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KZPBA–CB PCI-to-UltraSCSI Differential Host Adapter

User's Guide

EK–KZPBC–UG. C01

Digital Equipment Corporation
Maynard, Massachusetts

Third Edition, April, 1998

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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 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 SCSI port should be connected only with shielded data cables. DIGITAL recommends cables such as BN38C and BN21K. These are available in 2M, 3M, 5M, 10M, and 20M lengths.

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Revision Record

This Revision Record provides a concise publication history of this guide. It lists the guide revision levels, release dates, and reasons for the revisions. It also describes how the changes to affected pages are marked in the guide.

The following revision history lists all revisions of this publication and their effective dates. The publication part number is included in the Revision Level column, with the last entry denoting the latest revision. This publication supports the KZPBA–CB PCI-to-UltraSCSI Storage Adapter.

Revision Level	Date	Summary of Changes
EK-KZPBC-UG. A01	September 1997	Original release
EK-KZPBC-UG. B01	November 1997	Makes corrections, adds procedure for systems running Alpha BIOS, and deletes Appendix B.
EK-KZPBC-UG. C01	April 1998	Makes changes to the EEROM Configuration Utility (Section 4.2 makes general formatting changes.

About This Guide

This chapter tells you what this User's Guide does, identifies the audience, describes the structure and contents (chapter-by-chapter), lists the conventions used in the guide, and tells you have to get support and services from DIGITAL.

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Introduction

This guide describes how to install and configure the KZPBA-CB PCI-to-Ultra Wide Differential SCSI Host Adapter, and how to use the software utilities to modify the parameters in the flash EEROM located on the module.

Audience

This guide is intended for the end-user who is installing the KZPBA-CB Host Adapter into a host computer.

Related Documentation

The user should be familiar with the documentation for the host computer and for the SCSI devices that are mounted internally or externally and are to be connected to the module.

Organization

This guide contains the following:

- Chapter 1: Overview — Provides an overview of the KZPBA–CB PCI-to-UltraSCSI Host Adapter. The KZPBA–CB is an ultra wide differential host adapter.

- Chapter 2: Configuration Guidelines — Provides information about valid configurations, cables and adapters, a description of differential SCSI, and sample configurations.

- Chapter 3: Installing the KZPBA−CB PCI-to-UltraSCSI Host Adapter — Describes how to install the KZPBA−CB board into a computer. The procedures include terminating the SCSI bus, verifying the installation, and connecting the board to external SCSI devices.

- Chapter 4: EEROM Configuration Utility (Alpha-Systems)— Describes how to use the supplied configuration utilities to modify parameters that are stored in the board's flash EEROM for Alpha-based systems.

- Chapter 5: Troubleshooting — Provides troubleshooting information to help diagnose problems that can occur during the installation of the KZPBA−CB adapter.

- Appendix A: EEROM Parameter Settings (Alpha-Systems) — Describes EEROM device-specific parameters on the KZPBA−CB for Alpha-based systems. It provides a description of each parameter, its default setting, and options available.

Conventions

The following conventions are used in this guide:

Convention Example	Description
boldface type	For user input.
italics	For document titles, titles of utilities, screen names, file names.
plain monospace type	For screen text.

Support and Services

Who to contact in the Americas

Information and Product Questions:	Local Sales Office / StorageWorks Hotline 1-800-786-7967
Installation Support:	Contact the DIGITAL Distributor where the Storage Solution was Purchased / Local Digital Sales Office.
<u>**DIGITAL Multivendor Customer Service (MCS)**</u>	
Installation	Contact the DIGITAL Customer Support Center (CSC).
Warranty	Contact the DIGITAL Customer Support Center (CSC) for warranty service after solution is installed and operating.
Remedial	Contact the DIGITAL Customer Support Center (CSC)
	Note: A Service Contract is recommended when the equipment is out of warranty. Contact the local DIGITAL Sales Office.
Customer Support Center (CSC)	1 800-354-9000

Who to contact in Europe

Information and Product Questions, **Installation Support, and Installation:**	Contact the DIGITAL Distributor or reseller from whom the Storage Solution was purchased.
For Warranty Service	See the Warranty Card packaged with the product.
For Remedial Service	Contact the DIGITAL Distributor or reseller from whom the Storage Solution was purchased.
	Note: A Service Contract is recommended when the equipment is out of warranty.

Who to contact in Asia Pacific

For all services, contact the DIGITAL Distributor or reseller from whom the equipment was purchased.

1

Overview

This chapter provides an overview of the KZPBA-CB PCI to UltraSCSI-3 Host Adapter. The KZPBA-CB is a single-channel differential host adapter.

1.1 Introduction

The KZPBA-CB host adapter module (Figure 1–1) provides the interface between the host computer's PCI bus and external SCSI devices. The KZPBA-CB combines a powerful Reduced Instruction Set Computing (RISC) processor, a SCSI executive processor, and a PCI local bus interface on a single chip.

Figure 1–1 KZPBA-CB Single Channel, Wide Differential Host Adapter
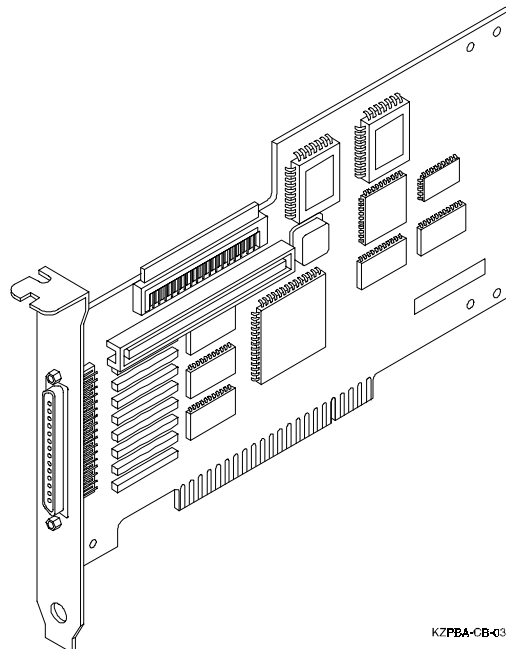
KZPBA-CB-03

The KZPBA-CB is a leading edge host adapter that supports bootable devices and provides a powerful multi-tasking interface. The SCSI bus can be connected to disk drives, CD-ROM drives, scanners, tape drives, and other SCSI devices. More than one KZPBA-CB host adapter can be installed in the same host computer.

The RISC processor minimizes the overhead of the host computer's microprocessor by transferring data directly into the host computer's memory. It also manages the actual data transfers between the host computer and the SCSI devices without involving the host computer's microprocessor.

The SCSI processor negotiates with each device on the SCSI bus to establish the data transfer rate between the host adapter and each SCSI device. It also automates SCSI command processing and significantly reduces the number of interrupts and command overhead.

The KZPBA-CB is capable of 32-bit bus master data transfers, including PCI enhanced data transfer commands. The host adapter supports all SCSI-2 and UltraSCSI functionality.

The host adapter supports multithreaded I/O operations, thereby allowing simultaneous operations on multiple SCSI targets or Logical Units (LUNs). In systems with multiple targets, the Disconnect/Reconnect feature optimizes SCSI bus usage. In systems that have fragmented memory buffers, the Scatter/Gather feature provides high performance.

The KZPBA-CB comes with EEROMCFG.EXE, an AXP configuration utility. This configuration utility provides the capability of changing settings on the boards flash EEROM without having to make physical changes to the host adapter board. You can change settings such as host adapter SCSI Parity Checking.

1.2 KZPBA–CB External Bulkhead Connector

The single-channel, ultra-wide, differential host adapter contains one HD68 connector on the external bulkhead. The HD68 connector can support up to 15 differential wide SCSI devices or seven differential narrow SCSI devices.

The length of the Ultra Wide Differential SCSI bus should not exceed 25 meters (81.75 feet).

