StorageWorks™

KZPBA PCI-to-Ultra SCSI Host Adapter

User's Guide

Digital Equipment Corporation
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About This Guide

Introduction

This guide describes how to install and configure the KZPBA PCI-to-Ultra 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 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 PCI-to-Ultra SCSI Host Adapter. The KZPBA is an ultra wide single-ended host adapter.

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

- Chapter 3: *Installing the KZPBA PCI-to-Ultra SCSI Host Adapter* — Describes how to install the KZPBA board into a computer. The procedures include terminating the SCSI bus, verifying the installation, and connecting the board to internal and 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: *QLogic Fast! Utility (Intel-Systems)*— Describes how to use the supplied configuration utilities to modify parameters that are stored in the board's flash EEROM for Intel-based systems.

- Chapter 6: ***Troubleshooting*** — Provides troubleshooting information to help diagnose problems that can occur during the installation of the KZPBA adapter.
- Appendix A: ***EEROM Parameter Settings (Alpha-Systems)*** — Describes EEROM device-specific parameters on the KZPBA 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
bold text	Represents text or commands you must enter.
italics text	Indicates titles of manuals, chapters, sections of chapters, new terms, command and file names, and is used for emphasis.
c:\windows>	Monospaced text indicates file names, path names, directories, or screen text.

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 PCI-to-Ultra SCSI Storage Adapter.

Revision Level	Date	Summary of Changes
EK-KZPBA-UG. A01	May 1997	Original release

1

Overview

This chapter provides an overview of the KZPBA PCI to Ultra SCSI-3 Host Adapter. The KZPBA is an ultra wide single-ended host adapter.

1.1 Introduction

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

The KZPBA 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 host adapter can be installed in the same host computer. Each host adapter and its associated SCSI devices form a separate SCSI bus.

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 is capable of 32-bit bus master data transfers, including PCI enhanced data transfer commands. The host adapter supports all SCSI-2 and SCSI-3 functions.

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 comes with both AXP and Intel configuration utilities. These configuration utilities provide 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 termination and SCSI Parity Checking.

1.2   KZPBA Ultra Wide Single-Ended Host Adapter

The Ultra Wide Single-ended Host Adapter contains two 68-pin high density connectors, one internally on the surface of the board and the other on the external bulkhead, and a 50-pin board edge connector. The internal connectors are used to connect any internal SCSI drives to the PCI bus. The KZPBA single-ended Host Adapter is shown in Figure 3–1.

In a 16-bit (wide) SCSI bus, the KZPBA can directly support up to 15 wide single-ended SCSI devices (operating system dependent). Each of the two 68-pin connectors can support up to 15 single-ended 16-bit SCSI devices or seven single-ended 8-bit SCSI devices. The 50-pin connector can support up to seven single-ended 8-bit devices.

You can use only internal or external SCSI connectors at any one time. The KZPBA does not support simultaneous use of both internal and external connectors.

1.3   Major Features of the KZPBA
- 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)
- Single-ended version
- 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 Ultra SCSI synchronous devices
- Concurrent support for 8- and 16-bit SCSI devices
- Scatter/Gather
- Disconnect/Reconnect
- Fully multithreading/multitasking
- 68-pin high density external connector
- One 68-pin high density and one 50-pin internal connectors
- Tagged Queuing
- Support of multiple LUNs
- SCSI termination power control
- Parity handling in Data, Message, Status, Selection/Reselection, and Command phases
- Active negation

Maximum Off-loading of Host CPU Requirements

- Onboard RISC and SCSI executive processors 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 Host Adapter is designed for easy installation and use. If you need further assistance, please contact your Digital services representative. Specifications for the KZPBA are listed in Table 1–1.

Table 1–1 KZPBA Specifications

Item	Specification
Operating Power	5 volts @ 1 Ampere
Performance	
Interface transfer rate:	
Synchronous Ultra Wide SCSI	40 MB/sec
Synchronous Ultra SCSI	20 MB/sec
Synchronous Fast Wide SCSI	20 MB/sec
Synchronous Fast SCSI	10 MB/sec
Synchronous SCSI	5 MB/sec
Asynchronous SCSI	1.5 MB/sec
Host Data Transfer Rate:	32-bit bus master DMA data transfers up to 132 MB/sec
Environmental	
Operating Temperature:	0°C/32°F to 55°C/131°F
Operating Relative Humidity:	10% to 90%, non-condensing
Storage Temperature:	-20°C/-4°F to 70°C/158°F
Storage Relative Humidity:	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	128 Kbytes of static RAM
Connectors: Ultra Wide Single-Ended	68-pin, high-density, external 68-pin, high-density, internal 50-pin, ribbon, internal
Safety and EMI Compliances	FCC Class B, Vfg, CE
Reliability	MTBF: 1,000,000 hours

2

Configuration Guidelines

Before you install the KZPBA 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 single-ended 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 Host Adapter can be installed in the same host computer. The number of boards that can be installed is only limited by the number of PCI slots available in the host computer. Unless a SCSI-bus converter is used, only single-ended SCSI devices can be directly connected to the single-ended host adapter.

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 both internal connectors, each connected to one or more internal SCSI devices.

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.

2.2.1 SCSI Cable Selection

Always select high-quality SCSI cables to use in your system. Because single-ended host adapters support Ultra SCSI 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-2 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 80-100ohms

- 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 Single-ended SCSI bus should not exceed 1.5 meters when operating in Ultra SCSI mode, using internal connectors to internal devices. If you are using an Ultra SCSI StorageWorks enclosure, refer to the Ultra SCSI Configuration Guidelines and Configuration documentation for cable lengths.

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 on the SCSI bus in relation to the host adapter and the SCSI devices.

SCSI bus termination on the KZPBA Host Adapter ultra wide single-ended board is established using one of the utility programs included in the host adapter kit.

Proper bus termination involves supplying termination power onto the SCSI bus and the strategic placement of terminators on the bus.
The KZPBA PCI-to-Ultra SCSI Host Adapter provides active 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. SCSI devices are protected by a diode or similar semiconductor to prevent back flow of the termination power when more than one device supplies this power.

2.4 Adapter Placement Configuration Example

Figure 2–1 shows a configuration topography that you can use to place the host adapter at the end of the SCSI bus.

