

digital

**MCS
LOGISTICS
ENGINEERING**

**NIJMEGEN
THE NETHERLANDS**

Service Maintenance Manual

PRIORIS LX Server

K-MN-SD00000-01-JG00.A

Copyright Digital Equipment Corporation
All rights reserved
October 1995

**P
R
I
O
R
I
S

L
X**

October 1995

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation.

Digital Equipment Corporation assumes no responsibility for any errors that might appear in this document. The software, if any, described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license. No responsibility is assumed for the use or reliability of software or equipment that is not supplied by Digital Equipment Corporation or its affiliated companies.

Restricted Rights: Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013.

Copyright Digital Equipment Corporation

All Rights Reserved

The following are trademarks of Digital Equipment Corporation:
PRIORIS and the Digital logo.

The following are third party trademarks:

MS-DOS and Windows and Windows NT and Windows NT Server are trademarks of Microsoft Corp.

Novell and Netware are trademarks of Novell, Inc.

SCO and Open Desktop are trademarks of The Santa Cruz Operation, Inc.

UNIX is a registered trademark of UNIX System Laboratories, Inc.

All other trademarks and registered trademarks are the property of their respective holders.

Created by:



MCS Logistics Engineering - Nijmegen

Printed in Ireland

Table of Contents

PREFACE 7

CHAPTER 1 PRODUCT DESCRIPTION 9

PRODUCT INTRODUCTION 9

PRODUCT MODELS INFORMATION 10

 PRIORIS LX 486 Server..... 10

 PRIORIS LX Pentium Server 10

CHAPTER 2 SERVER UTILITIES & CONFIGURATION 11

SERVER UTILITIES 11

 PHLASH.EXE 11

 Before Using PHLASH.EXE 11

 Creating a Crisis Recovery Diskette..... 12

 Using the Crisis Recovery Diskette 12

 Upgrading The Server's BIOS 12

 EPP3SMC.EXE 13

CONFIGURING THE SERVER 13

 The SCU 13

 Before Using the SCU 14

 SCI Files and CFG Files..... 15

 Using the SCU 15

 Configure The Computer 16

 Adding ISA Boards 17

SCU AND SETUP OPTIONS 17

 Main Menu Options..... 17

 Memory and Cache Options 19

 Boot Options 20

 Keyboard Features..... 21

 Advanced Options 22

 Advanced chipset control..... 23

 Power Options..... 24

 Security Options 24

 SCU Options Only..... 25

 Onboard SCSI device group 26

 Onboard network device group 26

 PCI slot 1, 2, and 3 options group 26

 CL-GD5428 VGA graphics controller..... 27

CHAPTER 3 SERVICE PROCEDURES 29

SAFETY REQUIREMENTS 29

RECOMMENDED TOOLS 30

 Other Materials Needed..... 30

 Special Tools Required 30

 Remedial Diagnostic Test Software 30

 Recommended Virus Detection and Cleanup Software..... 30

ECO/FCO INFORMATION	31
BIOS Version Information.....	31
REMOVING THE SIDE PANEL.....	31
SERVER COMPONENTS	32
EXPANSION SLOTS.....	33
MAIN LOGIC BOARD SWITCHES/JUMPERS	34
Main Logic Board Jumper Settings.....	34
Main Logic Board Jumper Locations.....	35
CPU MODULE SWITCHES/JUMPERS	35
i486 CPU Module Switch Settings.....	36
i486 CPU Module Jumper Locations.....	36
Pentium CPU Module Switch Settings	37
Pentium CPU Module Jumper Locations	37
COMPUTER MEMORY CONFIGURATIONS	38
i486 CPU Module Memory Configurations	38
i486 CPU Module SIMM Socket Locations.....	39
Pentium CPU Module Memory Configurations.....	40
Pentium CPU Module SIMM Socket Locations	41
PART REMOVAL AND REPLACEMENT PROCEDURES	42
Removing the 3½-Inch Diskette Drive	42
Removing Devices in the Upper Drive Bay Area	43
Removing a Device in the Rear Drive Bay	44
Removing Devices in the Lower Drive Bay Area.....	46
Removing the Main Logic Board	48
Removing the Power Supply	49
Removing the CPU Module.....	50
INSTALLATION PROCEDURES	51
Installing a Secondary Cache Module (Pentium CPU Module Only).....	51
UPGRADING PROCEDURES	52
Upgrading the CPU Module	52
Upgrading the CPU	53
Replacing the Server Battery	55
CONNECTING DEVICES.....	56
Diskette Drive Connections	57
Primary and Secondary IDE Drive Data Cable Connections	58
SCSI Configuration Guidelines	59
SCSI Cable Connections.....	60
Connecting an External Storage Box	61
External SCSI Bus Guidelines.....	61
CHAPTER 4 TROUBLESHOOTING	63
INITIAL TROUBLESHOOTING	63
POST EXECUTION MESSAGES	64
BEEP CODES	64
POST AND BOOT MESSAGES	65
SERVER TROUBLESHOOTING	67
DISK DRIVE TROUBLESHOOTING	71
MONITOR TROUBLESHOOTING	72
CD-ROM TROUBLESHOOTING	73
QAPLUS/FE ADVANCED DIAGNOSTICS	74
QAPLUS/FE Error Messages	74

CHAPTER 5 DEVICE MAPPING..... 75

- CPU Memory Address Map (Full Range i486,DX2 CPUs)..... 75
- CPU Memory Address Map (Full Range, 560/566 CPUs)..... 76
- CPU Memory Address Map (Full Range, 575 and higher CPUs) 76
- CPU Memory Address Map (PC Compatibility Range)..... 77
- CPU I/O Address Map..... 77
- I/O Address Map..... 77
- Computer Interrupt Levels 78
- DMA Channel Assignment..... 78
- PCI Configure Space Address Map..... 78

CHAPTER 6 PASS / FAIL CRITERIA..... 79

APPENDIX A SERVICE NOTES..... 81

APPENDIX B USEFUL INFORMATION 83

- RELATED DOCUMENTATION 83
- ON-LINE BULLETIN BOARDS 83

DOCUMENT FEEDBACK 85

PERSONAL NOTES 87

READERS COMMENTS 91

Table of Figures

Figure 2 - 1 SCU Main Menu Options	14
Figure 3 - 1 Unlocking and Removing the Side Panels	31
Figure 3 - 2 Server Components	32
Figure 3 - 3 PRIORIS LX Expansion Board Slots	33
Figure 3 - 4 Main Logic Board Jumper Locations	35
Figure 3 - 5 i486 CPU Module Jumper Locations.....	36
Figure 3 - 6 Pentium CPU Module Jumper Locations.....	37
Figure 3 - 7 i486 CPU Module SIMM Socket Locations	39
Figure 3 - 8 Pentium CPU Module SIMM Socket Locations.....	41
Figure 3 - 9 Removing the 3½-Inch Diskette Drive	42
Figure 3 - 10 Removing a Device from the Second Drive Bay.....	43
Figure 3 - 11 Removing the Rear Drive Bay Assembly.....	44
Figure 3 - 12 Removing a 3½-Inch Device in the Rear Drive Bay Assembly	45
Figure 3 - 13 Removing the Lower Drive Bay Assembly.....	46
Figure 3 - 14 Removing the Lower Drive Bay Devices.....	47
Figure 3 - 15 Removing the Main Logic Board.....	48
Figure 3 - 16 Removing the Power Supply.....	49
Figure 3 - 17 Removing the CPU Module (Pentium CPU Module Shown)	50
Figure 3 - 18 Installing a Secondary Cache Module.....	51
Figure 3 - 19 Upgrading the CPU Module (Pentium CPU Module Shown).....	52
Figure 3 - 20 Releasing the CPU	53
Figure 3 - 21 Installing a New CPU	54
Figure 3 - 22 Replacing the Server Battery.....	55
Figure 3 - 23 Diskette Drive Data Cable Connections	57
Figure 3 - 24 Primary and Secondary IDE Drive Data Cable Connections.....	58
Figure 3 - 25 SCSI Cable Connections	60
Figure 3 - 26 Connecting an External Storage Box.....	61

Preface

The Digital PRIORIS LX Service Maintenance Manual is a troubleshooting guide that can be used for reference when servicing the PRIORIS LX line of Servers.

Digital Equipment Corporation reserves the right to make changes to the Digital PRIORIS LX Server series without notice. Accordingly, the diagrams and procedures in this document may not apply to the computer(s) you are servicing since many of the diagnostic tests are designed to test more than one product.

**CAUTION**

Digital recommends that only A+ certified engineers attempt to repair this equipment. All troubleshooting and repair procedures are detailed to support subassembly/module level exchange. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indications of component replacement or printed wiring board modifications may void warranty or exchange allowances.

Chapter 1

Product Description

Product Introduction

The PRIORIS LX servers are a family of high-performance, 486DX2 or Pentium™ processor-based, network, application, and file/print servers. These servers are the first in their class to offer an integrated PCI design that includes enhanced IDE, Fast SCSI-2, and support for full-duplex ethernet transmission (throughput to 20 Mb/sec).

The PRIORIS LX family of servers also provide investment protection through CPU upgrade technology. CPU upgrade technology enables to easily upgrade to a higher-performance CPU by simply installing a new CPU module. Supported CPU modules are also designed to be chip-upgradable as future high-performance CPUs become available.

The PRIORIS LX family is available in the following models:

- ◆ PRIORIS LX 486, 66MHz Intel 486DX2.
- ◆ PRIORIS LX 575, 75MHz Intel Pentium.
- ◆ PRIORIS LX 590, 90MHz Intel Pentium.

PRIORIS LX server family features:

- ◆ 16 MB Memory; expandable to 128 MB for PRIORIS LX 486.
16 MB Memory; expandable to 192MB for PRIORIS LX Pentium models.
- ◆ 256 KB external cache memory for 486 and Pentium models, expanable to 512 KB for Pentium models only.
- ◆ ECC options supported.
- ◆ Three EISA slots, two PCI slots, one shared slot, all bus mastering.
- ◆ On-board PCI enhanced IDE controller.
- ◆ On-board PCI fast/narrow SCSI II Adaptec 7850 controller.
- ◆ On-board Cirrus video graphics controller with 512KB memory.
- ◆ On-board PCI Digital Tulip chip ethernet controller.
- ◆ Two serial ports, one parallel ECP/EPP port, monitor, mouse and keyboard port.

Product Models Information

PRIORIS LX 486 Server

<i>Model</i>	<i>CPU</i>	<i>RAM</i>	<i>Cache</i>	<i>FDD</i>	<i>HDD</i>	<i>CD-ROM</i>
FR-940WW-XA	486DX2	16 MB	256 KB	1.44 MB	None	600MB SCSI-2, quad speed
FR-940WW-XB	486DX2	16 MB	256 KB	1.44 MB	840 MB IDE	600MB SCSI-2, quad speed

PRIORIS LX Pentium Server

The PRIORIS LX Pentium server supports an Intel Pentium processor on a single socket CPU module. The PRIORIS LX Pentium CPU module comes standard with a 256 KB write-back asynchronous secondary cache memory.

The CPU module contains 6 sockets capable of supporting up to 192 MB of standard parity memory (SIMMs).

<i>Model</i>	<i>CPU</i>	<i>RAM</i>	<i>Cache</i>	<i>FDD</i>	<i>HDD</i>	<i>CD-ROM</i>
FR-941WW-XA	Pentium / 75 MHz	16 MB	256 KB	1.44 MB	None	600MB SCSI-2, quad speed
FR-941WW-XC	Pentium / 75 MHz	16 MB	256 KB	1.44 MB	1 GB SCSI-2	600MB SCSI-2, quad speed
FR-942WW-XA	Pentium / 90 MHz	16 MB	256 KB	1.44 MB	None	600MB SCSI-2, quad speed
FR-942WW-XC	Pentium / 90 MHz	16 MB	256 KB	1.44 MB	1 GB SCSI-2	600MB SCSI-2, quad speed

Chapter 2 Server Utilities & Configuration

Server Utilities

The following sections provide detailed instructions on running the MS-DOS utilities contained on the supplied CD-ROM startup diskette and CD-ROM. Note that these utilities can also be copied to the hard disk drive. Refer to the operating system documentation for information on copying files.

PHLASH.EXE

All servers have BIOS software in a read-only, non-volatile memory (ROM) chip. This BIOS initializes hardware and boots the operating system when the server is turned on. The BIOS also provides access to other services such as keyboard and disk drives.

The server comes equipped with flash memory. This means that the server's BIOS can simply be restored by running the PHLASH.EXE utility. To upgrade the server's BIOS to future releases by running PHLASH.EXE along with any flash BIOS update diskette is also possible if necessary.

Before Using PHLASH.EXE

When not familiar with utility programs and their uses, carefully read and understand the following instructions before attempting to use PHLASH.EXE.

Before beginning have the following items available:

- ◆ Blank 3½-inch 1.44 MB formatted diskette
- ◆ Diskette copy of the server utilities

Creating a Crisis Recovery Diskette

A crisis recovery diskette should always be prepared before attempting to upgrade the BIOS. This diskette is used to reprogram the BIOS in case the flash process fails. To create a crisis recovery diskette:

- 1) Turn on the server and allow the POST to complete. If POST detects an error refer to *chapter 4 “troubleshooting”* and take the appropriate steps to correct the problem. After the problem has been resolved, restart the server.
- 2) Insert the startup and utilities diskette and make sure the following files are in the UPGRADE directory:
 - MINIDOS.SYS
 - PHLASH.EXE
 - DEVTBLS.DAT
 - PHLASH.INI
 - PRIORISLX.ROM
 - MAKEBOOT.EXE
 - MAKECRD.EXE
- 3) Create the same directory on the hard disk drive and then copy the above files to it.
- 4) Insert a blank formatted diskette into drive A..
- 5) From drive C: type MAKECRD. This copies the files to drive A..
- 6) Remove the crisis recovery diskette from drive A and store it in a safe place.

Using the Crisis Recovery Diskette

The crisis recovery diskette must be used only if the server’s BIOS fails or if a BIOS upgrade was unsuccessful. If the server’s BIOS fails:

- 1) POST detects an error after a normal boot cycle or a BIOS upgrade.
- 2) The BIOS in the bootblock memory executes.
- 3) The server beeps several times.
- 4) The diskette drive begins searching for the crisis recovery diskette.
- 5) Turn off the server and set the recovery jumper (**J39**) to recovery mode. Insert the crisis recovery diskette into drive A and power on the server. After the BIOS is restarted, turn off the power and remove the crisis recovery diskette from drive A. Set the recovery jumper (**J39**) back to normal to prevent unauthorized personnel from loading a new server BIOS. Turn the power back on for normal operation.

Upgrading The Server's BIOS

Perform the following steps to update the server's BIOS in the flash memory:

- 1) Turn on the server and allow the POST to complete.
- 2) If POST detects an error refer to *chapter 4 “troubleshooting”* and take the appropriate steps to correct the problem. After the problem has been resolved, restart the server.
Create a crisis recovery diskette when not already having done so. Refer to *“Creating a Crisis Recovery Diskette”* previously described.

- 3) Insert the startup and utilities diskette.
At the MS-DOS prompt:
change directory to **a:\UPGRADE**
type: **PHLASH /e**
- 4) A screen appears on the monitor warning that you are about to erase the server's BIOS
- 5) Press [Enter] to continue. Else, press [Esc] to cancel.
Once [Enter] is pressed, PHLASH.EXE automatically updates the server's BIOS.
After the flashing process completes, the server automatically reboots itself so changes immediately take effect.
- 6) Remove the startup utilities diskette.

NOTE When a file other than the one on the diskette has to be flashed, copy the new file to the upgrade directory and type: **PHLASH [filename]**

EPP3SMC.EXE

EPP3SMC.EXE can be executed as an MS-DOS command or added to the CONFIG.SYS file as a device driver. In either case, use the BIOS Setup utility or the SCU to set the parallel port to EPP mode.

