Intel EtherExpress™ PRO/100 Smart Adapter

Installation Guide

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Contents

Where to go for more information

Installation Guide

This Installation Guide shows you how to install the adapter and troubleshoot common problems. If you can't find the answer to your question in this book, see the other sources on this page.

Need a translated guide? There may be installation instructions in different languages on your regional FaxBack service. See the inside back cover for phone numbers.

Help files

For detailed information about the adapter, see the online help files. To view the help files, insert the Intel Configuration and Drivers disk into a drive, switch to that drive, and type:

```
SETUP /README Enter
```

Then select *View Help Files*.

Topics include:
   Installing network drivers
   Release notes
   Cabling specifications
   PCI adapter installation
   Diagnostics

Online Services
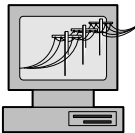
You can use your modem to download software updates, troubleshooting tips, installation notes, and more. Online services include:
- Internet (World Wide Web and FTP server)
- CompuServe*
- Intel BBS

See the inside back cover for details.

Installation overview

1 ▶ **Make sure you have the correct wiring** (page 2)

2 ▶ **Put the adapter in the computer** (page 3)

3 ▶ **Configure the adapter** (page 4)

4 ▶ **Test the adapter** (page 5)

5 ▶ **Install network drivers** (pages 6-10)

If the computer doesn't connect to the network after you've completed these steps, see pages 12 and 13 for troubleshooting tips.

1 ▶ # Make sure you have the correct wiring

To reliably operate your network at 100 Mbps, you must use twisted pair Ethernet (TPE) Category 5 or better Data Grade wire. While Category 3 or 4 wire may initially seem to work, it will soon cause data loss.

For 10 Mbps operation, you can use TPE Category 3, 4, or 5 Data Grade wire.

For mirrored servers, you can use a crossover cable. See page 11 for details.

See the *Cabling specifications* help files for more information.

2 ▶ **Put the adapter in the computer**

1 Turn off and unplug your computer. Then remove its cover.

> ⚠️ Turn off and unplug the computer before removing the computer's 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. See your computer's documentation to determine which slots are busmaster slots.

PCI slot   PC-2612
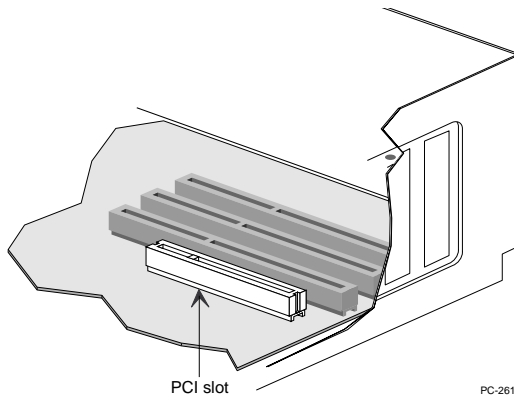
3 Push the adapter into the slot until the adapter is firmly seated. Then, secure the adapter bracket with a screw.

4 Repeat steps 2 and 3 for each adapter you want to install.

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

6 Connect a TPE Category 5 cable to the adapter. If you're in a residential environment, make sure it's a shielded cable.

To configure the adapter, continue with the procedure on the next page.

3 ▶ Configure the adapter

Peripheral Component Interconnect (PCI) computers are designed to automatically detect and configure PCI-compliant adapters, saving you from running a configuration program.

Simply start your computer to automatically (and invisibly) configure the adapter while the computer boots. Configuration is complete when the DOS prompt appears. You can now continue with the test procedure on the next page.

If it didn't work...

Some PCI computer require additional steps to configure a PCI adapter. Try the following if you're having problems configuring the adapter:

- **Enable the PCI slot**. In some PCI computers, you may need to use the PCI BIOS Setup program to enable the PCI slot. This is especially common in PCI computers with the Phoenix BIOS.

- **Enable the slot for busmaster**. You must install the EtherExpress PRO/100 Smart adapter in a busmaster slot. Some PCI BIOS Setup programs require you to enable the slot for busmaster/master. Check your PCI 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 PCI BIOS Setup program to make sure.

- **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 PCI BIOS Setup program; there may be IRQ options such as "Enable for ISA" or "Disable for PCI."

