Installation Overview for PRO100+ Dual Port Server Adapter --preliminary--

▶Put the Adapter in the Server

1   Turn off the computer and unplug the power cord. Then remove its
    cover.

   ⚠ Warning: Turn off and unplug power to the computer before
       removing its cover. Failure to do so could shock you and may
       damage the adapter or computer.

2   Remove the cover bracket from a PCI busmaster adapter slot. In most
    servers, all slots are busmaster-enabled. If you have configuration
    problems, see your server's documentation to determine if the PCI slots
    are busmaster-enabled.

PCI slot
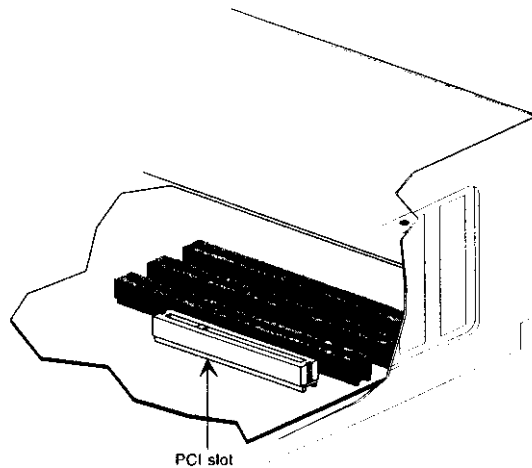
3   Push the adapter into the slot until it's seated firmly. Then secure the
    adapter bracket.

    If you're installing multiple adapters, see *Installing Multiple Adapters* on
    page 11 for specific instructions.

4   Replace the computer cover and plug in the power cord.

Connect the Network Cable

1   Connect a single network cable to each port of the adapter as shown
    below. For 100BASE-TX, your network cable must be Category 5,
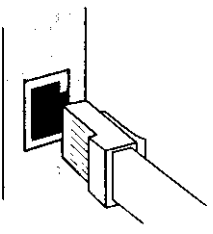   twisted-pair wiring. If you plan to run the adapter at 100 Mbps, it must
    be connected to a 100BASE-TX hub or switch (not a 100BASE-T4 hub).
    For 10BASE-T, use Category 3, 4, or 5 twisted-pair wiring. If you want
    to use this adapter in a residential environment, you must use a Category
    5 cable.

100BASE-TX Wiring

Twisted Pair Ethernet (TPE).
Use Category 5 cable and RJ-45
connector for this adapter. Do not
use Category 3 wiring at 100
Mbps. At 100 Mbps, connect to a
TX hub, not a T4 hub. For full
duplex, see *Select Duplex Mode* on
page 12.

NOTE: For more information on 100BASE-TX wiring requirements and
limitations, see *Fast Ethernet Wiring* toward the end of this guide and
refer to the readme files on the installation disk.

2   To configure the adapter, continue with the procedures specific to your
    operating system on the following pages.

▶ Configure the Adapter and Install the Drivers

Windows 95

▶ Automatic Configuration

PCI servers automatically detect and configure PCI-compliant adapters while booting. The BIOS automatically sets the adapter IRQ level and I/O address each time you start your server.

Start your server to automatically configure the adapter. Resource configuration is complete when Windows 95 starts.

If your server displays an error while booting, it may require additional steps to configure. See *PCI Installation Tips* on page 25 for more information.

▶ Install Network Drivers from Disk

Have your Windows 95 installation CD or disks available, as Windows 95 prompts for them when you install the new adapter.

1   After you put the adapter in the server, start Windows 95.
    You'll see the New Hardware Found dialog box. *If this box does not appear and Windows 95 starts normally, you may need to manually add the adapter. See Manually Adding an Adapter on page 5.*
2   Click "Driver from disk provided by hardware manufacturer," then click OK. You'll see the Install From Disk dialog box.
3   Insert the PRO/100+ Server adapter disk.
4   Specify D : \ (for CD) or A : \ (for floppy) as the path, then click OK.
5   Follow prompts for any Windows 95 installation disks and restart when prompted. (If you installed from the CD, the installation files are typically located at D:\Win95, where D is your CD-ROM drive.)

After restarting Windows 95, connect to your network by double-clicking the Network Neighborhood icon on the desktop.

### ▶ Install PROSet Software (recommended)

PROSet is an enhanced utility you can use to easily configure and test your adapter in Windows 95. PROSet also displays the computer resources that are assigned to each port of the adapter you install. To install PROSet:
1   Insert the PRO/100+ Server adapter disk in the disk drive.
2   From My Computer or the Windows Explorer, double-click the 3½ Floppy disk icon.

