DECchip 21040 PCI Evaluation Board

User's Guide

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1 Introduction

The DECchip 21040 PCI Evaluation Board (EB40) is a peripheral component interconnect (PCI) bus master adapter board that demonstrates the functionality of the DECchip 21040 Ethernet LAN controller for PCI (referenced in this document as 21040).

With the EB40 installed in a personal computer, you can:

- Evaluate hardware.
- Develop a complete set of software drivers.
- Evaluate features of an Ethernet controller and the PCI protocol.

1.1 Features

The EB40 has the following features:

- Direct interface to a PCI bus
- Full PCI compliance (Revision 2.0)
- PCI bus master operation
- Unique Ethernet address read-only memory (ROM)
- Direct 10BASE-T network connection
- Full joint test action group (JTAG) support
- Single 5-volt power supply
- Jumperless board (fully software controlled)
- LinkFail and Network Activity LEDs
- Minimum chip count application
- 5-volt signaling environment systems support

2 Description

The EB40 is based on the 21040 with direct connection to the PCI bus and to the 10BASE-T connection on the network.

The EB40 is fully compliant with the Revision 2.0 PCI specifications.

The EB40 is capable of PCI bus master operation, working with programmed burst length. It uses INTA as its primary interrupt line.

The EB40 has the following two LEDs:

- LinkFail—A red LED that indicates a link failure on the network (that is, no valid link pulse has been issued by the hub).
- Network Activity—A green LED that indicates network activity.

The network serial clock is generated by a 20-megahertz crystal.

The EB40 uses the 21040 auto-polarity detection circuit for the 10BASE-T lines.

The unique Ethernet node address is provided in the serial read-only memory (SROM).

The EB40 uses a single, 5-volt power supply with an onboard voltage regulator to supply the 3.3 volts for the 21040. The EB40 functions only in systems with a 5-volt signaling (logic levels) environment; it does not support a 3.3-volt signaling environment system. The EB40 uses approximately 1 watt of power.

3 Hardware Requirements

To use the EB40, you need the following hardware:

- PCI personal computer system (with master mode operation)
- PCI Revision 2.0 system compliance
- Available PCI (master mode) expansion slot
- 5-volt supply to the PCI expansion slot
- 3½-inch diskette drive

4 Installation

Use the following procedure to install the EB40:

1. Power OFF the personal computer (PC).
2. Remove the PC box cover.
3. Insert the EB40 into a PCI slot (master slot).
4. Connect the communications media jack (10BASE-T wires).
5. If the motherboard includes IRQ jumper settings, refer to your motherboard documentation for the correct IRQ setting.
6. Replace the PC box cover.
7. Remove any diskettes from the diskette drives.
8. Power ON the PC.

5 Diagnostic Utility

TDIAG.EXE is a diagnostic program used to exercise or verify the integrity of the EB40. This program provides basic loopback functions in various burst length modes.

Use the following procedure to access the diagnostic utility:

1. Insert the EB40 distribution diskette into the diskette drive.
2. Set the system to the diskette drive being used.
3. Type the following, then press Enter:

   ```
   cd
   diag
   ```

4. Type the following, then press Enter:

   ```
   tdiag
   ```

5. Select the Test Setup menu, then press Enter to display the submenu.
6. Select the SIA option, then press Enter to display the query display.
7. Type the desired media, that is, UTP for unshielded twisted-pair or AUI for attachment unit interface, then press Enter.

8. Select the Module Status menu to display the current configuration.
9. Select the Diagnostic menu, then press Enter to display the diagnostic submenu.

Note

Ensure that the external loopback connector is installed before starting the following test.