Here are some example PCI BIOS Setup program parameters:

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

The exact wording of the parameters varies with different computers.

4 ▶ **Test the adapter**

Intel's diagnostic software lets you test the adapter to see if there are any problems with the adapter hardware, the cabling, or the network connection. It's a good idea to run diagnostic tests every time you install an adapter. You can also use diagnostics to isolate problems during troubleshooting.

1   If this computer already has EtherExpress PRO/100 Smart network drivers installed, down the server and boot to DOS. (If you're installing on a client, you don't need to down the server.)

2   Insert the Intel Configuration and Driver disk into a drive, switch to that drive, and at the DOS prompt, type:

SETUP ⌷Enter⌷

3   If you have more than one Intel PRO adapter in your computer, an Adapter Selection menu appears on the screen. From that menu, select the adapter you want to test.

4   From the Main menu, select *Test adapter* and then select the type of test you want to run.

- • *Test adapter* to test the adapter components and run a quick network test.
- • *Continuous network test* to test the network by sending a continuous stream of packets to a responder out on the network. To run this test, first set up a responder on the network as described below.

5   Repeat steps 3 and 4 for each EtherExpress PRO/100 Smart adapter installed in the computer.

To test the adapter with a responder on the network

1   Go to a computer on the same network segment with an EtherExpress 16 ISA, Flash32, PRO/10, PRO/100 or PRO/100 Smart adapter installed.

2   If this computer already has EtherExpress adapter network drivers installed, restart the computer without loading them.

3   Run the diagnostics program for the adapter that's installed in the computer. From the program's Main menu, select the command for testing the adapter, then select *Set up as responder*.

4   Return to the computer you want to test. Run SETUP, select *Test adapter*, and then *Continuous network test.*

5 ▶ Install the network drivers

We've included basic driver installation procedures for:

- Novell DOS ODI clients (page 6)
- Novell NetWare 3.x/4.x servers (pages 7-8)
- Windows NT 3.51 clients/servers (page 9)
- NetWare 4.1 SFT III mirrored servers (page 10)

Detailed instructions are in the help files on the Intel Configuration and Drivers disk.

Novell DOS ODI clients

You can use the Novell DOS ODI client driver, E100SODI.COM, in the following ways:

- As a client driver to connect to a server and set up the computer as a server, or
- As a client driver for a full-time DOS ODI client computer

To load the drivers:

1 Copy these files from the \DOS directory on the Intel Configuration and Drivers disk to the appropriate directory on your hard drive:

```
\LSL.COM
\E100SODI.COM
\IPXODI.COM
\NETX.EXE
\NET.CFG          (The example NET.CFG file uses the 802.2
                   frame type. Edit this file before continuing
                   if you're using a different frame type.)
```

2 At the DOS prompt, load the drivers in this order:

```
LSL
E100SODI
IPXODI
NETX or VLM (included in Netware 4.1 or 3.12)
```

3 If you're going to use the computer as a full-time client, create a STARTNET.BAT file and add the above statements so they run automatically every time you start the client. (Remember to call the STARTNET.BAT file in your AUTOEXEC.BAT file.)

Novell NetWare 3.x/4.x servers

The Novell NetWare server driver, E100S.LAN, is a high-performance driver that supports NetWare 3.x and 4.x servers.

NetWare 4.x servers

1   Copy these files from the \NWSERVER directory on the Intel Configuration and Driver disk to the appropriate directory on your server's hard drive:

```
NLM4X\MSM.NLM
NLM4X\ETHERTSM.NLM
E100S.LAN
```

Make sure you use these or later versions of the NLMs.

2   Start the server. At the server console issue the LOAD and BIND statements in this order (include a path if files aren't in the \SYSTEM directory):

```
LOAD MSM
LOAD ETHERTSM
LOAD E100S SLOT=n FRAME=ETHERNET_802.2
BIND IPX TO E100S NET=xxxxx
```

Where: `SLOT=n` is the PCI device number. If you don't know the number, load the driver without it. NetWare will prompt you with available PCI device numbers.

`FRAME=ETHERNET_802.2` is the default frame type for NetWare 4.x. To add additional frame types, load the driver again with a different FRAME= setting.

