

Intel® PRO/100

Server and Client Adapters

Quick Installation Guide



Full online User's Guide is on the Intel CD. See page 2 for details.

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More Information

Online User's Guide

The full User's Guide is located on the Intel CD. Use your web browser to view or print topics from the User's Guide. The guide covers additional configuration topics, including Teaming Options, VLAN setup, Hot Plug support, and PROSet instructions. To view the guide, put the CD in your drive and wait for the Autorun screen to display. Click the User's Guide button. Or go to \INFO\INDEX.HTM.

Online Services

You can use the Internet to download software updates, troubleshooting tips, installation notes, and more. Online services are on the World Wide Web at:

<http://support.intel.com>

Late Breaking News

Look for the *Late Breaking News* document in your shipping container. This printed document provides useful information about adapter compatibility and gives special installation release notes.

System Requirements

Before installing the PRO/100 adapter, check your system for the following configuration requirements:

- One open 32-bit PCI slot
- The latest BIOS for your computer
- Microsoft Windows 2000, Windows NT 4.0, Windows Me, Windows 98, Windows 95, Novell NetWare 3x to 5.x, Linux, Solaris, UnixWare or DOS.
- Windows NT 4.0 requires Service Pack 5 or later.
- For NetWare, Intel suggests you update to the latest Support Pack available, but includes the required NLMs on the Intel CD. See the Online User's Guide on the Intel CD for more information.

You can download the necessary software patches from Microsoft and Novell sites, as listed here:

Microsoft Service Packs

Visit the following Microsoft web site for the latest Service Pack information. If this site has changed, go to the main Microsoft site and search for the term Service Pack.

<http://www.microsoft.com/ntserver/>

Novell NetWare Support Packs

<http://support.novell.com/misc/patlst.htm>

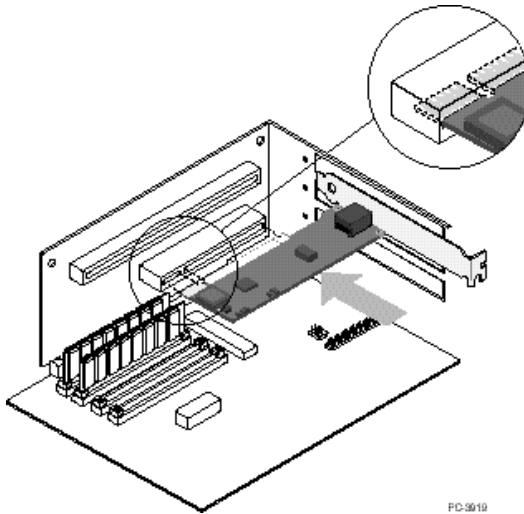
Put the Adapter in the Computer

- 1 If your computer is a Hot Plug system, refer to your hardware documentation for instructions on installing adapters. Otherwise turn off and unplug your computer.



Turn off and unplug the computer before removing the computer's cover. Failure to do so could endanger you and may damage the adapter or computer. For servers with Hot Plug support see your server's documentation.

- 2 Remove the cover bracket from a 32-bit slot by unscrewing the screw which secures it. Make sure the cover bracket does not contact any conducting part of the motherboard.



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- 3 If you are installing an Intel[®] PRO/100+ or Intel PRO/100 S Server Adapter and you want to enable the Wake on LAN* feature, see the section *Connect the Wake On LAN Power Cable* later in this guide.
- 4 If you are installing an Intel PRO/100+ Dual Port Server Adapter, see the section *Managing Ethernet Addresses on Dual Port Adapters* later in this guide before completing the rest of these steps.
- 5 Push the adapter into the slot until the adapter is firmly seated. Then secure the adapter bracket with the screw you removed in step 2.
- 6 Repeat steps 2 through 5 for each adapter you want to install.
- 7 Replace the computer cover and plug in the power cord.
- 8 Turn the power on. The computer's BIOS automatically assigns resources to the adapter(s). If you get a PCI configuration error, see *PCI Configuration Troubleshooting*.

Attach the Network Cable

Connect the cable to the adapter using Category 3, 4, or 5 Twisted Pair Ethernet (TPE) network cable for 10 Mbps networks, and only Category 5 TPE for 100 Mbps networks and 10/100 Mbps residential networks. For maximum cable lengths, see *Adapter Specifications*.



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To configure the adapter, continue with the procedures specific to your operating system outlined in the section *Install the Network Drivers*.

