COMPAQ

KZPEA

User's Guide

Order Number: EK-KZPEA-UG. A01

This guide is intended for use by customer service engineers and self-maintenance customers installing a KZPEA adapter in *Compaq AlphaServer* systems or workstations.

Compaq Computer Corporation

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這是甲類的資訊產品，在居住的
環境中使用時，可能會造成射頻
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Intended Audience

This manual is written for customer service engineers and self-maintenance customers who require information to install a KZPEA adapter in *Compaq Alpha* systems or workstations.

Document Structure

This manual uses a structured documentation design. Topics are organized into small sections, usually consisting of two facing pages. Most topics begin with an abstract that provides an overview of the section, followed by an illustration or example. The facing page contains descriptions, procedures, and syntax definitions.

This manual has four chapters and one appendix.

- **Chapter 1, Introduction,** describes the KZPEA adapter, gives its physical description, and provides cable information.

- **Chapter 2, Installing the KZPEA Adapter,** shows how to install the adapter in an *AlphaServer* system or workstation.

- **Chapter 3, Using the SCSI Configuration Utility,** shows how to use the SCSI configuration utility.

- **Chapter 4, Troubleshooting,** explains how to troubleshoot system power-on and SCSI device problems and how to use console commands to aid in troubleshooting.

- **Appendix A, Electrostatic Discharge,** summarizes some of the considerations to be aware of when handling adapters and working on systems.

Conventions Used in This Document

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
FILENAMES	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, DRIVE NAMES	These elements appear in uppercase.
Type	When you are instructed to *type* information, type the information **without** pressing the **Enter** key.
Enter	When you are instructed to *enter* information, type the information and then press the **Enter** key.

Information on the Internet

Visit the Compaq Web site at www.compaq.com for service tools and more information about *AlphaServer* systems and workstations.

Chapter 1
Introduction

The *Compaq* KZPEA adapter is a 64-bit/66 MHz PCI, dual-channel Ultra3 SCSI controller that interfaces directly with a Peripheral Component Interface (PCI) local bus. It supports both external *Compaq* StorageWorks or internal storage devices on *AlphaServers* and workstations, per LVD Ultra3 SCSI channels. The adapter supports no more than 15 SCSI drives per channel or 30 SCSI drives per adapter. The SCSI buses can be connected to disk drives, CD-ROM drives, tape drives, and other SCSI devices. More than one host adapter can be installed in the same host computer.

The SCSI processor negotiates with each device on the SCSI bus to establish the maximum data transfer rate, based on the SCSI specifications, between the host adapter and the device. It also automates SCSI command processing and significantly reduces the number of interrupts and command overhead. The host adapter supports multi-threaded I/O operations, thereby allowing simultaneous operations on multiple SCSI targets or Logical Unit Numbers (LUNs). In systems with multiple targets, the Disconnect/Reconnect feature optimizes SCSI bus usage. In systems that support fragmented memory buffers, the Scatter/Gather feature provides high performance.

Sections in this chapter include:

- Physical Description
- Specifications
- Wide Ultra3 SCSI Support

1.1   Physical Description

The KZPEA adapter components are mounted on a 4-inch by 7-inch printed circuit board that is inserted in a PCI expansion slot on the host computer motherboard.

Figure 1–1   KZPEA Adapter
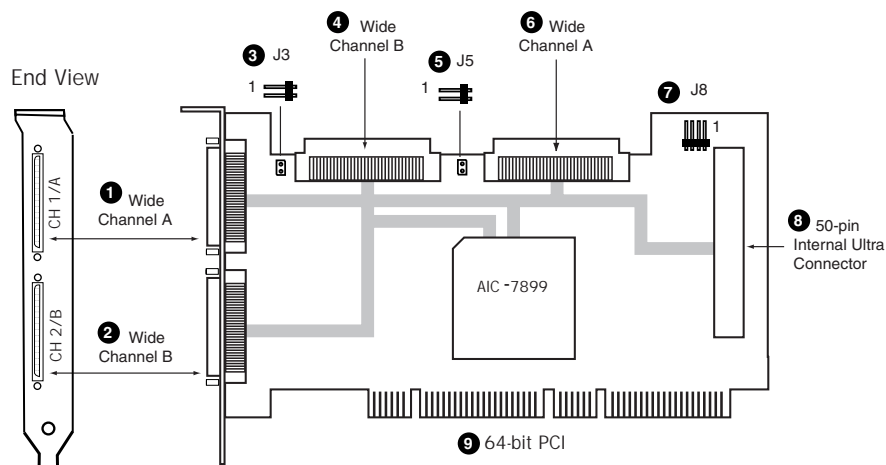
❶   68-pin VHDCI external connector, Channel 1/A

❷   68-pin VHDCI external connector, Channel 2/B

❸   J3 termination jumper, SCSI Channel 2/B

❹   68-pin HD internal SCSI connector, Channel B

❺   J5 termination jumper, SCSI Channel 1/A

❻   68-pin HD internal SCSI connector, Channel 1/A

❼   J8, SCSI activity LED (SCSI Channel 1/A, 2/B)

❽   50-pin internal SCSI connector (CD-ROM and/or tapes),
       Channel 1/A

❾   64-bit PCI connector

The KZPEA adapter has the following features:

- Self-resetting term power.

- Multiple Logical Unit Numbers (LUNs) for robotics control commands.

- Onboard NVRAM and SCSI Utility.

- PCI 2.2 compliant.

- Supports universal 32-bit PCI and universal 64-bit PCI.

- Supports 33 MHz and 66 MHz PCI.

- Contains one 50-pin narrow SCSI internal connector to support legacy devices such as CD-ROMs. This cable supports up to seven devices.

- Automatically detects and communicates with Wide Ultra3, Wide Ultra2, Wide Ultra SCSI-3, Fast Wide SCSI-2, or Fast SCSI-2 devices.

- Supports Wide Ultra3 SCSI, a 16-bit 40 MHz bus that provides a 160 Mbytes/sec data transfer rate.