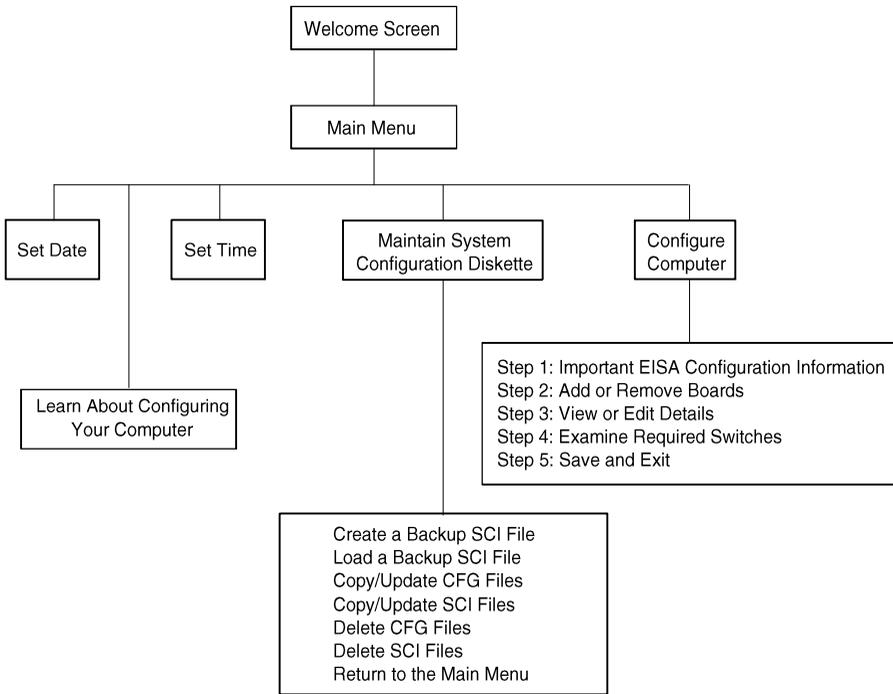
Configuring The Server

This chapter provides detailed information on how to configure the server using the System Configuration Utility (SCU). Digital recommends to use the SCU to initially configure the server and each time you add hardware, remove hardware, or change server settings.

If the server was delivered with factory-installed hardware and software, the server has already been configured.

The SCU

The SCU enables to setup and configure the server using the menu driven items shown in figure 2-1. Depending on the installed hardware and level of server security required, one or more of these items may have to be accessed to properly configure the server.



DEC00456

Figure 2 - 1 SCU Main Menu Options

Before Using the SCU

When familiar with utility programs and their uses, refer to the appropriate sections in this chapter to setup or update the server's configuration. Otherwise, carefully read and understand this chapter before attempting to modify the server's configuration settings.

Read any README files contained on the System Configuration Utility diskette for additional information.

In addition, have the following items readily available:

- 1) A 1.44 MB formatted diskette.
- 2) Configuration (CFG) files supplied with any installed EISA/PCI expansion boards. Refer to the section "SCI Files and CFG Files" later in this chapter for more information about CFG files.
- 3) Kit installation instructions for any installed optional hardware.

SCI Files and CFG Files

The SCU creates a System Configuration Information (SCI) file each time the server is configured. This SCI file can be used on any PRIORIS LX Server that is equally configured and can serve as a backup for the EISA configuration stored in NVRAM memory. The SCI file is maintained on the System Configuration Utility diskette and has a default name of SYSTEM.SCI.

Configuration (CFG) files contain main logic board, EISA, PCI, and ISA expansion board vital characteristics and the server resources they require for proper operation. When additional EISA, PCI, or ISA expansion boards are to be installed, make sure to copy the CFG files (and overlays, if applicable) associated with the expansion boards, to the System Configuration Utility diskette before attempting to configure the server.

Refer to the option documentation for additional information.

Using the SCU

Use the SCU when experiencing problems with the hard disk and when there is a need to reconfigure the server. In addition, the SCU should be used to modify the configuration after you add or remove hardware, or change server settings.

If this is the first time using the SCU, it is recommended to follow the procedures in the order given. If this is a subsequent session, refer to the appropriate sections to update the server configuration.

To run the SCU, perform the following steps:

- 1) Install any optional hardware, for example disk drives, EISA expansion boards, and so on. *Refer to Chapter 3, "Service Procedures".*
- 2) Make a backup copy of the supplied System Configuration Utility diskette. Store the original in a secure place and only use the backup copy when running the SCU. When unable to make a backup copy, use the original diskette cautiously.

NOTE It is recommended not to install the SCU or any of its utilities on a hard disk drive. Running the SCU or any of its utilities from a hard disk drive might cause memory conflicts between the SCU and application software. This specifically applies to memory managers and Windows applications.

- 3) Insert the backup System Configuration Utility diskette into drive A and then soft boot (reset) the server. The SCU introductory screen appears.

NOTE The SCU contains help pop-up screens for any selected menu item. Press **[F1]** at anytime to display a help screen. Press **[Esc]** to remove a help screen.

- 4) Press **[Enter]** to display the SCU Welcome screen.
- 5) If no configuration errors appear, the Welcome screen displays information about the SCU. Press **[Enter]** to display the Main menu and proceed to Step 6. If a configuration error appears, the Welcome screen displays information about the error and tells to reconfigure the server.
- 6) Press **[Enter]** to display the Main menu, select the **Configure Computer** option, then select the **View and Edit Details** option. Make any changes as indicated by the POST error message, and then select the **Exit and Save** option to end the SCU session and boot the server so the changes take effect.

- 7) If applicable, select the `Learn About Configuring The Computer` option to get familiar with the SCU.
- 8) If applicable, set the current server time and date using the `Set Time` and `Set Date` menu options.
- 9) Using the `Maintain System Configuration Diskette` option, copy the CFG files supplied with any EISA, PCI, or ISA expansion board.
- 10) Select the `Configure Computer` option to configure the server.
- 11) If applicable, select the `Maintain System Configuration Diskette` option to create, change, or update SCI or CFG files.
- 12) To end the SCU session select the `Exit From This Utility` option.
- 13) If applicable, install the operating system and any application software.
Refer to the operating system and application software documentation for installation information.

Configure The Computer

When accessing this menu item for the first time, it is recommended to follow the menu items listed below in the order given. If this is a subsequent session, refer to the appropriate menu item to update the server configuration.

Step 1: Important EISA Configuration Information

This menu item provides basic EISA configuration information and differences with ISA configuration. These screens are available at any time during the configuration process by pressing **[F1]** and by selecting EISA configuration from the help menu.

Step 2: Adding or Removing Boards

This menu item provides a list of boards and options in the configuration. Boards can be added, moved, and deleted from this list until it shows all the boards and options installed in the server, including the boards not yet physically installed.

The SCU automatically detects any EISA expansion boards installed on the server and configures the server accordingly. The SCU does not automatically detect ISA expansion boards.

Step 3: View or Edit Details

This menu item allows to examine and change the setting of each function and the resource allocated for those functions. When editing a function or resource in this step, the switch or jumper setting might have to be changed.

Step 4: Examine Required Switches

This menu item allows to view settings (switches and jumpers) that need to be manually set and software drivers that need to be installed. These recommendations must be followed exactly, otherwise the server will not work properly.

Step 5: Save and Exit

This menu item allows to exit the SCU program with or without saving the configuration settings.

Adding ISA Boards

Perform the following steps to add ISA boards to the server configuration:

- 1) Select "*Step 2: Adding and Removing Boards*" and update the list of boards and options to include any ISA boards to be installed in the server.
- 2) Select "*Step 4: Examine Required Switches*" to check the required switch and jumper settings of the ISA boards.
- 3) Select "*Step 5: Save and Exit*" to save the configuration and exit the SCU.
- 4) Turn off the server and install the ISA boards.



CAUTION

Do not attempt to physically install boards while the server is turned on.

SCU and Setup Options

The following tables list the options that are available in the BIOS Setup utility and in the SCU (View or Edit details). Use the keyboard function keys to help select options, change values, and display help information.

NOTE The ROM BIOS Setup utility and the SCU contain the same options as those listed below. Digital recommends to use the SCU to configure the server each time you add hardware, remove hardware, or change server settings.

Main Menu Options

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
System time	Current time	Displays the current time.
System date	Current date	Displays the current date.
Language	English Deutsch Español Français Italiano	Enables to select a desired language for BIOS Setup fields and POST messages.
Diskette drive A Diskette drive B	1.44 MB, 3½ 2.88 MB, 3½ Not Installed 360 KB, 5¼ 1.2 MB, 5¼ 720 KB, 3½	Sets the size and density of diskette drives.

Main Menu Options (continued)

Menu Fields	Settings	Comments
Autotype fixed disk		Press [Enter] to detect and automatically fill in the installed IDE hard disk drive parameters in the remaining fields.
Type⁽¹⁾	None to 39 User	Selecting None to 39 automatically fills in the remaining fields in this menu. Selecting User prompts to fill in the remaining fields with the installed hard disk drive's parameters. ⁽²⁾
Cylinders⁽¹⁾	0 to 4095	Displays the number of cylinders.
Heads⁽¹⁾	1 to 64	Displays the number of heads.
Sectors/track⁽¹⁾	0 to 63	Displays the number of sectors/tracks.
Write precomp⁽¹⁾	0 to 4095 None	Displays the number of cylinders that have their write timing changed.
Multi-sector transfers	2 sectors 4 sectors 8 sectors 16 sectors Auto Disabled	Determines the number of sectors per block for multiple sector transfers. Auto refers to the size the disk returns when queried.
LBA control mode	Disabled Enabled	Enabling LBA causes logical block addressing to be used instead of cylinders, heads, and sectors. This option allows to select Disabled for IDE hard disk drives up to 528 MB. When using IDE drives greater than 528 MB and MS-DOS or MS-Windows as operating system, select Enabled. Select Disabled for all other operating systems.
Transfer mode	Standard Fast PIO1 Fast PIO2 Fast PIO3	Selects the method to transfer data to and from the HDD. When selecting the user autotype for the HDD, Setup automatically selects the optimum transfer mode is selected.
Video system	EGA / VGA CGA 80x25 Monochrome	Sets the video controller type.

⁽¹⁾ These fields are automatically filled in if the server auto-detected an installed hard disk drive.

⁽²⁾ Incorrect settings can cause the server to malfunction continuously.

Memory and Cache Options

Menu Fields	Settings	Comments
Internal cache	Enabled Disabled	Enables or disables the server's internal cache. Enabling this feature decreases the average memory cycle time to boost server performance. It is possible to disable this option to aid in troubleshooting software problems.
External cache	Enabled (write-back) Enabled (write-through) Disabled	The server's external cache operates in write-back mode when Enable (WB) is selected. The server's external cache operates in write-through mode when Enable (WT) is selected. Disables the server's external cache. For optimal server performance, keep this setting at Enabled (WB).
System BIOS shadow⁽¹⁾	Not user selectable, permanently set to Enabled.	The main logic board reserves an area of DRAM for a copy of system BIOS ROM. This DRAM called "shadow memory" is write-protected and has the same addresses as the system BIOS ROM locations. When shadowing system BIOS ROM, the ROM information is copied into an appropriate area in DRAM. This increases the server's performance because the system BIOS instructions are in fast DRAM instead of ROM.
System BIOS cache	Enabled Disabled	This option enables the system BIOS to be cached in the internal cache and external cache (if installed). This increases server performance because BIOS instructions can be executed in cache instead of RAM.
Video BIOS shadow	Enabled Disabled	The main logic board reserves an area of DRAM for a copy of video BIOS ROM. This DRAM called "shadow memory" is write-protected and has the same addresses as the video BIOS ROM locations. When shadowing video BIOS ROM, the ROM information is copied into an appropriate area in DRAM. This increases the server's performance because the video BIOS instructions are in fast DRAM instead of ROM. For PCI VGA cards, video BIOS is always shadowed, regardless of this field's setting.
Video BIOS cache	Enabled Disabled	This option enables the video BIOS to be cached in the internal cache and external cache (if installed). This increases server performance because video BIOS instructions can be executed in cache instead of RAM.
Shadow 16K at: C8000h, CC000h D0000h, D4000h D8000h, DC000h	Enabled Disabled	Allows to enable or disable shadowing and caching of individual segments of ROM to increase server performance. Caution: Some option ROMs do not operate properly when shadowed.

Memory and Cache Options (continued)

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
AT bus space ⁽¹⁾	Disabled F00000h, 1MB E00000h, 2MB C00000h, 4MB	Memory hole not available, upper memory is contiguous. Sets the memory hole at address F00000 with 1 MB memory available. Sets the memory hole at address E00000 with 2 MB memory available. Sets the memory hole at address C00000 with 4 MB memory available.
System memory	Not user selectable	Displays the amount of base (conventional) memory each time the server boots.
Extended memory	Not user selectable	Displays the amount of extended memory each time the server boots.
Extended memory report ⁽¹⁾	Compatibility Non- compatibility	Selects the BIOS report mechanism for memory amount. Select Compatibility when using a conventional operating system. Select Non-Compatibility for extended memory above 64 MB under Windows NT v3.1.

⁽¹⁾ BIOS Setup utility option only**Boot Options**

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Boot sequence	A only A: then C: C: then A: C: only	Each time the server boots, it will load the operating system from the drive sequence selected.
SETUP prompt ⁽¹⁾	Enabled Disabled	When selecting Disable, only the prompt informing when to press <F2> to enter Setup is disabled. Entering Setup by pressing <F2> before POST completes is still possible.
POST errors ⁽¹⁾	Enabled Disabled	Enabling this options causes the server to pause and display a setup entry or resume the boot prompt if an error occurs at boot. Disabling this option causes the server to always attempt to boot regardless of a setup entry or error.
Floppy check ⁽¹⁾	Enabled Disabled	Enabling this option causes the server to verify the diskette type each time the server boots. Disabling this option speeds up the boot process.
Summary screen ⁽¹⁾	Enabled Disabled	Enabling this option causes the server to display configuration parameters (in the form of a summary screen) during boot.

⁽¹⁾ BIOS Setup utility option only

Keyboard Features

Menu Fields	Settings	Comments
NumLock⁽¹⁾	Auto On Off	Turns NumLock on or off each time the server boots. Note: When selecting Auto, the server will turn on NumLock if it detects a numeric keypad.
Key click⁽¹⁾	Disabled Enabled	Enables or disables the audible key click feature.
Keyboard auto-repeat rate⁽¹⁾	2/sec 6/sec 10/sec 13.3/sec 21.8/sec 26.7/sec 30/sec	Sets the number of times a second to repeat a keystroke while holding the key down.
Keyboard auto-repeat delay⁽¹⁾	1 sec 0.75 sec 0.5 sec 0.25 sec	Sets the delay time after a key is held down before it begins to repeat a keystroke.

⁽¹⁾ BIOS Setup utility option only

Advanced Options

Integrated peripherals

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Mouse port	Disabled Enabled	Enables or disables the mouse port.
LPT port⁽¹⁾	378, IRQ 7 278, IRQ 5 Auto Disabled 3BC, IRQ 7	Enables or disables the onboard port at the specified address.
LPT port mode	EPP 1.7 EPP 1.9 ECP Compatible mode Bi-directional mode	Enhanced parallel port mode. Selection based on what EPP version the printer supports. EPP 1.9 is IEEE 1284 compliant. Only choose a mode that the parallel port device (such as a printer) supports. Check the device documentation for this information. When unsure or unable to locate this information, use the default setting. Sets the extended capabilities port mode. Compatible mode - standard printer connection. Bi-directional mode - PS/2 compatible mode and able to receive data.
Serial port 1	Auto Disabled 3F8, IRQ 4 2F8, IRQ 3 3E8, IRQ4 2E8, IRQ3	Enables or disables serial port 1 at the specified address. Note: If the server is connected to a network, see the System Administrator.
Serial port 2	Auto Disabled 3F8, IRQ 4 2F8, IRQ 3 3E8, IRQ4 2E8, IRQ3	Enables or disables serial port 2 at the specified address. Note: If the server is connected to a network, see the System Administrator.
Diskette controller	Enabled Disabled	Enables or disables the onboard diskette controller.
Exchange diskette drives	Disabled Enabled	Enables to logically exchange physical diskette drive designations.

