE program in a virtual session, you will not be able to get NetBIOS connections from your OS/2 sessions or any other DOS and Windows sessions until the NETBIOS.EXE program is unloaded. You will only have one NetBIOS connection from a single virtual session. This is true even if your OS/2 NetBIOS drivers appears to be loaded.

## IBM LAPS NetBIOS Support

The LAPS NetBIOS support is virtualized, meaning that you do not have the single-connection limitation. You do not have access to this virtualized support unless you have the LAPS protocols, included with both Extended Services and LAN Services from IBM.

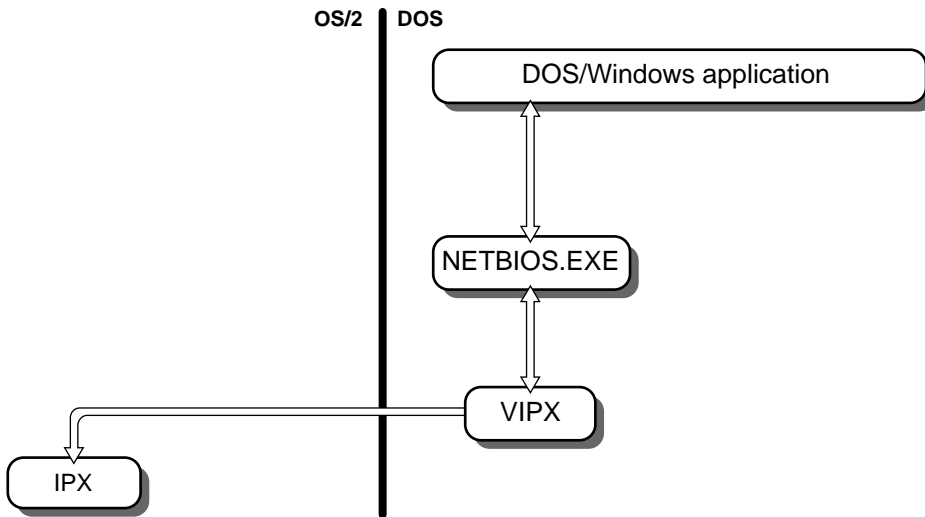
To use . . .	Go to . . .
NetWare Requester non-virtualized NetBIOS support	<a href="#">“Using NetWare NetBIOS Support for a Single DOS Session” on page 146</a>
LAPS virtualized NetBIOS support	<a href="#">“Using LAPS NetBIOS Support for Virtual Sessions” on page 148</a>

## Using NetWare NetBIOS Support for a Single DOS Session

As [Figure 43 on page 147](#) shows, NetWare NetBIOS support for a single DOS session goes through NETBIOS.EXE and VIPX.

**IMPORTANT:** When using NetWare NetBIOS for a single DOS session, you cannot have NetBIOS connections from any other DOS, Windows, or OS/2 sessions. You must disable NetBIOS support for OS/2 sessions.

Figure 43 Novell NetBIOS Support for a virtual session



## Prerequisites

- ❑ Enable IPX support for virtual sessions. “[Network Access from Virtual DOS and Windows](#)” on page 19 explains how to do this.
- ❑ Disable NetBIOS support for OS/2 sessions. Novell's NetBIOS solution for DOS boxes is not virtual and so does not allow any other NetBIOS drivers to be running at the same time. Disable NetBIOS support by running the NetWare Requester installation program and deselecting "NetBIOS Emulation for OS/2." “[Installing the Driver](#)” on page 131 explains how to run the installation program.

## Procedures

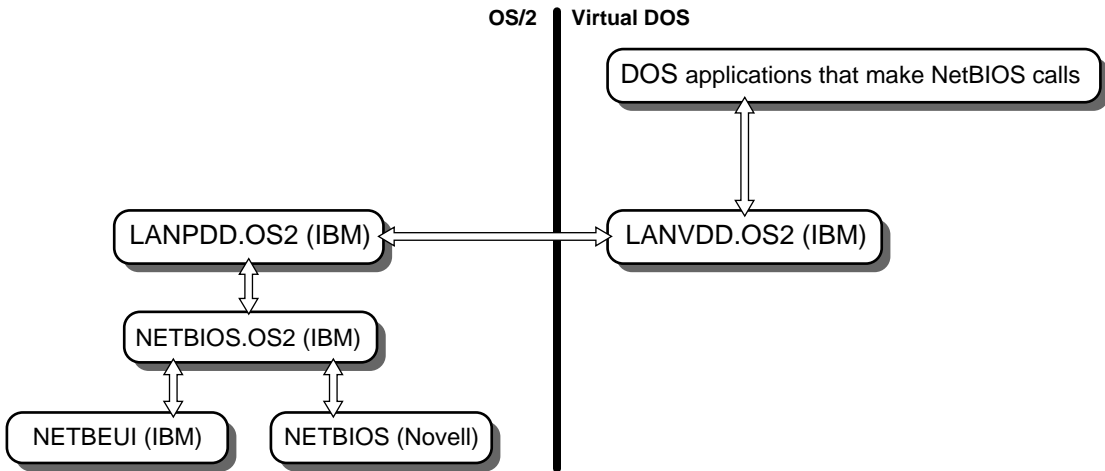
Follow the instructions in the NetWare Workstation for DOS and Windows manual. Use that documentation to

- ◆ Load NETBIOS.EXE in a single DOS session.
- ◆ Configure NetWare NetBIOS for DOS if necessary.

# Using LAPS NetBIOS Support for Virtual Sessions

As [Figure 44](#) shows, LAPS virtual NETBIOS support goes through LANVDD and LANPDD. It uses the NETBIOS.OS2 interface to communicate with either the Novell or IBM NetBIOS driver.

Figure 44 LAPS NetBIOS Support for Virtual Sessions



LAPS NetBIOS support follows the NetBIOS 3.0 (NB30) standard. You can run NetBIOS applications in a virtual session even if those applications are not NB30 conformant. However, the need for increasing resources in a session is more likely when running non-NB30 applications.

## Avoiding Resource Errors

As you can see in [Figure 44](#), your virtualized NetBIOS sessions can be supported by Novell's OS/2 NETBIOS.SYS driver or Extended Services's OS/2 NETBEUI.OS2 driver or both.

When virtual sessions are supported by Novell's OS/2 NetBIOS driver, you must be aware of a potential resource limitation.

**NOTE:** If you have previously followed the steps in the [“Configuring NETBIOS.OS2 with PROTOCOL.INI”](#) on page 136, then you are using Novell's driver.



LAPS NetBIOS support for virtual sessions follows the NetBIOS 3.0 (NB30) standard. Among other things, a NetBIOS 3.0 application reserves a certain number of names, commands, and sessions when it first executes.

If you run NetBIOS applications in several virtual sessions, you may find that all of the resources in one of the NetBIOS components get reserved and additional applications will not run. You will see a resource error when you try and make NetBIOS connections.

You can minimize the possibility that NetBIOS will run out of resources by doing both or either of the following:

- ◆ Whenever you're using virtual NetBIOS connections, increase the default resources allowed for the NETBIOS driver in NET.CFG.

“[Configuring the Driver](#)” on page 132 explains how to increase the defaults for the OS/2 NetBIOS driver.

- ◆ Explicitly specify the resources consumed for each virtual session you use.

“[Procedures](#)” on page 149 explains how to explicitly specify resources.

### Prerequisites

- Install Extended Services with NetBIOS support. See the Extended Services documentation.
- Install LAN Services if you have it. See the LAN Services documentation.
- Install the NetWare Requester with NetBIOS support. “[Setting Up the Novell NetBIOS Driver](#)” on page 130 explains how to do this.
- Configure NETBIOS.OS2 to use both the Novell and IBM drivers. “[Configuring NETBIOS.OS2 with PROTOCOL.INI](#)” on page 136 explains how to do this.

### Procedures

These instructions explain how to set resource information for Extended Services virtualized NetBIOS. This information is stored with a program called LTSVCFG.COM.

The LTSVCFG.COM program is included with LAPS in Extended Services and LAN Services.

- 1** Open the virtual session.
- 2** Execute the LTSVCFG.COM program with the command line parameters you need.

For example, you might type the following to set the number of NetBIOS commands to 12:

```
LTSVCFG.COM C=12
```

Three parameters that apply to NetBIOS resources are:

*s=number of NetBIOS sessions*

*n=names*

*c=commands*

For more information about these and other NetBIOS parameters, see the LAPS documentation on NetBIOS.

**IMPORTANT:** You cannot set the parameters for LTSVCFG.COM to amounts higher than the amounts currently set for the NETBIOS.OS2 or NETBIOS.SYS driver. The default sessions, names, and commands settings for the NETBIOS.SYS driver are:

Sessions=16

Names=24

Commands=32

You may have changed these defaults in your NET.CFG file.

# 10

## Backing Up Your OS/2 Workstation

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**Topic**

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[“Starting the TSA\\_OS2 Manually” on page 152](#)

[“Starting the TSA\\_OS2 Automatically” on page 153](#)

[“Setting Up Your TSA\\_OS2.CFG File” on page 154](#)

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The system administrator or backup administrator can back up your OS/2 workstation to the network. To allow access, run the NetWare TSA\_OS2 (Target Service Agent) program on your workstation.

The TSA\_OS2 program runs as an application in an OS/2 session. You can continue working in other sessions while TSA\_OS2 is running on your workstation. Whenever the TSA\_OS2 is running, SBACKUP or another backup program can access the hard drive data.

The TSA\_OS2 is installed automatically on the hard drive when you install the NetWare Requester for OS/2. An icon for the TSA\_OS2 is placed in the Novell group on your desktop.

With the TSA\_OS2 program, you can specify:

- ◆ Users on the network who can access your hard drive
- ◆ Password they must type in the backup program before accessing your hard drive
- ◆ Drives on the hard drive that can be backed up

Chapter 8, "Backing Up and Restoring Data," in *Supervising the Network* explains more about backing up workstations and servers.

# Starting the TSA\_OS2 Manually

This section explains how to start TSA\_OS2 manually by choosing its icon on your desktop. [“Starting the TSA\\_OS2 Automatically” on page 153](#) explains how to start the TSA\_OS2 automatically each time you boot your workstation.

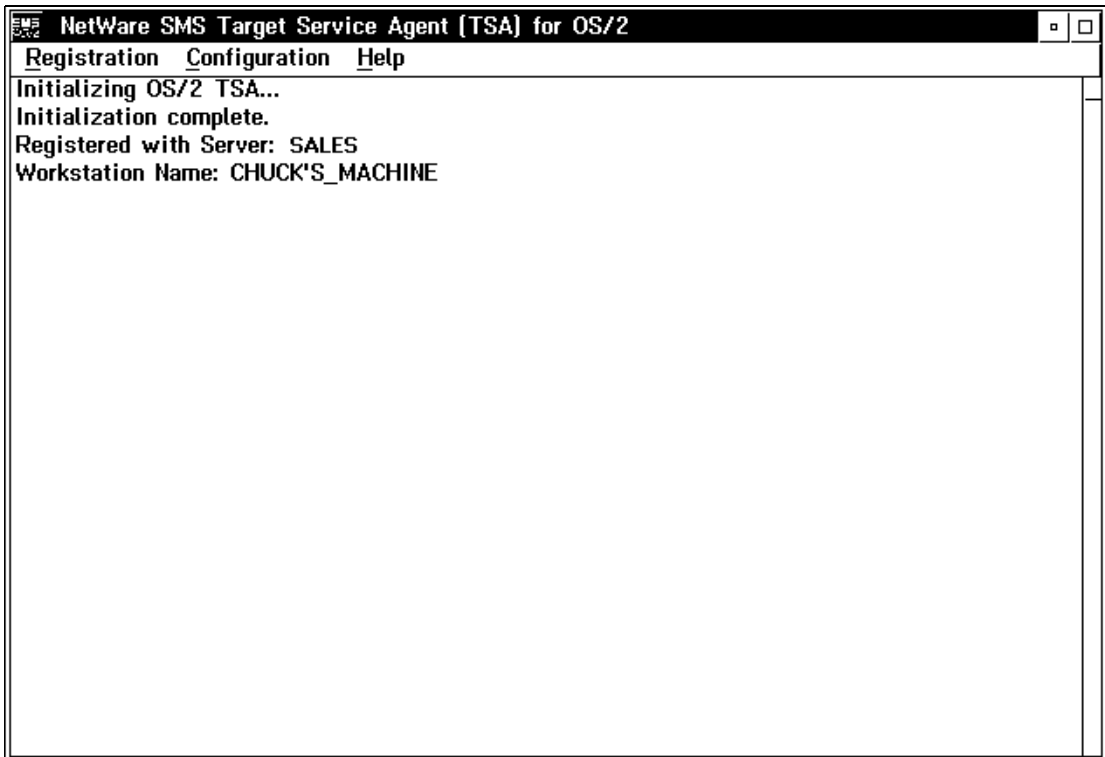
## Prerequisites

- ❑ Load the TSA\_OS2.NLM on the server.
- ❑ Install the NetWare Requester. See Chapter 3, "Installing a NetWare Workstation" in *Workstation Basics and Installation*.

## Procedures

- 1** Choose the "Novell" icon on your OS/2 desktop.  
The "Novell" window appears.
- 2** From the "Novell" window on your desktop, choose the icon for the TSA\_OS2.EXE program.  
The TSA\_OS2 main window appears. See [Figure 45 on page 153](#).

Figure 45 The TSA\_OS2 main window



- 3 Choose the features you want from the menu bar.  
Choose "Help" or press <F1> for more information.

## Starting the TSA\_OS2 Automatically

You can set up the TSA\_OS2 program to start up automatically each time you boot your machine. To do this, you need to

- ◆ Place your TSA\_OS2 icon in the "Startup" folder.

This section explains how to put the icon in the "Startup" folder.

- ◆ Set up your TSA\_OS2.CFG file.

["Setting Up Your TSA\\_OS2.CFG File" on page 154](#) explains how to use a TSA\_OS2.CFG file.

## Prerequisites

- ❑ Load the TSA\_OS2.NLM on the server.
- ❑ Install the NetWare Requester. See Chapter 3, "Installing a NetWare Workstation," in *Workstation Basics and Installation*.

## Procedures

- 1** Open the "OS/2 System" folder on your desktop.  
The "OS/2 System" window appears.
- 2** Open the "Startup" folder from the "OS/2 System" window.  
The "Startup" window appears.
- 3** Without closing the "Startup" window, open the "Novell" group on your desktop.  
The "Novell" window appears.
- 4** Drag the TSA\_OS2.EXE icon from the "Novell" window into the "Startup" folder.

Whenever you reboot your machine, the TSA\_OS2 program will start automatically. If you have a TSA\_OS2.CFG file set up, that file will be read each time the TSA\_OS2 program starts.

**IMPORTANT:** If backups at your site are normally done after hours, remember to leave the OS/2 workstations turned on or the backup administrator will not be able to access the hard drive.

## Setting Up Your TSA\_OS2.CFG File

You can create a text file called TSA\_OS2.CFG to store settings for the TSA\_OS2 program. These settings are automatically read by the TSA\_OS2 program each time the program starts up. [Table 15 on page 155](#) lists the parameters you can type in the configuration file.

**Table 15** List of TSA\_OS2.CFG parameters

<b>Parameter</b>	<b>Description</b>	<b>Example</b>
WSName	The Target Service name you assign to your workstation. Do not use spaces in the workstation name.	WSName JO_OS2
ServerName	The name of the server where the Target Service Agent Router NLM is loaded.	ServerName SALES_MKTG
UserName	<p>The User objects you allow to attach to the OS/2 workstation. Repeat this line for each User object. If you want to specify a password, simply specify it on the same line as the username.</p> <p>The username must be one that is defined on the network. The password is unique to your workstation, not the same password the user types to access the network. If you specify a password, the backup administrator will have to type that password in the backup program.</p>	<p>UserName NANCY</p> <p>or to set a password of NEATO:</p> <p>UserName NANCY NEATO</p>
HideResource	The drives you do not want to be backed up. Repeat this line for each drive. The colon after the driver letter is allowed, but not required.	<p>HideResource C</p> <p>HideResource D:</p>
AutoRegister	Automatically register with the Target Service Router NLM on the server whenever your workstation boots. To use this parameter, you must also specify a valid WSName, ServerName, and UserName.	<p>AutoRegister ON</p> <p>or</p> <p>AutoRegister OFF</p>
TempFilesDir	<p>The location on your hard drive where the backup program can temporarily store files during backup. These files are removed when backup is completed. Do not use spaces in the directory name.</p> <p>If you do not specify this parameter, the temporary directory will be located in the root of the directory where you started the TSA_OS2.EXE program from.</p>	TempFilesDir C:\TEMP_TSA

The following is a sample TSA\_OS2.CFG configuration file:

```
WSName Joe's_Machine
ServerName SALES_MKTG
UserName FredJ
UserName Mark
UserName admin
UserName lisa NEATO
HideResource c:
hideresource b:
AUTOREGISTER on
tempfilesdir c:\emp_os2
```

The file is not case-sensitive.



# 11

## Remote-Booting OS/2 Workstations

---

### Topic

---

[“Setting Up a Server to Boot Workstations Remotely” on page 157](#)

[“Installing OS/2 Files for Remote Workstations” on page 159](#)

[“Installing RIPL Files for Remote Workstations” on page 162](#)

[“Adding Remote Workstations to the Network” on page 166](#)

[“Configuring the Requester for Remote Workstations” on page 172](#)

---

OS/2 workstations that boot from the network do not need a workstation hard disk. Instead, they can run OS/2 and the Requester from network hard disks.

Remote-booting workstations must have network boards with remote boot PROMs attached. Boot PROMs allow workstations to connect to the network so that the boot information can be accessed.

## Setting Up a Server to Boot Workstations Remotely

### Creating Users and Granting Access

You have to set up accounts for Remote boot users. Do the following:

#### Procedures

- 1 Create the RPL User object.

RPL is the username each remote workstation uses to make the initial connection to the network.

**IMPORTANT:** Do not require a password for the RPL User object, or the remote workstations will not be able to make the connection. Protect the account by granting limited access, as explained in [Step 3](#).

**2** Create a User object for each user who will use a remote workstation.

**3** Grant access to the RPL User.

The RPL user needs at least Read and File Scan access to

- ◆ The SYS:RPL2 directory
- ◆ The SYS:RPL2\COMPUTER directory and all its subdirectories

These directories are created automatically during remote workstation installation.

**4** Grant access to each remote workstation user.

All remote users need access to

- ◆ The SYS:RPL2 directory
- ◆ The \OS2 and \NETWARE subdirectories under SYS:RPL2
- ◆ Their home directories under SYS:RPL2\USER

These directories are created automatically during remote workstation installation.

Users should not have access to

- ◆ Other users' home directories under SYS:RPL2\USER
- ◆ The SYS: volume

**WARNING:** Since the SYS:RPL2 directory becomes the root of the C: drive for all remote users, all remote users require access to this area. *You should not store critical files in this directory.* Instead, store them in another network directory where access can be more restricted.

You may want to warn users about this lack of privacy and encourage them to store data in their home directories (for example, C:\USER\MARY) or in another location on the network.

## To Boot Workstations with Novell Boards

You can remote boot OS/2 workstations that have any of the following Novell boards:

- ◆ NE1000
- ◆ NE2000
- ◆ NE2

To remote boot OS/2 workstations with these boards, you do not need to load any RPL loadable modules (NLMs) on the server.

Follow the instructions in the rest of this chapter.

## To Boot Workstations with IBM Boards

You can remote boot workstations that have either of the following IBM boards:

- ◆ PCN2L
- ◆ TOKEN

To set up the server to remote boot this type of workstation, you must load and bind the RPL loadable module on each server by doing the following:

### Procedures

**1** At the server console, type

```
LOAD RPL
```

**2** Then type

```
BIND RPL TO driver
```

Replace *driver* with the name of an LAN driver in your server. You can bind to more than one driver by specifying additional bind statements.

For more information about the RPL loadable module, see the *Utilities Reference* manual.

## Installing OS/2 Files for Remote Workstations

Complete the steps in this section if you are:

- ◆ Setting up remote workstations for the first time.
- ◆ Upgrading existing remote workstations from OS/2 v1.3 to OS/2 v2.0.
- ◆ Adding a server to the network where remote workstations attach (only for the server you add).

**IMPORTANT:** Don't do the steps in this section every time you want to add a remote workstation to the network. To add a remote workstation, see ["Adding Remote Workstations to the Network" on page 166](#).

