INSTALLATION AND USER'S GUIDE

ITIpci™ 5000 Series Fast Ethernet PCI Host Adapters

October 2001

Version 1.0 Preliminary

LSI LOGIC®

DB15-000206-00

Electromagnetic Compatibility Notices

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.

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. 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:

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- Increase the separation between the equipment and the 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.

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LSI Logic Corporation
North American Headquarters
Milpitas, CA
408.433.8000

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Preface

This book is the installation and user's guide for the ITIpci™ 5000 Series Fast Ethernet PCI Host Adapters. This preliminary version contains information pertaining to the ITI5232E and ITI5464E Four Port Ethernet Host Adapters.

Audience

This document assumes that you have some familiarity with Ethernet and Fast Ethernet PCI Host Adapters and related support devices. The people who benefit from this book are:

- Engineers and managers who are evaluating the Host Adapter for possible use in a system
- Engineers who are designing or installing the Host Adapter into a system
- End-users

Organization

This document has the following chapters and appendix:

- Chapter 1, **Installing the Fast Ethernet Host Adapters** describes the features of the ITI5232E and ITI5464E host adapters, and provides instructions for installing these boards.
- Chapter 2, **Hardware Specifications** provides adapter specifications, connector information, and cabling requirements.
- Chapter 3, **Network Device Driver Installation** provides instructions for installing your device driver onto various operating systems.
- Appendix A, **Using Digital SRM Console Settings** describes how the SRM console is used in Digital Alpha platforms.

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Chapter 1
Installing the Fast Ethernet Host Adapters

This chapter contains instructions about installing the ITI5232E and ITI5464E Four Port Fast Ethernet PCI Host Adapters. This chapter describes these topics:

1.1 General Description

The LSI Logic ITI5232E and ITI5464E Four Port Ethernet host adapters provide four FAST (10/100 Mbits/s) channels from a single PCI host slot. These Ethernet host adapters offer the highest degree of integration available for your PCI-based computer system to ensure maximum network server performance. Installing these adapters into your PCI system allows connection of Ethernet devices over an Ethernet bus.

Each of the four ports is capable of running FAST (100 Mbits/s), FAST Full Duplex, or 10 Mbits/s for configuration flexibility. This configuration allows a single card to communicate with FAST or Standard Ethernet systems simultaneously.

1.1.1 Features

The ITI5232E and ITI5464E host adapters support these features:

- ITI5232E - 32-bit direct memory access (DMA) architecture

  ITI5464E - 64-bit direct memory access (DMA) architecture
- ITI5232E - four independent 10/100 Digital 21143-PC Ethernet channels

ITI5464E - four independent 10/100 Intel 21143-TD Ethernet channels

- Jumperless “Plug and Play” implementation
- Half and Full Duplex mode of operation
- Speed, Link Status, Transmit and Receive activity LEDs
- 3.3 V and 5.0 V universal PCI support

1.2 Quick Host Adapter Installation

This section provides the system requirements and instructions for installing your ITI5232E or ITI5464E Ethernet Host Adapter.

1.2.1 System Requirements

Before you begin the installation procedure, you will need:

- A system that is compatible with the *PCI Local Bus Specification, Revision 2.1*
- An available PCI bus master expansion slot
- A floppy disk drive for loading the software drivers
- UTP category 3, 4 or 5 cable (type dependant on your network type)

Note: For multichannel adapters such as the ITI5232E and ITI5464E, LSI Logic requires that your host system firmware or BIOS support PCI bridging. If your host does not support PCI bridging, contact your system vendor for a BIOS upgrade. If your system cannot be brought into compliance with the PCI bridge specification, then you will not be able to use multichannel ITIpci host adapters.

1.2.2 Installing the Adapter

To install a Fast Ethernet PCI Host Adapter board, follow these steps:

Step 1. Turn off the power to the computer system, and to all peripherals directly connected to the system (monitor, printer, external SCSI enclosures, and other peripherals).

Step 2. Unplug the system from the AC power line.

Step 3. Open your PC cabinet by removing its cover.

Step 4. Ground yourself before handling the host adapter board to discharge static electricity.

You may use an antistatic strap or other precautions to avoid static discharge to your computer system or the Fast Ethernet Host Adapter.

Step 5. Remove the host adapter board from its packing and examine it for any damage. Retain the packing for future use.

