# intel.

# EtherExpress™ PRO/100 Mobile Adapter 16-bit PC Card

*- With Integrated 100 Mbps Transceiver*

# User's Guide

## How to Use This Manual

This User's Guide contains the latest and most complete information available at press time on the installation and operation of the PRO/100 PC Card. It is designed to help both new and experienced network users install and configure the Intel product in the shortest time possible.

## Overview of the Installation Process

For an overview of the installation process, see the **Quick Start Card** and **Chapters 1** and **2** in this User's Guide. For technical details on configuration issues see **Chapter 3, Configuration Reference.**

## How to Find More Information

Use the Table of Contents, Index, and page and text headings in this User's Guide to find what you need. Check the README file on the Intel Network Driver diskette. For updated drivers, access the Intel support website at:

```
http://support.intel.com
```

See **Appendix A** for additional support information.

**Second edition**                    **May 1997**                    **668562-002**

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# CONTENTS

# Hardware Installation

Follow the instructions in this chapter to install PRO/100 PC Card hardware and network cabling.

See **Chapter 2, Software Installation** for instructions on how to install network software using the Intel Installation Program.

## Model Number

MBLA1600

This model provides access to both 10Base-T and 100Base-TX networks with a single adapter cable, and detects 10 Mbps or 100 Mbps network speed. **Note that 100 Mbps operation requires Category 5 (data grade) unshielded twisted pair (UTP) cabling.**

## Before Installing Hardware

### Check Package Contents

Use the following list to check the package contents:

- PRO/100 PC Card
- A network adapter cable with a 15-pin PC Card connector at one end and a RJ-45 connector at the other (for 100Base-TX or 10Base-T Ethernet connectivity)
- Software on two 3.5-inch diskettes
- *Quick Install Card*
- *User's Guide*
- Product registration card (in this guide)
- Protective adapter case

**Note**

> Please fill out the Product Registration Card and mail it
> immediately to the Intel office indicated on the card.

## Verify Other Required Equipment

To install the PRO/100 PC Card, you need the following:

**1**   An Ethernet local area network running at 10 or 100 Mbps and a
network operating system supported by the PRO/100 PC Card.
See **Chapter 2, Software Installation** for a list of the network
operating systems supported.

**Note**

> Since the PRO/100 PC Card, automatically detects the
> speed of the network to which it is connected, it may be
> safely connected to either a 100Base-TX or 10Base-T
> network, as specified in items 2 and 3 below.

**2**   For connection to a 100Base-TX Ethernet network, a **Category 5**
(data grade) unshielded twisted pair (UTP) network cable
terminating in a male RJ-45 connector.

**Note**

> For 100 Mbps connectivity, network cable must be
> Category 5 (data grade) unshielded twisted pair (UTP).
> Category 3 (voice grade) wiring is reliable for 10 Mbps,
> however Intel recommends using Category 5 wiring
> whenever possible.

**3**   For connection to a 10Base-T twisted pair Ethernet network, a
network cable terminating in a male RJ-45 connector and
connected to a 10 Mbps hub or switch.

## Determine System Requirements

During installation of the PRO/100 PC Card hardware, power to the
computer may be ON or OFF. For best results, the computer should be
ON and your standard operating software should be loaded. If
configured to do so, your system will detect the PRO/100 PC Card. For
details on how to install driver software for your particular
environment, see **Chapter 2, Software Installation**.

The PRO/100 PC Card hardware is compatible with all type II and III PC Card slots (16-bit or 32-bit). Installation and removal procedures may vary on different computers. It can safely install in a CardBus, 32-bit slot.

## Installing the Hardware

### Insert the PRO/100 PC Card

**1**  Grasp the PRO/100 PC Card by the edges with the Intel label facing upward and the wide PC Card connector next to the insert slot.

**2**  Insert the PRO/100 PC Card into a PC Card slot and push it in until it is firmly seated (the Intel Installation Program will determine what slot the PRO/100 PC Card is in and configure accordingly).



Inserting the PRO/100 PC Card into the Computer

### Removing the PRO/100 PC Card

Follow the PC card removal instructions specified in the documentation for your computer.

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## Connecting the 10Base-T/100Base-TX Adapter Cable to the PRO/100 PC Card

•   With the Intel logo facing up, attach the 15-pin connector at the end of the adapter cable to the mating connector on the end of the PRO/100 PC Card. Press the cable connector gently into the connector on the PRO/100 PC Card until it clicks into place. Do not force the connection.
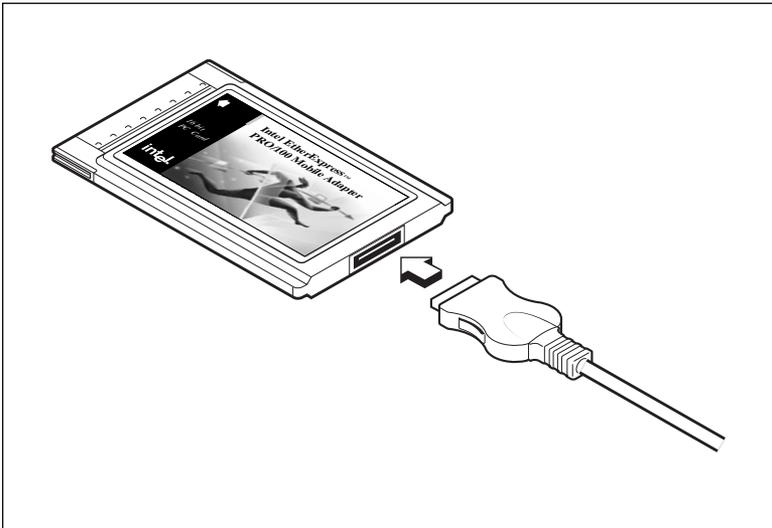


Connecting the 10Base-T/100Base-TX Adapter Cable to the PRO/100 PC Card

## Connecting the Network Cable to the PRO/100 PC Card

### Model PRO/100 PC Card (100 or 10 Mbps Ethernet network)

• Plug the network cable into the female RJ-45 connector.
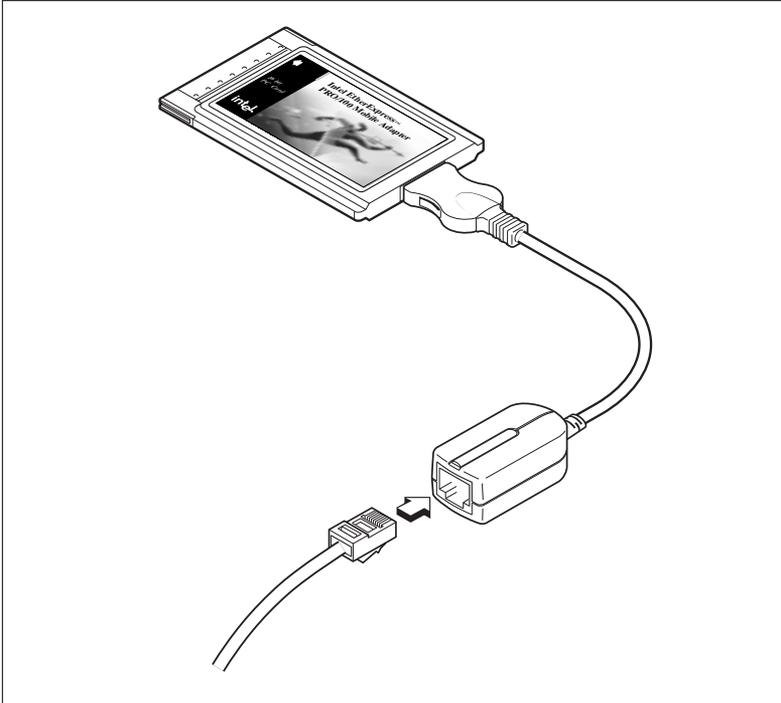


Connecting to the 10Base-T/100Base-TX Adapter Module

### Note

The PRO/100 PC Card supports both 10 and 100 Mbps, and auto-detects the network speed.

## What to Do Next

After installing the hardware and connecting cables, proceed to **Chapter 2. Software Installation**. You will need the Intel Installation Disk (for Windows 3.1 only) and Network Drivers Disk.

Chapter 2

# Software Installation

This chapter provides driver installation instructions for the following operating environments, in the order listed:

- Windows 95

- Windows NT

- MS-DOS

- IBM OS/2

- Windows 3.x (including Windows for Workgroups) using the Intel Installation Program

These instructions assume a first-time installation of the PRO/100 PC Card. For additional technical information, see **Chapter 3, Configuration Reference** and **Chapter 4, Troubleshooting**.

# Microsoft Windows 95

*Instructions are provided here for "Plug and Play" installation. For detailed technical information see Windows 95 headings in **Chapter 3, Configuration Reference** and **Chapter 4, Troubleshooting**.*

*NDIS 3 Driver*

**1** Insert the PRO/100 PC Card into a PC Card slot.

**2** If Windows 95 detects the PRO/100 PC Card, proceed to step 3. If it does not, click on the PC Card (PCMCIA) icon in the Control Panel to enable PC Card services, then go to step 3.

**3** If prompted for a manufacturer's disk, insert Disk 2, Network Drivers Disk. Windows will identify the product as a "PRO/100 Mobile Adapter 16."

**4** Complete the installation process as prompted by the Windows 95 software.

### Technical Note

For best results with autodetection, do not load DOS real mode PCMCIA Card and Socket Services and do not use EMM386 (or if needed, do not use the HIGHSCAN keyword). If installing from a SCSI CD-ROM through a PC Card, copy the \WIN95 directory from the CD-ROM to your hard disk (35 MB required) and install from the hard disk. For a more detailed discussion of these issues, see Chapter 4, Troubleshooting.

**5** If the automated (autodetection) installation procedure is not successful, proceed to the following section: "Verification and Troubleshooting."

*Verification and Troubleshooting*

**1** To verify successful installation, double-click the System icon in the Control Panel, choose the Device Manager tab in the System Properties window, and look for Intel EtherExpress PRO/100 Mobile PC Card under Network adapters.

- If the PRO/100 Mobile 16 icon has no X or circled exclamation point on top of it, the installation has been successful. Click OK to close the Network window, then restart the computer when prompted. If you wish to verify configuration

of a NetWare Client, proceed to the heading *Verification of NetWare Client Configuration*.

- An X or a circled exclamation point on top of the PRO/100 Mobile Adapter 16 icon indicates a problem. Select PRO/100 Mobile Adapter 16 and click Properties to see an explanation. Then continue with step 2 below.

**2** To review the installed Adapter configuration, double-click the Network icon in the Control Panel.

**3** Select the PRO/100 Mobile Adapter 16 component and click Properties.

**4** From the Properties window, select the Advanced tab.

**5** Confirm that the Properties and their associated Values are correct and that there are no conflicts with other installed devices. (For a technical discussion of these settings, see **Chapter 3, Configuration Reference** in this User's Guide. For more detailed troubleshooting information, see **Chapter 4, Troubleshooting**.)

*Verification of NetWare Client Configuration*

**1** After installing the PRO/100 Mobile PC Card driver and verifying the installation as described above, check for configuration of the NetWare Client by clicking on the Network icon. You should see both "Client for Microsoft" and "Client for Novell" listed. The installation process includes configuration for a NetWare Client as a default. If "Client for Novell" does not appear, you can configure the NetWare Client with the following steps:

**2** In the Control Panel, double-click the Network icon.

**3** From the Configuration tab in the Network window, click Add.

**4** From the Select Network Component Type window, select Client and click Add.

**5** Under Manufacturers in the Select Network Client window, select Microsoft.

**6** In the Network Clients window, select Client for NetWare Networks.

**7** Click OK (you will be returned to the Network window).

8  From the Configuration tab in the Network window, click Add.

9  From the Select Network Component Type window, select Protocol and click Add.

10  Select Microsoft as the manufacturer and IPX/SPX-compatible Protocol under Network Protocols, then click OK to return to the Network window.

11  Click OK to close the Network window, then restart the computer when prompted.

## Microsoft Windows NT 4.0

*NDIS 3 Driver*

If your system is running Windows NT 4.0, proceed as follows:

1  Insert the PRO/100 PC Card into a PC Card slot.

2  Select Control Panel, double-click the Network icon. Click the Adapters tab and then Add.

3  Insert Disk 2, Network Drivers Disk and click Have Disk. Specify A:\ for diskette and click OK.

4  Select "EtherExpress PRO/100 PC Card Adapter 16."

5  Click Close when the drivers have been copied.

6  Restart your computer when prompted by NT.

## Microsoft Windows NT 3.51

*NDIS 3 Driver*

If your system is running Windows NT 3.51, proceed as follows:

1  Insert the PRO/100 PC Card into a PC Card slot.

2  Select Control Panel, Network, Add Adapter, and Other.

3  When prompted for a manufacturer's disk, insert Disk 2, Network Drivers Disk.

4  Select "EtherExpress PRO/100 PC Card Adapter 16."

**5** Complete the installation process as prompted by the Windows NT software.

## Microsoft MS-DOS

For MS-DOS systems, see "Manual Installation" in the alphabetical listing under the heading "Completing the Installation" later in this chapter.

## IBM OS/2 and OS/2 Warp

To install drivers on systems running IBM OS/2 and OS/2 Warp, follow the instructions under Microsoft LAN Manager, Novell NetWare Requester, or Ungermann-Bass Net/One in the alphabetical listing under the heading "Completing the Installation" later in this chapter.

## Microsoft Windows 3.x (including Windows for Workgroups)

Run the Intel Installation Program (as described under the next heading) if you are using Microsoft Windows 3.1 or Windows for Workgroups 3.11

## Running the Intel Installation Program (Windows 3.x including Windows for Workgroups)

To install under **Windows or Windows for Workgroups** using the Intel Installation Program, insert Disk 1, Installation Disk, into your disk drive, and proceed as follows (substitute the correct drive letter for your system):

**1** From the Program Manager, choose File, then Run. In the Command Line box, type the following:

```
A:SETUP
```

**2** Press Enter or click OK.

**3** Select your network operating system from the list displayed and click OK.

**4** Follow the on-screen instructions. Note the following variations for NetWare and other network operating systems:

*Novell NetWare Installation*

With Novell NetWare highlighted, click the **OK** button. Intel provides all software necessary to configure your NetWare client workstation. Upon completion, the Installation Program will reboot your system. When your system comes back up, log in to the network.

**Note**

The NetWare VLM shell is used to connect to your NetWare server. The Intel Installation Program will decompress and configure the necessary files. If you do not plan to use the Installation Program, see "Manual Installation" in the alphabetical section of this chapter for instructions on how to decompress and load the NetWare VLM files.

If you need NETX shell support, contact your System Administrator.

*Installation of Other Network Operating Systems*

For listed network operating systems other than Novell Net-Ware, highlight your network operating system and click the **OK** button. The Intel installation software will analyze your system and create a custom Intel Network Drivers (device drivers) Disk.

**5** Once you have completed the steps prompted by the Intel Installation Program, exit the program and find your network operating system in this chapter of the User's Guide, using the **alphabetical listing** under the heading "Installing Network Software." Follow the procedures indicated there **to complete the installation**.

The Installation Program will modify your AUTOEXEC.BAT, CONFIG.SYS, and network configuration files to match the optimum configuration for your system.

For detailed technical information on configuration files and settings, see **Chapter 3, Configuration Reference** and **Chapter 4, Troubleshooting**.

## Completing the Installation

The instructions in the rest of this chapter should be used *only* in the following circumstances (they do not apply to Windows 95 or Windows NT environments):

- To complete the installation of network software under Windows 3.x  (including Windows for Workgroups) *after you have run the Intel Installation Program*: Find your network operating system in the alphabetical listing that follows.

- To install software for non-Windows operating systems not supported by the Intel Installation Program (for example, OS/2 or MS-DOS without Windows): Find your network operating system in the alphabetical listing that follows, or see the headings "Generic Installation" and "Manual Installation" in the same listing.

- To install and configure Windows 3.x drivers manually, without running the Intel Installation Program: See the heading "Manual Installation" in the alphabetical listing that follows.

### Use the Modified Intel Network Drivers Disk

When prompted for a device driver or manufacturer's disk by your network operating system install procedure, use Intel Disk 2, Network Drivers Disk.

# Alphabetical Reference

The following section is organized in alphabetical order by network operating system vendor. Unless otherwise indicated, *these instructions are designed to be used under Windows 3.x (including Windows for Workgroups) and with the Intel Installation Program.* They assume a first-time installation of client software on a workstation, using the configuration values set by the Intel Installation Program or, when the Installation Program is not used, using the default values listed in **Chapter 3, Configuration Reference**.

The PRO/100 PC Card supports ODI, NDIS 2.01, and packet drivers under Windows 3.x. To determine which of these drivers you need for your networking environment, consult your network administrator or network documentation.

# Artisoft LANtastic version 6.0

NDIS 2.0 Driver

**1**   Run the Intel Installation Program from Disk 1, Installation Disk.

**2**   Choose Artisoft LANtastic from the Select Network Operating System screen.

**3**   Follow the prompts to complete the Intel segment of the installation.

**4**   Run the Artisoft LANtastic 6.0 "install" program. Specify C:\LANTASTI as the destination directory.

**5**   At the "Select network adapter" screen, choose "NDIS Support for Network Adapters."

**6**   When prompted for the "manufacturer's driver disk" on the "Enter NDIS driver directory" screen, insert the Intel Network Drivers Disk (Disk 2).

**7**   Complete the Artisoft installation.

**8**   Reboot the computer and start LANtastic.

# AT&T StarGROUP LAN Manager version 2.1a

NDIS 2.0 Driver

See Microsoft LAN Manager.

# Banyan VINES version 6.0

NDIS 2.0 Driver

**1** Run the Intel Installation Program from Disk 1, Installation Disk.

**2** Choose Banyan VINES from the Select Network Operating System screen.

**3** Follow the prompts to complete the Intel segment of the installation. **Note the IRQ value set by the Intel Installation Program for use in step 10 below.** The Installation Program also creates a \VINES directory on your hard disk.

**4** Copy the files from the VINES Master disk into the VINES directory.

**5** Copy the NDIS driver files from \NDIS directory on the VINES LAN Drivers Disk into the VINES directory.

**6** Change to the VINES directory.

**7** Type PCCONFIG and select Network Card Settings, followed by NDIS Ethernet.

**8** At the PROTOCOL.INI bindings prompt, type INTELNET.

**9** Enter the IRQ value set by the Intel Installation Program (see step 3 above).

**10** Press F10 to save and Esc to return to the main menu.

**11** Select Login Environment Settings, followed by Default Communications Driver, followed by NDIS Ethernet.

**12** Press Esc to return to the Main Menu and press F10 to save.

**13** Reboot the PC.

# DEC PATHWORKS versions 5.x or 6.x

NDIS 2.0 Driver

These instructions are based on PATHWORKS documentation for configuration of a PC as a client workstation, using a system service already installed on a LAN Manager server and the LAN Manager SETUP diskette.

**1**   Run the Intel Installation Program from Disk 1, Installation Disk.

**2**   Choose DEC PATHWORKS from the Select Network Operating System screen.

**3**   Follow the prompts to complete the Intel segment of the installation. **Note the IRQ value set by the Intel Installation Program for use in steps 5 and 23 below.**

**4**   Check the README file on your PATHWORKS SETUP disk for requirements such as lastdrive, setver, etc. You will need 500 K of free conventional memory and about 1 MB of extended memory to run PATHWORKS SETUP. Be sure you have a lastdrive statement in your CONFIG.SYS file (lastdrive=g will work in most cases).

**5**   Use a text editor to modify the file A:\NDIS\PI.TPL on the PATHWORKS SETUP disk, as follows (A:\NDIS is a hidden directory. You can access it by typing CD A:\NDIS):

Change the line (remove the semicolon)

```
;NI_IRQ = (irq value from step 3)
```

to read

```
NI_IRQ = (irq value from step 3)
```

The NI_IRQ value must be the same as the interrupt value you will use for the Intel adapter.

**6**  Run the SETUP program from the PATHWORKS SETUP disk for LAN Manager.

**7**  Choose Configure PC.

**8**  Choose Network.

**9**  Select DECnet as transport.

**10**  When prompted to choose a network adapter, choose "Other."

**11**  Specify "Intel" as the Adapter Name.

**12**  When prompted for driver information, use the following:

a. for PATHWORKS 5.0:

```
NDIS Driver Path: a:\
NDIS Driver File: m16andis.exe
NDIS Driver Name: INTEL$
Other File: A:\M16ACFG.EXE
```

b. for PATHWORKS 5.1:

```
Driver file: a:\m16andis.exe
PROTOCOL.INI stub: a:\dec\protocol.ini
Additional Files: A:\M16ACFG.EXE
```

**13**  Insert the Intel Network Drivers Disk (Disk 2) when prompted.

**14**  Enter your node information when prompted.

At this point, the SETUP program will try to connect to the DECnet server. Once connected, the SETUP program will map a logical drive to your system service.

**15**  Highlight the logical drive mapped by the SETUP program, and press Enter to run PWSETUP.

**16**  Press Enter to confirm the Software Destination C:\PW.

**17**  Choose Express (or Custom if you have a lot of prior installation experience).

**18**  Select an appropriate Workstation Template, or create one.

**19**  Under Network Adapter Information, choose other network adapter, with NDIS enabled, and verify the following information:

```
Non-Supported Network Adapter
Driver file: a:\m16andis.exe
PROTOCOL.INI stub: a:\dec\protocol.ini
Additional Files: A:\M16ACFG.EXE
```

**20** Insert the Intel Network Drivers Disk (Disk 2) when prompted.

**21** Enter node information when prompted and proceed.

**22** A PROTOCOL.INI file created by SETUP will display in edit mode.

**23** Remove the semicolon at the beginning of the ni_irq line, as follows:

Change the line

```
        ;ni_irq = (irq value from step 3)
```

to read

```
        ni_irq = (irq value from step 3)
```

The **ni_irq** value must be the same as the interrupt value used for the Intel adapter.

