

EtherWORKS Turbo PCI 10

Installation

Order Number: EK-DE450-IN. B01

Revision/Update Information: This is a revised manual.

FCC ID: AO9-DE450X

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

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

This equipment 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

The use of unshielded Ethernet cables on ThinWire and thick wire ports with this equipment is prohibited due to non-compliance with FCC regulations for a Class B computing device pursuant to Part 15 of FCC Rules.

This product is found to be compliant with the requirements of CISPR-22 Class B and is eligible to bear the CEmark label.

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Contents

About This Manual	ix
1 Introduction	
Quick Start Procedures	1-2
Novell NetWare VLM DOS Client	1-2
Microsoft Windows 95	1-2
Microsoft Windows NT V3.51	1-3
Other DOS-Based Operating Environments	1-3
Features	1-4
2 Hardware Installation	
System Requirements	2-1
Installing the Adapter	2-2
Connecting to an Ethernet Network	2-4
Connecting to a Twisted-Pair Ethernet Network	2-4
Connecting to a ThinWire Ethernet Network	2-5
Connecting to an Ethernet Network Using AUI	2-6
Twisted-Pair Plus Cable Failover	2-6
Optional Remote Boot ROM	2-8
Installing the Remote Boot ROM	2-8

3 Configuration and EZWORKS Installation and Diagnostics

Adapter Configuration	3-1
EZWORKS Installation Utility	3-2
Running the EZWORKS Installation Utility	3-3
Diagnostics	3-5
Running Diagnostics	3-6
Configuring the Remote Boot ROM	3-8
EZWORKS Command Line Switches	3-10
Command Line Switch Format	3-10
Exiting the EZWORKS Installation Utility	3-11

4 Software Information

Device Driver Information	4-1
Network Management Software Information	4-2
Mac OS Information	4-2
Obtaining the Latest EtherWORKS Turbo PCI 10 Software	4-3

A Problem Solving

Fault Isolation by Symptom	A-1
Diagnostic Test Errors	A-3

B General Information

Physical Description	B-1
Functional Components	B-1
LEDs	B-2
Network Activity	B-2
Twisted-Pair Link	B-2
Electrical Parameters	B-3
Operating Environment	B-4
Connector Pinning	B-4
Cabling Requirements	B-5
Other Digital Network Adapter Products	B-6

C PCI BIOS Setup Utility

Figures

1	DE450-CA Kit Contents	xi
2	DE450-TA Kit Contents	xii
2-1	Removing the PCI Slot Cover	2-2
2-2	Installing the Adapter	2-3
2-3	Connecting the DE450-TA to an Ethernet Network	2-4
2-4	Connecting the DE450-CA to an Ethernet Network	2-7
2-5	Installing the Remote Boot ROM	2-9
3-1	EZWORKS Installation Menu	3-3
3-2	EZWORKS PCI Diagnostics	3-6
3-3	Remote Boot ROM Menu	3-8
B-1	8-Pin MJ Connector (Front View)	B-5

Tables

3-1	General Adapter and Novell Command Line Switches	3-10
3-2	Remote Boot ROM Command Line Switches	3-11
A-1	Fault Isolation by Symptom	A-1
A-2	Diagnostic Test Error Codes	A-3
B-1	LED States	B-2
B-2	Electrical Parameters (DE450-CA)	B-3
B-3	Operating Environment	B-4
B-4	Other Products	B-6
C-1	EtherWORKS Turbo PCI 10 Option Settings	C-2

About This Manual

The EtherWORKS Turbo PCI 10 adapter is a processor-independent network interface card (NIC) designed for the peripheral component interconnect (PCI) bus. The EtherWORKS Turbo PCI 10 adapter is referred to as the Turbo PCI 10 adapter or adapter in this manual.

This manual explains the following:

- Quick Start network procedures for experienced network computer users
- EZWORKS Installation utility
- Main features of the EtherWORKS Turbo PCI 10 adapter
- Adapter's connectors and LEDs
- How to install the adapter in your computer
- Where to find device driver information
- Problems that you could encounter when installing the adapter, and possible solutions

Reference to the EtherWORKS Turbo PCI 10 adapter includes both models (DE450-CA and DE450-TA) unless otherwise noted.

Manual Conventions

This manual uses the following conventions:

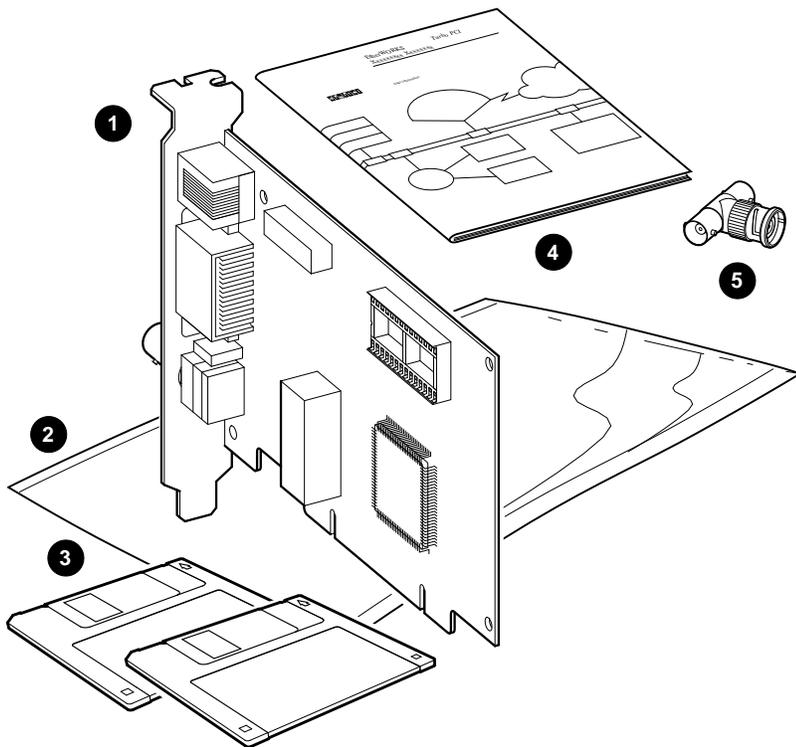
Convention	Description
Note	A note contains information of special importance.
Caution	A caution contains information to prevent damage to the equipment.
❶	A number in a black circle in text refers to the corresponding number in an accompanying illustration.
<code>Enter</code>	A word in a box indicates a particular keyboard key. For example, <code>Enter</code> indicates the Enter key.
<i>variables</i>	In command descriptions, italic type indicates a variable that you supply. In text, it emphasizes a term or indicates a book title.
Monospaced type	Monospaced type indicates a literal example of system output.

Kit Contents

The EtherWORKS Turbo PCI 10 kit includes the items shown in Figure 1 and Figure 2. Verify that you have the following components before proceeding:

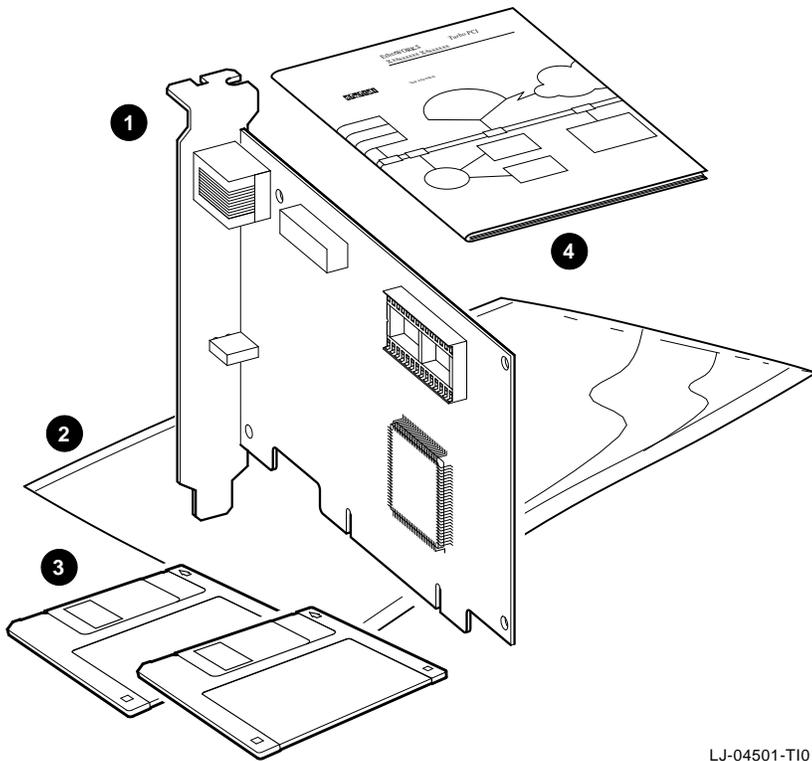
- EtherWORKS Turbo PCI 10 adapter **❶** contained in an antistatic packaging bag **❷**
- Two 3½-inch distribution diskettes **❸**
(Additional diskettes may be added to enhance the product.)
- This owner's manual **❹**
- T-connector **❺** (supplied with DE450-CA model only)

