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PCI-to-Fibre Channel Host Adapter (KGPSA)

User's Guide

EK-KGPSA-UG. A01

Digital Equipment Corporation
Maynard, Massachusetts

First Edition November, 1997

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Revision Record

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

The following revision history lists all revisions of this publication and their effective dates. This publication part number is included in the Revision Level column, with the last entry denoting the latest revision. This publication supports the KGPSA PCI -to- Fibre Channel host adapter.

Revision level	Date	Summary of Changes
EK-KGPSA-UG. A01	November 1997	Original Release

About This Guide

This section tells you what this User Guide does, identifies the audience of the guide and describes briefly the contents (chapter-by-chapter) and structure. In addition, this section includes a list of associated documents and describes the conventions used in the guide.

This guide explains how to install a Digital Equipment KGPSA Fibre Channel PCI host adapter in a computer, how to connect to a Fibre Channel storage device, and how to install and configure device drivers. The guide also describes how to use the software utility that allows the user to test the PCI host adapter card and to upload firmware. These topics are covered:

- Hardware installation
- Device driver installation and configuration by operating system
- Troubleshooting
- DOS diagnostic utility program

Intended Audience

This guide is intended for the end-user who is installing the KGPSA PCI-to-Fibre Channel host adapter into a computer.

Document Structure

This guide contains the following chapters:

Chapter 1: Product Description

This chapter gives a physical and functional overview of the KGPSA PCI-to-Fibre Channel Adapter and provides complete specifications.

Chapter 2: Host Adapter Installation

This chapter gives instructions for assembling and installing the Fibre Channel PCI Host Adapter.

Chapter 3: Device Driver Installation

This chapter tells you how to install the Windows NT SCSI miniport driver.

Chapter 4: Troubleshooting

This chapter provides information about obtaining and interpreting system status and diagnostic data.

Chapter 5: DOS Diagnostic Utility

This chapter gives instructions for installing and using the KGPSA diagnostic utility, lp6dutil.

Chapter 6: Technical Assistance

This chapter tells you how to get information when you have a technical problem.

Chapter 7: Windows NT Registry Information

This chapter lists the instructions that enable parameters to be passed through the registry.

Related Documentation

The user should be familiar with the documentation for the host computer and for the Fibre Channel devices that are mounted internally or externally and are being connected to the host adapter.

Conventions

Table 1 lists the style conventions used in this guide.

Table 1 Style Conventions

Style	Meaning
boldface monospace type	To be input by the user (e.g., menu picks)
plain monospace type	Text
<i>italic type</i>	<i>For emphasis, manual titles, chapter summaries, keyboard key names</i>
Special font (<i>Courier</i>)	For filenames and commands

Support and Services

Who to contact in the Americas

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

Who to contact in Europe

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

Who to contact in Asia Pacific

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1

Product Description

This chapter gives a physical and functional overview of the KGPSA PCI-to-Fibre Channel host adapter. It also lists both the standards with which the host adapter complies and the agency approvals granted to the adapter, and provides specifications for significant characteristics.

1.1 Introduction

The KGPSA PCI-to-Fibre Channel host adapter provides an interface between a computer and fibre channel storage devices. The host adapter features 3 custom ASIC's, which are highly-integrated chips that provide a simple, high-level command block interface to fibre channel protocols using a built-in protocol engine with an integrated RISC processor. This architecture reduces host requirements and simplifies the driver interface between a host computer PCI bus and internal or external fibre channel devices.

The KGPSA host adapter is a high-performance I/O solution for applications like client/server, database I/O, multimedia and imaging that require a new level of high throughput coupled with low-latency characteristics. The host adapter provides simultaneous and concurrent multiple-protocol support in distributed computing environments, and offers autonomous operation for up to four independent data paths/protocols. Storage protocol drivers and SCSI-FCP for Microsoft Windows NT3.5 and 3.5.1 are provided. The host adapter is both ANSI Fibre Channel and PCI Local Bus compliant and supports:

- Full-duplex data transfers of 266 Mb/s, 531 Mb/s and 1062.5 Mb/s
- Full PCI bus speed data transfers of 133 Mb/s
- Point-to-point, arbitrated-loop, and switch fabric connections
- Storage protocol
- Class 1, 2, 3

