FEBRUARY 1993

NOVELL® RESEARCH

ODINSUP Interoperability Configurations for DOS Workstations

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Novell's ODINSUP.COM module allows interoperability between Open Data-Link Interface (ODI) and Network Device Interface Specification (NDIS) protocol stacks. Network transports from multiple vendors--such as IBM's NetBEUI, DEC's LAT, and 3Com's XNS--can run along with Novell's IPX/SPX and other supported protocols over a common data-link driver. This AppNote details configuration files for using NetWare protocols with a number of specific third-party vendor environments.

Related AppNotes

NetWare and LAN Server Client Interoperability via ODINSUP: Part 1 (Sep 92)
NetWare and LAN Server Client Interoperability via ODINSUP: Part 2 (Dec 92)
Logging In to IBM LAN Server and NetWare from a DOS Workstation (Nov 91)

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Acknowledgements

Thanks to Larry Biggs, Bryan Clark, Sheffer Clark, Christopher Cleveland, Drex Dixon, Paul Holland, Steve Huntington, Behzad Moaddeli, Dave Murphy, Mark Parratt, Ron Richardson, and Earle Wells, for their help in testing, refining, configuring, and supporting ODINSUP.COM in these environments.

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Introduction

As part of Novell's commitment to be interoperable, the Open Data-Link Interface (ODI) specification supports the Network Device Interface Specification (NDIS) developed by IBM and Microsoft. ODI's modular architecture allows you to use NDIS protocol stacks along with IPX and other Novell-supported protocols.

A module called ODINSUP.COM allows NDIS protocol stacks to run unmodified over the ODI Link Support Layer and talk to an ODI LAN driver. Now, multivendor network transports--such as IBM's NetBEUI, DEC's LAT, and 3COM's XNS--can be run over a common data-link (driver) specification.

This AppNote details configurations for running NetWare with a number of specific vendor environments. The information is adapted from the ODINSUP.DOC file that accompanies the ODINSUP.COM module. These files are available on CompuServe's NetWire forum as part of the DOS client software package included in the DOSUP6.ZIP file in the NOVFILES Library. (For more information about ODI, read the ODIINFO.DOC file included in this .ZIP file.)

Installing and Configuring ODINSUP

This section gives a brief discussion on how to install and configure ODINSUP and related modules. (For more information, refer to the NetWare ODI Shell for DOS manual.)

1. Replace NDIS MAC Drivers with ODI LAN drivers.

   At the workstation, all NDIS MAC drivers should be replaced with their corresponding ODI LAN drivers. For example, if you were using the ELNKII.DOS NDIS MAC driver in CONFIG.SYS, you should now use the 3C503.COM ODI driver in the AUTOEXEC.BAT file.

2. Install ODINSUP.COM.

   Installing the ODINSUP module itself is simply a matter of loading it into memory. On a DOS machine, this is accomplished by loading ODINSUP.COM either at the command line or in a batch file (usually AUTOEXEC.BAT).

   Note: The NDIS PROTMAN device driver must be loaded before the ODINSUP module is loaded.

   ODINSUP only needs to be loaded once, since it can handle multiple ODI LAN drivers from the same module image in memory.

3. Configure ODINSUP via the NET.CFG file.

   You configure ODINSUP by adding statements to various sections of the workstation's NET.CFG file, as outlined below.

The NET.CFG File

The NET.CFG file is a configuration file that contains section headings and options that deviate from the established defaults of the regular NetWare workstation boot process. You can use any DOS text editor to create and modify the file. (Pertinent instructions for inserting options in NET.CFG are summarized below. Novell's NetWare ODI Shell for DOS manual gives more complete information.)

Enabling Frame Types. At this time, ODINSUP supports only Ethernet and Token-Ring compatible ODI LAN drivers. ODINSUP requires that the underlying LAN drivers have a number of frame types enabled:

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- For Ethernet ODI LAN drivers, the ETHERNET_802.2, ETHERNET_SNAP, and ETHERNET_II frames types must be enabled.
- For Token-Ring ODI LAN drivers, the TOKEN-RING, and TOKEN-RING_SNAP frames types must be enabled.

You enable frame types by specifying the keyword frame followed by the frame type name under the appropriate ODI LAN driver's section header. For example, the following lines illustrate how to enable frame types for the NE1000 driver:

```
link driver ne1000
        frame ethernet_802.2
        frame ethernet_snap
        frame ethernet_ii
        frame ethernet_802.3    <--- optional
```

Enabling Ethernet 802.3 frame types is optional, and is included mainly for backwards compatibility with NetWare v2.x.

Binding Information. If no binding information is present in the NET.CFG file, ODINSUP attempts to locate an Ethernet or Token-Ring ODI LAN driver. If it finds one, ODINSUP attempts to bind to it. If this default action of ODINSUP is not desired, you should place binding information in the protocol ODINSUP section of the NET.CFG file to tell ODINSUP which ODI LAN drivers it should bind to. ODINSUP can be bound to a maximum of four ODI LAN drivers.

Bind entries specify the name of the ODI LAN driver and (optionally) the instance number, like this:

```
bind LANDriverName InstanceNumber
```

The LANDriverName is usually the same as the ODI LAN driver's filename, without the extension (for example, NE1000 for NE1000.COM).

The InstanceNumber may be necessary in cases where more than one of the same type of network adapter are installed in the machine (two 3C523 adapters, for instance). If an instance value is not specified, ODINSUP defaults to the first ODI LAN driver found in memory. In other words, if two 3C523 adapters are present, ODINSUP binds to the first loaded instance of the ODI LAN driver. The lowest possible instance value is 1.

Here are some sample NET.CFG Bind commands showing how to assign instance numbers:

```
protocol ODINSUP
        bind ne1000     ;bind to the first instance of the NE1000 ODI LAN driver
        bind 3c523 2  ;bind to the second instance of the 3C523 ODI LAN driver
        bind token 1  ;bind to the first instance of the TOKEN ODI LAN driver
```

AUTOEXEC.BAT File

In the AUTOEXEC.BAT file, ODINSUP must be loaded after the LSL.COM module and ODI LAN drivers (such as NE1000.COM or 3C503.COM), and before the NDIS protocols and NETBIND.EXE. Load the ODI protocol stacks (such as IPXODI.COM and TCPIP.EXE) after NETBIND.

```
LSL
        3C503
        ODINSUP
        ... load NDIS protocols (if not loaded in CONFIG.SYS)
        NETBIND
        ... load ODI protocols
```

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PROTOCOL.INI File

No ODINSUP-specific information is necessary in the NDIS PROTOCOL.INI file. However, the PROTOCOL.INI file is still necessary to tell the NDIS protocols which Medium Access Control (MAC) they should bind to and use. Normally, you can remove all information for NDIS MAC drivers from the PROTOCOL.INI file.

