DIGITAL Server 5100/5200 Series

Service Maintenance Manual

Part Number: ER-B52WW-SM. A01

Digital Equipment Corporation

January 1998

FCC ID: B5XWW1

The FCC wants you to know...

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna

- Increase the separation between the equipment and receiver

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected

- Consult the dealer or an experienced radio/TV technician for help

All external cables connecting to this basic unit need to be shielded. For cables connecting to option cards, see the option manual or installation instructions.

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the radio interference regulations of the Canadian Department of Communications.

Contents

Contents

3
SCU Features

4
Troubleshooting

5
FRU Replacement

Contents

6
Processor Module Upgrades

7
Device Mapping

A
Service Notes

Figures

Contents

Preface **P**

This *Service Maintenance Manual* is a troubleshooting guide that can be used for reference when servicing DIGITAL Servers.

DIGITAL reserves the right to make changes to this *Service Maintenance Manual* without notice. Accordingly, the illustrations and procedures in this document might not apply to all DIGITAL Servers to be serviced since many of the diagnostic tests are designed to test more than one product.

> **CAUTION:** DIGITAL recommends that only A+/DIGITAL Server 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 the component level or make modifications to any printed circuit board. Improper repairs can create a safety hazard. Any indications of component replacement or circuit board modifications might void any warranty or exchange allowances.

Preface
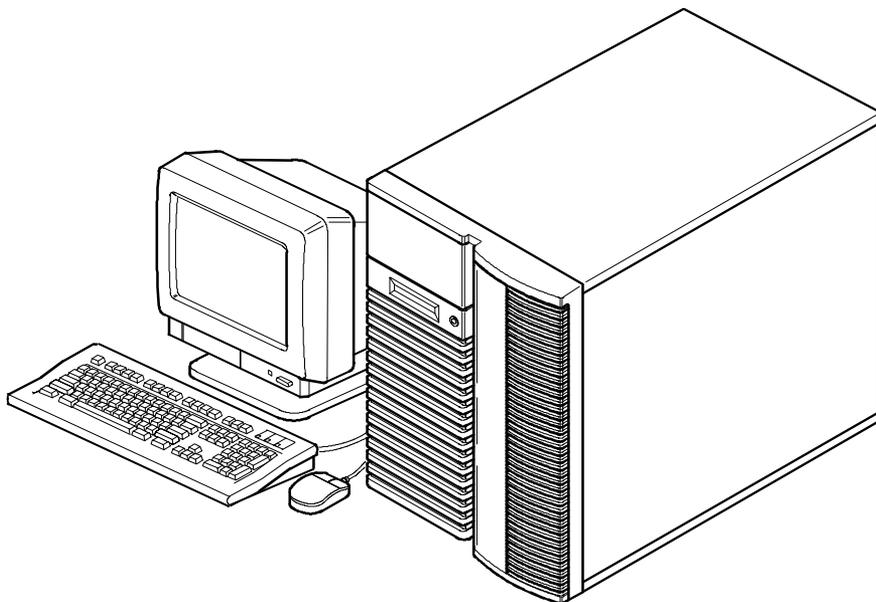
DEC00421

Typical DIGITAL Server 5100/5200

Product Description *1*

Introduction

The DIGITAL Server 5100/5200 is a high-performance, highly-scaleable network and application server featuring the latest in modular processor, and storage technology.

The DIGITAL Server provides support for the following features:

Reliability/Availability

Pentium Pro or Pentium II Processor Module	Pentium Pro processor module. Each Pentium Pro processor operates using either 36-bit SIMMs, 60 ns access time, EDO or Fast Page memory.
	Or
	Pentium II processor module. Each Pentium II processor operates using 168-pin, 72-bit DIMMs, 60 ns access time EDO memory, ECC protected.
Error Correction Code (ECC) Memory	Recovery from single-bit cache and memory errors.
Dual-Channel Storage Backplane	Redundant disk subsystems using integrated SCSI controllers or expansion storage controllers.