3 Click the PROSet icon or filename and click the right mouse button. From the menu that appears, click Install.

4 The PROSet files are copied to your hard disk.

5 To start PROSet, double-click on the PROSet icon in the Control Panel:

Intel PROSet

6 The PROSet software examines your computer and displays this window or a similar one:
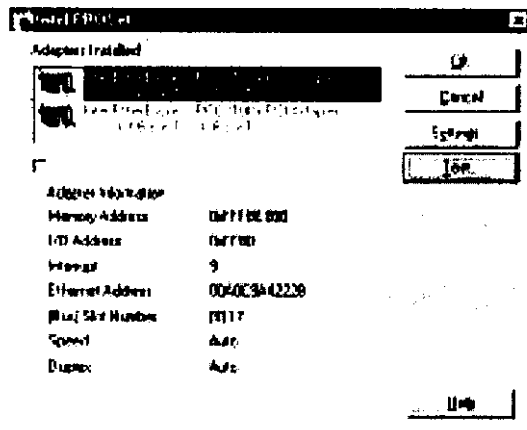
7 Click OK to exit PROSet and return to Windows 95.

To set duplexing options, continue to the section *Select Duplex Mode*.
To set teaming options, continue to the section *Choose Adapter Teaming Options*.

Manually Adding an Adapter (This may go to readme and be more explicitly described)

If the New Hardware Found dialog box does not appear at startup and you cannot connect to the network, check the Device Manager list to see if the new adapter is present. If it is not, follow these steps:

1 From the Control Panel, double-click the System icon.

2 Click the Device Manager tab.

3 Double-click Other Devices (question mark icon) in the list area.

4 Double-click a PCI Ethernet Controller.

5 Click the Driver tab, then click Change Driver.

6 Select Network Adapters and click OK.

5

7 Click Have Disk. Insert the PRO/100+ Server adapter disk and click OK.

8 Follow any prompts for Windows 95 installation disks and restart when prompted.

To install PROSet software (recommended), continue to the section *Install PROSet Software* in the ??? manual.

Troubleshooting

If you can't connect to a server or if Windows 95 reports an error after you double-click Network Neighborhood, try the suggestions here first, then turn to *Troubleshooting and FAQs* on page 21 if necessary.

- Make sure you're using the drivers that are on the drivers disk that ships with this adapter.

- Make sure the driver is loaded and the protocols are bound. Check Device Properties list for trouble indicators (an X or ! symbol).

- Test each port of the adapter. Start PROSet, select a port, and click Test to run diagnostics.

- Check with your LAN administrator — you may need to install additional networking software.

Windows NT Server or Workstation

Automatic Configuration

PCI computers automatically detect and configure PCI-compliant adapters while booting. The adapter IRQ level and I/O address are automatically set by the BIOS each time you start your computer.

Start your computer to automatically configure the adapter. Configuration is complete when Windows NT starts or the DOS prompt appears.

If your computer displays an error while booting, it may require additional steps to configure. See *PCI Installation Tips* on page 25 for more information.

Install Network Drivers - Windows NT Version 4.0 Only

After putting the adapter in the computer and starting Windows NT, you need to install the correct drivers.

1 Double-click the Network icon in the Control Panel.

2 Click the Adapters tab.

3 Click Add. You'll see a list of adapters.

4 **Don't select an adapter from this list.** Instead, insert the PRO/100+ Server adapter disk into your disk drive and click Have Disk.

5 Type D: \ (for CD) or A: \ (for floppy) in the dialog box and click OK. Then follow the prompts to complete the installation. When the adapter is added, you'll see two new adapters listed in the Network adapters list, one for each port of the Intel PRO100+ Dual Port adapter. Even if you've installed multiple PRO/100+ Dual Port adapters, all are configured at this time.

6 Select one of the new adapter listings and click Properties to run PROSet and view the adapter configuration. Adapter hardware diagnostics are available only when the drivers aren't loaded (before you restart your computer). Driver diagnostics are available when the drivers are loaded.
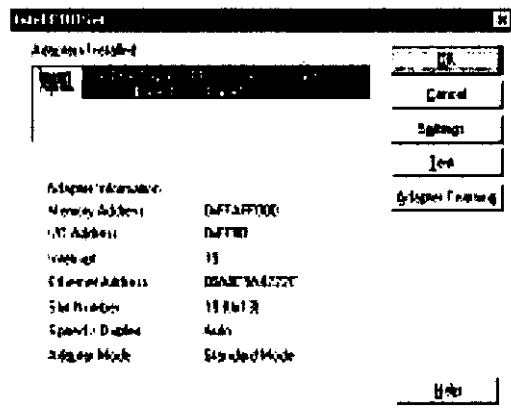
PROSet is an enhanced utility that you can use to easily configure and test your adapter in Windows NT. PROSet also displays the computer resources that were assigned to each adapter installed.

7 Click OK in the main PROSet window to return to Windows NT.

8   The adapters now appear on the list in the Network window. Click Close to finish.

9   Restart Windows NT when prompted.

To set duplexing options, continue to the section *Select Duplex Mode*. To set teaming options, continue to the section *Choose Adapter Teaming Options*.

> **NOTE:** To run the PROSet utility at any time, go to the Adapters tab in the Network control panel and click Properties.