The PROTOCOL.INI file must include a section for each NDIS protocol used. Part of the protocol section is the Bindings= statement, which specifies what NDIS MAC the protocol should bind to. This MAC name should be the name of the ODI LAN driver (NE2, NE1000, TOKEN, and so on).

If the ODI LAN driver's name starts with a number (for instance, 3C503), precede the ODI LAN driver name with the letter x (x3C503).

If you want to bind ODINSUP to an adapter instance number other than 1 (as when ODINSUP is bound to the second NE2 ODI LAN driver), append the instance number to the end of the ODI LAN driver name. For example, if ODINSUP is to be bound to the second instance of an NE1000 driver, use NE10002 for the MAC name. Similarly, to bind ODINSUP to the fourth instance of a 3C523 driver, use X3C5234 for the MAC name. The appropriate MAC names are displayed when ODINSUP is loaded.

Here are some sample PROTOCOL.INI commands showing binding instructions:

```
[PROTOCOL_MANAGER]
        DriverName = PROTMAN$

[ETHERAND]
        DriverName = DXME0$
        Bindings = NE2
        ; Bindings = x3C523
        ; Bindings = NE22   ;for second instance of NE2 board
```

Check the statements in the PROTOCOL.INI file carefully. If they are incorrect, you may get a message like "PRO0025E: Failed to bind" when you run NETBIND.EXE. This message can be caused by an invalid Bindings= statement in the PROTOCOL.INI file. Make sure the PROTOCOL.INI file resides in the path given in the "/I:" parameter on the line in CONFIG.SYS that references the PROTMAN driver. Another common mistake is not having removed your NDIS driver from the CONFIG.SYS file.

Other Configuration Notes

Memory Usage. Once installed, ODINSUP.COM consumes approximately 4,900 bytes of DOS memory. Each additional adapter ODINSUP is bound to will increase memory usage by approximately 2,800 bytes. The size of the installed LSL and ODI LAN driver is usually about the same amount of memory as the corresponding NDIS PROTMAN and NDIS MAC Driver. Using ODINSUP instead of an NDIS MAC driver incurs an additional 4900 bytes of memory usage, but this will vary depending on the LAN driver used.

Performance. Novell Labs has done some limited performance testing using the 3Com EtherLink II adapter to compare the native NDIS ELNKII.DOS MAC driver and the ODI 3C503.COM-ODINSUP.COM combination. We found that both setups provided the same results. In other words, using the ODINSUP modules in place of NDIS incurred no performance penalty. Use of other LAN drivers may show different results.

Third-Party LAN Drivers. NDIS drivers for third-party network adapters will not work with ODINSUP. The Novell ODINSUP solution requires that an ODI driver be written.

If you are using an old ODI driver from a third-party company, you might get an error message such as MLID does not support receive data size parameter. Call adapter manufacturer and request a newer MLID

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that supports it. Contact the developer to see if they have a new driver that was created using version 1.2 or later of Novell's Media Support Module (MSM). Version 1.2 of the MSM was shipped to third-party developers in September 1991. This and all subsequent MSM versions support the L Data Size in the Look ahead structure.

Here's how to tell if your ODI LAN driver has MSM version 1.2 or later:

a. Run an editor on the ODI driver (for example, PE NE2000.COM).

b. Search for the string MSM.

c. To the right of MSM, you will see the version number your driver is using.

Routing Issues. NDIS application packets cannot be routed across a Novell router. A Novell router will only route packets for protocols that are loaded on the router. Currently, only IPX and TCP/IP protocols are provided and supported by Novell. Since ODINSUP interfaces to the NDIS protocol being used, the packets on the wire are not necessarily supported on the router. For this reason, you can't communicate with LAN Manager (or any other NDIS service) which is on the other side of a Novell router, even with ODINSUP.

Note: Future revisions of Novell's Multi-Protocol Router may be able to route additional protocols. Check your current version to see if your protocol can be routed.

Node Address Overrides. An optional NDIS MAC capability that allows on-the-fly node address overrides is not supported by ODINSUP because ODI MLIDs do not support this feature. However, ODI MLIDs do support node address overrides from the NET.CFG file. NDIS protocols that want to change the node address will not work with ODINSUP. This should not be a problem, since the user desiring a different node address can simply specify it in the NET.CFG file. (For an example, see the configuration section for DEC Pathworks.)

Note that ODINSUP will allow its NDIS Node Address function to be called. However, it will return an error if the node address given does not match the node address already configured in the ODI MLID driver it is using.

Sample Configurations

The following examples of environment-specific customer configurations are reported to work successfully, although most of them have not been tested by Novell. You may want to test the NDIS application you are using before putting the configuration into production. For many customers, ODINSUP has solved the NDIS business need. In some cases, the ODI driver-ODINSUP solution has been more reliable and/or faster.

NetWare and 3Com 3+Open with the NBP Protocol

This section describes a sample configuration for NetWare and 3Com's 3+Open network operating system using NBP (Network Block Protocol).

CONFIG.SYS

```
shell=a:\command.com /p /e:1024 /msg
        device=a:\setver.exe
        buffers=35
        files=35
        lastdrive=M:
        device=a:\netware\protman.dos /i:a:\netware
```

AUTOEXEC.BAT

```
prompt $P$G
        path=a:\netware;
```

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```
cd \netware
lsl
3c503
odinsup
nbp
netbind
ipxodi A
netx
```

NET.CFG

```
protocol ODINSUP
        bind 3C503
        BUFFERED

link driver 3C503
        int  3
        mem DC000
        port 300
        frame Ethernet_II
        frame Ethernet_802.3
        frame Ethernet_snap
        frame ethernet_802.2
        protocol IPX 8137 Ethernet_II
```

PROTOCOL.INI

```
[PROTOCOL_MANAGER]
        drivername = PROTMAN$

[NBP]
        drivername = NBP$
        bindings = x3C503

[3C503]
        drivername = x3c503$
```

NetWare and 3Com 3+Share Server

This section describes a sample configuration for NetWare and 3Com's 3+Share network operating system.

CONFIG.SYS

```
break = on
    buffers = 4
    files = 20
    lastdrive = h
    device = c:\himem.sys
    device = c:\oditest\protman.dos /I:\oditest
    device = c:\oditest\xnstp.dos
```

In CONFIG.SYS, note that the /I: parameter points to the location of the PROTOCOL.INI file. Use XNSTP if you are using XNS.

AUTOEXEC.BAT

```
cd <path>
```

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```
lsl
3c503
odinsup
xnstp
netbind
netbios
minses12
msredir
setname $$3com$$
3clogin <username>
ipxodi a
netx
<next available drive>
```

In this example, <path> is the directory in which the ODINSUP.COM and NET.CFG files are found, and <next available drive> is LASTDRIVE plus one. For example, if LASTDRIVE=H, the next available drive is I. After the NetWare shell (NETX) is loaded, log in to the NetWare server by accessing the drive indicated by LASTDRIVE + 1.