Advanced Options (continued)

Menu Fields	Settings	Comments
Diskette write protection	Disabled Enabled	Enables or disables the selected diskette drive's write protection option. Enabling this option means nothing can be written to the diskette drive (however, data can still be read from the diskette drive). Disabling this option enables to read and write data to the diskette drive.
Local bus IDE adapter	Both Disabled Primary	Enables the onboard local bus IDE adapter. The server supports up to four IDE devices. IDE adapter 0 is the primary IDE channel and supports a master/slave IDE drive configuration as IRQ14. IDE adapter 1 is the secondary IDE channel and supports a master/slave IDE drive configuration as IRQ15.

Advanced chipset control

Menu Fields	Settings	Comments
Memory parity check	Enabled Disabled	Enables or disables the server's memory parity check feature.
CPU to PCI posting	Disabled Enabled	Enables or disables the CPU to PCI write buffers. When enabled, these buffers temporarily store data between writes.
CPU to memory posting	Enabled Disabled	Enables or disables the CPU to DRAM write buffers. When enabled, these buffers temporarily store data between writes.
PCI arbiter priority	System default Pure rotating EISA slots CPU PCI slot 1 PCI slot 2 PCI slot 3	Selects the PCI arbiter priority scheme. Select "System Default" for optimal setting. Select "Pure Rotating" or a device with the highest priority if absolutely needed.
PCI to memory posting	Enabled Disabled	Enables or disables the PCI to DRAM write buffers. When enabled, these buffers temporarily store data between writes.
PCI burst write	Enabled Disabled	Enables or disables PCI memory burst write cycles.
EISA to PCI line buffer	Enabled Disabled	Enables or disables the EISA to PCI line buffer.
Large disk access mode	DOS Other	Select DOS when having MS-DOS installed. Select Other when having another operating system installed. A large disk drive constitutes one that has more than 1024 cylinders, 16 heads, or 63 tracks per sector.

Power Options

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Power savings	Enabled Disabled	Enables or disables the following power management options.
Monitor suspend timer	30 min. 20 min. 10 min. 5 min. 1 min. Disabled	The server's monitor is placed in a suspended state if the keyboard and mouse remains inactive for a specified period of time. Keyboard or mouse activity returns the monitor to a full power state.
Monitor off timer	4 hr. 3 hr. 2 hr. 1.5 hr. 1 hr. Disabled	The server's monitor is placed into an OFF state if the keyboard and mouse remains inactive for a specified period of time. Keyboard or mouse activity returns the monitor to a full power state.

Security Options

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Supervisor password is⁽¹⁾	Not user selectable	Tells whether or not the supervisor's password is enabled or disabled.
User password is⁽¹⁾	Not user selectable	Tells whether or not the user's password is enabled or disabled.
Set supervisor password	Press [Enter]	Enables to set a supervisor password. Setting the supervisor password is needed when intending to allow the user password to be used. When the supervisor later enters his or her password, all user selectable features are accessible. Note: Entering Setup with a supervisor password provides full access to all BIOS Setup utility menus. To delete or disable the Supervisor password, press [Enter] for this field. When prompted for the Supervisor password, leave the field blank and press [Enter].

Security Options (continued)

Menu Fields	Settings	Comments
Set user password ⁽¹⁾	Press [Enter]	Enables to set a user password. This password can only be set if a supervisor password is entered. When the user has entered his or her name but the supervisor is not logged in, only the following information is accessible: Supervisor password is Enabled. User password is Enabled. Set user password [press enter] to enter a user password. Password on boot Enabled/Disabled (which ever is in effect). This option is not allowed to change. Note: Entering Setup with a user password restricts access to certain BIOS Setup utility menus. To delete or disable the User password, press [Enter] for this field. When prompted for the User password, leave the field blank and press [Enter]. Also, this option requires prior setting of the supervisor password.
Password on boot	Enabled Disabled	Enables or disables the enter password on boot option. Note: This option requires prior setting of the supervisor/user password.
Diskette access	Supervisor User	Enables to control who has access to diskette drives. When selecting Supervisor, access to the diskette drive is limited to the supervisor, who must enter his or her password. When selecting User, the diskette can be accessed by entering either the supervisor or the user password. Whatever setting has been chosen, it only becomes functional when a Supervisor Password and a User Password has been set (when User has been chosen for the setting).
Fixed disk boot sector	Normal Write protect	Enables to write protect the boot sector on the hard disk drive.
Network server	Disabled Enabled	This option keeps the server from being accessed during network operation.
System backup reminder	Disabled Daily Weekly Monthly	Enables or disables the system backup reminder message.
Virus check reminder	Disabled Daily Weekly Monthly	Enables or disables the virus check reminder message.

⁽¹⁾ BIOS Setup utility option only

SCU Options Only

Menu Fields	Settings	Comments
Reserved system resources	Not user selectable	Displays the current configuration file and overlay version.

P
R
I
O
R
I
S

L
X

Onboard SCSI device group

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Enable device	Enabled Disabled	Enables or disables the SCSI controller's I/O and memory cycle decoding.
PCI interrupt	None One IRQ required	Enables to set an interrupt for the onboard SCSI controller.
Use default latency timer value	Yes No	Enables to use or not use the minimum latency required by the onboard SCSI controller.
Latency timer value	40h through 38H	Enables to set a specific latency timer in units of PCI clocks for the onboard SCSI controller.

Onboard network device group

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Enable device	Enabled Disabled	Enables or disables the network controller's I/O and memory cycle decoding.
PCI interrupt	None One IRQ required	Enables to set an interrupt for the onboard network controller.
Use default latency timer value	Yes No	Enables to use or not use the minimum latency required by the onboard network controller.
Latency timer value	40h through 38H	Enables to set a specific latency timer in units of PCI clocks for the onboard network controller.

PCI slot 1, 2, and 3 options group

<i>Menu Fields</i>	<i>Settings</i>	<i>Comments</i>
Enable device	Enabled Disabled	Enables or disables PCI slot 1, 2, or 3 I/O and memory cycle decoding.
PCI interrupt	None One IRQ required	Enables to set an interrupt for an installed PCI expansion board.
Use default latency timer value	Yes No	Enables to use or not use the minimum latency required by a PCI expansion board.
Latency timer value	40h through 38H	Enables to set a specific latency timer in units of PCI clocks for a PCI expansion board.

CL-GD5428 VGA graphics controller

Menu Fields	Settings	Comments
CL-GD5428 VGA accelerator	Not installed Graphics: -color and mono -color -mono Text: -color and mono -color -mono	Enables to set the onboard video controller to operate in graphics or text mode.
Vertical retrace interrupt	Interrupt disabled Interrupt enabled	Enables or disables an interrupt for the video's vertical retrace capabilities.

Chapter 3

Service Procedures

Safety Requirements

**WARNING**

Static electricity collects on non-conductors such as paper, cloth, or plastic. A static discharge can be damaging even though you often cannot see or feel it.

The following safety precautions must be observed to insure product and personal safety and prevent damage to circuit boards and/or components:

- ◆ Always wear an ESD wrist strap when handling ESD sensitive material. Be sure it is properly connected.
- ◆ Keep circuit boards and components away from non-conductors.
- ◆ Keep clothing away from circuit boards and components.
- ◆ Keep circuit boards in anti-static bags.
- ◆ Be cautious when AC power is exposed when working on an assembly.
- ◆ Always use an ISOLATION TRANSFORMER when diagnosing any terminals, monitors or power supplies when AC power is applied.
- ◆ Be cautious of very high voltage potentials when working with monitors.

There should be an approved insulating mat (for technician safety) in front of any workbench where monitors, terminals or power modules are being serviced when power is applied.

NOTE Do NOT wear ESD straps when working on terminals, monitors or power supplies when AC power is applied. This is to avoid the hazard of electrical shock.

Recommended Tools

The following tools are needed for servicing Digital PC systems. Note that test equipment must be calibrated.

- ◆ Multimeter (4 1/2 digit)
- ◆ A philips screwdriver
- ◆ An antistatic wrist strap

Other Materials Needed

Cleaning agent should be an all purpose cleaner that is used in-house.

Special Tools Required

None.

Remedial Diagnostic Test Software

- ◆ **QAPLUS/fe**, PC Advanced Diagnostic Software, latest version.
Supplier information:
Diagsoft, Inc.
5615 Scotts Valley Drive, Suite 140
Scotts Valley, California 95066, U.S.A.
Voice : 1-408-438-8247
Fax : 1-408-438-7113
Internet : <http://www.diagsoft.com> (Diagsoft, Inc. homepage)

Recommended Virus Detection and Cleanup Software

- ◆ **F-PROT**, Virus Detection and Cleanup Software, latest version.
Supplier information :
North America, South America, Australia and New Zealand:
Command Software Systems Inc.
Tel: +1-407-575 3200
Fax: +1-407-575 3026

Most of Europe, Africa, Middle and Far East:
Data Fellows Ltd
Paivantaite 8
FIN-02210 ESPOO
FINLAND
tel: +358-0-478 444
fax: +358-0-478 44 599
e-mail: f-prot@datafellows.fi
Internet : <http://www.datafellows.fi> (Data Fellows Ltd. homepage)

ECO/FCO Information

BIOS Version Information

Refer to the Digital DECpc Bulletin Board Support (telephone number: **xx33 92960312**) for the latest information on BIOS upgrades.

Removing the Side Panel

Before removing the side panel, perform the following:

- 1) Turn off power to all external devices connected to server.
- 2) Turn server off.
- 3) Unplug power cord from wall outlet.
- 4) Disconnect power cord and monitor cord from server.



WARNING

You might injure yourself or damage the server if you attempt to remove the side panel before unplugging the ac and monitor power cords.

To unlock the side panels, turn the chassis key clockwise to a horizontal position (see Figure 3-1). To remove the side panels, pull each one toward the rear of the server and then lift away.

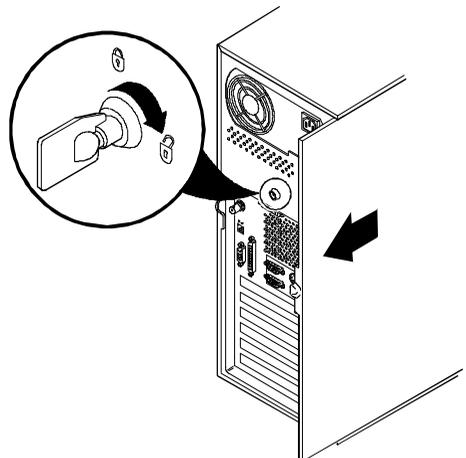
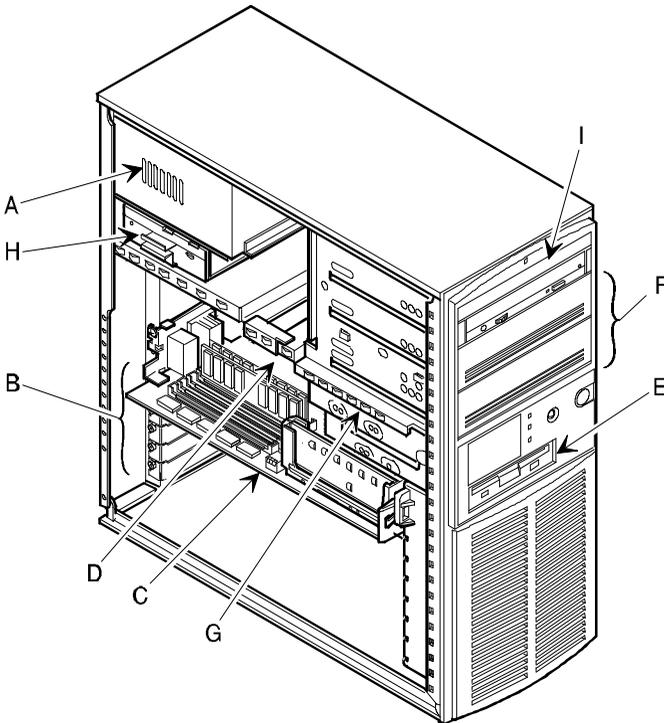


Figure 3 - 1 Unlocking and Removing the Side Panels

DEC00590

Server Components

<i>Legend</i>	<i>Component</i>
A	Power supply
B	EISA and PCI 32-bit local bus expansion slots
C	CPU and memory module (Pentium CPU module shown)
D	Main logic board
E	3½-inch diskette drive
F	Two additional 5¼-inch half-height drive bays
G	Hidden 3½-inch half-height drive bay
H	3½-inch, one-inch high drive bay
I	CD-ROM drive



DEC00591-2

Figure 3 - 2 Server Components

P
R
I
O
R
I
S

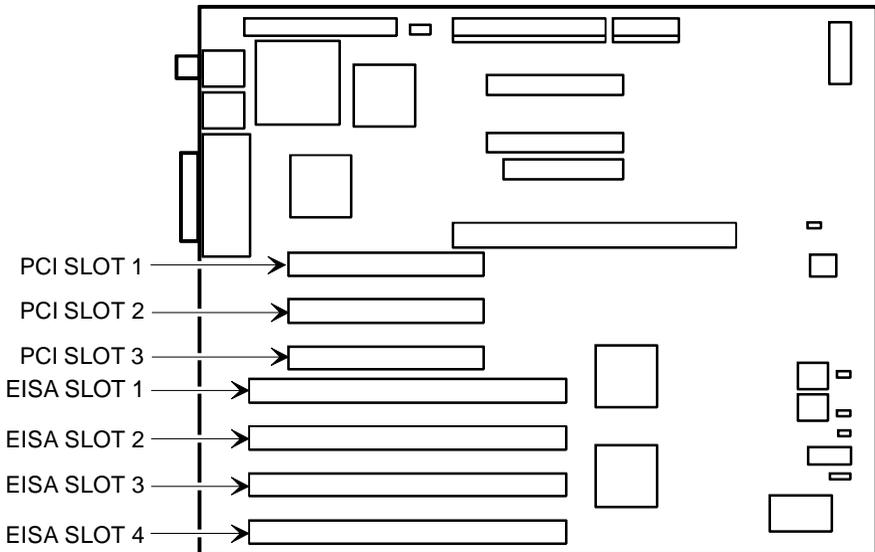
L
X

Expansion Slots

The PRIORIS LX server contains seven expansion board slots for installing up to six EISA or PCI expansion boards. Four of the slots support extended industry-standard 32-bit EISA expansion boards. The remaining three PCI local bus expansion slots support 32-bit PCI local bus expansion boards. This enables the server to deliver improved performance by using a higher speed data path.

<i>Expansion Slot Designation</i>	<i>Description</i>
EISA slots 2, 3, and 4	Supports extended industry-standard 32-bit EISA expansion boards
EISA slot 1	Supports extended industry-standard 32-bit EISA expansion boards Designated as a shared slot with PCI slot 3 ⁽¹⁾
PCI slots 1 and 2	Supports bus mastering 32-bit PCI expansion boards
PCI slot 3	Supports bus mastering 32-bit PCI expansion boards Designated as a shared slot with EISA slot 1 ⁽¹⁾

⁽¹⁾ Only one expansion board can reside in EISA slot 1 or PCI slot 3 at any one time. These slots have to share the expansion slot opening at the rear panel.



DEC00592-4

Figure 3 - 3 PRIORIS LX Expansion Board Slots

Main Logic Board Switches/Jumpers

The following table lists the main logic board switches/jumpers and factory-default settings. Figure 3-4 shows the locations of the main logic board switch/jumper pins.



CAUTION

Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the server chassis. A static discharge from your fingers can result in permanent damage to electronic components.

Main Logic Board Jumper Settings

<i>Feature</i>	<i>Description</i>	<i>Setting</i>
Flash upgrade	Enable Disable ⁽¹⁾	J22/SW1, On J22/SW1, Off ⁽¹⁾
Boot block upgrade	Enable Disable ⁽¹⁾	J22/SW2, On J22/SW2, Off ⁽¹⁾⁽²⁾
Clear password	Normal ⁽¹⁾ Password clear (MFG test)	J22/SW3, Off ⁽¹⁾ J22/SW3, On
DSM installed	Not installed ⁽¹⁾ Installed	J27, jumpered ⁽¹⁾ J27, open

(1) Factory default setting.