Power Supply	The DIGITAL Server ships with one power supply for normal operation. An optional second power supply can be purchased to provide redundant power.
Variable Fan Speed	Automatically adjusts fan speed according to ambient temperature.
Internal Sensors	Monitors internal server temperatures, fan operation, and power supply temperatures and voltages.
Clusters	Supports DIGITAL Clusters for Windows NT for database and file services failover.

Server Expansion

Flexible Memory Architecture	ECC memory supported. Server memory can be upgraded to a maximum of 1 GB using SIMM memory on a Pentium Pro processor module. For Pentium II processor modules, you can upgrade to a maximum of 512 MB using DIMM memory.
Five EISA Expansion Slots and Six PCI Expansion Slots	Accommodates industry-standard expansion boards such as network, Small Computer System Interface (SCSI), Redundant Array of Integrated Disks (RAID), and modems.
Integrated SVGA Video Controller	Supports management and configuration applications locally (on the main logic board) without use of an expansion slot.
Two Integrated SCSI Controllers	Support for narrow, fast wide, and wide Ultra external and internal SCSI devices. Wide Ultra configurations require optional wide Ultra SCSI bus repeaters. Contact an authorized DIGITAL sales representation for more information.

Capacity for 10 Internal SCSI Storage Devices	Accommodates one CD-ROM drive (standard), seven 3½-inch half-height drives in Storage Building Blocks (SBBs), and two narrow (50-pin) half-height, 5¼-inch devices; or one full-height, 5¼-inch device (CD-ROMs or tape drives).
External I/O Ports	Two serial ports and one parallel port to support external options such as a printer, modem, or local terminal.
Wide SCSI Storage Backplane	Supports high-performance drives.
Disk Hot Swap Capability	Allows replacement of SBB disk drives while the server is operating.
Integrated Network Controller/External Network Ports	A DIGITAL Ethernet controller on the main logic board. An Ethernet daughter card provides: one 10/100Base-T (10/100 Mb/s) port, one 10Base-2 (10 Mb/s) port, and one 10Base-5 (AUI) port.

Server Management and Security

Server Diagnostics	Allows local and remote diagnosis of server problems.
Hardware Configuration	Allows local and remote server configuration.
Unique Asset Management	Unique server identifier in non-volatile memory provides easy asset management.
Firmware Upgrade Utility	Upgrades firmware versions.
Operator Control Panel (OCP)	Back-lit, 16-character display for diagnostic and error messages.
Hard Drive Indicator Lights	Provides immediate status information on SBB hard drive activity or failure.
Key Lock	Limits access to the server's internal components.
Interlock Sensor Switches	Automatically turns off server power if either side panel is removed when the server power is on.

Server Configurations

The following rules apply when **Product Family Names** and **Product Model Names** are assigned to DIGITAL Server products. These rules apply to all products developed in the NT Server Business Unit (NTSBU).

Server Naming Guidelines

- All products in a family carry the same name on the nameplate. (i.e. all products in the Entry space will carry the name DIGITAL SERVER 1000)

Family Name	Segment
DIGITAL SERVER 500	SUB ENTRY
DIGITAL SERVER 1000	ENTRY
DIGITAL SERVER 3000	DEPARTMENT
DIGITAL SERVER 5000	APPLICATION
DIGITAL SERVER 7000	ENTERPRISE
DIGITAL SERVER 9000	SUPER ENTERPRISE

- Products in a rackmount chassis will have an R after the Family Name (DIGITAL Server 3000R).

- Product models within a family will be differentiated by the Product Model Name. The Product Model Name will appear on a label on the rear of the product. Specific configurations within a model will carry the same Product Model Name and will be differentiated by the part number.

Product Model Numbering Convention

The following example describes the product model numbering convention:

 DIGITAL SERVER 1234 5678A R

1 = PRODUCT FAMILY NAME (first character of family number)

2 = MAJOR PROCESSOR TECHNOLOGY DIFFERENTIATOR WITHIN THE FAMILY

This number will be assigned to each new platform based on the following matrix. Open numbers will be assigned as new processor technology is introduced. THIS FIELD IS NOT USED FOR SUB ENTRY PRODUCTS.