Step 6. Locate the slot for installing PCI plug-in boards.

Step 7. Remove the screw and metal bracket for the selected slot.

Step 8. Insert your ITI5232E or ITI5464E Fast Ethernet host adapter board into the selected PCI slot.

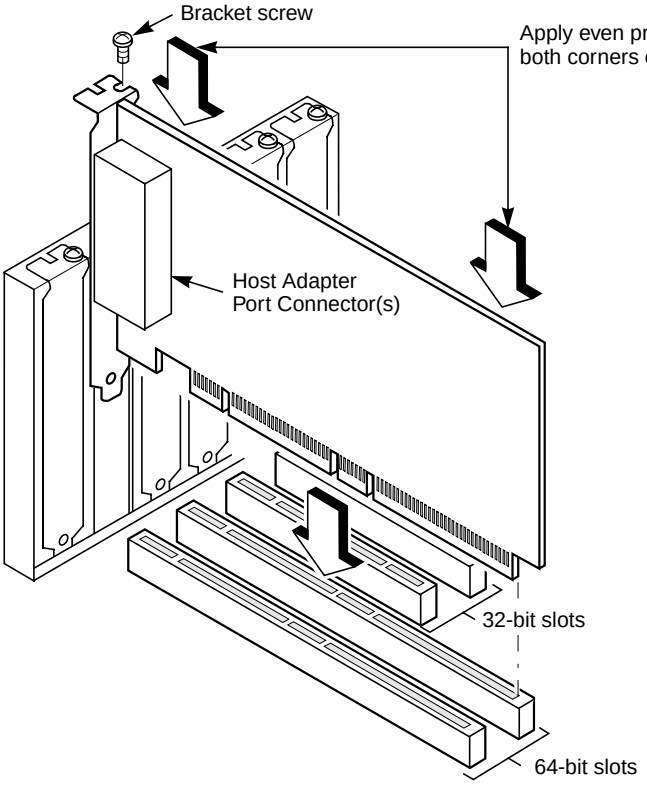
Step 9. Make any configuration changes.

Step 10. Replace your PC cabinet cover.

Step 11. Power up the peripherals, and then your computer.

The host adapter installation is complete.

Figure 1.1 Inserting the Host Adapter



Chapter 2
Hardware Specifications

This chapter provides technical specifications for the ITI5232E and ITI5464E Fast Ethernet host adapters. It discusses these topics:

2.1 Fast Ethernet Host Adapters

Table 2.1 describes the ITIpci 5000 Fast Ethernet host adapters.

Table 2.1 ITIpci Fast Ethernet Host Adapters

Host Adapter	Description
ITI5232E-N	Four Port FAST Ethernet Adapter for Windows NT, Windows 2000, Windows 95, and Windows 98 operating systems that support sharing of PCI interrupts.
ITI-5464E-I	Four Port FAST Ethernet Adapter for Windows NT, Windows 2000, Windows 95, Windows 98 operating systems that support sharing of PCI interrupts

The ITI5232E and ITI5464E modules are functionally similar but dimensionally the ITI5464E meets PCI short card specifications. See Section 2.2, “Adapter Specifications,” page 2-2 for more information.

2.2 Adapter Specifications

Table 2.2 provides the technical specifications for the ITI5232E Four Port 10/100 Ethernet PCI host adapter.

Table 2.2 ITI5232E Fast Ethernet Host Adapter Specifications

Bus Interface	PCI 32-bit bus master
Hardware Interrupts	ITI5232E-N - supports shared interrupts
Base I/O Addresses	Assigned by BIOS
Data Transfer Rates	Up to 800 Mbits/s in FAST Full Duplex mode
Power Requirements	PCI Universal 3.3 V or 5 V at 17 watts
Environmental • Operating Temperature • Humidity • Altitude	 0 to 55 °C 5% to 85% noncondensing 3000 m maximum
Ethernet Standards	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-T
Certifications	FCC Class B CE Class B
Ethernet Electrical Connections	Four female RJ-45 connectors
Physical Dimensions	9.0 x 4.2 inches 228.6 x 106.68 mm
Network Speeds Supported per Ethernet Network Segment	10 Mbits/s 20 Mbits/s Full duplex 100 Mbits/s 200 Mbits/s Full duplex
Indication LEDs	Link, Activity, and 100TX link for each channel

Table 2.3 provides the technical specifications for the ITI5464E Four Port 10/100 Ethernet PCI host adapter.