`NET=xxxxx` is the unique network address for that LAN segment.

3   Add the above LOAD and BIND statements to the server's AUTOEXEC.NCF file so that E100S.LAN loads automatically every time you start the server.

NetWare 3.12 servers

1   Copy these files from the \NWSERVER directory on the Intel Configuration and Driver disk to the appropriate directory on your server's hard drive:

```
NLM312\MSM31X.NLM
NLM312\ETHERTSM.NLM
E100S.LAN
```

Make sure you use these or later versions of the NLMs.

2 Start the server. At the server console issue the LOAD and BIND statements in this order (include a path if files aren't in the \SYSTEM directory):

```
LOAD MSM31XT
LOAD ETHERTSM
LOAD E100S SLOT=n FRAME=ETHERNET_802.2
BIND IPX TO E100S NET=xxxxx
```

Where: `SLOT=n` is the PCI device number. If you don't know the number, load the driver without it. NetWare will prompt you with available PCI device numbers.

`FRAME=ETHERNET_802.2` is the default frame type for NetWare 3.12. To add additional frame types, load the driver again with a different FRAME= setting.

`NET=xxxxx` is the unique network address for that LAN segment.

3 Add the above LOAD and BIND statements to the server's AUTOEXEC.NCF file so that E100S.LAN loads automatically every time you start the server.

NetWare 3.11 servers

1 Copy these files from the \NWSERVER directory on the Intel Configuration and Driver disk to the appropriate directory on your server's hard drive:

```
NLM311\PATCHMAN.NLM
NLM311\LSLENH.NLM
NLM311\MSM31X.NLM
NLM311\ETHERTSM.NLM
NLM311\MONITOR.NLM
E100S.LAN
```

Make sure you use these or later versions of the NLMs (using earlier versions of `MONITOR.NLM` can cause server failure).

2 Start the server. At the server console, issue the LOAD and BIND statements in this order (include a path if files aren't in the \SYSTEM directory):

```
LOAD PATCHMAN
LOAD LSLENH
LOAD MSM31X
LOAD ETHERTSM
LOAD E100S SLOT=n FRAME=ETHERNET_802.3
BIND IPX TO E100S NET=xxxxx
```

Where: `SLOT=n` is the PCI device number. If you don't know the number, load the driver without it. NetWare will prompt you with available PCI device numbers.

`FRAME=ETHERNET_802.3` is the default frame type for NetWare 3.11. To add additional frame types, load the driver again with a different FRAME= setting.

`NET=xxxxx` is the unique network address for that LAN segment.

3 Add these LOAD and BIND statements to the server's AUTOEXEC.NCF file so that E100S.LAN loads automatically every time you start the server.

Windows NT 3.51 servers/clients

The NDIS 3.0 driver, E100SNT.SYS, is a high-performance driver that supports Windows NT 3.51 servers or clients. To install the driver:

1 Click the Network icon in the Control Panel.

2 Click the Add Adapter button.

3 **Don't select an Intel adapter from the list. Instead, scroll to the end of the list and select:**
   <Other> Requires disk from manufacturer.

4 Insert the Intel Configuration and Drivers disk into your floppy drive and click OK.

5 The Intel EtherExpress PRO/100 Smart Adapter setup screen appears. Click the Continue button.

6 Click OK in the Network Settings dialog and when prompted, restart Windows NT.

Changing network speed

The EtherExpress™ PRO/100 Smart adapter server driver automatically senses the network speed (which the network hub determines). To change the network speed, follow these steps:

1 At the hub, set the desired speed according to the hub manufacturer's documentation or move the cable to a port supporting that speed.

Remember to use Category 5 cable for 100 Mbps.

2 Unload the driver and then reload it. It automatically senses the new speed and displays the detected network speed.

3 Check the LEDs on the adapter for correct speed indication.

NetWare 4.1 SFT III mirrored servers

NetWare System Fault Tolerance (SFT) III is supplemental Novell software that lets you mirror one NetWare server on another. For best mirroring performance, Novell recommends you use two identical servers.