Install Network Drivers - Windows NT Version 3.51 Only

After putting the adapter in the computer and starting Windows NT, you need to install the correct drivers and test the adapter.

1   Double-click the Network icon in the Control Panel.

2   Click Add Adapter.

3   When the list of adapters appears, scroll to the end of the list and select *<Other> Requires disk from manufacturer*.

4   Insert the PRO/100+ Server adapter disk in the drive and click OK. Drivers and the PROSet utility are installed and PROSet starts.

PROSet is an enhanced utility that you can use to easily configure and test your adapter in Windows NT. PROSet also displays the computer resources that were assigned to each adapter installed. The PROSet main window is shown on the preceding page.

5   Click OK in the PROSet main window to return to Windows NT. You'll see the Network Settings dialog box.

6   Click OK and remove the installation disk. When prompted, restart Windows NT.

To install multiple adapters, repeat this procedure for each new adapter. For more information, see *Installing Multiple Adapters* on page 11.

Troubleshooting

If Windows NT reports an error or you can't connect to the network, try the suggestions here first, then turn to *Troubleshooting and FAQs* on page 21 if necessary.

- Make sure that you use the drivers for this adapter. Drivers are located on the PRO/100+ Server adapter disk.

- Make sure the driver is loaded and the protocols are bound. Check the Network Bindings dialog box in Windows NT.

- Check the Windows NT Event Viewer for error messages.

- If you are attaching to a NetWare network, check your frame type and verify that NetWare client or server software has been installed.

DOS and Windows 3.1 Setup for Novell NetWare Clients

> **Important Note:**
>
> *Windows 95 and Windows NT users: refer to the previous sections on Windows 95 and Windows NT.*
> *NetWare Client 32 and NetWare Server users: refer to the NetWare readme files.*

▶ Automatic Configuration

PCI computers automatically detect and configure PCI-compliant adapters while booting. The BIOS sets the adapter IRQ level and I/O memory address automatically each time you start your computer.

Start your computer to automatically configure the adapter. Resource configuration is complete when the DOS prompt appears. You can now continue with the procedure below.

If your computer displays an error while booting, it may require additional steps to configure a PCI adapter. See *PCI Installation Tips* on page 25 for more information.

▶ Run Setup to Install Network Drivers

Setup can automatically install NetWare DOS ODI client drivers for you or display a readme file with installation instructions for other NOS drivers.

1   If your computer already has network drivers installed, restart the computer without loading them. If the drivers are loaded from the AUTOEXEC.BAT or CONFIG.SYS file, type REM in front of each line that loads a network driver. Or, with DOS 6.x or later press (F5) as DOS starts, to bypass the drivers.

2   Insert the PRO/100+ Server adapter disk in a floppy drive, switch to that drive, and at the DOS prompt, type

SETUP (←Enter)

3   If you have more than one PCI adapter in your computer, an adapter selection menu appears on the screen. Select the adapter you want by noting the Ethernet address. See *Installing Multiple Adapters* on page 11 for more information on multiple adapters.

4   Select Automatic Setup from the Main menu. Then follow the instructions on the screen. (If you want to test the adapter with a responder on the network, see the next procedure.)

Setup displays the adapter's configuration and then runs a series of diagnostic tests that make sure the adapter and network are functioning properly. If Setup finds a problem, it displays the results and some possible solutions.

5   When Setup finishes the tests, you'll see the Install Network Drivers screen.

6   Select the driver you want to install. Setup can install a NetWare client driver for you. If you want to install other drivers, Setup displays a readme file with installation instructions.

▶ Troubleshooting

If you can't connect to a server, first try the suggestions here, then turn to *Troubleshooting and FAQs* on page 21.

- Make sure you're using the drivers for this adapter. The driver filename contains the letter B (for example, E100BODI.COM).

- If you're replacing an existing adapter, make sure the LINK statement in your NET.CFG is correct for the new adapter. For example, the LINK statement for a NetWare client is:

    ```
    LINK DRIVER E100BODI
    ```

- Verify that the frame type in your NET.CFG file matches your network.

- If setting up a server, check your LOAD and BIND statements.

- Test the adapter by running diagnostics in Setup. Additional testing is available by using a responder (see the next section).

- Check the readme files (see the inside front cover for instructions).

Responder Testing on the Network (Optional)

Setup can test the adapter more thoroughly if there is a responder on the network while you run the tests.

1   Go to a computer on the network with a comparable PCI adapter installed.

2   Run the appropriate configuration program for the installed adapter and set it up as a responder.

3   Return to the server with the new adapter. Run Setup and test the adapter.

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NetWare Server, Client 32, UNIX, OS/2, Banyan, and Other Operating Systems

Refer to the online documents. On a DOS server, view the appropriate readme file for information on installing your network driver.

To view the readme files, insert the PRO/100+ Server adapter disk into a drive, switch to that drive, and type:

SETUP /README ⟨←Enter⟩

Refer to *Installing Adapter Drivers* for the operating system you need.