## Prerequisites

### For the Workstation You're Installing From

- Make sure OS/2 is installed on the workstation C: drive. It must be drive C:.
- Install the NetWare Requester in the \NETWARE directory
- Make sure the workstation connected to a server when it booted.
- Move to backup diskettes or delete all personal files in the C: drive. (The installation program copies all files from the C: drive to the server.)
- Make sure the CONFIG.SYS file only loads programs that remote workstations will need.
- Obtain an OS/2 installation diskette if you are setting up PS/2 computers as remote workstations. If you are using PS/2 computers as remote workstations, the program must copy some files from this diskette.

### For the NetWare Servers Where You're Installing Remote Boot Support

- Make sure you have the Supervisor object right to the NetWare Server object.
- Make sure enough disk space is free on each server where you want to install. You need to allow 30 MB for OS/2 plus enough space for whatever files are on the workstation hard drive you're installing from.
- Do the steps in [“Setting Up a Server to Boot Workstations Remotely” on page 157.](#)

## Procedures

**IMPORTANT:** All remote files must be installed on each server on the network. If you have servers where you don't want to install remote workstation support, you can set the following parameter and the servers will not respond to remote PROMs:

```
SET RESPOND TO GET NEAREST SERVER = OFF
```

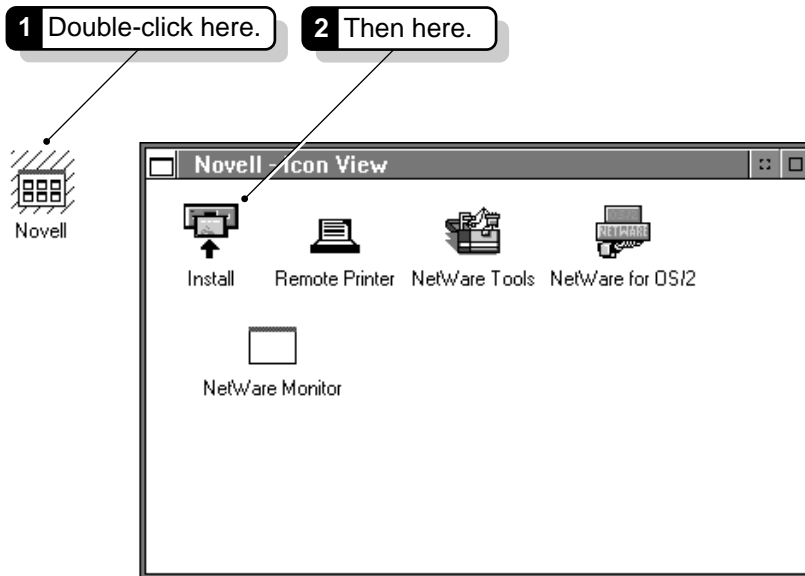
You can type this command at the server console or put it in your server AUTOEXEC.NCF file. If you set this parameter, the server will not be able to boot remote workstations, but you will also not have to install the files for remote workstations support on that server. See *Utilities Reference* for more information about the SET command.

We recommend that you establish a separate physical network for remote OS/2 users. Put as few servers on this network as you need to support the number of remote users you have. If you want, connect this network to other networks at your site through routers. This setup saves time and server space.

- 1 On a workstation with the NetWare Requester installed, open the NetWare Requester for OS/2 installation program.

Figure 46 shows how to open the program.

Figure 46 Opening the installation program from the Novell group



The "NetWare Requester for OS/2 Installation Utility" window appears. Use the online help as necessary.

- 2 Choose "Remote workstations. . ." from the "Installation" menu.

The "Install Requester for Remote Workstations" window appears.

- 3 Select "Only Copy OS/2 Files . . ." and choose "OK"

You can choose other actions from the "Remote Workstation Installation" screen if you want.

- 4 Choose the server(s) you want the files copied to.

You will be attached to the server or servers you select. It must be installed on all servers on local net (cable segment with same address).

**5** Choose "OK."

All OS/2 and NetWare Requester files are copied to the servers.

**6** After the files are copied, do the following.

If you want to . . .	Do this . . .
Copy remote boot files	Without exiting the installation program, go to <a href="#">"Installing RIPL Files for Remote Workstations" on page 162.</a>
Add remote workstations to the network	Without exiting the installation program, go to <a href="#">"Adding Remote Workstations to the Network" on page 166.</a>
Configure the Requester for remote workstations	Without exiting the installation program, go to <a href="#">"Configuring the Requester for Remote Workstations" on page 172.</a>
Exit the installation program	Choose "Close" from the system menu in the upper left corner of the Installation window.

## What Happens When You Install OS/2 Files

- ◆ A SYS:RPL2 directory is created on each server you selected.

All remote workstations use this directory as if it is their local root drive. Once remote users log in to the network, they can access all information in this directory.

Since the SYS:RPL2 directory is actually on the server and not on a local disk, NetWare security still applies. For example, you can limit remote users' access to specific directories and files. ["Setting Up a Server to Boot Workstations Remotely" on page 157](#) explains more about securing the SYS:RPL2 directory and its subdirectories.

**NOTE:** OS/2 v1.3 remote workstations used a directory called SYS:RPL. This directory is not erased when the SYS:RPL2 directory is created. OS/2 v1.3 remote workstations and OS/2 v2.01 workstations can both boot on the same network.

- ◆ Every file from the workstation drive C: is copied to the SYS:RPL2 directory on the server.

# Installing RIPL Files for Remote Workstations

Complete the steps in this section if you are:

- ♦ Setting up remote workstations for the first time.
- ♦ Upgrading existing remote workstations from OS/2 v1.3 to OS/2 v2.0.
- ♦ Adding a server to the network where remote workstations attach (only for the server you add).

Don't do the steps in this section every time you want to add a remote workstation to the network. To add a remote workstation, see [“Adding Remote Workstations to the Network” on page 166](#).

## Prerequisites

### For the Workstation You're Installing From

- Make sure the NetWare Requester is installed.
- Make sure the workstation connected to a server when it booted.

### For the NetWare servers where you're installing remote boot support

- Make sure you have the Supervisor object right to the NetWare server object.
- Do the steps in [“Setting Up a Server to Boot Workstations Remotely” on page 157](#).
- Do the steps in [“Installing OS/2 Files for Remote Workstations” on page 159](#).

## Procedures

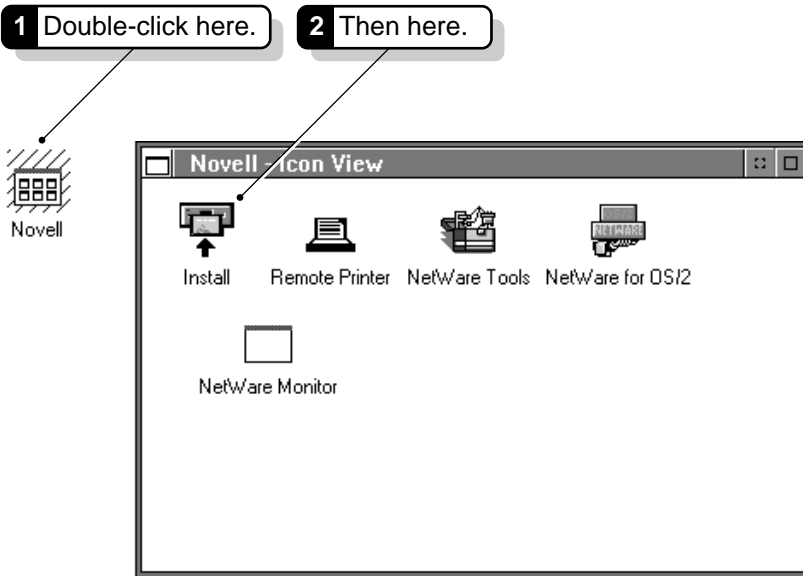
**IMPORTANT:** All remote files must be installed on each server on the network. There is no way to specify which server a remote workstation will initially establish a connection with.

We recommend that you establish a separate physical network for remote OS/2 users. Put as few servers on this network as you need to support the number of remote users you have. If you want, connect this network to other networks at your site through routers. This setup saves time and server space.

- 1 On a workstation with the NetWare Requester installed, open the NetWare Requester for OS/2 installation program.

Figure 47 shows how to open the program.

Figure 47 Opening the installation program from the Novell group



The "NetWare Requester for OS/2 Installation Utility" window appears. Use the online help as necessary.

- 2 Choose "Remote workstations. . ." from the "Installation" menu.

The "Install Requester for Remote Workstations" window appears.

- 3 Choose "Only Copy RIPL Files . . ."

You can choose other actions from the "Remote Workstation Installation" screen if you want.

- 4 Choose the server(s) you want the RIPL files copied to.

You will be attached to the server or servers you select. It must be installed on all servers on local net (cable segment with same address)

- 5 Choose "OK."

All remote boot files are copied to the servers.



**6** After the files are copied, do the following.

If you want to . . .	Do this . . .
Add remote workstations to the network	Without exiting the installation program, go to <a href="#">“Adding Remote Workstations to the Network” on page 166.</a>
Configure the Requester for remote workstations	Without exiting the installation program, go to <a href="#">“Configuring the Requester for Remote Workstations” on page 172.</a>
Exit the installation program	Choose "Close" from the system menu in the upper left corner of the Installation window.

## What Happens When You Install RIPL Files

When you use the installation program to install remote workstation support, the following actions occur.

### Directories Are Created

- ◆ SYSRPL2 is created if it didn't already exist
- ◆ The \USER and \COMPUTER subdirectories are created under SYS:RPL2 on each server.

For an illustration of the complete directory structure created when you install remote workstation support and add remote workstations, see [Figure 50 on page 172.](#)

### Files Are Copied

The following remote boot image files are copied to the SYS:LOGIN directory:

- ◆ TOKEN.200
- ◆ NE2.200
- ◆ NE2000.200
- ◆ NE1000.200
- ◆ PCN2L.200

These remote boot image files have different names than the remote boot image files used to boot OS/2 v1.3. OS/2 v1.3 remote boot files are also located in the SYS:LOGIN directory.

The following files are copied to the SYS:RPL2 directory:

- ♦ MINI.IFS
- ♦ MICRO.IFS

## Adding Remote Workstations to the Network

Each workstation you will boot from the network must be added to the remote boot setup on the network. You identify to each server the user who will use that workstation, the node address, and the network board.

Workstations are added by running the Requester installation program from a workstation that has a hard disk.

Complete the steps in this section on each server if you are:

- ♦ Setting up remote workstations for the first time
- ♦ Upgrading existing remote workstations from OS/2 v1.3 to OS/2 v2.0
- ♦ Adding remote workstations to the network
- ♦ Adding a server to the network (complete the steps on this server for every remote workstation currently defined on the other servers)

## Prerequisites

### For the Workstation You're Installing From

- Make sure the NetWare Requester is installed.
- Make sure the workstation connected to a server when it booted.

### For Workstations You're Booting Remotely

- Make sure each workstation that will boot remotely has one of the following types of network boards installed: NE2, NE2000, NE1000, or any IBM-compatible PCN2L or Token-Ring board.
- Make sure the matching remote boot PROMs are installed on each network board.

- ❑ Make sure the workstation is properly cabled to the network.
- ❑ Make sure you know the network and node address of the workstation you're booting remotely.

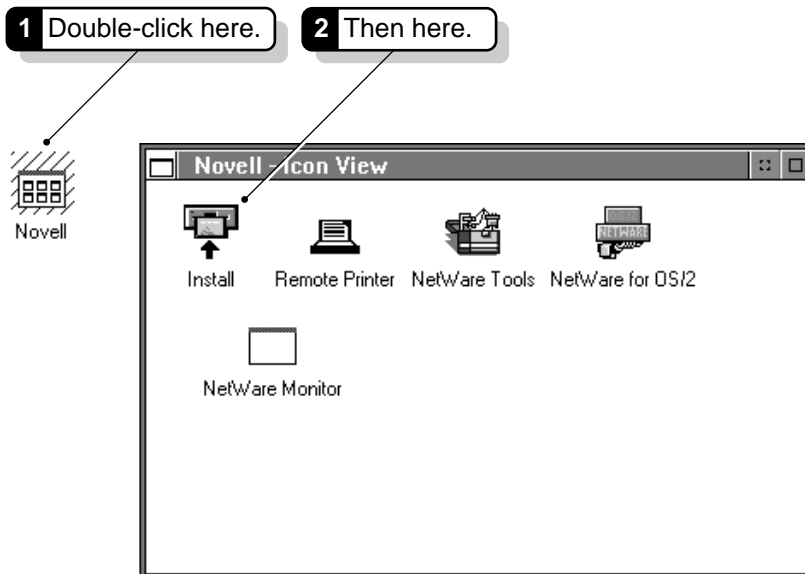
## Procedures

Whenever possible, use the same type of network board in all remote workstations. This will save you time when installing and make configuring remote workstations much easier.

If the installation program is already running, go to **Step 4**.

- 1** Start up an OS/2 workstation that has the Requester installed.
- 2** Open the "Novell" group icon on the desktop.
- 3** Choose the Install icon in the "Novell-Contents" window.

**Figure 48** Opening the Installation program from the "Novell" group



The "NetWare Requester for OS/2 Installation Utility" window appears.

- 4** Choose "Remote workstations. . ." from the "Installation" menu.

The "Add Remote Workstations" menu appears.

- 5** Choose "Add remote workstations . . ."
- 6** Choose servers on which you want to define remote workstations.

For more information, use the online help.

- 7** Add the workstations you want.

Remote users are easier to manage if you assign only one remote workstation to a username. If you do let one user log in to more than one workstation, you can use the "Logical Name" option to set up each workstation's configuration differently.

Choose "Help" or press <F1> for more information.

- 8** Exit the installation program.

## To Remote Boot Workstations With Hard Disks

If you want to remote boot a workstation with a hard disk, label your hard drive a drive other than C:. Drive C: must be assigned to the SYS:RPL2 network directory. OS/2 thinks this network directory is the local C: drive.

Also, you may need to do the following:

- ♦ If your hard disk is set to bootable or system (usually because you have a version of DOS installed on it), you need to run RPLON to keep your hard disk from booting. See ["To Run RPLON" on page 168](#).
- ♦ Whether your hard disk has an operating system or not, you can format it (FAT) and use it to store your OS/2 SWAPPER.DAT file. This will cut down on network traffic. See ["To Locate SWAPPER.DAT Locally" on page 169](#).

## To Run RPLON

- 1** Insert the *WSOS2\_1* diskette into a floppy drive of the workstation you want to boot remotely.

- 2** Change to the drive you put the diskette into.

For example, for a diskette in drive A:, type:

```
CD A:
```

- 3** Type:

```
\RPL\RPLON <Enter>
```

The RPLON program keeps the hard disk at the workstation from booting.

To enable the hard disk again, insert the *WSOS2\_1* diskette in the drive, change to that drive, and type \RPL\RPLOFF.

### To Locate SWAPPER.DAT Locally

- 1** Go to the home directory on the network for the user who will be using the remote workstation.

For example, if JOHN will be using the remote workstation with a hard drive, go to the following directory:

```
SYS:RPL2\USER\JOHN
```

Each user's home directory on the network contains that user's CONFIG.SYS file and several other OS/2 files. [Figure 50 on page 172](#) shows the complete network directory structure for remote workstations.

- 2** In a text editor, open the CONFIG.SYS file.
- 3** In the CONFIG.SYS file, find the line that designates the SWAPPATH.

You can search for SWAPPATH. The line looks like the following:

```
SWAPPATH=C:\OS2\SYSTEM 2048 2048
```

Remember that to OS/2, the SYS:RPL2 directory is drive C:.

- 4** Change the SWAPPATH line to point to the local hard drive.

For example, to point to the root of a local drive D:

```
SWAPPATH=D:\ 2048 2048
```

- 5** Save and exit the CONFIG.SYS file.

When you boot the remote workstation, the SWAPPER.DAT will be stored locally.

## What Happens When You Add Remote Workstations

When you add remote workstations to a network, the following actions occur.

### Directories Are Created

If you have not yet installed remote workstation support on the network, the SYS:RPL2 and the \USER and \COMPUTER directories are created on each server.

The following directories are created for each workstation you add:

- ◆ A user's home directory under the \USER directory.

This directory has the same name as the username you specify. For example, a user named JADAMS would have a home directory of:

```
SYS : RPL2 \USER \JADAMS
```

- ◆ A user's node address directory under the \COMPUTER directory.

This directory has the same name as the last 11 characters of the workstation node address. For example, if the node address was 2223345BBBBB, the node address directory would be:

```
SYS : RPL2 \COMPUTER \223345BB . BBB
```

- ◆ A subdirectory containing the Workplace Shell desktop in each user's subdirectory.

This directory is called OS!2\_2.0\_D if you're installing from a FAT drive and "OS2 20 Desktop" if you're installing from an HPFS drive.

- ◆ A \SPOOL subdirectory in each user's subdirectory.

This directory contains all desktop printing files.

## Files Are Created

- ◆ A file called CONFIG.WSS is created in each user's node address directory on the server.

This file tells OS/2 to use the OS2.INI, OS2SYS.INI, and CONFIG.SYS files from the user's home directory on the network instead of trying to find these files in their regular locations on a local drive.

It also tells OS/2 to use the desktop files and \SPOOL subdirectory from the user's home directory on the network rather than from a local hard disk.

- ◆ A BOOTCONF.SYS file is created in the SYS:LOGIN directory.

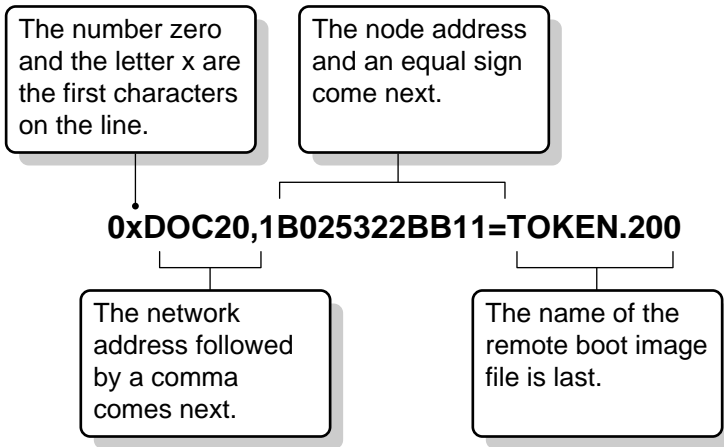
If a BOOTCONF.SYS file already exists (from other installations of remote workstations), the information for the new workstations is added to the beginning of the file.

This file tells the server which boot image file to use for each workstation. The BOOTCONF.SYS file contains lines identifying which remote workstation uses which type of network board. For example, a line for a Token-Ring workstation might be as follows:

```
0xDOC20 , 1b0276A32222=TOKEN . 200
```

See [Figure 49](#) for an explanation of the lines in the BOOTCONF.SYS file.

**Figure 49** Format of BOOTCONF.SYS file



## Files Are Copied

Every file in the \DESKTOP and \SPOOL subdirectories are copied from the local drive of the OS/2 workstation to the server.

These files allow remote workstations to load customized versions of OS/2 and the OS/2 desktop.

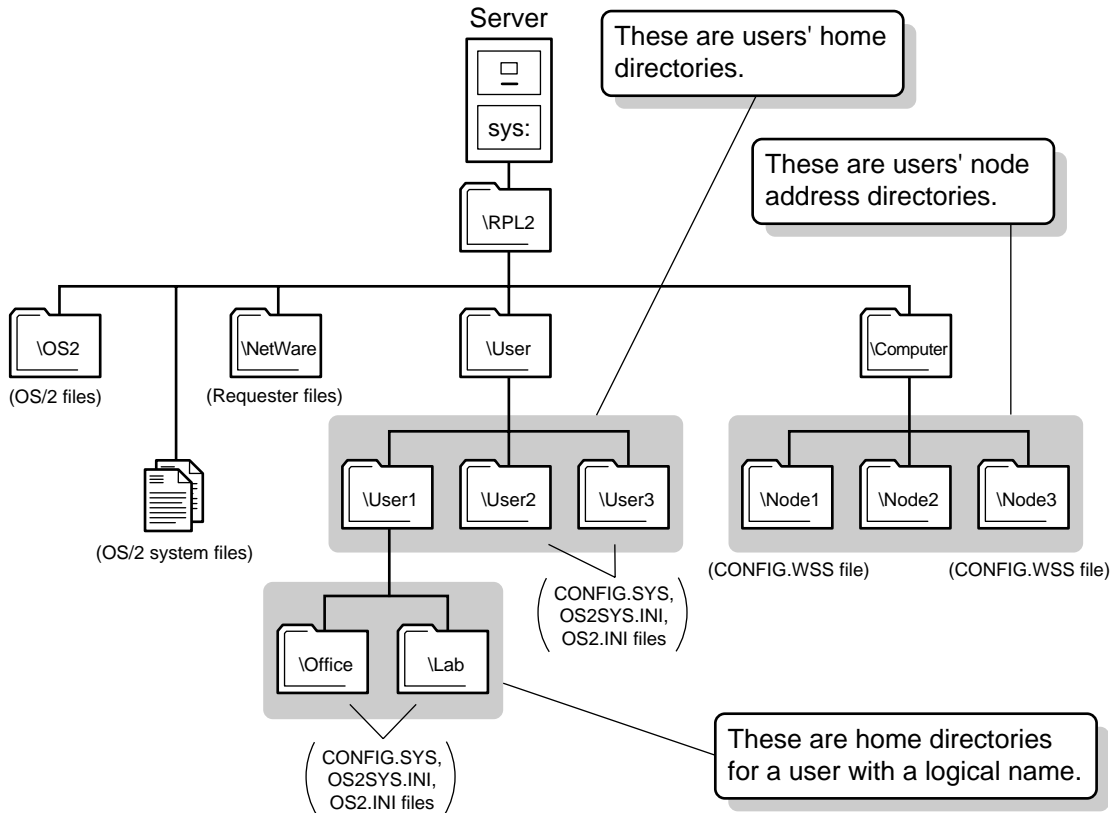
## CONFIG.SYS Is Copied and Modified

A CONFIG.SYS file is copied from the local drive of the OS/2 workstation you are installing from to each user's subdirectory on each server.