- Contains two 68-pin HD wide SCSI internal connectors that support Wide Ultra3 SCSI, Wide Ultra2 SCSI, Wide Ultra SCSI-3, and Fast SCSI-2 devices.

- Contains two Very High-Density Cable Interconnect (VHDCI) external connectors that support Wide Ultra3 SCSI, Wide Ultra2 SCSI, Wide Ultra SCSI-3, and Fast Wide SCSI-2 devices.

NOTE: *Double Transition (DT) clocking doubles data throughput to 160 megabytes per second. This is done by sending two pieces of data per clock pulse instead of one, thereby doubling the throughput without increasing the processor's clock speed.*

NOTE: *Devices may be connected to the 50-pin connector or Channel 1/A LVDs, but not to both.*

1.2   Specifications

Table 1-1 lists the KZPEA adapter electrical and environmental specifications.

Table 1–1   KZPEA Specifications

Electrical	Specification
Voltage	+ 5V DC (+/– 5%) at 1.1A
Power consumption	5.5 watts
Environmental (operating)	**Specification**
Temperature	0°C – 50° (32°F – 122°F)
Relative humidity	20% – 80%
Altitude	3048 meters (10,000 feet)

NOTE: *Maximum operating temperature reduced by a factor not more than 1.8ºC per 1000-meter increase in altitude.*

1.3   Wide Ultra3 SCSI Support

The KZPEA adapter provides 64-bit PCI bus master operation and SCSI data transfer rates of up to 160 MB/s, provided all components are Wide Ultra3 capable.

This combination allows high throughput in many network application environments, including resource-sharing, database-servicing, and high-performance backup solutions.

The adapter also supports tagged command queuing, which allows SCSI hard drives to queue and sort multiple commands, then execute those commands simultaneously.

The KZPEA adapter complies with ANSI SCSI-3 standards, supporting Wide Ultra3 SCSI, Wide Ultra2 SCSI, Wide-Ultra SCSI-3, Fast-Wide SCSI-2, and Fast-SCSI-2 devices. The KZPEA adapter can support several different SCSI devices at one time.

The KZPEA adapter interface to the server processor is the PCI local bus. The PCI bus is a high-performance, 64-bit bus with multiplexed address and data lines. The PCI bus provides a high-speed (up to 528 MB/s) path between the system unit and peripherals. Peripheral devices, such as Wide Ultra3 SCSI adapters, benefit the most from the high I/O performance of the PCI bus.

The KZPEA adapter is compatible in a 32-bit/33 MHz, 64-bit/33 MHz, or 64-bit/66 MHz PCI slot.

The 64-Bit/66 MHz Wide Ultra3 SCSI adapter is a PCI bus master device and conforms to Rev. 2.1 and 2.2 of the PCI Local Bus Specification.

1.3.1   SCSI Channel Assignments

SCSI channel 1/A and SCSI channel 2/B of the KZPEA adapter each support
one external VHDCI connector or internal 68-pin HD SCSI connector. SCSI
channel 1/A also has a 50-pin SCSI connector for CD-ROMs and tape support.
Only a single cable (internal or external) may be attached to each channel at a
time.

CAUTION: *Do not connect SCSI cables to the internal connector and external
connectors at the same time. Only the external VHDCI connector or
the internal 68-pin connector is supported.*

1.3.2   SCSI IDs

The KZPEA adapter contains two SCSI buses (SCSI channel 1/A and SCSI
channel 2/B) that support up to 15 peripherals each. Each SCSI bus has both
an internal and an external connector. The peripherals on each bus must have
a unique SCSI ID ranging from 6 to 0, then 15 to 8, with 6 being the highest
priority and 8 being the lowest priority. SCSI IDs on all peripherals must be
either set manually with switches or jumpers on the device itself, or set
automatically by Compaq products that support warm-swappable drives. The
SCSI IDs determine the priority of the peripheral device when it attempts to
access the SCSI bus. Your *AlphaServer* or *Alpha* workstation assigns the SCSI
adapter to the highest priority by setting the ID of the adapter to 7.

1.3.3 Multiple Adapter Installation

The following considerations apply when you install more than one KZPEA adapter:

- Each adapter has two independent SCSI channels. Each channel supports up to 15 drives.

- Each SCSI channel has its own set of unique SCSI IDs (from 0 to 6 and 8 to 15). Each drive on a bus must be assigned its own unique ID.

1.3.4 SCSI Termination

Both SCSI buses require termination at both ends of the bus to prevent signal degradation. The KZPEA adapter supplies the termination power at the adapter end of the SCSI bus.

To obtain Ultra3 and Ultra2 performance, the bus must have multi-mode or LVD-only terminators. Ultra and Fast-Wide SCSI are SE and have multi-mode or SE termination.

CAUTION: *To prevent error messages, an integrated SCSI controller on the system board of an AlphaServer or workstation must be terminated at all times. Mid-bus configurations are not supported.*

External SCSI buses must also be terminated. This termination is supplied in Compaq internal and external storage systems. Individual SCSI devices in Compaq storage systems should not contain bus termination.

1.3.5   SCSI Cables

Cables are provided with most Compaq server products that require cabling. If you find that you need an additional cable or that one was not provided with your server product, you can order the necessary cables from your local Compaq Reseller or authorized Compaq Service Provider. See Table 1-2 for external cable part numbers.

Table 1–2   External Cable Part Numbers

VHDCI to VHDCI Cable Length	Part Number	Alternate Part Number
0.5 meter (1.64 feet)	BN37A-0E	400984-001
1 meter (3.28 feet)	BN37A-01	N/A
2 meter (6.6 feet)	BN37A-02	400982-002
3 meter (9.8 feet)	BN37A-03	189505-B21
3.7 meter (12 feet)	3R-A0457-AA	341175-B21
5 meter (16.4 feet)	BN37A-05	400983-005
10 meter (32.8 feet)	BN37A-10	400985-010
15 meter (49.2 feet)	BN37A-15	400986-015
20 meter (65.6 feet)	BN37A-20	400987-020
25 meter (82.0 feet)	BN37A-25	N/A

1.3.6 SCSI Cable Connectors

To identify the various SCSI cables required for installing a KZPEA adapter in various configurations of *Compaq AlphaServers* and workstations, see Figure 1-2.

