DIGITAL PCI Quad 10/100 Ethernet Adapter

Installation Guide

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Digital Equipment Corporation
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- Increase the separation between the equipment and receiver

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- Consult the dealer or an experienced radio/TV technician for help

VCCI Class 2 Compliance

Title: (JAPANC21.EPS)
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This product is compliant with the requirements of CISPR 22 Class B, and is eligible to bear the CE Mark label.

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Preface

Overview

This guide explains how to install and configure the DIGITAL PCI Quad 10/100 Ethernet adapter (also referred to as the DE504-BA or adapter) in Alpha systems.

Intended Audience

This guide is intended for use by system or network administrators experienced in installing similar hardware.

Guide Conventions

This guide uses the following conventions:

Convention	Description
❶	A number in a black circle in text refers to the corres number in an accompanying illustration.
Boldface	Boldface type in examples indicates user input.
Italics	Italics in examples indicates a variable. Italics in text emphasizes a term or indicates a book title.
Note	A note contains information of special importance.
`Special Type`	This special type in examples indicates system output

Package Contents

The adapter kit contains the following items:

- The DIGITAL PCI Quad 10/100 Ethernet adapter

- A 3½ inch diskette containing Windows NT drivers

- This installation guide

1
Introduction

Overview

This chapter describes the DIGITAL PCI Quad 10/100 Ethernet adapter, and lists the adapter's main features.

Adapter Description

The DE504-BA is a single-slot adapter with direct interface to the 32-bit PCI local bus. The adapter contains four ports capable of running Fast Ethernet, 10/100 Mb/s (half- and full-duplex), for configuration flexibility. This allows a single adapter to communicate with Fast or standard Ethernet systems simultaneously.

Adapter Components

The DE504-BA provides four 8-pin MJ connectors for connecting to the network. Each of these ports supports Category 3 or 5 unshielded twisted-pair (UTP) cable for 10 Mb/s connections, or Category 5 UTP cable for 100 Mb/s operation (refer to the following figure and table).

The following figure shows the DE504-BA connectors and LEDs:

```
Title: (Lj-06474x.eps)
Creator: Adobe Illustrator(TM) for Windows, version 4.0
CreationDate: (5/8/98) (7:44 AM)
```
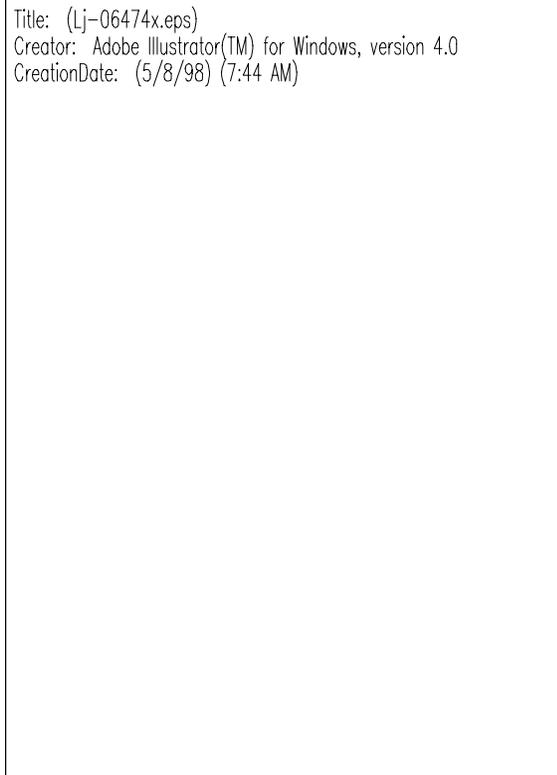
The following table describes the DE504-BA connectors and LEDs:

Reference	Component	Description
❶	Port 0 8-pin MJ connector	10/100 Mb/s UTP network connector for Port 0
❷	Port 1 8-pin MJ connector	10/100 Mb/s UTP network connector for Port 1
❸	Port 2 8-pin MJ connector	10/100 Mb/s UTP network connector for Port 2
❹	Port 3 8-pin MJ connector	10/100 Mb/s UTP network connector for Port 3
❺	Port indicator LEDs	100 Mb/s (left LED) Activity (center LED) Link (right LED)

Features

The main features of the DE504-BA are as follows:

- High-performance PCI bus master, 32-bit direct memory access (DMA) architecture

- Four independent 10/100 DIGITAL DC21143-PC Ethernet ports for optimal network performance

- Supports Alpha (AS800, AS1200, and AS4100), OpenVMS (Version 7.1-1h1), DIGITAL UNIX (Version 4.0D), and Windows NT (Version 4.0) operating systems

- Direct 10BaseT and 100BaseTX network connection with full autonegotiation support

- Supports half- and full-duplex mode of operation

- Speed (100), link status (LINK), and Transmit/Receive activity (ACT) LEDs

- Universal dual voltage signaling (3.3 V and 5.0 V)

- PCI Revision Specification, Version 2.1 compliant

- Year 2000 compliant

2
Installation

Overview

This chapter describes how to install the DIGITAL PCI Quad 10/100 Ethernet adapter into a PCI bus master-compatible system, and how to install the device drivers.

Hardware Installation

The DE504-BA host adapter is Plug and Play on the host system's PCI bus, and no configuration of the adapter hardware is necessary.

System Requirements

To install the adapter in your system, you need the following:

- An available PCI bus master expansion slot

- Category 3, 4, or 5 UTP cable (type dependent on your network type)

Installing the Adapter

To install the DE504-BA in your system, complete the following steps:

1. Unplug the computer and disconnect all cables that are connected to the main system unit.

2. Remove the system cover.

3. Unscrew and remove the option slot cover from the selected PCI slot, insert the adapter into the slot, then secure it with the slot cover screw.

4. Replace the computer's cover, reconnect the cables, then power up your system.

_____**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.
_____

Software Installation

This section describes the software driver installation information for the DE504-BA.

Windows NT

The DE504-BA uses DIGITAL's DC21X4.SYS miniport driver in Windows NT to
support the adapter's four Ethernet ports. These drivers are in the Windows NT
distribution kit.

The following table lists the contents of the software media:

Operating System	Architecture	File Name	File Description
A:\NT	\ALPHA	\OEMSETUP.INF	The driver's setup file for Windows NT Alpha-based systems.
		\DC21X4.SYS	The driver executable.
		\DC21X4.DBG	The driver's symbol table.

To install the DC21X4 driver on Windows NT, use the following procedure:

1. Select Control Panel from the Windows NT Main Menu.

2. Select Network from the Control Panel menu, then select "Yes" when asked if you
   want to install NT Networking.

3. Place the Windows NT installation media, the CD-ROM reader, and complete the
   Windows NT network installation. (Refer to your Windows NT documentation if
   you are unfamiliar with this process.)

4. Follow the screen prompts until you are prompted for a Network Adapter Type.
   Scroll through the menu and select "Other."

5. When prompted, insert the driver diskette, then click on OK.

6. Select the DC21143 option from the list of supported options, then click on OK.

7. Modify the default distribution path in the Windows NT Setup box to point to the appropriate path for DIGITAL's Alpha-based system: a:\nt\alpha.

8. Select Continue.

9. Use the Connection Type dialog box to select the connection type appropriate for your network configuration. The default connection type is Autosense (used for most network connections). To change the media connection type, select one that the adapter supports (shown in the following table).

10. Upon completion, the selected adapter is added to the Installed Adapter Cards list in the Network setting box (the number prefixing the adapter is the adapter number).

11. Click on Close to complete the network setting initialization.

12. Shut down, then reboot the system.

_____ **Note**_____

To run the DE504-BA on Windows NT, you need the latest hardware abstraction layer (HAL) code before you install the adapter. The HAL code instructions are located at the following URL: http://www.windows.digital.com/support/sysoft.asp.