Direct interface to copper cables through standard 80-pin gigabit link module (GLM)

1.2 Standards

- The KGPSA host adapter conforms to the following standards:
- ANSI Fibre Channel FC-PH, Revision 4.3
- ANSI Fibre Channel FC-AL, Revision 4.5
- FCSI 301 Rev 1.0 Gigabaud Link Module
- PCI Local Bus, Revision 2.0/2.1
- Fibre Channel Class 1, 2, 3

1.3 Agency Approvals

The KGPSA host adapter has the following agency approvals:

- UL Recognized to UL1950
- CUR Recognized to CSA22.2, No. 950
- TUV Certified to EN60950
- FCC Rules, Part 15, Class A
- DOC Rules, Class A
- EMC Directive 89/336/EEC (CE Mark)
 - EN55022, CISPR22/85, Class A
 - EN50082-1

1.4 Specifications

Table 1-1 lists significant specifications for the KGPSA Host Adapter.

Table 1-1 Specifications

Characteristic	Specification
Architecture	3-chip, 32-bit RISC protocol accelerator Up to 33 MHz PCI bus master DMA 512 Kbytes FLASH memory 128 Kbytes - 512 Kbytes context RAM 128 Kbytes - 512 Kbytes buffer RAM
Hardware Environment	x86 and ALPHA PCI hardware platform
Hardware Interface	80-pin connector for copper GLMs

Table 1-1 Specifications (Cont'd)

Supported Copper GLMs	
Data Rate	1062.5 Mb/s
Cable Type	Duplex cable
Connector Type	DE9
Distance	10 meters (unequalized)
Dimensions	Short PCI form factor - 6.88 in x 4.20 in
Power Requirements	
Volts	+5 Vdc
Power (w/o GLM)	8 Watts
Environmental Requirements	
Operating Temperature	0° to 46° C
Storage Temperature	-10° to 55° C
Relative Humidity	5% to 95% non-condensing

2

Host Adapter Installation

This chapter provides step-by-step instructions for assembling and installing the KGPSA PCI-to-Fibre Channel host adapter. The task involves: Verifying hardware prerequisites and operating environment; recording reference numbers; assembling the host adapter board; and installing the host adapter board and connecting media

2.1 Before You Begin

Before installing the host adapter, verify system requirements, record reference numbers, and determine hardware needs.

NOTE

The host adapter board contains static-sensitive components, especially the GLM. Observe Electrostatic Discharge (ESD) precautions.

2.1.1 System Requirements

- One open 32-bit PCI bus slot with a 5.0 VDC signaling interface
- Maximum PCI bus clock rate of 33 MHz

2.1.2 Reference Numbers

Each PCI host adapter is shipped with a unique address identifier stored in Flash memory. The Fibre Channel industry uses two unique identifiers, the World Wide Port Name (WWPN) and the Node name, both derived from the IEEE address. Together the World-Wide Port Name and Node Name make up the World Wild Name (WWN), an 8-byte field which uniquely identifies a host adapter on a loop.

This address and the board's serial number are clearly marked on the board. Write them here for future reference.

IEEE address: _____

Serial number: _____

2.1.3 Installation Requirements

- KGPSA Fibre Channel PCI host adapter
- Mounting bracket with two 3 mm screws
- Appropriate media and connectors (user supplied): Copper duplex cabling with DB9 connectors (also called DE9)

CAUTION

A Digital Equipment-supplied GLM is required to maintain regulatory compliance with the FCC and EMC Directive (89/336/EEC).

2.2 Assembly and Installation

CAUTION

Wear an electrostatic wrist strap.

Here is a brief outline of the steps to take to assemble and install the host adapter. Details are provided where necessary in following subsections.

- Establish a static-free environment, including a wrist strap and an ESD mat.
- Turn off the computer and unplug the ac power cord.
- If necessary, assemble the mounting bracket and the GLM on the host adapter board.
- Insert the host adapter board in an empty PCI slot in the computer.
- Connect the copper duplex cable.
- Plug in the ac power cord, turn on the computer and observe the LEDs for POST results.