Figure 1–2 SCSI Cable Connectors
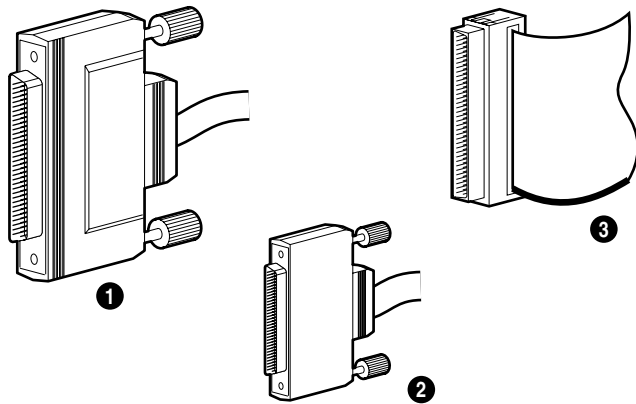
❶   External 68-pin wide SCSI connector (Not used on KZPEA)
❷   External VHDCI SCSI connector
❸   Internal 68-pin HD SCSI connector

Keep these characteristics of SCSI cables in mind:

- External VHDCI cables are round and have thumbscrews on the connectors. These connector heads are smaller than the 68-pin internal wide SCSI connector heads.

- Internal SCSI cables are flat ribbon cables with push-on connectors.

- Internal 68-pin wide SCSI ribbon cables (Wide-Ultra SCSI-3 and Fast-Wide SCSI-2) are narrower than 50-pin SCSI (Fast-SCSI-2) cables.

- Compaq SCSI cables are keyed so they cannot be installed incorrectly.

Chapter 2
Installing the KZPEA Adapter

This chapter describes installing the KZPEA adapter in *AlphaServer* systems or workstations. This chapter covers the following topics:

- Installation Preparation
- Install the KZPEA
- Cable the KZPEA

⚠ **WARNING: Many servers are capable of producing energy levels that are considered hazardous and are only intended to be serviced by qualified personnel trained in dealing with these hazards. Do not remove enclosures or attempt to bypass any interlocks that may be provided for the purpose of removing these hazardous conditions.**

To reduce the risk of personal injury or damage to the equipment, see the documentation supplied with your AlphaServer or workstation, and observe the appropriate safety precautions and option installation instructions.

2.1   Installation Preparation

Check system requirements and verify that you have received all items in the KZPEA adapter kit. Perform an orderly shutdown of the system. Prepare the system and adapter for installation. Install and cable the adapter.

2.1.1   System Requirements

Table 2–1   KZPEA Requirements

Item	Requirements
System Hardware	*AlphaServer* system or workstation with a PCI local bus, an available PCI slot, hard drive space to load software drivers as necessary, and system documentation.
Cables	SCSI cables necessary to connect SCSI devices to the KZPEA.
Operating System	*OpenVMS*. Your version may require a TIMA kit, which may be obtained from your authorized service representative, or from: http://www.compaq.com/support/
	Tru64 UNIX. Your version may require a driver, which may be obtained from your authorized service representative, or from: http://www.compaq.com/support/
Firmware	Alpha firmware upgrade CD 5.7 or higher.
Other	Supported internal/external drive enclosure, when used.

2.1.2 Prepare the KZPEA for Installation

Table 2–2 KZPEA Adapter Kit Contents

Part Number	Description
3X-KZPEA-DB	Dual-Channel PCI-to-Ultra3 SCSI Host Bus Adapter
EK-KZPEA-UG	*KZPEA User's Guide*
EK-KZPEA-RN	*KZPEA Release Notes*

SCSI Termination

The KZPEA host adapter has dual-SCSI channel capability, and each bus must be terminated at both ends of the bus. The adapter can be located only at the beginning of the bus; consequently, termination on the host adapter itself must be enabled. Verify that the termination jumpers, J3 and J5, on the host adapter (see Figure 1-1) are installed to enable termination on both channels. Furthermore, only the wide- or narrow-SCSI connectors on the 1/A-channel may be used, but not both.

SCSI IDs

Each device and host adapter on the SCSI bus must have a unique SCSI ID. It is recommended that the KZPEA adapter be left at its default ID of 7. If it is necessary to change the KZPEA adapter ID, refer to Table 3-1, SCSI Options.

On all *AlphaServers* and workstations, AlphaBIOS may be used to access the on-board SCSI Configuration Utility.

On most *AlphaServers* and workstations, the on-board SCSI Configuration Utility can be accessed via the special SRM console command.

On a 16-bit SCSI bus, each device must have a unique SCSI ID from 0 to 15. Since the KZPEA default ID is 7, all other devices on the bus should be given IDs from 6 to 0 and 15 to 8, with 6 being the highest priority and 8 being the lowest priority. SCSI IDs on all peripherals must be either manually set with switches or jumpers on the device itself, or automatically set on Compaq products that support hot-pluggable drives. The SCSI IDs determine the priority of the peripheral device when attempting to access the SCSI bus. The server assigns the SCSI adapter to the highest priority by setting the ID of the adapter to 7. For maximum performance, connect low-throughput peripheral devices, such as tape drives, on a SCSI bus separate from high-throughput devices, such as hard drives. If both low- and high-throughput devices must be connected to the same bus, assign the lower-throughput devices a higher SCSI ID priority. This allows the low-throughput devices access to the bus. Refer to the device documentation for instructions on setting the SCSI ID for that device (not all operating system versions support SCSI IDs above 7).

2.1.3   Prepare the System

To prepare your *AlphaServer* or workstation:

- Back up your *AlphaServer* or workstation data files.

- Perform an orderly shutdown of the system.

- Turn off all peripheral devices attached to the system.

- Unplug the system AC power cord from the outlet and then unplug the cord from the system.

- Disconnect all peripheral devices attached to the system that are connected to other systems during the KZPEA installation.