**24** Verify that the **[m16andis]** section has the following lines and settings:

```
[m16andis]
```

```
drivername=intel$
```

**25** Exit SETUP and reboot to start the network. (Some machines may require a cold boot at this point—power the computer down and back up again.)

# FTP Software LANWatch

Packet and NDIS 2.0 Drivers

FTP Software's LANWatch network monitor software can be installed using Intel's packet or NDIS 2.0 drivers. For information on which driver is appropriate for your network environment, refer to the FTP LANWatch documentation.

## FTP Software LANWatch Packet Driver Installation

1   Run the Intel Installation Program from Disk 1, Installation Disk.

2   Choose FTP LANWatch from the Select Network Operating System screen.

3   Follow the prompts to complete the Intel segment of the installation.

4   Install LANWatch according to the instructions in your FTP LANWatch manual.

5   Copy the files M16ACFG.EXE, M16APD.COM, and INTELPD.BAT from the C:\INTEL\M16A directory to the directory where your LANWatch files are stored. The file INTELPD.BAT contains the correct command lines for the Packet Driver.

6   (This step is not required for LANWatch versions 3.0 and later.) Using a text editor, add the following line to your CONFIG.SYS file:

    DEVICE = [*path*]IFCUST.SYS

    where [*path*] is the drive and directory where your LANWatch files are stored.

7   Reboot the PC.

8   Change to the directory of where your LANWatch files are stored and run INTELPD.BAT

9   Run LW.EXE.

**FTP Software LANWatch NDIS 2.0 Driver Installation**

**1**  Run the Intel Installation Program from Disk 1, Installation Disk.

**2**  Choose FTP LANWatch from the Select Network Operating System screen.

**3**  Follow the prompts to complete the Intel segment of the installation.

**4**  Install LANWatch according to the instructions in your FTP LANWatch manual.

**5**  Using a text editor, add the following lines to your CONFIG.SYS file:

```
DEVICE = C:\NDIS\PROTMAN.SYS /I:C:\NDIS

DEVICE = C:\NDIS\M16ACFG.EXE

DEVICE = C:\NDIS\M16ANDIS.EXE

DEVICE = C:\NDIS\DIS_PKT.GUP
```

(Include the following line for LANWatch versions earlier than 3.0 only)

```
DEVICE = C:\LW\IFCUST.SYS
```

**6**  Create a directory called NDIS on your hard disk, by typing:

```
MD NDIS
```

**7**  At the DOS prompt, copy the files M16ACFG.EXE and M16ANDIS.EXE from the C:\INTEL\M16A directory on your hard disk and the file PROTOCOL.FTP from the \NDIS directory on the Intel Network Drivers Disk to the \NDIS directory you created in Step 6.

**8**  Use a text editor to modify the PROTOCOL.FTP file to match the keywords and values in the sample PROTOCOL.INI file in the \INTEL\M16A directory.

**9**  Copy all the files from the \NDIS directory on the FTP Unsupported Software Disk A to the \NDIS directory created in Step 6.

**10**  Reboot the PC.

**11**  Change to the \NDIS directory and run NETBIND.EXE.

**12**  Run LW.EXE.

# FTP Software PC/TCP

Packet, NDIS 2.0, and ODI Drivers

FTP Software's PC/TCP Generic Ethernet Kernel ETHDRV.EXE can be installed using Intel's Packet, ODI, or NDIS drivers. PC/TCP can also be used concurrently with NetWare. For information on which driver is appropriate for your network environment, see the FTP PC/TCP documentation. For environments using values other than those set by the Intel Installation Program, see **Chapter 3, Configuration Reference** in this manual.

## FTP PC/TCP 3.X with OnNet 1.1 and Windows for Workgroups 3.11

**1**  Run the Intel Installation Program from Disk 1, Installation Disk.

**2**  From the Select Network Operating System screen, choose Microsoft Windows for Workgroups then FTP PC/TCP 3.x.

**3**  Follow the prompts to complete the Intel segment of the installation.

**4**  Run the PC/TCP installation program OnNet 1.1.

**5**  Follow the prompts to the Network Card Screen, then select "Other NDIS Driver or Updated Packet Driver."

**6**  Insert the Intel Network Drivers Disk (Disk 2) when prompted.

**7**  Choose the appropriate driver then follow prompts to complete the installation.

**8a**  For NDIS installation, reboot the PC.

**8b**  For ODI installation, *do not reboot*. Continue with step 9.

## Additional Steps for ODI Installation

If you are using an ODI driver, continue with the following steps:

**9**  Change to the directory into which PC/TCP was installed.

**10**  Use a text editor to change the file PCTCP.INI as follows:

- In the section PCTCP ifcust 0 change the line

    ```
    interface-type=NDIS
    ```

    to read

    ```
    interface-type=PKTDRV.
    ```

**11**  Save the file and exit the text editor.

**12**  Change to the C:\ (root) directory.

**13**  Use a text editor to modify the AUTOEXEC.BAT file as follows
       (\PCTCP is the default installation directory):

- Move the line containing the STARTNET.BAT command or
  the lines containing the network driver files to immediately
  above the line

  ```
  SET PCTCP=C:\PCTCP\PCTCP.INI
  ```

- Add the line

  ```
  C:\PCTCP\ODIPKT
  ```

  after the line

  ```
  PCTCP=C:\PCTCP\PCTCP.INI
  ```

**14**  Save the file and exit the text editor.

**15**  Copy the file ODIPKT from disk 5 of the FTP PC/TCP
       installation disks to the directory into which PC/TCP was
       installed.

**16**  Reboot the PC.

## FTP PC/TCP 3.X with OnNet 1.1 with Windows 3.1

**1**  Run the Intel Installation Program from Disk 1, Installation Disk.

**2**  From the Select Network Operating System screen, choose FTP
       PC/TCP.

**3**  Follow the prompts to complete the Intel installation.

**4**  Run the PC/TCP installation program OnNet 1.1.

**5**  When prompted, insert the Intel Network Drivers Disk (Disk 2).

**6**  Follow prompts to complete the PC/TCP installation.

**7a**  For an NDIS installation, reboot the PC.

**7b**  For ODI installation, *do not reboot*. Continue with step 8.

## Additional Steps for ODI Installation

If you are using an ODI driver, continue with the following steps:

**8**  Change to the directory into which PC/TCP was installed.

**9**  Use a text editor to change the file PCTCP.INI as follows:

- In the section PCTCP ifcust 0 change the line

```
interface-type=NDIS
```

to read

```
interface-type=PKTDRV
```

**10**  Save the file and exit the text editor.

**11**  Change to the C:\ (root) directory.

**12**  Use a text editor to modify the AUTOEXEC.BAT file as follows (\PCTCP is the default installation directory):

- Move the line containing the STARTNET.BAT command or the lines containing the network driver files to immediately above the line

```
SET PCTCP=C:\PCTCP\PCTCP.INI
```

- Add the line

```
C:\PCTCP\ODIPKT
```

after the line

```
PCTCP=C:\PCTCP\PCTCP.INI
```

**13**  Save the file and exit the text editor.

**14**  Copy the file ODIPKT from disk 5 of the FTP PC/TCP installation disks to the directory into which PC/TCP was installed.

**15**  Reboot the PC.

## FTP Software PC/TCP Packet Driver Installation

**1**  Run the Intel Installation Program from Disk 1, Installation Disk.

**2**  Choose FTP PC/TCP from the Select Network Operating System screen.

**3**  Follow the prompts to complete the Intel segment of the installation.

**4**  Install PC/TCP software according to the directions given in the PC/TCP documentation.

**5**  Copy the files M16ACFG.EXE, M16APD.COM, and INTELPD.BAT from the C:\INTEL\M16A directory to the PC/TCP directory specified in the PC/TCP install procedure. The file INTELPD.BAT contains the correct command lines for the Packet Driver.

**6** (This step is not required for PC/TCP versions 2.10 and later.)
Using a text editor, add the following lines to your CONFIG.SYS
file:

`DEVICE=[`*path*`]IPCUST.SYS`

`DEVICE=[`*path*`]IFCUST.SYS`

where [*path*] is the drive and directory specified at the PC/TCP
installation.

**7** Reboot the PC.

**8** Change to the directory where your PC/TCP files are stored and
run INTELPD.BAT by typing:

`INTELPD`

**9** Run the ETHDRV.EXE kernel program supplied with PC/TCP.
This loads the PC/TCP kernel into memory. The packet driver
must always load before the kernel.

**10** Continue your server or workstation startup as instructed in the
PC/TCP documentation.

## ODI with FTP Software PC/TCP and NetWare

If you need to run Novell NetWare concurrently with FTP PC/TCP,
proceed as follows:

**1** Run the Intel Installation Program from Disk 1, Installation Disk.

**2** Choose FTP PC/TCP from the Select Network Operating System
screen.

**3** Follow the prompts to complete the Intel segment of the
installation.

**4** Install PC/TCP according to the instructions in your FTP PC/TCP
manual.

**5** (This step is not required for PC/TCP versions 2.10 and later.)
Using a text editor, add the following lines to your CONFIG.SYS
file:

`DEVICE=[`*path*`]IPCUST.SYS`

`DEVICE=[`*path*`]IFCUST.SYS`

where [*path*] is the drive and directory specified in the PC/TCP
installation.

**6**  Copy the files M16ACFG.EXE and NET.CFG from the
C:\INTEL\M16A directory and the files LSL.COM and
M16AODI.COM from the root directory of the Intel Network
Drivers Disk to the PC/TCP directory created in the PC/TCP
install procedure.

**7**  To start the workstation, load the software as follows:

```
M16ACFG.EXE DRIVER=ODI
```

```
LSL
```

```
M16AODI
```

```
IPXODI
```

`ODIPKT`  (Use the version supplied with PC/TCP)

```
ETHDRV
```

```
VLM
```

**8**  Change to the network drive (usually F:\LOGIN).

**9**  Log in to the network.

# Generic Installation

If your NOS is not listed in the Intel Installation Program, you can try selecting "Generic NDIS Driver" or "Generic ODI Driver" in the Intel Installation Program and clicking the Install button. A sample configuration file containing parameters optimized for your system will be created in the \INTEL\M16A directory on your hard disk. For NDIS, this will be a custom PROTOCOL.INI file. For ODI, it will be a custom NET.CFG file. Use this sample file to assist you in configuring the actual configuration file for your system (or use the sample file itself if appropriate).

# HP LAN Manager

NDIS 2.0 Driver

> See Microsoft LAN Manager.

# IBM Local Area Network Support Program

### IBM Local Area Network Support Program (version 1.36)

NDIS 2.0 Driver

**1**   Run the Intel Installation Program from Disk 1, Installation Disk.

**2**   Choose IBM LAN Support Program from the Select Network Operating System screen.

**3**   Follow the prompts to complete the Intel segment of the installation.

**4**   Install the IBM Local Area Network Support Program according to the instructions in the IBM Local Area Network Support Program User's Guide.

**5**   Under Environment Information, respond "no" to the question "Do you have adapter option disks?"

**6**   Choose an Intel Adapter from the list provided.

**7** If prompted to do so, insert the Intel Network Drivers Disk (Disk 2) when prompted and type the path

```
A:\NDIS
```

**8** Press Esc twice to bypass error messages.

**9** Continue with the installation until finished.

**10** Use a text editor to add the following two lines in your CONFIG.SYS file at the location indicated by the "rem" statement concerning insertion of the driver name:

```
device=\LSP\M16ACFG.EXE
device=\LSP\M16ANDIS.EXE
```

**11** Copy the file M16ACFG.EXE and M16ANDIS.EXE from the directory C:\INTEL\M16A to the C:\LSP directory on your hard disk.

**12** Use a text editor to edit the PROTOCOL.INI keyword settings in the C:\LSP directory to match the keywords contained in the sample PROTOCOL.INI file located at C:\INTEL\M16A as required (unless you are using Intel PRO/100 PC Card default settings).

**13** Save the files and reboot the PC.

## IBM Local Area Network Support Program (version 1.2)

NDIS 2.0 Driver

**1** Run the Intel Installation Program from Disk 1, Installation Disk.

**2** Choose IBM LAN Support Program from the Select Network Operating System screen.

**3** Follow the prompts to complete the Intel segment of the installation.

**4** Install the IBM Local Area Network Support Program according to the instructions in the IBM Local Area Network Support Program User's Guide. The following instructions refer to the prompts and messages displayed with the Configuration Aid automated install software provided with the LAN Support Program.

**5** If a message appears during the LAN Support Program installation indicating there are no IBM LAN adapters installed in the workstation, bypass the message by pressing Enter.

**6** Answer [N]o to program support for the PC Network Adapter.

**7** Answer [Y]es to use of programs needing the NETBIOS interface.

**8** When prompted, select the Etherand Network family of network cards.

**9** Continue with the installation until finished.

**10** Use a text editor to replace the line in your CONFIG.SYS file that reads:

```
device=\XX.DOS
```

with the two lines

```
device=\M16ACFG.EXE DRIVER=NDIS
device=\M16ANDIS.EXE
```

**11** Still in the CONFIG.SYS file, add the parameter O=N (where O is a letter, not zero) to the line

```
device=\DXMT0MOD.SYS
```

as follows

```
device=\DXMT0MOD.SYS O=N
```

**12** Copy the files M16ACFG.EXE and M16ANDIS.EXE from the directory C:\INTEL\M16A to the root directory of your hard disk or boot disk.

**13** Change to the LANMAN directory on your hard disk or boot disk.

**14** Use a text editor to modify the PROTOCOL.INI file in the C:\LSP directory as follows:

- Under the ETHERAND section, change the line that reads

  ```
  Bindings = TCMAC2
  ```

  to:

  ```
  Bindings = INTELNET
  ```

- Underneath that section insert a new section that reads as follows:

  ```
  [INTELNET]
  DriverName = INTEL$
  ```

**15** Use a text editor to edit the keyword settings in the PROTOCOL.INI file in the C:\LSP directory to match the keywords contained in the sample PROTOCOL.INI file located at C:\INTEL\M16A as required (unless you are using Intel PRO/100 PC Card default settings).

**16** Save the file and reboot the PC.

## **IBM OS/2 and OS/2 Warp**

Use the instructions under Microsoft LAN Manager, Novell NetWare
Requester, or Ungermann-Bass Net/One to install drivers on systems
running OS/2 and OS/2 Warp.

## **IBM PC LAN and IBM DOS LAN Requester**

**1**  Install the IBM LAN Support Program according to the
instructions under the heading "IBM Local Area Network Support
Program," earlier in this section.

**2**  Reboot the PC.

**3**  Install IBM PC LAN or IBM DOS LAN Requester according to
the instructions in the IBM documentation.

**4**  Reboot the PC.

# Manual Installation

All network drivers provided on the Intel Network Drivers Disk can be installed manually, without the Intel Installation Program. You must copy the correct driver files to your hard disk and make appropriate changes to CONFIG.SYS, AUTOEXEC.BAT, and configuration files such as NET.CFG (for ODI) or PROTOCOL.INI (for NDIS). *Manual installation should only be performed by a system administrator or someone with equivalent knowledge of the installation process for your network operating system.*

### Note

For manual installation of Novell NetWare with VLM (available only under MS-DOS or Windows 3.x) you must first decompress the VLM files by running the MS-DOS batch file DCOMPVLM.BAT from the Network Drivers Disk, as follows:

```
DCOMPVLM [path]
```

where [*path*] is the directory for NetWare files (usually C:\NWCLIENT). DCOMPVLM will decompress and copy all required files to the designated directory.

For an overview of the installation process, see the instructions provided for your network operating system in the alphabetical section of this chapter. Consult **Chapter 3, Configuration Reference**, for detailed information on configuration files and settings. For additional information, consult your network operating system documentation.

# Microsoft LAN Manager

### Microsoft LAN Manager (version 2.1)

NDIS 2.0 Driver

**1** Run the Intel Installation Program from Disk 1, Installation Disk.

**2** Choose Microsoft LAN Manager from the Select Network Operating System screen.

**3** Follow the prompts to complete the Intel segment of the installation.

**4**  Begin installation of LAN Manager using "setup."

**5**  When prompted to select the available network adapter driver, choose "Other Driver."

**6**  When prompted, insert the Intel Network Drivers Disk.

**7**  Select "Intel EtherExpress PRO/100 Mobile Adapter 16-bit PC Card" from the menu.

**8**  Continue with the installation until it is completed.

**9**  If installing Microsoft LAN Manager to run under Microsoft Windows proceed to step 10. Otherwise, skip to step 15.

**10**  Run Windows.

**11**  Choose setup from "Main" group.

**12**  Select Startup, and under the "Options" screen select Change System Settings.

**13**  Select Network then scroll to LAN Manager version 2.1.

**14**  Follow the prompts to complete the installation.

**15**  Reboot the PC.

## Microsoft LAN Manager (version 2.1) with Windows for Workgroups 3.11

**1**  Run the Intel Installation Program from Disk 1, Installation Disk.

**2**  Choose Microsoft Windows for Workgroups from the Select Network Operating System screen.

**3**  Select "Yes" on the Attached to Network File Server screen.

**4**  Select Microsoft LAN Manager.

**5**  Follow the prompts to complete the Intel segment of the installation.

**6**  Start Windows and, in the Network program group, double-click on the Network Setup icon.

**7**  If you have not installed network support, choose Networks in the Network Setup dialog box, select Install Microsoft Windows Network, and click OK. Otherwise proceed with step 8.

**8**  In the Network Setup dialog box, choose Drivers.

**9**  In the Network Drivers dialog box, choose Add Adapter.

**10**  In the Add Network Adapter box, choose Unlisted or Updated Network Adapter and click OK.

**11**  When prompted for an "unlisted, updated, or vendor-provided network driver disk," insert the Intel Network Drivers Disk.

**12**  Select "**Intel M16A NDIS 2.01 Real Mode**," and click OK.

**13**  Close the Network Drivers dialog box and click OK in the Network Setup box.

**14**  Complete the installation process, inserting the Intel Network Drivers Disk if required.

**15**  Continue with the installation until it is completed.

**16**  Click on the Control Panel in the "Main" group.

**17**  Select Startup from the Control Panel.

**18**  In the Options for Enterprise Networking window click "Log on to Windows NT or LAN Manager Domain."

**19**  Save, exit, and reboot the PC.

# Microsoft Windows for Workgroups

NDIS 2.01 and ODI Drivers

Instructions are provided for installing Intel network drivers for the first time on a system using Windows for Workgroups version 3.11 alone or with NetWare. These instructions assume that Windows for Workgroups has already been installed. Remove any earlier version of the Intel drivers before installing the new version. No NDIS 3 driver is supplied for Windows for Workgroups.

The following topics are covered for Windows for Workgroups:

- How to install for Windows for Workgroups version 3.11 and NetWare using the ODI driver
- How to install for Windows for Workgroups 3.11 using the NDIS 2.0 driver
- How to remove an existing Windows for Workgroups Installation

For troubleshooting tips for Windows for Workgroups, see **Chapter 4, Troubleshooting**.

## Windows for Workgroups Version 3.11 and NetWare (Using the ODI driver)

1    To configure Windows for Workgroups with NetWare, run the Intel Installation Program and choose Novell NetWare.

2    When the installation is complete, reboot the computer.

3    At the Intel menu, choose "Load Intel EtherExpress PRO/100 Mobile Adapter16 for Network Access."

4    From the DOS prompt, run the NetWare Client install. Be sure to install support for Microsoft Windows.

5    When the Novell Client install program asks for an ODI driver, insert the Intel Network Drivers Disk.

6    Complete the installation process and reboot the computer.

7    Log in to NetWare.

8    Start Windows for Workgroups and, in the Network program group, double-click on the Network Setup icon.

Windows for Workgroups Network Setup will detect the NetWare configuration and automatically select Novell NetWare as an additional network. It will also prompt for Novell support files (from Novell Client diskettes) if required during the installation. (If necessary, use the Novell decompression utility to decompress the required files.)

Windows for Workgroups Setup will also attempt to determine what NetWare driver model you are using. If for some reason Windows for Workgroups was unable to detect the driver model, you should select IPXODI and LSL as the driver type.

Note (in steps 10a and 10b) that you can install NetWare as an additional network under Windows for Workgroups, or by itself but with Windows support.

**9**  In the Network Setup dialog box, choose Networks.

**10a** To install **both Windows for Workgroups and NetWare**, choose Install Microsoft Windows Network and proceed to step 11.

**10b** To install for **NetWare only with Windows support**, choose Install Windows Support for the Following Network Only, select the NetWare configuration appropriate for your network, then proceed to step 11.

**11**  Choose Other under Additional Network Support, then select the NetWare configuration appropriate for your network.

**12**  In the Network Setup dialog box, choose Drivers.

**13**  In the Network Drivers dialog box, choose Add Adapter.

**14**  In the Add Network Adapter box, choose Unlisted or Updated Network Adapter and click OK.

**15**  When prompted for an "unlisted, updated, or vendor-provided network driver disk," insert the Intel Network Drivers Disk.

**16**  Select "**Intel M16A ODI for NetWare**" and click OK.

**17**  Close the Network Drivers dialog box and click OK in the Network Setup box.

**18**  Complete the installation process, inserting the Intel Network Drivers Disk if required.

**Note**

Verify that the following lines have been added to your
AUTOEXEC.BAT and STARTNET.BAT files. If they are not there,
add them manually using a text editor.