Note the use of the A parameter for IPXODI to load IPX only, not SPX.

NET.CFG

```
protocol ODINSUP
        bind 3c503

link driver 3c503
        frame ethernet_802.3
        frame ethernet_ii
        frame ethernet_802.2
        frame ethernet_snap
        protocol IPX 0 Ethernet_802.3
```

PROTOCOL.INI

```
[PROTOCOL_MANAGER]
        DriverName=PROTMAN$

[XNS]
        DriverName=XNSTP$
        Bindings=x3c503
```

Note that an x must precede the LAN driver name if the LAN driver name begins with a number.

NetWare and AT&T StarLAN/StarGROUP

This section describes a sample configuration for NetWare and AT&T's StarLAN/StarGROUP version 3.4, running ATTISO.DOS version 3.41. AT&T StarLAN version 3.3 (OEM of LAN Manager 1.x) and version 3.5 (OEM of LAN Manager 2.x) should also work with ODINSUP.COM.

CONFIG.SYS

```
device=a:\protman.dos /i:a:\
    device=a:\attload.dos /Y
    device=a:\attiso.dos
    shell=a:\command.com /p /e:1024 /msg
    buffers=30
```

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```
files=60
lastdrive=h:
```

AUTOEXEC.BAT

```
prompt $P$G
        path c:\drdos;
        ;REM *** AT&T StarGROUP(R) Software - Do Not Modify ***
        SET ATTLANROOT=a:\
        PATH=%ATTLANROOT%\netprog;%PATH%;\\LANMGR33.SERVE\U
        lsl
        ne2000
        odinsup
        netbind
        ipxodi
        netx
```

NET.CFG

```
protocol ODINSUP
                bind NE2000
                BUFFERED

link driver NE2000
                int  #1 5
                port #1 360
                frame Ethernet_802.3
                frame Ethernet_II
                frame Ethernet_snap
                frame Ethernet_802.2
```

PROTOCOL.INI

```
[protocol manager]
                drivername = PROTMAN$

[attiso]
                drivername = ATTISO$
                bindings = NE2000
                nsess = 5
                ncmds = 14
                use_emm = N
```

NetWare and Banyan VINES

The following is a working configuration for using ODINSUP.COM with Banyan's VINES network operating system.

1. Run Banyan's PCCONFIG.EXE utility and select the NDIS Ethernet card settings.
2. Run SETHAND.EXE (available from Banyan) to decrease the number of file handles used by Banyan's REDIRALL.EXE redirector. Decrease file handles from 255 to 200 (200 representing the highest numbered file handle assigned by Vines). You must use the version of SETHAND that works with the version of REDIRALL.EXE you have.
3. The shell (REDIRALL.EXE or NETX.COM) loaded last will be the shell that will have the drive mapping for any given letter. For example, if NETX.COM was loaded after REDIRALL.EXE and you are using

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drive M for a NetWare mapping, you can't use Banyan's SETDRIVE command to map M to a Banyan drive.

CONFIG.SYS

```
files=20
        buffers=20
        device=c:\banyan\protman.dos /I:c:\lanman
        lastdrive=E
```

AUTOEXEC.BAT

```
echo off
        prompt $p$g
        lsl
        ne2000
        odinsup
        ban /nc
        ndisban
        ipxodi
        netx
        f:login supervisor
        c:
        redirall
        z:login admin@eng@testing
```

NET.CFG

```
link driver NE2000
            int 2
            port 320
            frame ethernet_802.2
            frame ethernet_snap
            frame ethernet_ii
            frame ethernet_802.3

protocol odinsup
            bind ne2000
```

PROTOCOL.INI

```
[PROTOCOL_MANAGER]
            DRIVERNAME=PROTMAN$

[VINES_XIF]
            DRIVERNAME=NDISBAN$
            BINDINGS=NE2000
```

NetWare and DEC Pathworks

Setting Up Files. Make a directory \DECNET on your hard disk, floppy diskette, or wherever the current drive is. (For example, if you're on drive E, make the directory E:\DECNET.) Copy the files from the floppy into this directory.

Copy or rename one of the .DAT files to DECPARM.DAT. If you receive a message from DLLNDIS that says it couldn't find your DECPARM.DAT file, be sure it's in the \DECNET directory on the current disk. (This can be moved if you want).

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CONFIG.SYS Changes. All you need in CONFIG.SYS is PROTMAN.SYS. To use ODINSUP, remark out the NDIS.DOS driver.

CONFIG.SYS

```
break on
        files=40
        buffers=30
        device=c:\qemm\qemm386.sys ram
        device=c:\pwtcp.sys
        device=c:\protman.exe
        stacks=9,256
        lastdrive=m
```

AUTOEXEC.BAT

```
lsl
        ne2000
        odinsup
        dllndis   ;DLL -> NDIS driver
        netbind
        sch           ;Load PathWorks network scheduler
        dnneth  ;Load DECnet network process
        ipxodi
        netx
```

Here is another sample AUTOEXEC.BAT for a slightly different configuration.

```
lsl
        ne2000
        odinsup
        dllndis
        ndis -d:2
        pwbind
        sch
        dnneth
        redir5
        setname joebob
        use f: \\au1\pcsav41
        use m: \\drie01\joebob%%joebob *
        emsload lat
        ipxodi
        netx
```

PROTOCOL.INI Changes. Edit the PROTOCOL.INI file and change the Bindings= section to bind to whatever driver you're really using.

PROTOCOL.INI

```
[PROTOCOL MANAGER]
        DRIVERNAME=PROTMAN$

[IPX4MAC]
        DRIVER=IPX$MAC
        BINDINGS=NE2000

[DATALINK]
```

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```
DRIVERNAME= DLL$MAC
LG_BUFFERS=16
SM_BUFFERS=6
OUTSTANDING=32
HEURISTICS=0
BINDINGS=NE2000
NI_IRQ=4
```

NET.CFG Changes. You need to add the node address override to your NET.CFG file. The address looks like:

```
Link Driver NE1000

..etc..

Node Address AA000400xxxx
```

All DECnet addresses are in the form AA-00-04-00-XX-XX. The final four digits are computed from the node address, as follows.