Figure 2–1 Host Adapter at the End of the SCSI Bus
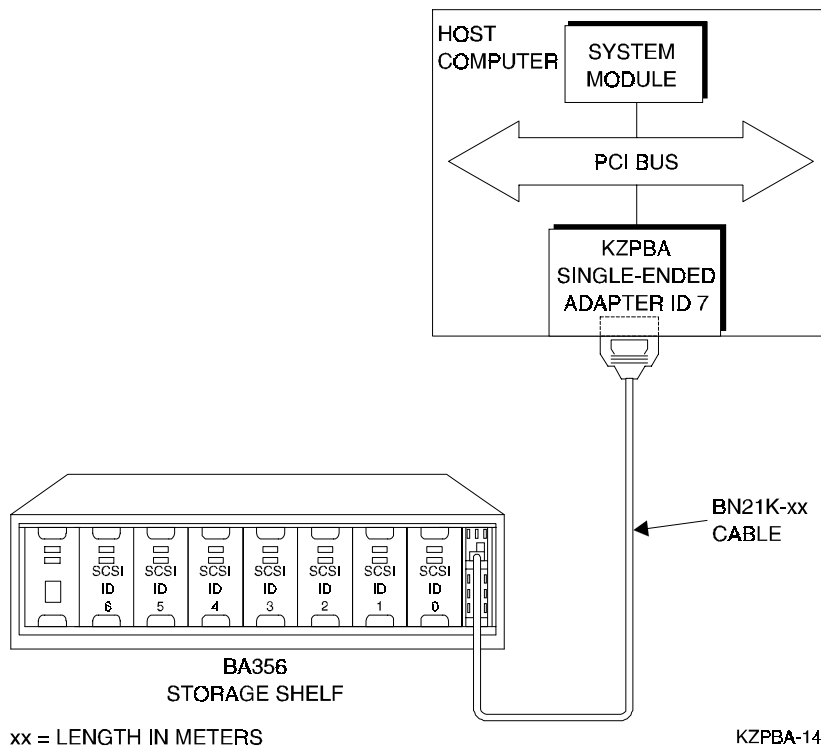
NOTE

The actual connecting cable is different than as labeled in this figure. The connecting cable is BN31S-XX.
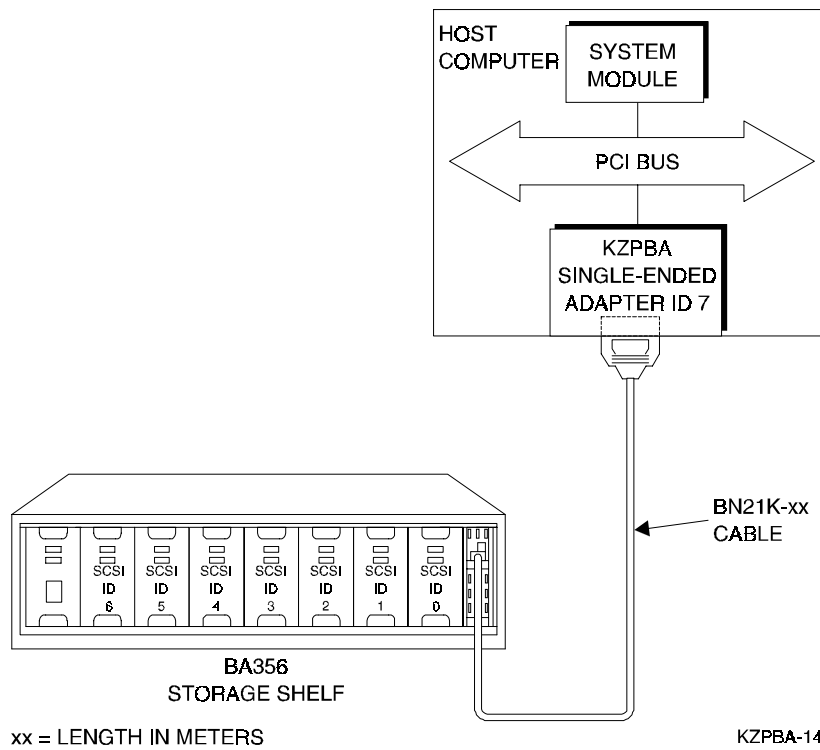
NOTE

The actual Personality Module connector is different than shown in this figure. The Personality module uses a straight connector rather than an angled connection as shown. In addition, the actual connecting cable is different than as labeled in this figure. The actual connecting cable is BN31S-XX.

Physical Configuration

The Personality Module resides in the BA356 storage shelf. The host adapter connects directly to the Personality Module using a point-to point cable connection.

Single-Ended SCSI Bus Configuration

The BA356 storage shelf contains two single-ended SCSI buses that are internally configured as a single bus. A maximum of seven 3½-inch half-height 8-bit or
16-bit SCSI devices in StorageWorks Building Blocks (SBBs) can be attached to the bus. This bus can be split so that storage shelf can be configured to have one 3-device bus configuration and one 4-device bus configuration. This is useful when a specific device requires more than one slot (such as a tape loader or solid state drive).

SCSI ID Selection

The KZPBA host adapter is assigned SCSI ID 7. For the SCSI devices mounted in the storage shelf, the device address is determined by its physical location in the storage shelf, with the slot number equating to the SCSI ID number.

SCSI Bus Termination
For a single-ended bus connection, the single-ended bus is terminated at one end by the KZPBA adapter and at the other end by the Ultra SCSI Personality Module.

3

Installing the KZPBA Adapter

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

3.1 Installation Overview

The installation of the KZPBA 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 internal or 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 Host Adapter Kit
- Back up the computer system

3.2.1 User-Supplied Hardware and Software Requirements

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

- An AXP- or Intel-based computer system with a PCI local bus, a 3½-inch (1.44 MB) floppy 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:
    - Windows NT
    - Open VMS
    - DIGITAL UNIX

3.2.2 KZPBA Host Adapter Kit Contents

The KZPBA Host Adapter kit contains the following:

- KZPBA PCI-to-Ultra SCSI Host Adapter module

- License Agreement

- One diskette containing the AXP flash EEROM Configuration Utility and operating system specific software drivers for both AXP and Intel Windows NT based systems

- This guide

- Release Notes

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 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 single-ended Host Adapter is shown in Figure 3–1.

Figure 3–1 KZPBA Single-Ended Host Adapter

(A)   (B)

(C)

(A) 68-PIN CONNECTOR MOUNTED ON THE
COMPONENT SIDE OF BOARD

(B) 50-PIN CONNECTOR-PINS PERPENDICULAR
TO BOARD

(C) EXTERNAL 68-PIN CONNECTOR   KZPBA-02
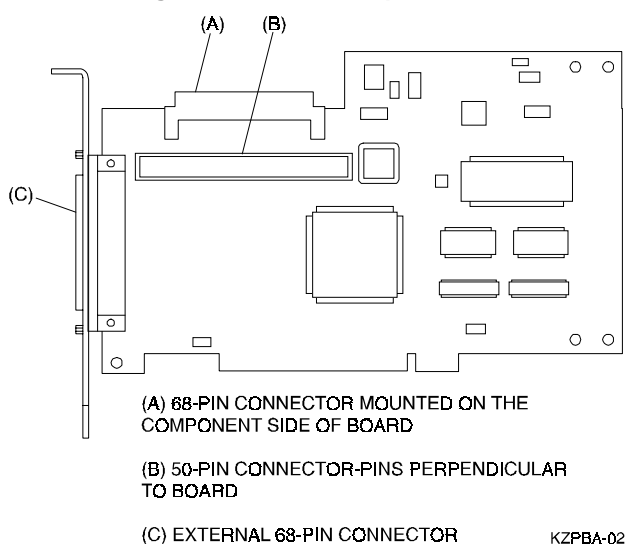
CAUTION

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 PCI-to-Ultra SCSI 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 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 Host Adapter
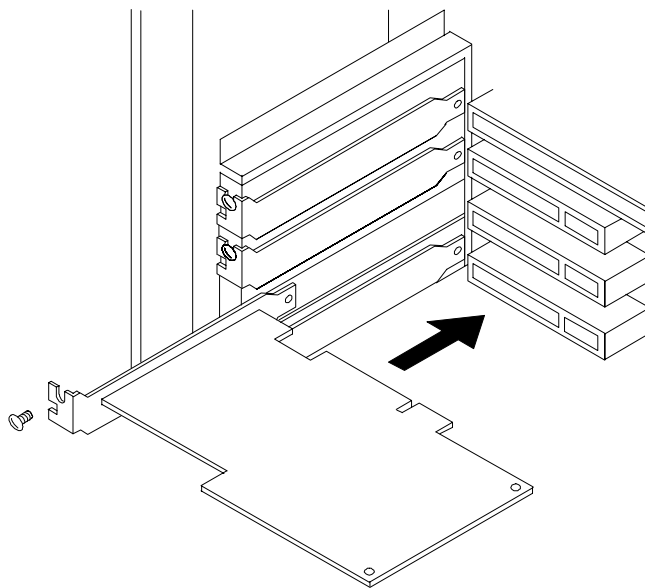
KZPBA-03

3.3.1 Connecting Internal SCSI Devices

Refer to your SCSI device documentation if you want to install one or more SCSI device inside the host computer. The internal device(s) must be single-ended.