Add the following command to the AUTOEXEC.BAT file, where
\WINDOWS is the directory into which Microsoft Windows was
installed:

```
C:\WINDOWS\NET START
```

Add the following command to the STARTNET.BAT file in your
NWCLIENT directory, where \WINDOWS is the directory into
which Microsoft Windows was installed:

```
C:\WINDOWS\ODIHLP.EXE
```

**Windows for Workgroups 3.11 Using the NDIS 2.0 Driver**

**1**   Run the Intel Installation Program from Disk 1, Installation Disk.

**2**   Choose Microsoft Windows for Workgroups installation from the Select Network Operating System screen.

**3**   Choose "No" on the Attached to Network File Server screen.

**4**   Follow the prompts to complete the Intel segment of the installation.

**5**   Start Windows for Workgroups and double-click on the Network Setup icon in the Network Group.

**6**   If you have not installed network support, choose Networks in the Network Setup dialog box, select Install Microsoft Windows Network, and click OK. Otherwise proceed to Step 7.

**7**   In the Network Setup dialog box, choose Drivers.

**8**   In the Network Drivers dialog box, choose Add Adapter.

**9**   In the Add Network Adapter box, choose Unlisted or Updated Network Adapter and click OK.

**10**  When prompted for an "unlisted, updated, or vendor-provided network driver disk," insert the Intel Network Drivers Disk.

**11**  Select "**Intel M16A NDIS 2.01 Real Mode**" and click OK.

**12**  Close the Network Drivers dialog box and click OK in the Network Setup box.

**13**  Complete the installation process, inserting the Intel Network Drivers Disk if required.

### How to Remove an Existing Windows for Workgroups Installation

**1**   Start Windows and select Network Setup in the Network program group.

**2**   In the Network Setup dialog box, choose Drivers.

**3**   In the Network Drivers dialog box, choose Remove to discard any existing network adapter drivers.

**4**   Choose Close and return to the Network Setup dialog box.

**5**   Exit the Network Setup program and exit Windows.

**6**   At the DOS prompt, change to the Windows system directory, as follows

```
cd \windows\system
```

**7**   Make a directory called OEM, as follows

```
mkdir oem
```

**8**   Type

```
dir oem?.inf
```

to see a list of driver configuration files.

**9**   Use the DOS EDIT program to view each OEM file to determine which ones reference Intel.

**10**  Copy the old Intel configuration files to the OEM directory.

**11**  Delete the old Intel configuration files from the Windows system directory.

**12**  Restart Windows.

**13**  Follow the instructions for installing drivers for Windows for Workgroups alone or Windows for Workgroups and NetWare.

## Connecting to a Windows NT Server with Windows for Workgroups 3.11

**1**   Run the Intel Installation Program from Disk 1, Installation Disk.

**2**   Choose Microsoft Windows for Workgroups from the Select Network Operating System screen.

**3**   Select "Yes" on the Attached to Network File Server screen.

**4**   Select Microsoft Windows NT or LAN Manager.

5   Follow the prompts to complete the Intel segment of the installation.

6   Start Windows and, in the Network program group, double-click on the Network Setup icon.

7   If you have not installed network support, choose Networks in the Network Setup dialog box, select Install Microsoft Windows Network, and click OK. Otherwise proceed with step 8.

8   In the Network Setup dialog box, choose Drivers.

9   In the Network Drivers dialog box, choose Add Adapter.

10  In the Add Network Adapter box, choose Unlisted or Updated Network Adapter and click OK.

11  When prompted for an "unlisted, updated, or vendor-provided network driver disk," insert the Intel Network Drivers Disk.

12  Select "**Intel M16A NDIS 2.01 Real Mode**," and click OK.

13  Close the Network Drivers dialog box and click OK in the Network Setup box.

14  Complete the installation process, inserting the Intel Network Drivers Disk if required.

15  Continue with the installation until it is completed.

16  Click on the Control Panel in the "Main" group.

17  Select Startup from the Control Panel.

18  In the Options for Enterprise Networking window click "Log on to Windows NT or LAN Manager Domain."

19  Save, exit, and reboot the PC.

# Novell NetWare

ODI Driver

The Intel ODI driver allows for the concurrent use of Novell NetWare and other protocols that support Novell's Open Data-Link Interface (ODI) specification.

### NetWare

**1**   Run the Intel Installation Program from Disk 1, Installation Disk.

**2**   Choose Novell NetWare from the Select Network Operating System screen.

**3**   Follow the prompts to complete the installation.

**4**   The Intel Installation Program will reboot the computer and verify the NetWare connection.

**5**   Reboot your computer again.

**6**   Log in to the network.

#### Note

The Intel  Installation Program uses the NetWare VLM shell to connect to your NetWare server. The Installation Program decompresses and copies all the required files.

If you are installing manually, without the Intel Installation Program (under MS-DOS or Windows 3.x) you must first decompress the VLM files by running the MS-DOS batch file DCOMPVLM.BAT from the Network Drivers Disk, as follows:

```
DCOMPVLM [path]
```

where [*path*] is the directory for NetWare files (usually C:\NWCLIENT). DCOMPVLM will decompress and copy all required files to the designated directory.

If you need NETX shell support, contact your System Administrator.

If using DOS 5.0, check your CONFIG.SYS file for the statement LASTDRIVE=Z. If not present, add it.

# NetWare Requester for OS/2

### NetWare Requester for OS/2 (versions 2.x)

These instructions explain how to load the Intel network driver as part of the NetWare Requester installation process.

**1** Run the NetWare Requester INSTALL program as instructed in the NetWare Requester documentation and choose Requester on workstation from the Installation menu.

**2** After verifying your target directory and source drive for NetWare Requester files, choose Edit CONFIG.SYS and Copy Files at the Requester Installation dialog box.

**3** When prompted for the Network Interface Card driver, type in the name of the Intel driver: M16AODI.OS2. After completing the other options in the dialog box, click on Save.

**4** When asked if the driver you specified is the one you want to install, choose Yes, then type in the path to the Intel driver:

    A:\ODI\M16AODI.OS2

**5** Remove the NetWare Requester install diskette and insert the Intel Network Drivers Disk.

**6** At the dialog box "Requester files will copy to:", click on Copy.

**7** Complete the installation and exit the NetWare Requester installation utility.

**8** Shut down OS/2 and reboot the computer.

## Novell NetWare Requester version 2.11 for OS/2 Warp

This section describes the steps for manually installing Novell NetWare Requester for OS/2 WARP *without the Intel Installation Program*, using a two-slot generic machine without Card and Socket Services. Some machines might require changes to the NET.CFG INT and PORT settings.

1   Copy M16AODI.OS2 from the ODI directory of the Intel Driver diskette to the OS2 subdirectory of the WorkStation Driver (WSDRV) diskette from the NetWare Client package.

2   Run the INSTALL program from the NetWare Requester disk (WSOS21). It will prompt you for the target directory and begin installing. When it prompts you to choose a Network Interface Card driver, enter M16AODI.OS2. The INSTALL program will copy the drivers and modify the CONFIG.SYS for you.

3   After the files have been copied, you will be at the main screen of the NetWare Workstation for the OS/2 Installation Utility. From the menu bar, choose the "Configuration" menu, and the "This workstation" command. Edit the NET.CFG following the sample below, and including the correct frame types for your network.

Sample NET.CFG file

```
link driver M16AODI
        frame ethernet_802.2
        port 300
        int 5
```

4   Save the NET.CFG. The main message area should report that you have finished the installation. Close the installation utility. You can verify that the CONFIG.SYS changes appear to be correct.

5   Shut down the OS/2 desktop and reboot the machine. The drivers should load without error. If an interrupt or IO port conflict is detected, adjust the settings in your NET.CFG and repeat the process from Step 3.

Sample CONFIG.SYS

```
rem — NetWare Requester statements BEGIN —
SET NWLANGUAGE=ENGLISH
DEVICE=D:\NETWARE\LSL.SYS
RUN=D:\NETWARE\DDAEMON.EXE
rem — ODI-Driver Files BEGIN —
DEVICE=D:\NETWARE\M16AODI.OS2
rem — ODI-Driver Files END —
rem DEVICE=D:\NETWARE\ROUTE.SYS
DEVICE=D:\NETWARE\IPX.SYS
rem DEVICE=D:\NETWARE\SPX.SYS
rem RUN=D:\NETWARE\SPDAEMON.EXE
rem DEVICE=D:\NETWARE\NMPIPE.SYS
rem DEVICE=D:\NETWARE\NPSERVER.SYS
rem RUN=D:\NETWARE\NPDAEMON.EXE
DEVICE=D:\NETWARE\NWREQ.SYS
IFS=D:\NETWARE\NWIFS.IFS
RUN=D:\NETWARE\NWDAEMON.EXE
rem DEVICE=D:\NETWARE\NETBIOS.SYS
rem RUN=D:\NETWARE\NBDAEMON.EXE
DEVICE=D:\OS2\MDOS\LPTDD.SYS
rem — NetWare Requester statements END —
```

# SunSoft PC-NFS (version 3.5)

NDIS 2.0 Driver

**1**   Run the Intel Installation Program from Disk 1, Installation Disk.

**2**   Choose SunSoft PC-NFS from the Select Network Operating System screen.

**3**   Follow the prompts to complete the Intel segment of the installation.

**4**   Install PC-NFS for Ethernet according to instructions in the PC-NFS documentation. Choose NDIS setup, and follow the instructions to complete the setup. Note the prompt that tells you that further manual modifications will have to be made.

**5**   Reboot the computer. You will see some error messages. Disregard them and continue with these instructions.

**6**   Rename the file PROTOCOL.NFS in the C:\LANMAN directory to PROTOCOL.INI. Use an text editor to edit the PROTOCOL.INI file as follows:

Replace the items

```
[your-mac-module]
 drivername = YOURMAC$
 option1 = value1 etc.
[NFS-NDIS]
 drivername = NFSLINK1
 bindings = your-mac-module
```

with

```
[INTELNET]
drivername = INTEL$
[NFS-NDIS]
drivername = NFSLINK$
bindings = INTELNET
```

**7**   Be sure the keyword settings in the PROTOCOL.INI file in the C:\LANMAN directory match the settings in in the sample PROTOCOL.INI file contained in the C:\INTEL\M16A directory.

**8**   Copy the files M16ACFG.EXE and M16ANDIS.EXE from the C:\INTEL\M16A directory to the C:\LANMAN directory.

**9**   Use a text editor to insert the following lines in your CONFIG.SYS file:

```
DEVICE=C:\LANMAN\M16ACFG.EXE
DEVICE=C:\LANMAN\M16ANDIS.EXE
```

between the two lines

```
DEVICE=C:\LANMAN\PROTMAN.SYS
DEVICE=C:\LANMAN\NFS-NDIS.SYS
```

as follows:

```
DEVICE=C:\LANMAN\PROTMAN.SYS
DEVICE=C:\LANMAN\M16ACFG.EXE
DEVICE=C:\LANMAN\M16ANDIS.EXE
DEVICE=C:\LANMAN\NFS-NDIS.SYS
```

**10** Verify that your AUTOEXEC.BAT file contains a line that reads

```
C:\LANMAN\NETBIND
```

before the line that reads

```
NET INIT
```

**11** Configure PC-NFS options according to your PC-NFS documentation, and reboot the computer.

# Ungermann-Bass Net/One for DOS and OS/2

NDIS 2.0 Driver

The PRO/100 PC Card is supported on Ungermann-Bass Net/One LAN Manager and MS-NET networks. There are two NDIS driver packages available from UB: XNS BNS/NDIS and TCP BNS/NDIS. These packages, used with a Intel NDIS driver, provide files that support DOS and OS/2 workstations. They are available from UB and authorized UB representatives.

### Ungermann-Bass Net/One LAN Manager version 2.1 Installation

1   Begin installation of LAN Manager 2.1 using "setup."

2   When prompted to select the available network adapter driver, choose "Other Driver."

3   When prompted, insert the Intel Network Drivers Disk.

4   Select "Intel EtherExpress PRO/100 Mobile Adapter 16-bit PC Card" from the menu.

5   Continue with the installation until it is completed.

6   Copy the file M16ACFG.EXE from the root directory of your Intel Network Drivers Disk to the drive and directory where you installed your network operating system.

7   Following the UB instructions, modify your CONFIG.SYS file by adding the following lines:

For DOS:

```
DEVICE = [path]M16ACFG.EXE DRIVER=NDIS
DEVICE = [path]M16ANDIS.EXE
```

For OS/2:

```
DEVICE = [path]M16ANDIS.OS2
```

where [*path*] is the drive and directory in which you installed your network operating system.

8   Use a text editor to modify your PROTOCOL.INI file as follows:

• For each protocol that you want to bind, set the protocol definition area of the PROTOCOL.INI file to:

```
BINDINGS = UBLOOP
```

• At the end of the file, add the following fragments:

```
[UBLOOP]
 DRIVERNAME = UBLOOP$
 BINDINGS = INTELNET
;INTEL ADAPTER
[INTELNET]
 DRIVERNAME = INTEL$
```

**9** Reboot the PC.

# Wollongong PathWay Access for DOS

NDIS and ODI Drivers

Wollongong PathWay Access for DOS can be installed using Intel NDIS or ODI drivers. Installation instructions for both types of driver are provided below. For information on which driver is appropriate for your network environment, refer to the Wollongong PathWay Access for DOS documentation.

## Wollongong PathWay NDIS Installation

1   Run the Intel Installation Program from Disk 1, Installation Disk

2   Choose Wollongong PathWay Access from the Select Network Operating System screen.

3   Follow the prompts to complete the Intel segment of the installation.

4   Install PathWay Access for DOS Kernel and Drivers programs according to the instructions in the PathWay Access for DOS manual. Before rebooting the PC, continue with the following steps.

5   Use a text editor to modify the CONFIG.SYS file. After the statement that reads

```
DEVICE=C:\PATHWAY\PWTCP.SYS
```

add the lines

```
DEVICE=\PATHWAY\[PROTMAN FILE] /I:C:\PATHWAY
DEVICE=\PATHWAY\M16ACFG.EXE DRIVER=NDIS
DEVICE=\PATHWAY\M16ANDIS.EXE
```

where [PROTMAN FILE] is equal to the PROTMAN2.EXE or PROTMAN.EXE file that is located in your PATHWAY directory. (Refer to the Wollongong PathWay Access for DOS manual for information regarding the differences between these two files.)

6   Copy the files M16ACFG.EXE, M16ANDIS.EXE, and PROTOCOL.INI from C:\INTEL\M16A directory to the PATHWAY directory on your hard disk or boot disk.

7   Continue with the "custom" instructions in the PathWay Access for DOS manual.

8   Reboot the PC.

## Wollongong PathWay ODI Installation

**1** Run the Intel Installation Program from Disk 1, Installation Disk.

**2** Choose Wollongong PathWay Access from the Select Network Operating System screen.

**3** Follow the prompts to complete the Intel segment of the installation.

**4** Install PathWay Access for DOS Kernel and Drivers programs according to the instructions in the PathWay Access for DOS manual. Before rebooting the PC, perform the following steps.

**5** Run the MS-DOS batch file DCOMPVLM.BAT from the Network Drivers Disk, as follows:

```
DCOMPVLM PATHWAY
```

DCOMPVLM.BAT will decompress and copy all required files from the Intel Network Drivers Disk to the PATHWAY directory on your hard disk or boot disk. (The files are LSL.COM, M16AODI.COM, IPXODI.COM, VLM.EXE, M16ACFG.EXE, and NET.CFG.)

**6** Change to the PATHWAY directory and load the software in the following order:

```
M16ACFG
```

```
LSL
```

```
M16AODI
```

`IPXODI` (only if using Novell NetWare)

`VLM` (only if using Novell NetWare)

**7** Load the Wollongong file ODI.EXE.

**8** Continue with the instructions in the PathWay Access for DOS manual.

**9** Reboot the PC.

Chapter 3

# Configuration Reference

## Who Should Consult This Chapter

This chapter contains additional information on PRO/100 PC Card features and technical information on configuration requirements, including sample configuration files for the Windows 3.x environment, and driver parameter settings, including registry values for Windows 95 and NT. This information can be used to modify an existing installation or perform a new installation manually without the assistance of the Intel Installation Program.

### Note

Intel recommends operations described in this chapter be performed by a system or network administrator or a user with equivalent technical experience.

### Microsoft Windows 95 and Windows NT

Windows registry settings can be found on page 68, under the heading "M16A.SYS Settings for Microsoft Windows 95 and Windows NT."

### Modifying Settings After Running the Intel Installation Program (Windows 3.x)

The file modifications made by the Intel Installation Program should allow most **Windows 3.x** users to log on to their network after performing the steps outlined in **Chapter 1, Hardware Installation** and **Chapter 2, Software Installation**.

If you followed those instructions and still have not been able to successfully log on to your the network, you may need to modify the configuration parameters set by the Intel Installation Program. You can modify configuration settings by rerunning the Intel Installation Program or by running IEDIT, the Intel System File Editor installed in the Intel PRO/100 Windows program group.

## Installation without the Intel Installation Program

The information in this chapter can be used to manually configure the PRO/100 PC Card under Windows 3.x, MS-DOS, and IBM OS/2. For manual installation, it is assumed that you have some experience with manual setup of network adapters, and know how to access and modify configuration files, using an ASCII text editor. Intel recommends that manual installation be performed by a system administrator or equivalent.

## For Preliminary Troubleshooting

Review the configuration information in this chapter. For more detailed information on specific installation problems, see **Chapter 4. Troubleshooting**.

# PRO/100 PC Card Features

## Card and Socket Services

### Note

> Microsoft Windows 95 and Windows NT have this functionality built-in and do not require separate Card and Socket Services software.

The Personal Computer Memory Card International Association (PCMCIA) has developed specifications governing the use of PC Cards (formerly PCMCIA cards) in personal computer systems. The software components that implement these specifications are called Card and Socket Services. This software supports the ability of PC Card-aware device drivers (known as clients) to share cards, sockets, and system resources.

Unless you are using Windows 95 or Windows NT, Card and Socket Services are required with the PRO/100 PC Card if you want to take advantage of the full range of features and benefits of PC Card capability. If your PC Card computer is not equipped with Card and Socket Services, ask your computer manufacturer or dealer for details on how to obtain them.

## HotSwap

The Intel PRO/100 PC Card supports HotSwap during connection to a network or host computer from a PC Card computer using both Card and Socket Services software (or the equivalent functionality of Windows 95 or Windows NT). This feature allows the PRO/100 to be removed from the computer, temporarily replaced with another type of card such as a modem or memory card, then reinserted without loss of network connection.

For example, a user could replace a PRO/100 PC Card connected to a network with a PC Card flash or SRAM memory card. The network drives become temporarily inaccessible. Any access from DOS or Windows will return an "Invalid drive specification" message. Meanwhile, the drive associated with the flash or SRAM card is available for copying and data retrieval.

If the PRO/100 is returned to the PC Card slot within the timeout period specified by the network operating system, then network drives, path, and mappings will be reinstated exactly as they were before the swap. The default timeout value varies for different network operating systems.

### Note

The HotSwap feature is not supported unless Card and Socket Services software (or its equivalent under Windows 95 or Windows NT) is running on the PC Card computer.

## Power Management Suspend/Resume

Power management features such as suspend/resume are supported by the PRO/100 PC Card on PC Card systems running both Card and Socket Services (or the equivalent functionality of Windows 95 or Windows NT). This means that when the computer enters a reduced power or power saving mode, an ongoing network connection will remain active for the period of time allowed by the network operating system. Even if the time period is exceeded, the network connection can usually be restored by simply logging back in without rebooting.

### Note

The suspend/resume feature is not supported unless Card and Socket Services software (or its equivalent under Windows 95 or Windows NT) is running on the PC Card computer.

## Power Management Guidelines

HotSwap and suspend/resume operations are subject to limitations dictated by the network operating system. See the documentation for your network operating system to determine how long the network will wait for activity before dropping a connection, and whether this time period is user configurable.

## Full-Duplex Transmission (10Mbps Only)

The Intel PRO/100 PC Card hardware and network drivers are designed to support full-duplex operation, or the ability to transmit and receive on the network at the same time, on 10Mbps networks. This feature is only available when the PRO/100 PC Card is connected to a full-duplex 10Mbps switch. It is not available on 100Mbps networks.

If your network supports full-duplex operation, activate the PRO/100 feature by including the keyword FULLDUPLEX in the configuration file or on the command line for your network driver.

### Note

> To use full-duplex capabilities, your network must run at 10Mbps and have full-duplex hardware in place and enabled. If you use the FULLDUPLEX keyword without full-duplex hardware, the network may become unusable due to excessive collisions.

## Advanced Look-Ahead Pipelining

The PRO/100 PC Card also uses pipelining technology to improve performance. Advanced Look-Ahead Pipelining allows for processing and transmission of packets before the entire packet has been loaded into memory, resulting in significant gains in performance. This feature is enabled automatically, without user intervention.

## M16ACFG.EXE Configuration Utility (Windows 3.x)

A configuration utility (or "resource manager") is required to support the functions of Card and Socket Services on PC Card systems (except under Microsoft Windows 95, Windows NT, and IBM OS/2). This utility is called M16ACFG.EXE and is supplied on the Network Drivers Disk. The utility can be run from the DOS command line or included in the AUTOEXEC.BAT file or the CONFIG.SYS file. M16ACFG.EXE allows the Intel PRO/100 PC Card to become a client of Card Services. It must be run prior to loading a network driver on a PC Card computer using Card and Socket Services.

**Note**

> M16ACFG.EXE is not used under Microsoft Windows 95,
> Windows NT, or IBM OS/2.

## Memory Exclusion (Windows 3.x)

When using a memory manager, you must exclude a 4K memory
range between C000 to EF00 for the use of the PRO/100 PC Card. For
example:

```
device=c:\dos\himem.sys
device=c:\dos\emm386.exe noems x=D200-D2FF
```

This example excludes 4K of the D200 segment for use by the PRO/
100 when using the default memory address D200. If the PRO/100 is
configured for a memory address other than the default, be sure to
exclude a corresponding 4K memory address range.