(2) Setting this switch to the OFF position prevents corruption of the BIOS boot block when a boot block update is not required.

Main Logic Board Jumper Locations

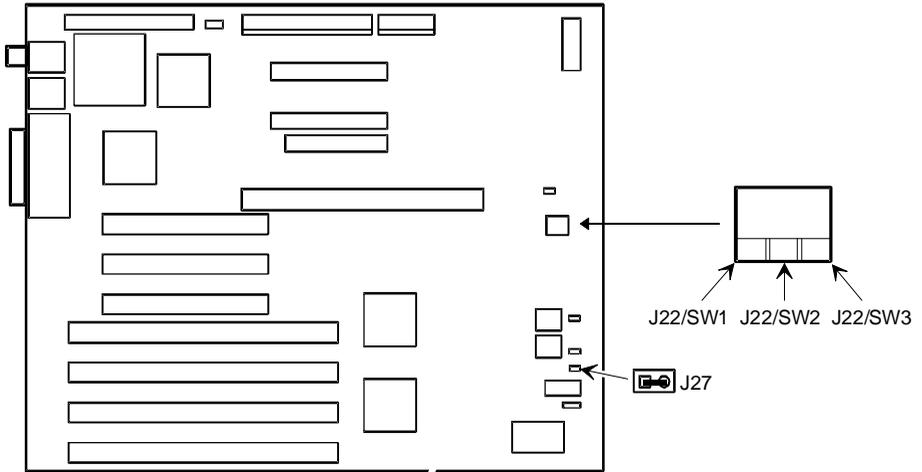


Figure 3 - 4 Main Logic Board Jumper Locations

CPU Module Switches/Jumpers

The following table lists the CPU Module switches/jumpers and factory-default settings. Figure 3-5 and Figure 3-6 show the locations of the CPU Board switch/jumper pins.



CAUTION

Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the server chassis. A static discharge from your fingers can result in permanent damage to electronic components.

i486 CPU Module Switch Settings

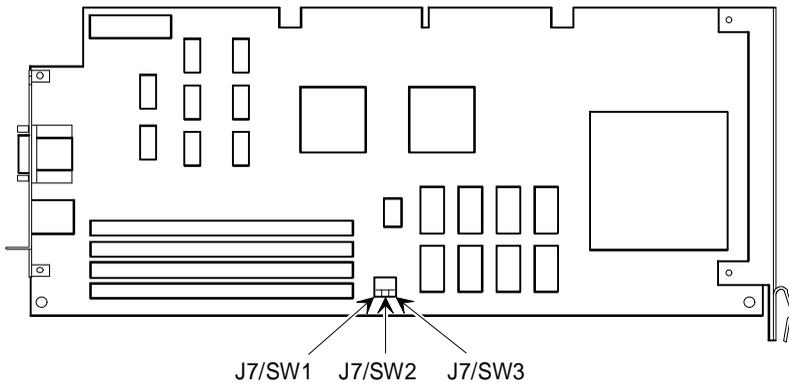
The following table lists the i486 CPU module switches/jumpers and factory-default settings. Figure 3-5 shows the locations of the i486 CPU module switch/jumper pins.

Feature	Description	Setting
CPU clock input	25 MHz	J7/SW1, On
	33 MHz ⁽¹⁾	J7/SW1, Off ⁽¹⁾
Reserved	Reserved	J7/SW2, On J7/SW2, Off
Reserved	Reserved	J7/SW3, On J7/SW3, Off

⁽¹⁾ Factory default setting

NOTE Digital recommends that the factory default settings are left unchanged.

i486 CPU Module Jumper Locations



DEC00607-3

Figure 3 - 5 i486 CPU Module Jumper Locations

Pentium CPU Module Switch Settings

The following table lists the Pentium CPU module switches/jumpers and factory-default settings. Figure 3-6 shows the locations of the Pentium CPU module switch/jumper pins.

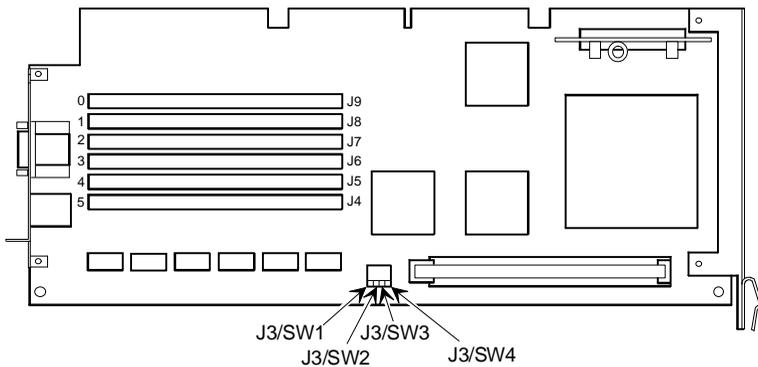


CAUTION

Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the server chassis. A static discharge from your fingers can result in permanent damage to electronic components.

<i>Feature</i>	<i>Description</i>	<i>Setting</i>
Bus/core ratio	2/3	J3/SW1, Off J3/SW2, Off
	1/2	J3/SW1, On J3/SW2, Off
	1/3	J3/SW1, Off J3/SW2, On
	2/5	J3/SW1, On J3/SW2, On
CPU clock input	50 MHz	J3/SW2, Off J4/SW3, Off
	66.6 MHz	J3/SW2, On J4/SW3, Off
	60 MHz	J3/SW2, On J4/SW3, On

Pentium CPU Module Jumper Locations



DEC.00602-3

Figure 3 - 6 Pentium CPU Module Jumper Locations

PRIORIS LX

Computer Memory Configurations

Adding more memory allows the server to run larger, more complicated software and run it quicker. The amount of memory the server supports depends on the type of CPU module that has been installed. When the i486 CPU module has been installed, the server will support up to 128 MB using 32 MB single in-line memory modules (SIMMs) in SIMM sockets 0 through 3 (J3 through J6). When the Pentium CPU module has been installed, the server will support up to 192 MB using 32 MB SIMMs in SIMM sockets 0 through 5 (J4 through J9).

The server is shipped with at least 16 MB of memory. 4 MB, 8 MB, 16 MB, or 32 MB SIMMs can be added.

When installing SIMMs:

- ◆ SIMMs must be installed in pairs. For example, a 32 MB SIMM in socket 0 and a 32 MB SIMM in socket 1. SIMM sizes within sockets can not be mixed.
- ◆ SIMMs must be the same type and speed.
- ◆ SIMMs must have an access time of 70 ns or less.

i486 CPU Module Memory Configurations

<i>SIMM 0</i>	<i>SIMM 1</i>	<i>SIMM 2</i>	<i>SIMM 3</i>	<i>Total</i>
8 MB	8 MB			16 MB
8 MB	8 MB	4 MB	4 MB	24 MB
8 MB	8 MB	8 MB	8 MB	32 MB
16 MB	16 MB			32 MB
16 MB	16 MB	4 MB	4 MB	40 MB
16 MB	16 MB	8 MB	8 MB	48 MB
16 MB	16 MB	16 MB	16 MB	64 MB
32 MB	32 MB			64 MB
32 MB	32 MB	4 MB	4 MB	72 MB
32 MB	32 MB	8 MB	8 MB	80 MB
32 MB	32 MB	16 MB	16 MB	96 MB
32 MB	32 MB	32 MB	32 MB	128 MB

i486 CPU Module SIMM Socket Locations

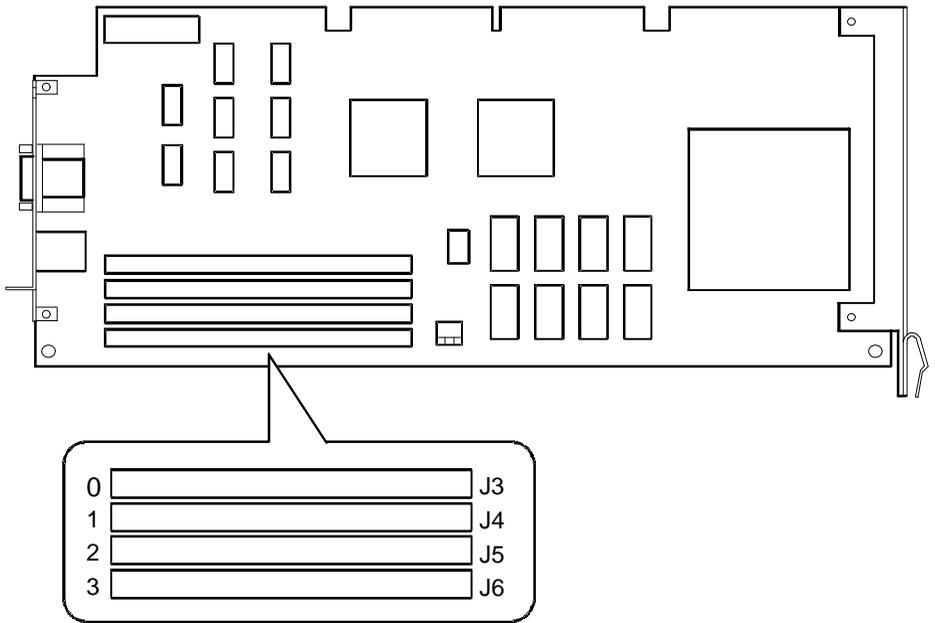


Figure 3 - 7 i486 CPU Module SIMM Socket Locations

Pentium CPU Module Memory Configurations

<i>SIMM 0</i>	<i>SIMM 1</i>	<i>SIMM 2</i>	<i>SIMM 3</i>	<i>SIMM 4</i>	<i>SIMM 5</i>	<i>Total</i>
8 MB	8 MB					16 MB
8 MB	8 MB	4 MB	4 MB			24 MB
8 MB	8 MB	4 MB	4 MB	4 MB	4 MB	32 MB
8 MB	8 MB	8 MB	8 MB			32 MB
16 MB	16 MB					32 MB
8 MB	8 MB	8 MB	8 MB	4 MB	4 MB	40 MB
16 MB	16 MB	4 MB	4 MB			40 MB
8 MB	48 MB					
8 MB	8 MB	16 MB	16 MB			48 MB
16 MB	16 MB	4 MB	4 MB	4 MB	4 MB	48 MB
16 MB	16 MB	8 MB	8 MB	4 MB	4 MB	56 MB
16 MB	16 MB	16 MB	16 MB			64 MB
32 MB	32 MB					64 MB
32 MB	32 MB	4 MB	4 MB			72 MB
16 MB	16 MB	16 MB	16 MB	4 MB	4 MB	72 MB
8 MB	8 MB	16 MB	16 MB	16 MB	16 MB	80 MB
8 MB	8 MB	32 MB	32 MB			80 MB
32 MB	32 MB	8 MB	8 MB	4 MB	4 MB	88 MB
32 MB	32 MB	8 MB	8 MB	8 MB	8 MB	96 MB
16 MB	96 MB					
32 MB	32 MB	16 MB	16 MB			96 MB
32 MB	32 MB	16 MB	16 MB	8 MB	8 MB	112 MB
32 MB	32 MB	32 MB	32 MB			128 MB
32 MB	32 MB	16 MB	16 MB	16 MB	16 MB	128 MB
32 MB	32 MB	32 MB	32 MB	4 MB	4 MB	136 MB
32 MB	32 MB	32 MB	32 MB	8 MB	8 MB	144 MB
32 MB	32 MB	32 MB	32 MB	16 MB	16 MB	160 MB
32 MB	192 MB					

Pentium CPU Module SIMM Socket Locations

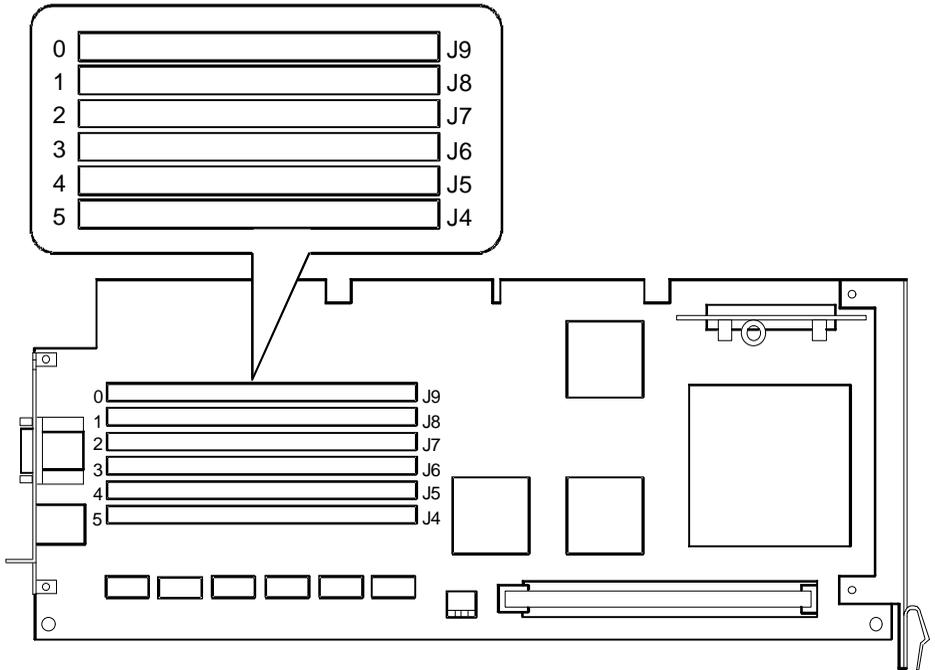


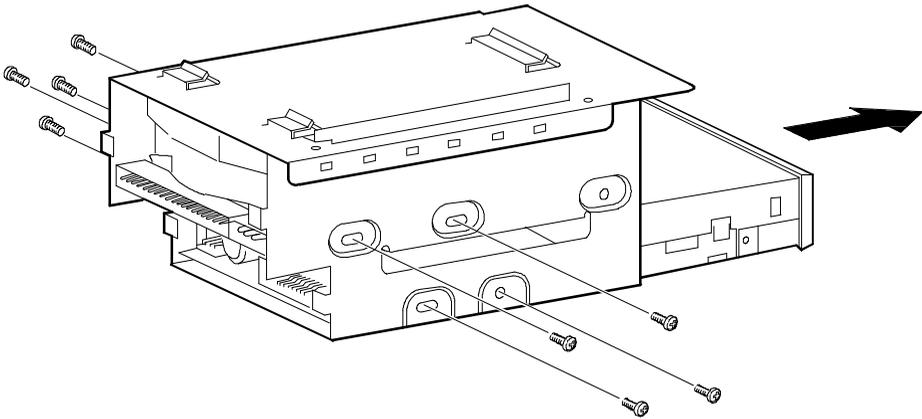
Figure 3 - 8 Pentium CPU Module SIMM Socket Locations

Part Removal and Replacement Procedures

Removing the 3½-Inch Diskette Drive

To remove the 3½-inch diskette drive:

- 1) Turn off external devices and server.
- 2) Disconnect external devices, ac power, and monitor power.
- 3) Unlock and remove side panel.
- 4) Disconnect power and ribbon cables.
- 5) Remove screws securing drive to chassis.
- 6) Slide diskette drive out of the drive bay..