Table 2.3 ITI5464E Fast Ethernet Host Adapter Specifications

Bus Interface	PCI 64-bit bus master
Hardware Interrupts	ITI5464E-I - supports shared interrupts
Base I/O Addresses	Assigned by BIOS
Data Transfer Rates	Up to 800 Mbits/s in FAST Full Duplex mode
Power Requirements	PCI Universal 3.3 V or 5 V at 17 watts
Environmental • Operating Temperature • Humidity • Altitude	 0 to 55 °C 5% to 85% noncondensing 3000 m maximum
Ethernet Standards	IEEE 802.3 10 BASE-T IEEE 802.3u 100 BASE-T
Certifications	FCC Class B CE Class B
Ethernet Electrical Connections	Four female RJ-45 connectors
Physical Dimensions	6.875 x 4.2 inches 174.625 x 106.68 mm
Network Speeds Supported per Ethernet Network Segment	10 Mbits/s 20 Mbits/s Full duplex 100 Mbits/s 200 Mbits/s Full duplex
Indication LEDs	Link, Activity, and 100TX link for each channel

2.3 Connectors and Indicator LEDs

The ITI5232E and ITI5464E provide four 8-pin Modular Jack (MJ) connectors (also known as RJ-45 connectors) for connection with your network. Each of these four ports supports either Twisted Pair Category 3 or 5 cable for 10 Mbits/s connections, or Category 5 cable for 100 Mbits/s operation. Figure 2.1 shows the ITI5232E and ITI5464E adapter connectors and indicator LEDS.

Figure 2.1 Connectors and Indicator LEDS

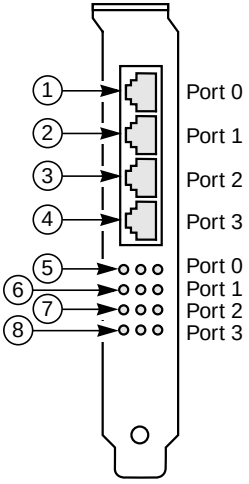


Table 2.4 describes each component as shown in Figure 2.1.

Table 2.4 Connections and Indicator LEDs for ITI5232E and ITI5464E

Reference	Component	Description
1	Channel 0 8-pin RJ-45 Connector	10/100 Mbits/s twisted-pair network connector for Channel 0
2	Channel 1 8-pin RJ-45 Connector	10/100 Mbits/s twisted-pair network connector for Channel 1
3	Channel 2 8-pin RJ-45 Connector	10/100 Mbits/s twisted-pair network connector for Channel 2
4	Channel 3 8-pin RJ-45 Connector	10/100 Mbits/s twisted-pair network connector for Channel 3
5	Channel 0 Indicator LEDs	100 Mbits/s (Left LED) Activity (Center LED) Link (Right LED)
6	Channel 1 Indicator LEDs	100 Mbits/s (Left LED) Activity (Center LED) Link (Right LED)

Table 2.4 Connections and Indicator LEDs for ITI5232E and ITI5464E (Cont.)

Reference	Component	Description
7	Channel 2 Indicator LEDs	100 Mbits/s (Left LED) Activity (Center LED) Link (Right LED)
8	Channel 3 Indicator LEDs	100 Mbits/s (Left LED) Activity (Center LED) Link (Right LED)

2.4 Connector Pin Assignments

Each of the four 8-pin RJ-45 connectors for 10/100 Mbytes/s are wired as shown in Figure 2.2.

Figure 2.2 8-Pin RJ-45 Connector

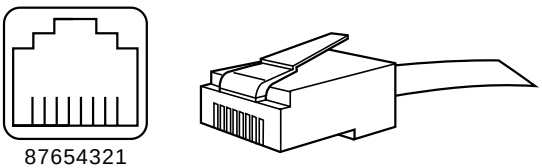


Table B.5 shows the connection pins that are assigned.

Table B.5 8-Pin RJ-45 Connector Pin Assignments

Pin Number	Signal Name
1	Transmit + TX (+)
2	Transmit – TX (–)
3	Receive + RX (+)
4	No Connection NC
5	No Connection NC
6	Receive – RX (–)
7	No Connection NC
8	No Connection NC

Connection from the ITI5232E or ITI5464E adapter to a network hub must be made as shown in Table B.5.