To set up mirrored servers, you need the SFT III software installed on both servers and a dedicated high-speed link between the servers. A pair of EtherExpress PRO/100 Smart adapters connected with a CAT 5 crossover cable serves as this link, called the Mirrored Server Link (MSL).
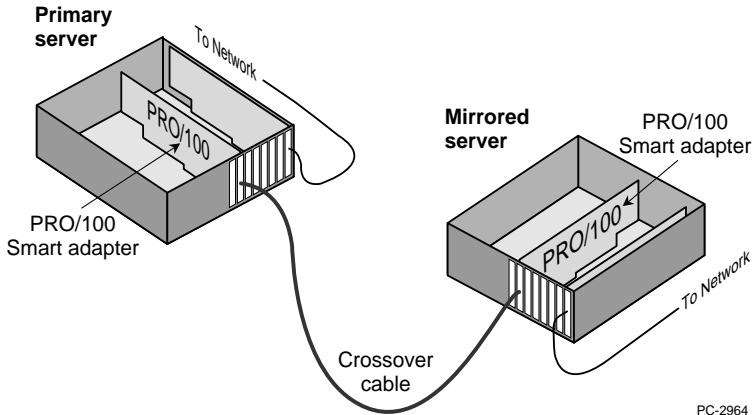
PC-2964

Installing the MSL driver

1   Make sure the adapters are connected with a crossover cable. For information on making a crossover cable, see page 11.

2   Copy the MSL driver from the \MSL directory on the Configuration and Driver disk to the appropriate directory on both servers.

    E100SMSL.MSL

3   Start the mirrored server program (MSERVER.EXE) on both servers.

4   At both server consoles, issue the following load statement (include a path if the MSL driver isn't in the \SYSTEM directory):

    LOAD E100SMSL SLOT=n SPEED=100

Where: SLOT=n is the PCI device number. If you don't know the number, load the driver without it. NetWare will prompt you with available PCI device numbers.

SPEED=100 sets the mirrored server link to 100 Mbps.

5   Add the above load statement to the IOSTART.NCF file on both servers so that E100SMSL.MSL loads automatically every time you run MSERVER.
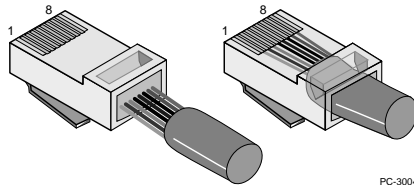
Making a crossover cable

A crossover cable allows you to connect two mirrored servers together without a hub. If your network services supplier doesn't carry crossover cables, you can make one yourself. To make a crossover cable:

1   Cut off the RJ-45 connector and strip the sheath from one end of a TPE CAT 5 cable.

2   Using a new RJ-45 connector, wire the pins as shown. For example, instead of inserting the TX+ wire into pin 1, insert it into pin 3.

PC-3006
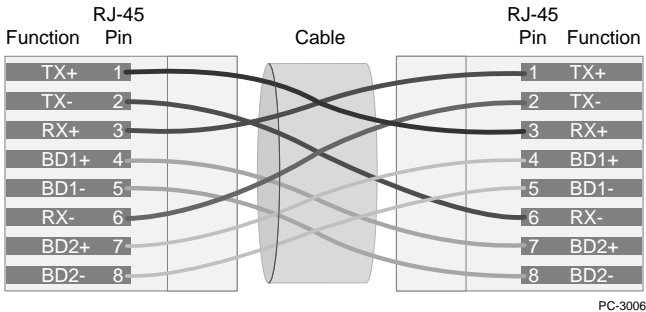
Where   TX+/- are the transmit wires for TX and T4 cabling
         RX+/- are the receive wires for TX and T4 cabling
         BD1+/- are the first set of bidirectional wires for T4 cabling (optional)
         BD2+/- are the second set of bidirectional wires for T4 cabling (optional)

3   Make sure the individual wires are snug against the end of the connector and then crimp it.


PC-3004

4   Test the crossover cable by transmitting packets across it. You can also use the adapter's LEDs, but make sure you load the MSL driver on both servers before trying to read them.

See the *Cabling specifications* help files for more information.

If the adapter doesn't connect to the network

1 ▶ **Check the LED lights on the adapter**

10MB
LNK ACT

If the LNK light isn't lit,
check all connections at
the adapter and the hub.
Make sure the hub is
transmitting at the correct
speed and the drivers are
loaded.