1.3   Major Features of the KZPBA-CB

- Wide Differential UltraSCSI Channel
- Compliance with PCI Local Bus Specification Revision 2.0, ANSI X3.131 SCSI-2 Standard, ANSI X3T10/1071D SCSI-3 Fast 20 Standard, and U.S. and international safety/emissions standards
- Ultra-Narrow SCSI (8-bit, 20 MB per second, 7 devices)
- Ultra-Wide SCSI (16-bit, 40 MB per second, 15 devices)
- Interface compatibility with Asynchronous, Synchronous and Fast SCSI differential devices
- Ability to boot from any drive on the SCSI bus
- Onboard flash EEROM that can be customized using a configuration utility – no need to remove the computer cover to change configuration
- A wide variety of operating system specific managers and device module software
- Extensive support for StorageWorks storage products

PCI Bus Interface

- Up to 132 MB/sec data transfer rate on the PCI bus
- PCI single and dual address cycles support
- PCI bus address and data parity generation
- PCI bus master for data transfer

SCSI-3 Implementation

- Concurrent support for asynchronous, Fast SCSI synchronous, and UltraSCSI synchronous devices
- Concurrent support for 8- and 16-bit SCSI devices
- Scatter/Gather
- Disconnect/Reconnect
- Fully multithreading/multitasking
- 68-pin HD68 external connector
- Tagged Queuing
- Support of multiple LUNs
- Socketed Differential SCSI Terminator
- Parity handling in Data, Message, Status, Selection/Reselection, and Command phases

Maximum Off-loading of Host CPU Requirements

- Onboard RISC and SCSI executive processor automates SCSI processing
- Low SCSI processing overhead
- Bus Master DMA implementation
- Task scheduling and message-based communication

1.4   Support and Information Services

The KZPBA-CB Host Adapter is designed for easy installation and use. If you need further assistance, please contact your DIGITAL service representative. Specifications for the KZPBA-CB are listed in Table 1–1.

Table 1–1 KZPBA-CB Specifications

Item	Specification
Operating Power	5 volts @ 2.5 Ampere (max)
Performance	
Interface transfer rate: (max.) Synchronous Ultra Wide SCSI Synchronous UltraSCSI Synchronous Fast Wide SCSI Synchronous Fast SCSI Synchronous SCSI Asynchronous SCSI	 40 MB/sec 20 MB/sec 20 MB/sec 10 MB/sec 5 MB/sec 5 MB/sec
Host Data Transfer Rate:	32-bit bus master DMA data transfers up to 132 MB/sec
Environmental	
Operating Temperature: Operating Relative Humidity: Storage Temperature: Storage Relative Humidity:	0°C/32°F to 55°C/131°F 10% to 90%, non-condensing -20°C/-4°F to 70°C/158°F 5% to 95%, non-condensing
Physical	
Form Factor	17.78 cm X 10.67 cm (7.0" X 4.2")
CPU	On-chip RISC processor
RAM	64 Kbytes of static RAM
Connectors:	
Ultra Wide Differential	68-pin, HD68, external
Safety and EMI Compliances	FCC Class B, Vfg, CE

2

Configuration Guidelines

Before you install the KZPBA-CB host adapter in your computer, you need to become familiar with the product, the configuration guidelines for the host adapter, and its SCSI bus. This chapter includes installation guidelines, a description of differential SCSI buses, and sample configurations.

NOTE

If you are familiar with configuration guidelines and know the configuration that you are installing, skip to Chapter 3 and begin by installing the host adapter.

2.1 Configuration Guidelines

More than one KZPBA-CB Host Adapter can be installed in the same host computer. Refer to your Product Release Notes for the number of KZPBA-CB host adapters supported in your specific platform. Only differential SCSI devices can be directly connected to the host adapter. Refer to the *UltraSCSI Configurations Guidelines (EK–ULTRA–CG)* for the recommended configurations.

2.2 Configuration Topography

You can configure the host adapter to be in the middle or at the end of the SCSI bus. Configure the host adapter in the middle of the SCSI bus by using a "Y" cable connected to the external connector. When using the adapter in this configuration, be sure to remove the eight socketed on-board differential terminators (RM1 through RM8).

When the host adapter is at one end of the bus, the bus is terminated at the host adapter and at the last SCSI device. When the host adapter is in the middle of the bus, the bus is terminated by the last SCSI device at each end of the bus, or by an external terminator at the end of the cable.

2.2.1 SCSI Cable Selection

Always select high-quality SCSI cables to use in your system. Because differential host adapters support UltraSCSI transfer rates, the use of high-quality cabling is especially critical. Cables of a lesser quality can cause data corruption, parity errors, and other problems.

Round external SCSI cables vary widely in quality and electrical characteristics. Ascertain, from your cable supplier, that external cables meet SCSI-3 standards. The following are some cable selection guidelines:

- Use layered twisted pair cables with 25-wire pairs

- Use cables that have a single-ended impedance range of 80-100 ohms

- Do not use cables shorter than 30 cm (11.8 inches) between any two SCSI devices

2.2.2 SCSI Bus Lengths

The length of a SCSI bus segment is the cable distance between the two bus terminators, with each terminator located at an end of the bus segment. The length of the Ultra Wide Differential SCSI bus should not exceed 25 meters (81.75 feet). If you are using an UltraSCSI StorageWorks enclosure, refer to the *UltraSCSI Configuration Guidelines (EK-ULTRA-CG)* for cable lengths. DIGITAL recommends the cables referenced in Table 2–1.

Table 2–1 Hardware Installation Information

Item	UltraSCSI Part Number	Usage Examples
HD68 68-pin to VHDCI SCSI cable	BN38C-xx[1]	Connects KZPBA-CB to an HSZ70. (Requires connection with VHDCI TriLink Connector on HSZ70)
VHDCI UltraSCSI wide differential terminator	H8863-AA	Terminates the end device on a wide differential UltraSCSI bus such as the HSZ70.
VHDCI Tri-Link connector	H8861-AA	Used to install a device or controller in the middle of the SCSI bus.
HD68 SCSI "Y" cable	BN21W-OB	Used to install a device, host adapter, or controller in the middle of the SCSI bus (with HD68 connector).
VHDCI "Y" cable	BN37C-OC	Used to install a device host adapter, or controller in the middle of the SCSI bus (with VHDCI connector).
HD68 differential terminator	H879-AA	Terminates the end device on a wide differential bus such as the HSZ40.
HD68-to-right HD68 SCSI cable	BN21K-xx[1,2] (90⁰ connector)	Connects KZPBA-CB to a DWZZB-yy converter or another KZPBA-CB host adapter.

[1] xx = length of cable

[2] yy = denotes variant type

2.3   SCSI Bus Termination

The integrity of the data written to or read from a SCSI device can be seriously compromised due to signal reflections caused by an unbalanced SCSI bus. An unbalanced bus is the result of an improperly terminated or unterminated bus. Therefore, failure to terminate the bus properly can result in a system crash or even worse, data corruption.

A balanced bus is achieved by properly installing bus terminators RM1 – RM8 on the SCSI bus in relation to the host adapter and the SCSI devices.

The differential board termination is determined by the presence or absence of terminating resistors on the board. There are eight resistor SIPs (RM1 – RM8) for the SCSI channel on the KZPBA-CB. When the adapter is located in a mid-bus configuration, the terminating resistor SIPs should be removed. Proper bus termination involves supplying termination power onto the SCSI bus and the correct placement of terminators on the bus.

The KZPBA-CB PCI-to-UltraSCSI Host Adapter provides termination power and is generally the only source of termination power required on the bus. However, Digital Equipment Corporation recommends that all devices on the SCSI bus supply termination power to ensure that there is a sufficient level of power along the entire bus. A diode or similar semiconductor prevents back flow of the termination power when more than one device supplies this power.

2.4   Adapter Placement Configuration Examples

Figure 2–1 shows configuration topography with the adapter at the end of the SCSI bus, attached to a pair of HSZ70 Array Controllers on the same SCSI Bus.