Figure 1 DE450-CA Kit Contents



LJ-04500-T10

Figure 2 DE450-TA Kit Contents



LJ-04501-T10

Related Documents

Additional information relative to the EtherWORKS Turbo PCI 10 adapter and networks can be found in the following documents:

- *OPEN DECconnect Applications Guide*
(Order No. EC-G2570-42)
Provides information to help plan and install networking systems based on Digital Equipment Corporation's OPEN DECconnect System and networking products.
- *Network Product Guide*
(Order No. EC-G4343-42)
Provides comprehensive information about Digital Equipment Corporation's hardware and software networking solutions.

Safety Statements

The cautions and warnings that appear in this manual are defined as follows:

Warning	Contains information to prevent personal injury.
Caution	Contains information to prevent damage to equipment.
Vorsicht	Enthält Informationen, die beachtet werden müssen, um den Benutzer vor Schaden zu bewahren.
Achtung	Enthält Informationen, die beachtet werden müssen, um die Geräte vor Schaden zu bewahren.
Danger	Signale les informations destinées à prévenir les accidents corporels.
Attention	Signale les informations destinées à prévenir la détérioration du matériel.
Aviso	Contiene información para evitar daños personales.
Precaución	Contiene información para evitar daños al equipo.

The cautions and warnings you must observe for the hardware described in this manual are listed in English, German, French, and Spanish as follows:

CAUTION	Static electricity can damage modules and electronic components. Digital recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules.
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ACHTUNG	Module und elektronische Komponenten können durch elektrostatische Entladungen beschädigt werden. Benutzen Sie immer eine antistatische Gelenkmanschette und eine geerdete Arbeitsunterlage, wenn Sie am offenen Gerät arbeiten.
ATTENTION	Les charges excessives d'électricité statique peuvent endommager les modules et les composants électroniques. Digital conseille l'utilisation d'un bracelet de masse et d'un plan de travail mis à la terre lors de la manipulation des modules.
PRECAUCIÓN	La electricidad estática puede dañar los componentes electrónicos y los módulos. Digital recomienda que se utilicen cintas de pasadores y superficies de trabajo conectadas a tierra al trabajar con cualquier módulo.
WARNING	Some fiber-optic equipment can emit laser light that can injure your eyes. Never look into an optical fiber or connector port. Always assume the cable is connected to a light source.
VORSICHT	Schauen Sie niemals direkt in ein Glasfaserkabel oder einen Glasfaseranschluß. Die Laserstrahlen in faser-optischen Geräten können Augenverletzungen verursachen.
DANGER	Certains équipements utilisant les fibres optiques peuvent émettre des rayonnement laser dangereux pour les yeux. Ne vous avisez jamais de regarder par l'extrémité d'une fibre optique ou dans l'ouverture d'un connecteur. Considérez toujours que le câble est relié à une source lumineuse.
AVISO	Algunos equipos de fibra óptica pueden emitir luz láser que daña los ojos. No se debe mirar en una puerta de conector o fibra óptica. Siempre se debe suponer que el cable está conectado a la luz.

CAUTION	When adding any option module to your computer, verify that the combined power (wattage) required for all modules in your computer does not exceed the power supply rating. Check your computer documentation for this information.
ACHTUNG	Wenn Sie Zusatzmodule in Ihren Computer einbauen, darf die gemeinsame Leistung (in Watt) aller eingebauten Module die Nennleistung nicht überschreiten. Weitere Informationen finden Sie in der Dokumentation zu Ihrem Computer.
ATTENTION	Si vous ajoutez des options à votre système, assurez-vous que le nombre de watts total n'excede pas la puissance nominale du bloc d'alimentation. Reportez-vous à la documentation de votre système pour obtenir plus d'information.
PRECAUCIÓN	Al añadir cualquier modulo de opciones al ordenador, es preciso comprobar que la potencia combinada (vatios) necesaria para todos los modulos del ordenador no sobrepasa las condiciones normales del suministro de energia. Consúltense estos datos en la documentación del ordenador.
WARNING	To prevent personal injury or equipment damage, do not insert telecommunications cabling into the optical bypass relay connector.
VORSICHT	Um Personen oder Geräteschaden zu vermeiden, dürfen Sie das Telefonkabel AUF KEINEN FALL am Anschluß des optischen Bypass-Relais anschließen.
DANGER	Pour éviter tout risque d'accident corporel ou de dommage matériel, NE BRANCHEZ PAS de cable de télécommunication sur le connecteur de relais selectif optique (optical bypass relay connector).
AVISO	Para evitar daños personales o al equipo, NO se debe introducir cableado de telecomunicaciones en el conector óptico de reles de derivación.

1

Introduction

This chapter describes the EtherWORKS Turbo PCI 10 adapter and briefly summarizes the adapter's features. For the experienced network computer user, this chapter also provides Quick Start procedures to install device drivers on the various network operating systems.

The EtherWORKS Turbo PCI 10 adapter is a 10-Mb/s network interface card (NIC) that enables you to connect PCI-compatible systems (PCs, high-end workstations, and multiprocessor servers) into an Ethernet/IEEE 802.3 network.

The two models of the EtherWORKS Turbo PCI 10 adapter are as follows:

- EtherWORKS Turbo PCI 10 Combo (DE450-CA)—Includes 10Base2 ThinWire, AUI, and 10Base-T twisted-pair connectors
- EtherWORKS Turbo PCI 10 TP (DE450-TA)—Includes a 10Base-T twisted-pair connector

After you install the adapter in your system, you can use various network software products to integrate your system into a local area network (LAN) environment.

Quick Start Procedures

To Quick Start your network interface, use one of the following procedures:

Novell NetWare VLM DOS Client

1. Install the EtherWORKS Turbo PCI 10 adapter in your computer.
2. Attach the network cable to the appropriate connector on the adapter.
3. Boot your computer.
4. When the DOS prompt appears, insert the EtherWORKS Turbo PCI 10 distribution diskette 1 into drive A, then enter the following to invoke the EZWORKS Installation utility:

```
A:\Setup
```

5. Review the settings, then click on the Install button.
6. Reboot your computer to connect to your NetWare server.

Microsoft Windows 95

1. Turn on your computer (before installing the adapter), then boot the Windows 95 operating system.
2. Insert the EtherWORKS Turbo PCI 10 distribution diskette 1 into drive A, then click on the MSDOS prompt to open a DOS box.
3. Enter the following to invoke the EZWORKS Installation utility:

```
A:\Setup
```

4. Select Windows 95 NDIS 3 under the Select a Network Operating System option. Click on the Install button to configure Windows 95 and install the driver.
5. Shut down Windows 95, then power down your computer.
6. Install the EtherWORKS Turbo PCI 10 adapter in your computer, then attach the network cable to the appropriate connector on the adapter.