This CONFIG.SYS is modified slightly for each user. The line which loads HPFS is commented out, and the directory in the SWAPPATH line is changed. Also, disk caching is turned off and the ODI driver is changed to the driver you selected.

[Figure 50 on page 172](#) shows the complete directory structure that is created for remote workstation support.

Figure 50 Directory structure for remote workstation support



## Configuring the Requester for Remote Workstations

Configure the NetWare Requester for remote workstations by running the NetWare Requester installation program and choosing "Remote workstations . . ." from the "Configuration" menu. **Chapter 4, "How to Configure Your Workstation," on page 37** explains more about configuring from the installation program.

When you configure remote workstations, the Requester installation program puts a NET.CFG configuration file in the home directory of the users you specify. The home directory is located under SYS:RPL2\USER on each server on the local network.



The NET.CFG you create with the installation program should be identical on all servers on the local network so remote workstations boot the same way each time.

For example, if user JOHN has a NET.CFG file in his user directory on SERVER1, then a copy of the same NET.CFG file should be placed in his home directory on SERVER2.

The installation program puts a line in each user's CONFIG.WSS file in the workstation subdirectory, telling the Requester where to find the NET.CFG file.

For example, for John's NET.CFG file, the installation program puts in the following line:

```
C:\NET.CFG C:\USER\JOHN\NET.CFG
```

**NOTE:** Remember that the SYS:RPL2 directory becomes the root of the C: drive.



# A System Messages

## Messages Summary

This appendix includes system messages and explanations for all NetWare Requester v2.01 drivers and daemons. Messages for the NetWare Tools or the Network Printer (NPRINTER.EXE) programs are not included. For information about messages for those modules, see *System Messages*.

### **REQ0106: An error occurred during attempt to get shared memory.**

**Explanation:** DDAEMON.EXE attempted to access the daemon's shared memory, but failed. At this point, the program has verified that the shared memory exists, but is unable to access it. This may be an internal program error.

**Action:** Try rebooting your system. If the problem persists, call your Novell Authorized Reseller.

### **REQ0107: An error occurred during attempt to allocate a shared segment.**

**Explanation:** DDAEMON.EXE tried to create shared memory, but none is available. This error usually occurs when the device drivers and applications currently running on your system require more memory than your system has available.

**Action:** Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0108: The daemon cannot access the Link Support Layer. Error: <code>.**

Explanation: DDAEMON.EXE cannot find the Link Support device driver LSL.SYS.

Action: Make sure that the device driver LSL.SYS has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the LSL for any errors or warnings, and correct the problems indicated. Try again. If this error persists, call your Novell Authorized Reseller.

**REQ0109: The DDAEMON is already loaded.**

Explanation: DDAEMON.EXE tried to create shared memory for the first time, but the memory already exists. Another daemon is already running. The attempt to create shared memory is terminated.

Action: Make sure that you are not trying to run multiple copies of the daemon. Typically the daemon is run from the CONFIG.SYS file at system startup and does not need to be executed again.

**REQ0204: The system does not have enough memory for socket tables.**

Explanation: OS/2 lacks sufficient system memory for IPX to allocate memory for its socket tables.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0205: The LAN support module could not be installed.**

Explanation: Either the LSL.SYS driver failed to load, or the "DEVICE=" statement is missing from the CONFIG.SYS file.

Action: Either correct the problem that kept the LSL.SYS driver from loading (indicated in an error message preceding this one), or add the "DEVICE=" statement to the CONFIG.SYS file.

**REQ0206: The IPX MLID could not be installed.**

Explanation: Either the Multiple Link Interface Driver (MLID) specified in the CONFIG.SYS failed to load, or the "DEVICE=" statement for an MLID is missing from the CONFIG.SYS file.

Action: Either correct the problem that kept the MLID from loading (indicated in an error message preceding this one), or add the "DEVICE=" statement to the CONFIG.SYS file.

**REQ0207: The configured LAN-A driver does not support IPX.**

Explanation: The Multiple Link Interface Driver (MLID) to which IPX.SYS attempted to bind does not support IPX-based data transmissions.

Action: Bind IPX to an MLID that supports IPX-based data transmissions.

**REQ0208: The IPX protocol handler cannot be registered.**

Explanation: IPX cannot register with the LSL.SYS driver because the LSL is servicing its maximum number of protocol stacks.

Action: Remove the "DEVICE=" statements for any unnecessary protocol stacks from the CONFIG.SYS file.

**REQ0209: The IPX entry point cannot be initialized.**

Explanation: The IPX and link support layer (LSL) versions may not be compatible versions.

Action: Make sure that the IPX.SYS driver and LSL.SYS driver are compatible. If they are not, obtain compatible drivers from your Novell Authorized Reseller. If this is not the problem, contact your Novell Authorized Reseller for customer assistance.

**REQ0210: An internal error occurred. The IPX router socket cannot be opened.**

Explanation: IPX was unable to open the router socket due to an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0211: An internal error occurred. A router selector cannot be allocated.**

Explanation: IPX was unable to allocate an OS/2 router selector due to an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0212: The system has insufficient memory to allocate a router.**

Explanation: OS/2 cannot access sufficient system memory for IPX routing purposes.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0213: Router memory is exhausted.**

Explanation: IPX did not have enough memory previously allocated for routing purposes.

Action: Increase the size of the IPX router memory in the NET.CFG "ROUTER MEM" statement.

**REQ0214: An internal error prevented CGroup variable initialization.**

Explanation: An internal program error has occurred. IPX was unable to initialize internal variables.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0215: An internal error prevented DosHlp variable initialization.**

Explanation: OS/2 internal variables were either incomplete or invalid.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0216: IPX cannot register with OS/2 for PDD-to-VDD communications.**

Explanation: This is an internal program error. IPX cannot register with OS/2 for VIPX.SYS driver support.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0217: The IPX device driver is not running.**

Explanation: Either IPX.SYS encountered a fatal error during system initialization, or the "DEVICE=[path]IPX.SYS" statement was missing from the CONFIG.SYS file. If the problem is a fatal error, another message should precede this one that identifies the specific error that occurred.

Action: Either resolve the fatal problem (indicated in a preceding message), or add the "DEVICE=" statement to the CONFIG.SYS file; then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0231: The default protocol configuration option is not used for IPX.**

Explanation: IPX cannot be configured as a default protocol stack.

Action: Remove this option statement from the NET.CFG file.

**REQ0232: The prescan protocol configuration option is not used for IPX.**

Explanation: IPX cannot be configured as a prescan protocol stack.

Action: Remove this option statement from the NET.CFG file.

**REQ0233: The OS/2 version number cannot be found; OS/2 v2.0 is assumed.**

Explanation: IPX's query of OS/2 for the version number returned a value that did not match the value it expected to receive.

Action: Make sure the OS/2 version installed on the machine is v2.0 or later.

**REQ0304: An LSL error occurred. NET.CFG buffers are too big for ECB pool.**

Explanation: The configured buffer size for the Link Support component is too large. Total available buffer space is around 60 KB, but the Link Support Layer (LSL) is unable to allocate even one buffer of the requested size in its buffer space. See "Link Support Layer" in *Concepts* for more information about LSL.

Action: Reduce the Link Support component's buffer size in the NET.CFG file. It is more important to have several smaller buffers available than one large one. It is a waste of system memory to configure buffers much larger than the communications media can support.

**REQ0305: The Link Support module (LSL) could not install the AES timer.**

Explanation: The Link Support Layer (LSL) could not register its timer handler with the operating system because the maximum number of handlers have already been installed. This timer handler is a critical component of the Requester, and none of the Novell-supplied communication handlers can be expected to work properly without it. See "Link Support Layer" in *Concepts* for more information about LSL.

Action: Previously installed device drivers (those entered before LSL.SYS in the CONFIG.SYS file) have used all available timer resources. Identify those device drivers and either remove or reconfigure them. Since the Requestor's communications handlers all use a common timer service in the LSL, only one available timer handler is required for proper operation. If you are unable to resolve this problem, contact your Novell Authorized Reseller.

#### **REQ0306: The Link Support module could not initialize its call gate.**

Explanation: The Link Support module could not register its entry point with the operating system. This entry point is vital to most of the Requester's communications components, and its absence will cause them to fail. The most likely cause of this error is a previously loaded device driver that is using too many kernel resources.

Action: Try removing application device drivers installed before LSL.SYS in the CONFIG.SYS file. It is highly unlikely that a device driver from the OS/2 base system has caused this error. If the problem persists, contact your Novell Authorized Reseller.

#### **REQ0404: NetBIOS error occurred. Link Support module cannot be installed.**

Explanation: NetBIOS could not open or communicate with the Link Support LINKSUP\_ device driver. This can happen if the Link Support Layer (LSL) driver has not been properly installed or if you are using the wrong version of the driver. See "Link Support Layer" in *Concepts* for more information about LSL.

Action: Make sure that the device driver LSL.SYS has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the LSL for any errors or warnings, and correct the problems indicated. If the Link Support device driver is initializing properly, the problem is with incompatible versions of the software. NetBIOS and Link Support are usually installed together from a single installation diskette. Try reinstalling them. If the problem persists, contact your Novell Authorized Reseller.

#### **REQ0405: NetBIOS error occurred. The IPX module is not installed.**

Explanation: NetBIOS could not open or communicate with the Link Support LINKSUP\_ device driver. This can happen if the Link Support Layer (LSL) driver has not been properly installed or if you are using the wrong version of the driver. See "Link Support Layer" in *Concepts* for more information about LSL.

Action: Make sure that the device driver LSL.SYS has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the LSL for any



errors or warnings, and correct the problems indicated. If the Link Support device driver is initializing properly, the problem is with incompatible versions of the software. NetBIOS and Link Support are usually installed together from a single installation diskette. Try reinstalling them. If the problem persists, contact your Novell Authorized Reseller.

**REQ0406: The NetBIOS call gate cannot be initialized.**

Explanation: This is an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0407: NetBIOS error occurred. The program cannot initialize local NCBs.**

Explanation: Insufficient memory is available for the NCBs requested. Usually this error is caused by incorrect configuration information in the NET.CFG file. However, the underlying problem could also be a lack of global system resources in the OS/2 Global Descriptor Table.

Action: Reduce the number of commands in the NetBIOS section of the CONFIG.SYS file. (The default number of commands is 12; the maximum allowed is 25.) You also might be able to reduce the number of node names (possible range is 0-126). Additional possibilities include adding RAM, reducing your configuration options (for example, reducing the size of DIRCACHE) or removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2 and then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0408: NetBIOS emulator parameters are too large for the memory pool.**

Explanation: Insufficient memory is available for all of the control tables needed by the NetBIOS emulator.

Action: The amount of table space available to the NetBIOS emulator cannot be increased. The only way to solve this problem is to reduce the number of NetBIOS resources you are requesting. You can do this by modifying the NETBIOS parameters in the NET.CFG file. If the problem persists, contact your Novell Authorized Reseller.

### **REQ0409: Incompatible versions of OS/2 and NetBIOS are running.**

Explanation: You are attempting to run NetBIOS v2.01 on some version of OS/2 earlier than OS/2 v2.0.

Action: Either install OS/2 v2.0 to run with NetBIOS v2.01, or install a different version of NetWare NetBIOS to match your OS/2 version.

### **REQ0504: The SPX module is not installed.**

Explanation: The NMPIPE.SYS driver could not open or communicate with the SPX.SYS driver.

Action: Make sure that the SPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated; then try again. If the problem persists, contact your Novell Authorized Reseller.

### **REQ0505: The IPX module is not installed.**

Explanation: NMPIPE.SYS could not open or communicate with the IPX.SYS driver.

Action: Make sure that the IPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated; then try again. If the problem persists, contact your Novell Authorized Reseller.

### **REQ0519: An incorrect OS/2 version is being used.**

Explanation: Either the DosGetVersion call failed (an internal program error), or the OS/2 version currently running is not v2.0 or later.

Action: Make sure the client OS and NMPIPE.SYS driver are compatible versions. If the problem persists, contact your Novell Authorized Reseller.

### **REQ0520: The driver cannot register the PDD for VDD-to-PDD communications.**

Explanation: NMPIPE.SYS could not register IPX as a PDD so that PDD to VDD communication may take place.

Action: Make sure the IPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Also make sure the OS/2 version is v2.0 or later; then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0613: Invalid characters were specified in COMPUTERNAME.**

- Explanation: The Named Pipes server name specified after NPDAEMON.EXE is invalid.
- Action: Make sure the server name is not more than 15 characters and is composed of letters, numbers, and these special characters: !#\$%&()-.@^\_Q{}~

**REQ0614: An error occurred during attempt to initialize NPCALLS.DLL.**

- Explanation: The NPDaemon could not initialize NPCALLS.DLL.
- Action: Make sure the NPCALLS.DLL file in the NetWare Requester directory is included in the LIBPATH statement of the CONFIG.SYS file. If you are running Named Pipes, make sure the NMPIPE.SYS driver and NPSERVER.SYS are correctly configured in the CONFIG.SYS file.

**REQ0615: The Named Pipes daemon could not be registered. Error: <code>.**

- Explanation: The NPDaemon could not open or communicate with the NMPIPE.SYS driver.
- Action: Make sure the NMPIPE.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems. Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0616: An error occurred during attempt to allocate shared memory.**

- Explanation: The NPDaemon could not allocate shared memory.
- Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0617: An error occurred during attempt to allocate the ECB pool.**

- Explanation: The NPDaemon could not allocate memory for the ECB pool.
- Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk

space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0618: An error occurred during attempt to create a system semaphore.**

Explanation: A DosCreateSem call failed. An internal program error may have occurred.

Action: Try again. If the error persists, contact your Novell Authorized Reseller.

**REQ0619: An error occurred during attempt to create a thread.**

Explanation: A beginthread call failed. An internal program error may have occurred.

Action: Try again. If the error persists, contact your Novell Authorized Reseller.

**REQ0620: A dynamic socket could not be opened. Error: <code>.**

Explanation: The NPDaemon failed to open a dynamic socket.

Action: Increase the socket count specified in the NET.CFG file; then reboot the system and try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0621: A well-known socket could not be opened. Error: <code>.**

Explanation: The NPDaemon could not open Netware's registered Named Pipe socket; the socket may already be in use.

Action: Increase the SPX socket count in the NET.CFG and shut down OS/2; then reboot the system.

**REQ0622: The NPDaemon cannot get the internet address. Error: <code>.**

Explanation: An IpxGetInternetAddress call failed.

Action: Make sure the IPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Also make sure the IPXCALLS.DLL file is in the NetWare Requester directory; then try again. If the problem persists, notify your Novell Authorized Reseller.

**REQ0623: The NPDaemon cannot get the local target. Error: <code>.**

Explanation: An IpxGetLocalTarget call failed.

Action: Make sure the IPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Also make sure the IPXCALLS.DLL file is in the NetWare Requester directory; then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0624: The service advertising function failed. Error: <code>.**

Explanation: An IpxSend call to advertise this workstation as Named Pipe Server failed.

Action: Make sure the IPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Also make sure the IPXCALLS.DLL file is in the NetWare Requester directory; then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0625: The broadcast socket cannot be opened. Error: <code>.**

Explanation: The broadcast socket cannot be opened. This is a registered socket by which SAPs can be received. Possibly this socket has already been opened.

Action: Increase the socket count in the NET.CFG file and shut down OS/2 and then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0626: An error occurred during attempt to get code page information.**

Explanation: A call to DosGetCtryInfo failed. This may be an internal program error.

Action: Make sure the OS/2 is version 2.0 or later. If so, and the problem persists, contact your Novell Authorized Reseller.

**REQ0628: Memory cannot be allocated for turbo buffers.**

Explanation: The NPDaemon could not allocate memory for turbo buffers.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem.

After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0629: A connection thread died abnormally. Error: <code>.**

Explanation: The connection controller thread died unexpectedly.

Action: Make sure that the SPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Also make sure all of your Named Pipe drivers are within the same major version (for example, v2.x); then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0630: The specified computer name is already registered on the internet.**

Explanation: The Named Pipes server name specified in the CONFIG.SYS file has already been used on the network.

Action: Use a different server name.

**REQ0631: The receive buffer manager died abnormally. Error: <code>.**

Explanation: The receive buffer manager thread died unexpectedly.

Action: Make sure that your Named Pipes drivers are within the same major version (for example, v2.x). If so, try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0632: An error occurred checking for nondedicated server.**

Explanation: The NPDaemon could not open or communicate with the NWREQ.SYS driver.

Action: Make sure that the NWREQ.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Make sure

NWREQ.SYS is version 2.0 or greater. Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0633: An error occurred allocating memory for nondedicated SAP buffer.**

Explanation: NPDaemon could not allocate memory.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0634: The NPDaemon could not obtain a server list.**

Explanation: The Named Pipes daemon failed in its attempt to obtain a list of servers from the NetWare for OS/2 server running on the same machine.

Action: Make sure you are running the latest version of the NetWare for OS/2 server. If the problem persists, contact your Novell Authorized Reseller.

**REQ0704: The SPX module is not installed.**

Explanation: The Named Pipes daemon could not open or communicate with the SPX.SYS driver.

Action: Make sure that the SPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated; then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0705: The IPX module is not installed.**

Explanation: The Named Pipes daemon could not open or communicate with the IPX.SYS driver.

Action: Make sure that the IPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated; then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0719: An incorrect OS/2 version is being used.**

Explanation: The DosGetVersion call failed (which would indicate an internal program error) or the OS/2 version currently running is not v2.0 or later.

Action: Make sure that the client OS and NMPIPE.SYS driver are compatible; then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0806: The program cannot get code page information. Error: <code>.**

Explanation: The OS/2 system is not returning code page information. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0807: The Requester device driver and daemon are incompatible versions.**

Explanation: The most likely cause of this problem is that NWDAEMON.EXE and NWREQ.SYS driver were not installed from the same installation disk.

Action: Install the Requester driver again, making sure it is from the correct installation disk.

**REQ0808: The worker DLL cannot be registered. Error: <code>.**

Explanation: The NWORKER.DLL could not register with the Requester. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0809: The broadcast handler cannot be registered. Error: <code>.**

Explanation: This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0810: The program cannot get system information. Error: <code>.**

Explanation: The OS/2 system is not returning system information. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0811: The janitor thread priority cannot be set. Error: <code>.**

Explanation: The janitor thread is set to run at regular priority. The system had trouble setting the priority.

Action: Ignore the error.



**REQ0812: The janitor daemon cannot be registered. Error: <code>.**

Explanation: This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0813: The program cannot get the current drive map. Error: <code>.**

Explanation: The OS/2 system is not returning the current drive map. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0814: The program cannot set the current drive map. Error: <code>.**

Explanation: The OS/2 system is not setting the current drive map. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0815: The program cannot get the connection ID. Error: <code>.**

Explanation: The Requester tried to locate a NetWare server when it initialized. Either no servers are currently running or a cabling problem exists.

Action: Make sure the NetWare server is running and functioning properly. Also make sure the OS/2 machine has a working connection to the network; then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0816: An error occurred during attempt to initialize the cache.**

Explanation: The caching function is not working. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0817: The daemon could not boost the thread priority.**

Explanation: The thread is set to run at a greater priority. The system had trouble setting the priority.

Action: Ignore the error.