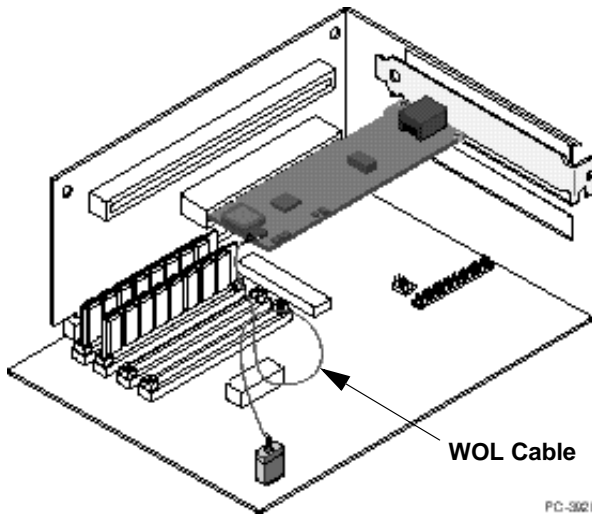
Connect the Wake on LAN* Power Cable (Optional)

NOTE:The Wake on LAN cable is not necessary for PCI 2.2 compliant systems, since power is supplied to the PME pin through the PCI slot. However, even though the Wake on LAN cable is unnecessary for these systems, you can connect the cable on these systems with no adverse effect.

For the Wake on LAN* (WOL) feature to work correctly, the adapter must be connected to a continuous power source. This allows the adapter to “listen to” the network even when the computer is turned off. To install the WOL power cable, carefully follow the procedure below.

WARNING: Turn off and unplug power to the computer before installing the WOL cable. The WOL connector on your motherboard is live when the computer is plugged in to a power outlet. Failure to do so could damage the adapter or computer. Likewise, always turn off and unplug the computer prior to removing an adapter from the computer.

- 1 Make sure your computer is unplugged from the power outlet.
- 2 Locate the 3-pin WOL connector on the adapter. Attach one end of the WOL cable to the adapter as shown in the diagram that follows. Note that the connector is notched so as to prevent incorrect attachment.



- 3 Locate the WOL connector on your motherboard. The location varies, depending on the vendor and model of motherboard. The WOL connector is usually located near other power connectors, such as the LED connectors.
- 4 Connect the other end of the WOL cable to the connector on the motherboard as shown in the diagram.
- 5 Some computers may require you to change a setting in your computer's BIOS or Setup program to enable the WOL feature. Check your computer owner's manual or contact your dealer for more information.
- 6 Replace the computer cover and plug in the power cord.
- 7 See the section on using Wake on LAN below, then continue to the section *Install the Network Drivers*.

Using Wake on LAN

The Wake on LAN feature operates according to a published specification. In simple terms, the specification allows designers to build network adapters that are capable of “listening” to network activity even when the computer is turned off.

WOL adapters have a special low-power standby mode that is active when the rest of the computer is without power. The adapter will respond to a special “wake-up” packet sent by another computer or network device.

Typically, this wake-up packet causes the adapter to signal the computer to power up and run a pre-defined program.

The wake-up packet structure and behavior are defined in a WOL information brief, available on the Web at:

<http://www.us.pc.ibm.com/infobr/iblan.html>

See the *Troubleshooting* section later in this guide for general troubleshooting and a listing of common problems and solutions for Wake on LAN operability.

Managing Ethernet Addresses on Dual Port Adapters

If you're installing an Intel PRO/100+ Dual Port Server adapter, you'll need a way to identify the Ethernet address for each port of the adapter. To do so:

- **All users:** Before inserting the server adapter in a PCI slot, write down the adapter's 12-digit, hexadecimal Ethernet address that is printed on a sticker on the adapter. Note also which adapter this address applies to. You will refer to this number often in configuring and monitoring the adapter.

NOTE:For dual port adapters, the Ethernet address printed on the identification sticker refers to the port closest to the PCI slot. Increment this address by one for the second port. For example, if the Ethernet address on the sticker reads 00A0C93F7F77, then the address of the port furthest from the PCI slot would be 00A0C93F7F78.

- **All users:** Note that each Intel PRO/100+ Dual Port Server adapter appears and acts as two separate adapters during installation and configuration.
- **NetWare users:** The server drivers use the PCI slot number to identify each installed port. You can correlate the PCI slot number to the port by using the Ethernet address printed on a sticker on the adapter. Run Setup from the Intel adapter disk to view the Ethernet address and slot number for each port. For more information, see the online User's Guide. NetWare 4.11 server installations use unique slot numbers that are assigned during server setup.