To connect an internal SCSI device to the KZPBA host adapter, you will need one, or both, of the following cables depending on the requirements of your internal drive.

- A 50-pin connector SCSI ribbon cable with a 50-pin header internal connector to mate with the KZPBA host adapter 50-pin connector

- A 68-pin connector SCSI cable with a 68-pin header internal connector to mate with the KZPBA host adapter 68-pin connector

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NOTE

If you are connecting more than one internal SCSI drive to the KZPBA host adapter, there must be additional connectors on the cable to accommodate the additional drives.

Follow these steps to install the internal SCSI ribbon cable:

1. Insert the connector on one end of the SCSI cable into the connector on the host adapter (see Figures 3–3 and 3–4).

Figure 3–3   Installing the 68-pin Cable Connector Onto the Host Adapter
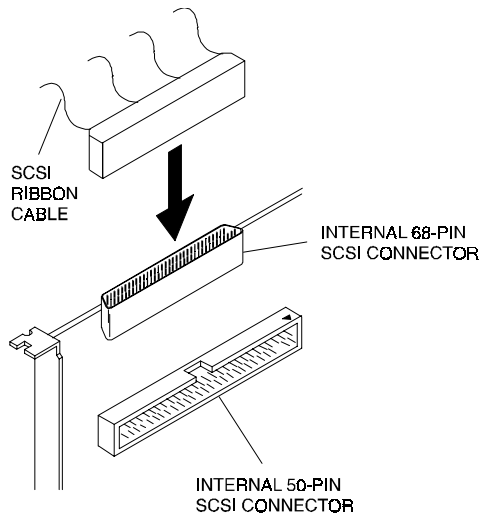
Figure 3–4   Installing the 50-pin Cable Connector Onto the Host Adapter
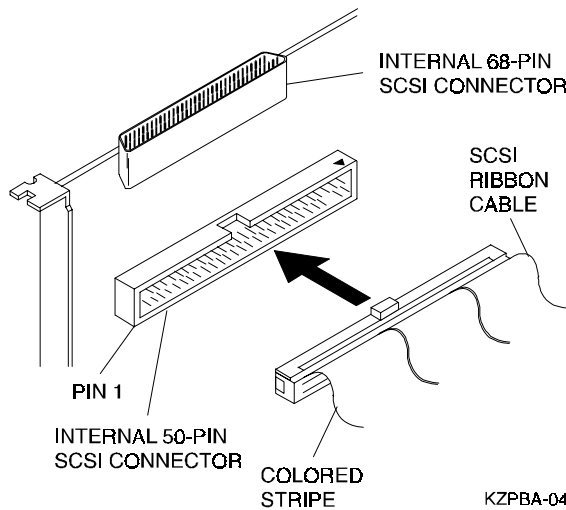
NOTE

The colored stripe on one side of the ribbon cable must be aligned with pin 1 on the host adapter board. For all remaining connections on the SCSI bus, make sure that the colored stripe edge of the ribbon cable aligns with pin 1 on the SCSI device connector. Pin 1 orientation is required so that all the SCSI devices will work properly.

2. Insert the last connector on the ribbon cable into the connector on the internal SCSI device on the shelf (see Figure 3–5).

Figure 3–5 Connecting Ribbon Cable to Internal SCSI Device
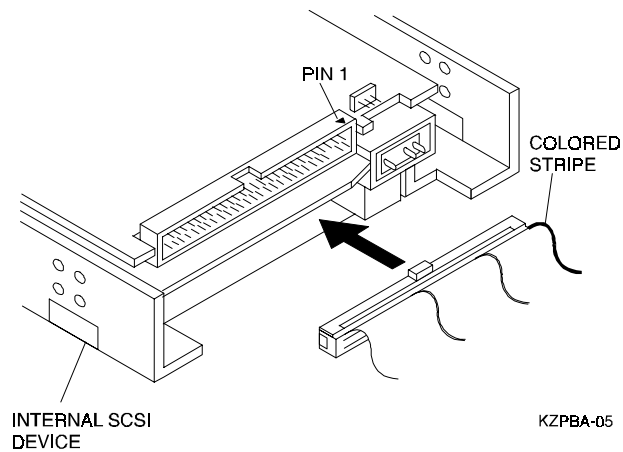
3. To connect a second internal SCSI device, plug the middle ribbon cable connector into the connector on the second internal device (see Figure 3–6) maintaining the pin orientation.

NOTE

Refer to your host computer documentation for more information describing how to connect the adapter to internal devices.

Figure 3–6 Connecting Ribbon Cable to a Second Internal SCSI Device
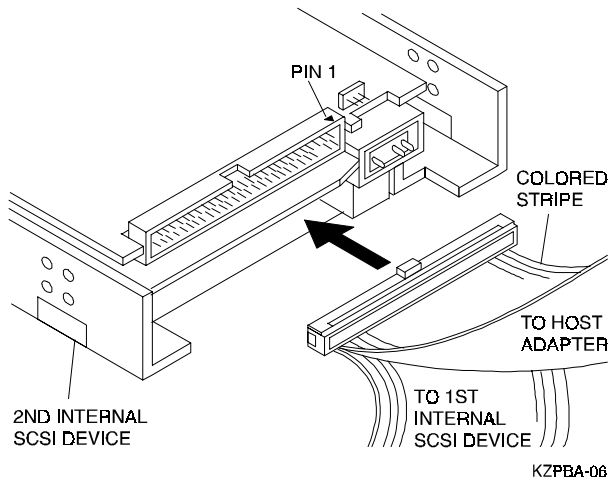
4. To connect three or more internal SCSI devices to the SCSI bus, the ribbon cable must have enough connectors to accommodate all the devices. Plug the connectors into the SCSI devices maintaining the pin-1 orientation.

5. If you are using both internal connectors on the host adapter, proceed in the same fashion as above for the other cable.

3.3.2 Connecting External SCSI Devices

The preferred cabling method is a point-to-point cable connection from the KZPBA Host Adapter to the BA356. Up to fifteen wide SCSI devices can be supported externally to the KZPBA through carefully cabled topologies. See the Ultra SCSI Configuration Guide for more details.

The KZPBA does not support daisy-chained configurations with the KZPBA in the middle of the SCSI bus attached by the external connector.

The external connector on the single-ended version of the module is a 68-pin connector. The external connector is keyed so that it can be plugged in only one way making the pin-1 orientation automatically correct.