- Open the system cabinet for access to the PCI.

For instructions on opening your system cabinet, refer to the documentation that came with your *AlphaServer* or workstation.

⚠ **WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them. When working with rackmounted systems, make certain the equipment rack is stable before continuing.**

2.2   Install the KZPEA

Install the KZPEA adapter in the AlphaServer or workstation PCI slot as shown in Figure 2-1.

Figure 2–1   Installing the KZPEA
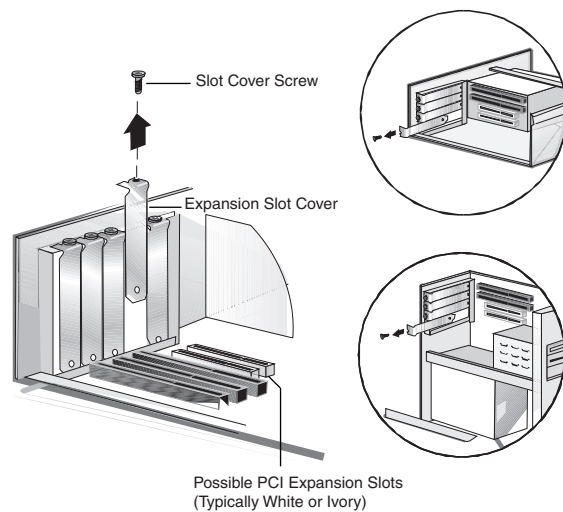
Install the KZPEA adapter as follows:

1. Use an ESD ground strap when handling the adapter module.

2. Locate an available PCI bus expansion slot. Make certain there are no restrictions for the PCI slot into which you will install the KZPEA. See the documentation that came with your *AlphaServer* or workstation for the location.

3. Depending on your *AlphaServer* or workstation model, remove the retaining screw (see Figure 2-1) or open the expansion slot latches that secure the PCI slots.

4. Remove the slot cover (see Figure 2-1) from the PCI slot. Save this protective cover for future use.

5. Install the KZPEA adapter into the PCI slot and press it firmly into place. The contacts on the adapter edge should be fully seated in the system board connector.

6. Depending on your *AlphaServer* or workstation model, secure the adapter by replacing the retaining screw or by closing the slot latch.

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

8. Connect the (optional feature) LED connector, as shown in Figure 2-2.

9. J3 and J5 should have jumpers factory-installed across pins 1 and 2, that must remain installed for all applications as shown in Figure 2-3.

Connecting the LED Connector

Most computers have a disk activity LED on the front panel of the system cabinet. If you choose to disconnect the cable from the LED connector on the motherboard and connect it to the LED connector on the SCSI card, as shown in Figure 2-2, the LED on the front panel of the computer will light whenever there is activity on the SCSI bus. Pins 2,3 are for the LED cathode and pins 1,4 for the LED anode.

Figure 2–2   Connecting the LED Connector
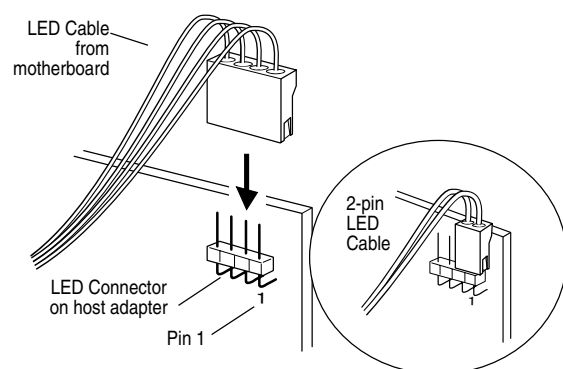
NOTE: *With the LED cable connected to the SCSI card, the LED disk activity*
light may not indicate disk activity on non-SCSI disk drives.

Figure 2–3   J3 and J5 Jumpers
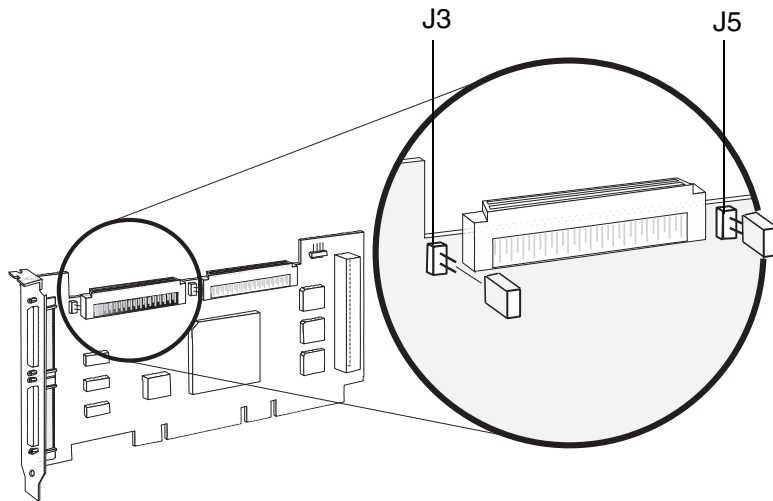
2.3   Cable the KZPEA

Each KZPEA adapter channel can be connected to external SCSI devices (located in outside units) or to internal SCSI devices (located in the server).