7. Powerup your computer. Windows 95 will automatically install the adapter.

Microsoft Windows NT V3.51

1. Install the EtherWORKS Turbo PCI 10 adapter in your computer.
2. Attach the network cable to the appropriate connector on the adapter.
3. Turn on your computer, then select the following options:
 - Control Panel
 - Network
 - Add Adapter
4. Select the <Other> Requires disk from manufacturer option, then click on the Continue button to display the Insert Disk screen.
5. Insert the EtherWORKS Turbo PCI 10 distribution diskette 1 into drive A, then click on OK to display the Select OEM Option screen.
6. Select the DEC DE450 EtherWORKS Turbo PCI 10 option, then click on OK.
7. Continue to configure your network.
8. Restart the Windows NT operating system when instructed.

Other DOS-Based Operating Environments

1. Install the EtherWORKS Turbo PCI 10 adapter in your computer.
2. Attach the network cable to the appropriate connector on the adapter.
3. Boot your computer to either a DOS or Windows environment.
4. Insert the EtherWORKS Turbo PCI 10 distribution diskette 1 into drive A, then enter the following:

A:\Setup

5. Select your operating environment, then click on the Help button for further instructions.

Features

The main features of the EtherWORKS Turbo PCI 10 adapter are as follows:

- High-performance 32-bit direct memory access (DMA) architecture
- Easy installation on DOS-based systems by using the EZWORKS Installation utility
- Automatic and complete installation of NetWare VLM DOS Client using the EZWORKS Installation utility
- SNMP manageable under SCO OpenServer, Windows NT, and NetWare network operating systems
- Powerful parallel cut-through architecture and other patented features maximize data throughput and minimize CPU utilization
- Digital-designed VLSI Ethernet chip (DECchip 21041) supports high data transfer rates for optimal network performance
- Optional remote boot ROM (DE45D-AR) and FLASH memory (DE45F-AR) interface for RPL, MOP, NetWare, and TCP/IP protocols
- Software configurable to operate in full-duplex mode, increasing aggregate bandwidth up to 20 Mb/s
- Supports Ethernet and IEEE 802.3 industry standards
- PCI specification compliance, V2.1
- FCC Class B, CISPR-22 Class B, CEmark, VCCI, and UL compliance

- Supports both PCI 5.0 volt and 3.3 volt signaling environments
- Supports two LEDs, one for Link function (green) and one for Tx/Rx function (amber)
- Enables full automatic media detection between attachment unit interface (AUI), BNC, and twisted-pair ports (DE450-CA)
- Twisted-pair plus cable failover (DE450-CA)
- Limited lifetime warranty with return of the warranty registration card to Digital
- Comprehensive set of device drivers for the most popular network operating environments:
 - Novell NetWare server
 - NetWare DOS ODI Client
 - NetWare OS/2 ODI Client
 - Microsoft Windows NT (Intel, Alpha, MIPS, and PowerPC)
 - Microsoft Windows and Windows 95
 - Microsoft Windows for Workgroups
 - Digital PATHWORKS
 - Digital UNIX (device driver supplied with Digital UNIX operating system)
 - Digital OpenVMS (device driver supplied with Digital OpenVMS operating system)
 - LAN Manager DOS
 - LAN Manager OS/2
 - SCO OpenServer
 - Packet Driver

2

Hardware Installation

This chapter describes how to install the EtherWORKS Turbo PCI 10 adapter in a PCI bus master-compatible computer and how to connect the adapter to an Ethernet network.

System Requirements

To use the Turbo PCI 10 adapter, you need the following:

1. An available PCI bus master expansion slot in your computer.
2. A system that is compliant with the PCI revision specification, V2.1.
3. A 3½-inch diskette drive for device driver and network management loading.
4. Cables
 - Use UTP/ScTP Category 5 Ethernet cable with an 8-pin MJ connector to connect a Turbo PCI 10 TP (DE450-TA) adapter to the network.
 - Use UTP/ScTP Category 5 Ethernet cable, ThinWire cable, and a T-connector, or an AUI transceiver cable to connect a Turbo PCI 10 Combo (DE450-CA) adapter to the network.

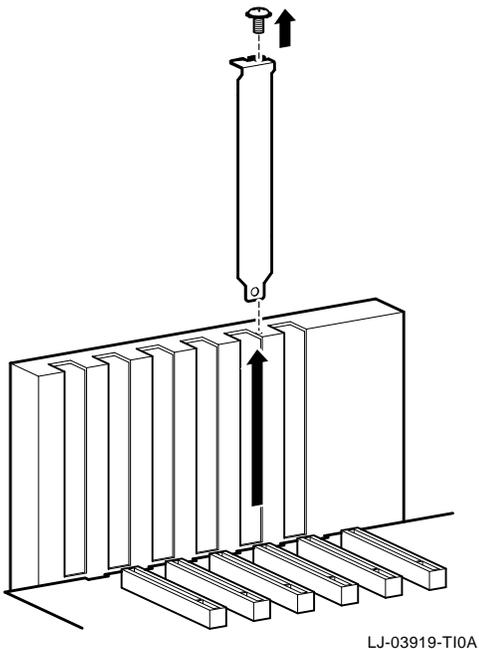
See the Cabling Requirements section in Appendix B for further cable information.

Installing the Adapter

To install the EtherWORKS Turbo PCI 10 adapter in your system, use the following procedure:

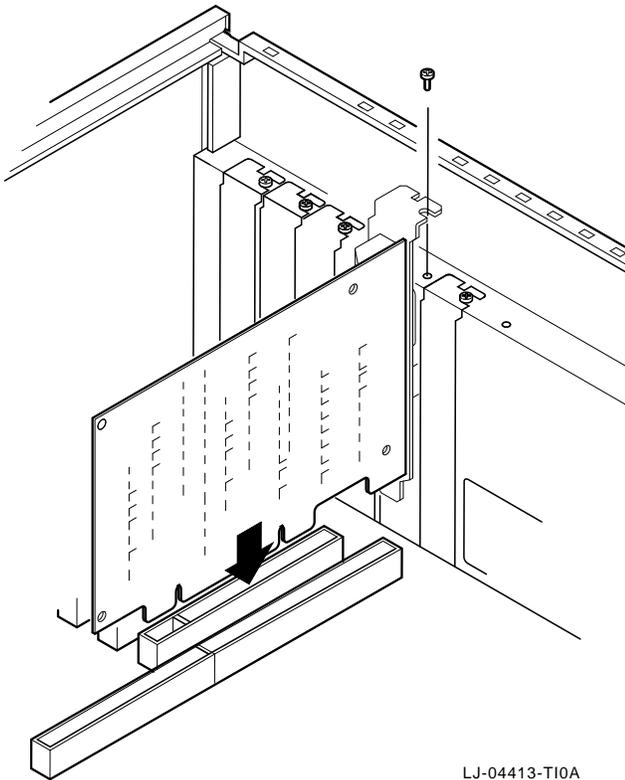
1. Unplug the computer and disconnect all cables that are connected to the main system unit.
2. Remove the computer cover.
3. Unscrew and remove the option slot cover from the PCI bus master slot that you plan to use (see Figure 2-1).

Figure 2-1 Removing the PCI Slot Cover



4. Install the optional remote boot ROM on the adapter. (See the Optional Remote Boot ROM section in this chapter for instructions on how to install the ROM.)
5. Insert the adapter into the slot, then replace the screw to secure the adapter (see Figure 2-2).
6. Replace the computer cover, reconnect the cables, then power up your system.

Figure 2-2 Installing the Adapter



LJ-04413-T10A

Connecting to an Ethernet Network

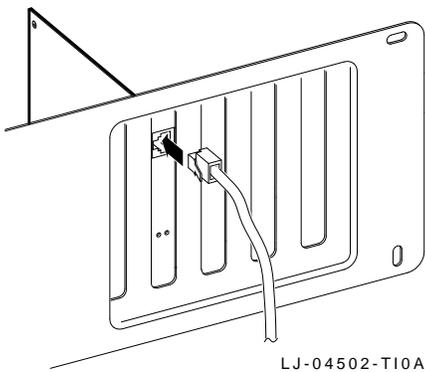
Figure 2-3 and Figure 2-4 show how to connect Ethernet cables to the connectors on the Turbo PCI 10 adapter. Use one of the following procedures to connect your system to the network.