## Sample Configuration Files for Selected Network Operating Systems (Windows 3.x)

The following sample configuration files show default parameters for
some network operating systems run under Windows 3.x. This
information is designed to supplement the information provided in
**Chapter 2. Software Installation**.

# Artisoft LANtastic/AI 6.0 (Windows 3.x)

**Note**

> If you are using DOS multi-menu CONFIG.SYS, the three
> LANtastic-related lines in the CONFIG.SYS will be located in
> a COMMON section at the end of your CONFIG.SYS. You
> will have to manually move those lines into the proper
> menuitem section of your CONFIG.SYS. The same is true
> for the line call c:\lantasti\startnet.bat in your
> AUTOEXEC.BAT file.

*Sample CONFIG.SYS*

```
DEVICE=C:\DOS\HIMEM.SYS

REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES BELOW

DEVICE=C:\DOS\EMM386.EXE NOEMS X=D200-D2FF

REM DEVICE=C:\DOS\EMM386.EXE NOEMS

REM INTEL PRO/100 — DO NOT CHANGE LINES ABOVE
```

```
FILES=50

BUFFERS=30

REM INTEL PRO/100 — DO NOT CHANGE LINES BELOW

DEVICE=C:\LANTASTI\PROTMAN.DOS /I:C:\LANTASTI

DEVICE=C:\LANTASTI\M16ACFG.EXE DRIVER=NDIS

DEVICE=C:\LANTASTI\M16ANDIS.EXE

REM INTEL PRO/100 — DO NOT CHANGE LINES ABOVE
```

### Sample AUTOEXEC.BAT

```
PATH=C:\UTIL;C:\DOS;
PROMPT $P$G

CALL C:\LANTASTI\STARTNET.BAT
```

### Sample PROTOCOL.INI

```
;PROTOCOL.INI FOR LANTASTIC VERSION 6.00

;———— USING INTEL PRO/100 PC CARD

;

[PROTMAN]

 DRIVERNAME = PROTMAN$

 DYNAMIC = YES

; PROTOCOL.INI SECTION FOR THE PRO/100 PC CARD.

[M16ANDIS_NIF]

 DRIVERNAME = INTEL$

 IOADDRESS=0X320

 INT=5

 MEM=0XD2000

 NOEARLYRX
```

### Sample STARTNET.BAT

```
@ECHO OFF
REM LANTASTIC VERSION 6.00 INSTALLED 95/01/26
11:31:28
REM (FOR DOS)
C:
CD C:\LANTASTI
```

```
SET LAN_CFG=C:\LANTASTI
REM IF LANTASTIC IS DISABLED, SKIP EVERYTHING.
IF EXIST DISABLED GOTO :STARTNET_DONE
@ECHO ===== BEGIN LANTASTIC CONFIGURATION =====
PATH C:\LANTASTI;%PATH%
SET LAN_DIR=C:\LANTASTI.NET
LOADHIGH AI-NDIS BIND_TO=M16ANDIS_NIF
AILANBIO @STARTNET.CFG
REDIR T4700 @STARTNET.CFG
IF EXIST NOSHARE GOTO :NOSHARE
SERVER C:\LANTASTI.NET @STARTNET.CFG
NET LOGIN \\T4700
GOTO :CONTINUE
:NOSHARE
@ECHO LANTASTIC SERVER WAS INSTALLED BUT TURNED OFF.
:CONTINUE
REM IF CONNECT.BAT EXISTS, RUN IT TO SET UP CONNECTIONS

IF EXIST CONNECT.BAT GOTO :CONNECT
REM OTHERWISE SET UP CONNECTIONS SPECIFIED DURING
INSTALL.
NET USE LPT1: \\T4700\@PRINTER
NET LPT TIMEOUT 10
GOTO :CONNECT_DONE
:CONNECT
@ECHO SETTING UP LANTASTIC CONNECTIONS FROM CONNECT.BAT
REM BUILD CONNECT.BAT LIKE THIS: "NET SHOW/BATCH
   >C:\LANTASTI\CONNECT.BAT"
REM  (OR RUN THE BATCH FILE SETNET.BAT)
CALL CONNECT.BAT
:CONNECT_DONE
NET POSTBOX
@ECHO ===== END LANTASTIC CONFIGURATION =====
:STARTNET_DONE
CD \
```

## Banyan VINES 5.5 (Windows 3.x)

### Note

> If you are using DOS Multi-menu CONFIG.SYS, the three
> VINES related lines in the CONFIG.SYS will be located at the
> end of your CONFIG.SYS. You will have to manually move
> those lines into the proper menuitem section of your
> CONFIG.SYS. If you get Banyan VINES Error codes 10xx,
> check C:\VINES\NDISBAN.DOC for explanations of error
> codes.

### *Sample CONFIG.SYS*

```
DEVICE=C:\DOS\HIMEM.SYS
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES BELOW
(EMM)
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D200-D2FF
```

```
REM DEVICE=C:\DOS\EMM386.EXE NOEMS
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES ABOVE
FILES=40
BUFFERS=30
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES BELOW
(NDIS)
DEVICE=C:\VINES\PROTMAN.DOS /I:C:\VINES
DEVICE=C:\VINES\M16ACFG.EXE DRIVER=NDIS
DEVICE=C:\VINES\M16ANDIS.EXE
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES ABOVE
```

*Sample AUTOEXEC.BAT*

```
PATH=C:\UTIL;C:\DOS;
PROMPT $P$G

CD\VINES
LH BAN/NC
LH NDISBAN.COM
LH REDIRALL.EXE
NETBIND
ARSWAIT
Z:\LOGIN
```

*Sample PROTOCOL.INI*

```
; PROTOCOL.INI SECTION FOR THE INTEL PRO/100 PC CARD.
[INTELNET]
   DRIVERNAME = INTEL$
   IOADDRESS=0X320
   INT=5
   MEM=0XD2000
```

## DEC PATHWORKS 5.0 or 5.1 (Windows 3.x)

*Sample CONFIG.SYS*

```
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D200-D2FF
FILES=40
BUFFERS=30
SHELL=C:\DOS\COMMAND.COM /P /E:1024
LASTDRIVE=G
```

*Sample AUTOEXEC.BAT*

```
CD\PW
STARTNET.BAT
```

*Sample PROTOCOL.INI (after completion of install process)*

```
[PROTOCOL MANAGER]
 DRIVERNAME = PROTMAN$
[IPX4MAC]
 DRIVER  = IPX$MAC
 BINDINGS  = M16ANDIS
[IPX_XIF]
 DRIVERNAME = IPX$
 BINDINGS  = M16ANDIS
```

```
[NETBEUI]
 DRIVERNAME = NETBEUI$
 SESSIONS  = 6
 NCBS     = 12
 BINDINGS  = M16ANDIS
 LANABASE  = 0
[DATALINK]
 DRIVERNAME = DLL$MAC
 LG_BUFFERS = 14
 SM_BUFFERS = 6
 OUTSTANDING = 32
 BINDINGS  = M16ANDIS
 DECPARM   = C:\PW\
 NI_IRQ    = 5
;; YOUR DECNET ADDRESS IS AA0004008407
;;
[M16ANDIS]
DRIVERNAME=INTEL$
   INT=5
   IOADDRESS=0X320
   MEM=0XD2000
```

## Windows for Workgroups 3.11

### *Sample CONFIG.SYS*

```
DEVICE=C:\DOS\HIMEM.SYS
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES BELOW
(EMM)
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D200-D2FF
REM DEVICE=C:\DOS\EMM386.EXE NOEMS
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES ABOVE
FILES=40
BUFFERS=30
DEVICE=C:\WINDOWS\IFSHLP.SYS
LASTDRIVE=Z
```

### *Sample AUTOEXEC.BAT*

```
C:\WINDOWS\NET START
```

### *Sample PROTOCOL.INI*

```
[NETWORK.SETUP]
VERSION=0X3110
NETCARD=INTELMAC,1,INTELMAC,1
TRANSPORT=MS$NETBEUI,NETBEUI
TRANSPORT=MS$NDISHLP,MS$NDISHLP
LANA0=INTELMAC,1,MS$NETBEUI
LANA1=INTELMAC,1,MS$NDISHLP
[NETBEUI]
BINDINGS=INTELMAC,ASYMAC
LANABASE=0
DRIVERNAME=NETBEUI$
SESSIONS=10
NCBS=12
[PROTMAN]
DRIVERNAME=PROTMAN$
PRIORITY=MS$NDISHLP
[INTELMAC]
DRIVERNAME=INTEL$
```

```
   INT=5
   IOADDRESS=0X320
   MEM=0XD2000
[MS$NDISHLP]
DRIVERNAME=NDISHLP$
BINDINGS=INTELMAC
```

*Sample [NETWORK DRIVERS] SECTION IN SYSTEM.INI*

```
[NETWORK DRIVERS]
DEVDIR=C:\WINDOWS
LOADRMDRIVERS=YES
NETCARD=M16ACFG.EXE,M16ANDIS.EXE
TRANSPORT=*NETBEUI,NDISHLP.SYS
```

## Windows for Workgroups Using the ODI Driver with NetWare as Secondary Network

*Sample STARTNET.BAT*

```
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES BELOW
:M16A_MENU
@ECHO OFF
CLS
GOTO %CONFIG%
:M16A_INTEL
C:
CD C:\NWCLIENT
IF NOT EXIST M16AODI.COM GOTO INT_ERROR
M16ACFG.EXE DRIVER=ODI
LSL
M16AODI.COM
IPXODI
C:\WINDOWS\ODIHLP.EXE
VLM
IF NOT EXIST XCHECK.EXE GOTO S_M16A_INTEL
CLS
XCHECK.EXE -E -1 F:
:S_M16A_INTEL
F:
LOGIN
GOTO INT_END
:INT_ERROR
ECHO ERROR: UNABLE TO LOCATE DRIVER FILE.
:INT_END
C:
CD \
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES ABOVE
```

*Sample CONFIG.SYS*

```
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES BELOW
(MENU)
[MENU]
MENUITEM=M16A_E_INTEL,LOAD INTEL PRO/100 PC CARD FOR
NETWORK ACCESS
MENUITEM=INT_END,DO NOT LOAD ANY INTEL DRIVERS
```

```
MENUCOLOR=15,0
[M16A_E_INTEL]
[INT_END]
[COMMON]
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES ABOVE

DEVICE=C:\WINDOWS\HIMEM.SYS /TESTMEM:OFF
DEVICE=C:\DOS\EMM386.EXE X=D000-DFFF
DOS=HIGH
DOS=UMB
BUFFERS=20
FILES=40
LASTDRIVE=Z
DEVICE=C:\WINDOWS\IFSHLP.SYS
STACKS=9,256
```

## *Sample AUTOEXEC.BAT*

```
@ECHO OFF
PROMPT $P$G
PATH C:\WINDOWS;C:\DOS
SET TEMP=C:\DOS
C:\DOS\SMARTDRV.EXE /X C+

REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES BELOW
:M16A_MENU
@ECHO OFF
CLS
GOTO %CONFIG%
:M16A_INTEL
C:\WINDOWS\NET START
C:
CD C:\NWCLIENT
IF NOT EXIST C:\NWCLIENT\STARTNET.BAT GOTO INT_ERROR
CALL C:\NWCLIENT\STARTNET.BAT
GOTO INT_END
:INT_ERROR
ECHO ERROR: UNABLE TO LOCATE DRIVER FILE.
:INT_END
C:
CD \
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES ABOVE
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES BELOW
(PATH)
PATH=%PATH%;C:\NWCLIENT
REM INTEL PRO/100 ADAPTER — DO NOT CHANGE LINES ABOVE
```

## *Sample PROTOCOL.INI*

```
[NETWORK.SETUP]
VERSION=0X3110
NETCARD=INTEL$ODI,1,INTEL$ODI,4
TRANSPORT=MS$NWLINKNB,NWLINK
TRANSPORT=MS$NETBEUI,NETBEUI
LANA0=INTEL$ODI,1,MS$NETBEUI
LANA1=INTEL$ODI,1,MS$NWLINKNB

[NET.CFG]
PATH=C:\NWCLIENT\NET.CFG
```

```
[INTEL$ODI]

[LINK DRIVER M16AODI]
DATA=FRAME ETHERNET_802.2

[NWLINK]

BINDINGS=M16AODI
[NETBEUI]
BINDINGS=M16AODI
LANABASE=0
SESSIONS=10
NCBS=12
```

*Sample [network drivers] section in SYSTEM.INI*

```
[NETWORK DRIVERS]
DEVDIR=C:\WINDOWS
LOADRMDRIVERS=NO
```

*Sample NET.CFG file (located C:\NWCLIENT)*

```
LINK DRIVER M16AODI
  FRAME ETHERNET_802.3
  FRAME ETHERNET_802.2
  FRAME ETHERNET_II
  FRAME ETHERNET_SNAP
  INT 5
  PORT 320
  MEM D2000
```

## Windows 95 and Windows NT Driver Parameters Reference

### Caution

Under most circumstances it will not be necessary to make modifications directly to the registry. Incorrect settings can result in undesirable changes to the configuration of Windows 95 or NT. Consult Intel Customer Support for assistance if you find it necessary to modify the registry.

### M16A.SYS (NDIS 3) Settings for Microsoft Windows 95 and Windows NT

M16A.SYS is an NDIS 3 driver. It conforms to the Microsoft Network Driver Interface Specification (NDIS). It supports both Windows NT and Windows 95.

### Windows 95 Support

The files necessary for using M16A.SYS with Windows 95 include:

| NETM16A.INF | Intel installation file for Windows 95 |
|---|---|
| M16A.SYS | Intel NDIS 3 driver for Windows 95 |

There are user-configurable parameters to the M16A.SYS driver which can be modified using the Network Control Panel built into Windows 95. This applet queries the user for parameter selections and then sets the corresponding parameters in the registry. The user-configurable parameters are as follows:

| Parameter | Default | Valid Values | Registry Value |
|---|---|---|---|
| CABLE TYPE | AUTO | AUTO | 0 |
| | | TWISTED PAIR 10BT | 1 |
| DIRECT ENABLE | OFF | OFF, ON | 0 |
| EARLY TRANSMIT | ON | OFF | 0 |
| | | ON | 1 |
| FULL DUPLEX | OFF | OFF | 0 |
| | | ON | 1 |
| LINE SPEED | AUTO | AUTO DETECT | 0 |
| | | 10MBPS | 1 |
| | | 100MBPS | 2 |
| LINK INTEGRITY | ON | OFF | 0 |
| | | ON | 1 |
| MODE | I/O | I/O | 0 |
| | | MEMORY MAPPED | 1 |
| NETWORKADDRESS | | | |
| TRANSMITBUFFERSIZE | 7168 | 1024-29696 | 1024-29696 |

The network node address can be modified by specifying a value for 'NetworkAddress' such as '00A0C9112233'. If the user does NOT specify a 'NetworkAddress' then the M16A.SYS driver uses the network node address contained in the PRO/100 PC Card Information Structure.

There are parameters in the Windows 95 registry which specify the configuration of the PRO/100 PC Card hardware to the M16A.SYS driver. Many of these parameters correspond directly to the user-configurable parameters. These parameters are found in the registry at the following location:

`HKEY_LOCAL_MACHINE\SYSTEM\CURRENTCONTROLSET\SERVICES\CLASS\NET\000X`

### Caution

Under most circumstances it will not be necessary to make
modifications directly to the registry. Incorrect settings can
result in undesirable changes to the configuration of
Windows 95 or NT. Consult Intel Customer Support for
assistance if you find it necessary to modify the registry.

The registry parameters are as follows:

| Keyword | Default | Valid Values |
|---|---|---|
| CABLETYPE | "0" | 0-1 |
| DEVICEVXDS | "M16A.SYS" | |
| DEVLOADER | "NDIS" | |
| DIRECTENABLE | "0" | 0-1 |
| DRIVERDESC | "INTEL PRO/100 PC CARD" | |
| EARLYTRANSMIT | "1" | 0-1 |
| ENUMPROPPAGES | "NETDI.DLL,ENUMPROPPAGES" | |
| FULLDUPLEX | "0" | 0-1 |
| INFPATH | "NETM16A.INF" | |
| INTERRUPTNUMBER | 04 00 00 00 | |
| IOBASEADDRESS | 02 00 00 00 | |
| LINESPEED | "0" | 0-2 |
| LINKINTEGRITY | "1" | 0-1 |
| MEMORYBASEADDRESS | 01 00 00 00 | |
| MODE | "0" | 0-1 |
| NETWORKADDRESS | | |
| PLATFORMTYPE | "1" | 1 |
| TRANSMITBUFFERSIZE | "7168" | 1024-29696 |

'InterruptNumber', 'IoBaseAddress', and 'MemoryBaseAddress' are
NOT user-configurable and their values are assigned by the Windows
95 Configuration Manager.

## Windows NT Support

### Caution

Under most circumstances it will not be necessary to make
modifications directly to the registry. Incorrect settings can
result in undesirable changes to the configuration of
Windows 95 or NT. Consult Intel Customer Support for
assistance if you find it necessary to modify the
registry.The M16A.SYS driver supports the networking
environment in Windows NT versions 3.5 and greater.

The files necessary for using M16A.SYS with Windows NT include:

| | |
|---|---|
| M16A.DLL | Intel M16A installation DLL |
| OEMSETNT.INF | Intel installation file for Windows NT |

M16A.SYS             Intel NDIS 3 driver for Windows NT

There are user-configurable parameters to the M16A.SYS driver
which can be modified using the Network Control Panel built into
Windows NT. This applet uses the OEMSETNT.INF file to set the
corresponding parameters in the registry. The user-configurable
parameters are as follows:

| Parameter | Default | Valid Values | Registry |
|---|---|---|---|
| I/O PORT | 0X320 | 0X200-0X3D0 | SAME |
| MEMORY ADDRESS | 0XD4000 | 0XA0000 - 0XFE000 | SAME |
| INTERRUPT | 5 | 3, 4, 5, 7, | SAME |
| | | 10, 11, 15 | |
| MODE | I/O | I/O | 0 |
| | | MEMORY MAPPED | 1 |
| CABLE TYPE | AUTO | AUTO DETECT | 0 |
| | | TWISTED PAIR... | 1 |
| LINE SPEED | AUTO DETECT | AUTO DETECT | 0 |
| | | 10MBPS | 1 |
| | | 100MBPS | 2 |
| EARLY TRANSMIT | ENABLED | DISABLED | 0 |
| | | ENABLED | 1 |
| LINK INTEGRITY | ENABLED | DISABLED | 0 |
| | | ENABLED | 1 |
| FULL DUPLEX | DISABLED | DISABLED | 0 |
| | | ENABLED | 1 |

The network node address can be modified by manually editing the
registry and adding the parameter 'NetworkAddress' with a
hexadecimal string value, such as '00A0C9112233'. If the user does
NOT specify a 'NetworkAddress' then the M16A.SYS driver uses the
network node address contained in the PRO/100 PC Card Card
Information Structure.

There are parameters in the Windows NT registry which specify the configuration of the PRO/100 PC Card hardware to the M16A.SYS driver. Many of these parameters correspond directly to the user-configurable parameters. These parameters are found in the registry at the following location:

HKEY_LOCAL_MACHINE\SYSTEM\CURRENTCONTROLSET\SERVICES\M16A1\PARAMETERS\

The registry parameters are as follows:

| Keyword | Default | Valid Values |
|---|---|---|
| ADAPTERTYPE | 0 | |
| BUSNUMBER | 0 | |
| BUSTYPE | 0X5 | |
| CABLETYPE | 0 | 0-1 |
| DIRECTENABLE | 0 | 0-1 |
| EARLYTRANSMIT | 0X1 | 0-1 |
| FULLDUPLEX | 0 | 0-1 |
| INTERRUPTNUMBER | 0X5 | 3, 4, 5, 7, A, B, F |
| IOBASEADDRESS | 0X320 | 0X200 - 0X3D0 |
| IOLENGTH | 0XF | |
| LINESPEED | 0 | 0-2 |
| LINKINTEGRITY | 0X1 | 0-1 |
| MEMORYMAPPEDBASEADDRESS | 0XD5000 | A1000-FF000 |
| MEMORYMAPPEDSIZE | 0X1000 | |
| MODE | 0 | 0-1 |
| NETWORKADDRESS | | |
| PCCARDATTRIBUTE-MEMORYADDRESS | 0XD4000 | A0000 - FE000 |
| PCCARDATTRIBUTE-MEMORYOFFSET | 0 | |
| PCCARDATTRIBUTEMEMORYSIZE | 0X1000 | |
| PCCARDMEMORYWINDOWOFFSET | 0 | |
| PCMCIA | 1 | 0-1 |
| TRANSMITBUFFERSIZE | 0X1C00 | 0X0400-0X1E800 |

'Pcmcia' defaults to '0' for Windows NT 3.5.

## Windows 3.x Driver Parameters

PRO/100 default settings may have to be changed in some PC Card environments under Windows 3.x, when initialization is not successful using the M16ACFG.EXE utility and the parameters selected by the Intel Installation Program. The following paragraphs present configuration guidelines for each of the driver types: NDIS, ODI, and packet. These guidelines are followed by a comprehensive "keyword" reference section and a list of error messages.

All of the drivers described here automatically detect the speed of the network to which the adapter is attached (10Mbps or 100Mbps), unless otherwise noted. Speed can also be specified with the LINESPEED keyword.

Full-duplex operation is only supported at 10Mbps and must be explicitly configured with the FULLDUPLEX keyword. Full-duplex operation is not supported at 100Mbps.

## ODI Settings (for drivers M16AODI.COM and M16AODI.OS2)

Custom parameters for networks using the ODI driver can be set up with the Intel Installation Program or entered manually, using an ASCII editor, in the **NET.CFG** file. If Card and Socket Services are being used, the Intel **M16ACFG.EXE** configuration program implements the appropriate parameters when the network driver is loaded.