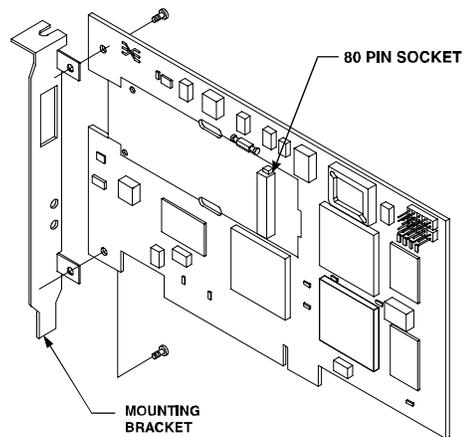
2.2.1 Assembling the Mounting Bracket on the Host Adapter

NOTE

The copper bracket is distinguished by its beryllium copper fingers lining the GLM opening.

1. Align the mounting bracket tabs with the holes in the host adapter board (Figure 2-1).

Figure 2-1 Mounting Bracket and Host Adapter Board

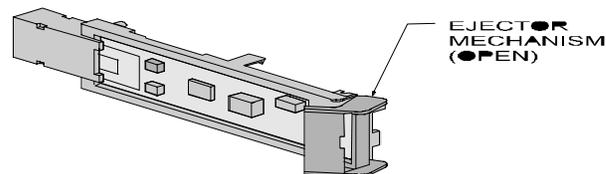


2. Insert the 3mm screws provided from the solder side of the board and tighten them with a screwdriver.

2.2.2 Assembling the GLM on the Host Adapter Board

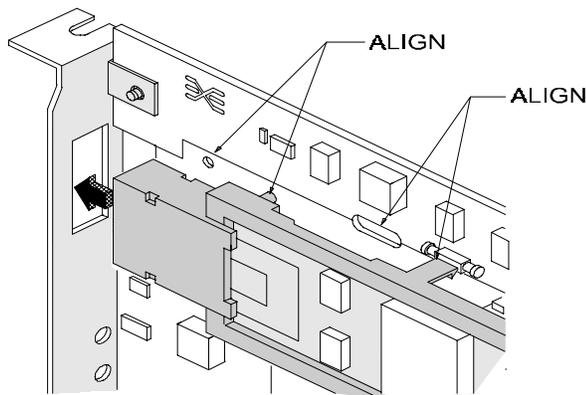
1. Make sure the mounting bracket is attached to the host adapter board.
2. Figure 2-2 illustrates the GLM and its rectangular ejector lever, which is used during GLM removal. The lever opens and closes with slight finger pressure; if the lever is open, close it and make sure it remains closed during installation.

Figure 2-2 GLM and Ejector Lever



3. Insert the GLM through the rectangular opening in the mounting bracket and align it with the board at these points (Figure 2-3):
 - Align GLM pins with host adapter board socket.
 - Align GLM round alignment tabs with holes in the board.
 - Align GLM rectangular mounting tabs with oval openings in board.

Figure 2-3 Aligning the GLM

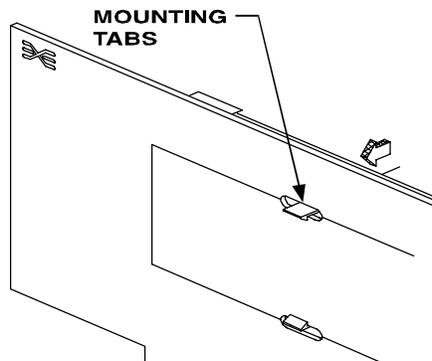


4. Press the GLM into place by exerting even pressure.
5. Verify that the mounting tabs are attached to the solder side of the board (Figure 2-4).

NOTE

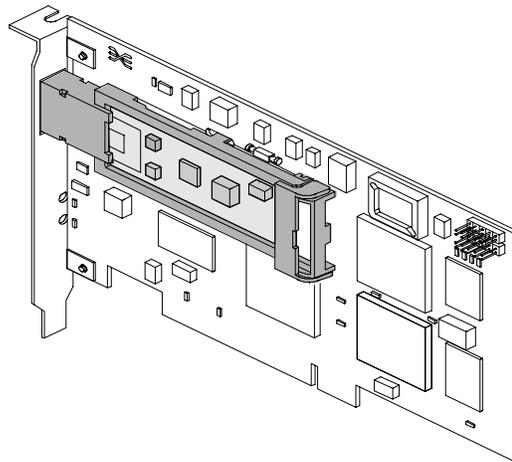
A faint click signals the placement of the rectangular tabs on the solder side of the board