100MB
LNK ACT

PC-2681
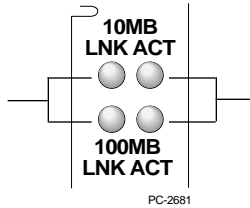
If the ACT light isn't lit,
the adapter probably isn't
transmitting or receiving
data. Make sure the hub
and network are operating
and the drivers are
loaded.

LNK Indicates the adapter is connected to a hub or switch and is
receiving link pulses.

ACT Indicates read/write activity on the network. It doesn't always mean
there is activity on the adapter.

Green indicates 100 Mbps, and yellow indicates 10 Mbps.

If you're using a crossover cable, load the drivers on both servers before
trying to read the LEDs.

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. If you're setting up
mirrored servers, make sure you use a crossover cable (see page 11).

3 ▶ **Test the adapter**

Run the adapter and network tests described on page 5.

4 ▶ **Look in the *Common problems* table on page 13 and try the
recommended solutions**

This table lists common problems and their solutions. If none of these work,
check the *Late-breaking news* that came with the adapter or get document
6328, *Troubleshooting Notes from Tech Support* from one of Intel's online
services. See the Inside back cover for information on connecting to Intel's
online services.

Common problems and solutions

Problem	Solutions
Your computer can't find the adapter.	• Make sure there's an EtherExpress PRO/100 Smart adapter in this computer. • 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 EtherExpress PRO/100 Smart adapter.
Diagnostics pass, but the connection fails.	• Try running the *Continuous Network Test*. • Make sure the network cable is securely attached. • Make sure that you're using TPE Category 5 cabling for 100 Mbps.
Data is corrupted or sporadic at 100 Mbps.	• Make sure that you're using TPE Category 5 cabling.
Another adapter stopped working after you installed the PRO/100.	• Make sure the cable is connected to the EtherExpress PRO/100 Smart adapter and not to some other adapter. • Make sure both adapters are seated firmly in the slot.
The adapter stopped working without apparent cause.	• Try reseating the adapter. • The network driver files may be corrupt or deleted. Reinstall the drivers. • Try a different PRO/100 Smart adapter.
LNK LED does not light.	• Make sure you've loaded the drivers. • Check all connections at the adapter and the hub. • Try another port on the hub. • Make sure that the hub port is configured for the correct speed, 10 or 100 Mbps. • If you're using a crossover cable, make sure the drivers are loaded on both servers.
ACT LED does not light.	• Make sure you've loaded the network drivers. • Network may be idle; try logging in from a workstation. • The adapter isn't transmitting or receiving data; try another adapter.

SFT III or the MSL connection doesn't work; the servers aren't mirroring.	• Make sure you're using a Category 5 crossover cable.
	• Try a different PCI slot.
	• View the MSL help files by running:
	   SETUP /README Enter
	• See your Novell documentation:
	   NetWare 4.1 Installation, Chapter 5
	   Supervising the Network, Appendix C

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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.

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From North America:
Before returning any product, contact Intel Customer Support and obtain a Return Material Authorization (RMA) number by calling +1 503 264-7000.

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.

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April 28, 1994

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 EtherExpress PRO/100 Smart 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.

Intel Corporation, Mailstop JF3-333
Hillsboro, Oregon 97124-6497 USA

Contacting Intel customer support

	Help files	FaxBack*	TalkBack	Intel BBS	CompuServe*	Internet
	Insert the Configuration disk, switch to that drive, and type SETUP ⏎.	Have documents sent to your fax machine or fax board.	Listen to questions and answers using a touch tone phone.	Connect to Intel's Bulletin Board Service. Dial in via modem. (8-N-1, up to 14.4Kbps)	Intel Forum. Must be CompuServe subscriber. Dial in via modem. (7-E-1, up to 14.4Kbps)	Download information using Anonymous FTP.
Troubleshooting	YES	YES	YES	YES	YES	YES
Software updates	--	--	--	YES	YES	YES
Installation notes	YES	YES	YES	YES	YES	YES
Compatibility lists	--	YES	YES	YES	YES	YES
Product information	YES	YES	YES	YES	YES	YES
FaxBack documents	--	YES	--	YES	YES	YES
24-hour access	YES	YES	YES	YES	YES	YES
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