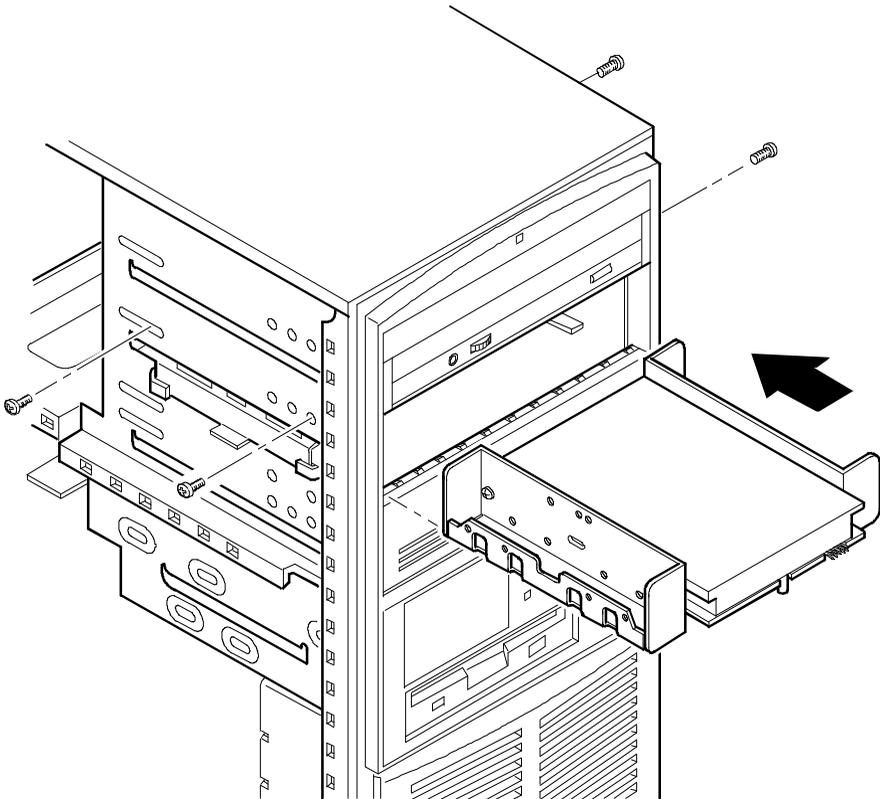
DEC00601

Figure 3 - 9 Removing the 3½-Inch Diskette Drive

Removing Devices in the Upper Drive Bay Area

To remove a device from the upper drive bay area perform the following steps:

- 1) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the server.
- 2) Unlock and remove both side panels.
- 3) Disconnect power and ribbon cables.
- 4) Remove screws securing device to chassis.
- 5) Slide device drive out of the upper drive bay.



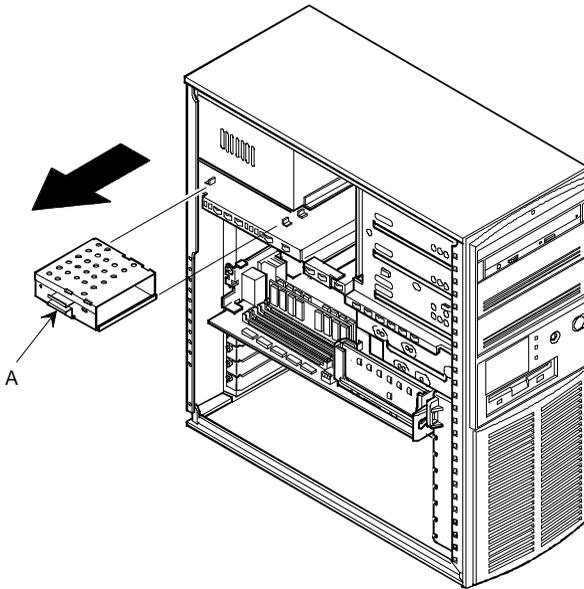
DEC00594-3

Figure 3 - 10 Removing a Device from the Second Drive Bay

Removing a Device in the Rear Drive Bay

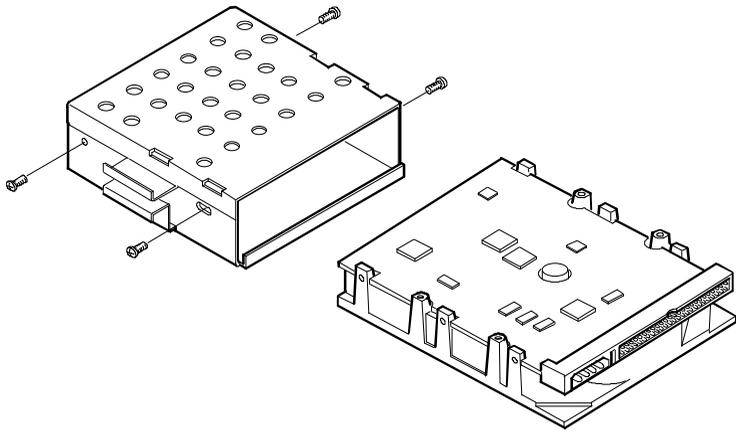
To remove a device in the rear drive bay area perform the following steps:

- 1) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the server.
- 2) Unlock and remove the left side panel.
- 3) While squeezing the two metal tabs together, remove the drive bay assembly from the server (A, Figure 3-11).



DEC00595-2

Figure 3 - 11 Removing the Rear Drive Bay Assembly



DEC00596

Figure 3 - 12 Removing a 3½-Inch Device in the Rear Drive Bay Assembly

Removing Devices in the Lower Drive Bay Area

The lower drive bay area holds two 3½-inch devices, typically a diskette drive and a hard drive. To remove the devices in the lower drive bay area, remove the entire drive bay assembly from the server and then remove the devices from the assy.

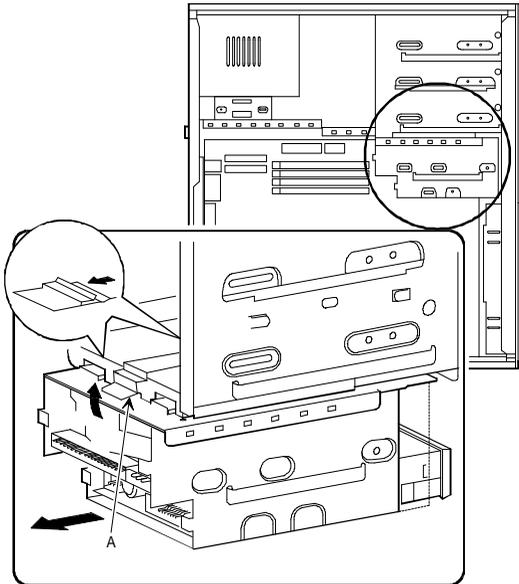
Perform the following steps:

- 1) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet.
- 2) Unplug the power cord and monitor cord from the back of the server.
- 3) Unlock and remove the left side panel.
- 4) Remove the cables from the devices in the lower drive bay.
- 5) Note the position of the cables so that they can be reconnected to the correct devices later.
- 6) Lift up on the retaining clip at the rear top of the drive bay assembly and slide the assembly to the rear of the server (A, Figure 3 - 13).
- 7) Remove a device by removing the screws on the side and sliding the device out of the lower bay assembly.



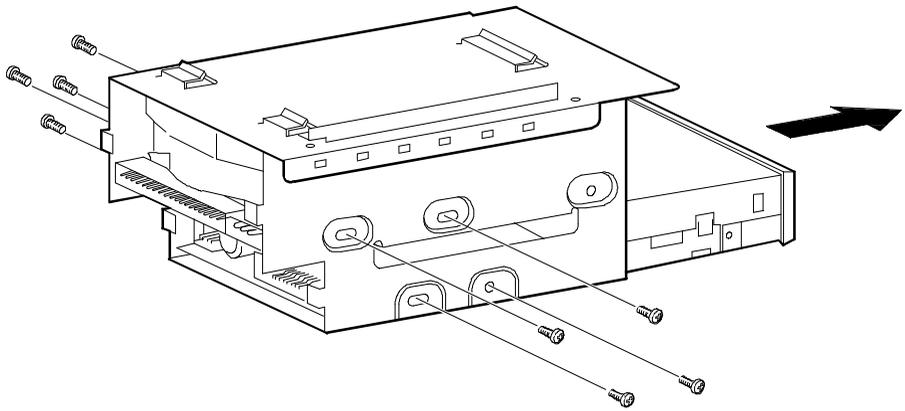
CAUTION

Be sure to support the drive bay assembly so that it does not fall and damage circuit boards.



DEC00600

Figure 3 - 13 Removing the Lower Drive Bay Assembly



DEC00601

Figure 3 - 14 Removing the Lower Drive Bay Devices

Removing the Main Logic Board

To remove the main logic board:

- 1) Turn off external devices and server.
- 2) Disconnect external devices, ac power, and monitor power.
- 3) Unlock and remove side panel.
- 4) Remove all connectors.
- 5) Remove CPU module retaining bracket and CPU module.
- 6) Remove all expansion boards.
- 7) Remove mounting screws.
- 8) Carefully rotate the main logic board out, bottom first.

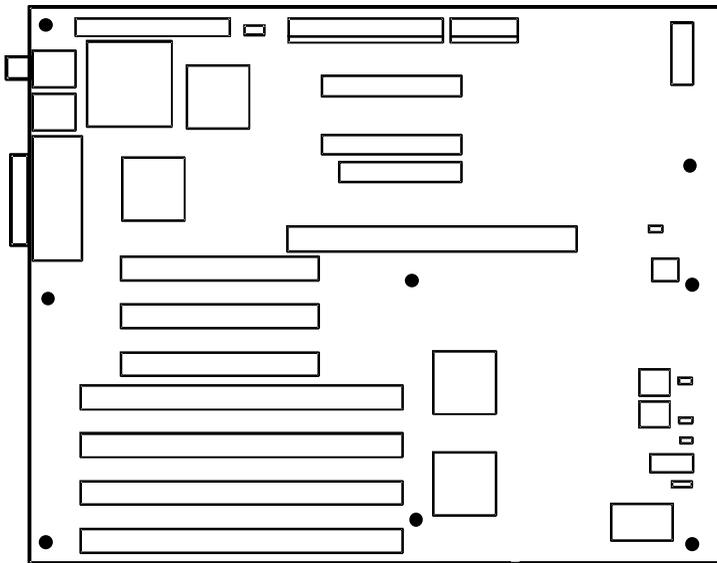
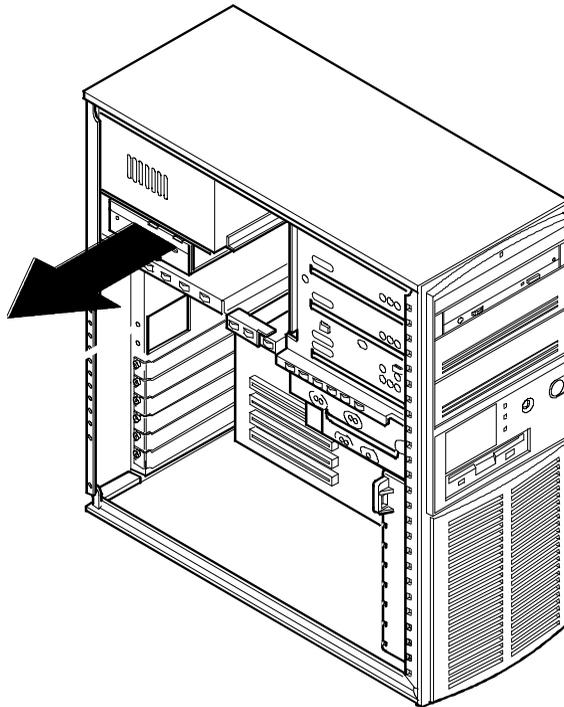


Figure 3 - 15 Removing the Main Logic Board

Removing the Power Supply

To remove the Power Supply:

- 1) Turn off external devices and server.
- 2) Disconnect external devices, ac power, and monitor power.
- 3) Unlock and remove side panel.
- 4) Remove metal shield.
- 5) Remove screws securing power supply to rear of chassis.
- 6) Release power supply from two locking tabs at side of chassis.
- 7) Carefully remove power supply from server.



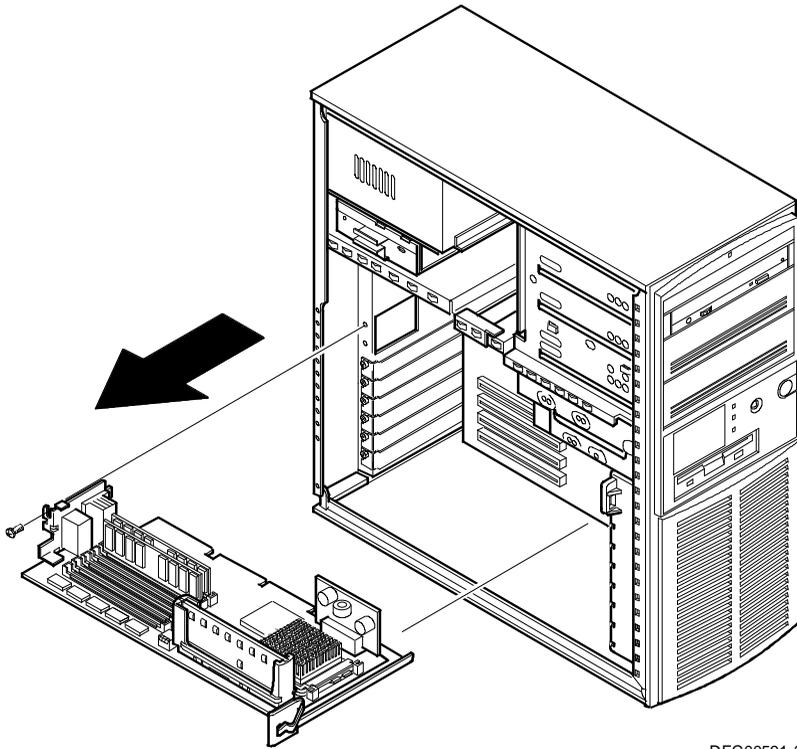
DEC00591-3

Figure 3 - 16 Removing the Power Supply

Removing the CPU Module

To remove the CPU Module:

- 1) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the server.
- 2) Unlock and remove the left side panel.
- 3) Remove the screw that secures the CPU module to the server's rear panel.
- 4) Grasping both ends of the CPU module, carefully remove it from the main logic board.
- 5) Store the CPU module in an anti-static package.



DEC00591-3

Figure 3 - 17 Removing the CPU Module (Pentium CPU Module Shown)

Installation Procedures

Installing a Secondary Cache Module (Pentium CPU Module Only)

The server's Pentium CPU module comes with a 256 KB write-back standard or burst secondary cache module. Standard cache refers to asynchronous cache; "burst" cache refers to synchronous (higher performance) cache. An upgrade to a 512 KB secondary cache module can be made by replacing the existing 256 KB cache module.

To upgrade to a 512 KB cache, perform the following:

- 1) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the server.
- 2) Unlock and remove the left side panel.
- 3) Remove the CPU module and place it on an antistatic surface.
- 4) Holding the 256 KB secondary cache module only by the top edge, carefully lift it away from the CPU module and place it in an antistatic package.
- 5) Holding the 512 KB secondary cache module only by the top edge, carefully insert it into the socket on the CPU module. Make sure it fully seats into the socket.
- 6) Install the CPU module making sure it is firmly seated into the socket.
- 7) Replace and lock the left side panel.
- 8) Reconnect the power cord and monitor cord to the back of the server. Reconnect any external devices and plug the power cord into the wall outlet.
- 9) Reboot and run the SCU.
- 10) From the main menu select `Configure Computer` then select `View` and `Edit Details` to enable the external cache option. Select `Save` and `Exit` to configure the server for the secondary cache.

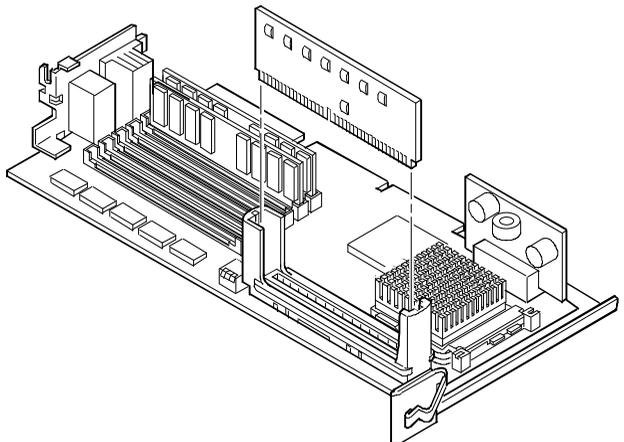


Figure 3 - 18 Installing a Secondary Cache Module

DEC00611

Upgrading Procedures

Upgrading the CPU Module

Installing a higher-performance CPU module increases the capabilities of the server. It also enables upgrades with future CPUs, install additional server memory, and installation of a larger capacity secondary cache module (Pentium CPU module only).