Figure 2–4   SCSI Cables
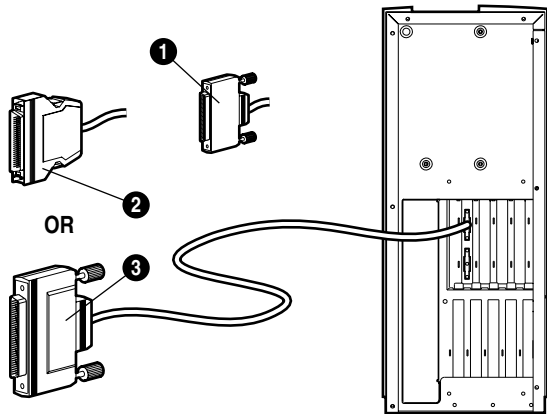
Table 2–3   SCSI Cabling

Connector	Description
❶	VHDCI - VHDCI cable
❷	VHDCI - to - narrow SCSI cable
❸	VHDCI - to - wide SCSI cable

NOTE: *In order to run in wide Ultra3 mode, all components, including the cable, must be Ultra3-capable.*

2.3.1   Internal SCSI Connections

NOTE: *Do not connect SCSI cables to both internal and external connectors from the same port. If you have both SE and LVD devices on your server, use a separate port for each.*

Placing Hard Drives or Other Devices on a Separate SCSI Bus

To add a separate SCSI bus, you may need an internal SCSI cable designed specifically for your *AlphaServer* model. Refer to your *AlphaServer* or workstation documentation to determine if you need an additional cable. If the cable was not provided with your system, you can obtain it from your local Compaq reseller or service personnel.

Proceed as follows:

1. Remove any devices that are to be moved to the new SCSI bus, from the existing SCSI bus.

2. Install any new SCSI devices.

3. Locate the new SCSI cable. Plug one end of the cable into the appropriate connector on the KZPEA adapter.

4. Attach one or more connectors on the cable to the SCSI device(s) or backplane connector.

5. Proceed to Section 2.3.2.

Replacing the Integrated SCSI Controller

If you are replacing the integrated SCSI controller with the KZPEA adapter, proceed as follows:

1. Unplug the original SCSI cable from the system board or original SCSI adapter.

2. Plug the SCSI cable into the proper KZPEA connector.

3. Depending on your server model, you may need to secure the cable by clipping it to another component in the server (refer to your server documentation for specific internal cabling instructions).

4. Proceed to Section 2.3.2.

2.3.2   Completing the Installation

⚠ **WARNING: To reduce the risk of electrical shock or damage to the equipment, do not disable the power cord grounding plug. The grounding plug is an important safety feature. Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times. Disconnect power from your AlphaServer or workstation by unplugging the power cord from either the electrical outlet or the server.**

After the cabling and connections are complete, reassemble your *AlphaServer* or workstation as follows:

1. Make certain all cables are routed properly and are not restricted or pinched by other components. Refer to your system documentation for proper routing of cables.

2. Reconnect any peripheral devices to your *AlphaServer* or workstation.

3. Plug the AC power cord into the server and then into a grounded AC outlet.

4. Turn on any peripheral devices attached to the *AlphaServer* or workstation.

5. Turn on the *AlphaServer* or workstation.

6. To verify your internal/external SCSI devices are available at the console, enter the **show config** command at the SRM console prompt.

Example 2-1 shows a typical **show configuration** command. See Chapter 4 for a description of the command output.

Example 2–1 Show Configuration Command

```
>>> show config

                    COMPAQ AlphaServer DS10 466 MHz

SRM Console: V5.7-7
PALcode:      OpenVMS PALcode V1.79-66, Tru64 UNIX PALcode V1.72-59

Processors
CPU 0        Alpha 21264-4 466 MHz    SROM Revision: V1.11.208
             Bcache size: 2 MB

Core Logic
Cchip        DECchip 21272-CA Rev 2
Dchip        DECchip 21272-DA Rev 2
Pchip 0      DECchip 21272-EA Rev 2

TIG          Rev 2.1
Arbiter      Rev 7.30 (0xfe)

MEMORY
Array #       Size      Base Addr
-------    ----------  ---------
   0        128 MB     000000000

Total Bad Pages = 0
Total Good Memory = 128 MBytes


PCI Hose 00
     Bus 00  Slot 01: Acer Labs M1543C USB

     Bus 00  Slot 07: Acer Labs M1543C

Bridge to Bus 1, ISA
     Bus 00  Slot 09: DE500-BA Network Controller
                         ewa0.0.0.9.0    08-00-2B-86-71-0E
     Bus 00  Slot 11: DE500-BA Network Controller
                         ewb0.0.0.11.0   08-00-2B-86-71-42
     Bus 00  Slot 13: Acer Labs M1543C IDE
                         dqa.0.0.13.0
                         dqa0.0.0.13.0   COMPAQ CDR-8435
```

Example 2–1 Show Configuration Command (Continued)

```
      Bus 00   Slot 14: ELSA GLoria Synergy

      Bus 00   Slot 15: DECchip 21152-AA

Bridge to Bus 2, PCI
      Bus 00   Slot 16/0: Adaptec AIC-7899
                          pkc0.7.0.16.0           SCSI Bus ID 7
                          dkc0.0.0.16.0
COMPAQ BB00921B91
      Bus 00   Slot 16/1: Adaptec AIC-7899
                          pkd0.7.0.116.0          SCSI Bus ID 7
                          dkd300.3.0.116.0
COMPAQ BD01812579
      Bus 02   Slot 00: NCR 53C875
                          pka0.7.0.2000.0         SCSI Bus ID 7
      Bus 02   Slot 01: NCR 53C875
                          pkb0.7.0.2001.0         SCSI Bus ID 7
      Bus 02   Slot 02: DE500-AA Network Controller
                          ewc0.0.0.2002.0         00-06-2B-00-58-C6


ISA
Slot  Device        Name          Type         Enabled  BaseAddr
      IRQ   DMA
0
      0     MOUSE         Embedded      Yes    60    12
      1     KBD           Embedded      Yes    60    1
      2     COM1          Embedded      Yes    3f8   4
      3     COM2          Embedded      Yes    2f8   3
      4     LPT1          Embedded      Yes    3bc   7
      5     FLOPPY        Embedded      Yes    3f0   6     2
```

NOTE: *SRM console firmware will need to be installed if your system's version is earlier than V5.7. If so, you must upgrade to the latest version (see your system documentation). In addition, you may need to install software drivers to enable communication between the processor and the KZPEA adapter.*

Chapter 3
Using the SCSI Configuration Utility

Your KZPEA adapter has default settings that will allow the proper operation in your *AlphaServer* or workstation. However, under some conditions you may want to configure your KZPEA adapter using the on-board configuration utility. This chapter provides the procedures to guide you through the steps.