### DOS ODI Driver Configuration Notes (M16AODI.COM)

The ODI driver M16AODI.COM conforms to the "Novell ODI Specification: 16-bit DOS Client HSMs." It is a DOS-based terminate-and-stay-resident (TSR) program. The driver will configure itself according to the options specified in the NET.CFG file. This file is supplied on the Network Drivers Disk and must be present in the same directory as the ODI driver. Files required for using M16AODI.COM are

| | |
|---|---|
| M16AODI.INS | Intel installation information file |
| NET.CFG | Network configuration file |
| M16AODI.COM | Intel ODI driver |

If Card and Socket Services are loaded, the Intel resource manager M16ACFG.EXE must be run before M16AODI.COM to establish connection between the PRO/100 PC Card and the computer.

Most installations will be able to use the settings implemented in the NET.CFG file by the Intel Installation Program. If any parameters need to be changed, use an ASCII text editor to open and modify the NET.CFG file and insert the appropriate keywords and values after the line
```
LINK DRIVER M16AODI
```
Parameters can also be implemented on the command line. Keyword syntax can be found below. Keywords are not case sensitive. A Keyword Alphabetical Reference follows the discussion of keyword syntax.

## NET.CFG Example

```
LINK DRIVER M16AODI
  INT 5
  PORT 280
  MEM D2000
```

## M16AODI.COM Keywords

| Keyword | Default | Valid Values |
|---|---|---|
| FULLDUPLEX | (NO KEYWORD = FULL-DUPLEX DISABLED) | |
| INTERRUPT | 5 | (3 - 15) |
| IOADDRESS | 320 | (240 - 380) |
| IOWAITSTATES | 0 | (1 - 3) |
| LINESPEED | AUTO | (10 OR 100) |
| LINKDISABLE | (NO KEYWORD = LINK INTEGRITY EN ABLED) | |
| LINK DRIVER M16AODI | (REQUIRED FIRST ITEM IN NET.CFG) | |
| MEMORY | D2000 | (C0000 - EE000) |
| MEMWAITSTATES | 0 | (1 - 3) |
| MODE | MEM | (MEM OR IO) |
| NOCHECK | (NO KEYWORD = ADAPTER RESOURCE VERIFICATION ENABLED) | |
| NOEARLYRX | (NO KEYWORD = EARLY RECEIVE EN ABLED) | |
| NOEARLYTX | (NO KEYWORD = EARLY TRANSMIT EN ABLED) | |
| NOLED | (NO KEYWORD = LEDS ENABLED) | |
| S | (COMMAND LINE ONLY: SHOW RESIDENT LAN DRIVERS) | |
| SOCKET | AUTO | (1 - 4) |
| U | NOT USED | (COMMAND LINE ONLY: UNLOAD M16AODI) |
| WORDSIZE | 16 | (8 OR 16) |

## ODI Driver Example

A typical load sequence for the ODI driver M16AODI.COM with M16ACFG.EXE in a NetWare environment would be

```
M16ACFG
LSL
M16AODI
IPXODI
VLM
```

## OS/2 ODI Driver Configuration Notes (M16AODI.OS2)

The OS/2 ODI driver M16AODI.OS2 conforms to the Novell "ODI Developer's Guide for OS/2 Client Driver Hardware Specific Modules" version 2.1. It is an IBM OS/2-based device driver for use with OS/2 versions 2.0 and later. The Novell OS/2 workstation ODI stack including M16AODI.OS2 supports Novell's NetWare Requestor for OS/2 networking client environment.

Files required for using M16AODI.OS2 include Novell OS/2 Requestor files and the following files:

NET.CFG                 Network configuration file
M16AODI.OS2             Intel ODI driver for OS/2

Most installations will be able to use the settings implemented in the
NET.CFG file by the Intel Installation Program. If any parameters
need to be changed, use an ASCII text editor to open and modify the
NET.CFG file and insert the appropriate keywords and values after the
line

```
LINK DRIVER M16AODI
```
Parameters can also be implemented on the command line. Keyword
syntax can be found below. Keywords are not case sensitive. A
Keyword Alphabetical Reference follows the discussion of keyword
syntax.

### NET.CFG Example
```
LINK DRIVER M16AODI
 INT 5
 PORT 280
 MEM D2000
```

### M16AODI.OS2 Keywords

| Keyword | Default | Valid Values |
|---|---|---|
| FULLDUPLEX | (NO KEYWORD = FULL-DUPLEX DISABLED) | |
| INTERRUPT | 5 | (3 - 15) |
| IOADDRESS | 320 | (240 - 380) |
| IOWAITSTATES | 0 | (1 - 3) |
| LINESPEED | AUTO | (10 OR 100) |
| LINKDISABLE | (NO KEYWORD = LINK INTEGRITY EN ABLED) | |
| LINK DRIVER M16AODI | (REQUIRED FIRST ITEM IN NET.CFG) | |
| MEMORY | D2000 | (C0000 - EE000) |
| MEMWAITSTATES | 0 | (1 - 3) |
| MODE | MEM | (MEM OR IO) |
| NOCHECK | (NO KEYWORD = ADAPTER RESOURCE VERI- | FICATION ENABLED) |
| NOEARLYRX | (NO KEYWORD = EARLY RECEIVE EN ABLED) | |
| NOEARLYTX | (NO KEYWORD = EARLY TRANSMIT EN ABLED) | |
| NOLED | (NO KEYWORD = LEDS ENABLED) | |
| SOCKET | AUTO | (1 - 4) |
| WORDSIZE | 16 | (8 OR 16) |

## NDIS 2.0.1 Settings (for drivers M16ANDIS.EXE and M16ANDIS.OS2)

Custom parameters for the NDIS driver can be set up with the Intel
Installation Program or entered manually, using an ASCII editor, in
the **PROTOCOL.INI** file. If Card and Socket Services are being
used, the Intel **M16ACFG.EXE** resource manager program will

implement the appropriate parameters when the network driver is loaded.

### NDIS 2.0.1 DOS Driver Configuration Notes

The DOS NDIS driver **M16ANDIS.EXE** conforms to the 3Com/ Microsoft LAN Manager Network Driver Interface Specification (NDIS) version 2.0.1. It is a DOS-based executable terminate-and-stay-resident (TSR) program that will configure itself according to the options specified in the PROTOCOL.INI file, which is supplied on the Network Drivers Disk.

The files required for using M16ANDIS.EXE are:

| | |
|---|---|
| PROTOCOL.INI | Configuration and binding information file |
| M16ADOS.NIF | Intel installation file for Microsoft LAN Manager |
| M16ANDIS.EXE | Intel DOS NDIS 2.0.1 driver |

If Card and Socket Services are loaded, the Intel resource manager M16ACFG.EXE must be run before M16ANDIS.EXE to establish connection between the PRO/100 PC Card and the computer.

Most installations will be able to use the settings implemented in the PROTOCOL.INI file by the Intel Installation Program. If any parameters need to be changed, use an ASCII text editor to modify the PROTOCOL.INI file with the appropriate keywords and values.

Keyword syntax for PROTOCOL.INI can be found below. Keywords are not case sensitive, and can be abbreviated to a unique sequence of initial characters (for example, IN for INTERRUPT, IO for IOADDRESS). A Keyword Alphabetical Reference follows the keyword listings.

### NDIS 2.0.1 OS/2 Driver Configuration Notes

The OS/2 NDIS driver **M16ANDIS.OS2** conforms to the 3Com/ Microsoft LAN Manager Network Driver Interface Specification (NDIS) version 2.0.1. It is an IBM OS/2-based device driver for use with OS/2 versions 2.0 and later.

The files required for using M16ANDIS.OS2 are:

| | |
|---|---|
| PROTOCOL.INI | Configuration and binding information file |
| M16AOS2.NIF | Intel installation file for Microsoft LAN Manager |

     M16ANDIS.OS2       Intel OS/2 NDIS 2.0.1 driver

Most installations will be able to use the settings implemented in the
PROTOCOL.INI file by the Intel Installation Program. If any param-
eters need to be changed, use an ASCII text editor to modify the
PROTOCOL.INI file with the appropriate keywords and values.

Keyword syntax for PROTOCOL.INI can be found below. Keywords
are not case sensitive, and can be abbreviated to a unique sequence of
initial characters (for example, IN for INTERRUPT, IO for
IOADDRESS). A Keyword Alphabetical Reference follows the
keyword listings.

### *PROTOCOL.INI Example*

```
[INTELNET]
 DRIVERNAME=INTEL$
 MEM=0XD2000
 MODE=IO
```

## NDIS 2.0.1 Keywords (M16ANDIS.EXE and M16ANDIS.OS2)

| Keyword | Default | Valid Values |
|---|---|---|

```
DRIVERNAME=INTEL$ (REQUIRED FIRST ITEM IN PROTOCOL.INI)

FULLDUPLEX          (NO KEYWORD = FULL-DUPLEX DISABLED)
INTERRUPT=          5             (3 - 15)
IOADDRESS=          320           (240 - 380)
IOWAITSTATES=       0             (1 - 3)
LINESPEED=          AUTO          (10 OR 100)
LINKDISABLE         (NO KEYWORD = LINK INTEGRITY EN-
                     ABLED)
MEMORY=             D2000         (C0000 TO EE000)
MEMWAITSTATES=      0             (1 - 3)
MODE=               MEM           (MEM OR IO)
NOCHECK             (NO KEYWORD = ADAPTER RESOURCE VERI
                     FICATION ENABLED)
NOEARLYRX           (NO KEYWORD = EARLY RECEIVE EN
                     ABLED)
NOEARLYTX           (NO KEYWORD = EARLY TRANSMIT EN
                     ABLED)
NOLED               (NO KEYWORD = LEDS ENABLED)
SOCKET=             AUTO          (1 - 4)
WORDSIZE=           16            (8 OR 16)
```

## NDIS Driver Example - MS-DOS

The following example illustrates the use of M16ACFG.EXE with the
M16ANDIS.EXE driver in a CONFIG.SYS file supporting Microsoft
LAN Manager:

```
DEVICE=C:\LANMAN.DOS\DRIVERS\PROTMAN\PROTMAN.DOS /
          I:C:\LANMAN.DOS
DEVICE=C:\LANMAN.DOS\DRIVERS\ETHERNET\INTEL\M16ACFG.EXE
DEVICE=C:\LANMAN.DOS\DRIVERS\ETHERNET\INTEL\M16ANDIS.EXE
DEVICE=C:\LANMAN.DOS\DRIVERS\PROTOCOL\TCPIP\TCPDRV.DOS
          I:C:\LANMAN.DOS
```

M16ACFG.EXE must be loaded before the NDIS driver if Card and Socket Services is being used.

## Novell Server Driver Settings (for driver M16AODI.LAN)

The driver M16AODI.LAN conforms to the Novell "ODI NetWare Server Driver Development Tool Kit Driver Specification" version 3.3. It is a 32-bit driver. The NetWare Server ODI stack including M16AODI.LAN supports NetWare versions 4.1 and 4.11.

### Novell Server Driver Keywords

Parameters for configuring the Novell server driver must be specified on the command line.

| Keyword | Default | Valid Values |
|---|---|---|
| FULLDUPLEX | (NO KEYWORD = FULL-DUPLEX DISABLED) | |
| INT= | 5 | (3 - 15) |
| IOWAITSTATES= | 0 | (1 - 3) |
| LINESPEED= | AUTO | (10 OR 100) |
| LINKDISABLE | (NO KEYWORD = LINK INTEGRITY EN-<br> ABLED) | |
| MEM= | D100 | (C000 - EE00) |
| MEMWAITSTATES= | 0 | (1 - 3) |
| MODE= | MEM | (MEM OR IO) |
| NOCHECK | (NO KEYWORD = ADAPTER RESOURCE<br> VERIFICATION ENABLED) | |
| NOEARLYRX | (NO KEYWORD = EARLYRX ENABLED) | |
| NOEARLYTX | (NO KEYWORD = EARLYTX ENABLED) | |
| NOLED | (NO KEYWORD = LEDS ENABLED) | |
| PORT= | 320 | (240 - 380) |
| SOCKET= | AUTO | (1 - 4) |
| WORDSIZE= | 16 | (8 OR 16) |

## Packet Driver Settings (for driver M16APD.COM)

Packet driver parameters must be stated on the **M16APD.COM** command line when running the packet driver.

### Packet Driver Configuration Notes

The Intel packet driver M16APD.COM conforms to FTP Software's public domain packet-driver specification. It is a DOS-based terminate-and-stay-resident (TSR) program. The driver file M16APD.COM is located in the \PKTDRV directory on the Network Drivers Disk.

Refer to your network documentation for instructions on how to install the packet driver with your network. Most installations should be able to use the default settings listed below. If Card and Socket Services are loaded, run the utility M16ACFG.EXE before running M16APD.COM.

Keywords are not case sensitive, and can be abbreviated to a unique sequence of initial characters (for example, IN for INTERRUPT).

## Packet Driver Keywords

```
KEYWORD            DEFAULT        VALID VALUES
FULLDUPLEX         (NO KEYWORD = FULL-DUPLEX DISABLED)
INTERRUPT=         5              (3 - 15)
IOADDRESS=         320            (240 - 380)
IOWAITSTATES=      0              (1 - 3)
LINESPEED=         AUTO           (10 OR 100)
LINKDISABLE        (NO KEYWORD = LINK INTEGRITY EN
                    ABLED)
MEMORY=            D2000          (C0000 - E8000)
MEMWAITSTATES=     0              (1 - 3)
MODE=              MEM            (MEM OR IO)
NOCHECK            (NO KEYWORD = ADAPTER RESOURCE
                    VERIFICATION ENABLED)
NOEARLYRX          (NO KEYWORD = EARLYRX ENABLED)
NOEARLYTX          (NO KEYWORD = EARLYTX ENABLED)
NOLED              (NO KEYWORD = LEDS ENABLED)
SINT               60             (60 - 80)
SOCKET=            AUTO           (1 - 4)
WORDSIZE=          16             (8 OR 16)
```

## Packet Driver Example

A typical sequence for loading the packet driver M16APD.COM with M16ACFG.EXE and default configuration settings is as follows:

```
M16ACFG
M16APD
ETHDRV
```

If nondefault configuration settings are used, these must be stated on the M16APD.COM command line. For example,

```
M16ACFG
M16APD IOADDRESS=320 INT=7
ETHDRV
```

## Diagnostic Test Utility Settings (M16ATEST.EXE)

The M16ATEST.EXE utility is a Intel utility for testing Intel adapter hardware. It is an MS-DOS executable file.

M16ATEST.EXE tests the adapter hardware functionality, including the PC Card interface, the serial EEPROM, the local SRAM, the Ethernet controller, and the PHY interface (adapter modules). It displays manufacturing information including serial number and date and time of manufacture. It also displays configuration information including interrupt, I/O address, and starting memory location used.

Parameters for the M16ATEST.EXE utility must be specified on the
DOS command line with the command M16ATEST. The parameters
are as follows:

**M16ATEST.EXE Keywords**

```
KEYWORD             DEFAULT         VALID VALUES
FULLDUPLEX          (NO KEYWORD = FULL-DUPLEX DISABLED)
INTERRUPT=          5               (3 - 15)
IOADDRESS=          320             (240 - 380)
IOWAITSTATES=       0               (1 - 3)
LINESPEED=          AUTO            (10 OR 100)
LINKDISABLE         (NO KEYWORD = LINK INTEGRITY EN-
ABLED)
MEMORY=             D2000           (C0000 - E8000)
MEMWAITSTATES=      0               (1 - 3)
MODE=               MEM             (MEM OR IO)
NOCHECK             (NO KEYWORD = ADAPTER RESOURCE VERI
                    FICATION ENABLED)
NOEARLYRX           (NO KEYWORD = EARLYRX ENABLED)
NOEARLYTX           (NO KEYWORD = EARLYTX ENABLED)
NOLED               (NO KEYWORD = LEDS ENABLED)
SILENT              NOT USED        (SUPPRESSES DISPLAY
DURING TEST AND RETURNS DOS ERROR CODES)
SOCKET=             AUTO            (1 - 4)
WORDSIZE=           16              (8 OR 16)
```

# Keyword Alphabetical Reference

| | |
|---|---|
| **?** | (MS-DOS) displays command summary for driver |
| **CABLETYPE** | (NDIS 3) sets the driver to autodetect the cable type or set unshielded twisted pair. |
| **DRIVERNAME** | **DRIVERNAME=INTEL$** required as first item in the INTEL section of the PROTOCOL.INI file for the M16ANDIS driver. |
| **EARLYTRANSMIT** | (NDIS 3) when set to OFF functions like the keyword NOEARLYTX. |
| **FULLDUPLEX** | (10 Mbps only) enables the PRO/100 PC Card to send and receive data simulta-neously when connected to a full-duplex hub. Default is keyword not used, and therefore full-duplex "disabled." This parameter is ignored in 100Mbps mode. |
| **INT** | *see* INTERRUPT |

| | |
|---|---|
| **INTERRUPT** | specifies a **PC Card port hardware interrupt**. Use 10 or 11 on most PCs. Default (if parameter not specified) is 5. Use 0 (zero) to force the adapter into a polled mode. |
| **IOADDRESS** | specifies the base I/O address of the Intel adapter I/O ports, in hexadecimal notation. Default address is 320. |
| **I/O PORT** | *see* IOADDRESS. |
| **IOWAITSTATES** | specifies the number of wait states to use for accesses to the Intel adapter. |
| **LINESPEED** | forces operation at 10 or 100Mbps. If the keyword is not stated, the line speed will be automatically detected. |
| **LINKDISABLE** | disables link integrity for non-IEEE 10BASE-T networks such as StarLAN 10. Without this keyword in the driver command line, the driver defaults to link integrity ENABLED. |
| **LINKINTEGRITY** | (NDIS 3) when set to OFF, operates like the LINKDISABLE parameter. |
| **LINK DRIVER** | **LINK DRIVER M16AODI** required as first item in the NET.CFG file listing configuration parameters for the M16AODI driver. This must be the first keyword in the section of the NET.CFG file for the Intel adapter. |
| **MEM** | *see* MEMORY. |
| **MEMORY** | specifies the host PC memory location for the Intel adapter in hexadecimal notation, when. MODE MEMORY (memory-mapped I/O) is being used (see MODE). The memory block occupies 4Kbytes of host memory. |
| **MEMWAITSTATES** | specifies the number of waitstates to use for memory accesses to the Intel adapter. Values are decimal 1 to 3. The keyword is provided as a troubleshooting aid. |

**MODE**               set this keyword to IO to disable requests for memory-mapped mode on systems that only support an I/O-driven card. The MEMORY setting provides increased performance on computers that allow simultaneous availability of memory and I/O resources.

**NETWORKADDRESS**     allows user to override adapter's unique network node address by specifying a different node address. **Network node address can be displayed with the M16ATEST utility (MS-DOS).**

**NODEADDRESS**        *see* NETWORKADDRESS.

**NOCHECK**            disables verification of adapter resources, for troubleshooting purposes.

**NOEARLYRX**          disables Advanced Look-ahead Pipelining features of the Intel PRO/100 PC Card. This parameter should be used in the NET.CFG file when the ODI driver is used with Microsoft Windows for Workgroups 3.11.

**NOEARLYTX**          disables early transmit features of the Intel PRO/100 PC Card. Try using this keyword if you are experiencing a large number of transmit underruns (in which hardware reports not finding expected data in the transmit buffer).

**NOLED**              turns off LED indicators on LAN adapter module to conserve power.

**PORT**               (ODI) *see* IOADDRESS.

**S**                  (ODI)(MS-DOS command line only) displays LAN drivers resident in memory.

**SILENT**             (M16ATEST) disables display of information on the screen and returns DOS error code when tests are complete.

**SINT**               (Packet Driver) is number from hexadecimal 60 to 80 designating a software interrupt. Default is 60.

| | |
|---|---|
| **SOCKET** | the number of the host computer's PC Card slot or socket into which the Intel PRO/100 adapter is inserted. If a socket number is specified, the only the specified socket is checked for the Intel adapter. If no socket is specified, the all sockets are searched until the Intel adapter is found. |
| **U** | (ODI)(MS-DOS command line only) unloads driver from memory |
| **WORDSIZE** | this parameter specifies the network data path size. Values are 8 or 16 for 8- or 16-bit transfers. Default is 16. |

# Chapter 4

# Troubleshooting

This chapter contains troubleshooting information covering the most common issues encountered when installing the PRO/100 PC Card, based on information developed by Intel Customer Support.

This information is intended for users or network administrators who are familiar with the PRO/100 PC Card and its user documentation, and who have run into difficulties *after having completed the installation procedures*, as described in the preceding chapters of this User's Guide.

This chapter contains the following headings:

- LED Indicators
- Diagnostic Test
- Error Messages
- General Troubleshooting
- Network Operating System Troubleshooting (Artisoft LANtastic, DEC PATHWORKS, Windows 95, Windows for Workgroups, Novell NetWare)
- Computer-Specific Troubleshooting
- Troubleshooting Checklist

**Additional Sources of Information**

In addition to this *User's Guide*, your computer and network documentation should also be consulted as needed. For the latest information on the PRO/100 PC Card, see the **README** file on the Intel Network Drivers Disk, or visit the Intel World Wide Web site at **http://support.intel.com**. See **Appendix A** in this *User's Guide* for Intel support services access information.