Table B.6 Adapter to Network Hub Wiring

Straight Through				
	Adapter Pin		**Hub Pin**	
TX (+)	1	⇔	1	RX (+)
TX (–)	2	⇔	2	RX (–)
RX (+)	3	⇔	3	TX (+)
	4		4	
	5		5	
RX (–)	6	⇔	6	TX (–)
	7		7	
	8		8	

Connection from the ITI5232E or ITI5464E adapter to another network adapter (point-to-point) must be made as shown in Table B.7.

Table B.7 Adapter to Adapter (Point-to-Point) Wiring

Crossover				
	Adapter 1 Pin		**Adapter 2 Pin**	
TX (+)	1	⇔	3	RX (+)
TX (–)	2	⇔	6	RX (–)
RX (+)	3	⇔	1	TX (+)
	4		4	
	5		5	
RX (–)	6	⇔	2	TX (–)
	7		7	
	8		8	

2.5 Cabling Requirements

In order for your network to operate properly, you must use a category of network cabling that is appropriate for the data rate of the channel. For 10 Mbits/s operation, Category 3, 4, or 5 cable is appropriate. When operating in 100 Mbits/s or 100 Mbits/s Full Duplex, a Category 5 cable should be used.

The maximum cable segment length supported at 100 Mbits/s speed, on Category 5 cable is 100 m. Any single cable segment (adapter to adapter or adapter to network hub) must be within the 100 m length requirement.

Chapter 3
Network Device Driver Installation

This chapter provides instructions for installing your network device driver on various operating systems. It includes these topics:

3.1 Windows Device Driver Installation

The ITI5232E and ITI5464E Four Port Fast Ethernet host adapters use the industry leading Fast Network Engine, which is the Intel 21143 PCI MAC. The Digital DC21X4.SYS miniport driver supports the four Ethernet channels on each host adapter.

Note: Digital’s Alpha systems use a dynamic link library file (DLL) called a hardware abstraction layer (HAL). This file can be found on your boot disk at the location `\os\hal.dll`. This is a system file and is hidden. You must use the “show system and hidden files” option under explorer to see this file.

Certain Alpha systems will hang (wait forever) after installing multiport Ethernet cards unless this file is updated to `hal.dll` dated on or after 26-MAY-1998.

If you experience this hang, shut down the machine, and remove the ITI5232E or ITI5464E board from your system. Contact Digital for an updated HAL file and installation instructions.

3.1.1 For Windows NT

This section provides instructions about installing the miniport driver to new and existing Windows NT systems. The choices that you are given may vary slightly from these examples based on your machine's current network configuration and options. See your system administrator for any additional information.

3.1.1.1 New System Installation

To install Windows NT on a new system, the system BIOS must support booting from a CD-ROM. Windows NT automatically adds the driver to the registry and copies the driver to the appropriate directory. To install Windows NT from a boot diskette, refer to the Microsoft Windows NT documentation for more information.

The network driver is bundled with the Windows NT operating system, and there is automatic installation of your network driver. Thus, no user action is required as they will be loaded from the CD-ROM. Follow the Microsoft Windows NT prompts to complete the installation.

To verify the installation, follow these steps.

Step 1. Click on the Start button. Select Settings-->Control Panel.

Step 2. Double click on the Network icon.

Step 3. Click on the Adapters tab.

The system displays the four controllers for your Fast Ethernet Host Adapter.

Step 4. Select one controller and right click on your mouse.

Step 5. Select Properties to see more information.

3.1.1.2 Existing System Installation

Follow the instructions about installing your Fast Ethernet host adapter into your computer. Be sure to have your Windows NT distribution media available prior to starting this procedure. To install the network driver on your Fast Ethernet host adapter, follow these steps:

Step 1. Boot Windows NT and log on as Administrator.

Step 2. Click on the Start button. Move to Settings-->Control Panel.

Step 3. Select the Network icon from the Control Panel menu.

A dialog box may appear and prompt you with this question:

```
Do you want to install NT Networking?
```

Step 4. Select Yes and continue.