**REQ0818: The daemon could not register the DosBox handler.**

Explanation: This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0820: Not enough memory for diagnostic daemon. Error: <code>.**

Explanation: The NWDaemon program tried to allocate memory from the system for the diagnostic thread to use as a stack, but the system returned an error.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0821: The diagnostic daemon cannot be started. Error: <code>.**

Explanation: The NWDaemon tried to start the diagnostic thread but the system encountered an error condition. The system may have too many threads already running, or this may be an internal program error.

Action: Try closing other applications that are currently running. If the problem persists, contact your Novell Authorized Reseller.

**REQ0822: The diagnostic daemon priority cannot be changed. Error: <code>.**

Explanation: The diagnostic thread is set to run at regular priority. The system had trouble setting the priority.

Action: Ignore the error.

**REQ0823: Not enough memory to start a new thread. Error: <code>.**

Explanation: The NWDaemon could not allocate memory from the system to create a thread for a new task.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0824: The SPX send thread cannot be started. Error: <code>.**

Explanation: This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0825: The SPX receive thread cannot be started. Error: <code>.**

Explanation: This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0826: The SFT 3 handler cannot be registered.**

Explanation: This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0827: Packet Burst cannot be initialized.**

Explanation: This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0843: Not enough memory for a network management thread (<error code>).**

Explanation: The NWDaemon tried to allocate memory from the system for a thread to initialize network management, but memory was not available. Network management cannot be initialized.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0844: A named pipe cannot be started for network management (<error code>).**

Explanation: The NWDaemon could not allocate a named pipe. Network management will not be supported until the computer is rebooted. This error could result from a variety of causes. Named Pipes or SPX may not be loaded, one of your drivers may have opened too many Named Pipes already, you may not have enough memory or disk space, or it may be an internal program error.

Action: Make sure that Named Pipes and SPX are loaded and that your system has enough memory. (If you suspect a memory problem, see the discussion for message 843.) After completing these actions, reboot the system and try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0845: Not enough memory to run network management (<error code>).**

Explanation: The NWDaemon program tried to allocate memory from the system to run network management, but memory is not available. Network Management will not run until memory is available and the system is rebooted.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0904: The NWREQ.SYS driver is not loaded.**

Explanation: The Requester cannot be initialized until the driver is loaded.

Action: Load the NWREQ.SYS driver.

**REQ0914: The program cannot allocate selectors for the workspace table.**

Explanation: All available memory selectors are being used by the system or by previously loaded device drivers.

Action: Remove optional or unneeded device drivers from the CONFIG.SYS file and try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ0915: The program cannot allocate memory for the workspace table.**

Explanation: All available system memory is in use. The Requester cannot load properly.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem.

After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0917: Memory is not available for the cache table. Caching is disabled.**

Explanation: All available system memory is in use by the system. The Requester cannot load properly.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ0919: An incorrect OS/2 version is being used.**

Explanation: The major versions of the Requester and OS/2 do not match.

Action: Upgrade the Requester or OS/2.

**REQ0937: The Requester driver version does not match the IFS version.**

Explanation: NWIFS.IFS and NWREQ.SYS were not installed from the same installation disk.

Action: Install the Requester again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1004: The LAN support module is not installed.**

Explanation: The Requester driver requires the LSL.SYS driver to be running when it loads. Either the "DEVICE=C:\NETWARE\LSL.SYS" line is missing from the CONFIG.SYS file or the LSL encountered an error while loading.

Action: Check the CONFIG.SYS file for the LSL.SYS driver. If this is not the problem, contact your Novell Authorized Reseller.

**REQ1008: A NetWare server cannot be found.**

Explanation: The Requester tries to locate a NetWare server when it initializes. Either no servers are currently running or there is a cabling problem.

Action: Make sure that the NetWare server is running and operating properly. Also make sure that the OS/2 machine is connected to the network.

**REQ1010: The program cannot allocate selectors for the connection table.**

Explanation: All available memory selectors are being used by the system or by previously loaded device drivers.

Action: Remove optional or unneeded device drivers from the CONFIG.SYS file and try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1011: The program cannot allocate memory for the connection table.**

Explanation: All available system memory is in use. The Requester cannot load properly.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ1019: An incorrect OS/2 version is being used.**

Explanation: The major version of the Requester and OS/2 do not match.

Action: Upgrade the Requester or OS/2.

**REQ1021: The config file cannot be parsed. Default parameters will be used.**

Explanation: The Requester driver could not read parameters in the NET.CFG file.

Action: Make sure the syntax for the NetWare Requester section of the file is correct.

**REQ1022: An unrecoverable error occurred. The driver was not loaded.**

Explanation: The driver could not load properly. This is probably an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1024: The program cannot allocate selectors for worker support.**

Explanation: All available memory selectors are being used by the system or by previously loaded device drivers.

Action: Remove optional or unneeded device drivers from the CONFIG.SYS file. Then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1038: The program cannot allocate memory for the error message buffer.**

Explanation: All available system memory is in use by the system. The Requester cannot load properly.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

**REQ1039: The Requester could not send to NetWare server <number> as <number>.**

Explanation: The Requester waits for a response from the server after each request. If the server does not respond within a certain amount of time, the Requester times out.

Action: Make sure that the server is still running and functioning properly. Also make sure that all routers between the workstation and the server are still running. If the problem persists, contact your Novell Authorized Reseller.

**REQ1040: The Requester timed out waiting for reply from server <number>.**

Explanation: The Requester waits for a response from the server after each request. If the server does not respond within a certain amount of time, the Requester times out.

Action: Make sure that the server is still running and functioning properly. Also make sure that all routers between the workstation and the server are still running. If the problem persists, contact your Novell Authorized Reseller.

**REQ1041: Server <number> did not respond to a request.**

Explanation: The Requester waits for a response from the server after each request. If the server does not respond within a certain amount of time, the Requester times out. This error can also occur if the server responds with an unexpected response.

Action: Make sure that the server is still running and functioning properly. Also make sure that all routers between the workstation and the server are still running. If the problem persists, contact your Novell Authorized Reseller.

**REQ1042: Connection to NetWare server <number> as <number> is now invalid.**

Explanation: The Requester waits for a response from the server after each request. If the server does not respond within a certain amount of time, the Requester times out.

Action: Make sure that the server is still running and functioning properly. Also make sure that all routers between the workstation and the server are still running. If the problem persists, contact your Novell Authorized Reseller.

**REQ1043: Routing to NetWare server <number> has been disrupted.**

Explanation: The network route to the server has been disrupted.

Action: Make sure that the server is still running and functioning properly. Also make sure that all routers between the workstation and the server are still running. If the problem persists, contact your Novell Authorized Reseller.

**REQ1045: Routing to NetWare server <number> has been disrupted.**

Explanation: The network route to the server has been disrupted.

Action: Make sure that the server is still running and functioning properly. Also make sure that all routers between the workstation and the server are still running. If the problem persists, contact your Novell Authorized Reseller.

**REQ1106: The SPDaemon cannot get the SPX version. Error: <code>.**

Explanation: The SpxGetVersion call failed. This may be an internal program error.

Action: Make sure that the SPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Check for a mismatch of driver versions. If the problem persists, contact your Novell Authorized Reseller.

**REQ1107: The SPX driver and the SPX daemon are incompatible versions.**

Explanation: The SPX.SYS driver and SPDAEMON.EXE versions may not match.

Action: Make sure that the client SPX.SYS driver and SPDAEMON.EXE are compatible versions. If the problem persists, contact your Novell Authorized Reseller.



**REQ1108: The SPX driver entry cannot be obtained. Error: <code>.**

Explanation: The SPDaemon could not get a handle to the SPX.SYS driver. This may be an internal program error.

Action: Make sure that the client SPX.SYS driver and SPDAEMON.EXE versions are compatible. If the problem persists, contact your Novell Authorized Reseller.

**REQ1109: The SPX daemon is already loaded. Error: <code>.**

Explanation: The SPDAEMON.EXE has already registered with the SPX.SYS driver, which means it is already loaded.

Action: Make sure that the daemon SPDAEMON.EXE has not been entered in the CONFIG.SYS file more than once.

**REQ1110: The daemon cannot register with the SPX driver. Error: <code>.**

Explanation: The SPDaemon cannot communicate with the SPX.SYS driver.

Action: Make sure that the SPX.SYS file has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Check for a mismatch of driver versions. If the problem persists, contact your Novell Authorized Reseller.

**REQ1111: The SPX device handle cannot be closed. Error: <code>.**

Explanation: The SPDaemon cannot close the device handle. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1112: The SPDaemon cannot wait on semaphore. Error: <code>.**

Explanation: A DosSemSetWait call failed. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1113: System information segments cannot be obtained. Error: <code>.**

Explanation: The DosGetInfoSeg call failed. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1114: Priority for the lock thread cannot be set. Error: <code>.**

Explanation: The DosSetPrty call failed. This may be internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1115: The SPX driver cannot be accessed. Error: <code>.**

Explanation: The SPDaemon was not able to access SPX.SYS through the call gate.

Action: Make sure that the SPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Also check for a mismatch of driver versions; then try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1116: Priority for an AES thread cannot be set. Error: <code>.**

Explanation: The DosSetPrty call failed. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1117: Priority for a watchdog thread cannot be set. Error: <code>.**

Explanation: The DosSetPrty call failed. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1118: Priority for a session thread cannot be set. Error: <code>.**

Explanation: The DosSetPrty call failed. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

**REQ1119: The SPXCALLS.DLL cannot register with the SPX driver.**

Explanation: The SPXCALLS.DLL cannot communicate with the SPX.SYS driver.

Action: Check to see if the SPX.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Check for a mismatch of driver versions; then try again. If the problem persists, contact your Novell Authorized Reseller.

### **REQ1205: The driver cannot initialize the CGroup Data variables.**

**Explanation:** Normally, key data variable are stored in the driver's CGroup for easy and reliable access. However, in this instance the variables could not be initialized due to a memory-related error.

**Action:** Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

### **REQ1206: The driver cannot configure SPX.**

**Explanation:** The driver in conjunction with the NWCONFIG.DLL failed to parse the NET.CFG file for the SPX parameters.

**Action:** Make sure the format of the NET.CFG file is correct.

### **REQ1207: The driver failed to get support hooks from the LSL or IPX.**

**Explanation:** SPX could not open or communicate with either the LINKSUP\_ (LSL.SYS) or the IPX\_ (IPX.SYS) drivers. The most likely cause of this error is that one or both of these drivers has been improperly installed.

**Action:** Make sure that the device drivers LSL.SYS and IPX.SYS have been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Check for a mismatch of driver versions; then try again. If the problem persists, contact your Novell Authorized Reseller.

### **REQ1208: The OS/2 version cannot be obtained; OS/2 v2.0 is assumed.**

**Explanation:** The DosGetVersion call failed (an internal program error), or the OS/2 version currently running is not v2.0 or later.

**Action:** Make sure that OS/2 and the SPX.SYS driver are compatible versions. If this is not the problem, contact your Novell Authorized Reseller.

### **REQ1209: The driver cannot get OS/2 DOS variables.**

Explanation: The SPX.SYS driver could not obtain either the system or local information segment. This may be an internal program error.

Action: Try again. If the problem persists, contact your Novell Authorized Reseller.

### **REQ1210: The driver cannot initialize the SPX call gate.**

Explanation: The SPX.SYS driver could not register a call gate with the LSL.SYS driver.

Action: Make sure that the LSL.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. Check for a mismatch of driver versions; then try again. If the problem persists, contact your Novell Authorized Reseller.

### **REQ1211: The driver cannot allocate memory for SPX use.**

Explanation: The system does not have enough memory to run SPX.

Action: Try adding RAM, reducing your configuration options in the CONFIG.SYS file (for example, reducing the size of DIRCACHE), removing optional device drivers from the CONFIG.SYS file, and freeing up some hard disk space by deleting unnecessary programs. If you are using multiple disk partitions, consider moving the OS/2 swapper file to a larger partition. Disk compression utilities may also be available that can help resolve this problem. After completing these actions, shut down OS/2; then reboot the system. If the problem persists, contact your Novell Authorized Reseller.

### **REQ1301: The application cannot initialize named pipes.**

Explanation: The application could not open or communicate with the NMPIPE.SYS driver. Most likely, the NMPIPE.SYS driver is not entered in the CONFIG.SYS file.

Action: Make sure that the NMPIPE.SYS driver has been properly entered in the CONFIG.SYS file. If so, check the messages displayed by the driver for any errors or warnings, and correct the problems indicated. If the problem persists, contact your Novell Authorized Reseller.

# B

## NET.CFG Options Reference

---

**Topic**

---

[“Using the NET.CFG Reference Pages” on page 202](#)

[“Daemon Configuration” on page 203](#)

[“DisplayHardErrors” on page 204](#)

[“Link Driver” on page 205](#)

[“Link Support” on page 216](#)

[“Named Pipes” on page 218](#)

[“NetWare NetBIOS” on page 221](#)

[“NetWare Requester” on page 227](#)

[“Protocol ODINSUP” on page 234](#)

[“Protocol Stack IPX” on page 236](#)

[“Protocol Stack SPX” on page 238](#)

[“Token-Ring Source-Route Driver” on page 242](#)

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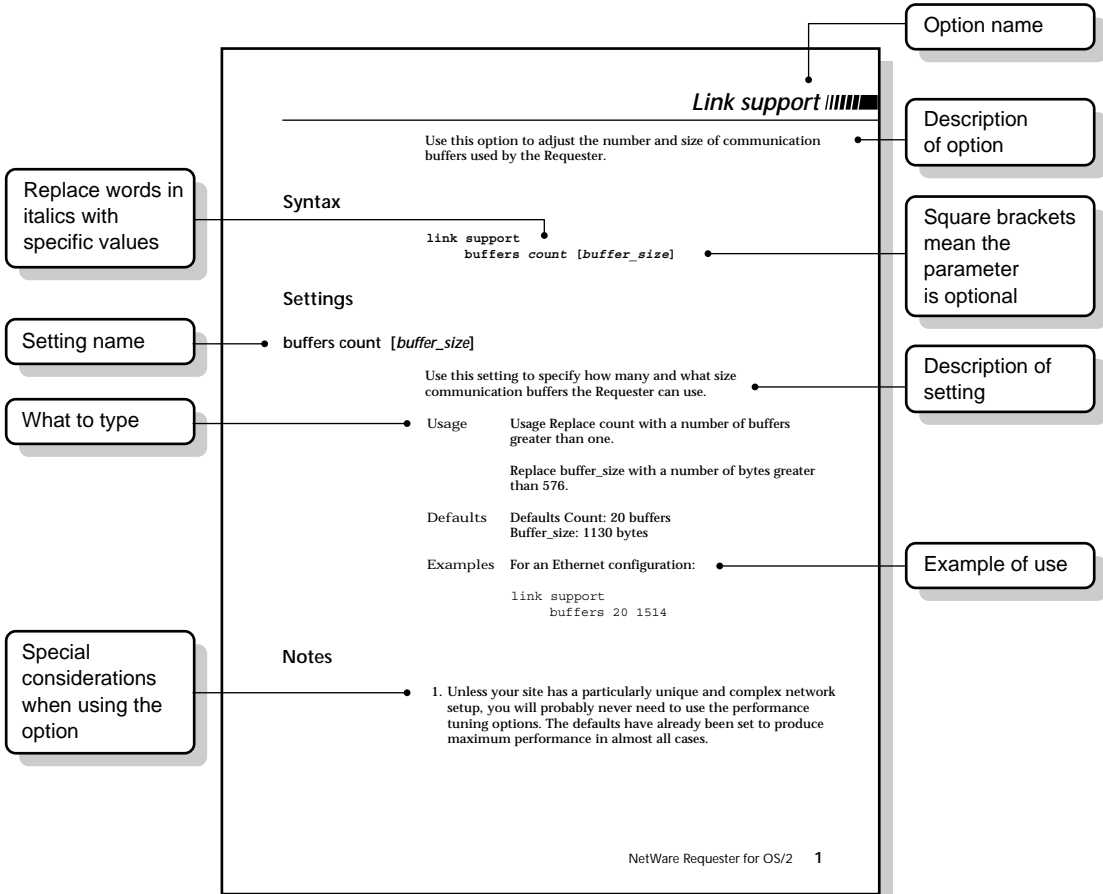
This appendix contains an alphabetical listing of all NET.CFG options. For instructions on how to edit the NET.CFG file, format requirements, and reasons to configure, see [Chapter 4, “How to Configure Your Workstation,” on page 37](#).

All the information in this appendix is also found online in the NetWare Requester installation and configuration program.

# Using the NET.CFG Reference Pages

Figure 51 explains how to read the NET.CFG reference pages in this chapter.

Figure 51 Format of NET.CFG reference pages



# Daemon Configuration

Use this option to control the length of time network-related error messages stay on your screen. This option controls only pop-up and broadcast messages.

**NOTE:** Pop-up and broadcast messages appear in a small box on your screen and prompt you to "Press <Esc> to continue . . ."

## Setting

### message timeout

---

<i>Syntax</i>	<pre>daemon configuration     message timeout <i>number</i></pre> <p>Replace <i>number</i> with a number of milliseconds that you want pop-up and broadcast messages to display on your screen before disappearing.</p> <p>Replace <i>number</i> with 0 (zero) to prevent pop-up and broadcast messages from displaying at all.</p> <p>If you leave this line out of your NET.CFG, pop-ups and broadcast messages are displayed until you press &lt;Esc&gt;.</p>
<i>Default</i>	Pop-up and broadcast messages display until you press <Esc>.
<i>Example</i>	To prevent pop-up and broadcast messages from displaying: <pre>daemon configuration     message timeout 0</pre>

---

# DisplayHardErrors

Use this option to keep programs running without interaction when a hard error is displayed. With this option set, hard errors are automatically returned to the program that caused them rather than displayed to you for further interaction.

This option is useful for sites with unattended workstations. Be careful about using it in other environments as you might turn off important messages.

**NOTE:** Hard errors display on a full screen and prompt you to choose among several actions. These error messages cause background processes to suspend until you respond to the message.

## displayharderrors no

---

<i>Syntax</i>	Type <code>displayharderrors no</code> to keep error messages from displaying.  To display error messages, leave this line out of your NET.CFG file.
<i>Default</i>	Error messages are displayed.
<i>Example</i>	To prevent hard error messages from displaying:  <code>displayharderrors no</code>

---



# Link Driver

Use this option to specify the hardware configuration of the LAN drivers for each network board in your workstation.

Use this option only if the network boards are not using the default settings. The settings you specify with this option should match the hardware settings for your boards.

**NOTE:** If you have more than one network board in your workstation, put this option in your NET.CFG file for each board.

## Syntax

```
link driver name
      dma [index] channel
      frame name
      int [index] irq
      mem [index] starting_address [size]
      node address number
      port [index] starting_port [number]
      protocol name id frame
      slot number
```

## Option

### link driver

Use this option to specify the name of the LAN driver whose defaults you want to modify.

---

<i>Syntax</i>	<code>link driver <i>name</i></code>  Replace <i>name</i> with the name of the driver. <a href="#">Table 16 on page 206</a> lists some network boards and their driver names.
<i>Default</i>	None.
<i>Example</i>	To configure an IBM Token-Ring PC driver, type the following with any settings from the following pages:  <code>link driver token</code>

---

**Table 16** List of network boards and drivers

Driver name	Network board
NE2	Novell Ethernet NE/2
NE2_32	Novell Ethernet NE/2-32
NE1000	Novell Ethernet NE1000
NE2000	Novell Ethernet NE2000
TOKEN	IBM Token-Ring
LANSUP	Boards using NDIS drivers
ODINSUP	IBM Token-Ring and Ethernet Communications Manager
3C501	3Com EtherLink series 501
3C503	3Com EtherLink series 503
3C505	3Com EtherLink series 505
3C523	3Com EtherLink/MC series
PCN2	IBM PC Network II and II/A (older Novell frame format)
PCN2L	IBM PC Network II and II/A (newer IBM frame format)

**NOTE:** The PCN2 and PCN2L drivers cannot be used in the same workstation.

# Settings

## DMA

Use this setting to specify which direct memory access (DMA) channel the network board uses.

---

*Syntax*            `link driver name  
                      dma [index] channel`

Replace *index* with either #1 or #2 (optional).

The driver configuration table for each board can store the DMA channel number on either of two lines. The lines are labeled #1 and #2.

Replace *channel* with the number of the DMA channel used by the board.

The channel numbers for different network boards are recorded in the documentation from the board manufacturers.

---

*Defaults*            Index: #1

Most boards use this default.

Channel: Set by the driver. See the documentation for the board.