Figure 2-4 GLM Mounting Tabs



6. Check again to make sure the GLM is placed and connected correctly, as shown in Figure 2-5.

Figure 2-5 GLM Placement



2.2.3 Installing the Host Adapter Board in the Computer

1. Make sure the computer is turned off and the ac power cord is disconnected.
2. Unscrew the screws that secure the computer case and remove the case; make sure you observe the ESD precautions.
3. Remove the blank panel from an empty 32-bit PCI bus slot.
4. Insert the host adapter board in the empty 32-bit PCI bus slot; press firmly until the board is seated securely.
5. Secure the host adapter board mounting bracket to the computer panel with the panel screws.
6. Replace the computer case and secure it with the screws removed.

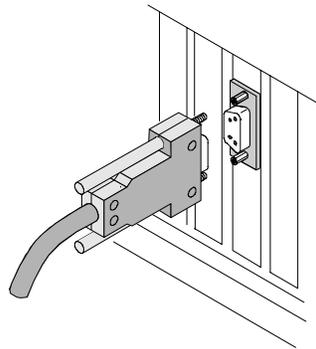
2.2.4 Connecting the Copper Duplex Cable

NOTE

GLM is required to be “media and speed matching.”

Connect the copper duplex cable to the copper GLM using a DB9 (also called DE9) connector (Figure 2-6).

Figure 2-6 Connecting the Copper Duplex Cable



2.2.5 Verifying Correct Operation

To verify that the host adapter board has been installed correctly and is operating, connect the computer ac power cord and turn on power to the computer. When power is applied the host adapter board begins a Power On Self Test (POST) to verify internal operation before operational software is loaded.

Observe the green and yellow LEDs through the host adapter mounting bracket. The green LED indicates power functions and the yellow LED signifies port activity. One LED will be blinking at all times during normal operation. Table 2-1 shows normal LED indications. Refer to Chapter 6, Technical Assistance, if you have any non-typical indication.

Table 2-1 POST LED Indications

Green LED	Yellow LED	State
OFF	Flashing (irregular)	POST processing in progress
ON	Slow blink (1 Hz)	Normal – inactive
ON	Flashing (irregular)	Normal – active
ON	Fast blink (4 Hz)	Normal – busy
Slow blink	OFF	Normal – link down or not yet started

3

Device Driver Installation

This chapter gives step-by-step instructions for installing the Windows NT SCSI miniport driver. Since the PCI host adapter utilizes the lowest layer of the SCSI subsystem, full compatibility with the rest of the NT SCSI driver subsystem is maintained, including all management capabilities. For more information, consult your Windows NT documentation.

NOTE

The procedures work for both x86 and Alpha platforms.

3.1 Before You Begin

Verify these minimum requirements:

- Installed KGPSA Fibre Channel PCI host adapter and GLM, with media
- Windows NT SCSI driver
- Windows NT 3.51 or 4.0 (server and workstation)

3.2 Installing Windows NT SCSI Device Driver

NOTE

Windows NT must be currently running.

3.2.1 Upgrading a Previous Installation

If you are upgrading a previously installed copy of the device driver, do the following:

1. Rename the current version (e.g., lp6nds35.old).
2. Copy the new device driver file (lp6nds35.sys) to the \system32\drivers directory of the Windows NT system path.
3. Reboot Windows NT.

3.2.2 Installing Windows NT 3.51

NOTE

Prior to installation, we recommend that you have a valid system backup.

If you are installing Windows NT SCSI device driver for the first time, do the following steps:

From the Main program group,

1. Double-click *Windows NT Setup* to open the Windows NT Setup window.
2. Select *Options*.
3. Select *Add/Remove SCSI Adapter*.
4. Select *Add*.
5. Click *OK*.
6. Select *Other* from the list of supported adapters.
7. Enter the path to the KGPSA INT SCSI software driver and click *OK*.
8. Select the *KGPSA SCSI Driver* and click *OK*.
9. Click *Install*.
10. Click *Continue* to install the driver.
11. Reboot the computer to restart Windows NT. The Fibre Channel SCSI disk devices will be configured automatically by Windows NT.