_____

DIGITAL UNIX

Drivers for the DE504-BA are in the DIGITAL UNIX distribution kit beginning with Version 4.0D. The adapter is identified as having four 21140-based Ethernet controllers.

Once the hardware is installed in your system, use the following procedure to boot the system:

1. >>>boot-file genvmunix. DIGITAL UNIX scans all hardware devices in the system, then identifies the DE504-BA.

2. Use the **#doconfig** command to create a new kernel identified by genvmunix to support the four Ethernet ports.

3. When doconfig completes, back up your existing kernel using the **#cp/vmunix/vmunix.sav** command.

4. Copy the new kernel created by doconfig to /vmunix, then shut down and reboot your system with the new kernel. (Refer to your DIGITAL UNIX documentation if you are unfamiliar with the doconfig command.)

_____ **Note** _____

DIGITAL UNIX relies on the settings for media type and speed set by the system reference manual (SRM) console. See appendix A for more information.
_____

OpenVMS

Drivers for the DE504-BA are in the OpenVMS distribution kit beginning with Version 7.1-1h1. The DE504-BA is identified as having four 21143-based Ethernet controllers. Refer to the network software documentation you will be running for specific configuration information.

Many hubs do not support autosense; therefore, it is recommended that you select the correct media type and speed manually.

_____ **Note** _____

OpenVMS relies on the settings for media type and speed set by the SRM console. See appendix A for more information.
_____

A
SRM Console Settings

Overview

This appendix describes the Alpha SRM console settings. When the DE504-BA is being used in a DIGITAL Alpha platform running OpenVMS or DIGITAL UNIX, the SRM console sets the port speed, media type (cable), boot protocols, and can be used to test the adapter.

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

DIGITAL uses a set of environment variables to store the settings of certain user-definable parameters. These variables are passed to the operating system to allow the user's configuration information to stay consistent when the SRM passes control of the system to the operating system.

Ethernet Port Characteristics

The Alpha console recognizes the Ethernet device as an EW port. Use the following commands to show and set the Ethernet port characteristics:

- Use Show to display characteristics of the Ethernet port, where n is the Ethernet port letter:

  >>>Show ewn0_mode

- Use Set to set characteristics of the Ethernet port.

The OpenVMS and DIGITAL UNIX SRM console media selections are shown in the following table:

Parameter	Settings	Description
ewn0_mode	Twisted-pair	10 Mb/s twisted-pair
	Fast	100 Mb/s twisted-pair half-duplex
	Full-duplex twisted-pair	Full-duplex twisted-pair
	AUI	Not supported
	BNC	Not supported
	Fast FD	Fast full-duplex
	AutoSense	Autonegotiation modes

_____ **Note** _____

The settings for the ewn0_mode parameter may not be available in all SRM consoles.

_____

To set the media type and speed to Fast twisted-pair, enter the command:

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

To remote boot using the Ethernet, you must also set the boot protocol to match that of the boot node. Typically OpenVMS uses the MOP protocol and DIGITAL UNIX uses BOOTP.

For example, to set a port to MOP (OpenVMS), enter the following command:

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

_____ **Note** _____

Port 0 will be the lowest controller letter (A) found by the SRM console if there are no other Ethernet ports in the system. If there is an onboard Ethernet controller, it will be assigned port letter A. The ports on your DE504-BA will be assigned B, C, D, and E for ports 0, 1, 2, and 3 respectively.