NOTE: *The KZPEA must be installed in PCI hose 0 in order to use the Configuration Utility. If your configuration requires having the KZPEA in another PCI hose, install and configure the adapter on hose 0 and then move it to the final PCI position. A video monitor is required to run the utility.*

3.1   SCSI Configuration Utility

Table 3-1 lists the available and default settings appropriate for most systems. Use the Configuration Utility if you need to view or change current settings or if you need to use the SCSI disk utilities.

Table 3–1   SCSI Options

SCSI Utility Options	Available Settings	Default Setting
SCSI Bus Interface Definitions:		
Host Adapter SCSI ID	0-15	7
SCSI Parity Checking	Enabled/Disabled	Enabled[1]
Host Adapter SCSI Termination: Ch.A	Automatic	Automatic[2]
	Low On/High On	
	Low Off/High Off	
	Low Off/High On	
Ch.B	Automatic	Automatic
	Enabled, Disabled	
Boot Device Options:		
Boot Channel [Auto-sync]	A First, B First	A First
Boot SCSI ID	0-15	0
Boot LUN Number[3]	0-7	0
SCSI Device Configuration:		
Sync Transfer Rate (Mbytes/sec)	160, 80, 53.4, 40, 32, 26.8, 20, 16, 13.4, 10	160
Initiate Wide Negotiation	Yes, No	Yes (Enabled)
Enable Disconnection	Yes, No	Yes (Enabled)
Send Start Unit Command	Yes, No	Yes (Enabled)
Enable Write Back Cache[4]	Yes, No, N/C (No Change)	N/C (No Change)
BIOS Multiple LUN Support[4]	Yes, No	No (Disabled)
Include in BIOS Scan[4]	Yes, No	Yes (Enabled)

---

[1] Do not change.

[2] No effect.

[3] Setting is valid only if Multiple LUN Support is enabled.

[4] Settings are valid only if host adapter BIOS is enabled.

Table 3–1   SCSI Options (Continued)

SCSI Utility Options	Available Settings	Default Setting
Advanced Configuration Options:		
Reset SCSI Bus at IC Initialization	Enabled, Disabled	Enabled
Display <Ctrl><A> Message during BIOS Initialization [Auto-sync]	Enabled, Disabled	Enabled
Extended BIOS Translation for DOS Drives > 1 Gbyte	Enabled, Disabled	Enabled
Verbose/Silent Mode [Auto-sync]	Verbose, Silent	Verbose
Host Adapter BIOS [Auto-sync] [4]	Enabled Disabled: Scan Bus Disabled: Not Scan	Enabled
Domain Validation[4]	Enabled, Disabled	Enabled
Support Removable Disks Under BIOS as Fixed Disks[4]	Disabled Boot Only, All Disks	Disabled
BIOS Support for Bootable CD-ROM[4]	Enabled, Disabled	Enabled
BIOS Support for Int 13 Extensions[4]	Enabled, Disabled	Enabled[2]
<F6>	**Reset to Host Adapter Defaults.**	

3.1.1 Starting Configuration Utility on BIOS Supported Systems

Example 3–1 Show BIOS and Run BIOS Commands

```
>>> show bios
Hose Bus  Slot Function Type
 0    0   14     0      ELSA GLoria Synergy
 0    0   16     0      Adaptec AIC-7899
 0    0   16     1      Adaptec AIC-7899
 0    2    0     0      NCR 53C875
 0    2    1     0      NCR 53C875
Resetting I/O buses...

>>>run bios 00 00 16

Adaptec SCSI Card 39160 BIOS V2.55.0
Press <Ctrl><A>

  Ch A, SCSI ID: 0     COMPAQ BB00921B91  3B05
  Ch B, SCSI ID: 3     COMPAQ BD01812579  BCJC
```

Starting Configuration Utility on BIOS Supported Systems

When you have connected the internal and external devices and have configured the termination of the SCSI bus correctly, you are ready to reassemble the computer enclosure. After assembly, reconnect all peripherals that you disconnected, and turn on the power to all external enclosures and peripherals. Then turn on the computer. Depending on your system and firmware version, after the computer completes the Power On Self-Tests (POST) and you are at the SRM console prompt (**>>>**), you can invoke the SCSI Configuration Utility. Use the **show bios** command (see Example 3-1) to determine in which hose, bus, and slot your KZPEA is installed.

Hold the Ctrl key and press the letter A key to activate the built-in configuration utility. The Configuration Utility Main Menu appears. Follow the on-screen instructions. The descriptions for all entries to configure host adapters and connected devices are in the Description of SCSI Configuration Utility settings.

Exiting the Configuration Utility

When all required changes have been made, pressing the **Esc** key moves you back through the menus. Once you have exited from the menu, you may return to the SRM console by cycling the power on the system, if necessary for your system.

3.1.2 Starting Configuration Utility on Non-BIOS Supported Systems

Example 3–2 Invoking SCSCI Configuration Utility with AlphaBIOS

```
>>> alphabios


Adaptec SCSI Card 39160 BIOS V2.55.0
Press <ctrl><A>

  Ch A, SCSI ID: 0     COMPAQ BB00921B91  3B05
  Ch B, SCSI ID: 3     COMPAQ BD01812579  BCJC
```

Configuration Utility on Non-BIOS Supported Systems

For systems or firmware versions that do not support the **run bios** command, you will need to do the following to get into the utility:

Turn on the power to all external enclosures and peripherals. Turn on the computer.   After the computer completes the Power On Self-Tests (POST) and you are at the SRM prompt (>>>), you may invoke the AlphaBIOS by entering the **ARC** command.   If you are on an *Alpha* workstation, as opposed to an *AlphaServer*, this may not work and you must type:

```
        >>> alphabios
```

You must then reboot to the AlphaBIOS console.

Hold the **Ctrl** key and press the letter **A** key to activate the built-in configuration utility. The Configuration Utility Main Menu appears. Follow the on-screen instructions. The descriptions for all entries to configure host adapters and connected devices are in the Description of SCSI Configuration Utility settings.