3.2.3 Installing Windows NT 4.0

NOTE

Prior to installation, we recommend that you have a valid operating system backup.

If you are installing Windows NT SCSI device driver for the first time, do the following steps:

From the Main program group,

1. Select *Start* menu.
2. Select *Settings*.
3. Click *Control Panel*.
4. Select *SCSI Adapters* icon.
5. Select *Drivers* tab.

6. Select *Add*.
7. Click *Have Disk*.
8. Enter the path to the KGPSA INT SCSI software driver and click OK.
9. Select the *KGPSA SCSI Driver* and click OK.
10. Click *Install*.
11. Click *Continue* to install the driver.
12. Reboot the computer to restart Windows NT. The Fibre Channel SCSI disk devices will be configured automatically by Windows NT.

3.2.13 Verifying Device Driver Installation

After you have installed the Windows NT SCSI device verify that you can see the Fibre Channel disks, if they are present. Do the following steps:

From the Main program group,

1. Select *Start* menu.
2. Select *Settings*.
3. Click *Control Panel*.
4. Select *SCSI Adapters* icon.
5. Click *Device* tab; the Fibre Channel drive names should be present.

4

Troubleshooting

The Power On Self Test (POST) and the Windows NT System Event Logger (Viewer) help you to troubleshoot the host adapter. This chapter describes how to use these two tools when there is a host adapter problem.

4.1 POST Conditions and Results

Table 4-1 lists the host adapter LED states and their meanings. If the LEDs indicate a failure during the POST, do the following steps:

1. Verify that the host adapter board is firmly seated in the PCI slot.
2. Verify that the GLM is securely seated in the host adapter board socket.
3. Verify that the copper cable connection to the host adapter board is secure.

Table 4-1 Host Adapter POST LED Meanings

Green LED	Yellow LED	State
OFF	OFF	Wake-up failure (dead board)
OFF	ON	POST failure (dead board)
OFF	Slow blink (1 Hz)	Wake-up failure
OFF	Fast blink (4 Hz)	Failure in POST
OFF	Flashing (irregular)	POST processing in progress
ON	OFF	Failure while functioning
ON	ON	Failure while functioning
ON	Slow blink (1 Hz)	Normal – inactive
ON	Flashing (irregular)	Normal – active
ON	Fast blink (4 Hz)	Normal – busy
Slow blink	OFF	Normal – link down or not yet started
Slow blink	Slow blink (1 Hz)	Off-line for download
Slow blink	Fast blink (4 Hz)	Restricted off-line mode (waiting for restart)

4.2 Windows NT Event Viewer

The Windows NT SCSI driver verifies the success of the PCI Host Adapter POST. In case of a failure or suspected failure, an error log entry is issued to the Windows NT System Event Logger (Viewer). Do this procedure to view the Windows NT error log.

From the Main menu,

1. Double-click or select the *Administrative Tools* program group.
2. Double-click or select the *Event Viewer*; the display shows a list of discrete events specifying the source name *LP6NDS35 (NT SCSI driver)*.
3. Double-click any event with the source name *LP6NDS35*.
4. Change the data view from *Bytes (default)* to *Words*.
5. Examine the entry at offset 0x10; if the low byte = En, match the low byte with the error found in Table 4-2, Windows NT SCSI Port Log.

Table 4-2 Windows NT SCSI Port Error Log

Error Codes	Meaning	Additional Information
0xE1	HA_ERRATT set; 31:8 = status register	Error bit set in the host attention register; bits 31:8 reflect additional error status found in status register
0xE2	MB command timeout; 15:8 = timed-out command	
0xE3	MB error; 15:8 = command; 31:16 = mbx status code	
0xE4	FFRDY or MBRDY not set; 31:8 = status register	Adapter not ready
0xE5	Topology != LOOP	Initialization
0xE6	MBATT, but OWN = 1; 31:8 = mb word 0	
0xE7	SRB already queued to ring when attempted	Internal driver software error
0xE8	RESTART failed	
0xE9	Received an FC-AL PORT BYPASS primitive	Port taken off-line
0xEA	IOCB error: 15:8 = command, 16:23 = IOSTAT code; 24:31 = parm field 0:7	