Install the Network Drivers

Driver installation procedures are included for:

- Windows 2000 (For Windows 95, Windows 98, and Windows Me see the online User's Guide)
- Windows NT 4.0 servers/workstations
- Novell NetWare 5.x servers (For 3.x, 4.x and DOS clients, see the online User's Guide)
- Linux, Solaris, UnixWare 2.x and 7.0 (See the online User's Guide)

You can install drivers directly from the Intel CD or you can also create a floppy disk to install from. See *Making a Floppy Disk* later in this section.

Windows* 2000

After you install the PRO/100 adapter in the computer, connect the cable, plug in the power cord and start the computer, Windows displays the Found New Hardware dialog box and starts the Found New Hardware Wizard.

Using the Wizard, follow this procedure to install the correct driver.

- 1 Insert the PRO/100 adapter CD in the CD-ROM drive. If the CD autorun program starts, close this window at this time.
- 2 On the Wizard Welcome screen, click Next to start.
- 3 On the next screen choose the Search option and click Next.
- 4 Click the CD-ROM box only on the Locate Driver screen and click Next.
- 5 After a few moments, the Search Results indicates a driver was found on the CD. Click Next to continue.
- 6 The necessary files are copied to your computer. The wizard displays a Completed message. Click Finish.
- 7 Restart your computer.

Windows NT 4.0 servers

The E100NT4.SYS NDIS 4.0 driver supports Windows NT 4.0 servers and workstations. This driver doesn't support Windows NT 3.51 or earlier versions of Windows NT.

NOTE: Prior to installing, review the Service Pack requirements in the *System Requirements* section. If you are also installing NT 4.0 at this time, you must first create a floppy disk for the driver installation. See *Making a Floppy Disk* later in this section.

To install the driver:

- 1 Click the Network icon in the Control Panel.
- 2 Go to the Adapters tab and click Add.
- 3 **Don't select an Intel adapter from the list.** Instead, click Have Disk.
- 4 Insert the PRO/100 adapter CD into your CD-ROM drive.
- 5 Type the path to your CD-ROM drive in the dialog box and click OK. Then follow the instructions to install the drivers. When the adapter is added, it appears in the Network adapters list.
- 6 Click OK and then Close. When prompted, restart Windows NT.

Novell NetWare* 5.x

NOTE: For other NetWare server and client operating systems, see the online User's Guide located on your Intel CD. To view the guide, insert the Intel CD in a computer running Windows and wait for the Autorun screen to appear. Click the User's Guide button to start your web browser and view the guide.

Use the NetWare Install program to install the PRO/100 adapter driver. Use the NetWare Install program to install the PRO/100 adapter driver (Driver name: CE100B.LAN in the \NWSERVER folder). Review the Service Pack requirements in the *System Requirements* section.

NOTE: Prior to installing, either load DOS or NetWare drivers for your server's CD-ROM drive or create a floppy disk from the Intel CD on a different computer. See *Making a Floppy Disk* section.

- 1 From the NetWare console, type NWCONFIG and press Enter.
- 2 From the Configuration Options screen, choose "Driver options" and press Enter.
- 3 Choose "Configure network drivers" and press Enter. If any drivers are already loaded, a list of them appears.
- 4 Choose "Load an additional driver" and press Enter. A list of drivers appears.
- 5 Insert the Intel CD or floppy disk you've created and choose "Install an unlisted driver" by pressing Insert.

- 6 If you're using a floppy disk, insert the disk in drive A and press Enter. If you've mounted the CD as a NetWare volume, press F3 and enter the CD as the source path.
- 7 The driver name is displayed. Press Enter to select it.
- 8 A prompt appears asking if you want to copy driver CE100.LAN. Select Yes and press Enter.
- 9 The next screen asks for parameters for loading the driver. To modify any driver parameters or protocols, highlight "Select/Modify driver parameters and protocols" and press Enter. The slot number is a required field and must be entered. If you have multiple adapters, enter the slot number for the adapter you are currently configuring. When finished configuring the driver, select "Save parameters and load driver" to continue.

NOTE: If your system contains a single PRO/100 adapter, you may enter any number for the slot. The driver will automatically detect the correct slot number and load successfully.

NOTE: If your system contains more than one PRO/100 adapter, to find the valid slot numbers for your adapters, use Alt-Esc to switch to the console screen in NetWare. Type LOAD CE100 and press <Enter>. The driver will attempt to load and prompt you with the available slot numbers. Note the slot numbers, and press Esc to abort the driver load. Use Alt-Esc to switch back to the Install screen and enter the correct slot number.

- 10 To complete the driver installation process, go back to the Configuration Options screen by pressing the Escape key until you see the Configuration Options screen. Then, follow on-screen instructions.
- 11 Choose Exit to return to the server console prompt.