Figure 2–1 KZPBA-CB Host Adapter at End of SCSI Bus
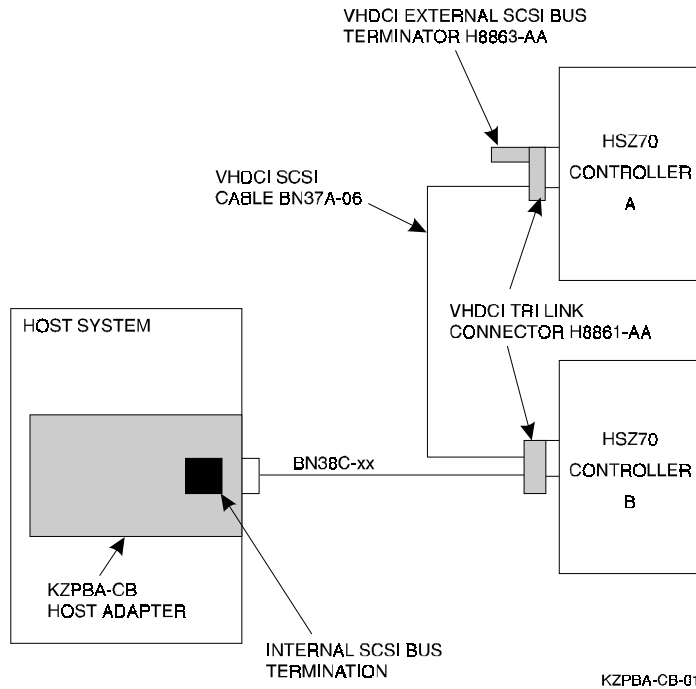
Figure 2–2 shows configuration topography with adapter "A" in the middle of the SCSI Bus, and adapter "B" at the end of the same SCSI Bus, attached to a pair of HSZ70 Array Controllers on the same SCSI Bus.

Figure 2–2 KZPBA-CB Host Adapter "A" in middle of SCSI Bus, Host Adapter "B" at end of SCSI Bus

3
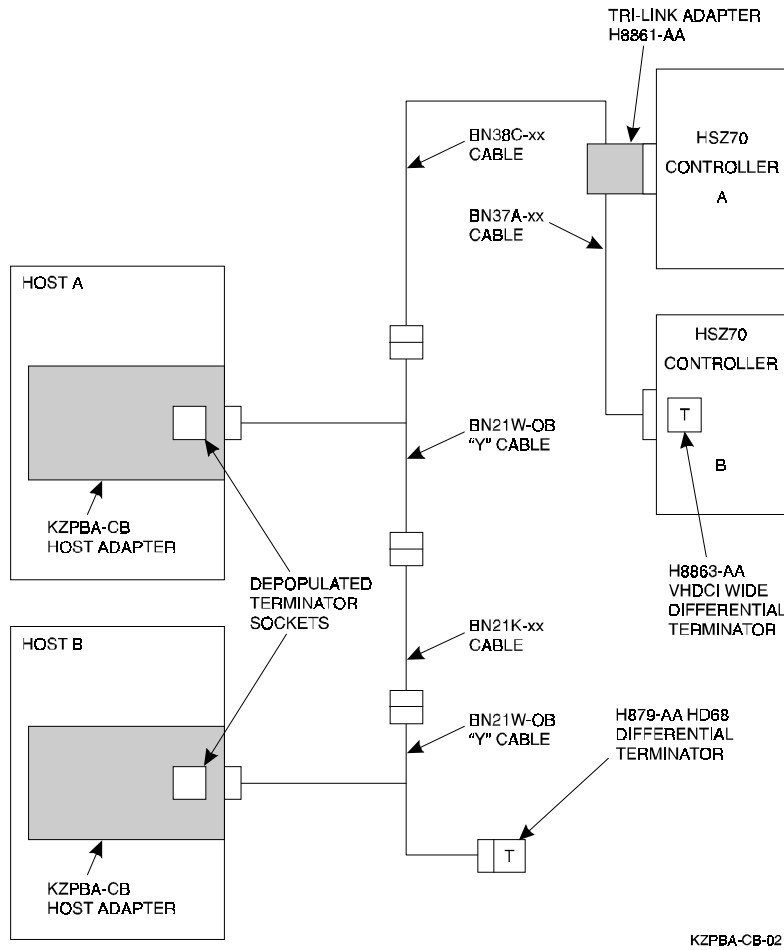
Installing the KZPBA-CB Adapter

This chapter describes how to install the KZPBA-CB board into a computer. The procedures include terminating the SCSI bus, verifying and troubleshooting the installation, and connecting the board to external SCSI devices.

3.1 Installation Overview

The installation of the KZPBA-CB includes the following steps:

- Installing the host adapter module into your computer
- Modifying the contents of the flash EEROM as necessary
- Loading the appropriate software drivers for the operating system running on your computer
- Connecting external SCSI devices to the module

These procedures take approximately 30 minutes to complete.

3.2 Getting Started

Prior to starting the installation, do the following:

- Check that you have the necessary user-supplied hardware and software
- Inventory the contents of the KZPBA-CB Host Adapter Kit
- Back up the computer system

3.2.1 User-Supplied Hardware and Software Requirements

The KZPBA-CB PCI-to-UltraSCSI Host Adapter requires the following user-supplied hardware and software:

- An AXP based computer system with a PCI local bus, a 3.5" floppy diskette drive, an available PCI slot, disk space to load software drivers, and the associated system hardware manual
- The SCSI cables necessary to connect SCSI devices to the adapter module
- One of the following operating systems (refer to the release notes for specific supported operating system versions):
  - DIGITAL UNIX
  - DIGITAL OpenVMS
  - Windows NT

3.2.2 KZPBA-CB Host Adapter Kit Contents

The KZPBA-CB Host Adapter kit contains the following:

- KZPBA-CY PCI-to-UltraSCSI Host Adapter module
- This guide (EK-KZPBC-UG)
- Release Notes (AA-R5XWA-TE)
- OneOne floppy diskette containing Alpha Configuration Utility and Windows NT drivers for both Alpha and Intel systems (AA-R5XUA-TE)
- Software License Letter (AA-R5XVA-TE)

Contact your Service Representative if any items are missing.

3.2.3 Back up Your System

Follow your normal procedures to back up your system before installing the KZPBA-CB Host Adapter.

3.3   Installing the Host Adapter

Install the host adapter module using the following procedure. Take precautions to protect the module from static discharge. The Host Adapter circuit board device connectors and terminator resistors (RM1 – RM8) are identified in Figure 3–1.

Figure 3–1 KZPBA-CB Device Connectors and Terminator Resistors
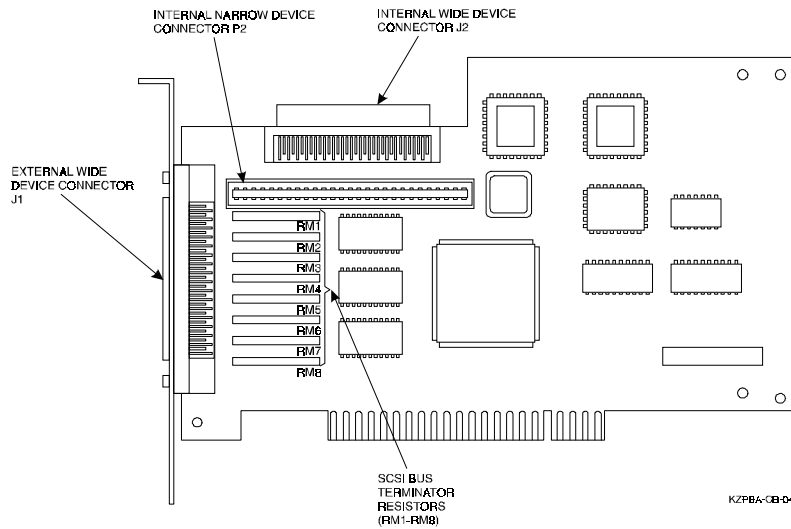
CAUTION

To protect the board from static discharge, wear an electrostatic discharge (ESD) wrist strap. If a wrist strap is unavailable ground yourself by touching a bare metal surface on the computer chassis before you open the case.

1. Turn off the power to the computer system and attached peripherals. Disconnect the power cords.

2. Remove the computer cover.

3. Locate an available PCI bus slot. PCI slots are shorter than ISA and EISA slots and are normally colored white. (Refer to your system hardware manual to determine the location of the PCI bus slot in your system.)

    Unscrew and remove the outside slot cover. The slot cover is the metal strip that covers the opening in the rear of the computer chassis and where the external connector on the adapter fits (save the screw.)