Table 4-2 Windows NT SCSI Port Error Log (Cont'd)

0xEB	Unsupported IOCB command rsp; 15:8 = command field	
0xEC	Could not allocate an uncached extension from Windows NT	
0xED	Did not get a LINK_ATT in 30 seconds of wait	Failed on startup; host adapter inoperative
0xEF	FFERR_DISC_ERROR	Could not finish Initial Discovery, even after 120 Link down/up transitions

5

DOS Diagnostic Utility

This chapter gives instructions for installing and using the KGPSA diagnostic utility, lp6dutil, a DOS-based program that is intended for use in a stand-alone environment.

5.1 Lp6dutil Description

The lp6dutil program enables a user to test the PCI host adapter board and to upload firmware. The program has the following functions:

- Discovering and preliminary testing of KGPSA host adapters in the system.
- Functional testing and making operational checks on the KGPSA.
- Using input and output files to automate the lp6dutil program.
- Updating KGPSA host adapter firmware.

5.2 DOS Based Systems

5.2.1 DOS Memory Requirements

You might have to modify memory to run the lp6dutil. Consider the following steps.

NOTE

The lp6dutil diagnostic utility may not work with the Expanded Memory Manager (EMM386).

1. If you must use EMM386, do this to prevent memory conflicts: Add the option `x=mmmmm-nnnnn` in the EMM386 command line of the `config.sys` file; this is to exclude the memory areas used by KGPSA.
2. If the lp6dutil program is running in the DOS shell under Windows, do this: Add the statement `"MMExclude = mmmm-nnnn"` in the [386Enh] section of the `system.ini` file.

NOTE

The lp6dutil may not run in the DOS shell under Windows on all systems. For further explanation of EMM386, consult your DOS documentation.

5.2.2 Installing the Lp6dutil Software

Do these steps to install the lp6dutil software.

1. Insert the diagnostic diskette in the diskette drive.
2. Make a directory and copy files to your hard drive. For example:

```
c:\>md dir_name
```

```
c:\>copy a:*. * c:\dir_name
```

```
c:\>cd dir_name
```

(where **dir_name** is the directory where the diagnostic software is stored)

5.2.3 Starting lp6dutil

Do these steps to start the lp6dutil diagnostic program.

1. To start the lp6dutil without options, enter this command at the DOS prompt: `c:\> lp6dutil`
2. To customize the command with parameters enter one or more of these options: `{i=infilename}`; `{o=outfilename}`; `{/d}`; `{/nr}`; `{d=xxxx}`, where
infilename is a script input file read and executed by the program.
outfilename creates a file of keystrokes that is stored for later use (as an input file for example).
nr disables adapter reset upon program start.
xxxx is an alternate device ID. This command searches for an alternate device ID at program start (**only necessary for OEM special firmware**).

Here is a sample customized command:

```
c:\> lp6dutil o=pciha001 (where pciha001 is the output filename)
```

NOTE

All message lines except user input begin with a # symbol to indicate a comment line. User entered data appears on a line by itself, not preceded by a #.

Go to Start-up Procedure Section 5.4.

5.3 Alpha Based Systems with Alpha BIOS

For systems running AlphaBIOS follow these steps to start the lp6dutil program:

1. If the system default is NT, press “F2” for setup. The AlphaBIOS screen appears. Then go to Step 4.
2. If the system is a workstation and the default is SRM, set the `os_type` variable to NT by typing **set os_type NT**; then reboot the system. The system will come up in AlphaBIOS. Then go to Step 4.
3. If the system is a server and the default is SRM, type **ARC** at the SRM console. The AlphaBIOS initialization screen appears. Then go to Step 4.
4. Select *Utilities* from the AlphaBIOS setup menu.
5. Select *Run Maintenance Program* from the Utilities menu. The Run Maintenance Program window appears.
6. Tab to *Location*; using the arrows select the correct location of the program
7. Type the following program name: **Lp6dutil**; press the **enter** key.
8. Go to Start-up Procedure, Section 5.4

5.4 Start-up Procedure

When lp6dutil starts it searches for installed PCI host adapters and does preliminary analyses before displaying its Main menu. If it finds no host adapter, it exits; when failures occur the program displays error messages. Here is the sequence of tasks the program goes through at startup.