To upgrade the CPU module:

- 1) Remove the CPU module. *Refer to “Removing the CPU module”.*
- 2) Install additional server memory. *Refer to “Computer Memory Configurations”.*
- 3) Install a secondary cache module (Pentium CPU module only). *Refer to “Installing a Secondary Cache Module”.*
- 4) Prior to installing an upgraded or new CPU module, *refer to “CPU Module Switch/Jumper settings”* to see if any configuration switches need to be set.
- 5) Install the CPU module.
- 6) Make sure the metal bracket at the right-side of the CPU module is firmly seated against the plastic fan housing.
- 7) Reboot and run the SCU.
- 8) From the main menu select `Configure Computer` and then `View` and `Edit Details`.
- 9) Select `Save` and `Exit` to configure the server for the CPU module.

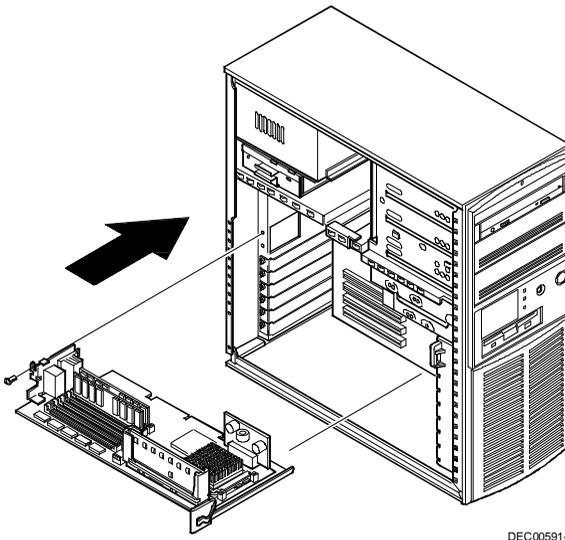


Figure 3 - 19 Upgrading the CPU Module (Pentium CPU Module Shown)

DEC00591-4

Upgrading the CPU

The CPU module is equipped with a ZIF socket (Socket 7 type) capable of supporting higher performance Pentium processors.

To install a higher performance CPU:

- 1) Remove the CPU module.
- 2) Place the CPU module on an anti-static surface.
- 3) Lift up on the release lever to release the CPU.
- 4) Remove the CPU, noting its pin 1 orientation (A, Figure 3-20).
- 5) Install the new CPU.
- 6) Make sure pin 1 on the CPU is aligned with pin 1 on the ZIF socket. Pin 1 is located at the notched end of the CPU (A, Figure 3-21).
- 7) Return the release lever to its original position.
- 8) Refer to Chapter 3, "CPU Module Jumper Settings" to see if any configuration switches need to be set.
- 9) Install and secure the CPU module to the main logic board.

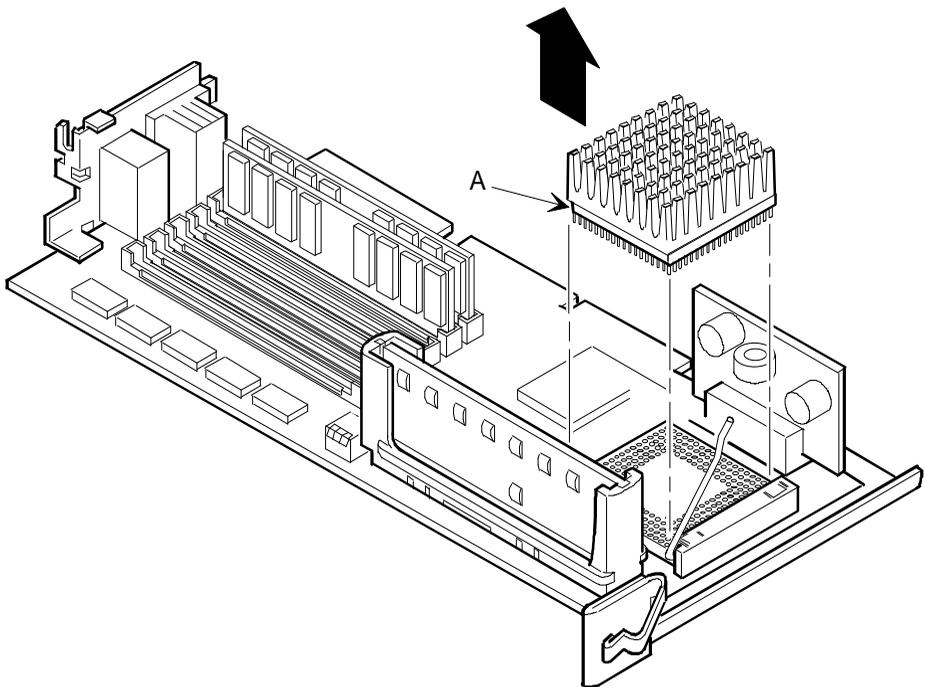
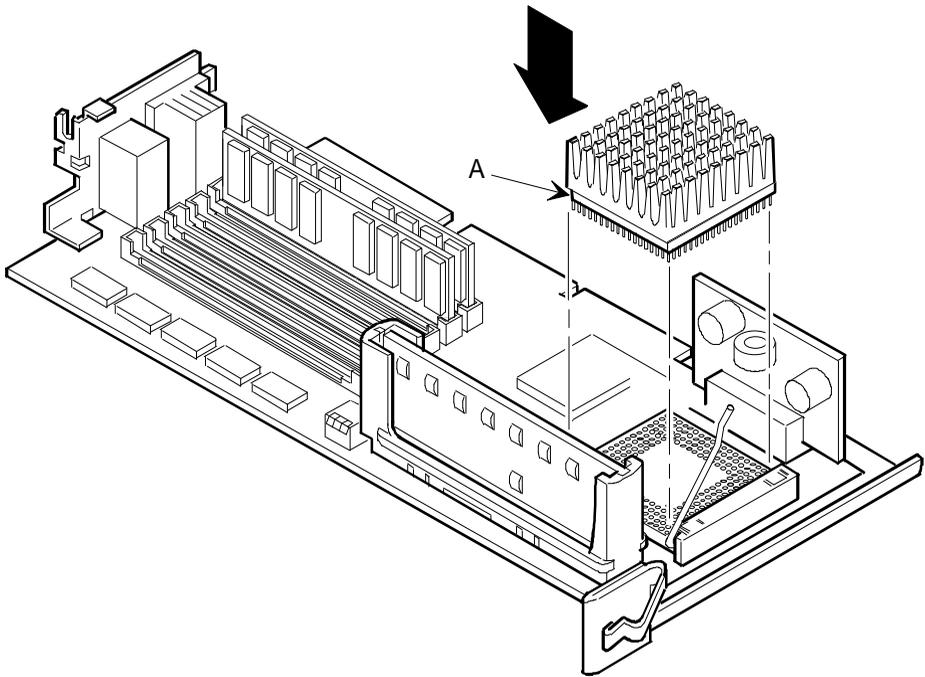


Figure 3 - 20 Releasing the CPU

DEC00606-2



DEC00606-2

Figure 3 - 21 Installing a New CPU

Replacing the Server Battery

The server battery runs the server clock and retains any setup information when it is turned off. If the server ever fails to retain the correct date, time, or configuration settings when it is turned on, replace the server's battery.

To replace the battery, perform the following steps:

- 1) Record the server's configuration settings using the SCU.
- 2) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the server.
- 3) Unlock and remove the left side panel.
- 4) Remove the battery.
- 5) Install the new battery.



CAUTION

Make sure pin 1 on the battery is correctly aligned with the pin 1 location on the socket (A, Figure 3-22). The pin 1 location on the battery is designated by a white dot in the lower left corner of the battery. Incorrect installation may cause faulty server operation.

- 6) Replace and lock the left side panel.
- 7) Reconnect the power cord and monitor cord to the back of the server. Reconnect any external devices and plug the power cord into the wall outlet.
- 8) Reboot and run the SCU and configure the server using the recorded configuration settings from step 1.

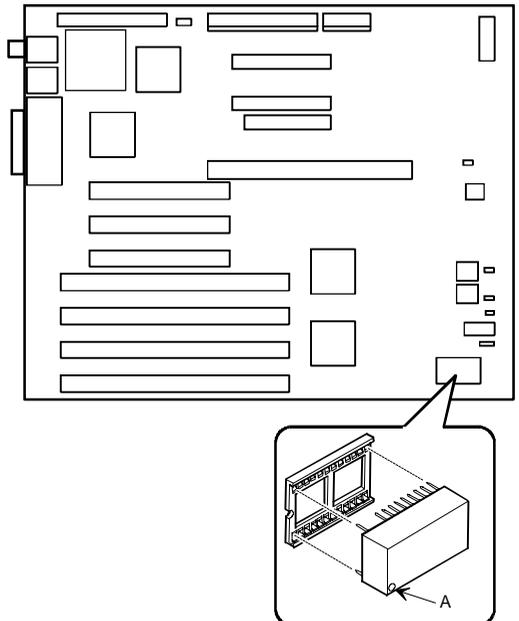


Figure 3 - 22 Replacing the Server Battery

DEC00592-3

Connecting Devices

The data cable is usually a ribbon cable. Figure 3 - 23 shows a cabling configuration using one diskette drive. Figure 3-24 shows a cabling configuration using one primary IDE drive. Figure 3-25 shows a cabling configuration for two SCSI devices.

NOTE Be sure the cable is connected with the correct orientation. Most cables and sockets are keyed so that they cannot be connected backwards. If the cable or drive is not keyed, connect pin 1 of the cable to pin 1 of the socket.

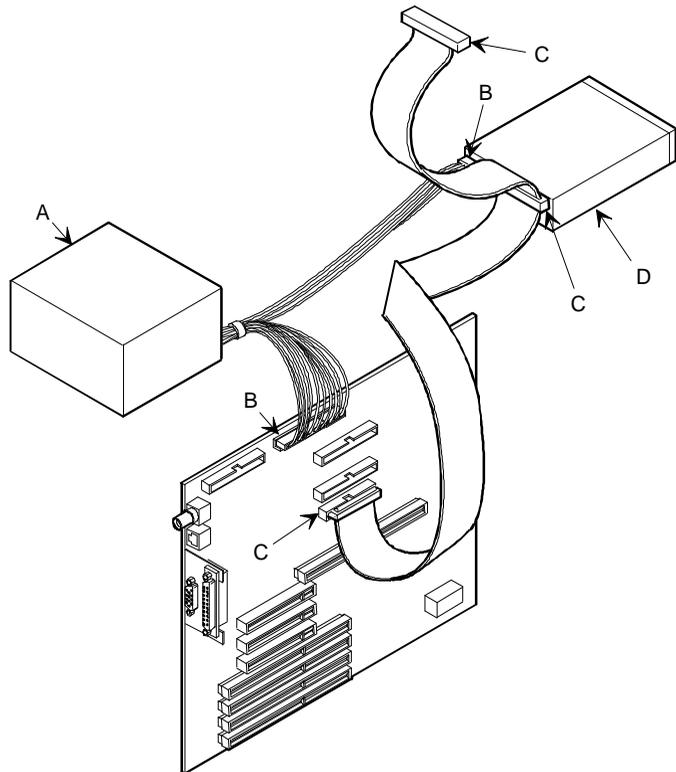
Pin 1 of the cable is on the edge with the colored stripe. Pin 1 of the socket should be marked number "1" at one end of the socket or with a number "1" printed on the circuit board near one end of the socket.

To connect any device, perform the following:

- 1) Connect the data cable to the device.
- 2) Connect a power cable to the device. Use one of the 4-pin connectors from the power supply.
- 3) If necessary, secure the device with two screws on each side. Use the screws that came with the device.
- 4) If the device is an internal device that has no front panel and is installed in the upper drive bay area, replace the plastic filler panel.
- 5) Replace and lock both side panels.
- 6) Connect the power cord and monitor cord to the back of the server. Connect any external devices and plug the power cord into the wall outlet.
- 7) Run the SCU to reconfigure the server for diskette or IDE devices.
- 8) Run the SCSI configuration utility to reconfigure the server for SCSI devices.

Diskette Drive Connections

<i>Legend</i>	<i>Component</i>
A	Power supply
B	Power connections
C	Diskette drive connections
D	Diskette drive



DEC00597-2

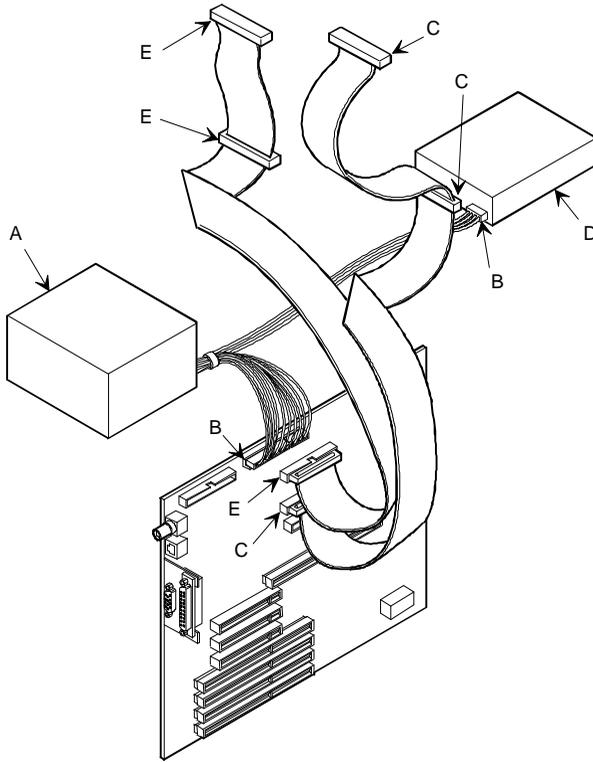
Figure 3 - 23 Diskette Drive Data Cable Connections

P
R
I
O
R
I
S

L
X

Primary and Secondary IDE Drive Data Cable Connections

Legend	Component
A	Power supply
B	Power connections
C	Primary IDE drive connections
D	Primary IDE hard drive
E	Secondary drive connections



DEC00597-3

Figure 3 - 24 Primary and Secondary IDE Drive Data Cable Connections

SCSI Configuration Guidelines

The PRIORIS LX Server includes an onboard Adaptec AIC-7850 SCSI-2 controller. The AIC-7850 controller connects directly to the PCI local bus and supports up to seven industry-standard fast, narrow (8-bit), 50-pin SCSI-2 devices. The server has been supplied with a standard 50-pin SCSI ribbon cable installed at the factory.

Additional SCSI devices can be added to the server by using an EISA- or PCI-based SCSI controller installed in an available expansion slot in conjunction with an external SCSI expansion box.

The server configuration, SCSI controller, and all SCSI devices must work together for optimum performance.

Use the following guidelines to configure the server and all SCSI devices:

- ◆ Each SCSI device (including the SCSI host adapter) must be configured with a unique ID number. The onboard SCSI controller defaults to ID 7. The SCSI CD-ROM drive defaults to ID 6. Use the remaining IDs (0-5) to configure hard disk drives and other SCSI devices. Hard disk drives should be configured to start with SCSI ID 0 and the lower ID numbers.
- ◆ The last physical SCSI device on each end of the SCSI bus must be terminated. Only use SCSI devices without terminators. If the SCSI device came with a built-in terminator installed, remove or disable the terminator from the device before completing the installation.

NOTE The server uses a single-ended actively terminated cable. Use only the SCSI cable supplied with the server.

Refer to the SCSI device's manufacturer documentation for terminator locations.