Connecting to a Twisted-Pair Ethernet Network

To connect the Turbo PCI 10 adapter to a twisted-pair network:

1. Plug the twisted-pair Ethernet cable connector into the 8-pin MJ connector until it clicks and locks in place (see Figure 2-3 and ❶ in Figure 2-4).

Figure 2-3 Connecting the DE450-TA to an Ethernet Network



2. Refer to Figure B-1 in Appendix B for 8-pin MJ connector pin assignments.

To configure a full-duplex connection, make sure that you are connecting to another device that supports full-duplex mode to avoid serious network problems. Full-duplex mode is enabled by the software. See the driver `README.TXT` file subdirectories for further information.

Connecting to a ThinWire Ethernet Network

To connect the DE450-CA adapter to a ThinWire network:

1. Attach the ThinWire cables to a T-connector.
2. If the system is at the end of an Ethernet segment, attach a terminator to the unused side of the T-connector. If the system is between consecutive networked systems, attach a ThinWire cable to each end of the T-connector. Termination is usually required at each end of a ThinWire cable segment.
3. Push the T-connector onto the BNC connector, then twist the T-connector to lock it in place (see ② in Figure 2-4).

Connecting to an Ethernet Network Using AUI

To connect the DE450-CA adapter to an AUI network:

1. Slide the latch assembly upward on the adapter's AUI connector.
2. Plug the AUI cable connector into the 15-pin AUI connector on the adapter.
3. Slide the latch assembly downward to lock the connector in place (see ③ in Figure 2-4).

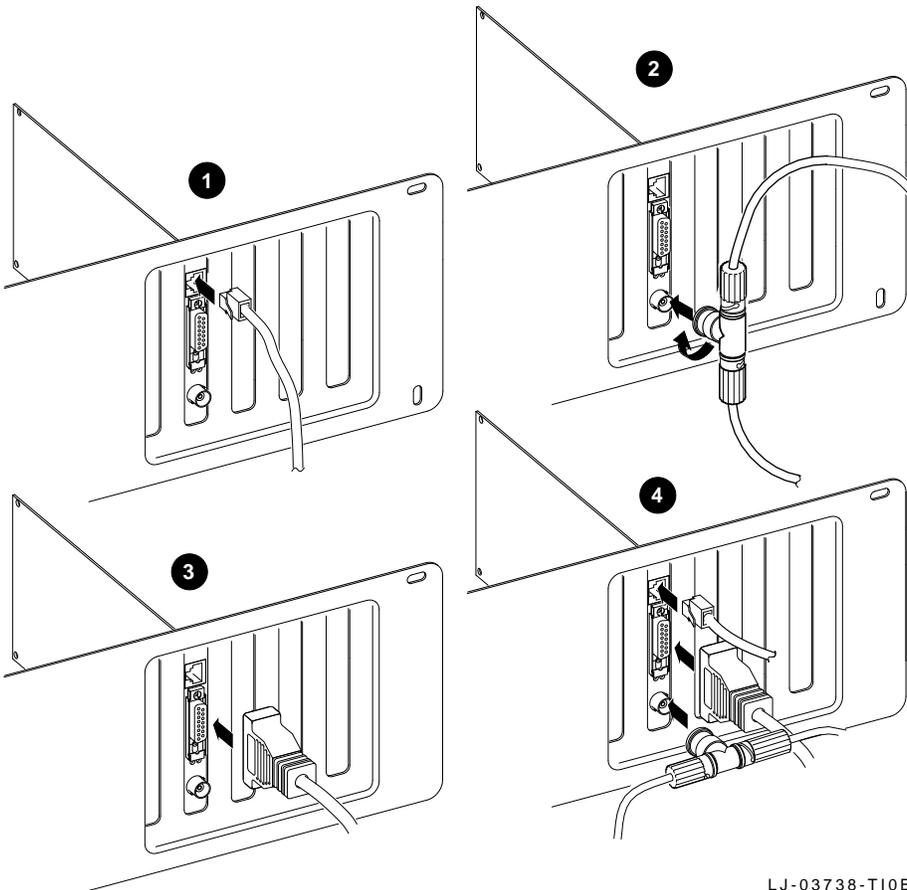
Twisted-Pair Plus Cable Failover

Although the DE450-CA adapter uses only one port at a time, multiple cables may be connected to the adapter (see ④ in Figure 2-4). When the twisted-pair port is used, an additional cable may be connected to either the BNC or AUI port. The adapter uses the twisted-pair connection until it is removed or fails, then it automatically switches to the other cable.

Note

For twisted-pair plus cable failover to work properly, both cables must be attached to valid network links when the device driver is loaded.

Figure 2-4 Connecting the DE450-CA to an Ethernet Network



LJ-03738-T10B

Optional Remote Boot ROM

Digital offers the following remote boot ROMs to be used with the EtherWORKS Turbo PCI 10 adapter:

- DE45D-AR, 28-pin remote boot ROM
- DE45F-AR, 32-pin upgradable FLASH remote boot ROM

When you install a remote boot ROM on an EtherWORKS Turbo PCI 10 adapter (DE450-CA or DE450-TA) in a DOS-based system, the ROM enables your computer to perform a remote boot using the MOP, RPL, NetWare, or TCPIP protocols.

Installing the Remote Boot ROM

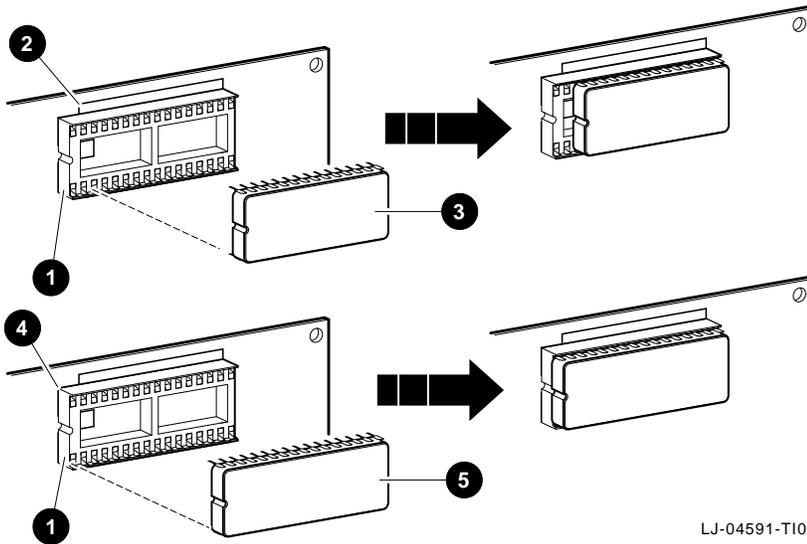
To install the remote boot ROM, use the following procedure:

1. Remove the DE450 adapter from your computer, then place it on a flat surface.
2. Align the ROM with the corresponding outline on the 32-pin ROM socket ❶ (see Figure 2-5):
 - a. Align the DE45D-AR, 28-pin ROM ❸ with the socket's smaller silk-screen outline ❷.
 - b. Align the DE45F-AR, 32-pin ROM ❺ with the socket's larger silk-screen outline ❹, or align the notch in the ROM with the notch in the ROM socket.

Caution

Static electricity can damage modules and electronic components. Digital recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules or components.

Figure 2-5 Installing the Remote Boot ROM



3. Align the pins on the ROM with the holes in the ROM socket, then insert the pins into their correct holes, taking care not to bend any pins during the process. Press firmly on the ROM to make a solid contact. (See the Configuring the Remote Boot ROM section in Chapter 3 for ROM configuration information.)

3

Configuration and EZWORKS Installation and Diagnostics

This chapter provides information about adapter and ROM configuration, and how to use the EZWORKS Installation utility for software installation and diagnostics.

Adapter Configuration

In most systems, the EtherWORKS Turbo PCI 10 adapter is automatically configured by the system. This occurs when the computer is powered up for the first time after the adapter is installed. Use your system's console commands or BIOS Setup utility only if you wish to modify the configuration after you install the adapter, or if you need to change the computer settings.