1. Searches for installed PCI host adapters.
2. Performs these preliminary tests on all installed host adapters:
 - SLIM memory test
 - BIU register test
 - BIU configuration registers test.
3. Reports pass or fail status messages.
4. Resets the host adapters.
5. Checks POST status of host adapter.
6. Reports revision levels of diagnostic and functional firmware.
7. Displays the resources of each host adapter.

Sample Output of the Start-up Procedure

Figure 5-1 is a sample output of the start-up procedure.

Figure 5-1 Lp6dutil Start-up Procedure Sample Output

```
WELCOME TO LP6DUTIL HOST DIAGNOSTIC UTILITY Revision x.x

*****
WARNING:   This utility may not work with the Expanded Memory Manager
           (EMM386). Please read LP6DUTIL documentation for further details.
*****

KGPSA Host Adapters found in the system: 1

PRELIMINARY TESTING of Host Adapter 1
  Host Adapter 1: PASS 0xA: SLIM Memory Tests
  Host Adapter 1: PASS 0xA: BIU Registers Tests
  Host Adapter 1: PASS 0xA: BIU Configuration Registers Tests
Adapter 1 PASSED PRELIMINARY TESTS

Resetting Host Adapter 1

Host Adapter 1: POST Done.
Host Adapter 1 is READY. Functional Firmware Loaded.
  Diagnostic Firmware Version x.x
  Functional Firmware Version x.x

Hit RETURN or ENTER key to continue
<return>

      HOST ADAPTER 1 Resources Info
pci_bus_num = 0           pci_dev_num = 0xA0
slim_base_addr = 0x000D0000   reg_mem_base_addr = 0x000D1000
reg_io_base_addr = 0x0000FC00   IRQ = 0xB

NOTE: Enter 0 in 'Option:' prompt to display previous menu
```

Figure 5-1 Lp6dutil Start-up Procedure Sample Output (continued)

NOTE: All values entered are hexadecimal

LP6DUTIL Main Menu Revision x.x

1 - Test Host Adapters
 2 - Modify Test Options
 3 - Restart Host Adapters
 4 - Input/Output
 5 - Maintenance
 6 - Show Host Adapters Info
 7 - Quit

Option:

5.5 Diagnostic Main Menu

After the lp6dutil goes through its start-up procedure, the Main menu displays and handles user requests. If lp6dutil finds two or more host adapters in the system, the user is prompted to select which host adapters are to be tested. Table 5-1 lists and describes briefly the Main menu options; following sub-sections provide detailed descriptions of each option.

Table 5-1 Lp6dutil Main Menu Options

Menu Selection	Description
Test Host Adapters	Runs host-based internal and external loopback tests
Modify Test Options	Specifies number of retries and actions to take if error occurs
Restart Host Adapters	Resets the KGPSA
Input/Output	Opens or closes input and output files
Maintenance	Updates firmware or non-volatile parameters in FLASH ROM; displays program images stored in memory.
Show Host Adapters info	Displays configuration and status data used by Tech Support
Quit	Exits the lp6dutil program.

NOTE

Enter 0 at the Option prompt in Figure 5-1 to display the Main menu. All values entered are hexadecimal.

5.5.1 Test Host Adapters

Select this option to run host-based internal and external loopback tests on the host adapters. Internal BIU PCI loopback and other loopback tests are run automatically. External loopback tests are disabled by default (0 = No; 1 = Yes, and 0 = No as the default).

Choose 0 (No) if you do not have an external loopback connector.

NOTE

Testing the host adapter while it is connected to an arbitrated loop is not recommended.

5.5.2 Modify Test Options

Select test and specify the number of passes on one or more of these tests: PCI loopback, Internal loopback, External Loopback, or all three.

These test options are available for KGPSA BIU-3 cards: BIU3 Tx and Rx DMA, BIU3 GP DMA, and BIU3 concurrent DMA.

Choose also the number of passes (default is 0x50; 0 = infinity), and the action to take upon encountering errors (0 = stop, 1 = repeat, 2 = ignore, default is 0).