DECnet nodes are numbered in the form area.number. For example, node 9.440 is in area 9, number 440. Basically, you calculate area x 1024 + node. In this example, 9 x 1024 + 440 = 9,656 (decimal). Convert this to hex to get 25B8h. Swap the bytes and put them into the address. You now have AA-00-04-00-B8-25. So, for node 9.440, the Node Address is AA000400B825.

Note: If you don't do this NET.CFG node address calculation, a common error message is Network name not found when attempting to connect to the DEC.

NET.CFG

```
link support
        buffers 20 1514
        mempool 4096

protocol ODINSUP
        bind ne2000

protocol IPX
        bind ne2000

link driver NE2000
        int #1 4
        port #1 320
        mem #1 D000
        frame Ethernet_II
        frame Ethernet_802.3
        frame Ethernet_802.2
        frame Ethernet_snap
        protocol IPX 0 Ethernet_802.3
        Node Address AA000400B825
```

NetWare, DEC Pathworks, and IBM 3270 Emulation

The following configuration files were used to successfully connect a workstation containing a 3C523 network adapter to an IBM 3090 (running a 3270 application and using the LAN Support Program from IBM), a DEC VAX running Pathworks, and a NetWare v3.11 server.

The workstation connects to the 3090 using 3270 emulation from Windows. The workstation goes through

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an OS/2 gateway to access the mainframe. From the Ethernet LAN segment, the OS/2 gateway connects to a Token-Ring segment, which connects to a 3745 controller, which connects via a T1 line to the mainframe offsite.

The VAX is running DEC Pathworks. From the Ethernet LAN segment, a Cisco router connects via a T1 line to the VAX offsite.

CONFIG.SYS

```
device=c:\dos\setver.exe
        device=c:\dos\himem.sys
        device=c:\dos\emm386.exe noems i=b000-b7ff
        dos=high,umb
        files=35
        buffers=30
        device=c:\protman.exe
        devicehigh=c:\dxma0mod.sys
        devicehigh=c:\dxme0mod.sys
        stacks=0,0
        shell=c:\command.com c:\ /E:1024 /P
```

AUTOEXEC.BAT

```
lh lsl
        lh 3c523
        odinsup
        dllndis      <--- DLL -> NDIS driver
        netbind
        path c:\dos;
        prompt $p$g
        sch          <--- load Pathworks network scheduler
        dnneth       <--- load DECnet network process
        redir5
        lat
        ipxodi
        netx
```

NET.CFG

```
protocol ODINSUP
        bind 3C523

link driver 3C523
        frame Ethernet_802.2
        frame Ethernet_802.3
        frame Ethernet_II
        frame Ethernet_snap
        protocol IPX 0 Ethernet_802.3
        Node Address AA000400B825  <-- Note new node address
```

PROTOCOL.INI

```
[PROTOCOL MANAGER]
        drivername=PROTMAN$

[ETHERAND]
        drivername=DXME0$
```

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```
        bindings=x3C523

[3C523]
        drivername=X3C523$
        maxtransmits = 20
        interrupt=3
        iobase=0x300

[IPX4MAC]
        driver=IPX$MAC
        bindings=x3C523

[DATALINK]
        drivername= DLL$MAC
        lg_buffers=16
        sm_buffers=6
        outstanding=32
        heuristics=0
        bindings=x3C523
        ni_irq=3
```

NetWare and HP ARPA Services in Windows

This section details a sample integration of MS-DOS 5.0/Windows, QEMM 6.02, Netware v3.11, and Hewlett-Packard HP ARPA Services 2.1 using ODINSUP. ARPA Services is an NDIS application that uses NDIS drivers instead of Novell ODI drivers. However, ODINSUP will also work as an option. In this case, the customer didn't want to use 802.3 frames for the servers, but apparently 802.3 is the only option with ARPA Services. For that reason, ODINSUP was the solution.

The sample configuration files were used with ODINSUP.COM and Windows ARPA Services. The network interface card is an HP Elite 16.

CONFIG.SYS

```
device=c:\qemm\qemm386.Sys ram rom on
        device=c:\qemm\loadhi.sys c:\dos\setver.exe
        device=c:\qemm\loadhi.sys c:\windows\mouse.sys /y
        device=c:\qemm\loadhi.sys c:\dos\ansi.sys /x
        install c:\dos\share.exe
        shell=c:\dos\command.com c:\dos\ /e:384 /p
        dos=high
        break=on
        stacks=0,0
        buffers=40
        files=60
        device=c:\hpnet\drivers\protman\protman.dos /i:c:\hpnet
        device=c:\hpnet\drivers\protocol\tcpip\nemm.dos
        device=c:\hpnet\drivers\protocol\tcpip\tcpdrv.dos
          /i:c:\hpnet
        device=c:\hpnet\drivers\protocol\tcpip\ipxdrv.dos
```

AUTOEXEC.BAT

```
prompt $p$g
        set path=c:\qemm;c:\windows;c:\dos;c:\;c:\hpnet;
          c:\hpnet\netprog
        lsl
```

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```
hpdwsa16    <----- Newest HP ODI driver required
                   (dated June 1992 or later)
odinsup
c:\hpnet\drivers\protman\netbind
call c:\hpnet\net_strt
ipxodi
netx
f:
login
win
```

NET.CFG

```
link support
        buffers 8 1500
        mempool 4096

protocol ODINSUP
        bind hpdwsa16
        BUFFERED

link driver hpdwsa16
        int #1 5
        port #1 300
        frame ETHERNET_II
        frame ETHERNET_802.3
        frame ETHERNET_802.2
        frame ETHERNET_SNAP
        protocol IPX 0 Ethernet_802.3

protocol TCPIP
        IP_address xxx.xxx.xx.xxx
```

PROTOCOL.INI

```
; HP IPX stub driver
        [IPXDRV]
          DRIVERNAME = IPX$
          BINDINGS   = hpdwsa16  <----- must be ODI driver name

; To add another NDIS driver, uncomment (remove semicolon
        ; for [DEVICENAME] ) the devicename and replace the new
        ; DeviceDriver description. The new card may or may not
        ; require parameters following DRIVERNAME. If some
        ; parameter lines are not required, delete them.
        ; NOTE: semicolons represent commented out lines.
        ;
        ; [DEVICENAME]
        ; DRIVERNAME = DeviceDriver ??
        ; INTERRUPT = 5
        ; IOADDRESS = 0x300
        ; RAMAddress = 0x
        ;
        ;************************
        ;**     PROTOCOLS      **
        ;************************
```