NOTE: If the adapter cannot transmit or receive following the installation, you may need to modify the frame type or LOAD and BIND statements in the AUTOEXEC.NCF file.

NOTE: If you are installing multiple PRO/100 adapters, repeat the driver installation process for each new adapter in the server.

Making a Floppy Disk

If you need to use a floppy disk to install the adapter drivers, use the MAKE-DISK.BAT utility located in the \MAKEDISK directory on the Intel CD.

For more information on MAKEDISK, see the README.TXT file in the root directory of the Intel CD.

Additional Setup and Configuration

The PRO/100 adapter supports a wide range of advanced networking features. The following features are fully described in the online User's Guide located on your Intel CD. To view the guide, insert the Intel CD in your computer and wait for the Autorun screen to appear. Click the User's Guide button to start your web browser and view the guide.

Adapter Teaming: maximize throughput and fault tolerance in your servers with,

- Adapter Fault Tolerance (AFT) — provides automatic redundancy for your adapter. If the primary adapter fails, the secondary takes over. Adapter Fault Tolerance supports two to four adapters per team.
- Adaptive Load Balancing (ALB) — allows balancing the transmission data flow among two to four adapters. Also includes the AFT option. Works with any Ethernet switch.
- Cisco Fast EtherChannel* (FEC) — creates a team of two, four, six or eight adapters to increase transmission and reception throughput. Also includes AFT option. Requires a switch with FEC capability.

Virtual LAN (VLAN): improve network security and efficiency by creating VLANs for your workgroups.

Intel PROSet: Intel adapter configuration utility.

Management Features: Configure Wake on LAN and the Intel Boot Agent.

Priority Packet: Set up priority filters on your network traffic.

Troubleshooting

If you cannot link to your switch, try the following suggestions.

1. Check the LED lights on the adapter

If the LINK light isn't on, check all connections at the adapter and link partner. Make sure the link partner is set to 100 Mbps and full duplex and the driver is loaded. (See LED table on following page.)

2. Make sure the cable is installed properly

The network cable must be securely attached at all connections. If the cable is attached but the problem persists, try a different cable.

3. Test the adapter

Run the adapter and network tests described in *Test the Adapter* in the online User's Guide.

4. Check the *Common problems* table and try the recommended solutions

If none of these works, check the *Late-breaking News* document that came with the adapter or check the Intel support Web site. See *Intel Automated Customer Support* for information on connecting to Intel's online services.

LED	Meaning
<p>ACT/LNK On</p> <p>ACT/LNK Off</p>	<p>The adapter and switch are receiving power; the cable connection between the switch and adapter is good.</p> <p>The adapter and switch are not receiving power or there is a driver configuration problem.</p> <p>If the LED is off:</p> <ul style="list-style-type: none"> • Make sure power is connected to the PC. If power is connected and the LED is still off: <ul style="list-style-type: none"> — Make sure the WOL cable is attached and power is applied to the computer. — Make sure the network cable is attached at both ends. • Make sure you've loaded the network drivers. • Check all connections at the adapter and the switch and make sure both ends are connected. • 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. 100BASE-TX requires two pairs. • Make sure you've loaded the correct network drivers.
<p>ACT/LNK Flashing</p>	<p>The adapter is sending or receiving network data. The frequency of the flashes varies with the amount of network traffic.</p> <p>If the ACT/LNK LED does not flash, the cause could be:</p> <ul style="list-style-type: none"> • The network may be idle. Try accessing a server. • The adapter may not be transmitting or receiving data. Try another adapter. • Make sure you're using two-pair cable for TX wiring.
<p>100 Mbps On</p> <p>100 Mbps Off</p>	<p>Operating at 100 Mbps.</p> <p>Operating at 10 Mbps.</p>