5.5.3 Restart Host Adapters

Select this to reset the host adapter. When restart occurs, lp6dutil performs POST testing on the adapter and reloads functional firmware.

5.5.4 Input/Output

Select this option to open or close input and output files. Input file is interpreted and executed by the lp6dutil program. The output file contains a log of all messages. Nesting of input files is not supported.

5.5.5 Maintenance

Select this option to update firmware or non-volatile parameters in the Flash ROM. This option also displays program images (load list) stored in the host adapter's memory. User must reboot the host adapter for the new firmware to take effect.

5.5.6 Show Host Adapter Info

- Select this option to display host adapter data in these areas:
- BIU PCI Configuration Parameters
- Host Adapter Info and Status
- Adapter Revisions
- Display Configuration data
- Service Parameters
- Status/Counters Info
- Link Status
- Link Attention

5.5.7 Quit

Select this option to exit the lp6dutil program. A warning message occurs if errors were encountered during the session.

6

Windows NT Registry Information

This chapter provides information about Windows NT registry.

6.1 Registry Instructions

This version of the NT SCSI driver adds the ability to pass parameters through the registry under these instructions.

HKEY_LOCAL_MACHINE->SYSTEM->CurrentControlSet->Services->lp6nds35

Add (if not already present) the following Keys under lp6nds35:

Parameters->

Device (Parameters apply to ALL KGPSA adapters)

or

Parameters->

Devicen (Parameters apply to KGPSA adapter number 'n' 0-99)

Under Device or Devicen add a value of DriverParameter Type Reg_SZ. The string can contain multiple entries separated by a semi-colon (;).

6.2 Parameters

Current parameters that can be set are shown in Table 6-1.

Table 6-1 Current Available Parameters

Parameter	Value
QueueDepth=n	Values from 1-64 (decimal), default=64
HardAIPa=0xn	Values from 0x01 to 0xEF, default=0x01. NOTE: ONLY VALID AL_PAs may be used! Refer to Table 6-2, Valid AL_PA Settings.
ARBOV=n	Values are in milliseconds from 500 to 10000, default=1000.
EDTOV=n	Values are in milliseconds from 500 to 10000, default=1000.
RATOV=n	Values are in seconds from 2 to 120, default=2.
RetryloTimeOut=1	Values 0 or 1, default=0, 1=allow Miniport to retry I/O.
RetryInterval=n	Values are in seconds from 2 to 255, used for time-out interval if RetryloTimeOut=1.
EnabledDPC=n	Values 0 or 1, default=0, 0=process I/O completion at interrupt level, 1=process at DPC level.
TrafficCop=n	Values 0 or 1, default=0, 1=enable FC-AL loop master to run unfair and break potential arbitration problems by sending frames to itself, 0=run fair all the time.

Table 6-2 Valid AL_PA Settings

0x01	0x02	0x04	0x08	0x0F	0x10	0x17	0x18	0x1B
0x1D	0x1E	0x1F	0x23	0x25	0x26	0x27	0x29	0x2A
0x2B	0x2C	0x2D	0x2E	0x31	0x32	0x33	0x34	0x35
0x36	0x39	0x3A	0x3C	0x43	0x45	0x46	0x47	0x49
0x4A	0x4B	0x4C	0x4D	0x4E	0x51	0x52	0x53	0x54
0x55	0x56	0x59	0x5A	0x5C	0x63	0x65	0x66	0x67
0x69	0x6A	0x6B	0x6C	0x6D	0x6E	0x71	0x72	0x73
0x74	0x75	0x76	0x79	0x7A	0x7C	0x80	0x81	0x82
0x84	0x88	0x8F	0x90	0x97	0x98	0x9B	0x9D	0x9E
0x9F	0xA3	0xA5	0xA6	0xA7	0xA9	0xAA	0xAB	0xAC
0xAD	0xAE	0xB1	0xB2	0xB3	0xB4	0xB5	0xB6	0xB9
0xBA	0xBC	0xC3	0xC5	0xC6	0xC7	0xC9	0xCA	0xCB
0xCC	0xCD	0xCE	0xD1	0xD2	0xD3	0xD4	0xD5	0xD6
0xD9	0xDA	0xDC	0xE0	0xE1	0xE2	0xE4	0xE8	0xEF

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