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```
[TCPIP]
        DRIVERNAME = TCPIP$
        BINDINGS = hpdwsa16  <------ Must be ODI driver name
        TCPCONNECTIONS = 11
        TCPWINDOWSIZE  = 1450
        TCPSEGMENTSIZE = 1450
        TCPCONNTIMEOUT = 30
        TCPKEEPALIVE   = 600
        LOADFACTOR     = 120
        LBUFSZ         = 1530
        MBUFSZ         = 600
        SBUFSZ         = 256
        LBP            = 51
        MBP            = 31
        CLIENTOD       = 14
        CLIENTBD       = 40
        CLIENTMSG      = 18
        CLIENTAMSG     = 31
        IPSOCKETSIZE   = 3
        ARPTBLSIZE     = 28
        ERRLOGSIZE     = 1
        IPADDRESS0     = 15 13 161 69
        SUBNETMASK0    = 255 255 248 0
        DEFAULTGATEWAY0 = 15 13 160 254
        UDP_Q_PER_USER =10
        UDP_Q_TOTAL    =20

[PROBE]
        DRIVERNAME = PROBE$
        BINDINGS = TCPIP
        NSDOMAIN = domain1.hpcom

[TCPGLOBAL]
        HOSTNAME = hess486
        NETFILES = C:\HPNET\ETC

[TINYRFC]
        DRIVERNAME = TINYRFC$
        BINDINGS   = TCPIP
        NUMNAMES   = 9
        NUMSESSIONS = 0

[NMDRV]
        DRIVERNAME = NMDRV$
        BINDINGS   = TCPIP

[SOCKETS]
        DRIVERNAME = SOCKETS$
        BINDINGS = TCPIP
        NUMSOCKETS = 3
        POOLSIZE = 3200
        MAXSENDSIZE=1024

[DNR]
        DRIVERNAME = DNR$
        BINDINGS = TCPIP
```

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```
        NAMESERVER0 = 15 3 32 17
        DOMAIN = domain1.hp.com

[HP-VT]
        DRIVERNAME = VTCOM
        BINDINGS = TCPIP
        NSESSIONS = 3

[TELNET]
        DRIVERNAME = TELNET$
        BINDINGS = TCPIP
        NSESSIONS = 3
        MAX_OUT_SENDS = 3
        MAX_SEND_SIZE = 128
        DRIVER_EOL = 1
        APP_EOL = 1
        REDIRECT_COM = 1
        ECM_CHAR = 0x1E
        BRK_ACTION = 3
        MUI_PROMPT = MUI (? for help)>

[TICL]
        DRIVERNAME = TICL$
        BINDINGS = TCPIP
        ACBS =
        CMDS =
        VCS  = 2
        PORTS =
```

NetWare and IBM AS/400 (Ethernet)

The following is a working configuration for using ODINSUP.COM with IBM's AS/400 PC/Support 2.1 application.

Note: You can also use Novell's NetWare for SAA v1.2 or later to connect to an IBM AS/400 host without having to use IBM LAN Support, ODI drivers, or ODINSUP.

This example details the CONFIG.SYS, AUTOEXEC.BAT, NET.CFG, and PROTOCOL.INI files for Ethernet connectivity with SMC (also known as Western Digital) network adapters that employ remote booting with WD boot PROMs. The customer is using LAN Support version 1.25 from IBM for DXMA0MOD.SYS and DXME0MOD.SYS, and SMCPLUS.COM (size 17,385 bytes, dated 2-13-92 or later). Older versions of this ODI LAN driver did not have the MSM (Media Support Module) version 1.2 linked in.

AS/400 Error Message. Occasionally we have seen the following error messages when loading IBM PC/Support with some third-party LAN drivers:

```
5150 SNA Verb Failed 0014 00000000
        5143 NJAC07nD system not found
```

These messages have only been seen with the ODINSUP.COM version 1.01 dated 2-27-92. Upgrade to at least ODINSUP version 1.1 dated 4-27-92 or later. The latest is ODINSUP.COM version 1.21 dated 11-13-92.

CONFIG.SYS

```
files=30
        buffers=30
```

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```
device=protman.exe /I:A:\
device=dxma0mod.sys 001
device=dxme0mod.sys
device=EIMPCS.SYS P=0
device=ECYDDX.SYS files=8 drives=2
```

AUTOEXEC.BAT

```
echo off
    prompt $p$g
    cls
    lsl
    smcplus
    odinsup
    netbind
    ipxodi
    netx
    f:
    login
    startpcs
```

NET.CFG

```
protocol ODINSUP
        bind SMCPLUS

link driver SMCPLUS
        frame Ethernet_802.2
        frame Ethernet_II
        frame Ethernet_snap
        frame Ethernet_802.3
        protocol IPX 0 Ethernet_802.3
```

PROTOCOL.INI

```
[PROTOCOL_MANAGER]
        DriverName = PROTMAN$

[ETHERNET]
        DriverName = DXME0$
        Bindings = SMCPLUS
```

NetWare and IBM LAN Server

This section describes a sample IBM LAN Server and NetWare v3.11 ODINSUP solution with an NE2000 Ethernet adapter. (The version of ODINSUP.COM must be dated 2-27-92 or later).

CONFIG.SYS

```
device=c:\protman.exe
    device=c:\dxma0mod.sys 001
    device=c:\dxme0mod.sys
    device=c:\dxmt0mod.sys S=12 C=14 ST=12 O=N
    files=40
    buffers=40
    SHELL=C:\command.com /E:2000 /P
    LASTDRIVE=M
```

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AUTOEXEC.BAT

```
prompt $P$G
        lsl
        ne2000
        odinsup
        NETBIND
        NET START
        CALL INITFSI.BAT
        ipxodi
        netx
        n:
```

Note: It is required to load NETX after NET START and CALL INITFSI.BAT.

NET.CFG

```
protocol ODINSUP
        bind NE2000

link driver NE2000
        int 5
        port 360
        frame Ethernet_802.2
        frame Ethernet_II
        frame Ethernet_snap
        frame Ethernet_802.3
        protocol IPX 0 Ethernet_802.3
```

PROTOCOL.INI

```
[PROTOCOL_MANAGER]
        DriverName = PROTMAN$

[ETHERNET]
        DriverName = DXME0$
        Bindings = NE2000
```

NetWare and Microsoft LAN Manager

To run NetWare and Microsoft LAN Manager 2.0 and 2.1, you'll need ODINSUP.COM version 1.10 or later on the DOS client. Also, the BUFFERED parameter must be used in the NET.CFG file.

Since the mapping of functions between ODI and NDIS is not one-to-one, a few functions in the ODINSUP module do not comply completely with the NDIS MAC specification. Since most protocols don't use these MAC capabilities, it is not expected that any of these discrepancies will create situations where certain NDIS protocols won't work with ODINSUP.

When doing a receive operation, ODI Ethernet MLIDs provide a maximum of 150 (128+14+3+5) bytes of receive look-ahead data. ODI Token-Ring drivers provide a maximum of 168 (128+14+18+3+5) bytes of receive look-ahead when doing a receive operation. These numbers are derived as follows:

```
128             bytes of data
        14              size of an 802.3 or 802.5 MAC Layer header
        18              maximum size of Source Routing field in Token-Ring
        3               size of an 802.2 Type I header
        5               size of a SNAP Protocol ID field
```

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NDIS specifies that MACs must support up to 256 bytes of receive look-ahead data. Therefore, NDIS protocols needing more than the stated maximums above will not work with ODINSUP unless the new switch BUFFERED is added to the NET.CFG file for ODINSUP.

There is now a detection mechanism if a look-ahead size larger than 128 bytes and the maximum media header (Ethernet is 22 bytes) is requested. An error message is printed and the user is asked to insert the new keyword BUFFERED into the protocol section of the NET.CFG file. For example:

```
protocol ODINSUP
        bind ne2000
        BUFFERED
```

The ordering of the BUFFERED keyword doesn't matter. When ODINSUP.COM detects the BUFFERED keyword, it enables double buffering of received packets for presentation to the NDIS protocol stacks. This will result in a small degradation in performance due to a double copy of the packet. However, in a DOS environment it should not significantly affect performance.

Protocols that rely heavily on the MAC Interrupt Request function may not perform well with ODINSUP. This function requires the ability to generate asynchronous interrupts on demand of the protocol. Since ODINSUP does not have direct access to a hardware device, this function must be emulated in software. That limits the frequency of Interrupt Request acknowledges to a maximum of one every 55 milliseconds.

Although the IBM DLC software requires interrupt requests, it was possible to hook their Int 5C interface to provide higher resolution interrupt request acknowledges.

NetWare and Microsoft LAN Manager 2.0. For LAN Manager 2.0 or later, ODINSUP.COM v1.1 dated 4-27-92 or later is required.

CONFIG.SYS

```
lastdrive=m
        device=c:\lanman.dos\drivers\protman\protman.dos
          /i:c:\lanman.dos
        device=c:\lanman.dos\drivers\protocol\netbeui\netbeui.dos
```

AUTOEXEC.BAT

```
prompt $P$G
        lsl
        ne2000
        odinsup
        REM == LANMAN 2.0 - DO NOT MODIFY BETWEEN THESE LINES ==
        SET PATH=C:\LANMAN.DOS\NETPROG;%PATH%
        C:\LANMAN.DOS\DRIVERS\PROTMAN\NETBIND
        NET START WORKSTATION
        REM == LANMAN 2.0 - DO NOT MODIFY BETWEEN THESE LINES ==
        ipxodi
        netx
        n:
```

NET.CFG

```
protocol ODINSUP
        bind NE2000
        BUFFERED     <--------- REQUIRED!

link Driver NE2000
```

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```
        int 5
        port 360
        frame Ethernet_802.2
        frame Ethernet_II
        frame Ethernet_snap
        frame Ethernet_802.3
        protocol IPX 0 Ethernet_802.3
```

PROTOCOL.INI

```
[PROTMAN]
        DRIVERNAME = PROTMAN$
        DYNAMIC = YES
        PRIORITY = NETBEUI

[NETBEUI_XIF]
        Drivername = netbeui$
        SESSIONS = 6
        NCBS = 12
        BINDINGS = NE2000
        LANABASE = 0
```

NetWare and Microsoft LAN Manager 2.1. For LAN Manager 2.0 or later, ODINSUP.COM v1.1 dated 4-27-92 or later is required.

CONFIG.SYS

```
files=20
        buffers=10
        lastdrive=m
        device=c:\lanman.dos\drivers\protman\protman.dos
          /i:c:\lanman.dos
```

AUTOEXEC.BAT

```
prompt $P$G
        lsl
        ne2000
        odinsup
        REM = LANMAN 2.1 - DO NOT MODIFY BETWEEN THESE LINES ==
        SET PATH=C:\LANMAN21.DOS\NETPROG;%PATH%
        C:\LANMAN.DOS\DRIVERS\PROTMAN\NETBIND
        NET START WORKSTATION
        LOAD NETBEUI
        NET LOGON TESTER2 *
        REM == LANMAN 2.1 - DO NOT MODIFY BETWEEN THESE LINES ==
        ipxodi
        netx
        n:
```

NET.CFG

```
link support
                buffers 10 1518

protocol ODINSUP
        bind NE2000
```

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```
        BUFFERED      <------ REQUIRED!

link driver NE2000
        int 5
        port 360
        frame Ethernet_802.2
        frame Ethernet_II
        frame Ethernet_snap
        frame Ethernet_802.3
        protocol IPX 0 Ethernet_802.3
```

PROTOCOL.INI

```
[PROTMAN]
        drivername = PROTMAN$
        dynamic = YES
        priority = NETBEUI

[NETBEUI_XIF]
        drivername = netbeui$
        sessions = 6
        ncbs = 12
        bindings = NE2000
        LANAbase = 0
```

NetWare and Sun PC/NFS

For this example configuration, the following products and versions were used:

Package/Driver	Version/Comments
PC/NFS	3.5
NetWare	3.11
DOS	5.0
QEMM	6.03
ODINSUP.COM	1.01
LSL	current version
NETBIND	1.1
EXP16ODI	1.10 (Intel ODI Driver EtherExpress 16TP)
PCNFS.SYS	(for PC/NFS version 3.5)
SOCKDRV.SYS	(for PC/NFS version 3.5)
PROTMAN.SYS	1.1
NFS-NDIS.SYS	(for PC/NFS version 3.5)

CONFIG.SYS

```
device=c:\qemm\qemm386.sys ram nosh
        device=c:\qemm\loadhi.sys /r:3 /res=4208 /sqt=f800-f8ff c:\dos\ansi.sys dos=umb,high
        shell=c:\dos\command.com c:\dos\ /P /E:1024
        buffers=40
        files=40
        device=c:\nfspcnfs.sys
        device=c:\sockdrv.sys
        device=c:\lanman\protman.sys
        device=c:\lanman\nfs-ndis.sys
        lastdrive=e
```

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AUTOEXEC.BAT