▶ Installing Multiple Adapters

All users: The adapter's 12-digit, hexadecimal Ethernet address is printed on a sticker placed on the adapter. The Ethernet address is sometimes called the node address or the MAC address. Note that the PCI slot number may not correspond with the physical connector in your server.

NetWare users: The server drivers use the PCI slot number to identify each installed adapter. You can correlate the PCI slot number to the adapter by using the Ethernet address that is printed on a label on the adapter. Run Setup from the Intel disk to view the Ethernet address and slot number for each installed adapter. For more information, see the readme files. NetWare 4.11 server installations use unique slot numbers that are assigned during server setup.

Windows 95 and Windows NT 3.51 users: Repeat the configuration procedure for each adapter you want to install.

► Select Duplex Mode (Optional)

Duplexing is a performance option that lets you choose how the adapter sends and receives data packets over the network. The adapter can operate at full duplex only when connected to a full duplex 10BASE-T, 100BASE-TX switch, or another full duplex adapter.

- **Auto (requires a full duplex adapter or switch with auto-negotiation capability).** The adapter negotiates with the switch to send and receive packets at the highest rate. This is the default setting. If the switch does not provide auto-negotiation, the adapter runs at half duplex.
- **Full duplex (requires a full duplex switch or adapter).** The adapter can send and receive packets at the same time. This mode can increase adapter performance capability. If the full duplex switch provides auto-negotiation, the adapter runs at full duplex. If the full duplex switch does not provide auto-negotiation, you need to set the adapter duplex mode manually (see following paragraphs), because it defaults to half duplex.
- **Half duplex.** The adapter performs one operation at a time; it either sends or receives.

> **NOTE:** If your adapter is running at 100 Mbps and half duplex, your potential bandwidth is higher than if you run it at 10 Mbps and full duplex.

Manually Configuring for Full Duplex

If your switch supports auto-negotiation with the N-way standard, duplex configuration is automatic and no action is required on your part. However, few switches in the current installed base support auto-negotiation. Check with your network system administrator to verify whether your switch supports this feature. Most installations will require manual configuration to change to full duplex.

Configuration is specific to the driver you're loading for your network operating system (NOS).

To set up the duplex mode, refer to the section below that corresponds to your operating system.

> **NOTE:** Adapter performance may suffer or your adapter may not operate if your switch doesn't support full duplex and you configure the adapter to full duplex. Make sure you always set the speed when you configure duplex.

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DOS ODI, NDIS 2.01 Clients

Edit the NET.CFG or PROTOCOL.INI file. Add these keywords to the Link Driver section:

```
FORCEDUPLEX 2
SPEED 100    (or 10 if 10BASE-T)
```

NetWare Server

In AUTOEXEC.NCF, load E100B.LAN and add the following statement (you must include the equal sign for servers):

```
FORCEDUPLEX=2 SPEED=100
```

(or 10 if 10BASE-T)

For more information, see the readme file for NetWare servers.

Windows NT

While running Windows NT:

1 From the Control Panel, double-click the Networking icon. Select the adapter and click on Properties.

2 PROSet examines your system and displays the Adapter Setup window.

   If you have multiple adapters, click the Show All Adapters box and then select the adapter you are configuring (you can identify it by its Ethernet address). Each adapter must be configured separately. For more information, refer to *Installing Multiple Adapters* on page 11.

3 From the window that appears, click Settings. You'll see the Adapter Setup window.

4 Click the menu for Network Speed.

5 Click 100 or 10 Mbps, depending on switch speed.

6 Click the menu for Duplex Mode.

7 Click Full.

8 Click OK.

9 Click Restart Windows NT.

Windows 95

While running Windows 95:

1   In the Control Panel, double-click the System icon.

2   Go to the Device Manager tab and select the adapter.

3   Click Properties, then click OK to use the setup program (PROSet).

4   PROSet examines your system and displays the Adapter Setup window. If you have multiple adapters, click the adapter you are configuring (you can identify it by its Ethernet address). Each adapter must be configured separately. For more information, refer to *Installing Multiple Adapters* on page 11.

5   Click Settings and then Advanced.

6   In the Duplex Mode list box, choose Full.

7   Click OK and restart Windows 95.

Other Operating Systems

See the *Adapter Installation and Special Configurations* readme file. Instructions for viewing readme files are on the inside front cover of this book.
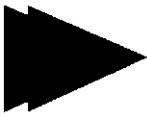
Choose Adapter Teaming Options

The PRO/100+ Server adapter provides several options for increasing throughput and fault tolerance when running Windows NT 4.0 or NetWare 4.1x or newer:

Adapter Fault Tolerance (AFT) - provides automatic redundancy for your adapter. If the primary adapter fails, the secondary takes over.

Adaptive Load Balancing (ALB) - creates a team of two, three, or four adapters to increase transmission throughput. Also includes the AFT option. Works with any 100BASE-TX switch.