You can't change the DMA setting on 3Com Etherlink 503 boards, and you do not need to change it on 3Com Etherlink 505 boards. You can change the DMA setting on 3Com Etherlink 523 boards.

---

*Example*            To set the DMA channel for a 3Com Etherlink 505 board:

```
link driver 3C505  
          dma 7
```

## frame

Use this setting to specify which frame type the driver for your network board uses.

Use this setting only for boards that support more than one frame type or if you want multiple networks (separate network addresses) to share the same network board and cabling.

The frame type transmitted by the workstation should match the type of packets being transmitted by the servers on your network.

<i>Syntax</i>	<pre>link driver name       frame name</pre> <p>Replace <i>name</i> with the name of the frame type. <a href="#">Table 17</a> lists common frame types and the network board drivers that support each type. This list is not comprehensive.</p>
<i>Default</i>	Set by the driver. See the documentation for the board.
<i>Examples</i>	<p>To specify the Ethernet_802.2 frame type for an NE2000 board:</p> <pre>link driver ne2000       frame ethernet_802.2</pre> <p>To specify the Ethernet_802.2 and Ethernet_802.3 frame types for an NE1000 board (for two logical networks):</p> <pre>link driver ne1000       frame ethernet_802.2       frame ethernet_802.3</pre>

**Table 17** List of frame types and drivers

Frame type	Network board driver
Ethernet_802.3	NE1000, NE2000, NE2100, NE2, NE2_32, 3C501, 3C503, 3C505, 3C523, EXOS205, EXOS215, ODINSUP
Ethernet_802.2	NE1000, NE2000, NE2100, NE2, NE2_32, 3C501, 3C503, EXOS205, EXOS215, ODINSUP, LANSUP
Ethernet_II	NE1000, NE2000, NE2100, NE2, NE2_32, 3C501, 3C503, 3C505, 3C523, EXOS205, EXOS215, ODINSUP
Ethernet_SNAP	NE1000, NE2000, NE2100, NE2, NE2_32, 3C501, 3C503, EXOS205, EXOS215, ODINSUP, LANSUP
Token-Ring	ODINSUP, TOKEN, LANSUP
Token-Ring_SNAP	ODINSUP, TOKEN, LANSUP
IBM_pcn2_802.2	PCN2, PCN2L, LANSUP

Frame type	Network board driver
IBM_pcn2_snap	PCN2, PCN2L, LANSUP
Novell_rx-net	TRXNET, TRXNET2

If you are using the ODINSUP driver, you must enable multiple frame types for each driver. For Ethernet, enable Ethernet\_802.3, Ethernet\_II, Ethernet\_802.2, and Ethernet\_SNAP.

For Token-Ring, enable Token-Ring and Token-Ring\_SNAP. For more information about ODINSUP, see [Chapter 8, “Sharing a Network Board with IBM Software,” on page 73](#).

You can specify more than one frame type statement for a single driver. For example, you can specify that an Ethernet NE2000 board can use both Ethernet\_802.2 and Ethernet\_802.3 frame types. 802.2 is the type of communications sent on one network, and 802.3 is the type of communication sent on the other network.

You can use up to four frame types for one set of Ethernet cabling. You can use either four network boards each with one frame type defined, or you can use one network board with four frames defined, or any similar combination.

For Token-Ring cabling, two frames types are the maximum allowed.

The default frame type for Ethernet drivers has changed to Ethernet\_802.2. This may conflict with the frame type used on your network. See [“Specifying Frame Types for a Driver” on page 48](#) for more information about specifying frame type.

## int

Use this setting to specify which interrupt line (IRQ) the network board uses to communicate with the driver.

---

<i>Syntax</i>	<pre>link driver name       int [index] irq</pre> <p>Replace <i>index</i> with either #1 or #2 (optional).</p> <p>The driver configuration table for each board can store the interrupt line number on either of two lines in the table. The lines are labeled #1 and #2.</p> <p>Replace <i>irq</i> with the number of the interrupt line used by the board.</p> <p>To determine the interrupt line number for your network board, see the documentation for the board.</p>
<i>Defaults</i>	<p>Index: #1</p> <p>IRQ: Set by the driver. See the documentation for the board.</p>
<i>Example</i>	<p>To set the interrupt line for an NE2000 board:</p> <pre>link driver ne2000       int 3</pre>

---

Before changing the interrupt setting for your board, be sure you know what interrupt settings are used on other hardware (such as monitors) that you are using. For example, interrupts 2 and 9-15 are usually reserved, so don't use those numbers (especially 2) for your network board. We recommend using 3, 5, or 7 for most network boards.

If you are using a PS/2 computer on a Token-Ring network, do not autoconfigure with the *Reference* diskette. Doing so may cause problems.

## mem

Use this setting to specify what range of memory can be used by the driver.

---

**Syntax**            `link driver name`  
                      `mem [index] starting_address size`

Replace *index* with either #1 or #2 (optional).

The driver configuration table for each board can store the memory range on either of two lines in the table. The lines are labeled #1 and #2.

Replace *starting\_address* with a hexadecimal memory address that begins the range. This address must be five digits and the same as the address designated for the board by the manufacturer. (See the documentation for the board).

Replace *size* with a hexadecimal number of paragraphs in the memory range (optional).

---

**Defaults**            Index: #1

Starting\_address: Set by the driver. See the documentation for the board.

Size: Set by the driver. See the documentation for the board.

---

**Example**            To set the memory range for a Token-Ring board:

```
link driver token
mem cc000 200
```

---

Assign each board a unique memory range. Be sure that you don't assign a range that is already being used by other hardware. (VGA monitors commonly use C6FFF and X VGA monitors commonly use CFFFF.)

## node address

Use this setting to change the node address of a network board. This setting can only be used with network boards that allow you to override the preset address.

---

<i>Syntax</i>	<code>link driver name node address number</code> <p>Replace <i>number</i> with a hexadecimal address. You can specify the address with either the least significant bit first (lsb format) or the most significant bit first (msb format).</p>
<i>Default</i>	The address preset on the board.
<i>Example</i>	To change the address for board that uses the ODINSUP driver:  <code>link driver odinsup node address 02608c861759</code>

---

## port

Use this setting to specify which range of I/O ports the network board uses.

---

<i>Syntax</i>	<code>link driver name port [<i>index</i>] starting_port [<i>number</i>]</code> <p>Replace <i>index</i> with either #1 or #2 (optional).</p> <p>The driver configuration table for each board can store information about ports on either of two lines in the table. The lines are labeled #1 and #2.</p> <p>Replace <i>starting_port</i> with a hexadecimal port number that begins the range. We recommend not using 2EO and 2FO since these port numbers are normally used by ARCnet for other functions.</p> <p>Replace <i>number</i> with the hexadecimal number of bytes in the range (optional).</p>
<i>Defaults</i>	Index: #1  Starting_port: Set by the driver. See the documentation for the board.  Number: Set by the driver. See the documentation for the board.

---



---

*Example* To set the memory range for board that uses the NE2000 driver:

```
link driver ne2000
      port 300
```

---

## protocol

Use this setting to allow LAN drivers to use protocols that have different frame types.

---

*Syntax* `link driver name`  
 `protocol name ID frame`

Replace *name* with the acronym of an ODI-compliant protocol.

Some common protocols are:

- ARP
- IP
- IPX (the NetWare protocol)
- RARP

Replace *ID* with the hexadecimal number of the protocol that goes with the frame type you specify. [Table 18 on page 214](#) shows common protocols with some frame types and hexadecimal numbers they support.

Replace *frame* with the name of the frame type used with the protocol. [Table 18 on page 214](#) lists some common frame types.

---

*Defaults* Name: IPX  
ID: 0  
Frame: Ethernet\_802.3

---

*Example* To specify the ARP protocol for an Ethernet II frame:

```
link driver NE2000
      protocol arp 806 ethernet_ii
```

---

**Table 18** List of protocols, frame types, and hexadecimal ID numbers

Protocol	Frame type	Hex number
IPX	Ethernet_802.3	0
	Ethernet_802.2	e0
	Token-Ring	e0
	IBM_PCN2_802.2	e0
	Ethernet_II	8137
	Ethernet_SNAP	8137
	Token-Ring_SNAP	8137
	IBM_PCN2_SNAP	8137
	Novell_RX-Net	fa
IP	Ethernet_II	800
	Ethernet_SNAP	800
	Token-Ring_SNAP	800
	Novell_RX-Net	d4
ARP	Ethernet_II	806
	Ethernet_SNAP	806
	Token-Ring_SNAP	806
	Novell_RX-Net	d5
RARP	Ethernet_II	8035
	Ethernet_SNAP	8035
	Token-Ring_SNAP	8035
	Novell_RX-Net	d6

## slot

Use this setting to tell the Requester which expansion slot an EISA or MicroChannel board is using.

EISA and Micro Channel boards are self-configuring, and the Requester can obtain all Link Driver information from the board itself. You have to tell the Requester which slot the board is using or, if you only have one board of a particular type, tell the Requester to scan all slots until it finds that board. .

---

*Syntax*      `link driver name  
                  slot number`

Replace *number* with the number of the expansion slot the board is using or a question mark to tell Requester to scan all slots.

---

*Default*      Slot ?

---

*Example*      To automatically configure the drivers for an NE/2 board in slot 4 and an NE/2 board in slot 2:

```
link driver ne2  
          slot 4
```

```
link driver ne2  
          slot 2
```

This slot setting is the only Link Driver hardware-related setting you need to specify in this case.

To scan the slots for a Novell Ethernet NE/2 board:

```
link driver ne2  
          slot ?
```

---

# Link Support

Use this option to adjust the number and size of communication buffers used by the Requester.

## Syntax

```
link support
    buffers number [buffer_size]
```

## Settings

### buffers

---

<i>Syntax</i>	Replace <i>number</i> with a number of buffers greater than 1.  Replace <i>buffer_size</i> with a number of bytes greater than 576.  The Requester cannot use more than 64 KB of memory for communication buffers. Header information takes 5 KB. This means that the buffer number multiplied by the buffer size (plus the header information) cannot be greater than 65,536 bytes. For example, 20 buffers multiplied by 1514 bytes equals 30,280 bytes.
<i>Defaults</i>	Number: 20 buffers  Buffer_size: 1514 bytes
<i>Examples</i>	For an Ethernet configuration:  <pre>link support     buffers 15 2800</pre> For a Token-Ring configuration:  <pre>link support     buffers 14 4210</pre>

---

## Notes

1. Increasing efficiency. For most efficient communication, your link support buffer size should be the same size as the packets that your workstation will receive over the network. You may want to set the link

support buffer size equal to the largest buffer size that the network boards in your workstation will support.

2. Using the TRXNET.SYS driver. If your workstation experiences performance problems running with TRXNET.SYS, you may need to reconfigure the number and size of link support buffers allowed. Set the following values:

```
link support  
  buffers 15 4202
```

TRXNET.SYS only supports SMC100, 110, and 120 cards.

# Named Pipes

Use this option to manage Named Pipes sessions.

## Syntax

```
named pipes
  client sessions number
  server sessions number
  service threads number
```

## Settings

### client sessions

Use this setting to specify the maximum number of connections a workstation can establish with all Named Pipes servers.

---

<i>Syntax</i>	<pre>named pipes   client sessions <i>number</i></pre>
---------------	--

Replace *number* with a number from 3 to 128.

You need at least one client session for each connection from an OS/2 application to a Named Pipes server.

---

<i>Default</i>	16 sessions.
----------------	--------------

The default is usually adequate, except with applications that use many Named Pipes.

---

<i>Example</i>	To allow each client thirty sessions:
----------------	---------------------------------------

```
named pipes
  client sessions 30
```

---

## server sessions

Use this setting to specify the maximum number of connections a Named Pipes server can support with all Named Pipes clients at any one time.

---

*Syntax*            `named pipes`  
                      `server sessions number`

Replace *number* with a number greater than 2.

Novell's Named Pipes support is designed to handle more than 1,000 server sessions; however, because of OS/2 requirements, the practical upper limit is much lower (around 400).

You must have one more SPX session than you have Named Pipes server and client sessions combined (see ["Protocol Stack SPX" on page 238](#)).

---

*Default*            32 sessions.

---

*Example*            To allow each server three hundred sessions:

```
named pipes
server sessions 300
```

---

## service threads

Use this setting to specify the number of threads the Named Pipes server can use to handle requests from all clients.

---

<i>Syntax</i>	<code>named pipes service threads <i>number</i></code>  Replace <i>number</i> with a number from 1 to 32.  If the client application uses blocking pipes, increase this default. If the client application uses non-blocking pipes, use the default value for better performance. SQL Server does not use blocking pipes.
<i>Default</i>	3 threads
<i>Example</i>	To increase the number of threads a Named Pipes server can use to twenty:  <code>named pipes service threads 20</code>

---

**NOTE:** For an OS/2 workstation to function as a Named Pipes server or client, you must have selected Named Pipes when you installed the Requester on that workstation. See [“Installing Named Pipes for OS/2” on page 116](#).



# NetWare NetBIOS

Use this option to manage NetBIOS names and sessions or to affect the internal memory allocation for NetBIOS.

**Table 19** Categories of NetWare NetBIOS settings

Purpose	Setting
Name management	“broadcast count” on page 223
	“broadcast delay” on page 223
	“internet” on page 224
	“names” on page 225
Session creation	“retry count” on page 225
	“retry delay” on page 226
	“sessions” on page 226
Session management	“abort timeout, listen timeout, verify timeout” on page 222
Command management	“commands” on page 224

## Syntax

```
netware netbios
  abort timeout number
  broadcast count number
  broadcast delay number
  commands number
  internet [on|off]
  listen timeout number
  names number
  retry count number
  retry delay number
  sessions number
  verify timeout number
```

# Settings

## abort timeout, listen timeout, verify timeout

Use these settings to monitor and control your NetBIOS connections.

When NetBIOS sessions at a sending computer do not receive any transmissions from the receiving computer for the length of the "verify timeout" interval, NetBIOS sends a request-for-acknowledgment packet to the receiving computer. NetBIOS then waits the length of the "listen timeout" interval to receive a response.

If no response is received, NetBIOS sends another packet requesting immediate response. NetBIOS then waits the length of the "abort timeout" interval to receive a response.

If no response is received, NetBIOS terminates the session.

---

*Syntax*            **netware netbios**  
                          **abort timeout *number***  
                          **listen timeout *number***  
                          **verify timeout *number***

Abort timeout: Replace *number* with a number of milliseconds greater than 500.

Listen timeout: Replace *number* with a number of milliseconds greater than 200.

Verify timeout: Replace *number* with a number of milliseconds greater than 100.

The ratio between these settings must remain the same. For example, if you double the Listen timeout value, you must also double the Abort timeout and Verify timeout values.

---

*Defaults*            Abort timeout: 30,000 milliseconds  
                          Listen timeout: 6,000 milliseconds  
                          Verify timeout: 3,000 milliseconds

---

---

*Examples* To make NetBIOS wait longer before sending a request-for acknowledgment packet, sending the packet requesting immediate response, and terminating the session:

```
netware netbios
    abort timeout 45000
    listen timeout 8000
    verify timeout 4000
```

---

## **broadcast count**

Use this setting to specify how many times NetBIOS broadcasts a query or claim for the name being used by an application.

---

*Syntax* **netware netbios**  
**broadcast count *number***

Replace *number* with a number of queries greater than 1.

---

*Defaults* With internet on: 4 times  
With internet off: 2 times

---

*Example* To broadcast more often:

```
netware netbios
    broadcast count 8
```

---

## **broadcast delay**

Use this setting to specify how long NetBIOS waits between query or claim broadcasts.

---

*Syntax* **netware netbios**  
**broadcast delay *number***

Replace *number* with a number of milliseconds greater than 100.

---

*Defaults* With internet on: 2,000  
With internet off: 1,000

---

*Example* To wait longer between broadcasts:

```
netware netbios
    broadcast delay 3000
```

---

## commands

Use this setting to specify how many NetBIOS commands can be buffered in the NetBIOS driver at any one time.

---

<i>Syntax</i>	<code>netware netbios           commands <i>number</i></code>  Replace <i>number</i> with a number of commands from 8 to 64.
<i>Default</i>	32 commands
<i>Example</i>	To run an application that requires a large number of outstanding commands:  <code>netware netbios           commands 64</code>

---

## internet

Use this setting to transmit name-claim packets to and from all stations on the internetwork, or to and from stations on the local network only.

Name-claim packets are packets that attempt to establish the uniqueness of the name of the station on which NetBIOS is running.

---

<i>Syntax</i>	<code>netware netbios           internet [on off]</code>  Type <b>on</b> or <b>off</b> .
<i>Default</i>	On
<i>Example</i>	To send and receive on the local network only:  <code>netware netbios           internet off</code>

---

## names

Use this setting to specify how many names the workstation can have in its name table for remote stations. When you add a name to a station, the station broadcasts that name to all other nodes on the network.

---

<i>Syntax</i>	<code>netware netbios names <i>number</i></code>  Replace <i>number</i> with a number of names from 4 to 64.  You can use a name instead of a node address to refer to a remote station.
<i>Default</i>	24 names
<i>Example</i>	To allow 45 names:  <code>netware netbios names 45</code>

---

## retry count

Use this setting to specify how many times NetBIOS transmits a request for connection or retransmits a failed communication.

---

<i>Syntax</i>	<code>netware netbios retry count <i>number</i></code>  Replace <i>number</i> with a number greater than 0.
<i>Default</i>	20 times
<i>Example</i>	To retransmit 50 times:  <code>netware netbios retry count 50</code>

---

## retry delay

Use this setting to specify how many milliseconds NetBIOS waits between transmissions while establishing a connection or resending a data packet.

---

<i>Syntax</i>	<code>netware netbios retry delay <i>number</i></code>  Replace <i>number</i> with a number of milliseconds greater than 0.
<i>Default</i>	500 milliseconds
<i>Example</i>	To wait eight hundred milliseconds between retransmission attempts:  <code>netware netbios retry delay 800</code>

---

## sessions

Use this setting to specify how many simultaneous NetBIOS sessions can be supported by the NetBIOS driver.

---

<i>Syntax</i>	<code>netware netbios sessions <i>number</i></code>  Replace <i>number</i> with a number of sessions from 4 to 64.
<i>Default</i>	16 sessions
<i>Example</i>	To allow one hundred NetBIOS sessions:  <code>netware netbios sessions 50</code>

---

# NetWare Requester

Use this option to control network requests from your workstation to a NetWare server.

## Syntax

```
netware requester
  cache buffers number
  directory services off
  large internet packets off
  name context context
  packet burst off
  preferred servername
  preferred tree treename
  request retries number
  sessions number
  signature level number
```

## Settings

### cache buffers

Use this setting to specify how many buffers the Requester can use to cache data from open files.

Cache buffers minimize read and write traffic on the network. The more buffers there are, the faster the Requester performs; however, more buffers use up more memory.

The Requester automatically uses the maximum buffer size permitted by each server to which the Requester is connected. However, the Requester cannot use more than 64 KB of total memory for cache buffers. Therefore, if the buffer size is large, you may not be allowed as many buffers as you specify.

---

<i>Syntax</i>	<code>netware requester cache buffers <i>number</i></code>
	Replace <i>number</i> with a number of buffers from 0 to 30. To turn off caching, specify 0.
<i>Default</i>	8 buffers
<i>Example</i>	To allow 15 cache buffers: <code>netware requester cache buffers 15</code>

---

### directory services off

Use this setting to disable directory services if you are on a NetWare 2.x or 3.x server. This will improve speed and overall performance because the Requester does not have to time out to establish initial connections with a NetWare v4.0 server.

---

<i>Syntax</i>	<code>netware requester directory services off</code>
	Type <code>directory services off</code> to disable directory services.
<i>Default</i>	Directory services is enabled.
<i>Example</i>	To disable directory services: <code>netware requester directory services off</code>

---



## large internet packets off

Use this setting to disable large internet packets transmission. [Chapter 6, “Improving Speed and Security,” on page 59](#) explains more about large internet packets.

---

<i>Syntax</i>	<pre>netware requester     large internet packets off</pre> <p>Type <code>large internet packets off</code> to turn off large packet transmissions.</p>
<i>Default</i>	Large internet packets are transmitted.
<i>Example</i>	To disable large packet transmission: <pre>netware requester     large internet packets off</pre>

---

## name context

Use this setting to specify the workstation's name context in the directory services tree. *Concepts* explains more about name contexts.

---

<i>Syntax</i>	<pre>netware requester     name context "context"</pre> <p>Replace context with your name context in the directory tree.</p>
<i>Default</i>	At the root of the tree.
<i>Example</i>	To specify a name context: <pre>netware requester     name context "john.sales.novell us"</pre>

---

## packet burst off

Use this setting to disable the packet burst feature. “[Improving Speed with Packet Burst](#)” on page 59 explains more about the Packet Burst feature.