The Network Setup Wizard window appears. Go to the next step.

or

Select No and continue if you just want to add the drivers without being wired to a network. Refer to your Microsoft documentation concerning this option.

Step 5. Choose the appropriate settings for your system.

Step 6. Click on the Next button.

Step 7. Click on Start Search button.

Step 8. Click on Find Next.

The system displays:

```
DEC PCI Fast Ethernet PCI chip 21142
[detected].
```

Step 9. Click on the Next button.

Step 10. Click on Protocols.

Step 11. Follow the Windows NT prompts.

Step 12. Click on the Next button.

The system copies files.

Step 13. Place the Windows NT installation media in the CD-ROM drive, and complete the Windows NT network installation.

Consult the Microsoft Windows NT documentation if you are unfamiliar with this process.

Step 14. Follow the on-screen prompts until you are prompted for a Network Adapter Type.

Step 15. Select the Adapters tab from the “Network dialog box”.

Step 16. Select “IntraServer ITI5232E Four Port 10/100 Mbits/s Ethernet” or “IntraServer ITI5464E Four Port 10/100 Mbits/s Ethernet” adapter, and click on the OK button.

A “Connection Type” dialog box appears and allows you to select the connection type appropriate for your network configuration.

Step 17. To select the default connection type for most network connections, choose AutoSense.

or

To change the media connection type, be certain to select the correct connection type for your network. If not, the adapter port will not “link” to the network.

Step 18. Click on the Continue button.

Step 19. Upon completion, the selected adapter port(s) is added to the Installed Adapter Cards list in the Network Setting box (the number prefixing the adapter is the adapter port number).

Step 20. Click on the OK button to complete the Network Setting initialization.

Based on the protocols you are running, one or more dialog boxes may appear. See your network administrator for appropriate settings for your network for each of the dialog boxes.

Step 21. Click on the Finish button.

The system prompts you about restarting your computer.

Step 22. Click on the Yes button to restart your system.

3.1.2 For Windows 2000

This section provides instructions about installing the miniport driver onto new and existing Windows 2000 systems. The choices you are given may vary slightly from these examples based on your machine's current network configuration and options. See your system administrator for any additional information.

3.1.2.1 New System Installation

To install Windows 2000 on a new system, the system BIOS must support booting from a CD-ROM. Windows 2000 automatically adds the driver to the registry and copies the driver to the appropriate directory. To install Windows 2000 from a boot diskette, refer to the Microsoft Windows 2000 documentation for more information.

The driver is bundled with the Windows 2000 operating system, so no user action is required as they will be loaded from the CD-ROM automatically. Refer to your Microsoft Windows 2000 documentation for more information on new system installations. To verify the driver has been installed, follow the instructions under Existing System Installation.

3.1.2.2 Existing System Installation

Follow the instructions about installing your Fast Ethernet host adapter into your computer. To verify your network drivers have been installed upon detecting your Fast Ethernet adapter, follow these steps:

Step 1. Boot Windows 2000 and log on as Administrator.

Step 2. Click on the Start button. Move to Settings-->Network & Dial Up Connection

The system displays a list of the four channels installed.

Step 3. Click on one of the channels and select Properties.

A window appears to display the connection.

You will see a message similar to this:

```
Cabletron DE5008 PCI Fast Ethernet Adapter
```

Step 4. Click on the OK button.

Windows 2000 performs an automatic installation of network drivers for all channels.

3.1.3 For Windows 95 and Windows 98

This section provides instructions about installing the miniport driver onto new and existing Windows 95 or Windows 98 systems. The choices you are given may vary slightly from these examples based on your machine's current network configuration and options. See your system administrator for any additional information.

3.1.3.1 New System Installation

Follow these instructions for new system installations:

Step 1. Start the Windows 95 or Windows 98 Setup according to the Microsoft Windows instructions.

Step 2. Setup enters the hardware detection phase after a system reboot.

If a message appears that the PCI Fast Ethernet Adapter was found, then the bundled driver supports this host adapter.

Step 3. Follow the Windows 95 or Windows 98 prompts to complete the installation.

After the Windows 95 or Windows 98 installation has completed, you can install the driver according to the existing system installation instructions.

3.1.3.2 Existing System Installation

Be sure to have the Windows 95 or Windows 98 distribution media available prior to starting this procedure. To install the device driver onto your Fast Ethernet adapter when the Windows 95 or Windows 98 operating system exists, follow these steps:

Step 1. Boot Windows 95 or Windows 98.