```
prompt $p$g
        ncc /fast
        scrollbk /ems /m128
        c:\qemm\loadhi /r:2 doskey
        set tz=CST6CDT
        set nfsdrive=C
        c:\qemm\loadhi /r:2 c:\lsl
        c:\qemm\loadhi /r:2 c:\exp16odi
        odinsup
        netbind
        c:\qemm\loadhi /r:2 prt *
        nfsrun
        c:\qemm\loadhi /r:1 ipxodi
        emsnetx
        f:
```

NET.CFG

```
protocol ODINSUP
        bind EXP16ODI

link driver EXP16ODI
        int 5
        port 360
        frame Ethernet_II
        frame Ethernet_802.2
        frame Ethernet_802.3
        frame Ethernet_snap
        protocol IPX O ethernet_802.3
```

PROTOCOL.INI

```
[PROTOCOL MANAGER]
        DRIVERNAME = PROTMAN$

[NFS-NDIS]
        DRIVERNAME = NFSLINK1
        BINDINGS = EXP16ODI
```

NetWare, Synoptics LNMS v4.0, and Windows

The LatisNet Network Management Software (LNMS) from Synoptics is an NDIS application. The sample configuration files assume LNMS 4.0 is already installed.

CONFIG.SYS

```
device=c:\dos\setver.exe
        device=c:\windows\himem.sys
        dos=high
        files=30
        shell=c:\dos\command.com c:\dos\  /p
        stacks=9,256
        device=c:\comm\protman.dos /i:c:\net
        device=c:\comm\netmanag.dos
```

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AUTOEXEC.BAT

```
c:\windows\smartdrv.exe
        echo off
        prompt $p$g
        path=c:\comm;c:\windows;c:\dos
        set temp=c:\dos
        cd \net
        lsl
        ne2000
        odinsup
        c:\comm\netbind
        cd \
        set tmp = c:\tmp
        set path=c:\ov;%path%
        ipxodi
        netx
        f:
        login
        win
```

NET.CFG

```
link support
        MEMPOOL 4096
        BUFFERS 8 1500

protocol ODINSUP
        bind ne2000

link driver ne2000
        int 5
        port 360
        frame Ethernet_802.3
        frame Ethernet_II
        frame Ethernet_SNAP
        frame Ethernet_802.2
        protocol IPX 0 Ethernet_802.3

protocol TCPIP
        ip_address      xxx.xxx.xx.x
        ip_netmask      xxx.xxx.x.x
        tcp_sockets     8
        udp_sockets     8
        raw_sockets     1
        nb_sessions     4
        nb_commands     8
        nb_adapter      0
        nb_domain
```

PROTOCOL.INI

```
[PROTOCOL_MANAGER]
        DriverName = PROTMAN$

[NETMANAGE]
```

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```
DRIVERNAME=NETMNG$
BINDINGS=NE2000
```

NetWare and Ungermann-Bass NDIS Stack with an NE2000

This is an example configuration for using an NE2000 compatible adapter in a DOS workstation loading one UB NDIS TCP stack and IPXODI using ODINSUP. In the CONFIG.SYS file, substitute the paths to the devices and change the LASTDRIVE statement to match your environment.

CONFIG.SYS

```
buffers=20
        files=25
        device=a:\arch\protman.dos /i:a:\arch
        device=a:\arch\ubtpw.dos
        device=a:\ubloop.dos
        lastdrive=m
```

Note: On line 4, use UBTPW.DOS if you will be using NETCI or an LC file. Use UBTPS.DOS if you will not be using NETCI or an LC file.

AUTOEXEC.BAT

```
prompt $p$g
        path a:\;a:\arch;
        set NETONE=a:\arch
        lsl
        ne2000
        odinsup
        a:\arch\netbind
        ipxodi
        netx
```

Substitute the PATH and SET statements to reflect your directory structure.

NET.CFG

```
protocol ODINSUP
                bind NE2000
                BUFFERED

link driver NE2000
                int 5
                mem D8000
                port 360
                frame Ethernet_802.3
                frame Ethernet_802.2
                frame Ethernet_II
                frame Ethernet_snap
                protocol IPX 0 Ethernet_802.3
```

Substitute the INT, MEM, and PORT settings to reflect the jumper settings on your network adapter.

PROTOCOL.INI

```
[PROTOCOL MANAGER]
        Drivername=Protman$
```

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```
[TCPBIOS]
        Drivername=UBDRV$0
        IPAddr    =xxx.xxx.x.xxx
        NetSubNetMask=xxx.xxx.xxx.x
      ; LCFile = a:\arch\xxxxxa.lc
        VCs = 10
        VCReceiveLarge = 40
        VCSends = 200
        Instance = 1
        Bindings = UBLOOP

[UBLOOP]
        DriverName = UBLOOP$
        Bindings = "NE2000"
```

Substitute your correct IP address and subnet mask. The LC file is only required if NETCI will be used (see the Note for the CONFIG.SYS example above.)

NetWare and Ungermann-Bass TCP NDIS Stack

This section describes a sample configuration for NetWare and Ungermann-Bass's TCP for NDIS protocol stack, using Ungermann-Bass's UBODI ODI LAN driver and the UBNEI NDIS MAC driver.

CONFIG.SYS

```
buffers=20
        files=25
        fcbs=16,8
        device=c:\arch\protman.dos /i:c:\arch
        device=c:\arch\ubtpw.dos
        device=c:\ubloop.dos
        rem device=c:\arch\ubnei.dos
        lastdrive=m
```

AUTOEXEC.BAT

```
prompt $p$g
        path c:\;c:\arch;c:\network;
        set NETONE=c:\arch
        lsl
        ubodi
        odinsup
        c:\arch\netbind
        ipxodi
        netx
```

NET.CFG

```
protocol ODINSUP
                bind UBODI
                BUFFERED

link driver UBODI
                ADAPTERTYPE Personal NIU/ex
                int 5
                mem b0000
```

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```
        port 368
        frame Ethernet_802.3
        frame Ethernet_802.2
        frame Ethernet_II
        frame Ethernet_snap
        protocol IPX 0 Ethernet_802.3
```

PROTOCOL.INI

```
[PROTOCOL MANAGER]
        Drivername=Protman$

[TCPBIOS]
        Drivername=UBDRV$0
        LCFile = c:\arch\91912a.lc
      ; RCVWindow = 8
      ; SendWindow = 8
        VCs = 10
        VCReceiveLarge = 40
        VCSends = 200
        Instance = 1
        Bindings = UBLOOP

[UBLOOP]
        DriverName = UBLOOP$
        Bindings = UBODI

[Adapter]
      ; DriverName = UBNEI$
        AdapterType = PCNIUex
        MemoryWindow = 0xb0000
        IO_Port = 0x368
        IRQ_Level = 5
      ; SlotNumber = 4
        MaxRequests = 6
        MaxTransmits = 6
        ReceiveBufSize = 600
        MaxMulticast = 16
        ReceiveMethod = ReceiveLookahead
        ReceiveBuffers = 64
```