_____

B

General Information

Overview

This appendix provides the following general information about the DE504-BA:

- Physical characteristics
- Power requirements
- Connector pin assignments
- Cabling requirements

Physical Description

The following table describes the physical measurements of the DE504-BA:

Dimension	Measurement
Length	228.6 mm (9 in)
Width	120.7 mm (4.75 in)

Power Requirements

The following table describes the power requirements of the DE504-BA:

| Specification	Measurement
Maximum power consumption	14 W
Voltage	5.0 V, 2.5 A 3.3 V, 150 mA (when available) 12.0 V, 0 A

Operating Environment Specifications

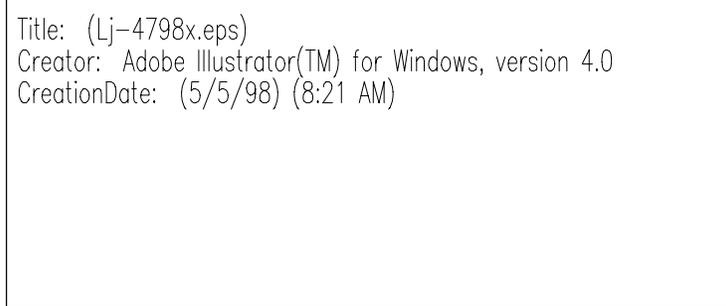The following table lists the operating environment requirements of the DE504-BA:

Item	Specification
Temperature	5°C to 55°C (+41°F to +131°F)
Relative Humidity	5% to 90% noncondensing
Altitude	Maximum operating temperature reduced by a factor of no more than 1.8^{o}C/1000 meters increase in altitude.
Compliance	Year 2000
Safety and EMI Compliance	FCC Class B, CE Mark
Reliability	MTBF > 200,000 hours
Number of Ports	Four Ethernet 10/100 ports autosense, Category 5 RJ-45 connector
Module Technology	Six layer, 2 signal/pad, 2 signal, 2 ref
Host Computer Bus	PCI local bus, 32-bit, 33 MHz, 5.0 V slot

Connector Pin Assignments

The DE504-BA 8-pin MJ connector pins (front view) are shown in the following figure:

```
Title: (Lj-0661X.eps
Creator: Adobe Illus
CreationDate: (5/5/
```
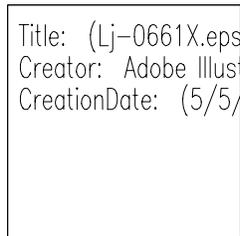
The DE504 -BA straight-through and crossover pin assignments are shown in the following figure:

```
Title:  (Lj−4798x.eps)
Creator:  Adobe Illustrator(TM) for Windows, version 4.0
CreationDate:  (5/5/98) (8:21 AM)
```

The connector pin assignments are described in the following table:

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

Cable Requirements

For your network to operate properly, use the appropriate category of network cabling for the data rate of the channel. Use Category 3, 4, or 5 UTP cable for 10 Mb/s operation; use Category 5 UTP cable for 100 Mb/s or 100 Mb/s full-duplex mode.

The maximum length of 10BaseT and 100BaseTX cables supported by Ethernet networks is 100 meters of UTP cable for 10/100 Mb/s speeds.

Use one of the following cable types, or its equivalent, to connect the DE504-BA to the network. The *xx* denotes cable length in meters for each of the following DIGITAL part numbers:

- **BN25G-*xx***— Category 5 100-ohm unshielded twisted-pair (UTP) office cable to connect a DE504-BA adapter to an office wall plate.

- **BN26M-*xx***— Category 5 100-ohm screened twisted-pair (ScTP) office cable to connect a DE504-BA to a shielded office wall plate.

- **BN24Q-*xx***— Category 5 100-ohm unshielded twisted-pair office cable with crossover (8-conductor, 4-twisted pair) to connect a DE504 -BA at 10/100 Mb/s to another adapter at 10/100 Mb/s (DTE to DTE).

- **BN28Q-*xx***— Category 5 100-ohm ScTP office cable with crossover (8-conductor, 4 twisted-pair) to connect a DE504 at 10/100 Mb/s to another adapter at 10/100 Mb/s (DTE to DTE).

Online Services

The device driver software included in your DE504-BA kit can become outdated as operating system software evolves, or additional drivers become available for the product.

Use the following procedure to obtain the latest versions of the driver files.

1. 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

2. For the latest drivers, go to:

   http://www.networks.digital.com/dr/nics/drivers