4. Carefully remove the KZPBA-CB PCI-to-UltraSCSI host adapter from its protective anti-static bag and insert it into the slot. Press down on the top of the card until it seats firmly. See Figure 3–2.

    > **NOTE**
    >
    > PCI cards are designed with their components on the opposite side of non-PCI cards

5. Secure the KZPBA-CB host adapter with the screw previously used to secure the slot cover.

6. Do not install the computer cover or reconnect power until all the SCSI devices are connected.

Figure 3–2 Installing the KZPBA-CB Host Adapter
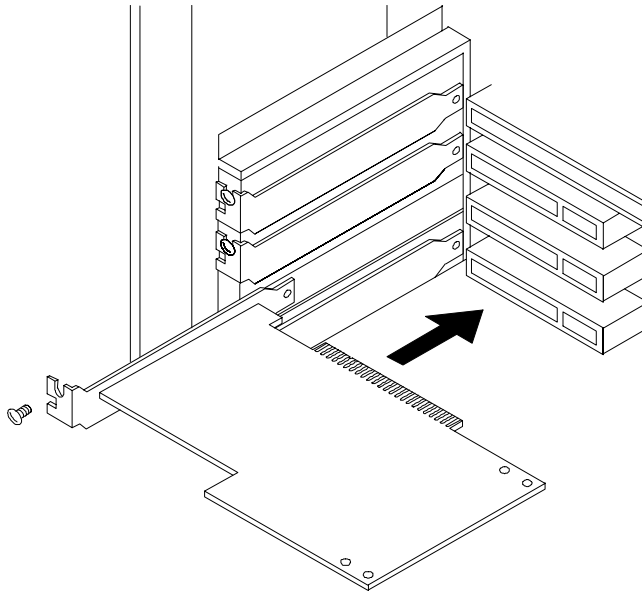
3.4 Connecting External SCSI Devices

Individual external SCSI devices can be daisy chained together using multiple cables, or mounted all together in an enclosure such as the DS–BA356–XX (the DS–BA356–XX daisy chains the devices together internal to the enclosure) with one cable running from the KZPBA-CB Host Adapter to the DS–BA356–XX. Up to fifteen wide-SCSI devices can be daisy-chained to the external connector as long as the distance limitations are met and the operating system being used accommodates addressing of all fifteen devices.

For single host configurations, it is recommended that SCSI Bus termination internal to the adapter be utilized. This results in no additional connectivity component requirements at the external connector of the KZPBA-CB Host Adapter.

For cluster environments where multiple hosts share a common SCSI bus, it is recommended that internal SCSI Bus termination not be used, and termination done instead external to the adapter. This requires the use of a HD68 "Y" Cable (see Figure 2–2), to connect to the KZPBA-CB Host Adapter. If the KZPBA-CB is the last node on at one end of the SCSI Bus, then an external HD68 SCSI Bus Terminator must be installed on one of the empty connectors of the HD68 "Y" cable. If the host adapter is somewhere in the middle of the SCSI Bus cable, make sure to terminate the ends of the bus properly.

When connecting to an HSZ70, the use of a VHDCI TriLink connector is required. The HSZ70 does not contain internal SCSI Bus termination, and therefore termination must be accomplished external to the HSZ70. If the HSZ70 is the last node at one end of the SCSI Bus, then an external VHDCI SCSI Bus Terminator must be installed on one of the empty connectors of the VHDCI TriLink connector. If the HSZ70 is somewhere in the middle of the SCSI Bus cable, make sure to terminate the ends of the bus properly.

The maximum accumulated cable length for a Differential SCSI Bus is 25 meters.

The connectors on the KZPBA-CB are HD68 connectors. The connectors are keyed so that they can be plugged in only one way, making the pin-1 orientation automatically correct.

Using a BN38C cable, follow these steps to connect an external SCSI device housed within a BA370 shelf:

1. Attach one end of the cable to the KZPBA-CB Host Adapter (see Figure 3–3).

2. Attach the other end of the cable to the VHDCI TriLink connector, which should be attached to the HSZ70 Controller SCSI connector.

For further information on attaching DIGITAL Storageworks UltraSCSI device shelves, refer to *the UltraSCSI DIGITAL StorageWorks Configuration Guidelines document (EK-ULTRA-CG)*, which is available on the web site mentioned at the beginning of this document.

Figure 3–3 Connecting External SCSI Cable to Host Adapter
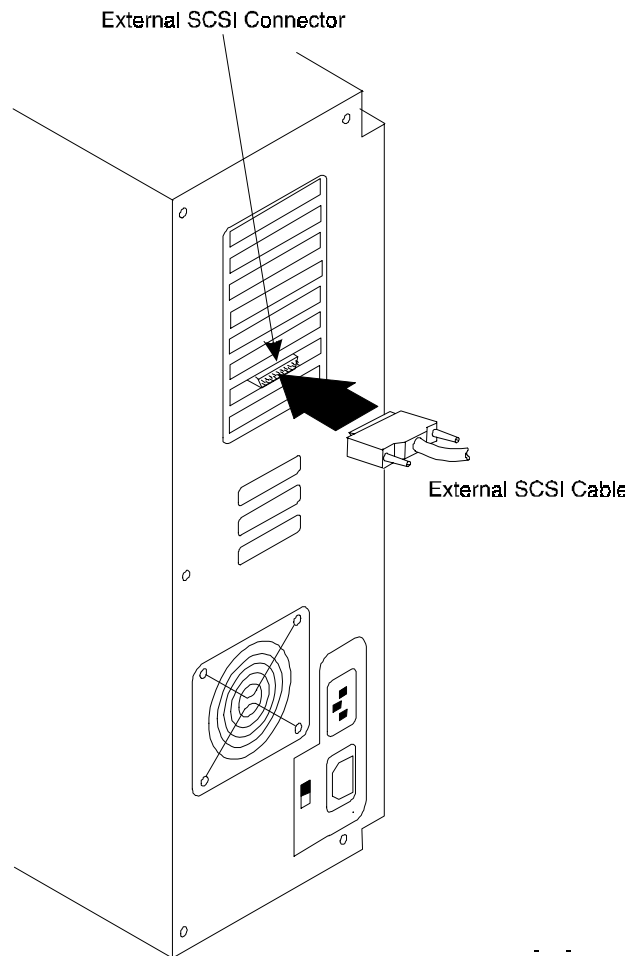
3.5   Setting SCSI Bus Termination

A set of terminating resistors must be physically installed on the first and last physical device on the SCSI bus. You may have to change the termination on the host adapter module and on some of the SCSI devices.

1.   Determine which two SCSI devices (including the host adapter) are at each end of the SCSI bus. Install termination on these two devices.

2.   Remove SCSI termination on all other devices on the SCSI bus.

The following paragraphs contain more information about device termination.

3.5.1 SCSI Device Termination

Refer to the SCSI device manufacturer's documentation to determine how a particular device's termination is enabled or disabled.

3.5.2 Host Adapter Termination

On the KZPBA-CB differential host adapter, termination is accomplished by the use of terminating resistor packs (RM1 – RM8) that are mounted directly on the module (see Figure 3–1). The termination must be removed only when the differential board is not at one end of the bus, such as when using the "Y" cable in a "middle of the bus" configuration.

3.6   SCSI Device Identification (SCSI ID)

Every device on a SCSI bus, including the Host Adapter, must be uniquely identified with a SCSI ID. The SCSI ID serves two purposes:

•   It provides a unique identification to each device on the SCSI bus

•   It establishes the device's priority on the bus during the arbitration phase

Setting the SCSI ID is a two-step process:

1.   Determine the SCSI ID number that is to be assigned to each drive on the SCSI bus. To set the ID for the various devices that are going to be on the bus, read the manufacturer's documentation for each device to determine the appropriate switch or jumper settings.

2. Use the EEROM Configuration Utility to change the KZPBA-CB SCSI ID as necessary so that priority arbitration is as desired and no two devices have the same ID. The host adapter should be assigned ID 7.

SCSI bus priority arbitration is based on the SCSI ID of the arbitrating device. Priority arbitration is established from highest to lowest. The host adapter is normally assigned SCSI ID 7.