Fast EtherChannel (FEC) - creates a team of two to four adapters to increase transmission and reception throughput. Also includes the AFT option. Requires a Cisco switch with FEC capability.

To set up an option, go to the appropriate section in the pages that follow.

General configuration notes

*   Adapter Teaming options are supported by Windows NT versions 4.0 and later .

*   Adapter Teaming options require NT 4.0 with Service Pack 3.0 and the NDIS driver hotfix from Microsoft. See the *Late Breaking News* for details.

Setting Up Adapter Fault Tolerance Only

> **NOTE:** Use this procedure to set up AFT only. If setting up ALB or FEC, use the procedures in the next sections. The AFT feature runs automatically when you enable ALB or FEC.

Adapter Fault Tolerance provides the safety of an additional backup link between the server and hub or switch. In the case of hub or switch port, cable, or adapter failure, you can maintain uninterrupted network performance.

Adapter Fault Tolerance is implemented with a primary adapter and a backup, or secondary, adapter. During normal operation, the backup adapter will have transmit disabled. If the link to the primary adapter fails, the link to the secondary adapter automatically takes over.

To use Adapter Fault Tolerance, you must have at least two PRO/100+ Server adapters installed in your Windows NT 4.0 or NetWare 4.1x server and they must be linked to the same network.
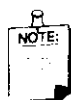
> **NOTE:** For more information about Adapter Fault Tolerance, see the Adapter Fault Tolerance readme files on the PRO/100+ Server adapter disk.

Setting up Adapter Fault Tolerance in Windows NT 4.0

1 Double-click the Network icon in the Control Panel.
2 On the Adapters tab, select a PRO/100+ Server adapter that will be in the team and click Properties.
3 Click Adapter Teaming in the PROSet window.
4 Click OK when prompted. You'll see the Adapter Teaming Configuration window.
5 Follow the instructions for assigning adapters to a team. Adapter Fault Tolerance supports up to four adapter teams, two adapters per team.
6 Select AFT Only in the Team Function area.
7 Click OK and then click Close to finish. When prompted, restart your server.

Deleting a team

1 Double-click the Network icon in the Control Panel.
2 On the Adapters tab, select the AFT team to delete.
3 Click Remove. A confirmation dialog appears. Click Yes.
4 Click Close. Restart when prompted.

Setting up Adapter Fault Tolerance in NetWare

1 Copy the following lines from the EXAMPLES.TXT file (on the PRO/100+ Server adapter disk) and paste them into the appropriate files. These commands assume the AFT.NLM and E100B.LAN files are in the system directory (SYS:SYSTEM) of your server. (Files must be copied from the PRO/100+ Server adapter disk to your server's hard drive).

> **NOTE:** Adapter Fault Tolerance must be loaded before the PRO/100+ Server adapter driver, E100B.LAN, or any other LAN driver.

Copy these lines into the AUTOEXEC.NCF file

```
;- Load Adapter Fault Tolerance
load aft

;- Load LAN driver on 1st adapter
load e100b slot=7 frame=ethernet_802.2 name=pri_802.2

;- Load LAN driver on 2nd adapter
load e100b slot=8 frame=ethernet_802.2 name=sec_802.2

;- Bind ipx to 1st adapter. Note: do not bind protocols
;- to 2nd adapter
bind ipx pri_802.2 net=2

;- Set the 2nd adapter to be a Fault Tolerance Partner
;- to the 1st adapter
aft bind 7 8
```

Where:
slot= the slot in which your PRO/100+ Server adapter is installed, such as 7. If you don't know the number, load the driver without it. NetWare will prompt you with supported PCI slot numbers.

frame= the frame type of the network segment the server is on.

7 is the primary adapter's slot number.

8 is the secondary adapter's slot number.

2 Modify the lines to match your server's requirements.

3 Save the AUTOEXEC.NCF file and restart your server.

Deleting a team

To remove a team in AFT, ALB or FEC mode, edit out the lines above and restart the server.

Setting Up Adaptive Load Balancing

Adaptive Load Balancing (ALB) is a simple and efficient way to increase your server's transmit throughput. With ALB you group PRO/100+ Server adapters in teams to provide an increased transmit rate (up to 400 Mbps) using a maximum of four adapters. The ALB software continuously analyzes transmit loading on each adapter and balances the rate across the adapters as needed. Adapter teams configured for ALB also provide the benefits of AFT. Receive rates remain at 100 Mbps.

To use ALB, you must have two, three, or four PRO/100+ Server adapters configured as a team in your server and linked to the same network switch.

Setting up ALB in Windows NT 4.0

1   Double-click the Network icon in the Control Panel.

2   On the Adapters tab, select a PRO/100+ Server adapter that will be in the team and click Properties.

3   Click Adapter Teaming in the PROSet window.

4   Click OK when prompted. You'll see the Adapter Teaming Configuration window.

5   Follow the instructions to assign adapters to a team. ALB supports up to two adapter teams, with two, three, or four adapters per team.