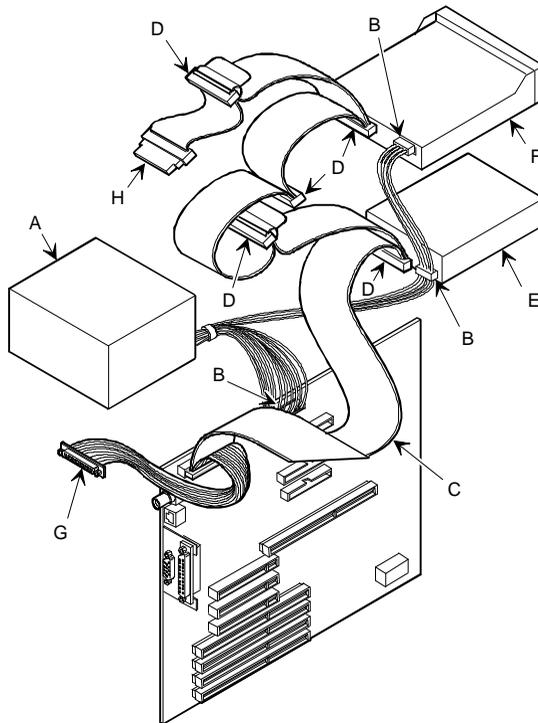
- ◆ The server is supplied with a fast, narrow (50-pin) connector cable assembly. The CD-ROM is connected to this cable leaving four connectors for internal drives.

NOTE This cable does not support wide (68-pin) SCSI devices. A separate wide adapter must be added to the server to support wide SCSI devices.

- ◆ SCSI device drivers are required to operate the SCSI devices, refer to the Adaptec 7800 Family Manager's Set or the EZ-SCSI documentation for installation procedures.
- ◆ The Adaptec AIC-7850 onboard controller includes a SCSI configuration utility, enabling changes of host controller settings, assigning SCSI IDs, and performing low-level formatting on new SCSI devices.
- ◆ To start the SCSI configuration utility:
- ◆ Press Ctrl + A when the BIOS banner appears during the boot process.
- ◆ If the server boots from a disk drive other than SCSI, make sure all SCSI device drivers are installed on that disk drive. SCSI devices can be used with an IDE drive only if the IDE drive is configured as drive C.

SCSI Cable Connections

Legend	Component
A	Power supply
B	Power connections
C	Internal SCSI cable (narrow)
D	SCSI connectors (narrow)
E	SCSI hard disk drive
F	CD-ROM drive
G	External SCSI connector
H	SCSI cable terminator



DEC00697-4

Figure 3 - 25 SCSI Cable Connections

Connecting an External Storage Box

Use the SCSI connector at the rear of the server to connect an external storage box. To connect an external storage box, follow these instructions:

- 1) Turn off the server. Disconnect any external devices and unplug the power cord from the wall outlet. Unplug the power cord and monitor cord from the back of the server.
- 2) Connect the external storage box to the SCSI connector at the rear of the server.
- 3) Make sure the SCSI bus is properly terminated.
- 4) Refer to “*SCSI Configurations Guidelines*” provided earlier in this chapter.
- 5) Reconnect the power cord and monitor cord to the back of the server. Reconnect any external devices and plug the power cord into the wall outlet.
- 6) Connect power to the external storage box.
- 7) Reboot and run the SCSI configuration utility to disable the onboard termination or reconfigure the SCSI devices.

External SCSI Bus Guidelines

- ◆ Make sure that the selected SCSI addresses for the external SCSI devices do not conflict with other devices in the server.
- ◆ Make sure that the external SCSI bus is terminated properly.
- ◆ For proper operation, the total length of the SCSI cable must not exceed 3 meters (9.84 ft) this includes the cable inside the server, the cable from the server to the external storage box, and the cable inside the external storage box.
- ◆ Use only a high-density 50-pin SCSI-2 external connector.

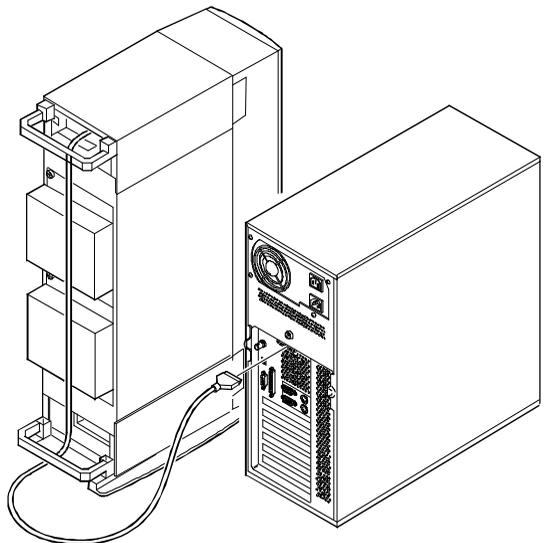


Figure 3 - 26 Connecting an External Storage Box

DEC00599

Chapter 4

Troubleshooting

The following pages provide initial troubleshooting procedures and tables listing specific problems, probable causes, and recommended actions to take if the computer fails after configuration or after installing optional hardware or software.

Refer to the documentation supplied with additional options when experiencing problems with specific installed options.

Initial Troubleshooting

Follow these general procedures to troubleshoot the PRIORIS LX Server:

- ◆ Press [Ctrl] + [Alt] + [Del]. If the computer fails to boot, turn it off, wait until all hard disk drives are spun down completely, and then turn it back on.
- ◆ If the POST detects an error refer to “*Computer Messages*” and take the appropriate steps to correct the problem. After the problem has been resolved, restart the computer.
- ◆ Run the BIOS Setup utility.
- ◆ Make sure all necessary changes have been made to the CONFIG.SYS and AUTOEXEC.BAT files
- ◆ Make sure all necessary video, printer, and application device drivers are properly installed.
- ◆ Ensure that all cables and connections are secure.
- ◆ Run the *QAPLUS/fe* advanced diagnostic software.
- ◆ If these steps do not identify and/or correct the problem, perform the specific troubleshooting procedures appropriate to the circumstances.

NOTE If you need to return a failed component, pack it in its original container and return it to Digital for service.

Fill in the appropriate fields of the Part Exchange Form with the relevant error information!!

POST Execution Messages

The following messages appear at the bottom of the screen during POST execution:

<i>Message Number</i>	<i>Description</i>
230	Unexpected interrupts test
220	Shadow ROMs
210	Test RAM between 512K and 640K
200	Extended memory test
190	Set cache registers
180	Cache configuration
170	Real -time clock test
160	Keyboard test
150	Initial hardware interrupt
140	Co-processor test
130	Serial ports test
120	Parallel ports test
110	Initiate onboard SIO
100	Mouse test
90	Testing diskette drives
80	Testing hard disk drives
30	Setup power management
20	Enable IRQs
10	Setting time of day

Beep Codes

When POST finds an error and cannot display a message, the server's speaker emits a series of beeps to indicate the error and places a value in I/O port 80h. During POST, if the video configuration fails or if an external ROM module fails a checksum test, then the server beeps three times (one long beep, and two short beeps).

The following table lists other fatal errors and their associated beep codes. Each code represents the number of short beeps that are grouped together. Fatal errors (errors that lock up the server) are generally the result of a fault in the main logic board or some other add-on component (SIMM, BIOS, server battery, etc.).

<i>Beep Code</i>	<i>Error</i>
2-2-3	BIOS ROM checksum
3-1-1	Test DRAM refresh
3-1-3	Test keyboard controller
3-4-1	Test 512K base address lines
3-4-3	Test 512K base memory
2-1-2-3	Check ROM copyright notice
2-2-3-1	Test for unexpected interrupts

POST and Boot Messages

The POST displays messages to alert in case of errors in hardware, software, and firmware or to provide operating information about the computer.

Each time the POST displays a message on screen, the computer's speaker beeps twice. If an error occurs before the monitor is initialized, specific beep codes sound to alert in case of a problem. The table below lists a general grouping of system messages arranged by the POST countdown number. In addition, each message is accompanied by text describing the message and in most cases, a recommended solution to the problem.

NOTE *Italics* indicate variable parts of a message such as memory addresses, hexadecimal values, and so on. These messages can differ at each occurrence.

Message	Description/Solution
<i>nnnn</i> Cache SRAM Passed	Where <i>nnnn</i> is the amount of server cache (in kilobytes) that tested successfully.
Diskette drive A error Diskette drive B error	Run the SCU. Check all connections.
Entering SETUP	BIOS Setup utility runs.
Extended RAM Failed at offset: <i>nnnn</i>	Extended memory failed or configured incorrectly. Make sure SIMMs are installed correctly. Run the SCU and restore all settings to original values.
Extended RAM Passed	Where <i>nnnn</i> is the amount of extended memory (in kilobytes) that tested successfully.
Failing Bits: <i>nnnn</i>	<i>nnnn</i> is a map of the bits at the RAM address which failed the memory test. Run the SCU and restore all to original values.
Fixed Disk 0 Failure Fixed Disk 1 Failure Fixed Disk Controller failure	Run the SCU. Check all connections.
Incorrect Drive A type - run SETUP Incorrect Drive B type - run SETUP	Diskette drive A and/or B not correctly identified in the SCU. Run the SCU and properly identify diskette drive A and/or B.
Invalid NVRAM media type	NVRAM access failed. Run the SCU and restore all settings to original values.
Keyboard controller error Keyboard error Keyboard locked - Unlock key switch	Check the keyboard connection. If the connection is secure, the keyboard or keyboard controller might have failed.
Monitor type does not match CMOS - Run SETUP	Run the SCU and set the correct monitor type.

POST and Boot Messages (continued)

Message	Description/Solution
Operating system not found	The operating system cannot be found on drive A or drive C. Run the SCU and correctly identify drive A or drive C. Correctly install the operating system. Refer to the supplied operating system documentation.
Parity check 1 <i>nnnn</i> Parity check 2 <i>nnnn</i>	Parity error found in the server bus. The BIOS attempts to locate the address and display it on the monitor screen. Run the SCU and restore all settings to original values.
Press <F1> to resume, <F2> to Setup	This message appears after any recoverable error message. Press <F1> to reboot or <F2> to enter the BIOS Setup utility to make any necessary changes.
Real time clock error	Real-time clock failed BIOS test. Replace real-time clock (battery) and then run the SCU to restore previous configuration information.
Shadow RAM Failed at offset: <i>nnnn</i>	Shadow RAM failed. Run the SCU and disable failed shadow memory region.
<i>nnnn</i> Shadow RAM passed	Where <i>nnnn</i> is the amount of shadow RAM (in kilobytes) that tested successfully.
System battery is dead - Replace and run SETUP	Replace the battery and then run the SCU to restore previous configuration information.
System BIOS shadowed	This indicates that the server's BIOS was successfully copied to shadow RAM.
System cache error - Cache disabled	RAM cache failed. Run the SCU and restore all settings to original values.
System CMOS checksum bad - run SETUP	Correct the address conflict using the SCU.
System RAM failed at offset: <i>nnnn</i>	System RAM failed. Run the SCU and restore all settings to original values.
<i>nnnn</i> System RAM passed	Where <i>nnnn</i> is the amount of system RAM (in kilobytes) that tested successfully.
System timer error	The server's timer test failed. Run the SCU and restore all settings to original values.
UMB upper limit segment address: <i>nnnn</i>	Displays the address of the upper limit of UMB. This indicates the released segments of the BIOS that can be reclaimed by a virtual memory manager.
Video BIOS shadowed	This indicates that the server's video BIOS was successfully copied to shadow RAM.

Server Troubleshooting

Problem	Possible Cause	Action
No response when the server is turned on	Main logic board jumpers incorrectly set.	Set all appropriate jumpers (<i>Refer to Chapter 3</i>).
	CPU module failed.	Reseat the CPU module. If the problem still persists, replace CPU module.
	CPU module switch setting incorrectly set.	Make sure the proper switch setting is correctly set. <i>Refer to Chapter 3 "CPU Module Switches/ Jumpers" for switch location and settings.</i>
	Power supply failed.	Replace Power supply.
Power is on, but there is no screen display	Main logic board failed.	Replace Main logic board.
	Brightness and contrast controls are not correctly set.	Adjust the brightness and contrast controls.
	Monitor cable is incorrectly installed.	Check all monitor connections.
	Incorrect VGA drivers installed.	Install the correct VGA drivers.
The server is on, but the network does not start	Video controller failed.	Replace Video controller.
	Power management features enabled.	Press any key on the keyboard to wake-up the monitor.
	Network cable not connected.	Connect the network cable.
	Server did not connect to the network.	Make sure the sign-on script is correct Onboard ethernet controller disabled. Run the SCU and enable the onboard ethernet controller.
The server is on, but the network does not start	A server resource conflict exists with an installed expansion board.	Run the SCU to resolve all resource conflicts. <i>Refer to Chapter 2 "SCU Setup Options" for information on running the SCU.</i>
	Main logic board failed.	Replace Main logic board.

PRIORIS LX

Server Troubleshooting (continued)

Problem	Possible Cause	Action
Server operates incorrectly after installing optional expansion board	<p>Expansion board installed incorrectly.</p> <p>Did not run SCU to configure expansion board after installation.</p> <p>Did not install CFG file for expansion board.</p> <p>Expansion board has failed.</p>	<p>Reinstall following expansion board installation instructions.</p> <p>Run the SCU to properly configure expansion board. <i>Refer to Chapter 2 "SCU Setup Options".</i></p> <p>Run the SCU and add the CFG file (if necessary).</p> <p>Remove expansion board and reboot. If server boots without errors, replace expansion board.</p>
Server operates incorrectly after installing optional SIMMs on the CPU module	<p>Did not run the SCU.</p> <p>SIMMs installed incorrectly.</p> <p>CPU module installed incorrectly.</p> <p>SIMMs have failed.</p>	<p>Run the SCU.</p> <p>Remove SIMMs and reinstall.</p> <p>Correctly install the CPU module.</p> <p>Replace SIMMs.</p>
Server operates incorrectly after installing secondary cache module on the CPU module	<p>Secondary cache memory installed incorrectly.</p> <p>Secondary cache module failed.</p>	<p>Remove secondary cache memory and reinstall.</p> <p>Replace secondary cache module.</p>
Server fails to retain setup information	<p>Server battery has failed.</p>	<p>Replace server battery (RTC).</p>
Server does not boot from an IDE hard disk drive	<p>IDE drive type incorrect.</p> <p>Onboard IDE interface disabled.</p> <p>Hard disk boot sector is missing.</p>	<p>Run the SCU to identify the correct drive type. See drive type label on drive or refer to drive documentation.</p> <p>Run the SCU and set the IDE controller to "Enabled."</p> <p>For DOS, boot from a DOS diskette then enter the following commands: c: cd\dos fdisk/mbr</p>

Server Troubleshooting (continued)

Problem	Possible Cause	Action
Server does not boot from an IDE hard disk drive	<p>There might be a boot sector virus.</p> <p>Operating system software is not installed on the IDE hard disk drive.</p> <p>IDE hard disk drive is not correctly formatted or the requested partition does not exist.</p> <p>There is no software on the requested partition.</p> <p>IDE hard disk drive jumpers incorrectly set.</p>	<p>Run anti-virus software.</p> <p>Install the appropriate operating system.</p> <p>Format the IDE hard disk drive or partition the IDE hard disk drive using the supplied operating system software. CAUTION: Formatting the IDE hard disk drive will destroy all the data on the drive.</p> <p>Install software on the requested partition.</p> <p>Refer to the supplied IDE hard disk drive kit installation instructions.</p>
No response to mouse activity	<p>Mouse is password protected.</p> <p>Mouse is connected to the keyboard port.</p> <p>Server operation halted.</p>	<p>Enter the mouse password.</p> <p>Power down the server and connect the mouse to the mouse port.</p> <p>Reboot server.</p>
Server does not recognize an internal or external SCSI device	<p>SCSI device jumpers incorrectly set.</p> <p>SCSI ID conflicts.</p> <p>Terminating resistors not removed from the SCSI device.</p> <p>SCSI cable not terminated.</p> <p>SCSI device not plugged in.</p> <p>Hard disk boot sector is missing.</p>	<p>Correct SCSI Device jumper settings.</p> <p>Refer to the supplied kit installation instructions.</p> <p>Remove terminating resistors.</p> <p>Terminate the SCSI cable.</p> <p>Check power and SCSI cables.</p> <p>For DOS, boot from a DOS diskette then enter the following commands: c: cd\dos fdisk/mbr</p>

Server Troubleshooting (continued)

Problem	Possible Cause	Action
Server does not recognize an internal or external SCSI device	There might be a boot sector virus.	Run anti-virus software.
	Onboard SCSI controller disabled.	Run the SCU and enable the onboard SCSI controller option.
	SCSI controller has failed.	Replace SCSI controller.
	SCSI cable incorrectly installed between SCSI controller and SCSI device(s).	Refer to “ <i>SCSI Configuration Guidelines</i> ” in Chapter 3 for cabling information.
	SCSI cable incorrectly installed between SCSI controller and rear panel connector or external SCSI device(s) and rear panel connector.	Refer to “ <i>SCSI Configuration Guidelines</i> ” in Chapter 3 for cabling information.
	SCSI devices not configured.	Run the SCSI configuration utility to properly configure all SCSI devices.
Server does not boot from a SCSI hard disk drive	Server not configured for SCSI hard disk drive operation.	Run the SCU and set the IDE controller option to "Disabled." This disables the onboard IDE interface. Note: If both IDE and SCSI hard disk drives are installed, the server uses the IDE hard disk drive as the boot device.
	SCSI boot hard disk drive not formatted.	Format the SCSI hard disk drive. CAUTION: Formatting the SCSI hard disk drive will destroy all the data on the drive.
	SCSI device drivers not installed or incorrectly installed on the SCSI boot hard disk drive.	Properly install all required SCSI device drivers.
	Operating system software is not installed on the SCSI hard disk drive.	Install the appropriate operating system.
Server does not boot from a SCSI hard disk drive	Requested partition does not exist.	Partition the SCSI hard disk drive and then reload the operating software. Run fdisk following the instructions in the DOS documentation.
	SCSI boot hard disk drive at wrong SCSI address.	Set the SCSI boot hard disk drive to the lowest “primary” SCSI address.