Note

Refer to your computer and operating system documentation for instructions on how to use your system's BIOS Setup utility. Refer to Appendix C for PCI BIOS Setup information.

EZWORKS Installation Utility

The EZWORKS Installation utility is a DOS-based program that is located on the DOS-based driver distribution diskette. This utility can be run on the following:

- DOS-based systems from the DOS prompt
- Microsoft Windows, Windows for Workgroups, and Windows 95 network operating systems
- From a DOS box under an OS/2 network operating system

The EZWORKS Installation utility cannot be run on a Windows NT network operating system or computers based on CPUs other than Intel i86 compatible systems.

The EZWORKS Installation utility provides the following:

- Information about the EtherWORKS Turbo PCI 10 adapter (for example, the adapter's current settings)
- Capability to configure and install your system's NetWare ODI DOS client
- Capability to use command line switches to configure the adapter and to display adapter information
- Information about other PCI adapters installed in your system
- Device driver installation instructions
- Capability to run some diagnostic tests
- Capability to detect MS-DOS startup menu items

This information is accessed from menu bar options and pop-up menus.

Note

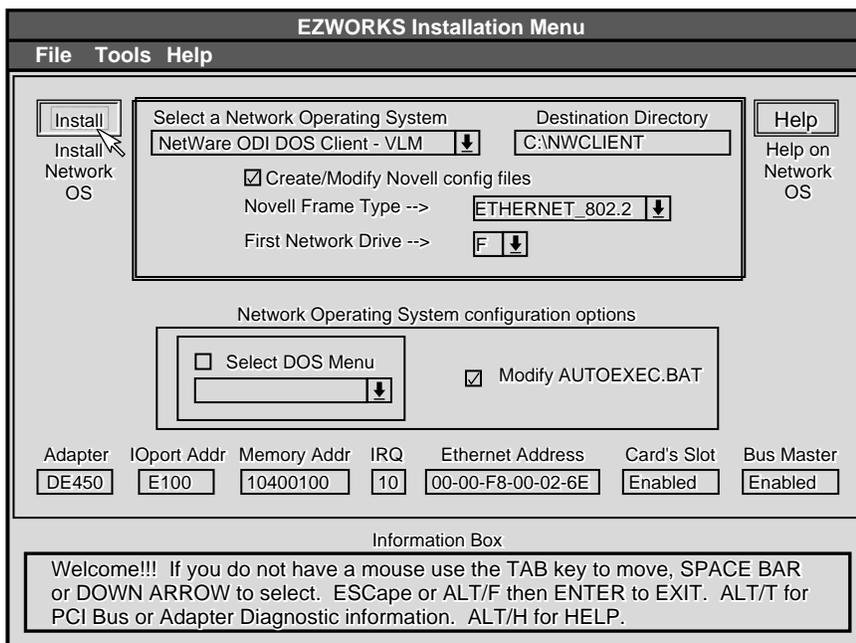
When you click on any box from the EZWORKS Installation utility menu, the information box located at the bottom of the menu displays information about that selection.

Running the EZWORKS Installation Utility

To run the EZWORKS Installation utility:

1. Insert the distribution diskette into drive A, then set your default to A:.
2. At the DOS prompt, enter Setup to start the EZWORKS Installation utility and display the main menu shown in Figure 3-1.

Figure 3-1 EZWORKS Installation Menu



LJ-4452.A14

If your system has a DOS startup menu on startup, you can select a specific menu item in which to place the startup command for the currently selected network operating system (NOS). Otherwise, the selected network operating system startup command is placed at the end of your AUTOEXEC.BAT file.

If you do not wish the utility to add any commands to your AUTOEXEC.BAT file, click on the Modify AUTOEXEC.BAT option to turn it off.

3. Click on the Install button to install and configure the selected network operating system, including drivers.

Note

The EZWORKS Installation utility is automatically ready to install and configure your system as a NetWare ODI client. Once the information box indicates that the NetWare ODI client installation is complete, reboot your system to connect to your NetWare server.

4. Click on the Help box to display device driver installation instructions for the selected network operating system.
5. Click on the information boxes, located at the bottom of the menu, for explanations of the adapter's settings.

Note

If multiple adapters are installed in your system, a Multiple cards detected button will be displayed. Click on this button for information about additional Digital EtherWORKS PCI adapters installed in your system. To change the settings, see Appendix C.

6. Click on the Tools option menu to display PCI bus information, run diagnostic tests on your adapter, and configure an installed remote boot ROM.
7. Click on the Help option menu items to display an explanation of the utility, how to obtain the latest device drivers, and the version number of the utility (from the About menu item).

Diagnostics

As previously mentioned, the diagnostics for the EtherWORKS Turbo PCI 10 adapter are run from the EZWORKS Installation utility. It is recommended that you run diagnostics after initial installation to ensure that the adapter is set up to meet your system requirements and to verify the adapter's functionality.

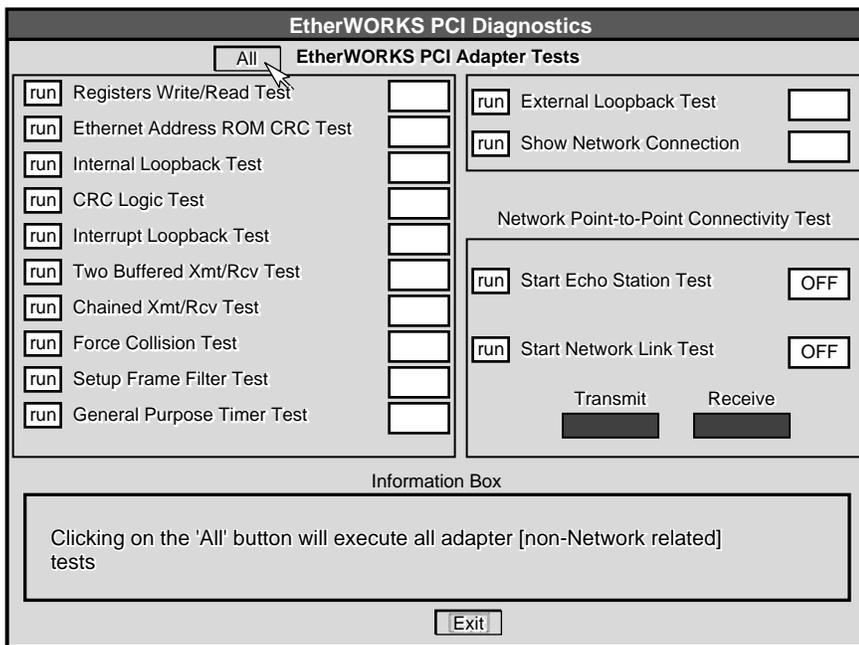
If the EtherWORKS Turbo PCI 10 adapter is active (when a network device driver is loaded), diagnostics will not run. If necessary, comment out the command that loads the device driver in the CONFIG.SYS or other files, then cold boot the computer to deactivate the adapter. For Windows 95 users, perform a shutdown, then restart the computer in MS-DOS mode.

Running Diagnostics

To run diagnostics:

1. Click on the Diagnostics menu item from the Tools option (shown in Figure 3-1) to display the following:

Figure 3-2 EZWORKS PCI Diagnostics



LJ-4453.A14

2. Click on the All button to run all non-network diagnostic tests.
3. Click on individual tests to run any network or adapter diagnostic test.

When diagnostics are complete, the box located to the right of the test will indicate whether the test passed or failed. If the test fails, an error message will appear in the information box. See Table A-2 for diagnostic test error messages and the recommended corrective action.

4. The Show Network Connection Test can be used to determine if the adapter is physically connected to your Ethernet network.
5. The Network Point-to-Point Connectivity Test can be used to verify a network connection between two EtherWORKS Turbo PCI 10 adapters. Click on the run button next to the Start Echo Station Test to activate the adapter to loop back packets with the Ethernet address of 00-11-11-11-11-11. Press **[Esc]** if you wish to end the test.