When Windows 95 or Windows 98 detects the new hardware, this message appears:

```
New Hardware Found, PCI Ethernet Controller
```

The system displays the Add New Hardware Wizard dialog box.

The Add New Hardware Wizard window appears and identifies the PCI Fast Ethernet DEC21143 Board Adapter.

Step 2. Click on the Next button.

The system searches for the default driver.

Step 3. Click on the Next button.

The system searches for a location and displays `C:\Windows\INF`.

Step 4. Click on the Next button.

The system prompts with this question:\

`What do you want to install?`

Another message appears and states the system has found the driver.

Step 5. Click on the Next button.

Windows 95 or Windows 98 is now ready to install the driver and lists the location of the driver.

Step 6. Click on the Next button to continue.

The system installs the driver.

The system displays this message:

Please insert the disk labelled Windows 95 or Windows 98 CD-ROM.

Step 7. Insert the Windows 95 or Windows 98 CD-ROM into your CD-ROM drive and click on the OK button.

The system copies files from this Windows 95 or Windows 98 CD-ROM and rebuilds the driver database.

Step 8. Click on the Finish button.

The system displays this message:

To finish setting up your new hardware, you must restart your computer.

Step 9. Click on the Yes button to restart you computer.

The driver has now been added to one channel of your Four Port Fast Ethernet adapter.

Upon rebooting, the system detects another channel and repeats the process above. Since there are four channels, you will repeat this process for the second to the fourth channel.

3.2 NetWare Device Driver Installation

The Novell Netware driver, DC21x4, is used with both Netware 3.1X and Netware 4.XX servers. Refer to your file server installation instructions in the Novell NetWare Installation Manual for more details.

3.2.1 NetWare 3.1X System

To install the Netware 3.1.X device driver, follow these steps:

Step 1. Prepare the hard drives of your server according to the instructions in your Netware 3.1x documentation.

Step 2. While the server is down, insert the Setup diskette into your server's A: drive.

Step 3. Copy the contents of `a:\netware\311` or `a:\netware\312` to the disk from which you boot Netware 3.1X.

Step 4. Type `SERVER` at the DOS prompt and press Enter to boot the Netware 3.1x Server.

Step 5. Type at the server console prompt:

`LOAD INSTALL`

and press Enter.

Step 6. Select System Options.

Step 7. Select Edit `AUTOEXEC.NCF` File

Step 8. Edit the `AUTOEXEC.NCF` file.

You must load the device driver once for each port used.

3.2.2 NetWare 4.X and 4.11 Systems

To install the Netware 4.X and 4.11 device driver, follow these steps:

Step 1. Type at the server console prompt:

`load install`

and press Enter.

The system displays the Installation Options menu.

Step 2. Select Driver Options to load/unload disk and network drivers.

The system displays the Driver Options menu.

Step 3. Select Configure Network Drivers.

The system displays the installed network drivers, and the Additional Driver Actions menu

Step 4. Select a driver and press Enter. If the desired driver is not on the list, proceed to Step 5.

Step 5. Insert the Setup diskette into drive A:.

Step 6. Use the INS key to install the unlisted driver.

Step 7. Press Enter.

The system scans path a:\ for uninstalled drivers.

Step 8. Press Enter to install the NetWare 4.XX or 4.11 driver located on the Setup diskette in drive A:.

Step 9. Select yes to copy the driver DC21X4.

Step 10. Enter information as prompted.

You may modify the adapter's default configuration by changing its parameters when prompted. The default settings provide best results in most cases.

3.3 Linux Device Driver Installation

Contact the technical support team for information regarding drivers, installation, and support for Linux by visiting the LSI Logic Web site at: `http://www.lsilogic.com/support`.

3.4 Compaq Tru64 UNIX Device Driver Installation

Drivers for the ITI5232E and ITI5464E are on the Compaq Tru64 UNIX distribution kit beginning with Version 4.0D. Compaq Tru64 UNIX will identify the ITI5232E and ITI5464E as four 21140 based Ethernet controllers.