Follow these steps to connect an external SCSI device housed within a BA356 shelf:

1. Attach one end of the cable to the KZPBA host adapter (see Figure 3–7).

Figure 3–7 Connecting External SCSI Cable to Host Adapter

KZPBA-07
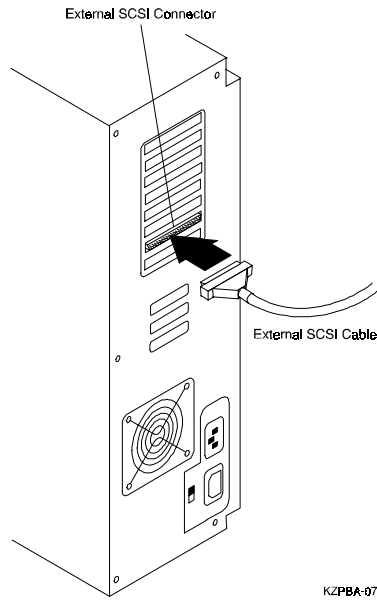
2. Attach the other end of the cable to the connector on the personality module
    in the BA356 wide SCSI storage shelf (see Figure 3–8).

Figure 3–8 Connecting External SCSI Cable to External SCSI Device

KZPBA-08
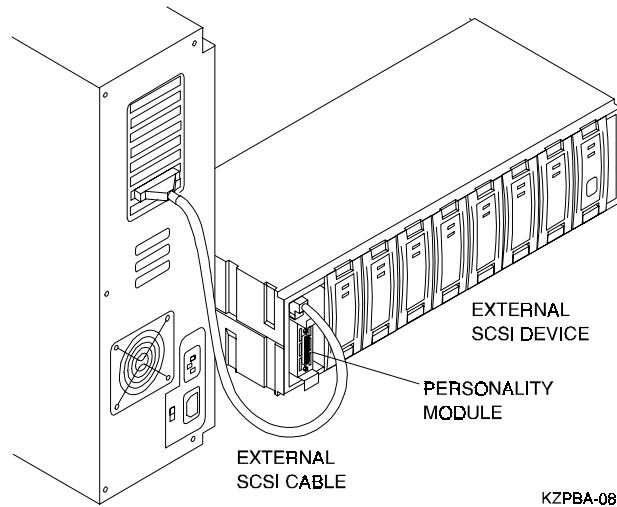
3.4 Setting SCSI Bus Termination

A set of terminating resistors must be either physically installed or software enabled 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 or enable termination on these two devices.

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

3. If one 8-bit and one 16-bit connector are used in a single-ended SCSI bus application, the upper 8 bits of the default termination setting must be terminated using the flash EEROM Configuration Utility (see Chapter 4).

The following paragraphs contain more information about device termination.

3.4.1 SCSI Device Termination

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

3.4.2 Host Adapter Termination

Termination on the KZPBA *single-ended* host adapter module is software controlled and its default is auto enabled. If you are using only one internal connector or external connector, the default does not have to be changed.

Single-Ended Module

On the single-ended module, if you are using both internal connectors, the default termination must be changed. To do this, first complete the installation, then refer to the flash EEROM Configuration Utility (see Chapter 4).

3.4.3 Possible Termination Configurations

Internal Devices only

Internal devices can only be used with the KZPBA Single-ended Host Adapter. How you terminate the devices and the host adapter depends on whether one or both of the module-edge connectors are used.

- If only one of the board-edge connectors is used, you must terminate the last internal device on the SCSI bus and disable termination on the other devices. The host adapter is already terminated by default and this setting should not be changed (see Figure 3–9).

-

Figure 3–9 Single Internal SCSI Bus
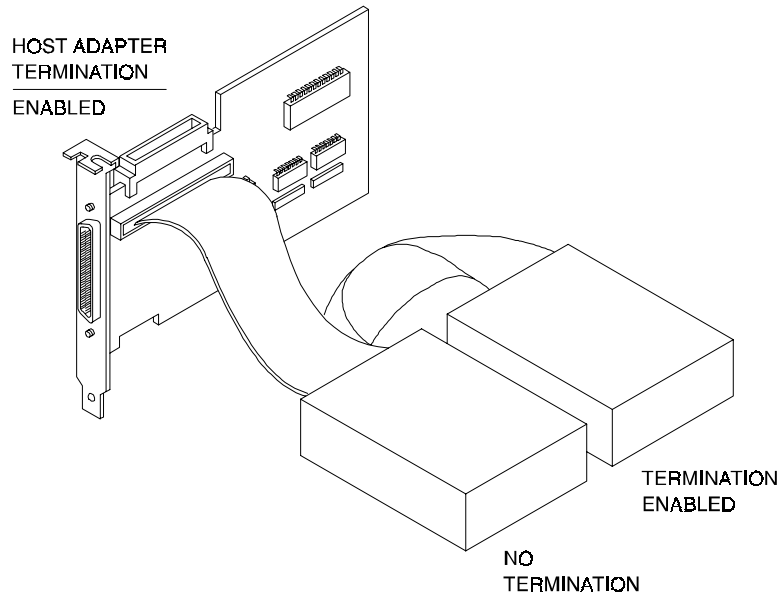
CAUTION

A KZPBA host adapter does not support the simultaneous use of both internal and external connectors. If it is necessary to attach both internal and external SCSI devices, a second KZPBA Host Adapter can be installed in the same host computer.

If you attach internal SCSI devices to both of the module-edge connectors on the host adapter, you must terminate the last SCSI device on each internal cable and disable termination on the other devices (see Figure 3–10). Because one device is attached to the 8-bit, 50-pin connector and the other attached to the 16-bit, 68-pin connector, the host adapter termination must be changed so that the high order bits are on. This is necessary to maintain the balance in the SCSI bus. To do this refer to the flash EEROM Configuration Utility (see Chapter 4).

Figure 3–10 Two Internal SCSI Buses
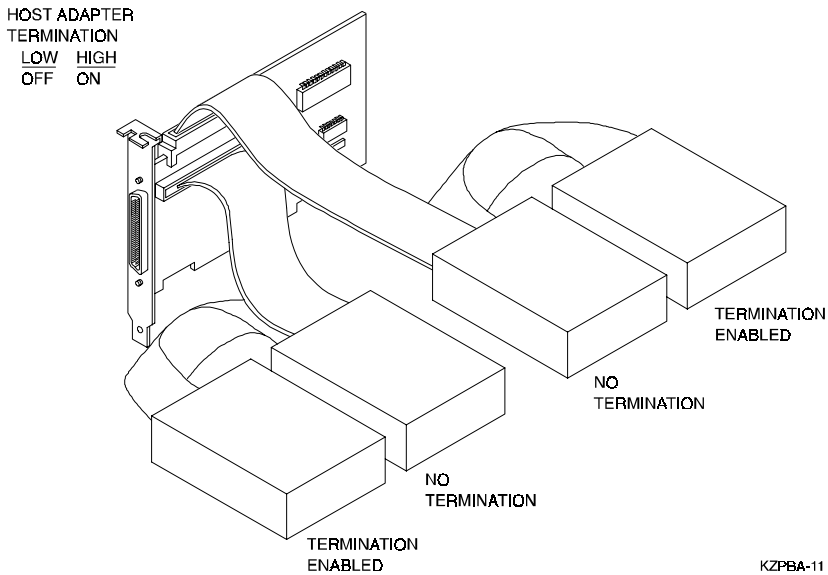
External Devices Only

When only external SCSI devices are connected to the host adapter, the last
external device must be terminated and all other devices must have their
termination removed. StorageWorks simplifies this by terminating the end of the
bus within the storage enclosure. For example, as shown in Figure 3–11 below,
the end of the bus is terminated by the Personality Module. The host adapter is
already terminated by default and this setting should not be changed.