# LED Indicators

The LED indicators on the PRO/100 PC Card media module operate under the following conditions: (1) the card is inserted into a PC Card slot and (2) connected to the network, (3) computer is powered on, and (4) network driver has been loaded.
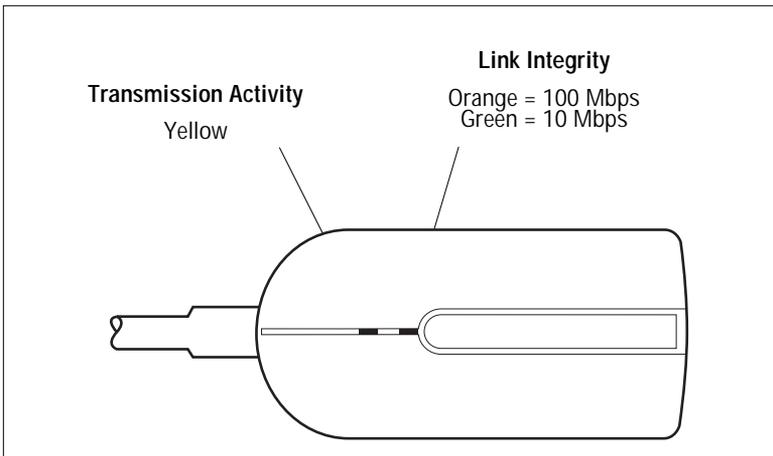


LED Indicators (10Base-T/100Base-TX)

# Diagnostic Self Test

Intel provides a DOS-based diagnostics program, located on the
Network Drivers Disk, that tests several PRO/100 PC Card functions.
It also reports test results, the serial number of the unit, and the
adapter **node or network address**. M16ATEST can only be run from
an MS-DOS command line (under Windows 95, use a DOS box, under
Windows NT boot to DOS).

## Executing the Self Test

Use the following steps to execute the self test.

**1** Install the PRO/100 PC Card according to the instructions
contained in **Chapter 1, Hardware Installation** in this User's
Guide.

**2** Start your computer from DOS (or use a DOS box). DO NOT
load a network driver.

### Note

> Do not run M16ATEST with a network driver loaded.
> Loading a network driver before running M16ATEST
> may cause unpredictable results when exiting the test
> utility.

**3** Run the diagnostic test by typing **M16ATEST** at the MS-DOS
prompt, followed by the appropriate keywords and parameters
(see Chapter 3), then press Enter. For example,

```
M16ATEST INT=10
```

The M16ATEST program executes all tests.

### Note

> If an error message displays when you execute the
> self test, see "Error Messages" later in this chapter.

The M16ATEST program screen appears, displaying test parameters
and results. An explanation of the information displayed in the various
windows follows.

## Self Test Window

*Hardware, EEPROM, Init, and Memory Tests* - The Hardware test
verifies that the PRO/100 PC Card is powered on and properly seated
in its slot. The EEPROM test reads the EEPROM and verifies that the
adapter data stored there is correct and readable. The Init test initial-

izes the PRO/100 PC Card memory and Ethernet controller. The Memory test tests the SRAM on the PRO/100 PC Card.

A failure in any of these tests may indicate that service is required for the PRO/100 PC Card. Contact Intel Customer Support.

### Adapter Data Window

This section displays the model and serial numbers of the unit, its manufacturing date and time, and its **network node address**. This data has been preprogrammed at the factory and cannot be altered.

### Important

> Write down the PRO/100 PC Card model, serial number, and network (node) address for reference.

Customer Support will ask you to supply the model and serial numbers when requesting technical assistance or warranty service from Intel.

### Configuration Window

This portion of the diagnostic screen lists current interrupt setting, port or I/O address, and the starting memory location for the Intel PRO/100 PC Card.

### Advanced Configuration Window

*Line Speed* - Indicates line speed: 10, 20 (full duplex), or 100Mbps.

*Mode* - Shows the memory mode of the adapter: either Memory Mapped I/O mode or I/O-only mode.

*Word Size* - Indicates word size that the adapter is using: 16 (default) or 8.

*Early Receive* - Indicates whether the adapter is operating in early receive mode.

*Early Transmit* - Indicates whether the adapter is operating in early transmit mode.

**Transmit Test Window**

This test transmits a packet every 1/2 second. A failure indicates that the PRO/100 PC Card is not accepting packets for transmission.

**Network Traffic Graph Window**

This graph provides a visual representation of the volume of traffic on the local area network (LAN). If there is no traffic or if the PRO/100 PC Card is not connected to the LAN, a line of dots will display.

*Instantaneous Packets* - Displays the number of packets on the network at half-second intervals.

## Error Messages

Except as noted, these messages are specific to the Intel PRO/100 PC Card. They are listed in strict numerical/alphabetical order, i.e., numbers appear before letters and messages starting with "The" are under the letter T, initial "A" or "An" under the letter A.

For an explanation of other messages that may appear on the screen, see the network-specific or computer-specific troubleshooting later in this chapter, as well as your computer and network operating system documentation.

*An invalid I/O address was specified*

The Intel PRO/100 PC Card requires 16 consecutive I/O locations. This message indicates that the I/O address specified does not start on a 32-byte boundary. The I/O address must begin on a 32-byte boundary. The PRO/100 PC Card supports all 32-byte boundary addresses within the range defined by the platform. Some examples of valid I/O addresses, in hexadecimal notation, are 300, 320, 240. Examples of invalid I/O addresses are 301, 325, 247.

*A PC Card was not detected*

If the SOCKET keyword was stated, then no PC Card was detected in the slot specified. If the SOCKET keyword was not used, then no PC Card was detected in any slot.

*Network Controller running in 8-bit mode*

Either the driver has determined that the PC hardware does not support 16-bit mode, or the Network Interface Controller (NIC) has been forced to run in 8-bit mode with the keyword WORDSIZE set to 8 (default is 16-bit mode).

*Network Controller running in I/O mode*

Either the driver has determined that the PC hardware only supports I/O-only mode, and not memory-mapped I/O mode, or the Network Interface Controller (NIC) has been forced to run in I/O-only mode with the keyword MODE IO (default is MEM).

*Please specify 1, 2, or 3 for the IOWAITSTATES keyword*

This message applies to both the ODI and NDIS 2.0 drivers. The value specified under the IOWAITSTATES keyword in the NET.CFG or PROTOCOL.INI file must be either 0, 1, 2, or 3.

*Please specify 1, 2, or 3 for the MEMWAITSTATES keyword*

This message applies to both the ODI and NDIS 2.0 drivers. The value specified under the MEMWAITSTATES keyword in the NET.CFG or PROTOCOL.INI file must be either 0, 1, 2, or 3.

*Please specify a decimal number for the INTERRUPT keyword*

This message applies only to the NDIS 2.0 Driver. The value specified under the INTERRUPT keyword in the PROTOCOL.INI file must be a decimal not a hexadecimal number.

*Please specify a hexadecimal number for the IOADDRESS keyword*

This message applies only to the NDIS 2.0 Driver. The value specified under the IOADDRESS keyword in the PROTOCOL.INI file must be a hexadecimal number.

*Please specify a hexadecimal number for the MEMORY keyword*

This message applies only to the NDIS 2.0 Driver. The value specified under the MEMORY keyword in the PROTOCOL.INI file must be a hexadecimal number.

*Please specify a non-zero decimal number for the SOCKET keyword*

This message applies to both the ODI and NDIS 2.0 drivers. The value specified under the SOCKET keyword in the NET.CFG or PROTOCOL.INI file must be a decimal number other than zero.

*Please specify either 8 or 16 for the WORDSIZE keyword*

This message applies to both the ODI and NDIS 2.0 drivers. The value specified under the WORDSIZE keyword in the NET.CFG or PROTOCOL.INI file must be either 8 or 16.

*Please specify either IO or MEM for the MODE keyword*

This message applies to both the ODI and NDIS 2.0 drivers. The value specified under the MODE keyword in the NET.CFG or PROTOCOL.INI file must be either IO or MEM.

*The card is unreadable, possible memory conflict*

The Card Information Structure (CIS) of the PC Card was unreadable. This could be a result of failure to exclude the selected memory range from the memory managers loaded on the machine. Either exclude a 4K memory range, or select a memory range that has already been excluded.

*The I/O test failed - Please select a different I/O address*

The driver failed the I/O test. Try a different I/O address.

*The IRQ test failed - Please select a different IRQ*

The driver failed the IRQ test. Try a different IRQ address.

*The memory test failed - Please select a different memory address*

The memory test will write data into the memory, read them back, and verify if they are the same. In this case, the memory written and read back were found to be different.

*The Network Controller is not responding*

A Intel PRO/100 PC Card adapter was detected, but subsequent attempts to initialize the network controller failed. Try setting the WORDSIZE parameter to 8.

*The Intel PRO/100 PC Card has not been initialized*

An error was detected during initialization. Usually another error message will be displayed giving more detailed information about the failure. For example, if the INTERRUPT keyword in the PROTOCOL.INI has an invalid value of '0A', the additional error message **Please specify a decimal number for the INTERRUPT keyword** is displayed after the Performance Series Adapter error message.

*M16AODI only supports the BUS ID PC Card, not the selected BUS ID. Either delete the BUS ID keyword from the NET.CFG file or change its value to 3.*

This message applies only to the ODI driver. Do not use the keyword BUS ID in the ODI NET.CFG file. If you do use it, you must set the value to 3.

## Windows 95 Troubleshooting

This troubleshooting information is intended primarily for users who already had Microsoft Windows installed on their system and are upgrading to Windows 95. It may also be helpful to new users of Windows 95 who were unable to successfully install the Intel driver using the instructions provided in **Chapter 2, Software Installation**.

*Using Real Mode Card and Socket Services: When using Intel PC Card adapters, should I still use DOS real mode Socket Services Drivers?*

No, it is recommended that you don't load the real mode Card and Socket Services drivers. It is also recommended that you boot the machine without EMM386.exe in the CONFIG.SYS. In rare cases where you still want to load EMM386.EXE, make sure you don't use the highscan keyword with EMM386.EXE. Windows 95 does not detect devices correctly if there is a highscan keyword in the EMM386 line of the CONFIG.SYS file.

*Installing from SCSI CDROM or EXTERNAL CDROM: I am install-ing Windows 95 from a SCSI CD-ROM attached to a SCSI PC Card Adapter. How can I install Windows 95 if it is recommended that I don't load real mode card and socket services drivers since most SCSI requires me to load a real mode SCSI driver?*

Put a copy of the directory for CAB files of Windows 95 from the CD-ROM on to your local hard drive. This will take up approximately

35MB of space. This will allow you to change settings on the system without using your CD-ROM. This also allows you to install Windows 95 without depending on the real mode SCSI CDROM driver.

*Installing Windows 95 PC Card support: How do I install PC Card support for the PRO/100 PC Card?*
To install PC Card Socket support, it is always advisable to let Windows 95 do an autodetect to determine the type of PC Card controller you have. Also make sure you have not loaded any real mode Card and Socket Services drivers before proceeding.

1   Click the Start button in the lower left corner of the screen.

2   Choose the menu item: Settings.

3   Choose the menu item: Control Panel.

4   Double click on the "PC Card (PCMCIA)" icon.

5   One of two dialog boxes should appear:

   a   If a dialog box entitled "PC Card (PCMCIA) Properties" appears, this means you have already installed the 32-bit PC Card support and you are finished.

   b   If a dialog box entitled "Welcome to the PC Card (PCMCIA) Wizard" appears, proceed to step 6.

   c   If neither of these dialog boxes appears, add PC Card support by doing the following: double click on My Computer, double click on Control Panel, double click on Add New Hardware, and click Yes for Autodetect. After Windows 95 detects and installs PC Card support, restart Windows 95, and go back to step 1.

6   The dialog box "Welcome to the PC Card (PCMCIA) Wizard" will ask the following question: "Are you using a PC card (networking card, CD-ROM connected to a SCSI card, etc.) to install windows?" The default answer is No. If you did use a PC Card SCSI adapter or a network card to install Windows 95, it is recommended that you keep a copy of the Windows 95 directory on your hard disk and not load any real mode PC Card or network drivers. Press Enter to select No.

7   The dialog box "PC Card (PCMCIA) Wizard" should now appear. It should read as follows: "Windows did not find any

existing real mode PC Card drivers. Either you did not have any, or you have drivers that Windows couldn't detect." It will ask you "Do you want to review your system files and select real mode PC Card drivers so Windows can disable them?" The default answer should be No. Now use the following decision table:

**a**  If you are not sure if you have real mode Card and Socket Services or you do not know what they are, contact Microsoft Customer Support or the manufacturer of your notebook computer.

**b**  If you know that you do not have real mode Card and Socket Services installed, choose No and press Enter. Go on to step 8.

**c**  If you know that you have real mode Card and Socket Services and you wish to keep using them, this is not recommended. We recommend removing real mode drivers and using the 32-bit driver.

**d**  If you know that you have real mode Card and Socket Services installed and Windows 95 either did or did not detect them, you can now remove. Choose Yes and press Enter.

**e**  A new dialog box should appear and it should read: "Windows has selected the known PC Card drivers in your CONFIG.SYS file. Make sure that the correct drivers are selected, or make any changes. When you click Next, Windows will disable the selected PC card drivers in your CONFIG.SYS file." Choose option 1, 2, or 3 below:

## Note

The dialog boxes displayed are the same except for the name of the file to be modified. The first box modifies the CONFIG.SYS, the next the AUTOEXEC.BAT and the third the SYSTEM.INI file.

**1**  Let Windows 95 automatically find the drivers for you. This is recommended. To do this click the Next button 3 times. This lets Windows 95 automatically modify the following files: CONFIG.SYS, AUTOEXEC.BAT, and SYSTEM.INI

> **2** Choose the drivers yourself if none are selected. This is recommended only for experienced users.
>
> **3** Override choices made by Windows 95. This is not recommended. Only experienced users should attempt this.

**f** This is the next to last dialog box for the wizard. It should read as follows: "You have finished the PC card wizard. To enable 32-bit support, click Finish, and then restart your computer for the changes to take effect." Click on the Finish button.

**g** A final box should appear entitled "System Settings Change". It should read as follows: "You must shut down Windows and TURN YOUR COMPUTER OFF to continue setting up this PC Card device. Would you like to shut down your computer now?" Click Yes. Make sure that the computer is completely turned off before turning it back on.

**8** Insert your Intel PC Card adapter. Windows 95 should now detect the Intel card, and put up a dialog box. It should automatically load the drivers from the Windows 95 directory. If it asks you to supply a manufacturer's disk, insert the Intel Network Drivers Disk. Press Enter. It will ask you to restart now. Choose yes. (We recommend copying the Windows 95 RETAIL or WIN95 directory to your hard disk so that you won't be dependent on the CD-ROM every time you need to reinstall.)

*Hardware Specific Issues: Are there Laptops or Notebooks that don't work with Windows 95 and PC Card adapters?*
Read the HARDWARE.TXT file in the Windows 95 directory. This file is supplied by Microsoft and describes machine-specific problems.

*NetWare Server is Not Found: Everything seems to load, I have checked that I have installed the Microsoft Client for NetWare, but I still can't see my NetWare server when I click on Network Neighborhood.*
Sometimes the Frametype autodetection fails. You can force the frame type IPX uses by going to the My Computer, Control Panel, Network, IPX/SPX compatible properties.

# Microsoft Windows 3.x Troubleshooting

If any of the following situations occurs after you have completed the installation procedure, review the accompanying information before calling Customer Support.

*The resource manager M16ACFG.EXE failed to load*

If you are using Card and Socket Services, you must run the M16ACFG.EXE resource manager before loading a PRO/100 PC Card driver. If you are NOT using Card and Socket Services, or are running Windows 95 or Windows NT, you do not need to run M16ACFG.EXE.

Here are some of the symptoms that could appear if M16ACFG fails to load:

**A** The message "No card services available" could indicate either of two possibilities:

- Card and Socket Services are not being loaded and this is just a notification message, not an error.

- The version of Card and Socket Services being loaded could be obsolete or not supported. Contact your computer manufacturer to be sure you have the latest version.

**B** If the M16ACFG message "Exclusive use denied" displays, try loading M16ACFG.EXE immediately before the Card and Socket Services "generic card driver" in the CONFIG.SYS file. "Generic card drivers" for the most popular Card and Socket Services are as follows:

| Manufacturer | Filename |
|---|---|
| SystemSoft | CARDID.EXE |
| Phoenix | PCMSCD.EXE |
| IBM | AUTODRV.SYS |

**C** If you're running Windows for Workgroups with the NDIS 2.0 driver and your machine hangs up at the NET START command, make the following change in the SYSTEM.INI:

Under the [NETWORK DRIVERS] section, remove M16ACFG.EXE from the line that reads:

```
NETCARD=M16ACFG.EXE, M16ANDIS.EXE
```

so that it reads:

```
NETCARD=M16ANDIS.EXE
```

If you are running Card and Socket Services with Windows for Workgroups, be sure to load M16ACFG.EXE before the NET START command, as follows:

```
C:\[PATH]M16ACFG
```

```
C:\[PATH]NET START
```

where [path] defines the locations of the referenced files for your network.

*A driver failed to load, and I'm using Card and Socket Services*

Card and Socket Services are a set of drivers designed to support the PC Card (PCMCIA) standard. These drivers are generally supplied by the computer manufacturer. Among other functions they

- Hide the PC Card socket hardware implementation from the PRO/100 PC Card driver.

- Control the allocation of resources (memory windows, I/O ports, interrupts) to the PRO/100 PC Card.

*Recommendations for Use of Card and Socket Services with the PRO/100 PC Card.*

**A** If the memory manager EMM386.EXE is being used, verify that the memory required for the PRO/100 PC Card has been excluded from use by the memory manager. Memory managers are generally loaded in the CONFIG.SYS. The memory exclusion required when using Card and Socket Services is generally larger than the exclusion needed by the PRO/100 PC Card alone. The safest setting when troubleshooting is to "remark out" the entire "C" and "D" memory ranges, as follows:

```
DEVICE=C:\[PATH]\EMM386.EXE NOEMS X=C000-DFFF
```

After the driver has been successfully loaded, the memory exclusion may be reduced through trial and error or in accordance with the Card and Socket Services documentation. The system must be rebooted before the revised settings take effect.

**B** When the PRO/100 PC Card driver is loaded it either reads a configuration file or uses command line parameters to determine which resources it should use. The following is a list of driver types, driver file names, and the configuration method used by each:

| Type | File Name | Configuration Method |
|------|-----------|----------------------|
| ODI | M16AODI.COM | reads NET.CFG file |
| NDIS2 | M16ANDIS.EXE | reads PROTOCOL.INI file |
| Packet | M16APD.EXE | uses COMMAND LINE parameters |
| Test | M16ATEST.EXE | uses COMMAND LINE parameters |

The default resources used by the PRO/100 PC Card in the absence of a contrary setting in the configuration file or on the command line are:

| | |
|---|---|
| MEMORY | D2000-D2FFF |
| IRQ | 5 |
| IOADDRESS (NDIS) | 320 |
| PORT (ODI) | 320 |

**C** Card and Socket Services will generally try to assign a set of resources (interrupt, memory window, I/O window) to the PRO/100 PC Card. The resources configured for the PRO/100 PC Card (in a configuration file or on a command line) must match the resources assigned by Card and Socket Services. If they do not, the driver will generally fail to load.

The way resources are assigned to the PC Card varies among Card and Socket Services manufacturers. The following section provides guidelines for the most popular Card and Socket Services. Review your Card and Socket Services documentation. To use Card and Socket Services with the PRO/100 PC Card, you must know what resources will be assigned by Card and Socket Services, then specify the same resources when configuring the PRO/100 PC Card.

**Note**

>  You can display a list of resources available on your computer by running the Intel resource manager M16ACFG.EXE with the /DEBUG parameter, with no network drivers loaded.

**D** If your computer requires Card and Socket Services, run the resource manager M16ACFG.EXE before loading the PRO/100 PC Card driver to ensure that everything works together. Suggestions arranged by Card and Socket Services manufacturers follow:

**IBM**

The following are the files generally loaded with IBM Card and Socket Services.

```
DEVICE=C:\THINKPAD\IBMDSS01.SYS /S0=2
```

```
DEVICE=C:\THINKPAD\IBMDOSCS.SYS
```

```
DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF (/MA
```
should match the EMM386 exclusion)

```
DEVICE=C:\THINKPAD\AUTODRV.SYS
C:\THINKPAD\AUTODRV.INI  (called a "generic" card driver)
```

The AUTODRV.INI file is used to assign resources to the PRO/100 PC Card. M16ACFG.EXE should be loaded before the AUTODRV.SYS line. The AUTODRV.INI file should be edited to read as follows:

```
[ETHERNET]
```

```
CARDID=ETHER,CREDI
```

```
;OPTION=IGNORE  (The semicolon is required)
```

```
PORT1=320, IRQ=5, MEMORY1=C800, WAITSTATE=1
```

The same resources should be specified in the PRO/100 PC Card driver initialization file.

**E** If M16ACFG.EXE returns the error message "Exclusive use

denied," try loading M16ACFG.EXE immediately before the Card and Socket Services "generic card driver" described above.

**F** If the Intel driver still fails to load, try using the PRO/100 PC Card without Card and Socket Services, as described in the following section.

## Phoenix

The Phoenix Card and Socket Services super client driver PCMSCD.EXE should NOT be configured with the PCM.EXE program to support the PRO/100 PC Card. Use the default setup and the following sequence of commands in your CONFIG.SYS file.

```
DEVICE=C:\PCMPLUS3\PCMSS.EXE

DEVICE=C:\PCMPLUS3\PCMCS.EXE

DEVICE=C:\PCMPLUS3\PCMRMAN.SYS

DEVICE=C:\INTEL\M16A\ODI\M16ACFG.EXE

DEVICE=C:\PMCPLUS3\PCMSCD.EXE
```
(called a "generic" card driver)

Be sure to verify that an EMM386 memory exclusion has been stated to cover the region where the Intel card loads.