Server Troubleshooting (continued)

Problem	Possible Cause	Action
Server does not boot from a target diskette drive	Onboard diskette controller disabled.	Run the SCU and set the diskette controller option to "Enabled."
	Diskette drive not enabled.	Run the SCU to enable the diskette drive.
	Diskette drive password protected.	Set supervisor password.
Server does not boot from a target diskette drive	Incorrect diskette drive type.	Run the SCU and select the correct drive type.
	Diskette boot option disabled.	Run the SCU and set the proper boot sequence
No response to keyboard commands	Keyboard is password protected.	Enter the keyboard password.
	Keyboard is connected to the mouse port.	Power down the server and connect the keyboard to the keyboard port.
	Server operation halted.	Reboot server.

Disk Drive Troubleshooting

Problem	Possible Cause	Action
IDE/SCSI hard disk drive cannot read or write information	Incorrect disk drive jumper settings.	Refer to the supplied kit installation instructions.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
	IDE/SCSI hard disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
	IDE drive type incorrect.	Run the SCU to identify the correct drive type.
Target diskette drive cannot read or write information	Diskette is not formatted.	Format the diskette.
	Diskette is worn or damaged.	Try another diskette.
	Diskette write protection enabled.	Run the SCU and set the Diskette Write Protection option to "Disabled."

Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator is not on	Monitor is turned off.	Turn on the monitor.
	Power indicator is defective.	Replace Monitor (power indicator).
No screen display	Configuration error.	Run the SCU to configure the server for VGA operation. Set the jumper for VGA operation.
	Monitor brightness and contrast controls are incorrectly set.	Adjust the monitor brightness and contrast controls.
No monitor display while loading Windows video drivers	Monitor type incorrectly set.	Set the correct monitor type.
Distorted, rolling, or flickering screen display, or wrong/uneven color	Monitor incorrectly adjusted.	Adjust accordingly.
	Monitor signal cable incorrectly installed.	Straighten any bent connector pins and then reconnect.
Color monitor displaying monochrome	Server was turned on before the monitor was turned on.	Turn off the server, turn on the monitor, then turn the server back on.
	Video jumper incorrectly set.	Set the jumper for VGA operation.
Monitor fails to switch to high-resolution mode	Appropriate high-resolution video drivers are not installed or incorrectly installed.	Correctly install all appropriate high-resolution video drivers.
Monitor display not centered while loading Windows video drivers	Monitor type incorrectly set.	Set the correct monitor type.

CD-ROM Troubleshooting

<i>Problem</i>	<i>Possible Cause</i>	<i>Action</i>
Cannot access the CD-ROM drive. Error message reading drive x	Device drivers not installed. Accessing wrong drive.	Install the correct device drivers. Make sure the correct SCSI ID is assigned.
Power is on but indicator shows no activity	No disc or tray is open. Cable connections.	Insert a disc and close the tray. Make sure cables are correctly connected.
Disc is spinning but drive is idle	Application software not running.	Run application software.

QAPlus/FE Advanced Diagnostics

Run QAPlus/FE Advanced Diagnostics to:

- ◆ Receive system Information, select SysInfo menu from the main menu.
- ◆ Locate bad chips and run mouse and keyboard tests, select Interact menu.
- ◆ Edit CMOS, select Setup menu.
- ◆ Run tests on components, select Testing menu.

Default testing is No Pause on Errors/Single Pass/No Peripherals/No Error Logging/Test All Components. To change default, select settings under the Testing menu before running tests.

QAPlus/FE Error Messages

Component	Messages	Solution
CPU	Arithmetic Function Failed General Functions Failed Exception Interrupt in Protected Mode Refresh Failure Logic Functions Failed	Reset CPU Replace CPU
Hard disk	Butterfly Cylinder Access Test Failed Cylinder 0 Errors Random Cylinder Access Failed Linear Cylinder Access Failed	Low-level format hard disk Replace disk
Hard drive / controller	Controller Diagnostic Test Failed Questionable Controller Card Hard drives failed	Run Setup, Check connections, Reset controller, Replace controller, Replace disk
Floppy diskette	Media Mismatch Drive Not Ready Write Protected Media Unformatted Media	Use known good diskette Check size and density of diskette Close drive door Remove write protection Format diskette
Floppy drive	Floppy Drives Failed	Check connections, Replace drive
Battery/clock	Clock Stopped Invalid Date RTC Interrupt Failed	Run Setup Replace battery/clock
CMOS	CMOS Clock Test Failed	Change time from Setup menu in QAPLUS
Serial port	COM port failed Serial Chip Error Serial Compare Error Serial Timeout Error	Check COM device Check connections Replace COM device Replace COM device
Video adapter	Video Failed Error in Video Buffer	Replace video adapter Replace video adapter

Chapter 5

Device Mapping

This section provides a series of tables listing mapping and address information related to computer memory and various main logic board devices (keyboard controller, interrupt controller, DMA controller, etc.).

The computer's memory and address locations are allocated at the factory to operate within a standard PC environment. However, due to the number of optional devices and/or expansion boards that are available, sometimes memory and address locations need to be changed. For example, some network expansion boards require a specific memory location. If that location is already allocated, a memory conflict results and the expansion board will not operate as expected. Note that some memory, I/O and interrupt locations can be changed using the BIOS Setup utility.



CAUTION

Before changing any memory or address location, refer to the documentation supplied with the optional device, expansion board, or software application and make sure adequate information is available.

CPU Memory Address Map (Full Range i486,DX2 CPUs)

<i>Range</i>	<i>Function</i>	<i>Notes</i>
0 KB to 512 KB	Main memory	PC compatibility range
512 KB to 1024 KB	Main memory	PC compatibility range (EIAS/ISA memory lower limit)
1 MB to 16 MB	Main memory Memory space gap	EISA/ISA memory upper limit PCI memory hole (4 MB max size) ⁽¹⁾
16 MB to 128 MB	Main memory	i486, DX2/66 upper limit
128 MB to 4 GB	PCI memory	

⁽¹⁾ 16 MB for PRIORIS XL Server.

CPU Memory Address Map (Full Range, 560/566 CPUs)

<i>Range</i>	<i>Function</i>	<i>Notes</i>
0 KB to 512 KB	Main memory	PC compatibility range
512 KB to 1024 KB	Main memory	PC compatibility range (EISA/ISA memory lower limit)
1 MB to 16 MB	Main memory Memory space gap	EISA/ISA memory upper limit PCI memory hole (16 MB max. size) ⁽²⁾
16 MB to 192 MB⁽¹⁾	Main memory	Pentium processor upper limit
192 MB to 4 GB⁽¹⁾	PCI memory	

⁽¹⁾ 128 MB max. for DECpc LPx 560/566
512 MB max. for PRIORIS HX (DP) Series

⁽²⁾ 4MB max. for PRIORIS XL Server

CPU Memory Address Map (Full Range, 575 and higher CPUs)

<i>Range</i>	<i>Function</i>	<i>Notes</i>
0 KB to 512 KB	Main memory	PC compatibility range
512 KB to 1024 KB	Main memory	PC compatibility range (EISA/ISA memory lower limit)
1 MB to 16 MB	Main memory Memory space gap	ISA memory upper limit
16 MB to 384 MB⁽¹⁾	Main memory	Computer memory upper limit
384 MB to 4 GB⁽¹⁾	PCI memory	

⁽¹⁾ 512 MB max. for PRIORIS XL Server
512 MB max. for PRIORIS HX (DP) Series

CPU Memory Address Map (PC Compatibility Range)

<i>Address Range</i>	<i>Function</i>	<i>Size</i>
0000 to 7FFFF	Main memory	512 KB
80000 to 9FFFF	Main/PCI/ISA memory	128 KB
A0000 to BFFFF	PCI/ISA video buffer memory	128 KB
C0000 to C7FFF	Video memory BIOS	32 KB
C8000 to DFFFF	PCI/ISA card BIOS and buffer memory	96 KB
E0000 to EBFFF	ISA/PCI adapter RAM after POST Used by BIOS Setup during POST	64 KB (48 KB if SCSI BIOS enabled) ⁽¹⁾
EC000 to EFFFF	SCSI BIOS (if enabled)	16 KB ⁽¹⁾
F0000 to FFFFF	Planar BIOS memory	64 KB

⁽¹⁾ 32 KB for PRIORIS XL Server

CPU I/O Address Map

<i>Range (hexadecimal)</i>	<i>Function</i>
0000 to 0CF7	PCI I/O space
0CF8	Configuration space enable register
0CF9	Turbo and reset control register
0CFA to BFFF	PCI I/O space
C000 to CFFF	PCI configuration space
D000 to FFFF	PCI I/O space

I/O Address Map

<i>Range (hexadecimal)</i>	<i>Function</i>
060 to 064	Keyboard/mouse controller
0F0 to 0FF	Math co-processor
1F0 to 1F7	IDE controller (if enabled)
278 to 27F	LPT2 (if enabled)
2F8 to 2FF	COM2 (if enabled)
378 to 37F	LPT1 (if enabled)
3BC to 3BE	LPT3 (if enabled)
3F0 to 3F7	Diskette controller (if enabled)
3F8 to 3FF	COM1 (if enabled)

Computer Interrupt Levels

<i>Interrupt Number</i>	<i>Interrupt Source</i>
IRQ1	Keyboard controller
IRQ3	COM2 (if enabled)
IRQ4	COM1 (if enabled)
IRQ6	Diskette drive (if enabled)
IRQ7	LPT1, LPT2, LPT3 (if enabled)
IRQ12	Mouse interrupt
IRQ13	Math co-processor
IRQ14	Hard disk drive (if enabled)

DMA Channel Assignment

<i>Channel</i>	<i>Controller</i>	<i>Function</i>
0	1	Refresh
1	1	Not used
2	1	Diskette controller (if enabled)
3	1	Not used
4	2	Cascade DMA
5	2	Not used
6	2	Not used
7	2	Not used

PCI Configure Space Address Map

<i>Range (hexadecimal)</i>	<i>Function</i>
C0xx	CPU bridge
C1xx	Onboard PCI SCSI (if applicable) ⁽¹⁾
C2xx	EISA/ISA bridge
C6xx	PCI slot 1
C7xx	PCI slot 2
C8xx	PCI slot 3

⁽¹⁾ For PRIORIS HX servers: PCI-to-PCI bridge (PCI slots 4, 5, 6).

Chapter 6

Pass / Fail Criteria

As Final Acceptance Test the following tests should be run to meet the Pass/Fail criteria:

- 1) **Successful Completion of the POST tests.**
- 2) **Successful Completion of the following QAPLUS/fe module tests (one pass):**
 - ◆ System Board (All Tests)
 - ◆ Memory (All Tests)
 - ◆ Video (All Tests)
 - ◆ Hard Disk (All Tests, except: Sequential write/read and Sequential write/random read (**Destructive Tests !!**))
 - ◆ Floppy Disk (All Tests)
 - ◆ Keyboard (All Tests)
 - ◆ COM Ports (All Tests)
 - ◆ LPT Ports (All Tests)
 - ◆ Pointer device (All Tests)
- 3) **Successful Bootstrap of the on the computer-installed Operating System.**

Operating Systems Supported:

- ◆ DOS 6.2
- ◆ Windows 3.1
- ◆ OS/2 Warp 3.0
- ◆ Windows for Workgroups.
- ◆ Windows NT
- ◆ UnixWare 2
- ◆ SCO Unix Server.
- ◆ NeXTStep
- ◆ Novell NetWare 3.12 and 4.1

Remove any software that was put on the hard drive to enable repair of the system before shipping.

When completed carefully clean outside of unit with cleaning solution.

Appendix A

Service Notes

Recommended Tools

The following tools will be needed for servicing Digital PC systems. Note that test equipment must be in calibration.

- ◆ Multimeter (4 1/2 digit)
- ◆ A philips screwdriver
- ◆ An antistatic wrist strap

Other Needed Materials

Cleaning agent should be an all purpose cleaner that is used in-house.

Required Special Tools.

None.

Remedial Diagnostic Test Software.

- ◆ *QAPLUS/fe* , PC Advanced Diagnostic Software, latest version.
Partnumber : 22-00908-06

Recommended Virus Detection and Cleanup Software

- ◆ *F-PROT*, Virus Detection and Cleanup Software, latest version.

Network locations:

North America, South America, Australia and New Zealand:
MINOTR::USER6:[VIRUS.F-PROT]

Europe, Africa, Middle and Far East:
VARDAF::EUROPUB:[VIRUS_SCANNER.F-PROT]

ECO/FCO Information.

BIOS version information.

Refer to the Digital DECpc Bulletin Board Support , for the latest information on BIOS upgrades

Network locations:

North America, South America, Australia and New Zealand:

PCBUHD::DKB300:[WC30.BBSFILES]

Europe, Africa, Middle and Far East:

SUTRA::D6:[PUBLIC].

Appendix B

Useful Information

Related Documentation

<i>Document Titles</i>	<i>Order #'s</i>
PRIORIS LX Quick Reference Guide	EK-A0828-RG
Service Maintenance Manual Spares Catalogue	EK-A0815-SV
Quick Reference Guide Spares Catalogue	EK-A0836-RG
PRIORIS LX Server User's Guide	ER-940WW-UA
PRIORIS LX Server Quick Setup Guide	ER-940WW-IA
Pentium CPU Modules	ER-78XWW-CA
Pentium CPU Modules (Multilingual)	ER-78XWW-CM

On-Line Bulletin Boards

The most current product information and technical support is also available on line. The most current device drivers, Setup diskettes and technical tips can be found on all of these bulletin boards.

◆ *DECpc Bulletin Board Server*

DECpc BBS provides an easy-to-use, menu-driven bulletin board providing on-line access to the latest PC product information, device drivers, shareware and freeware.

For access to the DECpc BBS, dial : **xx33 9260312**

Network Location for ;

North America, South America, Australia and New Zealand
PCBUHD::DKB300:[WC30.BBSFILES]

Europe, Africa, Middle and Far East:
SUTRA::D6:[PUBLIC].

Document Feedback

If you have comments on the contents or layout of this document we highly appreciate your feedback. We will do our best to make this document a valuable support to your service efforts for Digital. Please fill -out the reader feedback form and send or fax it to:

Digital Equipment Parts Center b.v.
Att: MCS Logistics Engineering Call Desk
P.O. Box 6774
6503 GG Nijmegen
Holland

If you have questions about this document please do not hesitate to get in contact with our Call Desk. The number is:

Phone: xx31-24-3529666

Fax: xx31-24-3563106