In the Wide SCSI priority arbitration scheme, SCSI ID 7 has the highest priority and SCSI ID 8 has the lowest priority:

```
SCSI ID 7-6-5-3-2-1-0-15-14-13-11-9-8
```

3.7 Installing Operating System Drivers

Operating system or platform console file updates may be required in order to support the KZPBA-CB Host Adapter in your system. Refer to the Product Release Notes for this product and your system for information on any required software updates. Load all required software prior to installing the KZPBA-CB into your system.

3.8 Verifying Installation on AXP-Based Systems with Windows NT

If you are using the Windows NT operating system, verify the proper installation of the KZPBACB as follows:

1. Power up your system; the Alpha AXP should go through its start up sequence and then display the ARC Boot Menu on your display terminal. Typically, your display should look like the following:

```
             Alpha Firmware Version x.y-z
      Copyright (c) 1993 - 1996 Microsoft Corporation
 Copyright (c) 1993 - 1996 Digital Equipment Corporation


                     Boot Menu:


      (Several lines of menu choices are displayed here)
```

If you do not see this menu, refer to your system documentation for more information about initially setting up your Alpha AXP. Return to this procedure when you have the *Boot Menu* displayed.

2. From the *Boot Menu*, select the **Supplementary Menu** item.

3. Next, select the **Display Hardware Configuration** item. The system will now display several pages of information about your Alpha AXP system.

4. Press the **Return** or **Enter** key to verify the devices detected and supported by the software. Your screen should look similar to the following depending upon the devices detected and supported.

```
ARC


Devices detected and supported by the firmware:


  eisa(0)video(0)monitor(0)
  multi(0)key(0)Keyboard(0)
  eisa(0)disk(0)fdisk(0)         (Removable)
  multi(0)serial(0)
  multi(0)serial(1)
  scsi(0)disk(3)rddisk(0)(RAW)        DEC RZ28      (C) DECX442
  scsi(0)cdrom(4)fdisk0  (Removable)  DEC RRD43     (C) DEC0064
  scsi(1)disk(1)rdisk(0)(RAW)         DEC RZ28      (C) DECX442
  scsi(1)disk(2)rdisk(0)(RAW)         DEC RZ28M     (C) DEC0446
```

5. Press the **Return** or **Enter** key to move through the pages until your screen has the *PCI Slot Information* display. Your screen should look similar to the following example:

```
PCI slot information


      Device   Function   Vendor   Device   Revision   Interrupt   Device
Bus   Number   Number     ID       ID       ID         Vector      Type
 0      8         0        1011      1          2           0       PCI
                                                                    Bridge
 0      10        0        8086     482         5           0       EISA
                                                                    Bridge
 0      11        0        1011      4          2          11       Video
                                                                    Card
 1      0         0        1011      2         24          21       Ethernet
 1      1         0         0       1020        2          22       SCSI
 1      2         0         0       1020        2          23       SCSI
```

6. Note that the third line in the list contains a Vendor ID field of "0" and a device type of "1020". These two values uniquely identify the KZPBA-CB. Search your display for a line (or lines if you installed more than one KZPBA-CB) containing these exact values. If there is no entry that corresponds to the KZPBA-CB, your adapter may not be correctly installed. Power off your system and repeat the installation process in Chapter 3.

7. When you have found all the installed KZPBA-CB adapters listed in step 4, continue to press **Enter** until you have returned to the *Supplementary Menu*, then select the *Boot Menu* item to return to that menu.

3.9   For Systems Running Alpha BIOS

If your system is running with an Alpha BIOS, verify the proper installation of the KZPBA-CB as follows:

1. Power up your system; after the Alpha AXP goes through its start-up sequence the Alpha BIOS initialization screen should appear.

2. Press **F2** for setup.

3. Select *Display System Configuration…* from the *Alpha BIOS* setup menu.

4. Select *Hard Disk Configuration* from the *Display System Configuration* menu and then press **Enter**. The system will now display the devices that are attached to the Qlogic adapter.

5. Press **ESC** to exit the *Hard Disk Configuration* menu.

6. Select *PCI Configuration* to display the configuration of the Qlogic adapter.

7. Select *SCSI Device* to list the installed Qlogic adapter.

8. Press the **ESC** key repeatedly until you have returned to the Windows NT operating system boot menu.

3.10 Verifying the Installation on AXP-Based Systems with DIGITAL OpenVMS or DIGITAL UNIX

If you are using the DIGITAL OpenVMS or DIGITAL UNIX operating system, verify the proper installation of the KZPBA-CB as follows:

1. Power up your system; the Alpha AXP should go through its start up sequence and then enter the SRM console.

2. Type: **show config** and press **Enter**.

3. Verify that the KZPBA-CB adapter is installed properly by observing the listing in the configuration display for the "Qlogic ISP1020/1040" module. The following is an example of a typical display for an AlphaServer 2100 system.

```
                 Digital Equipment Corporation
                    AlphaServer 2100 4/200


 SRM Console V4.0 – 3  VMS PALcode X5.48-94, OSF PALcode X1.35-39


   Component    Status          Module ID
   CPU 0          P             B2020-AA DECchip (tm) 21064-3
   Memory 0       P             B2021-BA  64 MB
   I/O                          B2021-AA
                                dva0.0.0.0.1   RX26
   Slot Option                  Hose 0, Bus 0, PCI
     0  DECchip 21040-AA        ewa0.0.0.0.0.  08.00-2B-E2-82-34
     1  NCR 53C810              pka0.7.0.1.0   SCSI Bus ID 7
                                dka200.2.0.1.0 RZ26
                                dka600.6.0.1.0 RRD43
     2  Intel 82375EB                          Bridge to Hose 1, EISA
     6  Qlogic ISP1020/1040     pkb0.7.0.6.0   SCSI Bus ID 7
                                dkb100.1.0.6.0 RZ28
                                dkb400.4.0.6.0 RZ28M
```

4

EEROM Configuration Utility (Alpha-Systems)

This chapter describes the EEROM configuration utility for the KZPBA–CB adapter in Alpha systems.

4.1   EEROM Parameter Settings

The KZPBA−CB host adapter ships with factory default EEROM parameters that determine how the host adapter board operates and interacts with connected devices. The default EEROM parameter settings were chosen to provide the best performance optimization for most system configurations. If you want to change the parameter settings, refer to Appendix A at the end of this guide.

The KZPBA−CB host adapter also ships with a floppy diskette containing the *ISP1020/1040 EEROM Configuration Utility* for Alpha AXP which you can use to change parameter settings. A description of the EEROM configuration utility and how to use it to change parameter settings is presented in the following section.

4.2   The EEROM Configuration Utility

The *ISP1020/1040 EEROM Configuration Utility* for Alpha AXP provides you with a means to access and change the host specific and device specific parameters stored in EEROM on the KZPBA−CB host adapter. It runs from the ARC console of Alpha AXP systems (see the Release Note supplied with the KZPBA−CB for the minimum version level required.)

The utility displays on a VGA monitor

The major steps required to change EEROM settings include:

- Setting terminal, if displaying on a terminal
- Starting the utility
- Changing the appropriate host adapter or device-specific parameters

4.2.1 Setting Terminal

To display the EEROM configuration utility on a VT320, or newer generation terminal, set your terminal to: VT300 mode, 8 bit controls.

4.2.2 Starting the EEROM Configuration Utility

Starting the EEROM Configuration Utility varies depending upon whether your system runs AlphaBIOS. For systems not running AlphaBIOS go to Section 4.2.2.1. For systems running AlphaBIOS go to Section 4.2.2.2.

4.2.2.1 Systems Without AlphaBIOS

1. If your system runs Windows NT, it should power up to the ARC console. The ARC console screen appears as shown in Figure 4–1.

   If your system runs DIGITAL UNIX or DIGITAL OpenVMS, set the *os_type* variable to NT by typing: **set os_type NT**, and reboot your system.

NOTE

Remember to reset your "operating system type" from the setup system via the supplementary menu at the end of the procedure.