## SystemSoft

The SystemSoft's CardSoft Card and Socket Services are loaded in the CONFIG.SYS file and generally include the following lines:

```
DEVICE=C:\CARDSOFT\SOCKET_SERVICES_DRIVER
```
(This file varies by machine type)

```
DEVICE=C:\CARDSOFT\CS.EXE

DEVICE=C:\CARDSOFT\CSALLOC.EXE C:\CARDSOFT\CSALLOC.INI

DEVICE=C:\CARDSOFT\CARDID.EXE
```
(called a "generic" card driver)

Resources assigned by CardSoft Card and Socket Services are controlled by the files CSALLOC.INI and CARDID.INI. CSALLOC.INI contains a list of resources available to Card and Socket Services. CARDID.INI controls how resources will be assigned to specific types of cards. The setting in the PRO/100

PC Card driver configuration file should match the resources assigned by the LAN1xxxxxx keywords in the CARDID.INI file. The LAN1MEMORYBASE2 entry can be ignored.

*A driver failed to load, and I'm NOT using Card and Socket Services*

**A** Verify that a block of memory for use by the PRO/100 PC Card has been excluded from any memory manager being loaded. Memory managers are generally loaded in the CONFIG.SYS. The following example is given for EMM386.EXE and a PRO/100 PC Card loading at its default memory address of D2000:

```
DEVICE=C:\PATH\EMM386.EXE NOEMS X=D200-D2FF
```

**B** Since your are not using Card and Socket Services, verify that power management has been disabled and the PC Card socket is powered/enabled in the computer system's CMOS setup. These settings may not be present in all machines. Consult your computer documentation for information on how to access and modify the system setup.

**C** Reboot the machine by turning off the power and turning it back on again (cold boot). If the driver still fails to load, the cause is generally a resource conflict. Common causes of resource conflicts include sound systems, other PC Card adapters, and built in ROMs. The resources required for a PRO/100 PC Card include a memory window (MEM keyword), an interrupt (INT keyword, and an I/O address (IOADDRESS keyword). The default settings are indicated below.

Review your computer documentation to determine what resources are available, or use a trial and error approach. The table on the next page shows a suggested trial and error sequence. If you use this method, be sure to add a memory exclusion from C000-DFFF to the EMM386 line until a suitable memory location has been found. Then the memory exclusion can be reduced to a 4K window. Perform a cold boot between each trial to ensure that the PRO/100 PC Card and PC Card sockets are completely reset.

When the PRO/100 PC Card driver is loaded it either reads a configuration file or uses command line parameters to determine which resources it should use. See the list of driver types, driver file names, and configuration methods earlier in this chapter.

The default resources used by the PRO/100 PC Card when no other setting is stated are:

| | |
|---|---|
| MEMORY | D2000-D3FFF |
| IRQ | 5 |
| IOADDRESS (NDIS) | 320 |
| PORT (ODI) | 320 |

Troubleshooting combinations for driver configuration without Card and Socket Services:

| TRIAL | MEM | INT | IOADDRESS | WORDSIZE |
|---|---|---|---|---|
| Default | D2000 | 5 | 320 | 16 |
| 1 | CC000 | 5 | 320 | 16 |
| 2 | D2000 | 10 | 320 | 16 |
| 3 | CC000 | 10 | 320 | 16 |
| 4 | D2000 | 11 | 320 | 16 |
| 5 | CC000 | 11 | 320 | 16 |
| 6 | D2000 | 15 | 320 | 16 |
| 7 | CC000 | 15 | 320 | 16 |
| 8 | D2000 | 5 | 340 | 8 |
| 9 | CC000 | 5 | 340 | 8 |
| 10 | D2000 | 10 | 340 | 8 |
| 11 | CC000 | 10 | 340 | 8 |
| 12 | D2000 | 11 | 340 | 8 |
| 13 | CC000 | 11 | 340 | 8 |
| 14 | D2000 | 15 | 340 | 8 |
| 15 | D2000 | 15 | 340 | 8 |

If none of the above settings allows the driver to load, it may be necessary to add an IOWAITSTATES=2 and MEMWAITSTATES=2 parameter to the appropriate PRO/100 PC Card driver configuration file or command line.

**D** If the driver still fails to load after you've tried the combinations above, your machine may require the use of Card and Socket Services. See the preceding troubleshooting item.

*The driver loaded successfully, but I can't get on the network*

**A** Check all connections and verify that the cable drop is good (try a cable that is known to work on another workstation).

**B** Reboot by powering down the machine (cold boot). On some machines the PC Card controller chipset is not properly reset on a warm boot, and this can cause network errors.

**C** In a NetWare environment, verify that the frame type running on your network server is the same as the FRAME type listed first in the NET.CFG. If you are not sure what the correct Ethernet frame type is, check with your system administrator. On a multi-server network, add a preferred server statement to the NET.CFG.

**D** Try changing the WORDSIZE parameter from 16 to 8.

**E** There could be an interrupt conflict. Try loading the driver with a different interrupt specified in the PRO/100 PC Card configuration file. (This may also require some re-configuration of Card and Socket Services, if they're being used.)

**F** If the problem persists, and you're on a 10BASE-T network, try patching directly into the hub. If the adapter works when plugged directly into the hub, but not when attached via a longer cable run, verify that the cable run length is within the IEEE 10BASE-T specification (100 meters). If the cable length is correct, the adapter may be defective. Contact Intel Customer Support.

*Loopback failure reported when driver loads.*

Add the MODE IO parameter to NET.CFG or MODE=IO to PROTOCOL.INI.

Download the latest driver from the Intel BBS or website at http://support.intel.com.

If you are using Windows For Workgroups, try removing M16ACFG.EXE from the NETCARD= line in the SYSTEM.INI file. Then place M16ACFG.EXE in the AUTOEXEC.BAT file before the NET START line.

*Drivers do not load on the IBM 755 or the IBM 360.*

Add MODE IO to NET.CFG or MODE=IO to PROTOCOL.INI.

Try using memory location C800.

Make sure the sound card is not using the same interrupt as the Intel adapter (Intel defaults to 5; if this is being used, try 11).

If loading Card and Socket Services, run M16ACFG from the CONFIG.SYS before AUTODRV.SYS. Also, edit the AUTODRV.INI file (found in the C:\THINKPAD directory) and in Ethernet section make the modification cardid=ETHER,CREDI. In the same location put a semi-colon (;) as the first character of the line OPTION=IGNORE.

*When executing M16ACFG.EXE, error "exclusive use denied" occurs. Driver does not load.*
Load M16ACFG.EXE before the CARDID.EXE or PCMSCD.EXE if using System Soft or Phoenix respectively.

*Drivers don't load on DATABOOK or TCIC based PC Card chipset machines.*
Use the parameter INT 10 in NET.CFG or INT=10 in PROTOCOL.INI.

List of common Databook machines that require INT 10:

> Acernote 750 c
>
> ACOM 486/66
>
> AMS 486/66
>
> Aquiline 486/66
>
> Arima 486/66
>
> Austin 66, 100 and 50MHz machines.
>
> Chaplett
>
> Compuadd
>
> Compuydne 486/66
>
> Epson Actionnote 4000
>
> Ergo Powerbrick 486/66
>
> Express Micro

      Micro International 486/66

      Ninja 486 Notebook

      Noteable 486/50

      Sager 486

      Sceptere 486/33

      Sharp

      Twinhead

      Ultra 486/66

*Windows won't load after installing adapter.*

Try WIN /D:X. If windows loads this way, add the EMMExclude
parameter in your SYSTEM.INI file to exclude the memory range
used by the Intel adapter.
For example:
EMMExclude=D000-D3FF

*PRO/100 PC Card Adapter is not found when driver is executed.*

If your computer is equipped with a sound device, try using INT 10 in
PROTOCOL.INI or NET.CFG. If this does not work, determine the
interrupts used by your sound device and any other device in your
computer. Then specify a unique interrupt for the Intel adapter.

If your computer uses CardTalk Card and Socket Services, they must
be release 3 or greater. If not, they must not be loaded in the
CONFIG.SYS.

## Network Operating System Troubleshooting under Windows 3.x

## Artisoft LANtastic

*Driver loads but I cannot attach to any other workstations on the
network.*

- Download the latest drivers from the Intel BBS or http://
  support.intel.com.

- Run the test utility to see if there is network traffic.

- Remove Card and Socket Services.

## DEC Pathworks

This section only discusses the problems that might be related to configuration of the Intel adapter. For non-Intel related issues, consult your PATHWORKS user's manual. These are the PATHWORKS error codes (indicated by "percentage done"):

```
83 LOADING NDIS DRIVER...

86 LOADING NDIS DATA LINK...

89 PERFORMING NETBIND...

92 LOADING SCHEDULER...

93 LOADING DNP...

94 LOADING REDIRECTOR...

95 SETTING COMPUTER NAME...

98 NETWORK LOADING COMPLETED SUCCESSFULLY
```

Use /~# parameter when you run Pathworks SETUP. This will allow you to see any error messages given by any driver that fails to load.

**1** If you hang on error code 83%, the Intel NDIS driver failed to load. Here are some possible reasons for the failure:

    **a** Interrupt conflict - some machines use INT 5 for a sound card. Change the ni_irq to 10 or 11 and make sure the INT setting in the PROTOCOL.INI matches the M16ACFG.EXE line in the AUTOEXEC.BAT file.

    **b** Some machines require you to change the default memory setting. Try using CE00, c800, or d400. Make sure to make the corresponding changes:

      • in the mem parameter line in your PROTOCOL.INI,

      • in the memory parameter of the M16ACFG.EXE line in your AUTOEXEC.BAT,

      • in the memory exclusion of the EMM386.EXE line in your CONFIG.SYS.

      Sample protocol.ini change:

```
MEM=0XD400
```

    **c** Some machines require using the mode=io parameter. Add mode=io to the Intel section in the PROTOCOL.INI and also make sure it matches the M16ACFG line in step 3.

**2** If you hang on error code 92%, the NDIS driver loaded properly but the scheduler failed to load. This is usually because your interrupt in the PROTOCOL.INI doesn't match the ni_irq line. Make sure you change the ni_irq line to match the INT you want to use. This process is described under DEC PATHWORKS in **Chapter 2, Software Installation**.

**3** If everything loads and you don't connect to the network, try the following

   **a** Choose another INT setting.

   **b** Verify that you have a good cable.

   **c** Verify that you have excluded the memory being used by the Intel adapter from the EMM386 line of CONFIG.SYS.

   **d** Try adding wordsize=8 in the m16andis section of the PROTOCOL.INI file.

   **e** Always do a cold boot when troubleshooting.

## Windows for Workgroups

This section describes general troubleshooting procedures and possible error codes you might encounter under Windows for Workgroups. Before doing anything else, check your configuration files against the sample files in **Chapter 3, Configuration Reference** of this document.

*Drivers load but you cannot see anybody on the network.*

   • Check that you have selected the correct workgroup.

   • Ensure that there are no spaces in your computer name.

*When trying to perform the add adapter function, an error occurs stating the OEMSETUP file does not contain adapter information.* Move or rename the oem*.inf files from the windows system directory (C:\WINDOWS\SYSTEM) and invoke the network setup program again.

*Drivers do not load or errors are reported when net start is executed.*

Determine if Card and Socket services are in use. Use the vendor provided configuration program to determine what memory and interrupt resources are allocated in Card and Socket services for the

network card. Change the Intel adapter settings in PROTOCOL.INI to match the Card and Socket service settings.

Ensure you are excluding the memory range used by the Intel adapter from the memory manager in CONFIG.SYS.

*Drivers do not load or errors are reported when net start is executed for Windows For Workgroups.*
Determine if Card and Socket services are in use. Use the vendor provided configuration program to determine what memory and interrupt resources are allocated for network card. Change the Intel adapter settings in PROTOCOL.INI to match the Card and Socket service settings.

Ensure you are excluding the memory range used by the Intel adapter from the memory manager in CONFIG.SYS.

If you are using NDIS2, edit the SYSTEM.INI file and look at NETCARD= line.

On certain configurations the M16ACFG.EXE parameter must be removed for proper operation. Add a line to the AUTOEXEC.BAT to load M16ACFG.EXE before NET START.

*An error occurs when NET START executes for Windows For Workgroups.*
Download the latest drivers from the Intel BBS or http:// support.intel.com.

REMOVE M16ACFG.EXE from the NETCARD= line in SYSTEM.INI.

If you are using Toshiba PCMPLUS Card & Socket Services, use CARDSERVICES=NO and MEM=C800 in the PROTOCOL.INI or NET.CFG.

*When using ODI for NetWare, I get attached to server, but can't see the F: login drive, "drive not ready" is the error message you get when trying to login.*

There are several reasons that this will happen, but the most common reasons are:

- DoubleSpace defaults to G or H as lastdrive, thus H: or I: will be the login drive when using DoubleSpace. The lastdrive command in CONFIG.SYS seems to be overruled by DoubleSpace lastdrive.

  Sample NET.CFG when using VLMs:

  ```
  NETWARE DOS REQUESTER

    FIRST NETWORK DRIVE = F
  ```

*The following error occurred while loading protocol 0, error 58:...*

This usually occurs when you have installed the IPX support stack in Windows for Workgroups and ODI, and later decided to switch to NDIS2 and not use IPX as another stack.

Windows for Workgroups sometimes will forget to remove the NWLINK.386 and NWBLINK.386 from the transport line in the [386enh] section of your C:\WINDOWS\SYSTEM.INI file. Fix this by making sure that the transport line in that section reads:

```
[386ENH]

TRANSPORT=NETBEUI.386
```

*Error 7323 or 3658:, The IFSHLP.SYS driver is not installed, or Windows Network was not started, check your configuration.*
Make sure the IFSHLP.SYS is installed in you CONFIG.SYS file and that this file exists in the C:\WINDOWS directory. See the sample CONFIG.SYS for proper syntax.

*Error 7733: The protocol manager has reported an incomplete binding.*
Make sure to check your \WINDOWS\PROTOCOL.INI to have proper bindings. The MS$NDISHLP and NETBEUI sections should have a BINDINGS=M16AMAC. Chances are, the binding statement is wrong. See the sample PROTOCOL.INI file.

*Windows for Workgroups works the first time I boot the machine, but after a warm boot, it fails to see other machines.*
Turn off the power to shut down the machine and do a COLD BOOT. See if this fixes the problem.

*When using Windows for Workgroups and ODI support for NetWare, I was able to login before I installed the Windows for Workgroups support for ODI. Now I can't see the server anymore.*

You were probably using frame Ethernet_802.2 for the IPXODI to connect to NetWare. The Windows for Workgroups network setup program shuffles the NET.CFG frame types such that Ethernet_802.3 becomes the first. To solve this problem, just shuffle them back and make sure the first frame type is the one your IPXODI needs to use; in this case it is Ethernet_802.2.

*When I do the NetWare ODI stack, VLM says "No server found." Or, when I use NDIS2, everything loads but I can't see other machines on the network.*

1 IF using NetWare, try changing the first frame type in the C:\NWCLIENT\NET.CFG file. Make sure you know what frame type your NetWare server supports. IPX binds to the first frame type in the NET.CFG file.

2 Try without loading Card and Socket Services, and leave only the PRO/100 PC Card in the machine with no other cards in there. This is always a good troubleshooting technique to create a bare-bones environment.

3 Change INT setting in the C:\NWCLIENT\NET.CFG file. Some machines use INT 5 for sound cards. Try changing the INT to 10 or 11 or 15.

   If using ODI, use INT 11 in C:\NWCLIENT\NET.CFG.

   If using NDIS2, use INT=11 in C:\WINDOWS\PROTOCOL.INI.

4 Check and make sure that the memory used by the PRO/100 PC Card is excluded from the EMM386 line in the CONFIG.SYS.

   If it is already excluded, try changing memory to CC000. Make sure to make corresponding changes in the EMM386.EXE exclusion parameter in the CONFIG.SYS. For example:

   ```
   X=CC00-CDFF
   ```

5 Try swapping cards or cables whenever possible during trouble-shooting.

6 Always do a COLD BOOT during troubleshooting.

## Novell NetWare

*Invalid network drive specified.*

Check the LASTDRIVE parameter in CONFIG.SYS if using NETX, or the FIRST NETWORK DRIVE statement in NET.CFG if using VLM. These should be set to the letter after your last local drive. Typically one would use LASTDRIVE=E or FIRST NETWORK DRIVE=F. If you are using a hard drive compression program that creates extra drives (i.e. doublespace or stacker), you will need to increase the values of the parameters (i.e.: LASTDRIVE=H or FIRST NETWORK DRIVE=I).

*File Server not found.*

- Run the Intel test utility to see if any network traffic is visible.

- Check the frame types in the NET.CFG file. Your frame type must match the frame type used by the file server. Remember that the adapter binds to the first frame type listed in the NET.CFG. If you are not sure what frame types the Novell server is running, check the NET.CFG file of a workstation that is able to attach. If you have access to the server, type CONFIG at the server console and the screen will display the frame types.

- If this is a coax adapter, try another location on the cable segment or if possible use a cable run that is shorter in overall length.

- If this is a multi-server environment add a PREFERRED SERVER parameter to the NET.CFG file.

- Verify the network drop is working by using a cable drop that works for another workstation.

# Computer-Specific Troubleshooting

If you are using Card and Socket Services and are experiencing problems, find your computer in the list below and review the information provided. The examples of Card and Socket Services driver stacks and EMM386.EXE lines have been verified and are known to be reliable. Sample Card and Socket Services configuration files and their known problems are also supplied.

### Ambra

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D000-DCFF

DEVICE=C:\PCM3\CNFIGNAM.EXE /DEFAULT

DEVICE=C:\PCM3\PCMSS.EXE

DEVICE=C:\PCM3\PCMCS.EXE

DEVICE=C:\PCM3\PCMRMAN.SYS

DEVICE=C:\[PATH]\M16ACFG.EXE
```

where [path] defines the location of M16ACFG.EXE for your network. This line is necessary to prevent a conflict between PCMSCD.EXE and M16ACFG.EXE. M16ACFG.EXE should not be loaded at a later time.]

```
DEVICE=C:\PCM3\PCMSCD.EXE

REM DEVICE=C:\PCM3\PCMATA.SYS

REM DEVICE=C:\PCM3\PCMFFCS.EXE

REM DEVICE=C:\PCM3\DBLFALSH.EXE

REM DEVICE=C:\PCM3\MS-FLASH.SYS
```

The configuration above will work with the PRO/100 PC Card driver at memory location D8000.

### AST Bravo

The Installation Program does not successfully configure this machine.

### AST Power Exec

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D000-DFFF

DEVICE=C:\CARDSOFT\SS365SL.EXE

DEVICE=C:\CARDOSFT\CS.EXE

DEVICE=C:\CARDSOFT\CSALLOC.EXE
```

```
REM DEVICE=C:\CARDSOFT\ATADRV.EXE

REM DEVICE=C:\CARDSOFT\MTSRAM.EXE

REM DEVICE=C:\CARDSOFT\MTDDRV.EXE

DEVICE=C:\CARDSOFT\CARDID.EXE
```

The above configuration will work with the PRO/100 PC Card driver at memory location D2000.

### Austin Notebooks series

```
DEVICE=C:\DOS\EMM386.EXE X=D000-D7FF

DEVICE=C:\PCMCIA\CARDSOCK.SYS /IO:240

DEVICE=C:\PCMCIA\CTALKCS.EXE

DEVICE=C:\PCMCIA\CARDTALK.SYS /A /IOW=320-31F /MEMW=D000-
D7FF
```

The above configuration will work with the PRO/100 PC Card driver at memory location D2000.

### Compaq Contura Aero

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D000-D5FF

DEVICE=C:\CPQDOS\SSVLSI.EXE

DEVICE=C:\CPQDOS\CS.EXE

DEVICE=C:\CPQDOS\CSALLOC.EXE C:\CPQDOS\CSALLOC.INI

REM DEVICE=C:\CPQDOS\ATADRV.EXE

DEVICE=C:\CPQDOS\CARDID.EXE C:\CPQDOS\CARDID.INI

REM DEVICE=C:\CPQDOS\MEMDRV.EXE

REM DEVICE=C:\CPQDOS\DBLFLASH.EXE

REM DEVICE=C:\CPQDOS\MS-FLASH.SYS
```

The above configuration uses only the drivers necessary for the Intel adapter. This configuration will work with the PRO/100 PC Card driver at memory location D2000.

### Compaq LTE Elite models

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D000-DFFF

DEVICE=C:\CPQDOS\SSVLSI.EXE

DEVICE=C:\CPQDOS\CS.EXE
```

```
DEVICE=C:\CPQDOS\CSALLOC.EXE C:\CPQDOS\CSALLOC.INI

DEVICE=C:\CPQDOS\ATADRV.EXE

DEVICE=C:\CPQDOS\CARDID.EXE C:\CPQDOS\CARDID.INI

DEVICE=C:\CPQDOS\MEMDRV.EXE

DEVICE=C:\CPQDOS\DBLFLASH.EXE

DEVICE=C:\CPQDOS\MS-FLASH.SYS
```

The above configuration will work with the PRO/100 PC Card driver at memory location D2000.

### DEC Ultra Hi-Note

These machines may hang when launching Windows. A BIOS update will be released by DEC.