10. Select the Loopback Tests option to execute loopback tests.
11. Press the Esc key to exit the program when done.

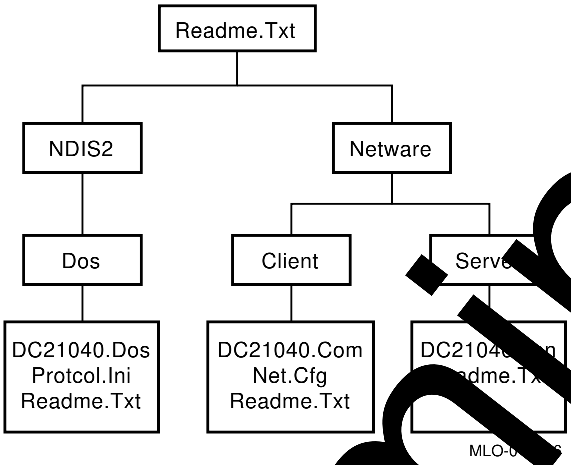
6 EB40 Software

The following software is provided with the EB40:

- Novell Netware (ODI) client driver
- Novell Netware (ODI) server driver
- NDIS2 driver
- Windows NT driver
- Diagnostic utility

Figure 1 provides the format and contents of the distribution media. Information for all drivers is contained with the software. Consult the Read_me.txt files for the latest information.

Figure 1 Distribution Media Directory



Section 6.1 through Section 6.3 describe the steps required to install the device drivers included on the distribution media. Refer to the Read_me.txt included for each device driver for additional information.

6.1 NDIS2-DOS Device Driver

To install the NDIS2-DOS device driver, perform the following steps:

Note

These instructions assume that the NDIS driver is being installed in a PATHWORKS environment, and therefore a \DECNET subdirectory exists. If this installation is for another type of system, refer to the appropriate installation manual.

---

1. Change to the \DECNET subdirectory by entering:

   ```
   CD DECNET
   ```

2. Insert the distribution media into the diskette drive and copy the necessary files.

   ```
   COPY A:\NDIS\MSLANMAN.DOS\DRIVERS\ETHERNET\DC21040\*.*
   ```

3. Edit the PROTOCOL.INI file to reflect the board settings, that is, NI_IRQ.
4. Modify the CONFIG.SYS file to include the NDIS device driver.

   ```
   CD \
   EDIT CONFIG.SYS
   ```

   Add the following line after the PROTMAN in the file:

   ```
   DEVICE=C:\DECNET\DC21040.DOS
   ```

   Note

   Ensure that PROTMAN.SYS is installed before the NDIS DOS driver.

   ---

5. Reboot the system.

6.2 ODI Client Device Driver

To install the ODI client device driver, perform the following steps:

Note

The ODI client subdirectory should contain the following files: LSL.COM, IPXODI.COM, and NETX.COM. For Netware 4.0, VLM.COM is also needed. Copy all the required files from the driver distribution media to your subdirectory.

1. Set default to the ODI client directory.
2. Copy the necessary files from the ODI client driver directory on the distribution media.
3. Modify the NET.CFG file (if necessary) to select protocol and media (TP) options.
4. If you need to create a LOGIN.BAT file for automating the login process, you can use any standard text editor. The content of this file is as follows:
   - LSL
   - DC21040
   - ipxodi
   - netx[1]
   - f:login

[1] For Netware 4.0, use vlm instead.

6.3 ODI Server Device Driver

To install the ODI server device driver, perform the following steps:

1. On the server, change the current directory to the directory where SERVER.EXE resides. For example, when NETWARE is used, enter the following:

   ```
   CD NETWARE
   ```

2. Copy the required files from the driver distribution media into this directory.

   ```
   copy a:\NETWARE\SERVER\*.*
   ```

   For Netware 3.11 or Netware 3.12 enter, the following:

   ```
   copy a:\NETWARE\SERVER\3_11\*.*
   ```

   For Netware 4.0, enter the following:

   ```
   copy a:\NETWARE\SERVER\4_0\*.*
   ```

3. Enter the following to load the server:

   ```
   server
   ```

4. At the prompt (:), install the device driver.

   For Netware 3.11, enter the following:

   ```
   load c:\NETWARE\patchman
   load c:\NETWARE\LSLENH
   load c:\NETWARE\MSM31X
   load c:\NETWARE\ETHERTSM
   load c:\NETWARE\DC21040
   ```

   Enter TP

   For Netware 4.0, enter the following:

   ```
   load c:\NETWARE\DC21040
   ```

   Enter TP

5. After loading the driver, bind the driver to the protocol stack (in this example, IPX is used).

   ```
   bind ipx DC21040
   Network Number: <Your choice>
   ```

6.4 Installing the EB40 from the Windows NT Session

To install the EB40 from a Windows NT session, perform the following steps:

1. From the Windows NT main menu, select the **Control Panel** icon.
2. From the control panel, select the **Network** icon. If you get a message in a dialog box asking if you want to install NT Network, select **Yes** and place the Windows NT 3.1 distribution CD_ROM in the CD-ROM reader.
3. Select the drive that matches your system configuration and complete the installation.
4. There will be several messages—select **Yes** and then **Continue** to add a network adapter.
5. For each additional message, press **Continue**.
6. From the Add Network Adapter dialog box, scroll the menu to select **Other**.
7. The Insert Diskette menu prompts you for a disk. Insert the EB40 installation diskette into drive A, then select the **OK** button.
8. Select the **OEM Option** menu. Select the **EB40**, then the **OK** button.
9. From the EB40 setup menu, select the following:
   a. Platform type—select desired platform type from the list[1].
   b. Slot number—select desired slot number.
   c. IRQ level—select desired IRQ level.
   d. Connection type—select either UTP or UTP full-duplex.
10. The files are copied. When the copy is complete, check the Network Settings dialog box to verify that all items are installed. Select **OK** to continue.
11. You may ignore any warnings or informational messages displayed. Select **OK**.
12. From the Windows NT Setup menu, select the **Reboot** button for the changes to take effect.

[1] If the listed platform does not match your system, please choose **other**.

Technical Support, Ordering, and Associated Literature

This section describes how to obtain DECchip information and technical support, as well as how to order DECchip products and associated literature.

Calling the DECchip Information Line for Information and Technical Support

Call the DECchip Information Line for information and technical support:

United States and Canada	**1–800–332–2717 (1–800–DEC–2717)**
TTY (United States only)	**1–800–332–2515 (1–800–DEC–2515)**
Outside North America	**+1–508–568–6868**

Ordering DECchip Products

To order the DECchip 21040 Ethernet LAN Controller for PCI or the DECchip 21040 Evaluation Board Kit, contact your local Digital sales office. When working with your sales representative, you may be able to take advantage of discounts and volume pricing.

You can order the following DECchip products from Digital.

Product	Order Number
DECchip 21040 Ethernet LAN Controller for PCI	21040–AA
DECchip 21040 Evaluation Board Kit	21A40–01

Ordering Associated DECchip Literature

The following table lists some of the DECchip literature that is available. For a complete list, and for information about ordering, contact the DECchip Information Line.

Title	Order Number
Alpha Architecture Reference Manual[1]	EY–L520E–DP–YCH
DECchip 21040 Ethernet LAN Controller for PCI Product Brief	EC–N0281–72
DECchip 21040 Ethernet LAN Controller for PCI Data Sheet	EC–N0280–72
DECchip 21040 Ethernet LAN Controller for PCI Hardware Reference Manual	EC–N0752–72
DECchip 21040 PCI Evaluation Board User's Guide	EC–N0753–72
Connecting the DECchip Ethernet LAN Controller to the Network: An Application Note	EC–N0737–72
Ethernet Address ROM Programming: An Application Note	EC–N3214-72

[1]To order and purchase the *Alpha Architecture Reference Manual*, call **1–800–DIGITAL** from the U.S. or Canada, or contact your local Digital office, or technical or reference bookstore where Digital Press books are distributed by Prentice Hall.