6   Select Load Balancing in the Team Function area.

7   Click OK and then click Close to finish. When prompted, restart your server.

Deleting a team

1   Double-click the Network icon in the Control Panel.

2   On the Adapters tab, select the ALB team to delete.

3   Click Remove. A confirmation dialog appears. Click Yes.

4   Click Close. Restart when prompted.

Setting up ALB in NetWare

1   Copy the following lines from the EXAMPLES.TXT file (on the PRO/100+ Server adapter disk) and paste them into the appropriate files. These commands assume the AFT.NLM and E100B.LAN files are in the system directory (SYS:SYSTEM) of your server. (Files must be copied from the PRO/100+ Server adapter disk to your server's hard drive).

> **NOTE:** Adaptive Load Balancing must be loaded before the PRO/100+ Server adapter driver, E100B.LAN, or any other LAN driver.

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Copy these lines into the AUTOEXEC.NCF file

```
;- Load Adaptive Load Balancing
load aft

;- Load LAN driver on 1st adapter
load e100b slot=7 frame=ethernet_802.2 name=pri_802.2

;- Load LAN driver on 2nd adapter
load e100b slot=8 frame=ethernet_802.2 name=sec_802.2

;- Bind ipx to 1st adapter
bind ipx pri_802.2 net=2

;- Set the 2nd adapter to be a Load Balancing Partner to
;- the 1st adapter
aft balance 7 8
```

Where:

slot= the slot your PRO/100+ Server adapter is installed in, such as 7. If you don't know the number, load the driver without it. NetWare will prompt you with available PCI device numbers.

frame= the frame type of the network segment the server is on.

7 is the primary adapter's slot number.

8 is the secondary adapter's slot number.

2   Modify the lines to match your server's requirements.

3   Save the AUTOEXEC.NCF file and restart your server.

Deleting a team

To remove a team in AFT, ALB or FEC mode, edit out the lines above and restart the server.

Setting Up Fast EtherChannel

Fast EtherChannel (FEC) is a performance technology developed by Cisco to increase your server's throughput. Unlike ALB, you can configure FEC to increase both transmission **and** reception channels between your server and switch. FEC works only with FEC-enabled Cisco switches, such as the Catalyst* 5000 series. With FEC, as you add adapters to your server, you can group them in teams to provide up to 800 Mpbs at full duplex, with a maximum of four PRO/100+ Server adapters. The FEC software continuously analyzes loading on each adapter and balances network traffic across the adapters as needed. Adapter teams configured for FEC also provide the benefits of AFT (see page 14).

To use FEC, you must have two or four PRO/100+ Server adapters configured as an FEC Team in your server and linked to the same FEC-enabled Cisco switch.

Setting up FEC in Windows NT 4.0

1   Double-click the Network icon in the Control Panel.

2   On the Adapters tab, select a PRO/100+ Server adapter that will be in the team and click Properties.

3   Click Adapter Teaming in the PROSet window.

4   Click OK when prompted. You'll see the Adapter Teaming Configuration window.

5   Follow the instructions for assigning adapters to a team. FEC supports up to two adapter teams, two or four adapters per team.

6   Select Fast EtherChannel in the Team Function area.

7   Click OK and then click Close to finish. When prompted, restart your server.

Deleting a team

1   Double-click the Network icon in the Control Panel.

2   On the Adapters tab, select the FEC team to delete.

3   Click Remove. You'll see a confirmation dialog. Click Yes.

4   Click Close. Restart when prompted.

Setting up FEC in NetWare

1   Copy the following lines from the EXAMPLES.TXT file (on the PRO/100+ Server adapter disk) and paste them into the appropriate files. These commands assume the AFT.NLM and E100B.LAN files are in the system directory (SYS:SYSTEM) of your server. (Files must be copied from the PRO/100+ Server adapter disk to your server's hard drive).

> **NOTE:** Fast EtherChannel must be loaded before the PRO/100+ Server adapter driver, E100B.LAN, or any other LAN driver.

Copy these lines into the AUTOEXEC.NCF file

```
;- Load Fast EtherChannel
load aft

;- Load LAN driver on 1st adapter
load e100b slot=7 frame=ethernet_802.2 name=pri_802.2

;- Load LAN driver on 2nd adapter
load e100b slot=8 frame=ethernet_802.2 name=sec_802.2

;- Bind ipx to 1st adapter
bind ipx pri_802.2 net=2

;- Set the 2nd adapter to be a Fast EtherChannel Partner to
;- the 1st adapter
aft fec 7 8
```

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Where:

slot= the slot in which your PRO/100+ Server adapter is installed, such as 7. If you don't know the number, load the driver without it. NetWare will prompt you with available PCI device numbers.

frame= the frame type of the network segment the server is on.

7 is the primary adapter's slot number.

8 is the secondary adapter's slot number.