Figure 4–1 The ARC Console Screen

```
Alpha Firmware Version 4.52
Copyright (c) 1993-1996 Microsoft Corporation
Copyright (c) 1993-1996 Digital Equipment Corporation

Boot Menu
      Boot Windows NT
      Boot an alternate operating system
      Run a program
      Supplementary menu ...

Use the arrow keys to select, then press Enter
```

2. Insert the floppy diskette containing the *eeromcfg.exe* file into the appropriate floppy drive.

3. Use the up and down arrow keys to highlight the *Run a Program* option from the *Boot Menu* on the ARC console and press **Enter** to select it. The following prompt appears: Program to run:

4. Type either of the following at the prompt and press **Enter**:

   To start from a floppy diskette, type: **a:eeromcfg**

   To start from a CD-ROM, type: **cd:\utility\eeromcfg**

5. Press the **Enter** key. The *EEROM Configuration Utility Select ISP1020/1040* screen appears similar to the one shown in Figure 4–2.

Figure 4–2 The Select ISP1020/1040 Screen

```
    ----------------------------------------------------------------
         ISP1020/1040 EEROM Configuration Utility V2.1
    ----------------------------------------------------------------
         +============Select ISP1020===============+
         |  Bus      Virtual Slot        Address    |
         | [0            12              B2021000]   |
         |_____|
         |                                          |
         |    < (O) k >      < E(x)it >             |
         |                                          |
         +======================================== +
```

4.2.2.2   Systems With AlphaBIOS

2.   If your system runs Windows NT, go to Step 3; otherwise proceed with Step 2.

3.   If your system is running SRM console, set the *os_type* variable to NT by typing **set os_type NT**, and then reboot.

> **NOTE**
>
> Remember to reset your system back to the SRM after running the configuration utility. Here are the steps to do:
>
> - Select *CMOS Setup* and press **Enter**.
>
> - In the *CMOS Setup* screen press **F6**; the *Advanced CMOS Setup* screen is displayed.
>
> - Select *Digital UNIX (SRM)* or *DIGITAL OpenVMS (SRM)* and press **F10**.
>
> - The *CMOS Setup* screen is again displayed. Press **F10** to save the change.
>
> - Reset the system.

3.   Press **F2** for setup. The *AlphaBIOS Setup* screen is displayed.

4.   Select *Utilities* from the *AlphaBIOS Setup* menu.

5.   Select *Run Maintenance Program* from the *Utilities* menu. The *Run Maintenance Program* window appears.

6.   Type either of the following at the prompt and press **Enter**:

     To start from a floppy diskette, type: **a:eeromcfg**

     To start from a CD-ROM, type: **cd:\utility\eeromcfg**

7.   Press the **Enter** key. The EEROM Configuration Utility *Select ISP1020/1040* screen appears similar to the one shown in Figure 4–2.

4.3   Using the EEROM Configuration Utility

Use the up and down arrow keys to move the selector brackets [ ].

To begin, move the selector brackets to the *ISP1020/1040* on the *Select ISP1020/1040* screen, shown in Figure 4−2, that you want to configure. The *Configure EEROM Parameters* menu appears as shown in Figure 4–3 for ISP 1020 and in Figure 4–4 for ISP 1040.

Use the up and down arrow keys to move the bracket selector to an option on the
Configure EEROM Parameters menu (or type the letter of the option in
parentheses) and press **Enter** to select the option.

Figure 4–3 The EEROM Configuration Utility 1020 Main Menu

```
--------------------------------------------------------------
       ISP1020/1040 EEROM Configuration Utility V2.1
--------------------------------------------------------------
       +========Configure EEROM Parameters========+
       |                                          |
       | [ (L)oad Default EEROM Parameters    ]   |
       |   Edit EEROM (H)ost Adapter Parameters   |
       |   Edit EEROM (D)evice Parameters         |
       |   E(x)it                                 |
       |                                          |
       +==========================================+
```

Figure 4–4 The EEROM Configuration Utility 1040 Main Menu

```
--------------------------------------------------------------
       ISP1020/1040 EEROM Configuration Utility V2.1
--------------------------------------------------------------
       +========Configure EEROM Parameters========+
       |                                          |
       | [ (L)oad Default EEROM Parameters    ]   |
       |   Edit EEROM (H)ost Adapter Parameters   |
       |   Edit EEROM (D)evice Parameters         |
       |   Enable (U)ltra [FAST-20] on all devices|
       |   Enable (F)AST-10 on all devices        |
       |   E(x)it                                 |
       |                                          |
       +==========================================+
```

4.4 Changing EEROM Parameters

Tables A–1 and A–3 in Appendix A describe reasons to change the EEROM parameters. This section describes how to change:

- Host adapter parameter settings, which control the general operation of the KZPBA−CB host adapter

    and,

- Device EEROM parameter settings, which control how the KZPBA−CB interacts with connected devices

4.4.1 Changing Host Adapter Parameters

To change host adapter parameters, follow these steps:

1. Use the up and down arrow keys, or type "**h**" to move the bracket selector to the "*Edit EEROM Host Adapter Parameters*" option on the "*Configure EEROM Parameters*" menu and press **Enter**. The "*Edit EEROM Host Adapter Parameters*" screen appears as shown in Figure 4–5.

Refer to Table A–1 in Appendix A for a list of the host adapter parameter default settings, parameter descriptions, and optional parameter settings.

Figure 4–5 The Edit EEROM Host Adapter Parameters Screen

```
+================Edit EEROM Host Adapter Parameters=============+
|                                                              |
|   Parameters                    Default         New          |
|FIFO Threshold                      3         [   0   ]       |
|Host Adapter Enable                 1         [   1   ]       |
|Initiator SCSI ID                   7         [   7   ]       |
|Bus Reset Delay                     1         [   1   ]       |
|Retry Count                         0         [   1   ]       |
|Retry Delay                         1         [   1   ]       |
|Asynchronous Data Setup Time        9         [   9   ]       |
|REQ/ACK Active Negation             1         [   1   ]       |
|Data Line Active Negation           1         [   1   ]       |
|Data DMA Burst Enable               1         [   1   ]       |
|Command DMA Burst Enable            1         [   1   ]       |
|Tag Aging                           8         [   8   ]       |
|Selection Timeout                 250         [ 250   ]       |
|Maximum Queue Depth               256         [ 256   ]       |
|Fast RAM Enable                     1         [   1   ]       |
|SCSI Reset Disable                  0         [   0   ]       |
|                                                              |
|                                                              |
|          <(O)K>                  <(C)ancel>                  |
|                                                              |
+==============================================================+
```

NOTE

If your board is capable of FAST-20, the asynchronous data setup time default is 9.

2. Press **Enter** or use the up and down arrow keys to move through the list of parameters. To change a parameter value, backspace over the value in the "*New*" field and type in a new value. If you enter a value out of the range for this parameter, the utility will display an error message indicating the valid range. Table 4–1 lists the default FIFO thresholds for various chips.

Table 4–1 Default FIFO Threshold for Various Chips

Chip	Default FIFO Threshold	Value Representing Each Threshold
ISP 1020	32 bytes	2
ISP 1020A	32 bytes	2
ISP 1040B	64 bytes	3

3. When you finish changing host adapter parameters, press the "**o**" key to confirm your changes. Press the "**c**" key if you do not want to save changes and return to the main menu. If you press the "**o**" key, a confirmation screen appears.

4. Press "**y**" to save changes and return to the main menu, or press "**n**" to return to the main menu without saving changes.

> **NOTE**
>
> If you choose not to save your changes, your changes will appear on the host adapter parameters screen until you press "**x**" from the main menu. Pressing "**x**" from the main screen clears your changes to the host adapter parameters.

4.4.2 Changing Device Parameters

To change device parameters, follow these steps:

1. Use the up and down arrow keys, or type "**d**" to move the bracket selector to the "*Edit EEROM (D)evice Parameters*" option on *the* "*Configure EEROM Parameters*" menu and press **Enter** to select. The "*Edit EEROM Device Parameters*" screen appears as shown in Figure 4–6.

   Table A–4 in Appendix A lists the device (specific) parameters. It indicates default settings, parameter descriptions, and available options.