---

<i>Syntax</i>	<code>netware requester packet burst off</code>
<i>Default</i>	Packet burst is enabled.
<i>Example</i>	To disable packet burst:  <code>netware requester packet burst off</code>

---

## preferred server

Use this setting to specify which NetWare server you want your workstation to attach to when it first accesses the network.

**NOTE:** If the server you specify is unavailable, your workstation will attach to the first available server.

---

<i>Syntax</i>	<code>netware requester preferred server <i>servername</i></code>  Replace <i>servername</i> with the name of a server. The server you specify should probably have the NetWare utilities for OS/2 installed.
<i>Default</i>	None
<i>Example</i>	To attach to server FINANCE:  <code>netware requester preferred server finance</code>

---

## preferred tree

Use this setting to specify a tree name to connect. This setting is only for sites with more than one directory tree.

---

*Syntax*        `netware requester  
                  preferred tree treename`

Replace *treename* with the name of your tree. Tree names can have up to 32 characters.

---

*Default*        None.

---

*Example*        To connect to a tree named Novell:

```
netware requester  
                  preferred tree novell
```

---

## request retries

Use this setting to specify how many times the Requester tries to resend a request following a communication error.

---

*Syntax*        `netware requester  
                  request retries number`

Replace *number* with a number of retries greater than 5.

---

*Default*        20 retries

Decrease the default if you are connected to the network over a modem and you do not want to waste phone time while the Requester keeps trying to resend packets.

---

*Example*        To decrease the number of times the Requester tries to resend a packet:

```
netware requester  
                  request retries 10
```

---

## sessions

Use this setting to specify the number of connections the Requester can have to all servers.

---

<i>Syntax</i>	<code>netware requester sessions number</code>  Replace <i>number</i> with a number of connections from 8 to 32. You must have at least three IPX sockets for each session you allow. (See <a href="#">“sockets” on page 237.</a> )
<i>Default</i>	8 sessions
<i>Example</i>	To allow more server connections:  <code>netware requester sessions 20</code>  You must also increase the sockets setting for the Protocol Stack IPX option in this case.

---

## signature level

Use this setting to assign a signature level. Signature levels help determine security on your network. [“Improving Security by Using Packet Signature” on page 61](#) explains more about signature levels.

---

<i>Syntax</i>	<code>NetWare Requester signature level number</code>  Replace <i>number</i> with 0, 1, 2, or 3.  <a href="#">Table 20 on page 233</a> describes the list of NCL Packet Signature levels.
<i>Default</i>	1 (Workstation signs packets only if the server requests signing.)
<i>Example</i>	To prevent the workstation from signing packets:  <code>netware requester signature level 0</code>

---

**Table 20** List of NCP Packet Signature levels

<b>Number</b>	<b>Explanation</b>
0	Workstation does not sign packets
1	Workstation signs packets <i>only</i> if the server requests it (server option is 2 or higher)
2	Workstation signs packets if the server is capable of signing (server option is 1 or higher)
3	Workstation signs packets and requires the server to sign packets (or logging in will fail)

# Protocol ODINSUP

Use this option to allow the NDIS protocol stack (used with Extended Services and LAN Services) to communicate using ODI Token-Ring or Ethernet drivers.

See “[Sharing a Network Board with IBM Software](#)” on page 73 before using this option.

## Syntax

```
protocol odinsup
    bind driver [number]
```

## Settings

### bind

Use this setting to bind the ODINSUP protocol to an ODI driver. When ODINSUP is bound to a driver, the network board for that driver is the board used for transmissions to and from the network.

---

<i>Syntax</i>	<pre>protocol odinsup     bind driver [number]</pre>
	<p>Replace <i>driver</i> with a Token-Ring or Ethernet ODI driver name. See <a href="#">Table 16 on page 206</a> for a list of common driver names.</p> <p>Use <i>number</i> to bind ODINSUP to a particular occurrence of a board when you have two boards with the same name. Replace <i>number</i> with a number from 1 to 4.</p> <p>For example, if you have two NE2000 network boards in your workstation, bind ODINSUP to each board by typing a 2 for the second board.</p> <p>ODINSUP can be bound to a maximum of four ODI drivers.</p>
<i>Default</i>	ODINSUP binds to the first Ethernet or Token-Ring board it locates.

---

---

*Examples*

To bind ODINSUP to a single NE2000 board in your workstation:

```
protocol ODINSUP
  bind ne2000
```

To bind ODINSUP to both the first and the second NE2000 boards in your workstation:

```
protocol ODINSUP
  bind ne2000
  bind ne2000 2
```

---

# Protocol Stack IPX

Use this option to adjust IPX communication between applications and the LAN drivers in your workstation.

## Syntax

```
protocol stack ipx
  bind name
  router mem size
  sockets number
```

## Settings

### bind

Use this setting to specify the primary network board in your workstation. By default, the primary board is the board whose driver loads first in the CONFIG.SYS file. If you specify a different board with this setting, that default is changed. See [Chapter 5, “Network Boards and Drivers,”](#) on page 47.

---

<i>Syntax</i>	<pre>protocol stack ipx   bind <i>name</i></pre>
	Replace <i>name</i> with the driver name for your network board. <a href="#">Table 16 on page 206</a> lists common network boards.
<i>Default</i>	The first driver listed in your CONFIG.SYS file.
<i>Example</i>	To specify a 3Com Etherlink 3C503 board as primary: <pre>protocol stack ipx   bind 3C503</pre>

---



## router mem

Use this setting to specify how many bytes in the router memory pool are allocated for routing requests to the network.

---

*Syntax*      `protocol stack ipx  
                 router mem size`

Replace *size* with a number of bytes.

---

*Default*      450 bytes

Since a size of 450 bytes accommodates up to 15 network boards per workstation, you should not need to increase this default.

---

*Example*      To increase the default:

```
protocol stack ipx
router mem 500
```

---

## sockets

Use this setting to specify how many sockets IPX can open at your workstation.

---

*Syntax*      `protocol stack ipx  
                 sockets number`

Replace *number* with a number of sockets between 9 and 128. If you are running IPX with the Requester, do not set this value below 32.

You need three sockets per server connection. The default of 64 works for the default number of server connections (see [“sessions” on page 232](#)),

---

*Default*      64 sockets

*Example*      To set the socket limit for a workstation connected to several servers that is running Named Pipes and applications that require sockets:

```
protocol stack ipx
sockets 128
```

---

# Protocol Stack SPX

Use this option to adjust the number and characteristics of SPX connections between your workstation and other computers.

## Syntax

```
protocol stack spx
    abort timeout number
    listen timeout number
    retry count number
    send timeout number
    sessions number
    verify timeout number
```

## Settings

### **abort timeout, listen timeout, verify timeout**

Use these settings to monitor and control SPX connections.

When SPX sessions at a sending computer do not receive transmissions from the receiving computer for the length of the "verify timeout" interval, SPX sends a keep-connection-alive packet to the receiving computer. SPX then waits the length of the "listen timeout" interval to receive a response.

If no response is received, SPX sends another packet requesting immediate acknowledgment. SPX then waits the length of the "abort timeout" interval to receive a response.

If no response is received, SPX aborts the session.

---

*Syntax*      `protocol stack spx`  
                  `abort timeout number`  
                  `listen timeout number`  
                  `verify timeout number`

Replace *number* with a number of milliseconds greater than 10.

The ratio between these settings must remain the same. For example, if you double the Listen timeout value, you must also double the Abort timeout and Verify timeout values.

If the machine you are setting up will be a Named Pipes server, double the default timeout values.

---

*Default*      Abort timeout: 30,000 milliseconds  
  
                  Listen timeout: 6,000 milliseconds  
  
                  Verify timeout: 3,000 milliseconds

---

*Example*      To make SPX wait longer before sending a keep-connection-alive packet, sending the packet requesting immediate response, or aborting the session:

```
protocol stack spx
    abort timeout 40000
    listen timeout 8000
    verify timeout 4000
```

## retry count

Use this setting to specify the number of times your workstation will resend packets that weren't acknowledged by the receiving computer the first time they were sent

**NOTE:** Some applications may set the "retry count" value. In these cases, the application-set value is used and the NET.CFG value is ignored.

---

<i>Syntax</i>	<code>protocol stack spx retry count <i>number</i></code>
	Replace <i>number</i> with a number of retries from 1 to 255.
	If your network traffic is heavy or if you are transmitting across routers, you may want to increase the default.
<i>Default</i>	15 retries
<i>Example</i>	To increase the number of times packets are resent:  <code>protocol stack spx retry count 30</code>

---

## send timeout

Use this setting to specify how long SPX waits between attempts to send packets across the network.

---

<i>Syntax</i>	<code>protocol stack spx send timeout <i>number</i></code>
	Replace <i>number</i> with a number of milliseconds greater than 500.
	This default works well in almost all cases. Increase the default if you are using network management products with a very large network and you encounter many SPX connection errors.
	You may also want to increase the default for a Named Pipes client that is operating faster than the Named Pipes server to which it is connected.
<i>Default</i>	A continually calculated value based on the time it takes SPX to get a response from the server.
<i>Example</i>	To increase the wait between sends:  <code>protocol stack spx send timeout 5600</code>

---

## sessions

Use this setting to specify how many SPX connections can be open simultaneously.

---

*Syntax*            `protocol stack spx  
                      sessions number`

Replace *number* with a number of SPX connections greater than 8. Numbers higher than 1,000 may not work in all circumstances.

If you run Named Pipes applications or other applications that use SPX, you may need to increase the default number of sessions.

---

*Default*            16 sessions

---

*Example*            To increase the number of SPX sessions:

```
protocol stack spx  
                      sessions 64
```

---

# Token-Ring Source-Route Driver

Use this option to configure the Requester for source-routing between Token-Ring networks that are connected with source routers. For more information about source routing, see [Chapter 7, “Using OS/2 Workstations on a Token-Ring Network,”](#) on page 67.

**NOTE:** Do not use this option if your Token-Ring networks do not use source routing.

## Syntax

```
protocol route
    source route def gbr mbr nodes n board n
```

## Settings

### board

Use this setting to specify the logical board (frame) of a particular type that is performing source routing.

---

<i>Syntax</i>	<pre>protocol route     source route board n</pre> <p>Replace <i>n</i> with a logical board (frame) number from 1 to 16.</p> <p>For example, if a workstation has more than one frame type listed in the Link Driver option, by default only the first listed frame is source routed. To enable source routing on the second or other frames, you must explicitly specify the second frame as logical board 2.</p>
<i>Default</i>	1
<i>Example</i>	<p>To specify that logical board 2, the Token-Ring_SNAP frame, will also be source routed:</p> <pre>link driver token     frame token-ring     frame token-ring_snap  protocol route     source route board 1     source route board 2</pre>

---

## DEF

Use this setting (default frame) to prevent frames that have unknown destination addresses from being sent across Single Route IBM bridges.

- ◆ If this setting is specified, these frames are forwarded as All Routes Broadcast frames.
- ◆ If this setting is not specified, all frames that have addresses not in the workstation's Source Routing table are forwarded as Single Route Broadcast frames.
- ◆ If ROUTE.SYS has already been configured with the DEF setting, reloading ROUTE.SYS with this setting broadcasts all subsequent Single Route Broadcast frames as All Routes Broadcast frames.

---

<i>Syntax</i>	<code>protocol route</code> <code>source route def</code>
	Type <b>DEF</b> to broadcast on all routes. Omit <b>DEF</b> to broadcast on a single route only.
<i>Default</i>	DEF is omitted (single-route broadcast only)
	Change this default when you are unsure of the stability of one or more routes in the network. Be aware that using DEF will substantially increase network traffic, especially on large, redundant ring networks.
<i>Example</i>	To broadcast on all routes:  <code>protocol route</code> <code>source route def</code>

---

## GBR

Use this setting (general broadcast) to specify that all General BRoadcast frames are to be sent as All Routes Broadcast frames

---

<i>Syntax</i>	<pre>protocol route source route gbr</pre> <p>Type <b>GBR</b> to broadcast to all destinations, on all rings, by all routes. Omit <b>GBR</b> to broadcast to all destinations, on all rings, by a single route.</p> <p>Change the default when you want to ensure successful transmission across all possible routes. If ROUTE has already been configured with this setting, reconfiguring ROUTE with this setting broadcasts all subsequent General Broadcast frames as All Routes Broadcast frames.</p>
<i>Default</i>	GBR is omitted (single-route broadcast only)
<i>Example</i>	To broadcast to all destinations, on all rings, by all routes: <pre>protocol route source route gbr</pre>

---

## MBR

Use this setting (multicast) to specify that all Multicast Broadcast frames are to be sent as All Routes Broadcast frames.

---

<i>Syntax</i>	<pre>protocol route source route mbr</pre> <p>Type <b>MBR</b> to transmit multicast frames simultaneously to a group of destinations by all possible routes. Omit <b>MBR</b> to transmit multicast frames by a single route.</p>	
<i>Default</i>	MBR is omitted (transmit by single route only)	If ROUTE has already been configured with the MBR setting, reconfiguring ROUTE with this parameter broadcasts all subsequent Multicast Broadcast frames as All Routes Broadcast frames.
<i>Example</i>	To broadcast multicast frames simultaneously: <pre>protocol route source route mbr</pre>	

---



## nodes

Use this setting to specify the number of table entries in the source-routing table.

---

*Syntax*

```
protocol route
  source route nodes n
```

Replace *n* with a number of table entries from 8 to 255. If you type a number less than 8, 8 will be used.

---

*Default*

16 entries

---

*Example*

To allow twenty-four entries in the source-routing table:

```
protocol route
  source route nodes 24
```

---



# C

## Architecture Diagrams

These diagrams provide a technical overview of the NetWare Requester for OS/2 v2.01. They can help you understand what components are used for the various functions the Requester performs (for example, which components are used to support Named Pipes).

Specifically, the diagrams illustrate:

- ◆ The major functions of the Requester components
- ◆ The different components of the Requester
- ◆ The relationships between components

**NOTE:** *You do not need to manually load the components shown in the diagrams.* Select the settings you want in the Requester installation program, and the correct components will be loaded. To change the settings later, simply run the installation program again.

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### Topics and architecture diagrams

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[“NetWare Requests from OS/2 Sessions” on page 248](#)

[“NetWare Core Protocol requests” on page 249](#)

[“File system requests” on page 250](#)

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[“Protocol Requests from OS/2 Sessions” on page 251](#)

[“IPX-only requests” on page 251](#)

[“SPX requests” on page 252](#)

[“Named Pipes server requests” on page 253](#)

[“Named Pipes client requests” on page 254](#)

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## Topics and architecture diagrams

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“NetBIOS Submit requests using only Novell NetBIOS driver” on page 256

“NetBIOS Submit requests using only Novell NetBIOS driver with Extended Services loaded” on page 257

“NetBIOS Submit requests using either Novell or IBM NetBIOS driver with LAN Services loaded” on page 258

“NB30 NetBIOS requests using either Novell or IBM NetBIOS driver with Extended Services loaded” on page 259

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“NetWare Requests from DOS/Windows Sessions” on page 259

“DOS/Windows NetWare Core Protocol requests” on page 260

“DOS/Windows file system requests” on page 261

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“Protocol Requests from DOS/Windows Sessions” on page 262

“DOS/Windows SPX- or IPX-only requests” on page 262

“DOS/Windows Named Pipes client requests” on page 263

“DOS/Windows SQL client "Get Server" requests” on page 264

“DOS and Windows NetBIOS requests” on page 265

“NetBIOS Submit requests using only Novell NetBIOS driver with Extended Services loaded” on page 257

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“Sharing a Network Board” on page 266

“NetWare Requester and IBM software using ODINSUP to share a network board” on page 267

“NetWare Requester and IBM software using LANSUP to share a network board” on page 268

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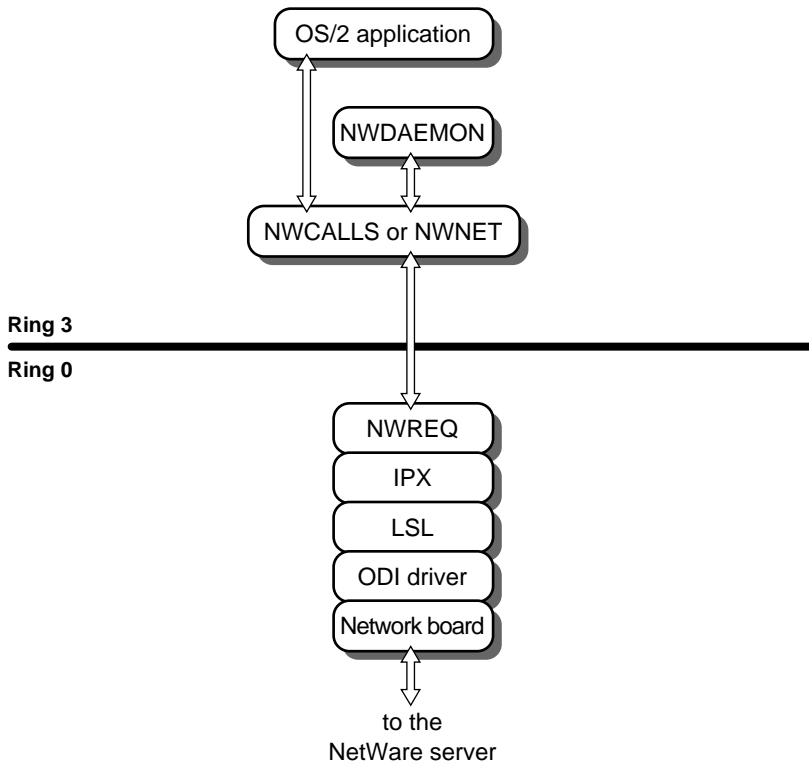
## NetWare Requests from OS/2 Sessions

### NetWare Core Protocol Requests

NetWare Core Protocol requests go directly to the NetWare server without going through OS/2. Some of the NetWare utilities issue this kind of request.

These requests are usually accompanied by file system requests, shown in [Figure 53 on page 250](#).

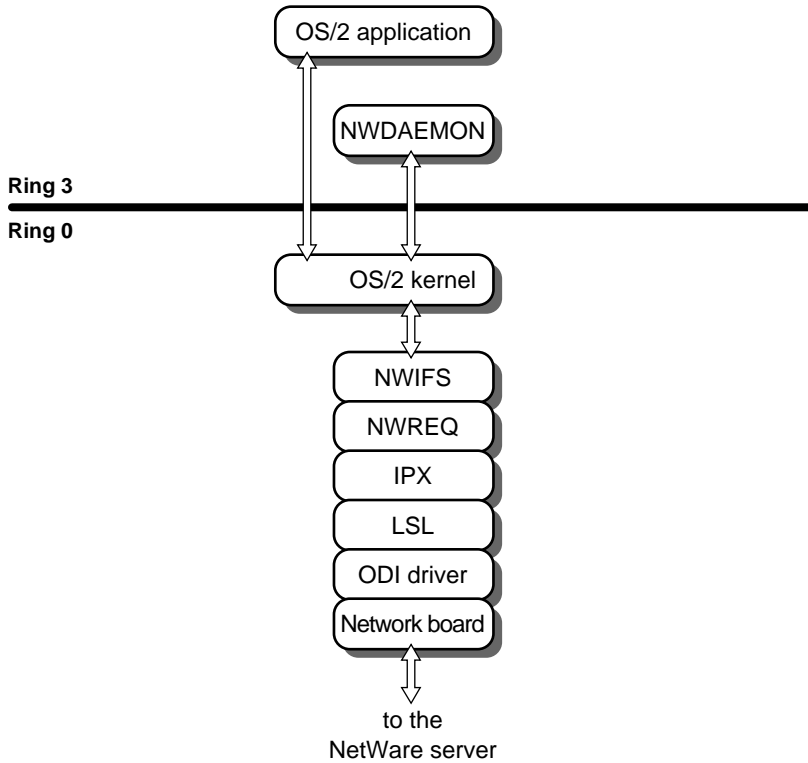
**Figure 52** NetWare Core Protocol requests



# File System Requests

File system requests are handled by OS/2 before being passed on to the NetWare Requester. Any program which manipulates files on the network makes this kind of request. These requests are always accompanied by NetWare Core Protocol requests, shown on [Figure 52 on page 249](#).