Figure 3–11 External SCSI Bus
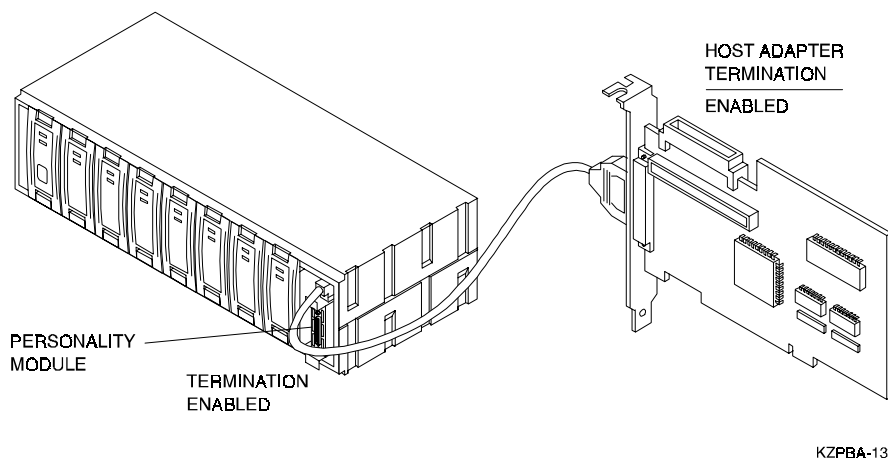
3.5   SCSI Device Identification (SCSI ID) and Arbitration

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.   Change SCSI IDs as necessary so that priority arbitration is as desired and
      that no two devices have the same ID. The host adapter should be assigned
      ID 7.

If more that one host adapter is installed, each host adapter has a separate SCSI
bus associated with it. The second SCSI bus can use the same ID numbers as
assigned to the first bus even though different devices are used.

SCSI Bus Priority Arbitration

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.

For example, in the following 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
```

3.6   Installing Operating System Drivers

To install drivers, see the *Driver.txt* file on the driver floppy diskette for your operating system. This floppy diskette comes with the product kit.

3.7   Verifying Installation on Systems with Windows NT

To verify installation on AXP-Based systems, see section 3.7.1.

To verify installation on Intel-systems, see section 3.7.2.

3.7.1 Verifying Installation on AXP-Based Systems

If you are using the Windows NT operating system on an AXP-based system, verify the proper installation of the KZPBA 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 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
```

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

Bus	Device Number	Function Number	Vendor ID	Device ID	Revision ID	Interrupt Vector	Device 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. Search your display for a line (or lines if you installed more than one KZPBA) containing these exact values. If there is no entry that corresponds to the KZPBA, 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 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.

3.7.2 Verifying Installation on Intel-Based Systems

If you are using the Windows NT operating system on an Intel-based system, verify the proper installation of the KZPBA as follows:

1. Turn on the power to your system.

2. Verify proper installation of the KZPBA during system boot. Look for a BIOS initialization process message similar to the following:

```
QLogic Corporation
PCI SCSI ROM BIOS Version X.XX
Copyright © Qlogic Corporation 1993-97 All Rights Reserved

Press <Alt-Q> for Fast! Util

ISP Firmware X.XX
Using IRQ number X
Device Device Adapter SCSI  SCSI Vendor Product  Product
Number  Type  Number  ID   LUN   ID      ID      Revision
81      Disk    0     0     0    XXX    XXX       XXXX
```

If no SCSI disk devices are attached to the computer, an error or status message appears.

3. To further verify the installation, if desired, press the **Alt-Q** key combination when the QLogic Ultra board BIOS initialization message appears to start the QLogic Fast! Utility.

4. The QLogic Fast! Utility displays the selected adapter in the top, left-hand corner of the main menu. Select the Scan SCSI bus option from the Fast! Util Options menu. See Chapter 5 for more details on using the QLogic Fast! Utility.

3.8 Verifying the Installation on AXP-Based Systems with Digital UNIX and OpenVMS

If you are using the Digital UNIX (OSF/1) or OpenVMS operating system, verify the proper installation of the KZPBA 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 *return*.

3. Verify that the KZPBA 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 adapter in Alpha-systems.

4.1 EEROM Parameter Settings

The KZPBA 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 B at the end of this guide.

The KZPBA 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 host adapter. It runs from the ARC console of Alpha AXP systems (see the Release Note supplied with the KZPBA 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 Not Running AlphaBIOS

For systems not running AlphaBIOS, follow these steps to start the EEROM Configuration Utility:

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 OpenVMS, set the *os_type* variable to NT by typing: **set os_type NT**, and reboot your system.

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 V1.8
----------------------------------------------------------------


        +===========Select ISP1020===============+
        |  Bus      Virtual Slot       Address   |
        |  [0           12           B2021000]   |
        |_____|
        |                                        |
        |    < (O) k >      < E(x)it >           |
        |                                        |
        +========================================+
```

4.2.2.2 Systems Running AlphaBIOS

For systems running AlphaBIOS, follow these steps to start the EEROM Configuration Utility:

1. Set the *os_type* variable to NT by typing: **set os_type NT**, and reboot your system.
2. Type: **ARC** at the SRM Console. The AlphaBIOS initialization screen appears.
3. Press *F2* for Setup. The AlphaBIOS Setup screen appears.
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 the following at `Program Name:` **eeromcfg**

   Tab to `Location:` and use the arrow keys to select the correct location of the program, either `a:` for floppy diskette or `CD:` for CD-ROM.
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 V1.8
---------------------------------------------------------------


        +========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 V1.8
---------------------------------------------------------------


        +========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 [FAST-10] on all devices|      |
        |    E(x)it                                |
        |                                          |
        +==========================================+
```

4.4   Changing EEROM Parameters

Tables B–1 and B–3 in Appendix B 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 host adapter

    and,

- Device EEROM parameter settings,
  which control how the KZPBA 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 B–1 in Appendix B 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      ]        |
|Low Termination Enable             1            [1      ]        |
|High Termination Enable            1            [1      ]        |
|Selection Timeout                250            [250    ]        |
|Maximum Queue Depth              256            [256    ]        |
|FIFO 128 Threshold Enable         .0            [0      ]        |
|Fast RAM Enable                    1            [1      ]        |
|SCSI Reset Disable                 0            [0      ]        |
|Enable Auto Termination            1            [1      ]        |
|                                                                |
|          <(O)K>                 <(C)ancel>                      |
+============================================================== +
```

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	64 bytes	3
ISP 1040B	64 bytes	3

NOTE

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

---

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 B–4 in Appendix B 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

If your board is capable of FAST-20 operation, the default for synchronous period is 12 and the default for synchronous offset is 8.

If your board is capable of 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 "**f**" 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:

```
This option will set the synchronous period and
offset to FAST-20 defaults. 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:

```
This option will set the synchronous period and
offset to FAST-10 defaults. 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

QLogic Fast! Utility (Intel-Systems)

This chapter describes the QLogic Fast! Utility for the KZPBA adapter in Intel-systems.

5.1 EEROM Parameter Settings

The KZPBA 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.

Use Fast!UTIL, a ROM-based utility evoked during BIOS initialization, to change parameter settings in Intel platforms.

5.2 Using QLogic Fast! Utility (Intel-Systems)

Use the QLogic Fast! Utility to set EEROM parameters for Intel systems.

To start QLogic Fast! Utility follow these steps:

1. Turn on the power to your system.

2. Press the **Alt-Q** key combination when the QLogic Ultra board BIOS initialization message appears. It appears on your screen during the boot process. The QLogic Fast! Utility main menu appears similar to Figure 5−1.

Note

If you have more than one QLogic PCI Ultra board installed, the utility prompts you to select which board you want to configure.

Figure 5–1 QLogic Fast! Util Main Menu

```
┌──────────────────────────────────────────────────────────────┐
│                                                                │
│              QLogic Fast! UTIL  Version 1.27                   │
│                                                                │
│                                                                │
│         ┌══════ Selected Adapter ══════┐                       │
│         │ Adapter Type     I/O Address │                       │
│         │ PCI Ultra-W      8000        │                       │
│         └──────────────────────────────┘                       │
│                                                                │
│                    ┌═══ Fast! UTIL Options ═══┐                │
│                    │ Configuration Settings   │                │
│                    │ Scan SCSI Bus            │                │
│                    │ SCSI Disk Utility        │                │
│                    │ Select Host Adapter      │                │
│                    │ Exit Fast! UTIL          │                │
│                    └──────────────────────────┘                │
│                                                                │
│  Use <Arrow keys> to move cursor, <Enter> to select option, <Esc> to backup │
└──────────────────────────────────────────────────────────────┘
```
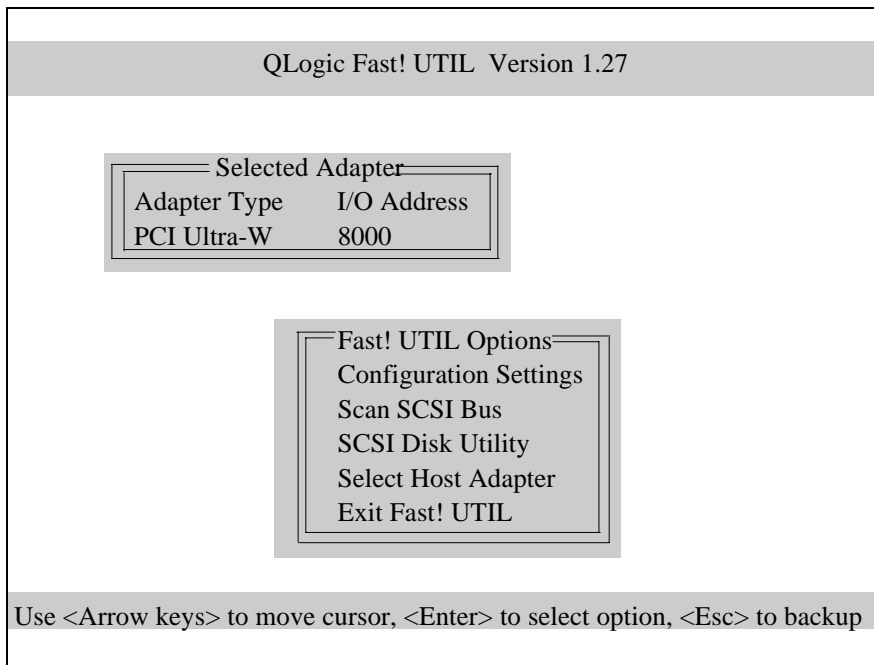
3. Use the arrow keys to highlight any of the option son the main menu as described in Table 5–1 and press the Enter key to select.

Table 5–1 QLogic Fast! Utility Main Menu Options

Main Menu Option	Description
Configuration Settings	Displays the Configuration Settings Menu
Scan SCSI Bus	Displays a list of the installed devices at each of the SCSI IDs.
SCSI Disk Utility	
Select Host Adapter	Displays a screen from which you can select which KZPBA you want to configure, if you have more than one KZPBA installed in your system.

5.3   Changing Configuration Settings

You can change configuration settings for a particular option, reset all settings to their defaults, or autoconfigure settings.

To change or view configuration settings, follow these steps:

1.   Use the arrow keys to move the cursor to *Configuration Settings* on the *Fast! Utility* main menu and press the Enter key. The *Configuration Settings* menu appears as shown in Figure 5–2.

Figure 5–2 The Configuration Settings menu.


```
┌────────────────────────────────────────────────────────────────┐
│                                                                  │
│            QLogic Fast! UTIL  Version 1.27                        │
│                                                                  │
│                                                                  │
│          ┌─── Selected Adapter ───┐                              │
│          │ Adapter Type   I/O Address │                          │
│          │ PCI Ultra-W    8000        │                          │
│          └────────────────────────┘                              │
│                                                                  │
│                    ┌─── Configuration Settings ───┐              │
│                    │  Host Adapter Settings        │              │
│                    │  SCSI Device Settings         │              │
│                    │  Autoconfigure SCSI Devices   │              │
│                    │  Restore Default Settings     │              │
│                    └───────────────────────────────┘             │
│                                                                  │
│  Use <Arrow keys> to move cursor, <Enter> to select option, <Esc> to backup │
│                                                                  │
└────────────────────────────────────────────────────────────────┘
```
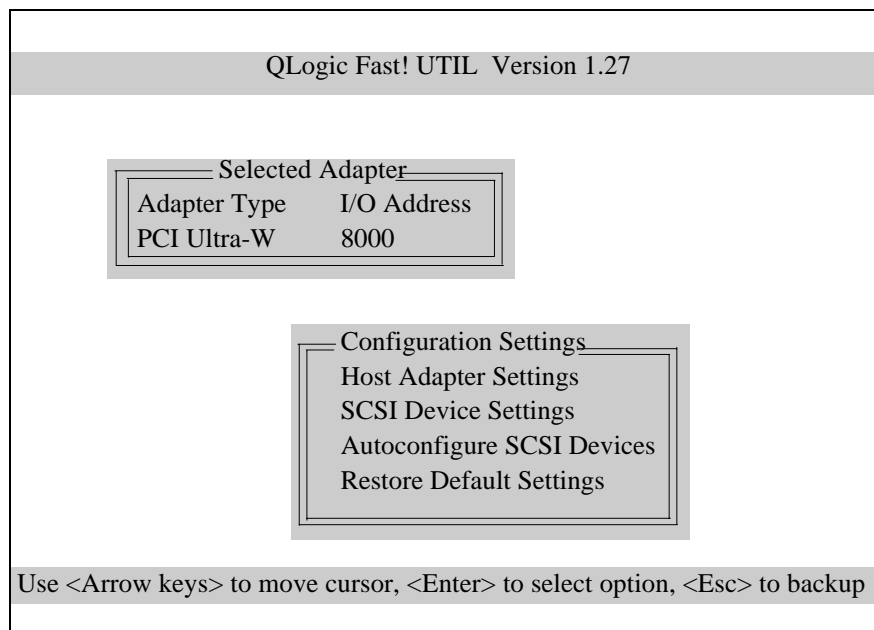
2.   Use the arrow keys to move to any option on the *Configuration Settings* menu and press the Enter key.

5.3.1 Changing Host Adapter Settings

If you need to change Host Adapter settings from their defaults, follow these steps:

1.   Use the arrow keys to highlight *Host Adapter Settings* from the *Configuration Settings* menu and press the Enter Key. The *Host Adapter Settings* appear as shown in figure 5–3.

Figure 5–3 Host Adapter Settings