To install the Digital UNIX device driver, follow these steps:

Step 1. Boot your system using genvmunix, in the following manner:

```
boot –file genvmunix
```

A Digital UNIX system scans all hardware devices in the system, and identifies the ITI5232E or ITI5464E as four 21140 based Ethernet adapters.

Step 2. Create a new kernel with support for the four Ethernet ports, identified in genvmunix by typing at the command prompt:

```
# doconfig
```

Step 3. When doconfig completes, backup your existing kernel as follows:

```
# cp /vmunix /vmunix.sav
```

Step 4. Copy the new kernel created by `doconfig` to the `/vmunix` directory.

Step 5. Shutdown and reboot your system with your new kernel.

Important: Refer to your Digital UNIX documentation for additional information about the doconfig command.

Digital UNIX relies on the settings for media type and speed set by the SRM console. See Appendix A “Using Digital SRM Console Settings” for more information.

3.5 Digital OpenVMS

Drivers for the ITI5232E and ITI5464E host adapters are on the Digital OpenVMS distribution kit beginning with Version 7.1. Digital OpenVMS identifies the ITI5232E or ITI5464E as four 21140 based adapters.

Follow the documentation for the network software that you will run on the adapter for specific configuration information.

Note 1: Digital OpenVMS relies on the settings for media type and speed set by the SRM console. See Appendix A “Using Digital SRM Console Settings” for more information.

Note 2: If you are connecting “Point to Point” to another adapter, do not select AutoSense for `ewa0_mode`. Also, many hubs do not support AutoSense, it is therefore recommended that the correct media type and speed are selected manually.

3.6 Troubleshooting

Some potential problems and their suggested solutions for Windows NT and Windows 95 installations are provided in this section.

3.6.1 Windows NT

The most common problem encountered on Windows NT for Ethernet devices is a mismatch of the port’s speed and media settings to those in use on the network. The most simple check of correct cabling is to observe the status lights on the handle of the card.

Once the card is installed in the system, the software is installed, and the module is wired to your network hub, the LINK light should be illuminated. If LINK fails to light, check that your cable type and media settings are correct. Refer to Section 2.4, “Connector Pin Assignments,” page 2-5 for more information about cable configurations.

If you are connected to a FAST hub, the adapter must be set to AUTO, FAST, or FAST Full Duplex. The setting depends on the capability of your hub.

If you are connected to a 10 Mbits/s hub, the adapter must be set to AUTO, Twisted Pair, or Twisted Pair Full Duplex. The setting depends upon the capability of your hub.

Note: If you are certain your cable type is correct, but you are not seeing LINK, set the port to match the hub port exactly (for example: FAST, not AUTO). Some hubs have trouble with cards set to AutoNegotiate.

Cables from the ITI5232E or ITI5464E to a hub *must not* be crossover.

Cables from the ITI5232E to another ITI-5232E *must* be crossover.

Cables from the ITI5464E to another ITI5464E *must* be crossover.

3.6.2 Windows NT Error Messages

The error messages are logged in the Windows NT Error Log and can be seen using the Error Log Viewer (in the Windows NT Administration Tools group).

Each error message has a standard NDIS error code and a driver's additional code. The additional codes are listed in Table 3.1.

Table 3.1 DC21X4 NT Driver Error Codes

Error Message	Code
DC21X4_ERRMSG_REGISTRY	0x01
DC21X4_ERRMSG_ALLOC_MEMORY	0x02
DC21X4_ERRMSG_SROM	0x03
DC21X4_ERRMSG_MEDIA	0x04
DC21X4_ERRMSG_LOAD_CAM	0x05
DC21X4_ERRMSG_SYSTEM_ERROR	0x06
DC21X4_ERRMSG_TXM_JABBER_TIMEOUT	0x07

3.6.3 Driver Initialization Error Messages

The Windows NT operating system may display some driver initialization error messages that may be preceded by a warning message.

`NDIS_ERROR_CODE_UNSUPPORTED_CONFIGURATION`
`DC21X4_ERRMSG_REGISTRY`

The AdapterType Registry's key is missing or its value is unsupported by the adapter board.

`NDIS_ERROR_CODE_ADAPTER_NOT_FOUND`

No board matching the AdapterCFID Registry's key value was found plugged into the PCI bus or in the slot specified in the Registry.

`NDIS_ERROR_CODE_OUT_OF_RESOURCES`
`DC21X4_ERRMSG_ALLOC_MEMORY`

Not enough memory to allocate space for the adapter data block.