**Figure 53** File system requests

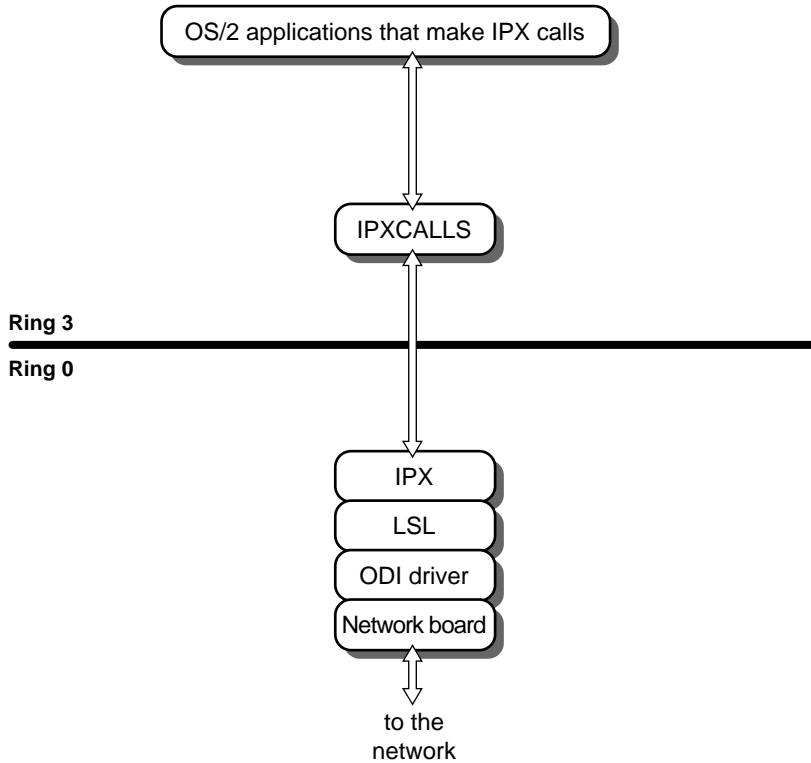


# Protocol Requests from OS/2 Sessions

## IPX-Only Requests

IPX requests are issued by IPX applications, including the Requester.

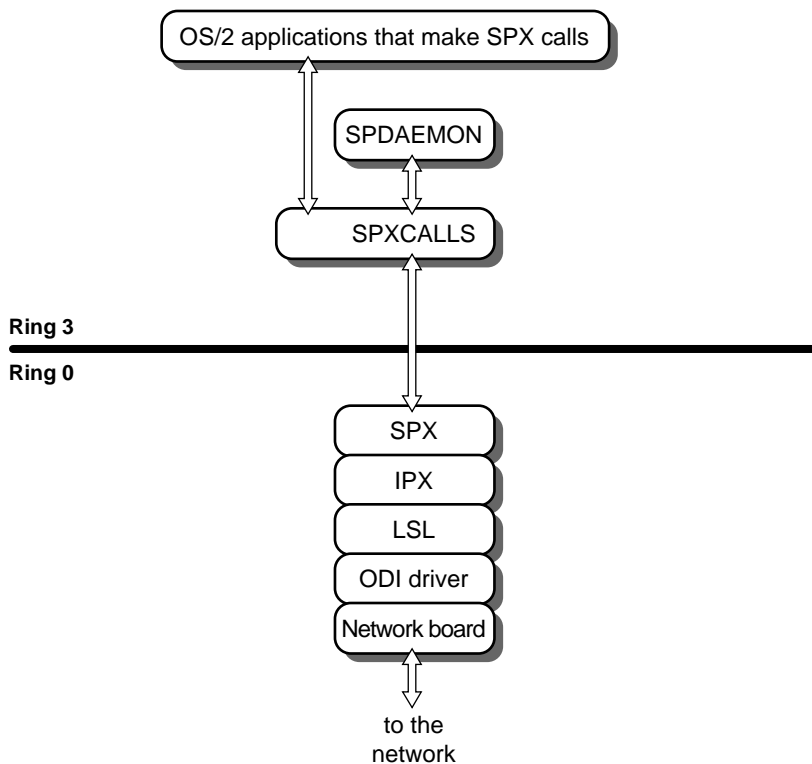
Figure 54 IPX-only requests



## SPX Requests

SPX requests are issued by SPX applications. Some NetWare print utilities and API calls use SPX.

Figure 55 SPX requests

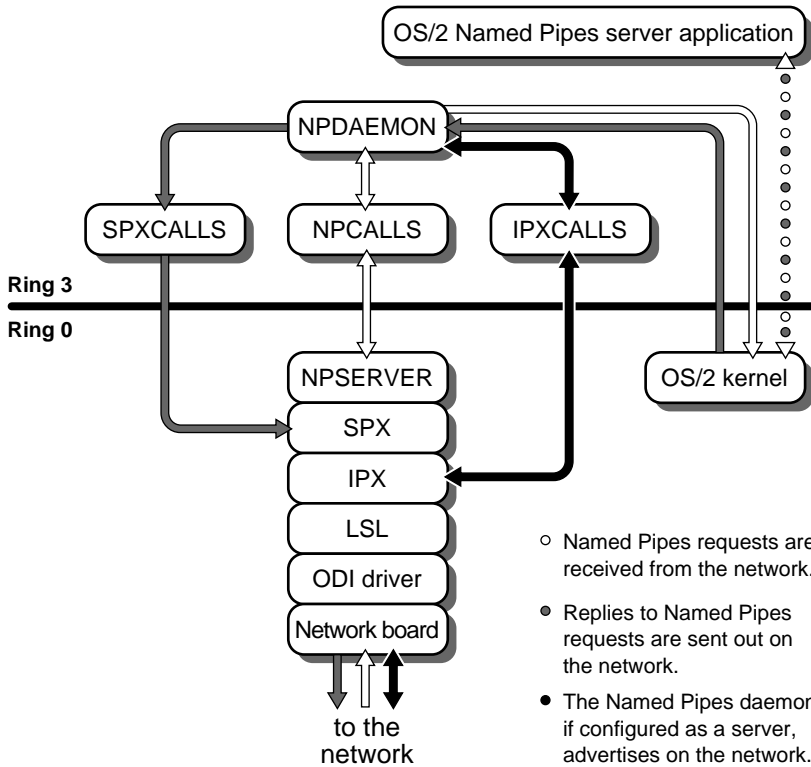




# Named Pipes Server Requests

Named Pipes server requests are made by Named Pipes distributed application servers.

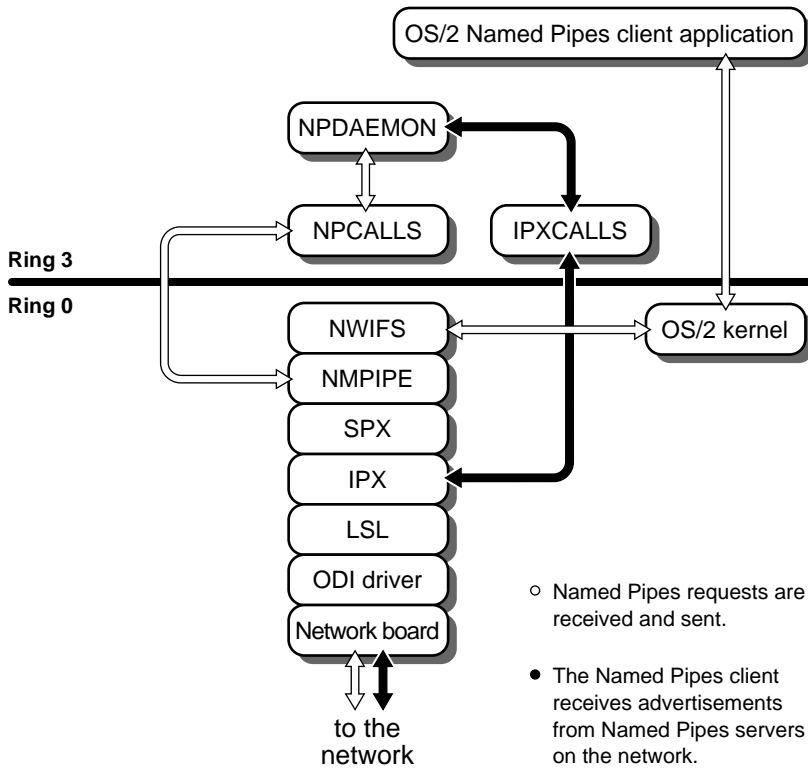
Figure 56 Named Pipes server requests



# Named Pipes Client Requests

Named Pipes client requests are issued by Named Pipes distributed application clients.

Figure 57 Named Pipes client requests



# NetBIOS Requests

## What is NetBIOS

NetBIOS is a "device-independent" protocol that lets applications use network boards without knowing the specifics of how the drivers for those boards work.

NetBIOS applications issue NetBIOS commands which are routed to a specific network board driver. That driver handles the transmission of NetBIOS packets over the network.

## What is the Novell NetBIOS Emulator

Novell provides a NetBIOS emulator that allows applications running on an IPX-based network (such as NetWare) to communicate using NetBIOS.

This NetBIOS emulator encapsulates NetBIOS packets inside of IPX packets. Then an ODI driver handles transmission of the IPX packets over the network. While your NetBIOS application communicates using NetBIOS commands, the NetBIOS emulator actually transmits IPX packets.

The Novell NetBIOS emulator can only communicate with other emulators that use IPX. For example, if you have one workstation running the NetBIOS emulator and another workstation running IBM's NetBIOS, the two workstations cannot communicate.

However, the NetBIOS emulator can run on the same OS/2 workstation as other NetBIOS implementations, including the NetBIOS provided with IBM Extended Services or LAN Services. Or, the NetBIOS emulator can run by itself.

NetBIOS requests are issued by applications which use Novell NetBIOS emulation. If Extended Services or LAN Services is installed, requests follow a different path. See [Figure 59 on page 257](#) through [Figure 61 on page 259](#).

Figure 58 NetBIOS Submit requests using only Novell NetBIOS driver

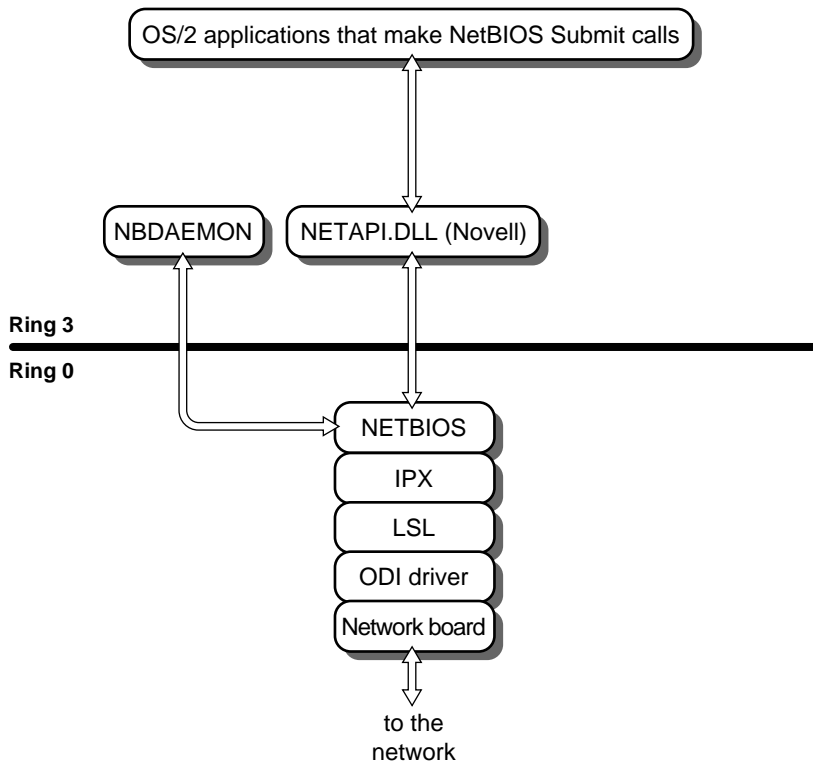
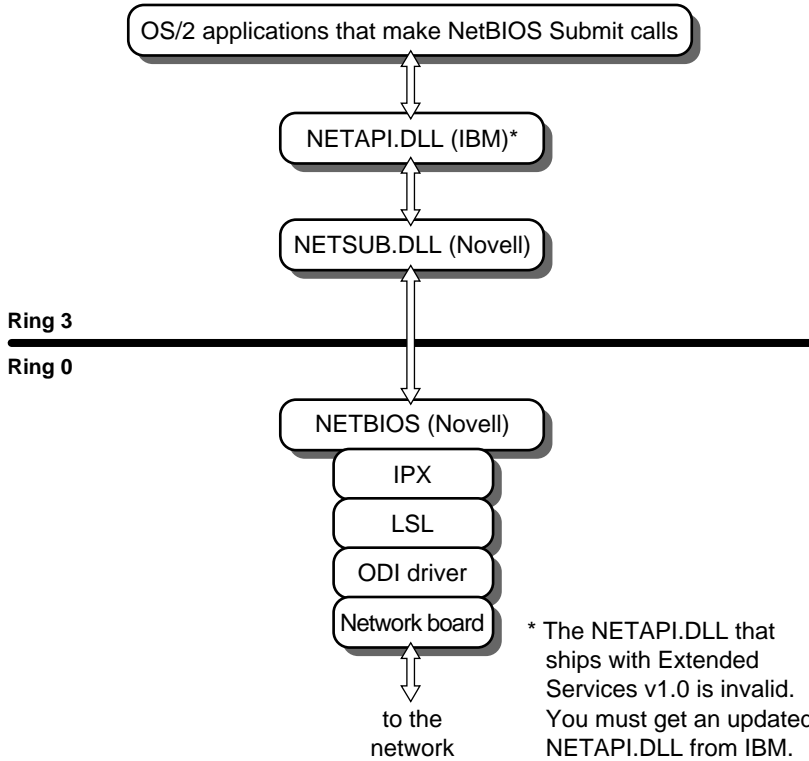


Figure 59 NetBIOS Submit requests using only Novell NetBIOS driver with Extended Services loaded



**Figure 60** NetBIOS Submit requests using either Novell or IBM NetBIOS driver with LAN Services loaded

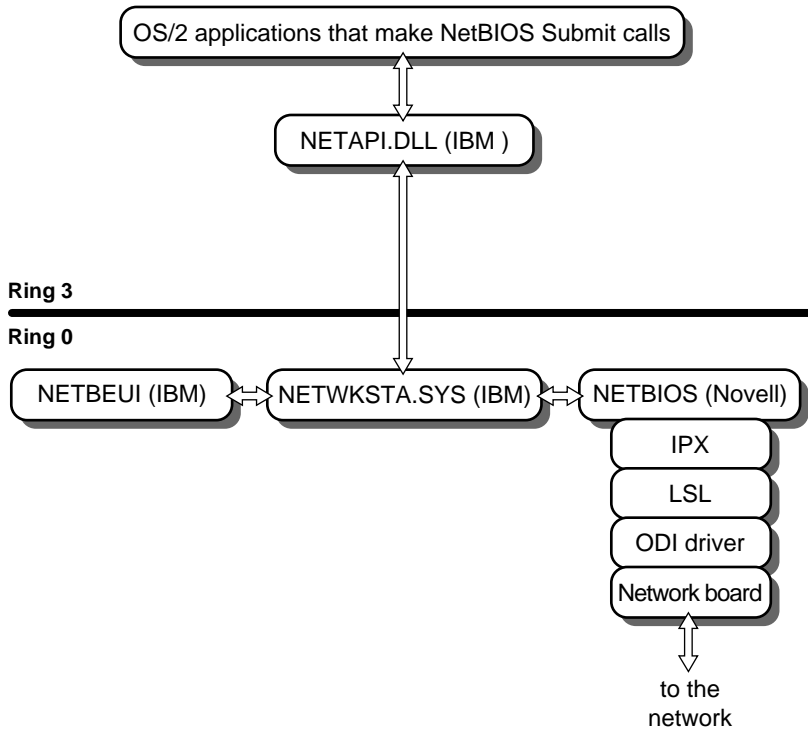
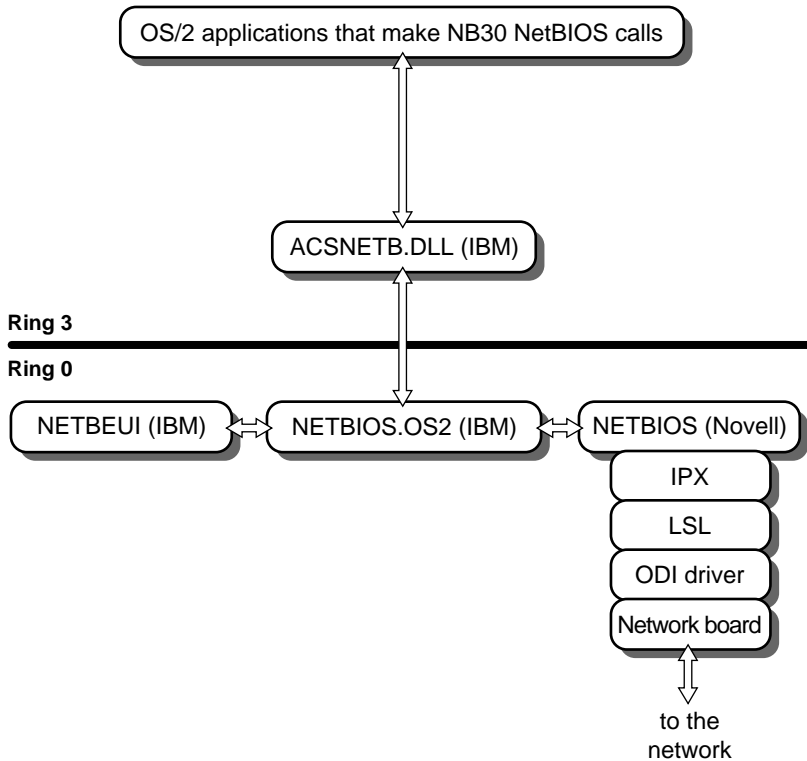


Figure 61 NB30 NetBIOS requests using either Novell or IBM NetBIOS driver with Extended Services loaded



## NetWare Requests from DOS/Windows Sessions

When you select "Support for Virtual DOS Sessions" in the NetWare Requester installation program, the installation program adds lines to the CONFIG.SYS file to load the VIPX and VSHELL components.

The NETWARE\_RESOURCES and VIPX\_ENABLED properties are also created and added to the "DOS Settings" notebook of all DOS and Windows icons. These properties allow you to choose global support, private support, or no network support for each session.

- ◆ If you choose global support, VIPX and VSHELL are enabled for the session.
- ◆ If you choose private support, VIPX is enabled, VSHELL is not enabled, and you can manually load NETX.EXE

- ◆ If you don't load NETX.EXE, you receive IPX- and SPX-only support.
- ◆ If you choose VIPX\_ENABLED OFF, then no NetWare support is loaded.

VIPX must be enabled for either Global (using VSHELL) or Private (using NETX) sessions to work.