```
                    QLogic Fast! UTIL  Version 1.27



                  _____ Selected Adapter_____
                 | Adapter Type     I/O Address |
                 | PCI Ultra-W      8000        |


                      _____Host Adapter Settings_____
                     |   BIOS Address:            CC000      |
                     |   BIOS Revision:           4.15       |
                     |   Interrupt Level:         5          |
                     |   Host Adapter:            Enabled    |
                     |   Host Adapter BIOS:       Enabled    |
                     |   Host Adapter SCSI ID:    7          |
                     |   PCI bus DMA burst:       Enabled    |
                     |   SCSI bus reset:          Enabled    |
                     |   SCSI bus reset delay:    5 seconds  |
                     |   SCSI termination:        Auto       |


 Use <Arrow keys> and <Enter> to change settings, <Esc> to exit
```

3. Use the arrow keys to select any of the Host Adapter settings you can move to. (You can only move to settings that you can change.) Press the Enter key to toggle between options or to display a list of options. Press the Enter key again to select an option from a list.
    Table 5−2 shows the host adapter setting defaults.
4. Press the Esc key to return to the *Configuration Settings* menu when you complete the host adapter settings.

Table 5–2 Host Adapter Settings

Setting	Range	Default
Host Adapter	Enabled or Disabled	Enabled
Host Adapter BIOS	Enabled or Disabled	Enabled
Host Adapter SCSI ID	0-7 (*Fast!*SCSI PCI Ultra-N) 0-15 (*Fast!*SCSI PCI Ultra-W and *Fast!*SCSI PCI Ultra-D)	7
PCI bus DMA burst	Enabled or Disabled	Enabled
SCSI bus reset	Enabled or Disabled	Enabled
SCSI bus reset delay	0-15 seconds	5 seconds
SCSI termination	Auto, Enabled, Disabled, High only	Auto

5.3.2 Changing SCSI Device Settings

If you need to change SCSI Device settings from their defaults, follow these steps:

1. Use the arrow keys to move the cursor to *Configuration Settings* on the *Fast! Utility* main menu and press the Enter key. The *Configuration Settings* menu appears as shown in Figure 5–2.
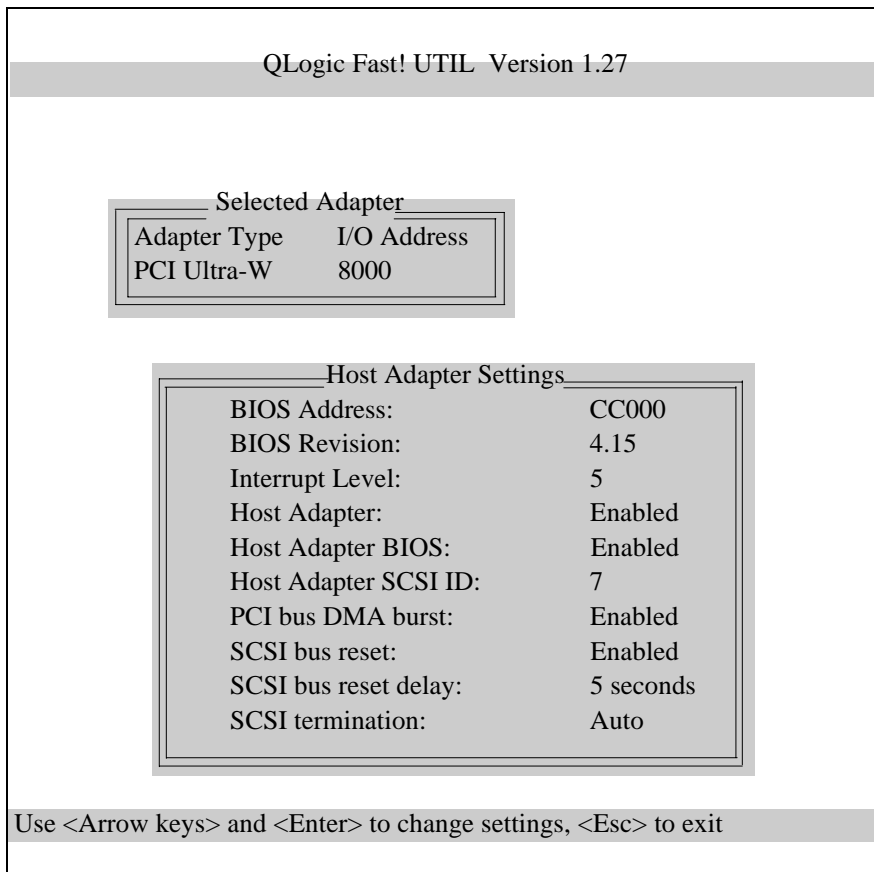
2. Use the arrow keys to move the cursor to the *SCSI Device settings* option on the *Configuration Settings* menu and press the Enter key. The SCSI Device Settings appear as shown in Figure 5–4.

Figure 5–4 SCSI Device Settings

```
                    QLogic Fast! UTIL  Version 1.27



                    ┌──── Selected Adapter ────┐
                    │ Adapter Type    I/O Address │
                    │ PCI Ultra-W       8000      │



 ─────────────────── SCSI Device Settings ───────────────────
        SCSI ID:        0   1   2   3   4   5   6   7   8   9  10  11  12
 13  14  15
 Enable Devices  yes yes yes yes yes yes yes yes yes yes yes yes yes yes
 yes
 Disconnects OK  yes yes yes yes yes yes yes yes yes yes yes yes yes yes
 yes
 Check Parity    yes yes yes yes yes yes yes yes yes yes yes yes yes yes
 yes
 Neogtiate Wide  yes yes yes yes yes yes yes yes yes yes yes yes yes yes
 yes
 Negotiate Sync  yes yes yes yes yes yes yes yes yes yes yes yes yes yes
 yes
 Tagged Queuing  yes yes yes yes yes yes yes yes yes yes yes yes yes yes
 yes
 Enable LUNs     yes yes yes yes yes yes yes yes yes yes yes yes yes yes
 yes
 Sync Offset     8   8   8   8   8   8   8   8   8   8   8   8   8   8   8   8
 Sync Period     12  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12