Click on the run button next to the Start Network Link Test on another system. This will start the adapter transmitting packets to the system that is presently the Echo Station. Press **[Esc]** to end the test. If the packets are successfully echoed back to the Network Link Station, they will be tabulated in the Transmit and Receive boxes.

Configuring the Remote Boot ROM

Once you have installed a remote boot ROM on your adapter and installed the adapter in your system, use the following procedure to configure the ROM:

1. Click on the remote boot ROM menu item from the Tools option to display the Remote Boot ROM Menu (see Figure 3–3). If a remote boot ROM is not installed in your system or is installed incorrectly, an error message will appear.

Figure 3–3 Remote Boot ROM Menu

Remote Boot ROM Menu

RPL NetWare MOP TCP/IP Utilities

ROM Version
V2.0

SET Remote Boot ROM Enabled or Disabled Enabled

SET Period of time the Remote Boot ROM will try to boot before timing out and booting locally 2.5 Minutes

SET Remote Boot ROM Protocol RPL

WRITE Update Remote Boot FLASH ROM software \install\flash450.bin

RUN ROM Diagnostics

SET RomShield ON

SET Config Menu OFF

Information Box

Use this option to select whether the Remote Boot ROM is Enabled or Disabled. The setting appears in the box to the right.

EXIT and save settings QUIT

LJ-4590C.A14

Command line parameters can be used as an alternative method to configure your remote boot ROM. For example:

```
A>Setup/remote=enable/protocol=RPL
```

See the EZWORKS Command Line Switches section in this chapter for further information.

2. Select the desired options:

- Enable the remote boot ROM to establish a remote boot session when the computer is powered up.
- Select the period of time to attempt a remote boot before a local boot occurs (MOP only). The default time is 2.5 minutes.
- Select the appropriate remote boot protocol to be used to establish a remote boot session.
 - a. Use the MOP protocol in PATHWORKS V4.1x environments.
 - b. Use the NetWare *xxxx* protocol in Novell NetWare environments. The *xxxx* stands for the corresponding frame type configured on the NetWare server performing the remote boot.
 - c. Use the TCP/IP protocol in BOOTP remote boot environments.
 - d. Use the RPL protocol (the default) in PATHWORKS V5.x, Microsoft LAN Manager V2.2, Microsoft Windows NT Advanced Server V3.5x, and IBM LAN Server V3.x, V4.0 environments.
- If you have a FLASH ROM version of the remote boot ROM, click on the WRITE button if you wish to update the ROM software.
- Run diagnostics to check the integrity of the remote boot ROM.
- Click on the ROMShield button to turn ON/OFF the antivirus function before a remote boot session is established (for NetWare, TCP/IP, and RPL). The default is ON.

- Click on the Config Menu button to turn ON/OFF the ability to change the remote boot settings before a remote boot session is established. When the Initializing Digital... message appears, press Ctrl/Alt/B to enter the Config Menu. The default is OFF.

3. Save your changes by selecting the Exit and save settings option.

EZWORKS Command Line Switches

The EZWORKS Installation utility supports command line switches. These switches perform EZWORKS functions when a single Digital PCI adapter is installed in your computer. The format for command line switches is not case sensitive; however, all switch fields must be entered without spaces before or after the equal sign (=) and without truncating switch names. (Refer to the following section for the correct command line format.)

Command Line Switch Format

Table 3–1 and Table 3–2 list and describe the available EZWORKS command line switches. For further information, see the EZWORKS.TXT file located in the /INSTALL directory on the distribution diskette.

Table 3–1 General Adapter and Novell Command Line Switches

Switch	Description
/help or /?	When these switches are included in the command line, EZWORKS displays help information on the command line switches.
/nodisplay	Turns off screen display except for /?, /help, /status, and any error messages.
/novell	Performs a full Novell DOS Client installation. Use the /frametype command to override the IEEE 802.2 default frametype.
/status	Displays current Digital PCI adapter configuration.

Table 3–2 Remote Boot ROM Command Line Switches

Switch	Description
/autoupdateflash	Only updates an installed FLASH ROM if the current version of the FLASH _{xxx} .BIN file is later than the version of the currently installed FLASH ROM.
/cfg=(enable, disable)	Allows you to enable or disable the configuration screen for the remote boot ROM. The adapter default is OFF.
/protocol=(mop,rpl...)	Modifies the remote boot protocol to the value you specify. For ROMs V2.0 or earlier, the valid values are MOP, RPL, and RPL_19h. For ROMs V2.0 or later, the valid values are MOP, RPL, TCPIP, NETWARE_802_2, NETWARE_802_3, and NETWARE_ETHERNET_II. The adapter default is RPL.
/remote=(enable, disable)	Allows you to change your adapter's remote boot setting to Enable or Disable according to the value you specify. The adapter default is Disable.
/rs=(enable, disable)	Allows you to enable or disable ROMShield antivirus protection. The adapter default is ON.
/timeout=(30secs, 2_5mins)	Selects the period of time the adapter will attempt a remote boot before a local boot occurs (MOP only). The adapter default is 2.5 minutes.
/updateflash	Allows you to write or update an installed remote boot FLASH ROM using the flash450.bin file.

Exiting the EZWORKS Installation Utility

To exit the EZWORKS Installation utility and return to the DOS prompt, use either the File option from the menu bar, or press the **Esc** key.

4

Software Information

The EtherWORKS Turbo PCI 10 kit contains device driver software and installation information, and network management information.

Device Driver Information

The distribution diskette's \README.TXT file, located in the diskette's root directory, contains a list of the supported device drivers and the directory structures for the supported operating environments.

The diskette contains additional README.TXT files within the directory structures for each supported operating environment. The information in these files pertains to the specific device driver or operating environment corresponding to the subdirectory where they are found.

Network Management Software Information

The network management diskette contains the NICWORKS local management application. NICWORKS is a graphical tool that allows the user to view adapter performance statistics in real time.

The \README.TXT file, located in the network management diskette's root directory, contains a list of additional supported network management software and the directory structure for the supported operating environments.

The network management diskette contains additional README.TXT files within the directory structures for each supported operating environment. The information in these files pertains to the specific network management software or operating environment corresponding to the subdirectory where they are found.

Mac OS Information

The supported device drivers for Mac OS are available electronically. See the following section for further information.

Obtaining the Latest EtherWORKS Turbo PCI 10 Software

The device driver software diskette included in your EtherWORKS Turbo PCI 10 kit can become outdated as operating system software evolves. The latest versions of the driver files can be found on the Internet, CompuServe, World Wide Web, or Network Product Business Bulletin Board Service (NPB BBS) by using the following procedures:

- **Internet:**

1. Perform an anonymous ftp connection to `ftp.digital.com`. Your login name is `anonymous`.
2. Enter your password. (Use your Internet electronic mail address as your password.)
3. Using uppercase and lowercase letters (as shown), change your directory to one of the following:

```
cd /pub/DEC/adapters/ethernet/de450/release
cd /pub/DEC/adapters/ethernet/de450/interim
```

4. Select image mode before extracting binary (non-ASCII) files:

```
ftp> i
```

5. Retrieve a driver file, as in the following example:

```
ftp> get driver.ZIP
```

6. Enter `quit` to exit ftp.
7. Use the `-d` option to extract subdirectories and files to the root directory of a blank diskette:

```
C:\> pkunzip -d driver.ZIP
```

- **CompuServe:**

1. Enter !Go decpci to select the DECPCI forum and enter the LAN Controllers library.
2. Select the *Browse* option to scroll through the library titles.
3. Click on the DE450 title, then press to display the description of the DE450.
4. Select the *Retrieve* option to copy the file to your system.

For information on how to obtain a CompuServe account in the U.S., call 1-800-848-8990.

- **World Wide Web:**

Enter the following universal resource locator (URL) to access Digital's adapter Home Page on the World Wide Web:

<http://ftp.digital.com/pub/DEC/adapters/home.html>

- **Network Product Business (NPB) Bulletin Board Service:**

1. Using a modem (parameters 9600, 8, n, 1), connect to the NPB Bulletin Board Service in the U.S. by dialing 508-486-5777.
2. Using a modem, connect to the PC Business Unit (PCBU) Bulletin Board Service (PCBU BBS) in Europe by dialing (33) 92 96 03 12, then select networks product/area 23.
3. Follow the menu-driven instructions on your screen to download the driver files.