### Dell Latitude XP series

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D000-DBFF

DEVICE=C:\CARDSOFT\SSVADEM.EXE

DEVICE=C:\CARDOSFT\CS.EXE

DEVICE=C:\CARDSOFT\CSALLOC.EXE

REM DEVICE=C:\CARDSOFT\ATADRV.EXE

REM DEVICE=C:\CARDSOFT\MTSRAM.EXE

REM DEVICE=C:\CARDSOFT\MTDDRV.EXE

DEVICE=C:\CARDSOFT\CARDID.EXE

INSTALL=C:\CARDSOFT\CS_APM.EXE
```

The above configuration will work with the PRO/100 PC Card driver at memory location D2000.

### Dell Latitude

The Dell Latitude laptops may have a chipset which is not compatible with Microsoft Windows NT and cannot be used with the PRO/100 PC Card in this environment.

### Dell 320SLi

The Dell 320SLi laptops may have an early version of Socket Services, built into the BIOS, that is not compatible with newer PC Card software specifications.

The NOCHECK keyword must be added to the NET.CFG, PROTOCOL.INI or command line.

### Gateway ColorBook DX/75

The Gateway Colorbook DX/75 must use a MEMWAITSTATES = 1 keyword in either NET.CFG or PROTOCOL.INI files in order to function.

### Gateway ColorBook 40MHz and 75MHz

These computers must run in I/O mode and need to have the keyword MODE IO in the NET.CFG file or MODE=IO in the PROTOCOL.INI file.

### Gateway ColorBook series

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D000-DFFF

DEVICE=C:\CARDSOFT\SSCIRRUS.EXE

DEVICE=C:\CARDOSFT\CS.EXE

DEVICE=C:\CARDSOFT\CSALLOC.EXE

REM DEVICE=C:\CARDSOFT\ATADRV.EXE

REM DEVICE=C:\CARDSOFT\MTSRAM.EXE

REM DEVICE=C:\CARDSOFT\MTDDRV.EXE

DEVICE=C:\CARDSOFT\CARDID.EXE
```

The above configuration will work with the PRO/100 PC Card driver at memory location D2000.

### GRiD Convertible

This computer must run in I/O mode and needs to have the keyword MODE IO in the NET.CFG file or MODE=IO in the PROTOCOL.INI file.

### IBM ThinkPad 350, 755CS

```
DEVICE=C:\DOS\EMM386.EXE X=C800-CFFF
```

The switch X=C800-CFFF on the EMM386 line must be used with the configuration below.

```
DEVICE=C:\THINKPAD\IBMDSS01.SYS

DEVICE=C:\THINKPAD\IBMDOSCS.SYS

DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF
```

```
DEVICE=C:\THINKPAD\$ICPMDOS.SYS

REM DEVICE=C:\THINKPAD\AUTODRV.SYS
C:\THINKPAD\AUTODRV.INI
```

The above line has been changed to prevent AUTODRV.SYS from loading. The above configuration will work with the PRO/100 PC Card driver at memory location C8000.

## IBM ThinkPad 355, 360, 755

Set the keyword WORDSIZE=8 in your PROTOCOL.INI file or on the command line, or WORDSIZE 8 in your NET.CFG file.

## IBM ThinkPad 360CS

```
DEVICE=C:\DOS\EMM386.EXE X=C800-CFFF
```

The switch X=C800-CFFF on the EMM386 line must be used with the configuration below.

```
DEVICE=C:\THINKPAD\IBMDSS01.SYS

DEVICE=C:\THINKPAD\IBMDOSCS.SYS

DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF

DEVICE=C:\THINKPAD\$ICPMDOS.SYS

DEVICE=C:\[PATH]\M16ACFG.EXE
```

where [path] defines the location of M16ACFG.EXE for your network. This line is necessary to prevent a conflict between AUTODRV.SYS and M16ACFG.EXE. M16ACFG.EXE should not be loaded at a later time.

```
DEVICE=C:\THINKPAD\AUTODRV.SYS
C:\THINKPAD\AUTODRV.INI
```

The above configuration will work with the PRO/100 PC Card driver at memory location C8000.

## IBM ThinkPad 360

The IBM ThinkPad 360 must use a MEMWAITSTATES = 1 keyword in either NET.CFG or PROTOCOL.INI files in order to function.

## IBM 720

The IBM 720 needs to be run in 25 MHz mode in order to support this card.

## IBM ThinkPad 750CS

```
DEVICE=C:\DOS\EMM386.EXE X=B000-BFFF X=C800-CFFF
```

The switch X=C800-CFFF on the EMM386 line must be used with the configuration below.

```
DEVICE=C:\THINKPAD\IBMDSS01.SYS /S0=2

DEVICE=C:\THINKPAD\IBMDOSCS.SYS

DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF

DEVICE=C:\THINKPAD\$ICPMDOS.SYS

DEVICE=C:\[PATH]\M16ACFG.EXE
```

where [path] defines the location of M16ACFG.EXE for your network. This line is necessary to prevent a conflict between AUTODRV.SYS and M16ACFG.EXE.

```
DEVICE=C:\THINKPAD\AUTODRV.SYS C:\THINKPAD\AUTODRV.INI

REM DEVICE=C:\IBMAUDIO\AUDIODD\TPAUDDD.SYS
```

The above line must be remarked out if the ThinkPad 750 series has a built in sound card. The above configuration will work with the PRO/100 PC Card driver at memory location C8000.

Use the parameter MODE IO for better performance.

## NCR 3150

In order to use Card and Socket Services, this machine must be run in IO mode. Also, this machine must use a MEMWAITSTATES = 1 keyword in either NET.CFG or PROTOCOL.INI files in order to function.

## NEC Versa models

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D000-DFFF

DEVICE=C:\CARDSOFT\SSCIRRUS.EXE

DEVICE=C:\CARDSOFT\CS.EXE

DEVICE=C:\CARDSOFT\CSALLOC.EXE
C:\CARDSOFT\CSALLOC.INI

REM DEVICE=C:\CARDSOFT\ATADRV.EXE

REM DEVICE=C:\CARDSOFT\CARDID.EXE
C:\CARDSOFT\CARDID.INI

REM DEVICE=C:\CARDSOFT\MEMDRV.EXE
```

```
REM DEVICE=C:\CARDSOFT\DBLFLASH.EXE

REM DEVICE=C:\CARDSOFT\MS-FLASH.SYS
```

The above configuration will work with the PRO/100 PC Card driver at memory location D2000.

Versa M75: Use the parameter MODE IO for better performance.

### Sharp 8650

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D000-DFFF

DEVICE=C:\CARDTALK\ARIMASS.SYS

DEVICE=C:\CARDTALK\CTALKCS.EXE

DEVICE=C:\CARDTALK\CARDTALK.SYS /A
```

The above configuration will work with the PRO/100 PC Card driver at memory location D2000. This machine also needs to be run with WORDSIZE = 8.

### Texas Instruments TI-5000M

We recommend using slot 2.

### Toshiba T3300SL

We do not support Card and Socket Services with this chipset "ICC/NT" at this time. To use the card, remove the Card and Socket Services in the CONFIG.SYS and AUTOEXEC.BAT. There is no need to run the M16ACFG program; simply run the appropriate network driver, such as M16AODI, M16ANDIS, or M16APD.

### Toshiba 1900, 1950CS

This model will not initialize properly at IO port 300. Choose another IO port, such as 320.

### Toshiba 19xx, 47xx, 48xx series

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=C800-CFFF

DEVICE=C:\PCMPLUS3\CNFIGNAM.EXE /DEFAULT

DEVICE=C:\PCMPLUS3\PCMSS.EXE

DEVICE=C:\PCMPLUS3\PCMCS.EXE

DEVICE=C:\PCMPLUS3\PCMRMAN.SYS

DEVICE=C:\PCMPLUS3\PCMSCD.EXE
```

The above configuration will work with the PRO/100 PC Card driver at memory location C8000.

### ZEOS laptops

These computers must run in I/O mode and needs to have the keyword MODE IO in the NET.CFG file or MODE=IO in the PROTOCOL.INI file.

## General Troubleshooting Checklist

Try the following troubleshooting measures before calling Intel Customer Support:

- Read the README file on the floppy disk. It contains important information (including known incompatibilities and machine specific issues) that may solve your problem.

- Obtain current versions of drivers for your adapter from the Intel BBS or http://support.intel.com.

- Boot the computer in a clean environment (press F8 or hold down the Shift key to bypass loading of CONFIG.SYS and AUTOEXEC.BAT), then use the Intel test utility to see if the adapter is functioning and detecting network traffic.

- When loading drivers or running the test utility, have the dongle cable attached to the PRO/100 PC Card.

- Under Novell, ensure that the FRAME TYPE you are using is the same as that of the file server. The server frame type should be specified as the first frame type in the NET.CFG.

- In a twisted pair environment, try plugging directly into the hub or concentrator.

- Try using a network connection that works for another computer.

- Try using the Intel adapter on a different computer.

- Try another Intel adapter if available.

- If your computer has multiple PC Card sockets, move the adapter to another socket.

- If you have more than one PC Card device in your computer, remove the non-Intel PC Card devices during your configuration/testing.

- Make sure you are using the most recent version of Card and Socket Services. Call the computer manufacturer or the company that makes the Card and Socket Services.

- Test the Intel adapter without loading Card and Socket Services to see if there is a conflict between the Intel adapter configuration and that of Card and Socket Services. The interrupt, memory address location, and I/O address specified to the Card and Socket service drivers must match the Intel configurations in NET.CFG or PROTOCOL.INI.

- Make sure that the Intel adapter is not conflicting (interrupt, memory address, I/O address) with any other adapters or hardware that is installed in the computer (including sounds cards, CD-ROM drives and PEN devices).

- Try loading the PRO/100 PC Card drivers at different memory locations (i.e.: C800, CC00, D400, D800).

- Try using different interrupt locations (i.e.: 5, 10, 11).

- Try using different port addresses (i.e.: 280, 290, 310, 320).

- Try adding the parameter MODE=IO in PROTOCOL.INI or MODE IO in NET.CFG.

- If the Intel adapter was functioning correctly then stopped, make sure none of configuration files have been changed by newly installed software or hardware.

- Disable all power management features in the CMOS settings on the computer.

- Disable all shadow RAM features in the CMOS settings on the computer.

- Ensure that you are excluding the memory range used by the Intel adapter from your memory manager (EMM386.EXE, QEMM.EXE, etc.).

# Intel Automated Customer Support

You can reach Intel's automated support services 24 hours a day, every day at no charge. The services contain the most up-to-date information about Intel products. You can access installation instructions, troubleshooting information, and general product information.

| | World Wide Web & Internet FTP | Intel Bulletin Board Service (BBS) |
|---|---|---|
| | Access Intel's World Wide Web home pages or download information using anonymous FTP. | Use Intel's BBS. Dial in by modem at 8-N-1, and up to 14.4 Kbps. |
| **Troubleshooting** | ✓ | |
| **Software updates** | ✓ | ✓ |
| **Installation notes** | ✓ | |
| **Product information** | ✓ | |
| **How to access:** | See web addresses on next page. | US and Canada: 1-503-264-7999 Europe: +44-1793-432955 Worldwide: +1-503-264-7999 |

## Intel Web and Internet Sites

*Support:* http://support.intel.com

*News:* news://cs.intel.com

*Network Products:* http://www.intel.com/comm-net.sns

*Corporate:* http://www.intel.com

*FTP Host:* ftp.intel.com

*FTP Directory:* /pub/support/enduser_reseller/etherexpress_lan_adapters

## Intel Customer Support Technicians

**Other support services:** You can purchase a range of support services, including 24 hour support, per incident support, on-site service, and software and hardware maintenance agreements. For details about the Intel Support Service options, download document 8549 from one of the automated services.

**Worldwide access:** Intel has technical support centers worldwide. Many of the centers are staffed by technicians who speak the local languages. For a list of all Intel support centers, the telephone numbers, and the times they are open, download document 9089 from one of the automated services.

If you don't have access to automated services, contact your local dealer or distributor. Or call +1-916-377-7000 from 07:00 to 17:00 Monday - Friday, U.S. Pacific Time.

# Specifications

## Media Interface Specifications

### Model MBLA1600

Cable:      100Base-TX unshielded twisted pair for use on

Category 5 (data grade) cabling; 10Base-T unshielded

twisted pair (UTP)

Connector:  RJ-45

Operating Distance:  328 ft (100 m)

### Ethernet specifications

Ethernet IEEE 802.3 for 10 Mbps, 802.3u for 100 Mbps

Type II PC Card (PCMCIA)

10 Mbps full-duplex (10 Mbps networks only)

# General Specifications

| | |
|---|---|
| **Size:** | 3.37 in (86 mm) x 2.13 in (54.0 mm) x 0.20 in (5.0 mm) excluding adapter cable and network connection |
| **Weight:** | 0.85 oz (24 g) |

**Power Requirements:**

| | | |
|---|---|---|
| 10Base-T | +5V DC, 320 mA typical, | 460 mA max |
| 100Base-TX | +5V DC, 340 mA typical, | 490 mA max |

**Temperature Range:**

| | |
|---|---|
| **Operating:** | 32°F to 131°F (0°C to 55°C) |
| **Storage:** | -4°F to 149°F (-20°C to 65°C) |
| **Humidity:** | 95% max. noncondensing |
| **Memory Size:** | 32 KB SRAM packet buffer |
| **LEDs:** | Link integrity, transmission activity |
| **Certification:** | FCC, Part 15, Class B |
| | CE Mark (EN 55022, Class B, EN50082-1) |

# Compatibility

## Platforms

Supports popular PC Card (PCMCIA) compliant PCs including Acer, AST/GRiD, AT&T/NCR, Compaq, DEC, Dell, Epson, Gateway 2000, IBM, NEC, Texas Instruments, Toshiba, and Zenith Data Systems.

## Card and Socket Services

Supports most Card and Socket Services including AMI, Award, Databook, IBM, Phoenix, SystemSoft, and VMI.

## Network Operating Systems

Supports all popular network operating systems including Novell NetWare, Microsoft Windows 95, Microsoft Windows NT, Microsoft Windows for Workgroups, Microsoft LAN Manager, Artisoft LANtastic, Banyan VINES, DEC PATHWORKS, and SCO UNIX. NDIS and ODI support for DOS and OS/2. Packet driver support for TCP/IP, and 32-bit ODI server driver.

# Technical Specifications

- Compatible with Type II and Type III PC Card slots.
- Supports Intel 82365 PCIC, Databook TCIC, Cirrus Logic CL-PD6710 or CL-PD6720, or Toshiba ICCNT PCMCIA interface chips.
- Variable interrupts, 3 to 15, default interrupt 5.
- Variable I/O window, 16 bytes needed, default base at 320h.
- Requires only a 4 Kbyte memory window on a 4 Kbyte boundary, within segment C000h to EF00h, default is D100h.

Note

The D000-D0FF memory segment is not supported. Use a different range, such as D100-D1FF.

- Keyword disables link integrity checking.
- Suspend/resume and HotSwap support through Card and Socket Services.
- Power On/Off switch under M16AFG allows power to the PRO/100 PC Card 16 to be turned on or off at the slot.
- Full-duplex capability on 10 Mbps full-duplex network increases bandwith to 20 Mbps.
- Advanced Look-Ahead Pipelining increases performance.
- Windows-based installation program automatically configures PC and NOS setup.
- Diagnostic test program (M16ATEST.EXE)

## Supported Environments

- NDIS 3 driver for Microsoft Windows 95 and Microsoft Windows NT 3.51 and 4.0.
- DOS and OS/2 ODI Driver
- DOS and OS/2 NDIS2 Driver
- Packet Driver
- Novell NetWare Server Driver for NetWare 3.12, 4.10, and 4.11.

# Appendix C

# Limited Lifetime Warranty

Intel warrants to the original owner that the hardware product delivered in this package will be free from defects in material and workmanship. This warranty does not cover the product if it is damaged in the process of being installed or improperly used.

THE ABOVE WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE ARISING OUT OF ANY PROPOSAL, SPECIFICATION, OR SAMPLE.

This warranty does not cover replacement of adapter products damaged by abuse, accident, misuse, neglect, alteration, repair, disaster, improper installation, or improper testing. If the product is found to be otherwise defective, Intel, at its option, will replace or repair the product at no charge except as set forth below, or refund your purchase price provided that you deliver the product along with a Return Material Authorization (RMA) number (see below), along with proof of purchase (if not registered), either to the dealer from whom you purchased it or to Intel with an explanation of any deficiency. If you ship the product, you must assume the risk of damage or loss in transit. You must use the original container (or the equivalent) and pay the shipping charge. Intel may replace or repair the adapter product with either new or reconditioned parts, and any part or product replaced becomes Intel's property. Repaired or replaced products will be returned at the same revision level as received or higher, at Intel's option. Intel reserves the right to replace discontinued product with an equivalent current generation product.

This warranty gives you specific legal rights and you may have other rights which vary from state to state. All parts or components contained in this hardware product are covered by Intel's limited warranty for this product; the product may contain fully tested, recycled parts, warranted as if new. For warranty information call one of the numbers below.

## Returning a defective product

### From North America:

Before returning any product, contact Intel Customer Support and obtain a Return Material Authorization (RMA) number by calling +1-916-377-7000.

If the Customer Support Group verifies that the product is defective, they will have the RMA department issue you an RMA number to place on the outer package of the product. Intel cannot accept any product without an RMA number on the package.

### All other locations:

Return the product to the place of purchase for a refund or replacement.

### INTEL ADAPTER MONEY-BACK GUARANTEE (North America Only)

Intel wants you to be completely satisfied with the Intel adapter product that you have purchased. Any time within ninety (90) days of purchase, you may return your **Intel adapter** to the original place of purchase for a full refund of the purchase price from your dealer. Resellers and Distributors, respectively, accepting returns and refunding money back to their customers may return Intel adapters to their original place of purchase. Intel guarantees that it will accept returns under this policy and refund the original purchase price to customers purchasing directly from Intel.

## Limitation of Liability and Remedies

INTEL SHALL HAVE NO LIABILITY FOR ANY INDIRECT, SPECULATIVE, CONSEQUENTIAL, INCIDENTAL, PUNITIVE OR SPECIAL DAMAGES ARISING FROM THE USE OF OR INABILITY TO USE THIS PRODUCT INCLUDING, WITHOUT LIMITATION, LOSS OF USE, BUSINESS INTERRUPTIONS, LOSS OF PROFITS, AND LOSS OF GOODWILL, WHETHER ANY SUCH DAMAGES ARISE OUT OF CONTRACT NEGLIGENCE, TORT, OR UNDER ANY WARRANTY, IRRESPECTIVE OF WHETHER INTEL HAS ADVANCE NOTICE OF THE POSSIBILITY OF ANY SUCH DAMAGES. NOTWITHSTANDING THE FOREGOING, INTEL'S TOTAL LIABILITY FOR ALL CLAIMS UNDER THIS AGREEMENT SHALL NOT EXCEED THE PRICE PAID FOR THE PRODUCT. THESE LIMITATIONS ON POTENTIAL LIABILITIES WERE AN ESSENTIAL ELEMENT IN SETTING THE PRODUCT PRICE. INTEL NEITHER ASSUMES NOR AUTHORIZES ANYONE TO ASSUME FOR IT ANY OTHER LIABILITIES.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.

Software provided with the hardware product is not covered under the hardware warranty described above. See the applicable software license agreement which shipped with the adapter product for details on any software warranty.

April 28, 1994

# Appendix D

# Network Software License Agreement

BY USING THIS SOFTWARE, YOU ARE AGREEING TO BE BOUND BY THE TERMS OF THIS AGREEMENT. DO NOT USE THIS SOFTWARE UNTIL YOU HAVE CAREFULLY READ AND AGREED TO THE FOLLOWING TERMS AND CONDITIONS. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, PROMPTLY RETURN THE SOFTWARE PACKAGE AND ANY ACCOMPANYING ITEMS.

**LICENSE:** Intel Corporation ("Intel") grants you the non-exclusive right to use the enclosed software program (the "Software"). You will not use, copy, modify, rent, sell or transfer the Software or any portion thereof except as provided in this Agreement.

You may:

1. Install/use the Software on a single computer or on a single local area network ("LAN") server;

2. Copy the Software solely for backup or archival purposes, including copying the Software into memory.

**RESTRICTIONS:**

You **Will Not**:

1. Sublicense the Software;

2. Reverse engineer, decompile, or disassemble the Software;

3. Copy the Software, in whole or in part, except as provided in this Agreement.

**TRANSFER:** You may transfer the Software to another party if the receiving party agrees to the terms of this Agreement and you retain no copies of the Software and accompanying documentation. Transfer of the Software terminates your right to use the Software.

**OWNERSHIP AND COPYRIGHT OF SOFTWARE:** Title to the Software and all copies thereof remain with Intel or its vendors. The Software is copyrighted and is protected by United States and international copyright laws. You will not remove the copyright notice from the Software. You agree to prevent any unauthorized copying of the Software.

**DUAL MEDIA SOFTWARE:** If the Software package contains multiple media, you may only use the disks appropriate for your single-user computer or LAN.

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# Appendix E

# Regulatory Agency Notices

## FCC Compliance Statement

This product has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable  protection against harmful interference in a residential installation. Installed correctly, it probably will not interfere with radio or TV reception. However, we do not guarantee the absence of interference.

This product generates and uses energy of about the same frequency as radio and TV broadcasts. Installed incorrectly, it may interfere with reception of radio and TV broadcasts.

If you suspect this product is causing interference, turn your computer on and off while the radio or TV is showing interference. If the interference disappears when you turn the computer off and reappears when you turn the computer on, something in the computer is causing interference.

To reduce interference, try these suggestions:

- Change the direction of the radio or TV antenna.
- Move the computer, radio or TV. For example, if the computer is to the right of the TV, move it to the left of the TV. Or move them farther apart.
- Plug the computer into a different electrical outlet than the radio or TV.
- Ensure that all expansion slots (on the back or side of the computer) are covered. Also ensure that all metal retaining brackets are tightly attached to the computer.

**NOTE**
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**CAUTION**
If the device is changed or modified without permission from Intel, the user may void his or her authority to operate the equipment.

## Canadian compliance (Industry Canada)

When tested in at least one intended host:

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Canadian Department of Communications.

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Class B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le Ministre Canadien des Communications.

## Manufacturer declaration

This certifies that Intel EtherExpress PRO/100 Mobile Adapters comply with the EU Directive 89/336/EEC, using the EMC standards EN55022 (Class B) and EN50082-1. This product also meets or exceeds EN60950 safety requirements.

This product has been tested and verified to meet CISPR 22 Class B requirements.

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