Exiting the Configuration Utility

When all required changes have been made, pressing the Esc key moves you back through the menus. Once you have exited from the menu, you may return to the SRM console by cycling the power on the system.

Chapter 4
Troubleshooting

This chapter provides some common solutions to problems that can occur when installing the KZPEA adapter. If you experience difficulty in installing or verifying the KZPEA, 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 KZPEA adapter, nor will the actions suggested remedy all problems. If you encounter a problem that is not described, or if the actions suggested do not solve the problem, call your authorized service representative. For problems that might be related to the host, refer to your host system documentation. Sections include:

- System Power-On Problems
- SCSI Device Problems
- Console Diagnostics

4.1   System Power-On Problems

When the host system is powered on, the processor performs a series of self-tests or enters console mode. Table 4-1 lists some problems that might occur when self-tests are running, gives the probable cause, and provides corrective action.

Table 4–1   Troubleshooting Power-On Problems

Symptom	Probable Cause	Corrective Action
Self-test halts with an error message or an error summary appears on the console terminal	An error was detected during self-test.	Check that the KZPEA and system boards are firmly seated in their respective connectors. Check all connections to external devices.
		Take actions listed in Section 4.3, Console Diagnostics.
		Record the error message and call your authorized service representative.
System fails to boot and returns to console.	The latest required driver has not been installed.	If the KZPEA adapter has been installed before, upgrade to the latest version of the operating system or driver for that version of the operating system.
		Power down the system. Boot the system and then install the latest operating system (OS) version or driver. If your OS requires it, install the driver before installing the adapter.

4.2   SCSI Device Problems

If a SCSI drive is not shown in the configuration, refer to Table 4-2 for possible causes and suggested corrective actions for each cause.

Table 4–2   Troubleshooting SCSI Devices

Symptom	Probable Cause	Corrective Action
A SCSI drive does not appear in the configuration display.	Duplicate SCSI IDs	Make sure each SCSI drive has a unique SCSI ID.
	Cable is not connected to SCSI drive.	Check cable connection.
	SCSI drive is not plugged in and turned on before system power-up.	Power up the devices first; then power up the system.
	SCSI bus is not properly terminated.	Make sure each end of the SCSI bus is terminated.
		Make sure drives in the middle of the SCSI bus are *not* terminated.
		Mid-bus configurations not allowed. Note that the 50-pin CD/Tape connector is Channel 1/A.
	Drive is defective.	Replace the drive.

4.3 Console Diagnostics

The show configuration console command is useful to obtain information about the system configuration, in case you need to replace a module. The show device command displays device information for any disk/tape adapter or group of adapters.

Example 4–1 Show Configuration Command

```
>>> show config
                      COMPAQ AlphaServer DS10 466 MHz


SRM Console: V5.7-7                                            ❶
PALcode:     OpenVMS PALcode V1.79-66, Tru64 UNIX PALcode V1.72-59


Processors                                                    ❷
CPU 0        Alpha 21264-4 466 MHz   SROM Revision: V1.11.208
             Bcache size: 2 MB


Core Logic                                                    ❸
Cchip        DECchip 21272-CA Rev 2
Dchip        DECchip 21272-DA Rev 2
Pchip 0      DECchip 21272-EA Rev 2
TIG          Rev 2.1
Arbiter      Rev 7.30 (0xfe)


MEMORY                                                        ❹
Array #        Size      Base Addr
-------     ----------   ---------
   0         128 MB      000000000

Total Bad Pages = 0
Total Good Memory = 128 Mbytes
```

Continued

The SRM console command **show config** displays system configuration information detailing the I/O adapter connected to your system and its status.

❶ Version numbers of the SRM console and PALcode

❷ **Processors**. Processors present, processor version and clock speed, and amount of backup cache

❸ **Core Logic**. Version numbers of the chips that form the interconnect on the system board

❹ **MEMORY**. Memory arrays and memory size

Example 4–1 Show Configuration Command (Continued)

```
PCI Hose 00                                                    ❺
   Bus 00  Slot 01: Acer Labs M1543C USB
   Bus 00  Slot 07: Acer Labs M1543C       Bridge to Bus 1, ISA
   Bus 00  Slot 09: DE500-BA Network Controller
                              ewa0.0.0.9.0      08-00-2B-86-71-0E
   Bus 00  Slot 11: DE500-BA Network Controller
                              ewb0.0.0.11.0     08-00-2B-86-71-42
   Bus 00  Slot 13: Acer Labs M1543C IDE
                              dqa.0.0.13.0
                              dqa0.0.0.13.0     COMPAQ CDR-8435
   Bus 00  Slot 14: ELSA GLoria Synergy
   Bus 00  Slot 15: DECchip 21152-AA
                                          Bridge to Bus 2, PCI
   Bus 00  Slot 16/0: Adaptec AIC-7899
                      pkc0.7.0.16.0         SCSI Bus ID 7
                      dkc0.0.0.16.0         COMPAQ BB00921B91
   Bus 00  Slot 16/1: Adaptec AIC-7899
                      pkd0.7.0.116.0        SCSI Bus ID 7
                      dkd300.3.0.116.0      COMPAQ BD01812579
   Bus 02  Slot 00: NCR 53C875
                      pka0.7.0.2000.0     SCSI Bus ID 7
   Bus 02  Slot 01: NCR 53C875
                      pkb0.7.0.2001.0     SCSI Bus ID 7
   Bus 02  Slot 02: DE500-AA Network Controller
                    ewc0.0.0.2002.0       00-06-2B-00-58-C6

ISA
Slot   Device  Name    Type      Enabled  BaseAddr  IRQ      DMA
0
       0       MOUSE   Embedded  Yes      60        12
       1       KBD     Embedded  Yes      60        1
       2       COM1    Embedded  Yes      3f8       4
       3       COM2    Embedded  Yes      2f8       3
       4       LPT1    Embedded  Yes      3bc       7
       5       FLOPPY  Embedded  Yes      3f0       6        2
```

❺ **PCI Hose**. The following information is provided: PCI Hose, Bus, Slot, and device information.