Figure 4–6 Edit EEROM Device Parameters Screen

```
+=====================Edit EEROM Device Parameters============== +
|                                                                |
|    Parameters              Default Dev0   Dev1   Dev2   Dev3   |
|Renegotiate on Error          1       [ 1 ] [ 1 ] [   ] [ 1 ]   |
|Stop Queue on Check Condition 0       [ 0 ] [ 0 ] [ 0 ] [ 0 ]   |
|Auto Request Sense            1       [ 1 ] [ 1 ] [ 1 ] [ 1 ]   |
|Tagged Queuing                1       [ 0 ] [ 0 ] [ 0 ] [ 0 ]   |
|Synchronous Data Transfers    1       [ 1 ] [ 1 ] [ 1 ] [ 1 ]   |
|Wide Data Transfer            1       [ 1 ] [ 1 ] [ 1 ] [ 1 ]   |
|Parity Checking               1       [ 1 ] [ 1 ] [ 1 ] [ 1 ]   |
|Disconnect Allowed            1       [ 1 ] [ 1 ] [ 1 ] [ 1 ]   |
|Execution Throttle            16      [16 ] [16 ] [16 ] [16 ]   |
|Synchronous Period            12      [12 ] [12 ] [12 ] [12 ]   |
|Synchronous Offset            8       [ 8 ] [ 8 ] [ 8 ] [ 8 ]   |
|Device Enable                 1       [ 1 ] [ 1 ] [ 1 ] [ 1 ]   |
|-------------------------------------------------------------- |
|                                                                |
|           < (O) K >                < (C)ancel >                |
|                                                                |
+============================================================== +
```

2. Use the right and left arrow keys to move between devices. The device columns scroll to the right for up to 15 devices.

3. Press **Enter** or use the up and down arrow keys to move through the list of parameters. To change a parameter value, backspace over the value in the "*New*" field and type in a new value. If you enter a value out of the range for this parameter, the utility will display an error message indicating the valid range.

> **NOTE**
>
> For FAST-20 operation, the default for synchronous period is 12 and the default for synchronous offset is 8.
>
> For FAST-10 operation, the default for synchronous period is 25 and the default for synchronous offset is 12.

4. When you finish changing device adapter parameters, press the "**o**" key to save your changes, or press the "**c**" key if you do not want to save changes. If you press the "**o**" key, a "*Write EEPROM Parameters*" screen appears. If you press the "**c**" key, the main menu appears.

5. Press "**y**" to save changes and return to the main menu, or press "**n**" to return to the main menu without saving changes.

> **NOTE**
>
> If you choose not to save your changes, your changes will appear on the device adapter parameters screen until you press "**x**" from the main menu. Pressing "**x**" from the main screen clears your changes from the host adapter parameters screen.

4.4.3 Enabling FAST-20 on all Devices Connected to a FAST-20 Board

To set all devices connected to a FAST-20 board to negotiate for FAST-20, follow these steps:

1. Use the up and down arrow keys, or type "**U**" to move the bracket selector to the "*Enable (U)ltra FAST-20 on all devices*" option on *the "Configure EEROM Parameters*" menu and press **Enter** to select.

> **NOTE**
>
> This option appears on the Configure EEROM Parameters menu only if the selected board is FAST-20.

2. When the screen appears prompting you as follows:

> **WARNING**
>
> ```
> Setting the DEFAULT PARAMETERS will
> write   over   the   previous   EEROM
> contents. Do  you  wish  to  continue
> (Y/N)?
> ```

Type **Y** to change the settings to FAST-20 on all devices connected to the specified board.

4.4.4 Enabling FAST-10 on all Devices Connected to a FAST-10 Board

To set all devices connected to a FAST-10 board to negotiate for FAST-10, follow these steps:

1. Use the up and down arrow keys, or type **"F"** to move the bracket selector to the *Enable (F)AST-10 on all devices* option on *the Configure EEROM Parameters* menu and press **Enter** to select.

> **NOTE**
>
> This option appears on the Configure EEROM Parameters menu only if the selected board is FAST-10.

2. When the screen appears prompting you as follows:

> **WARNING**
>
> ```
> Setting the DEFAULT PARAMETERS will
> write   over   the   previous   EEROM
> contents. Do  you  wish  to  continue
> (Y/N)?
> ```

Type **Y** to change the settings to FAST-10 on all devices connected to the specified board.

5

Troubleshooting

This chapter provides troubleshooting information to help diagnose problems that can occur during the installation of the KZPBA–CB adapter. If you experience difficulty in installing or verifying the operation of the adapter, refer to the information in the trouble-shooting tables to isolate and diagnose the problem.

5.1   Introduction

Troubleshooting is the process of isolating and diagnosing problems. This chapter provides solutions to problems that can occur during the installation of the KZPBA–CB adapter. If you experience difficulty in installing or verifying the adapter, use the information in this chapter to isolate and diagnose the problem.

The troubleshooting techniques described in this chapter **do not** identify all possible problems with your KZPBA–CB adapter, nor do the actions suggested remedy all problems. If a problem is not described, or if the actions suggested **do not** solve the problem, call your DIGITAL service representative. For problems that may be related to the host, refer to your host system documentation.

The troubleshooting information presented in this chapter is divided as follows:

- System Power-on Problems (Table 5–1)
- SCSI-Device Problems (Table 5–2)
- Boot-Sequence Problems (Table 5–3)

> **NOTE**
>
> Before you begin troubleshooting, ensure that the correct version of console code (SRM, ARC and AlphaBIOS) is loaded.

5.2   System Power-on Problems

After you turn on your host system, the CPU either performs a series of self-tests or enters the console mode. Table 5–1 describes possible problems that could occur during self-tests, specifies their probable cause, and provides corrective action.

Table 5–1 Power-on Problems Troubleshooting Table

Symptom	Probable Cause	Corrective Action
System self-tests halt with error message or error summary displayed on console terminal.	System detected an error while running its self-test.	Check that the KZPBA−CB and system boards are firmly seated. Check connections to external peripherals. Record the number following the question mark in the error message or error summary and call your DIGITAL service representative.

5.3   SCSI Device Problems

Table 5–2 lists a SCSI device problem, specifies the probable causes, and suggests corrective actions for each probable cause.

Table 5–2 SCSI Device Troubleshooting Table

Symptom	Probable Cause	Corrective Action
SCSI device does not appear in the configuration display after the SRM console command, `p00>>show config` or, SCSI device does not appear in the **List Existing SCSI Devices** display selected from the EEROM configuration utility.	Device cannot negotiate wide or synchronous transfers.	Use the EEROM configuration utility to disable (Refer to Chapter 4).
	Duplicate SCSI IDs	Ensure that each SCSI device has a unique SCSI ID.

Table 5–2 SCSI Device Troubleshooting Table (*Continued*)

Symptom	Probable Cause	Corrective Action
SCSI device (*continued*)	KZPBA–CB adapter is in an unknown state.	Initialize the adapter with the SRM console command, (P00>>> **init**) or, by pressing the systems re-set button.
	SCSI device or bus is hung.	Reset the SCSI bus via the flash EEROM utility (see Chapter 4.)
	Cable is not connected to the SCSI device.	Check cable connections.
	SCSI device(s) not plugged in and turned on before system power up.	Power up all external SCSI devices, and then power up system.
	SCSI bus not terminated properly.	Ensure each end of the bus is terminated. Ensure devices in the middle of the bus are not terminated.
	Total length of SCSI bus is too long.	Check total length of SCSI bus as follows: **Ultra Differential,** 25 meters, maximum.
	Defective SCSI device.	Replace SCSI device.

5.4 Boot Sequence Problems

Table 5–3 describes possible problems during the boot sequence, specifies their probable cause, and suggests corrective actions.

NOTE

For the DIGITAL UNIX and DIGITAL OpenVMS operating systems, obtain the correct device name as described in Section 3.10. For Windows NT refer to Section 3.8.

Table 5–3 Boot Sequence Troubleshooting Table

Symptom	Probable Cause	Corrective Action
Boot failure	Incorrect boot device was specified at the console boot command.	Re-define the default boot device. Refer to your system user's guide for specific Environmental parameter settings.
	KZPBA−CB is not termi-nated properly.	Ensure each end of the SCSI bus is termi-nated.
	KZPBA−CB is in an un-known state.	Initialize the adapter by either entering the SRM console "init" command or press the system-reset button.
Device not recognized during boot.	KZPBA−CB is not termi-nated properly.	Ensure each end of the SCSI bus is termi-nated.
	Operating system not configured correctly.	Reconfigure system software. Refer to system documentation.
	Operating system does not contain device driver or driver not installed correctly.	Ensure that the OS revision level supports the KZPBA−CB.