2 Modify the lines to match your server's requirements.

3 Save the AUTOEXEC.NCF file and restart your server.

Deleting a team

To remove team in AFT, ALB or FEC mode, edit out the lines above and restart the server

► Troubleshooting and FAQs

If the Adapter Can't Connect to the Network

### Make sure the cable is installed properly.

The network cable must be securely attached at both RJ-45 connections
(adapter and hub). The maximum allowable distance from adapter to hub is
100 meters. If the cable is attached and the distance is within acceptable
limits but the problem persists, try a different cable.

If you're directly connecting two servers (no hub), use a crossover cable.
Most hubs require a straight-through cable, while most switches require a
crossover cable (see your hub or switch documentation to verify).

See the *Cabling Information* readme file for more information on crossover
cables.

Check the LED lights on the adapter.

The adapter has three diagnostic LEDs above the cable connector. These
lights help indicate if there's a problem with the connector, cable, or switch/
hub. The table on the next page describes the LEDs.

Link LED

Activity LED

100 Mbps LED

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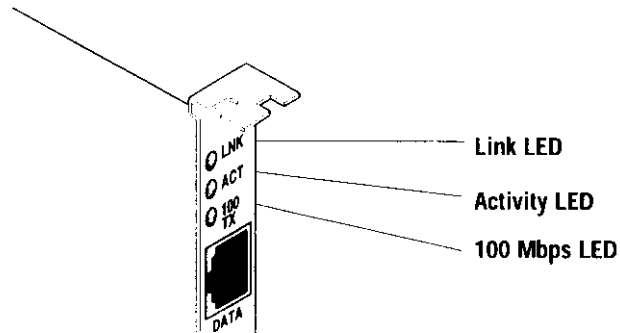
LED	Indication	Meaning
LNK	On	The adapter and switch are receiving power; the cable connection between the switch and adapter is good.
	Off	The adapter and switch are not receiving power; the cable connection between the switch and adapter is faulty; or you have a driver configuration problem.
ACT	On or flashing	The adapter is sending or receiving network data. The frequency of the flashes varies with the amount of network traffic.
	Off	The adapter is not sending or receiving network data.
100	On	Operating at 100 Mbps.
	Off	Operating at 10 Mbps.

Make sure you're using the correct drivers.

Make sure you're using the drivers that come with this adapter. The driver file name contains the letter B (for example, E100BODI.DOS). Drivers that support previous versions of this adapter don't support this version of the adapter.

Make sure the switch port and the adapter have the same duplex setting.

If you configured the adapter for full duplex, make sure the switch port is also configured for full duplex. Setting the wrong duplex mode can degrade performance, cause data loss, or result in lost connections.

Testing the Adapter (Diagnostics)

Test the adapter by running diagnostics. For DOS or Windows 3.1 servers, run Setup on the PRO/100+ Server adapter disk. For Windows NT and Windows 95 run PROSet by double-clicking the PROSet icon in the Control Panel. Click Help from the main PROSet window to get complete diagnostics information and instructions.

Frequently Asked Questions (FAQs)

SETUP.EXE reports the adapter is "Not enabled by BIOS".

- The PCI BIOS isn't configuring the adapter correctly. Try the *PCI Installation Tips* on page 25.

The server hangs when the drivers are loaded.

- Change the PCI BIOS interrupt settings. See *Technical Information* in the next section for PCI installation tips.

- If you are using EMM386, it must be version 4.49 or newer (this version ships with MS-DOS* 6.22 or newer).

Diagnostics pass, but the connection fails or errors occur.

- At 100 Mbps use Category 5 wiring and make sure the network cable is securely attached.

- For NetWare, make sure you specify the correct frame type in your NET.CFG file.

- Make sure the duplex mode setting on the adapter matches the setting on the switch.

- At 100 Mbps, connect to a 100BASE-TX hub/switch (not 100BASE-T4).

The LNK LED doesn't light.

- Make sure you've loaded the network drivers.

- Check all connections at the adapter and the switch.

- Try another port on the switch.

- Make sure the duplex mode setting on the adapter matches the setting on the switch.

- Make sure you have the correct type of cable between the adapter and the hub. 100 BASE-TX requires two pairs. Some hubs require a crossover cable while others require a straight-through cable. See the *Cabling* readme file for more information on cabling.

The ACT LED doesn't light.

- Make sure you've loaded the correct network drivers.

- The network may be idle. Try accessing a server.

- The adapter isn't transmitting or receiving data. Try another adapter.

- Make sure you're using two-pair cable for TX wiring.

The adapter stopped working when another adapter was added to the server.

- Make sure the cable is connected to the adapter.

- Make sure your PCI BIOS is current. See *PCI Installation Tips* on page 25.

- Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts — OS/2 doesn't.

- Try reseating the most recently installed adapter.

The adapter stopped working without apparent cause.

- Run the diagnostics.

- Try reseating the adapter first, then try a different slot if necessary.

- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.