The "Slot" column lists the logical slots seen by the system. These are not necessarily the physical slots into which devices are installed.

The Adaptec AIC–7899 is the device used on the KZPEA.

Refer to your system documentation for device specifics.

Depending on the host system type and configuration, the SCSI ports are given different designations. The designations are in the following format:

SCSI ports - *pkn*0, where *pk* is the type of storage port and *n* is the controller letter, starting at *a* (usually the onboard device).

Disk drives - *dkn*0, where *dk* is the type of disk device and *n* is the controller letter, starting at *a*.

Example 4–2   Show Device Command

```
>>> show dev
dkc0.0.0.16.0          DKC0              COMPAQ BB00921B91    3B05
dkd300.3.0.116.0       DKD300            COMPAQ BD01812579    BCJC
dqa0.0.0.13.0          DQA0              COMPAQ CDR-8435      0013

dva0.0.0.0.0           DVA0
ewa0.0.0.9.0           EWA0                 08-00-2B-86-71-0E
ewb0.0.0.11.0          EWB0                 08-00-2B-86-71-42
ewc0.0.0.2002.0        EWC0                 00-06-2B-00-58-C6
pka0.7.0.2000.0        PKA0                    SCSI Bus ID 7
pkb0.7.0.2001.0        PKB0                    SCSI Bus ID 7
pkc0.7.0.16.0          PKC0                    SCSI Bus ID 7
pkd0.7.0.116.0         PKD0                    SCSI Bus ID 7
```

Note that one of the entries, Hose 0, Bus 0, slot 16, consists of two AIC-7899 devices. This entry is the KZPEA host adapter in this system. For later identification of the module, write down the SCSI port names (in this example pkc0 and pkd0). After you have identified the SCSI ports, you can test them, as described in the following sections.

Determining the KZPEA Host SCSI ID

Use the **show device** console command to list all of the devices in the system and identify the related port entries (in this example pkc0 and pkd0). The **show device** command will list all devices in the system. In the following examples only the relevant devices are shown.

```
>>> show dev pk
pka0.7.0.2000.0         PKA0                  SCSI Bus ID 7
pkb0.7.0.2001.0         PKB0                  SCSI Bus ID 7
pkc0.7.0.16.0           PKC0                  SCSI Bus ID 7
pkd0.7.0.116.0          PKD0                  SCSI Bus ID 7
```

Note that in this example both ports are set to SCSI ID 7.

Determining Which Drives are Connected to the KZPEA Host Adapter

Issue the **show device dk** command and identify all devices on the KZPEA controller. The format for disks is dkcn, where c = controller letter matching pkc0 port, and n = the SCSI ID times 100. For example: DKC0, SCSI DISK on controller port C at SCSI ID 0 and DKD300, SCSI DISK on controller port D.

```
>>> show dev dk
dkc0.0.0.16.0          DKC0          COMPAQ BB00921B91   3B05
dkd300.3.0.116.0       DKD300        COMPAQ BD01812579   BCJC
```

Locating SCSI Device ID Conflicts

The most common SCSI configuration problem is an ID conflict. Each SCSI device on a port must have a unique ID from 0 – 15, which cannot be the same as the host ID or that of any other drive.

NOTE: *By default and convention the host is always at ID 7 and disks start at ID 0. Some versions of your operating system may not support drives with IDs from 8 – 15.*

Two Disk Drives with the Same ID

The most common result of having two disk drives with the same ID is that **neither** of them shows up at the **show dev** command.

Disk Drives with the Same ID as the Host

The most common result of having disk drives with the same ID as the host is that **none** of the disk drives shows up at the **show dev** command.

```
>>> show dev
dkb0.0.0.16.0      DKB0        RZ1CB-CS 0656
dkb100.1.0.16.0    DKB100      RZ1CB-CS 0656
dkb200.2.0.16.0    DKB200      RZ1CB-CS 0656
dkb300.3.0.16.0    DKB300      RZ1CB-CS 0656
dkb400.4.0.16.0    DKB400      RZ1CB-CS 0656
dkb500.5.0.16.0    DKB500      RZ1CB-CS 0656
dkb600.6.0.16.0    DKB600      RZ1CB-CS 0656
```

In this example, a disk drive was set to the host ID of 7. There is actually only one disk drive on the bus, but it responds at each ID.

Testing the SCSI Ports

Exer, a built-in test at the SRM console of most systems, can be used to determine if the SCSI ports and disks are functioning correctly.

```
>>> exer dkb*&
```

This command instructs **exer** to test all disks (**d**k) on the **b** channel (**dkb***). The **&** instructs the console to run the command as a background process. Issue the **show_status** command to diagnose the port:

```
>>> show_status
```

```
ID       Program  Device        Pass Hard/Soft Bytes Written Bytes Read
-------- -------- ------------- ---- --------- ------------- ----------
00000001 idle     system         0   0    0              0            0
000001b9 exer_kid dkb0.0.0.300   0   0    0              0       502272
```

Exer will run until it is interrupted with the **kill_diag** command.

```
>>> kill_diag
```

```
>>> show_status
```

```
ID       Program Device        Pass Hard/Soft Bytes Written Bytes Read
-------- ------- ------------- ---- --------- ------------- ----------
00000001 idle     system         0   0    0              0            0
```

Observe the Hard/Soft error counts from the tests. Hard errors should always be 0. Soft errors are usually 0, and if non-zero, usually indicate a bus that is incorrectly terminated.

If the **exer** command does not exist, then start:

```
        >>> test
```
This command will test all devices in the configuration.

Ctrl/C will end testing.

Appendix A
Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.

- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.

- Place parts on a grounded surface before removing them from their containers.

- Avoid touching pins, leads, or circuitry.

- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

Use one or more of the following grounding methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megaohm ± 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.

- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.

- Use conductive field service tools.

- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an Authorized Compaq Reseller install the part.

NOTE: *For more information on static electricity, or assistance with product installation, contact your Authorized Compaq Reseller.*

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