 Use <Tab keys> to toggle between individual or group settings
 Use <Arrow keys> and <Enter> to change settings, <Esc> to exit
```

3. Use the Tab key to select an entire group of settings or the arrow key to select the setting for one SCSI ID at a time. Press the Enter key to toggle the setting option.

    Table 5–3 shows the default SCSI Device settings.

4. Press the Esc key to return to the *Configuration Settings* menu when you complete the SCSI device settings.

Table 5–3 SCSI Device Settings

Setting	Range	Default
Enable Devices	Yes or No	Yes
Disconnects OK	Yes or No	Yes
Check Parity	Yes or No	Yes
Negotiate Wide	Yes or No	Yes
Negotiate Synchronous	Yes or No	Yes
Tagged Queuing	Yes or No	Yes
Enable LUNs	Yes or No	Yes
Sync Offset		
Sync Period		

5.3.3 Autoconfiguring SCSI Devices

Use *Autoconfigure SCSI Device* to optimize SCSI device settings. The autoconfigure option causes the KZPBA to scan the devices on the SCSI bus and set options for the devices based on each device's capabilities.

To autoconfigure SCSI devices, follow these steps:

1. Use the arrow keys to move the cursor to *Configuration Settings* on the *Fast! Utility* main menu and press the Enter key. The *Configuration Settings* menu appears as shown in Figure 5–2.

2. Use the arrow keys to move the cursor to the *Autoconfigure SCSI Devices* option on the *Configuration Settings* menu and press the Enter key. The utility displays the message:

```
Checking SCSI ID #.
```

3.   When the utility finishes polling the SCSI IDs, it displays a list of the SCSI device settings, similar to the list shown in Figure 5–4.

4.   Change settings as needed. Press the Esc key to exit.

5.3.4 Restoring Default Settings

Use *Restore Default Settings* to restore SCSI device settings to….

To restore default settings, follow these steps:

1.   Use the arrow keys to move the cursor to *Configuration Settings* on the *Fast! Utility* main menu and press the Enter key. The *Configuration Settings* menu appears as shown in Figure 5–2.

2.   Use the arrow keys to move the cursor to the *Restore Default Settings* option on the *Configuration Settings* menu and press the Enter key. The utility displays the message:

```
Checking SCSI ID #.
```

3.   When the utility finishes polling the SCSI IDs, it displays a list of SCSI device settings, similar to the list shown in Figure 5–4.

4.   Change settings as needed and press the Esc key to exit.

5.4   Scanning SCSI Bus

Use the *Scan SCSI Bus* option to determine what devices exist on the SCSI bus.

To Scan the SCSI bus, follow these steps:

1.   Use the arrow keys to move the cursor to *Scan SCSI Bus* option on the *Fast! Utility* main menu and press the Enter key.

The utility displays the message:

```
Checking SCSI ID #.
```

2.   When the utility finishes polling the SCSI IDs, it displays a list of SCSI devices at each of the SCSI IDs.

5.5 Formatting Devices

Use the *SCSI Disk Utility* option to select a device on the SCSI bus for low-level formatting, or to check for media defects.

To use the *SCSI Disk Utility*, follow these steps:

1. Use the arrow keys to move the cursor to *SCSI Disk Utility* option on the *Fast! Utility* main menu and press the Enter key.

   The utility displays the message:

   ```
   Checking SCSI ID #.
   ```

2. When the utility finishes polling the SCSI IDs, it displays a list of SCSI devices at each of the SCSI IDs.

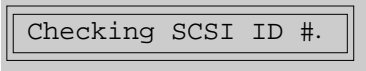3. Use the up and down arrow keys to highlight a device and press the Enter key. The *Disk Utility Options* menu appears.

4. Highlight either *Low-Level Format* or *Verify Disk Media* from the *Disk Utility Options* menu and press the Enter key to begin either operation.

6

Troubleshooting

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

6.1   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 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 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 services 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 6–1)
- SCSI-Device Problems (Table 6–2)
- Boot-Sequence Problems (Table 6–3)

6.2   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 6–1 describes possible problems that could occur during self-tests, specifies their probable cause, and provides corrective action.

Table 6–1 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 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.

6.3 SCSI Device Problems

Table 6–2 lists a SCSI device problem, specifies the probable causes, and suggests corrective actions for each probable cause.

Table 6–2 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 (see Chapter 4).

	Duplicate SCSI IDs	Ensure that each SCSI device has a unique SCSI ID.
	KZPBA adapter is in an unknown state.	Initialize the adapter with the SRM console command, (P00>>> **init**) or, by pressing the systems reset 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.

Table 6–2 SCSI Device Troubleshooting Table (*Continued***)**

Symptom	Probable Cause	Corrective Action
SCSI device . . . (con't)	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 too long.	Check total length of SCSI bus as follows:
		Ultra Single-ended, 1.5 meters, maximum.
	Defective SCSI device.	Replace SCSI device.

6.4   Boot Sequence Problems

Table 6–3 describes possible problems during the boot sequence, specifies their probable cause, and suggests corrective actions.

NOTE

For the Digital Unix and OpenVMS operating systems, obtain the correct device name as described in Section 3.7.

For the Windows NT operating system, obtain the correct device name as described in Section 3.6.

Table 6–3 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 is not terminated properly.	Ensure each end of the SCSI bus is terminated.
	KZPBA is in an unknown state.	Initialize the adapter by either entering the SRM console "init" command or press the system reset button.
Device not recognized during boot.	KZPBA is not terminated properly.	Ensure each end of the SCSI bus is terminated.
	Operating system not configured correctly.	Reconfigure system software. Refer to system documentation.
	Operating system does not contain device driver or driver not installed correctly.	If running "Windows NT", ensure the device driver is installed. If running Digital UNIX or OpenVMS, ensure that the OS revision level supports the KZPBA.

A

EEROM Parameter Settings

This chapter describes EEROM device-specific parameters on the KZPBA. 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–1and A–4, respectively.

The KZPBA 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 General Operation)

Parameter	Default	Description	Option
FIFO Threshold 1020 1020A 1040B	 2 3 3	Sets the FIFO threshold point at which burst transfers are requested on the KZPBA 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.	See Table 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 host adapter.	Set to 0 to disable the host adapter without physically removing it from your system.
Initiator SCSI ID	7	Sets the KZPBA's 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	6 9	Sets the number of clock periods the KZPBA host adapter card waits after driving the SCSI data signals before asserting a SCSI bus acknowledge signal.	See Table A–3.

Table A–1 Descriptions of Host Adapter Parameters (KZPBA 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 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 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.
Low Termination Enable	1	Provides termination to the low-order eight bits.	Set to 0 if termination not required on the board. See termination section of this guide for termination requirements.

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

Parameter	Default	Description	Option
High Termination Enable	1	Provides termination to the high-order eight bits.	Set to 0 if termination not required on high-order 8-bits, or not required on the board. See termination section of this guide for termination requirements.
Selection Time-out	250	Sets the selection phase time-out value.	Table A–4 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
FIFO 128 Threshold Enable	0	Enables or disables the FIFO burst length of 128 bytes.	Set to 1 to enable the FIFO 128 Threshold.
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.
Enable Auto Termination	1	Enables or disables the adapter's auto termination. Auto termination circuitry senses if proper SCSI bus termination is present and terminates the bus, if not.	Set to 0 to disable auto termination.

Table A–2 FIFO Threshold Controls and Corresponding Parameter Setting

Parameter	FIFO Threshold Point
Enable FIFO 128	128 bytes full during host memory writes. 128 bytes empty during host memory reads.
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 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 to the device.	Set to 1 to prevent the KZPBA 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 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 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 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 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 issues a command. The KZPBA 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 can send to the drive until the command queue is full. When the queue is full, the KZPBA 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.	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

Reader's Comments

KZPBA PCI-to-Ultra SCSI Storage Adapter User's Guide

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