NDIS_ERROR_CODE_INVALID_VALUE_FROM_ADAPTER
DC21X4_ERRMSG_SROM

Invalid data read from the adapter's serial ROM.

NDIS_ERROR_CODE_NETWORK_ADDRESS

No readable burnt_in or software configured station address.

NDIS_ERROR_CODE_UNSUPPORTED_CONFIGURATION
DC21X4_ERRMSG_MEDIA

The selected media port is not supported by the board.

NDIS_ERROR_CODE_INTERRUPT_CONNECT

Interrupt initialization has failed.

NDIS_ERROR_CODE_TIMEOUT DC21X4_ERRMSG_LOAD_CAM

DC21X4 CAM initialization has failed.

3.6.4 Driver Run-Time Error Messages

The Windows NT operating system may display some driver run-time error messages that may be preceded by a warning message.

NDIS_ERROR_CODE_HARDWARE_FAILURE
DC21X4_ERRMSG_SYSTEM_ERROR

System_Error interrupt (bus parity error)

NDIS_ERROR_CODE_HARDWARE_FAILURE
DC21X4_ERRMSG_TXM_JABBER_TIMEOUT

Transmit Jabber timer has expired.

3.6.5 Windows 95/Windows 98

If the Ethernet adapter is not detected by Windows 95/Windows 98 after installing it and rebooting Windows 95/Windows 98, follow these steps:

Step 1. Double click on My Computer-->Control Panel-->System to display the System Properties window.

Step 2. Select the Device Manager tab from the System Properties window in order to view the list of devices in the PC.

Step 3. Check the list of devices for an entry labeled Other Devices. If an Other Devices entry exists, double click on it to display the list of devices under it.

Step 4. Check the list for an entry labeled PCI Ethernet Controller. If this exists, click on it to highlight it.

Step 5. Click on the Remove button at the bottom of the windows to delete it.

Step 6. Reboot your computer and the Ethernet adapter should now be detected.

Appendix A
Using Digital SRM Console Settings

When the ITI5232E or ITI5464E is being used in a Digital Alpha platform running OpenVMS or Digital UNIX, the SRM console is used to set the port speed, media (cable) type and boot protocols, and can also be used to test the module.

After powering your system up, and before booting your operating system, the system will stop at the SRM console prompt. On a uniprocessor machine, the SRM prompt is ">>>" and on the primary processor of a multiprocessor machine, is "P0>>>".

Digital uses a set of "Environment Variables" to store the settings of certain user definable parameters, which are passed to the operating system to allow the users configuration information to stay consistent when the SRM passes control of the system to the operating system.

A.1 Displaying and Setting Ethernet Port Characteristics

The Alpha console recognizes the Ethernet device as an EW port. There are two commands that are necessary for setting and showing the Ethernet port:

SET and SHOW.

Use SHOW to display characteristics of the Ethernet port.

```
>>>Show EWn0_MODE
```

Where 'n' is the Ethernet port letter.

Use SET to set characteristics of the Ethernet port. The available settings for Ethernet media type are shown in Table A.1.

Table A.1 Digital UNIX and Open VMS SRM Console Media Selection

Parameter	Settings	Description
EWn0_MODE	TWISTED-PAIR	10 Mbits/s Twisted-Pair
	FAST	100 Mbits/s Twisted-Pair Half Duplex
	FULL DUPLEX TWISTED-PAIR	Full Duplex Twisted-Pair
	AUI	Not Supported
	BNC	Not Supported
	FAST FD	FAST Full Duplex

For example, to set the media type and speed to FAST Twisted-Pair, enter the command:

```
>>>set ewa0_mode FAST
```

If you will be remote booting through the Ethernet, you must also set the boot protocol to match that of the boot node. Typically OpenVMS uses MOP protocol and UNIX uses BOOTP.

For example to set a port to MOP (VMS) use:

```
>>>set ewa0_protocol MOP
```

Note: Port 0 will be the lowest controller letter found by the SRM console, “A” if there are no other Ethernet ports in the system. If there is an onboard Ethernet controller, it will be assigned port letter “A” and the ports on your ITI-5232 will be assigned “B, C, D, and E” for ports “0, 1, 2, and 3” respectively.

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