A

Problem Solving

This appendix describes problems that you could encounter when installing the EtherWORKS Turbo PCI 10 adapter, and suggests possible causes and solutions.

Fault Isolation by Symptom

Table A-1 describes how to isolate faults by the symptoms that occur.

Table A-1 Fault Isolation by Symptom

Symptom	Possible Cause	Recommended Action
The system is on, but there is no display or response from the keyboard.	The monitor is either not on or not connected to the video board.	Be sure the monitor cable is firmly connected to the video board. Set the monitor's power switch to ON.
	The Turbo PCI 10 adapter is not seated securely.	Turn your system off, reseal the adapter, then turn your system on again (see Chapter 2).
	The network cable is loose.	Secure the cable.

(continued on next page)

Table A-1 (Cont.) Fault Isolation by Symptom

Symptom	Possible Cause	Recommended Action
The system does not remote boot.	The adapter is preventing your system from operating correctly.	Disconnect the cable from the adapter. Turn your system off, reseal the adapter, then turn your system on again. If the problem persists, contact your system administrator or Authorized Digital Distributor.
	The IRQ settings are incorrect.	Check the adapter's settings in the EZWORKS Installation utility. Use the BIOS Setup utility to change any settings.
	The PCI slot containing the adapter is not enabled or not enabled for bus mastering.	Use the BIOS Setup utility to enable the PCI slot.
	The Turbo PCI 10 adapter is not configured for remote boot.	Ensure that the remote boot feature is enabled by the ROM Setup utility supplied with your boot ROM.
	The default remote boot timeout could be insufficient for a busy network.	Change the remote boot timeout period to 2.5 minutes.
	The Ethernet address is not registered with the remote boot server.	Register the Turbo PCI 10 adapter with the server. If the problem persists, contact your system administrator.
	The remote boot ROM is not present or is incorrectly installed.	Check the ROM installation to ensure it is aligned and seated correctly, and there are no bent pins.

(continued on next page)

Table A-1 (Cont.) Fault Isolation by Symptom

Symptom	Possible Cause	Recommended Action
	The ThinWire link is not connected correctly.	Check to see if the coaxial cable is connected and terminated correctly at each end.
	The twisted-pair link is down, signaled by the green LED being off on the DE450-TA adapter.	Verify that the twisted-pair cable is connected and correctly attached to the hub. A straight-through or cross-over type of cable may be required.

Diagnostic Test Errors

Table A-2 describes the EtherWORKS Turbo PCI 10 adapter diagnostic test error messages and the recommended corrective actions for each group of messages.

Table A-2 Diagnostic Test Error Codes

Error Message	Recommended Actions
Registers Read/Write error Ethernet Address ROM CRC error	Ensure that the Turbo PCI adapter is seated securely in a PCI bus slot, or try another available PCI bus slot. Ensure that the adapter was installed correctly during BIOS Setup: the PCI slot is enabled, an IRQ number is assigned, and bus mastering is enabled. (See Appendix C for more information.) ¹

¹If the problem persists, the adapter could be defective. Depending on where you purchased the adapter, contact either your Authorized Digital Distributor or Digital Technical Support.

(continued on next page)

Table A–2 (Cont.) Diagnostic Test Error Codes

Error Message	Recommended Actions
Internal Loopback error Interrupt Loopback error	IRQ conflict (when two adapters want to use the same interrupt line) or the PCI slot was not enabled. Check the adapter's settings in the EZWORKS Installation utility. Use the BIOS Setup utility to change any settings. ¹
CRC Logic error	Network-related test failures. If the driver was installed before running diagnostics, power down your system, then start again. ¹
Two Buffered Xmt/Rcv error Chained Xmt/Rcv error Force Collision error Setup Frame Filter error	Network-related test failures. If the driver was installed before running diagnostics, power down your system, then start again. ¹
General Purpose Timer error	IRQ conflict (when two adapters want to use the same interrupt line) or the PCI slot was not enabled. Check the adapter's settings in the EZWORKS Installation utility. Use the BIOS Setup utility to change any settings. ¹
External Loopback error	Confirm that the internal loopback test passed. Ensure that the selected medium port was attached with a loopback connector.
Echo Station error Network Link error	Confirm that the internal and external loopback tests passed. Ensure that the medium port is selected correctly and the cable is connected correctly.
Memory allocation error	Insufficient memory for diagnostics; release some memory. If the problem persists, contact your system administrator.

¹If the problem persists, the adapter could be defective. Depending on where you purchased the adapter, contact either your Authorized Digital Distributor or Digital Technical Support.

(continued on next page)

Table A–2 (Cont.) Diagnostic Test Error Codes

Error Message	Recommended Actions
Unable to find Digital network card error	Ensure that the Turbo PCI adapter is seated securely in a PCI bus slot or try another available PCI bus slot. Ensure that the PCI adapter was installed correctly during BIOS Setup: the PCI slot is enabled, an IRQ number is assigned, bus mastering is enabled, and remote boot is enabled (optional). (See Appendix C for more information.) ¹
Network is active error	Unload the driver or cold boot your system to deactivate the adapter.

¹If the problem persists, the adapter could be defective. Depending on where you purchased the adapter, contact either your Authorized Digital Distributor or Digital Technical Support.

Note

The last three error messages are network related. These messages appear in the EZWORKS Installation utility Diagnostics information box.

B

General Information

This appendix provides general system specifications and cabling requirements for the EtherWORKS Turbo PCI 10 adapter.

Physical Description

The EtherWORKS Turbo PCI 10 adapter meets the criteria for variable-height short cards that use the 32-bit PCI bus connector. The adapter measures 5.70 inches (144.8 mm) x 3.75 inches (95.3 mm), and is constructed using two-layer circuit board technology.

Functional Components

The major functional components of the EtherWORKS Turbo PCI 10 adapter are as follows:

- 10Base-T twisted-pair Ethernet (8-pin MJ connector) network interface (DE450-TA and DE450-CA)
- 10Base2 ThinWire Ethernet (coaxial) network interface (DE450-CA)
- AUI Ethernet network interface (DE450-CA)
- DECchip 21041
- Two LEDs that indicate transmit and receive network activity, and link status
- Remote boot ROM socket

LEDs

During normal system powerup, both the amber and green LEDs turn on and remain on. Once the network software and driver are loaded, or the EtherWORKS Turbo PCI 10 adapter's diagnostics are running, the LEDs reflect status as described in Table B-1.

Table B-1 describes the EtherWORKS Turbo PCI 10 adapter LEDs.

Table B-1 LED States

LED	Color	Description
Activity	Amber	On or blinking —Network is active. Off —Network is inactive.
Link	Green ¹	On —Link is OK. Off —Link has failed. Blinking —Link is failing.

¹This LED is used when twisted-pair or twisted-pair full-duplex mode is selected and a twisted-pair cable is attached to the network. Refer to the Twisted-Pair Link LED description for more information.

Network Activity

When the network or diagnostic software is running, the amber LED turns on whenever transmit or receive data is detected on the network. With low levels of network activity, the LED blinks. As network activity increases, the LED blinks faster, and at times appears to remain on.

Twisted-Pair Link

When the network or diagnostic software is running, the green LED turns on in either twisted-pair or twisted-pair full-duplex mode if receive data or link pulses are detected. If no receive data or link pulses are detected within 150 milliseconds, the green LED turns off, indicating link fail status.

Electrical Parameters

Table B-2 shows the electrical parameters for the EtherWORKS Turbo PCI 10 adapter.

Table B-2 Electrical Parameters (DE450-CA)

Cable Type	Power Maximum	dc Amps (+5.0 V) Maximum	dc Amps (+12.0 V) Maximum
Twisted-pair	1.9 W	0.38 A	–
ThinWire	1.7 W	0.34 A	–
AUI ¹	7.0 W	0.2 A	0.5 A

¹When using the AUI cable, the amount of +12.0 Vdc power used is dependent on the transceiver or medium attachment unit (MAU) to which the adapter is connected.