Common Problems and Solutions

Problem	Solution
Your computer can't find the adapter	<ul style="list-style-type: none"> • Make sure the adapter is seated firmly in the slot. • Try a different PCI busmaster slot. See your server's documentation to identify busmaster slots. • Try a different PRO/100 adapter.
Diagnostics pass but the connection fails	<ul style="list-style-type: none"> • Try running the <i>Sender-Responder diagnostic</i> test. • Make sure the network cable is securely attached.
An adapter stopped working after you installed the PRO/100 adapter	<ul style="list-style-type: none"> • Make sure the cable is connected to the PRO/100 adapter and not to another adapter. • Check for a resource conflict. See <i>PCI Configuration Troubleshooting</i>. • Make sure both adapters are seated firmly in the slot. • Check all cables.
The adapter stopped working without apparent cause	<ul style="list-style-type: none"> • Try reseating the adapter. • The network driver files may be damaged or deleted. Reinstall the drivers. • Try a different PRO/100 adapter. • Try enabling or disabling the auto-negotiation setting on the link partner (this setting must be set the same on both the switch and the adapter). NOTE: The adapter's LNK LED may light even if communications between the adapter and its link partner have not been properly established. Proper configuration of link partners consists of both sides being set to either auto-negotiate or set with the same speed and duplex settings.
The LNK LED does not light	<ul style="list-style-type: none"> • Make sure you've loaded the adapter driver. • Check all connections at the adapter or switch. • Try another port on the buffered repeater or switch. • Try enabling or disabling the auto-negotiation setting on the link partner (this setting must be set the same on both the switch and the adapter).
The Wake on LAN feature is not working	<ul style="list-style-type: none"> • Make sure the WOL cable is attached and that power is being applied to the computer. • Check the BIOS for its WOL setting. Some computers may need to be configured for WOL. • Make sure the network cable is fully attached to the adapter.

PCI Configuration Troubleshooting

Some PCI computers require additional steps to configure a PCI adapter. Try the following if you are having problems configuring the adapter:

- Disable PnP in the BIOS. In some computers, you may need to use the BIOS Setup program to disable Plug 'n Play (PnP) if resources are not properly assigned to adapters and other add-in cards.
- Enable the PCI slot. In some PCI computers, you may need to use the BIOS Setup program to enable the PCI slot. This is especially common in PCI computers with the PhoenixBIOS.*
- Enable the slot for busmaster. You must install the PRO/100 adapter in a busmaster slot. Some BIOS Setup programs require you to enable the slot for busmaster/master. Check your BIOS Setup program and the computer's documentation to make sure the slot is set for busmaster/master.
- Configure the slot for level-triggered interrupts. The PCI slot the adapter is using must be configured for level-triggered interrupts instead of edge-triggered interrupts. Check your BIOS Setup program to make sure triggering is set up.
- Reserve interrupts and/or memory addresses for ISA adapters. This prevents PCI cards from trying to use the same settings as ISA cards. Check your BIOS Setup program; there may be IRQ options such as Enable for ISA or Disable for PCI.

Here are some examples of BIOS Setup program parameters:

PCI slot #:	<i>Slot where the adapter is installed (1-3)</i>
Master:	ENABLED
Slave:	ENABLED
Latency timer:	40 - 80
Interrupt:	<i>Choose any one of several that the BIOS Setup provides.</i>
Edge-level:	Level

The exact wording of the parameters varies with different computers.

Adapter Specifications

Feature	Value
Compatibility	PCI v2.2 systems
Media (Cable) Connectors and Wiring	RJ45 Use Category 5 cabling at 100 Mbps Supports 100BASE TX Fast Ethernet
Data Rate Mode	10 or 100 Mbps
Power requirements	300mA @ +5VDC (1.5 watts) (3 Watts @ 5VDC for PRO/100+ Dual Port Server Adapters)
Interrupt	PCI: INTA (INTA and INTB for PRO/100+ Dual Port Server Adapters)
LEDs	Link, Activity
Dimension	2.00" x 4.7" excluding bracket
Operating temperature	32 - 131 deg. F (0 - 55 C)
Humidity	10% - 90% non-condensing
Standards Conformance	IEEE 802.3, IEEE 802.3x, IEEE 802.1p, IEEE 802.1Q
Diagnostic Software	On-board PROSet Responder
Compliance & Certification	Safety - UL FCC Class B CE & Immunity C-tick (Australian)
Duplex mode	Full duplex / Half duplex

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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.

User's Guide on Your Product CD-ROM

For more information about installing drivers or troubleshooting other topics, see the online User's Guide. To view the guide, insert the Intel CD in your drive and wait for the Autorun to display. Click the User's Guide button to view the guide. Note that a web browser is required to view the guide.

Web and Internet Sites

Support:	http://support.intel.com
Network Products:	http://www.intel.com/network
Corporate:	http://www.intel.com
FTP Host:	download.intel.com
FTP Directory:	/support/network/adapter/

Customer Support Technicians

US and Canada: 1-916-377-7000 (7:00 - 17:00 M-F Pacific Time)

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, visit: <http://www.intel.com/support/9089.htm>.

Product Warranty

This product is covered by a Limited Lifetime Warranty. See the online *User's Guide* for details.

Regulatory Notices

All regulatory notices are provided in the online *User's Guide*.

Software License Agreement

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