Technical Information

PCI Installation Tips

PCI computers are designed to automatically configure add-in cards each time the server starts. Your PCI server sets the I/O address and IRQ level for your network adapter when the server starts. These values cannot be changed by Intel adapter software. If you experience a problem when the server starts, additional configuration steps may be required.

On these computers, manual configuration is possible through the computer's PCI BIOS setup utility. Refer to your computer's documentation. You may need to verify or change some BIOS settings.

Some common PCI solutions are listed here.

- **Busmaster-enabled slots.** On some computers, all slots are not busmaster enabled by default. Check your BIOS PCI bus setting. It will be set to either Busmaster or Non-busmastered. Choose Busmaster.
- **Reserve interrupts (IRQs) and/or memory addresses for ISA adapters.** This prevents PCI cards from trying to use the same settings ISA cards are using. Check your PCI BIOS setup program. There may be IRQ options such as Enable for ISA, Reserve for ISA, or Disable for PCI.' This option is sometimes in the Plug and Play area of the BIOS setup.
- **Enable the PCI slot.** In some PCI computers, you must use the PCI BIOS setup program to enable the PCI slot. This is especially common in PCI computers with the PhoenixBIOS*.
- **Update your PCI BIOS.** An updated PCI system BIOS can correct some PCI configuration problems. Call your server manufacturer to see if an updated BIOS version is available for your server. Phone numbers for the top PCI server manufacturers are listed in the *PCI Installation* readme file on the PRO/100+ Server adapter disk.
- **Configure the slot for level-triggered interrupts.** The slot the adapter is using must be configured for level-triggered interrupts rather than edge-triggered interrupts. Check your PCI BIOS Setup program.

Here are some example PCI BIOS setup program parameters:

PCI slot #:	*Slot where the adapter is installed*
Master:	ENABLED
Slave:	ENABLED
Latency timer:	40
Interrupt:	*Choose an IRQ from the list*
Edge-level:	Level

The exact wording of these parameters varies with different computers.

"Push" Installation for Windows 95

If you are a LAN Administrator setting up server-based push installation of Windows 95 as defined in Microsoft Windows 95 Resource Kit, additional steps are required for this adapter. Refer to the *Push Installation for Windows 95* readme file on the support web site (see the inside back cover).

Fast Ethernet Wiring

100BASE-TX Specification: The 100BASE-TX specification supports 100 Mbps transmission over two pairs of Category 5 twisted-pair Ethernet (TPE) wiring. One pair is for transmit operations and the other for receive operations. Segment lengths are limited to 100 meters with 100BASE-TX for signal timing reasons. This complies with the EIA 568 wiring standard.

Fast Ethernet Hubs and Switches

The two basic types of hubs are shared hubs (hubs) and switching hubs (switches). This adapter can be used with either type of hub for 10 Mbps. At 100 Mbps, a TX hub or switch is required.

Shared hubs

In a shared network environment, computers are connected to hubs called repeaters. All ports of the repeater hub share a fixed amount of bandwidth, or data capacity. On a 100 Mbps shared hub, all nodes on the hub must share the 100 Mbps of bandwidth. As stations are added to the hub, the effective bandwidth available to any individual station gets smaller. Shared hubs do not support full duplex.

On a shared hub all nodes must operate at the same speed, either 10 Mbps or 100 Mbps. Fast Ethernet repeaters provide 100 Mbps of available bandwidth, ten times more than what's available with a 10BASE-T repeater.

Switching hubs

In a switched network environment, each port gets a fixed, dedicated amount of bandwidth. In the highway scenario, each car has its own lane on a multi-lane highway and there is no sharing.

In a switched environment, data is sent only to the port that leads to the proper destination station. Network bandwidth is not shared among all stations, and each new station added to the switch gets access to the full bandwidth of the network.

If a new user is added to a 100 Mbps switch, the new station receives its own dedicated 100 Mbps link and doesn't impact the 100 Mbps bandwidth of another station. Switches can effectively increase the overall bandwidth available on the network, significantly improving performance. Switches can also support full duplex.

For more information on Fast Ethernet, visit our Network Products web site at http://www.intel.com/network.

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FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the two following conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operations.

The board has been tested and verified to be within the energy emission limits for Class B digital devices as defined in Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential situation. This board generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Installed correctly, it probably will not interfere with your radio or TV. However, we do not guarantee the absence of interference.

If you modify the board in any way, without getting approval from Intel Corporation, your board may violate FCC regulations. Violation of FCC regulations may cause the FCC to void your right to use the modified board. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to the computer containing the board. Operations with non-certified peripherals is likely to result in interference with radio and TV reception. NOTE: Use only shielded, grounded cables.

If you suspect this board is causing interference, turn your computer on and off while your 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 or the 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 the computer farther away from the radio or TV.
· Plug the computer into a different outlet. Don't plug your radio or TV into the same circuit as your computer.
· 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.

If these suggestions don't help, consult your computer dealer or an experienced radio/TV technician for more suggestions.

Industry Canada's Compliance Statement

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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