Note

The maximum power for the DE450-TA adapter is 1.0 watts; the maximum amount for +5.0 Vdc power is 0.2 amps.

Caution

When adding adapters to your computer, verify that the combined power (wattage) required for the adapters in your computer does not exceed the power supply rating. Check your computer documentation for this information.

Operating Environment

Table B-3 lists the recommended operating environment specifications for the EtherWORKS Turbo PCI 10 adapter.

Table B-3 Operating Environment

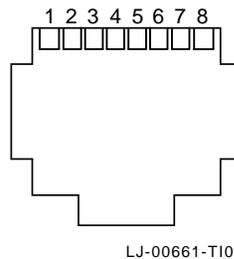
Condition	Value
Temperature (at sea level)	0°C—70°C (32°F—158°F)
Relative humidity	8% to 80% (noncondensing)
Radiated emissions	FCC Class B, CISPR-22 Class B, CEmark Class B, and VCCI 2

Connector Pinning

The EtherWORKS Turbo PCI 10 adapter's 10Base-T twisted-pair networks connector has the following pin signals (also see Figure B-1):

Pin Number	Signal Name
1	Transmit +
2	Transmit -
3	Receive +
4	NC (no connection)
5	NC (no connection)
6	Receive -
7	NC (no connection)
8	NC (no connection)

Figure B-1 8-Pin MJ Connector (Front View)



Cabling Requirements

Use one of the following cable types, or its equivalent, to connect your EtherWORKS Turbo PCI 10 adapter to the network. The *xx* stands for cable length in meters for each of the following Digital part numbers:

- 10Base-T twisted-pair cable:
 - BN25G-*xx*—Point-to-point unshielded twisted-pair patch cable to connect an EtherWORKS Turbo PCI 10 adapter to an office wallplate from a repeater
 - BN26M-*xx*—Point-to-point shielded twisted-pair office cable to connect an EtherWORKS Turbo PCI 10 adapter to a shielded office wallplate
 - BN24F-*xx*—Crossover (4-conductor, 2 twisted-pair) unshielded twisted-pair office cable to connect an EtherWORKS Turbo PCI 10 adapter to another EtherWORKS Turbo PCI 10 adapter, or an EtherWORKS Turbo PCI 10 adapter to an office wallplate from a 900-series DEC repeater
 - BN26N-*xx*—Crossover (4-conductor, 2-twisted pair) shielded twisted-pair office cable to connect an EtherWORKS Turbo PCI 10 adapter to another EtherWORKS Turbo PCI 10 adapter, or an EtherWORKS Turbo PCI 10 adapter to a shielded office wallplate from a 900-series DEC repeater

- 10Base2 ThinWire cable:
 - BC16M-xx—ThinWire cable used with an H8223-00 T-connector and an H8225-00 ThinWire terminator when connecting to an office wallplate.
- AUI cable:
 - BNE4C-xx—IEEE 802.3 office transceiver cable
 - BNE3H-xx—(PVC) IEEE 802.3/standard transceiver cable
 - BNE3L-xx—(Plenum) IEEE 802.3/standard transceiver cable

For more information about network configuration, planning, and cabling, refer to the *OPEN DECconnect Applications Guide* (PN EC-G2570-42).

Other Digital Network Adapter Products

The EtherWORKS Turbo PCI 10 adapter is part of a complete family of low-cost switches, repeaters, adapters, and ROMs developed by Digital Equipment Corporation. Other products are listed in Table B-4.

Table B-4 Other Products

Product	Order Number	Description
EtherWORKS Switch 6T/2TX	EK-DEL6X-IN.A01	Provides five 10 Mb/s 8-pin MJ ports and one 10 Mb/s TP/AUI/BNC combination port to connect to a subnetwork or directly to a PC, server, or key workstation, and two 8-pin 100 Mb/s Fast Ethernet ports for connection to a backbone or server.

(continued on next page)

Table B-4 (Cont.) Other Products

Product	Order Number	Description
EtherWORKS Switch 2TTX	EK-DEL2X-IN. A01	Provides two 10/100 Mb/s 8-pin MJ ports to connect to either a subnetwork or directly to a PC, server, or workstation.
EtherWORKS Hub 8TX Repeater	EK-DELXR-IN.A01	Provides eight 100 Mb/s 8-pin MJ ports to connect to a PC or workstation and one daisy-chain port to connect to another compatible repeater.
DE45X-AR Remote Boot ROM	EK-DE45X-AR.A01	Enables you to perform a remote boot using the MOP or RPL protocols when installed on an EtherWORKS Turbo PCI 10 adapter.
DE20M-AR Remote Boot ROM	EK-DE20M-AR.A01	Enables you to perform a remote boot using MOP or RPL protocols when installed on an EtherWORKS 3 Turbo adapter in a DOS-based system.
Fast EtherWORKS PCI 10/100 Adapter	EK-DE500-IN.C01	Provides single 10 Mb/s or 100 Mb/s 8-pin MJ port to connect to IEEE 802.3 Ethernet networks.
DEC FDDIcontroller /PCI Adapter	EK-DEFPA-IN.C01	Provides direct connection of industry standard computers with a PCI I/O bus to a 100-Mb/s FDDI network.

(continued on next page)

Table B-4 (Cont.) Other Products

Product	Order Number	Description
DEC FDDIcontroller /EISA Adapter	EK-DEFEA-IN.D01	Provides direct connection of industry standard computers with EISA I/O bus to a 100-Mb/s FDDI network.
EtherWORKS 3 Turbo Adapter	EK-LEMAC-IN.D01	Provides capability to integrate IBM compatible PCs into LAN environments using IEEE 803.3 Ethernet protocols.
EtherWORKS PCMCIA Turbo Adapter	EK-DEPCM-IN.A01	Provides a credit card sized adapter link for laptop and notebook PCs to 10-Mb/s Ethernet networks.
EtherWORKS Turbo EISA Adapter	EK-DE425-IN.A01	Provides capability to integrate EISA-compatible computers into a network using twisted-pair, AUI, or ThinWire Ethernet cables supporting full-duplex operation of 20 Mb/s.

To order these products, contact an Authorized Digital Distributor or Digital sales representative. For more information, call 800-457-8211 in the U.S. and Canada, 508-692-2562 in other locations, or your local sales office.

C

PCI BIOS Setup Utility

This appendix describes the PCI BIOS Setup utility and provides a list of the PCI option settings and requirements to use for the EtherWORKS Turbo PCI 10 adapter.

Some earlier PCI systems contain a PCI BIOS Setup utility that enables you to select and permanently store information about the computer's hardware and software in the battery-backed memory of the CMOS RAM. This information is used each time the computer is booted and can be changed each time you run the Setup utility.

When you invoke the BIOS Setup utility, perform the following steps for each PCI slot that contains an EtherWORKS Turbo PCI 10 adapter:

1. Enable the PCI slot.
2. Assign an IRQ number.
3. Enable bus mastering.

Table C-1 lists typical PCI option settings and the requirements for an EtherWORKS Turbo PCI 10 adapter. On later PCI plug-and-play systems, the PCI BIOS automatically configures the adapter, so there is no user action needed.

Table C-1 EtherWORKS Turbo PCI 10 Option Settings

This setting . . .	Allows you to . . .	EtherWORKS Turbo PCI 10 Requirements
Enable/disable device	Enable or disable each PCI slot.	PCI slot must be enabled.
IRQ	Set an IRQ default for each PCI slot (none or any valid IRQ).	Any valid IRQ.
Enable master	Enable bus mastering on a PCI slot.	PCI slot must be enabled for bus mastering. ¹
Latency timer	Set the PCI latency timer (in PCI clocks) for each PCI device.	All settings supported.

¹Some PCI computers have a slot that does not support bus mastering. Make sure that the Turbo PCI 10 adapter is installed in a PCI slot that has bus mastering capabilities.

Note

Check the device driver README.TXT files to make sure the drivers you install support shared interrupts.