A

EEROM Parameter Settings

This appendix describes EEROM device-specific parameters on the KZPBA–CB. It provides a description of each parameter, its default setting, and available options. It also lists the FIFO threshold controls and their corresponding parameter settings, the asynchronous data setup times, and the parameter selection time-out values.

A.1 EEROM Parameter Settings

Descriptions of the host adapter parameters and device (specific) parameters available through the Alpha AXP configuration utility appear in Tables A–1 and A–4, respectively.

The KZPBA−CB host adapter also ships with a floppy diskette containing the ISP1020/1040 EEROM Configuration Utility for Alpha AXP which you can use to change parameter settings. Refer to Chapter 4 of this guide for a description of the EEROM configuration utility and how to use it to change parameter settings.

Table A–1 Descriptions of Host Adapter Parameters (KZPBA–CB General Operation)

Parameter	Default	Description	Option
FIFO Threshold 1020 1020A 1040B	 2 2 3	Sets the FIFO threshold point at which burst transfers are requested on the KZPBA−CB host adapter. The burst transfer is triggered differently for host memory write operations and host memory read operations. The bus transfer is triggered when the FIFO byte count reaches the threshold point for host memory writes operations. The bus transfer is requested when the FIFO byte count is below the threshold point for host memory read operations.	Refer toTable A–2 for the FIFO threshold points available and the corresponding parameter setting to select each.
Host Adapter Enable	1	Determines whether the BIOS recognizes the KZPBA−CB host adapter.	Set to 0 to disable the host adapter without physically removing it from your system.
Initiator SCSI ID	7	Sets the KZPBA−CB SCSI ID.	0–15
Bus Reset Delay	1	After resetting the SCSI bus, the firmware refrains from initiating any SCSI activity for the number of seconds specified by this parameter.	0–255 seconds
Retry Count	0	Specifies the number of times the firmware attempts to retry a selection time-out or a busy status.	0–255 retries.
Retry Delay	1	Sets the time (in 100-ms increments) that the firmware waits before re-attempting an operation.	0–255 in 100-ms increments
Asynchronous Data Setup Time FAST-20	9	Sets the number of clock periods the KZPBA−CB host adapter card waits after driving the SCSI data signals before asserting a SCSI bus acknowledge signal.	Refer to Table A–3.

Table A–1 Descriptions of Host Adapter Parameters (KZPBA–CB General Operation) (*Continued*)

Parameter	Default	Description	Option
REQ/ACK Active Negation	1	Provides Active pull-up assist in single-ended mode. (The REQ and ACK signals are pulled up.) By enabling active negation, the KZPBA−CB host adapter is less sensitive to an imperfect SCSI bus.	Set to 0 to disable the active negation.
Data Line Active Negation	1	Provides active pull-up assist in single-ended mode. (The SD15-0 and SDP1-0 signals are pulled up.) By enabling active negation, the KZPBA−CB host adapter is less sensitive to an imperfect SCSI bus.	Set to 0 to disable the active negation.
Data DMA Burst Enable	1	When set to 1, performs burst transfers on the data DMA channel.	When set to 0, data is transferred in nonburst mode with each cycle initiated by a new address phase.
Command DMA Burst Enable	1	When set to 1, performs burst transfers on the data DMA channel.	When set to 0, data is transferred in nonburst mode with each cycle initiated by a new address phase.
Tag Aging	8	Insures tagged commands are not lost in the target device. Tag aging is a backup to the time-out mechanism.	0–255 cycles, drive dependent.
Selection Time-out	250	Sets the selection phase time-out value.	Table A–5 shows the time-out values available.
Maximum Queue Depth	256	Specifies the maximum number of outstanding commands issued to each SCSI target. When the number is reached, new commands are returned with Queue Full Status.	0 to 64K commands

Table A–1 Descriptions of Host Adapter Parameters (KZPBA–CB General Operation) (*Continued*)

Parameter	Default	Description	Option
Fast RAM enable	1	Provides no wait state, fastest performance.	Set to 0 to require a wait state, slower performance. (Not recommended.)
SCSI Reset Disable	0	Allows the BIOS code to issue a SCSI reset during BIOS initialization.	Set to 1 to prevent the BIOS code from issuing a SCSI reset during BIOS initialization.

Table A–2 FIFO Threshold Controls and Corresponding Parameter Setting

Parameter	FIFO Threshold Point
3 (default)	64 bytes full during host memory writes. 64 bytes empty during host memory reads.
2	32 bytes full during host memory writes. 32 bytes empty during host memory reads.
1	16 bytes full during host memory writes. 16 bytes empty during host memory reads.
0	8 bytes full during host memory writes. 8 bytes empty during host memory reads.

Table A–3 Asynchronous Data Setup Time

Parameter (h)	Set-up Time (in clock periods)	Parameter (h)	Set-up Time (in clock periods)
0	1.0	8	5.0
1	1.5	9 (default)	5.5
2	2.0	A	6.0
3	2.5	B	6.5
4	3.0	C	7.0
5	3.5	D	7.5
6	4.0	E	8.0
7	4.5	F	8.5

Table A–4   Descriptions of Device EEROM Parameters (KZPBA–CB to Device Interaction)

Parameter	Default	Description	Option
Re-negotiate-on-Error	1	Set to 1, enables re-negotiation for synchronous and wide data transfers (if wide transfers are enabled) after a hard reset, power cycle, or a bus device reset.	Set to 0 to disable re-negotiation on error.
Stop Queue on Check Condition	0	When a command is returned with a Check Condition status, new commands are issued by the KZPBA−CB to the device.	Set to 1 to prevent the KZPBA-CB from issuing new commands when a command is returned with a Check-Condition status.
Auto Request Sense	1	When a command is returned with Check Condition status the KZPBA−CB issues a request command to determine cause.	Set to 0 to disable the request command. The computer's OS must be able to correct the problem and notify the adapter when it can continue issuing commands.
Tagged Queuing	1	Allows the drive to queue multiple commands when enabled.	Set to 0 to disable tag queuing.
Synchronous Data Transfers	1	Specifies the number of clock cycles in the data hold period for synchronous data transfers.	Set to 0 to disable synchronous data transfers.
Wide Data Transfers	1	Sets the drive to support wide SCSI data transfers.	Set to 0 to disable wide-data transfers.
Parity Checking	1	The KZPBA−CB checks for odd parity on data received from the SCSI bus, the received parity is passed to the SCSI FIFO.	When set to 0, the KZPBA−CB does not check for odd parity on data received from the SCSI bus and odd parity is generated for the SCSI FIFO.

Table A–4 Descriptions of Device EEROM Parameters (KZPBA–CB to Device Interaction)(*Continued***)**

Parameter	Default	Description	Option
Disconnect Allowed	1	Determines whether the drive can sever its communications link. Allows the drive to sever the communications link when the KZPBA−CB issues a command. The KZPBA−CB must re-establish the link (through a reconnect) when its ready to continue executing.	When set to 0, disconnects are not allowed.
Execution Throttle	16	Specifies the number of tagged commands the KZPBA−CB can send to the drive until the command queue is full. When the queue is full, the KZPBA−CB waits until there are no outstanding commands before sending the tagged commands.	0–255 commands.
Synchronous Period FAST-10 FAST-20	 25 12	Specifies the minimum REQ/ACK period (4-ns increments) for a synchronous data transfer.	25–100 4 ns increments.
Synchronous Offset FAST-10 FAST-20	 12 8	Specifies the maximum number of requests (REQ) that can be sent during a synchronous data transfer before an acknowledge (ACK) is received.	0–12 requests.
Device Enable	1	The system BIOS and drivers recognize the drives attached to the KZPBA−CB.	Set to 0 for the BIOS and drivers to ignore the drives.

Table A–5 Selection Time-out Values

Parameter	Resulting Time-out
25	25 µs
50	50 µs
75	75 µs
100	100 µs
250	250 ms
500	500 ms
750	750 ms
1000	1 sec

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