NetWare and Ungermann-Bass XNS NDIS Stack

This is a sample configuration for NetWare and the Ungermann-Bass XNS NDIS protocol stack

CONFIG.SYS

```
buffers=20
        files=25
        fcbs=16,8
        device=a:\arch\protman.dos /i:a:\arch
        device=a:\arch\ubxpw.dos
        device=a:\ubloop.dos
        rem device=a:\arch\ubnei.dos
        lastdrive=m
```

AUTOEXEC.BAT

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```
prompt $p$g
        path a:\;a:\arch;a:\network;
        set NETONE=a:\arch
        lsl
        ubodi
        odinsup
        a:\arch\netbind
        ipxodi
        netx
```

NET.CFG

```
protocol ODINSUP
                bind UBODI
                BUFFERED

link driver UBODI
                adaptertype Personal NIU/ex
                int 5
                mem b0000
                port 368
                frame Ethernet_802.3
                frame Ethernet_802.2
                frame Ethernet_II
                frame Ethernet_snap
                protocol IPX 0 Ethernet_802.3
```

PROTOCOL.INI

```
[PROTOCOL MANAGER]
        Drivername=Protman$

[XNSBIOS]
        Drivername=UBDRV$0
        LCFile = a:\arch\565505a.lc
        RCVWindow = 8
        SendWindow = 8
        VCs = 10
        VCReceiveLarge = 40
        VCSends = 200
        Instance = 1
        Bindings = UBLOOP

[UBLOOP]
        DriverName = UBLOOP$
        Bindings = UBODI

[Adapter]
        ; DriverName = UBNEI$
          AdapterType = PCNIUex
          MemoryWindow = 0xb0000
          IO_Port = 0x368
          IRQ_Level = 5
        ; SlotNumber = 4
          MaxRequests = 6
          MaxTransmits = 6
```

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```
    ReceiveBufSize = 600
    MaxMulticast = 16
    ReceiveMethod = ReceiveLookahead
    ReceiveBuffers = 64
```

Netware and Walker Richer & Quinn's Reflection 1+

This section details a configuration using Walker Richer & Quinn's Reflection 1+ and its NDIS interface with an HP 3000, IBM PC 3270 Communication for Windows version 2.2 (and its DXMA0MOD and DXME0MOD interface using Token-Ring with IBM LAN Support Program version 1.3).

CONFIG.SYS

```
device=c:\dos\himem.sys
    device=c:\dos\emm386.exe noems
    device=c:\dos\setver.exe
    dos=high,umb
    lastdrive=E
    shell=c:\command.com /e:2048 /p
    buffers=20
    files=40
    stacks=8,256
    device=c:\lanman\protman.dos /I:C:\lanman
    device=c:\lanman\dxma0mod.sys 001
    device=c:\lanman\dxme0mod.sys
```

AUTOEXEC.BAT

```
set tid=047
    prompt $p$g
    PATH c:\dos;c:\bat;c:\windows;c:\novell;c:\win31;c:\winice
    cd \novell
    lsl
    lh token
    lh odinsup
    lh c:\wrqnet\rndis /stacks:4
    c:\lanman\netbind
    lh c:\wrqnet\tcp2pdis /textini:c:\lanman\protocol.ini
    lh c:\wrqnet\wrqtcp
    lh c:\wrqnet\conmgr /sessions:1
    lh c:\wrqnet\vtmgr /windows /sessions:1
    lh route
    rem lh ipxodi /d
    rem netx
```

NET.CFG

```
task mode = 1
    eoj = off
    file handles = 60
    spx connections = 20
    search dir first = on

link driver token

    frame token-ring
```

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```
        frame token-ring_snap
                max frame size 1200

protocol ODINSUP
                bind token
                   BUFFERED
```

PROTOCOL.INI

```
[DXME0_MOD]
                DriverName = DXME0$
                Bindings = TOKEN

[WRQNDIS1]
                BINDINGS = TOKEN
                DRIVERNAME = WRQNDS1$

  Node = NODE047
                File =
                Domain = DOMAIN
                Organization = Organization
                Ipaddress0 = xxx xx xxx xx
                SubnetMask0 = xxx xxx xxx x
                DefaultGateway0 = xxx xx xxx x
                HostsPath = C:\WRQNET\
                NumTCPBuffers = 5
                TCPBufferSize = 1090
```

NetWare, Wall Data Rumba, and IBM 3270

This section details following configuration. The workstation contains an Excelan Ethernet adapter (EXOS.COM driver) and runs IBM's LAN Support Program 1.25, ODINSUP.COM, Wall Data's Rumba (a Windows-based 3270 application), while attempting two other 3270 applications from DOS. ODINSUP goes through an OS/2 1.3 Communications Manager gateway (at CSD 5015 or 5016--the gateway has an SMC Ethernet card and a IBM Token Ring 16/4 adapter, both running NDIS drivers), going to a 3745 controller, to an IBM 9000 mainframe (also using TCP/IP). The NetWare servers are on Ethernet.

CONFIG.SYS

```
device=dxma0mod.sys 001
        device=dxme0mod.sys ,,1
        device=dxmt0mod.sys
```

AUTOEXEC.BAT

```
lsl
        exos
        odinsup
        netbind
        wdtoktsr.exe   <<  execute for rumba
        tcpip
        ipxodi
        netx
        win          <<   Windows 3.1
```

NET.CFG

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```
link support
        buffers 20 1514
        mempool 4096

protocol ODINSUP
        bind EXOS

link driver EXOS
        int #1 5
        port #1 310
        frame Ethernet_II
        frame Ethernet_802.2
        frame Ethernet_SNAP
        frame Ethernet_802.3
        protocol IPX 0 Ethernet_802.3

protocol TCPIP
        ip_address xxx.x.x.xx
        ip_router  xxx.x.x.x
        ip_netmask x.x.x.x
        tcp_sockets 8
        udp_sockets 8
        raw_sockets 1
        nb_sessions 4
        nb_commands 8
        nb_adapter  0
        nb_domain
```

PROTOCOL.INI

```
[PROTOCOL_MANAGER]
        DriverName = PROTMAN$

[ETHERAND]
        DriverName = DXME0$
        Bindings = EXOS

[EXOS]
        DriverName = EXOS$
        Interrupt = 5
        RamAddress = 0XC000
        IRQ = 3
```

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