Figure 62 DOS/Windows NetWare Core Protocol requests

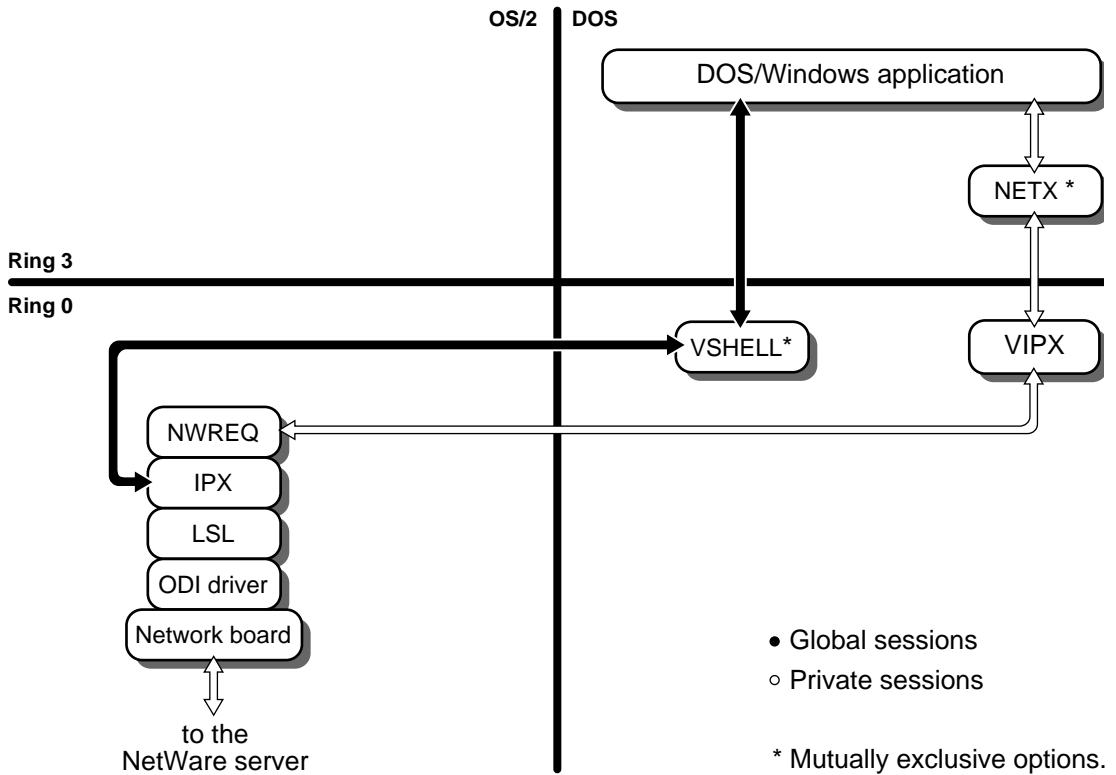
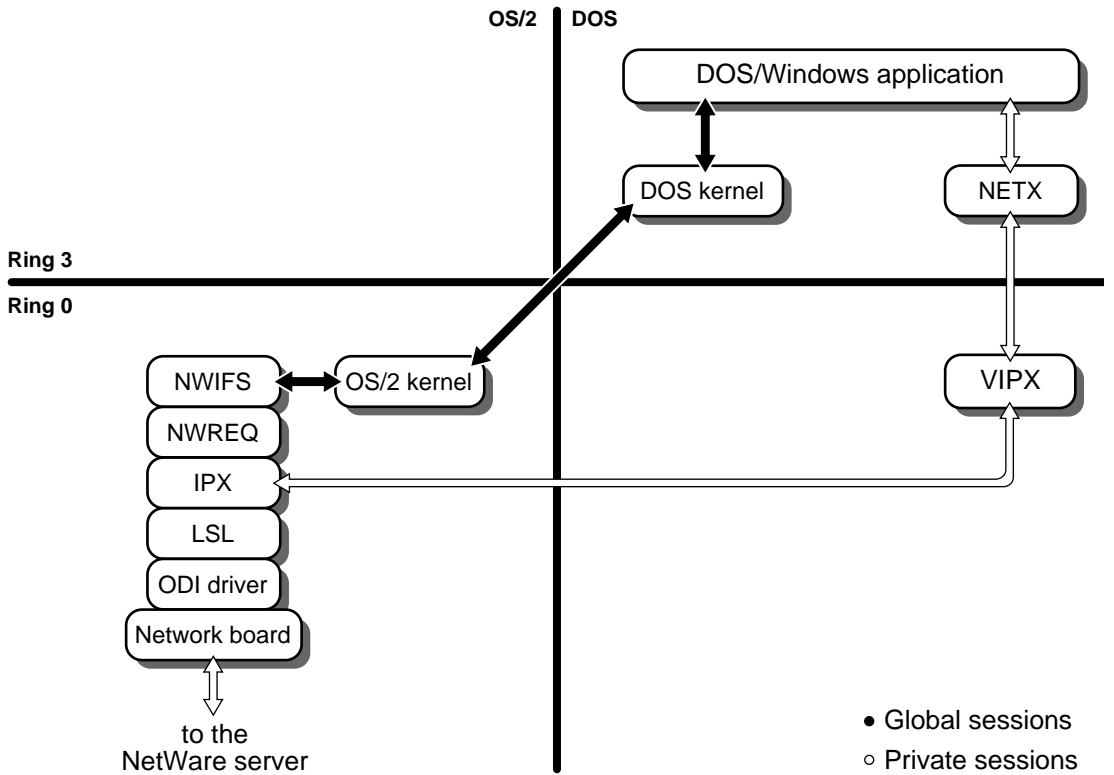




Figure 63 DOS/Windows file system requests



# Protocol Requests from DOS/Windows Sessions

Figure 64 DOS/Windows SPX- or IPX-only requests

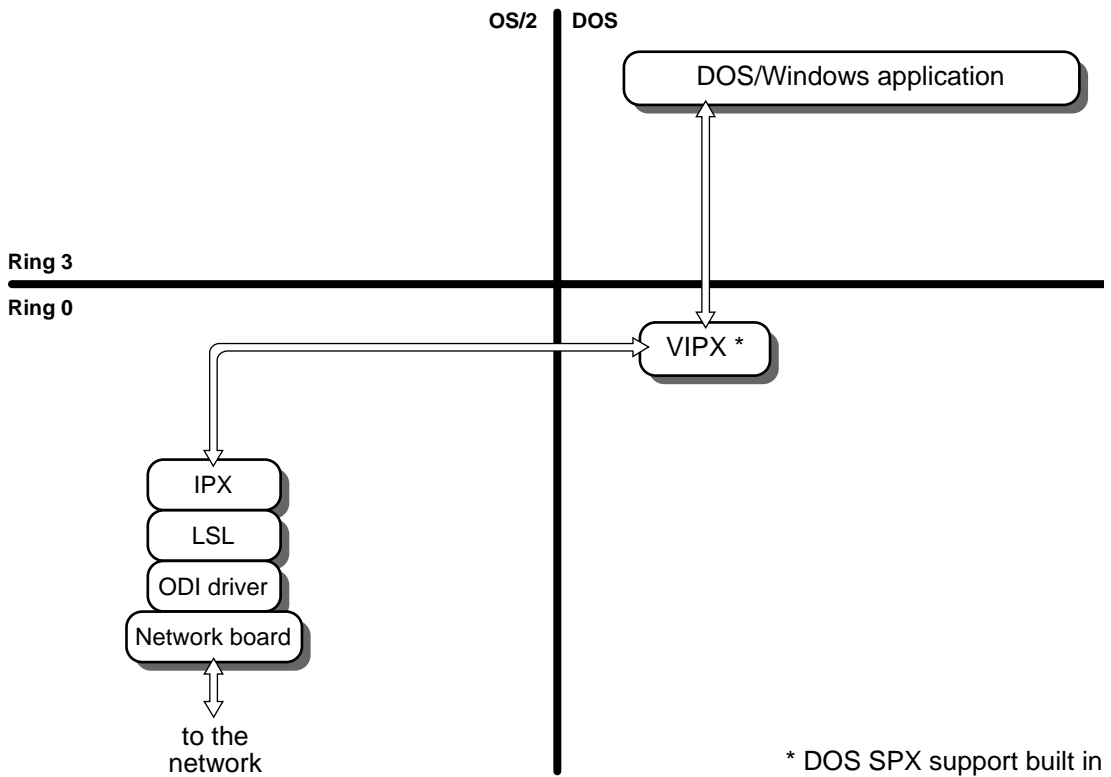


Figure 65 DOS/Windows Named Pipes client requests

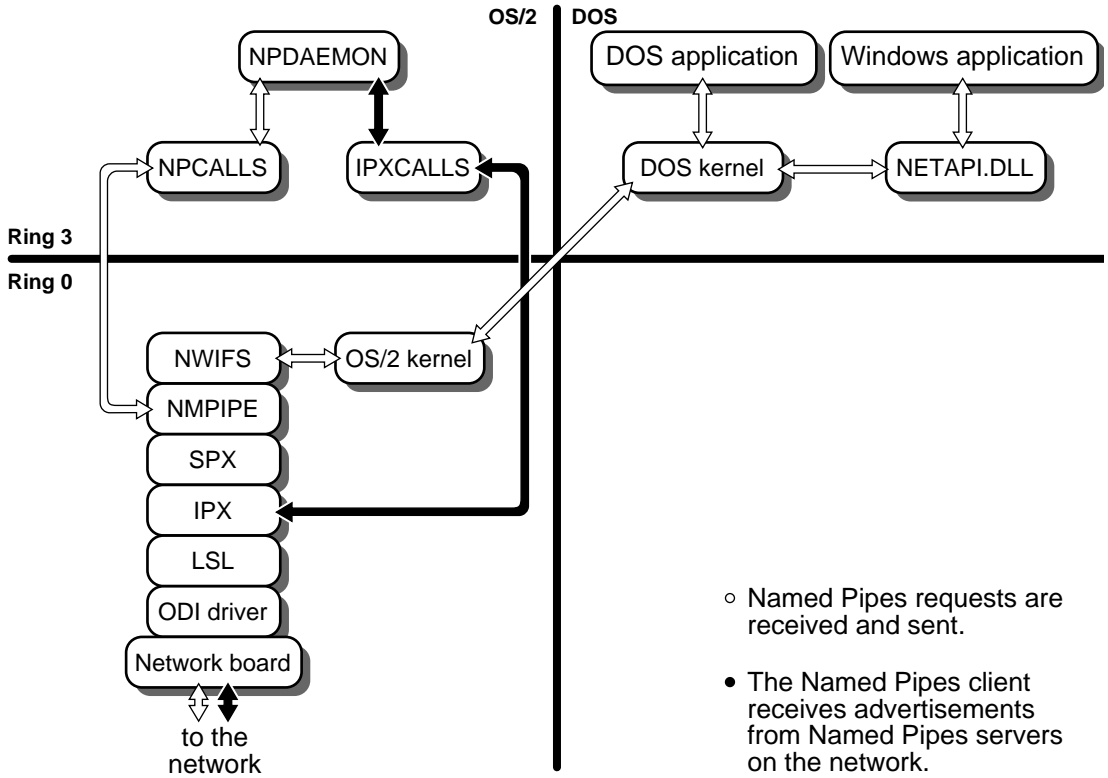


Figure 66 DOS/Windows SQL client "Get Server" requests

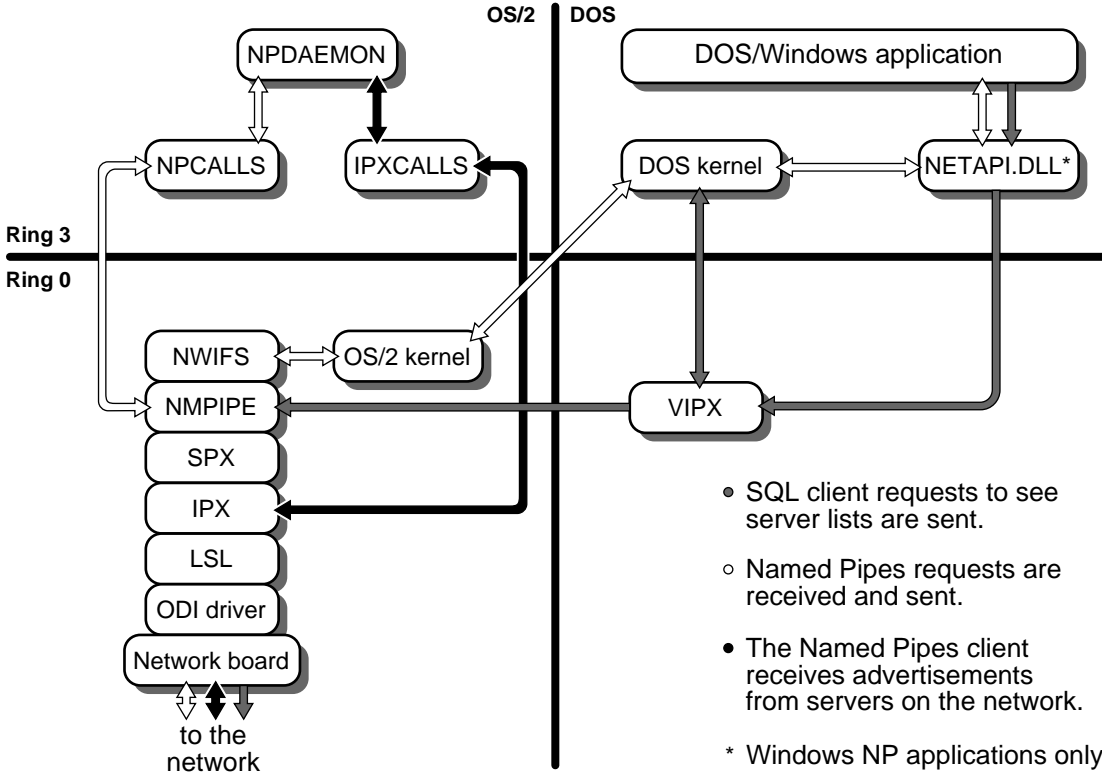
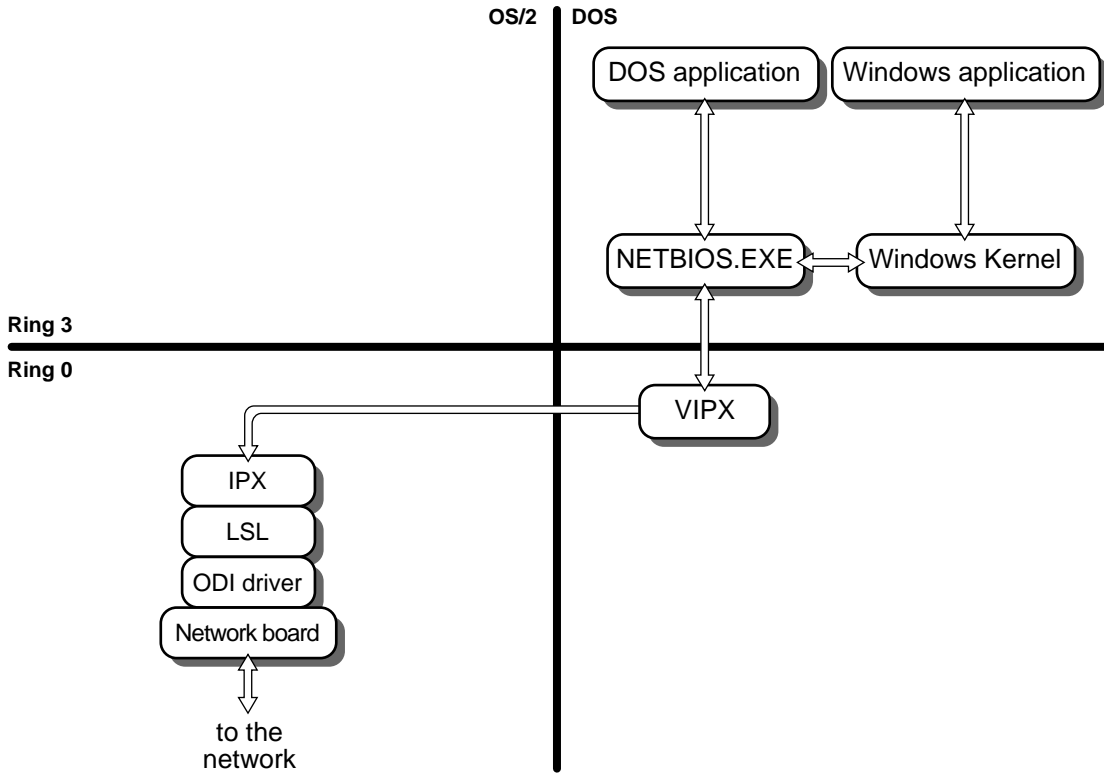
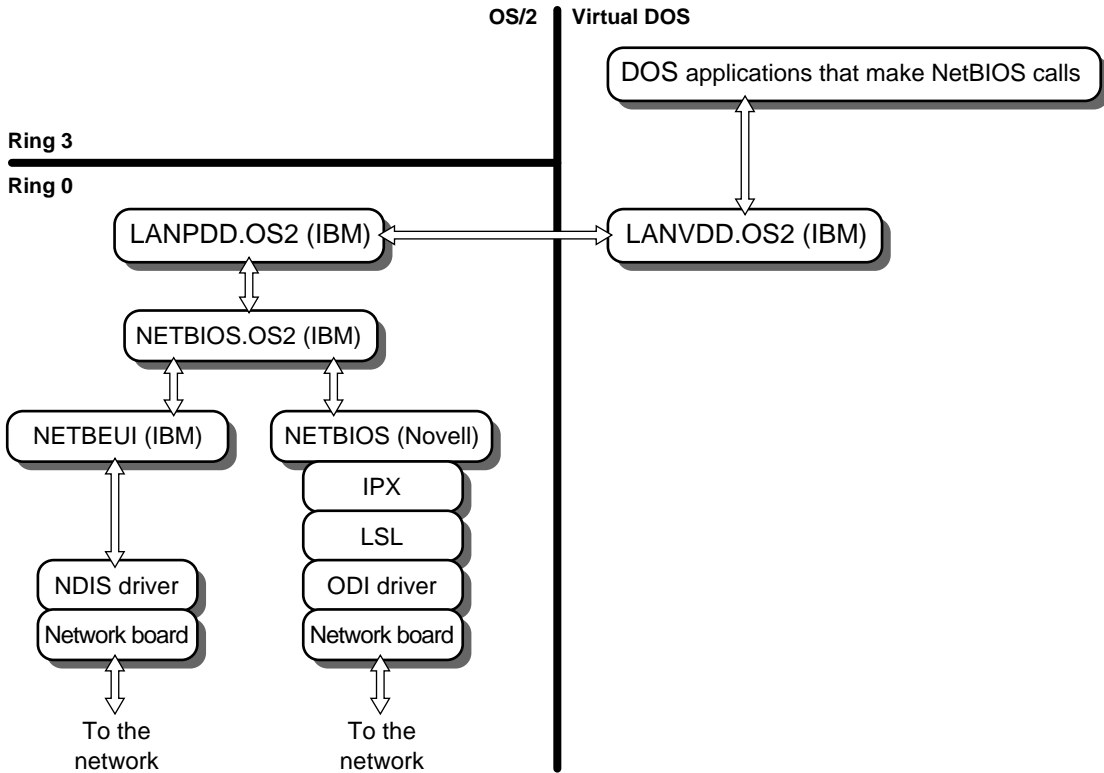


Figure 67 DOS and Windows NetBIOS requests



**Figure 68** DOS and Windows NetBIOS requests with Extended Services loaded



## Sharing a Network Board

### How Does ODINSUP Work?

ODINSUP translates NDIS transmissions from Extended Services or LAN Services into a form that complies with the ODI drivers. ODINSUP also translates transmissions received from the network into a form readable by Extended Services and LAN Services.

ODINSUP functions like a default protocol stack, meaning that it accepts requests from the Link Support Layer (LSL) that are not specifically marked for another registered protocol (such as IPX or TCP/IP). When it receives requests, ODINSUP passes them on to the NDIS protocol stack.

ODINSUP allows IBM's Protocol Manager (found in Extended Services and LAN Services) to communicate with a network board without having to be aware of the details of transmission on that board (such as frame type).

Instead, the details are handled at the ODI driver level and then transmissions are passed on to the Link Support Layer, which in turn passes them on to the correct protocol stack or to ODINSUP. ODINSUP translates the request to a form understood by Protocol Manager.

Chapter 8, "Sharing a Network Board with IBM Software," on page 73 explains more about using ODINSUP.

ODINSUP is for using ODI drivers. LANSUP is for using NDIS drivers.

**Figure 69** NetWare Requester and IBM software using ODINSUP to share a network board

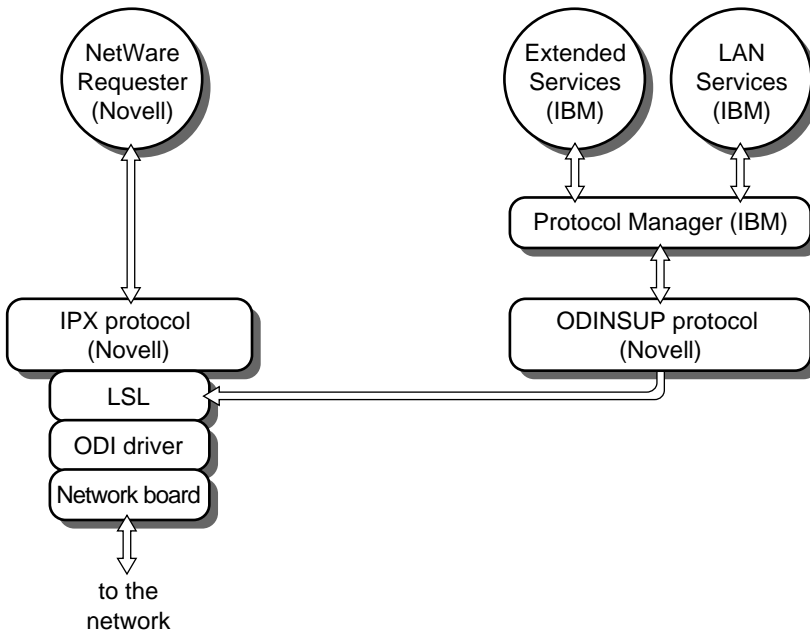


Figure 70 NetWare Requester and IBM software using LANSUP to share a network board