> 100 = Pentium Pro
> 200 = Pentium II – Slot 1
> 300 = EV5
> 400 = Pentium II – Slot 2
> 500 = EV6
> 600 = OPEN
> 700 = OPEN
> 800 = OPEN
> 900 = OPEN

3,4 = USED TO DIFFERENTIATE MODELS BASED UPON DIFFERENT PROCESSORS WITHIN A PROCESSOR TECHNOLOGY (I.E. CLOCK SPEED, CACHE SIZE) START AT 00 FOR FIRST MODEL AND INCREMENT BY 05 FOR EACH ADDITIONAL MODEL.

5 = CPU TYPE

    BLANK = PENTIUM

    1= PENTIUM PRO

    2 = PENTIUM II/SLOT 1

    3 = PENTIUM II/SLOT 2

    4 = Open/Available for future processors

    5 = Open/Available for future processors

    6 = ALPHA EV56

    7 = ALPHA PCA57

    8 = ALPHA EV6

    9 = ALPHA EV67

6, 7, 8,9 = CPU CLOCK SPEED IN MHZ

A = CPU VENDOR

      INTEL = BLANK

      ALPHA = A

      AMD = K

R = CHASSIS TYPE

      BLANK = STANDARD CHASSIS

      R = RACKMOUNT CHASSIS

Related Material

The following related material is available:

Document or Software Title	Order Number	Description
Service Quick Reference	ER-B52WW-SR (English only)	Provides troubleshooting information that can be used when servicing DIGITAL servers. This manual is a condensed version of the Service Maintenance Manual and is provided in a pocket-size format (4 x 8-inches).
Installation Guide	ER-B52WW-IM (Multilanguage)* ER-B52WW-IJ (Japanese)	Provides information on connecting hardware cables and booting the server. This guide also explains how to use DIGITAL ServerWORKS Quick Launch to install an operating system, create driver and utility diskettes, and view on-line help and support documentation.
System Reference	ER-B52WW-UA (English) ER-B52WW-UJ (Japanese)	Provides information on using the server's configuration utilities, installing peripherals and options, security, and troubleshooting. The System Reference is available on the Quick Launch CD-ROM in English, Spanish, German, Italian, and French.
Quick Reference labels	36-45369-07 (left side panel) 36-45369-08 (right side panel)	Provides an overview of major server components, configuration guidelines, and SCSI cabling information. These labels are located on the inside of the server's side panels.
Warranty and Service Information	ER-PCWAR-CM (Multilanguage)*	Provides warranty information and a listing of phone numbers for technical support.
Ultra SCSI Bus Repeater Module Installation Guide	ER-SBRAA-IA	Describes installation procedures for an Ultra SCSI Bus Repeater Module and configuring Ultra SCSI drives.

* Multilanguage includes: English, French, Italian, German, and Spanish

Document or Software Title	Order Number	Description
DIGITAL ServerWORKS software	QB-4WY9A-SA (Multilanguage)*	Contains ServerWORKS Quick Launch and ServerWORKS Manager software and documentation.
		Quick Launch consists of a bootable CD-ROM disk and Getting Started guide. This program steps the user through the initial server setup and operating system installation.
		ServerWORKS Manager consists of two CD-ROMs and an Overview and Installation Guide and supporting documentation.
Product README and Revision History Information - Quick Launch CD-ROM	Refer to the Quick Launch CDROM in the DIGITAL ServerWORKS software kit	Provides additional product information and product change history.
Option documentation - Quick Launch CD-ROM	Refer to the Quick Launch CDROM in the DIGITAL ServerWORKS software kit	Provides postscript files that can be viewed and printed using Adobe Acrobat Reader software. These files are provided in PDF format on the Quick Launch CD-ROM
Diagnostic Software - Quick Launch CD-ROM	Refer to the Quick Launch CDROM in the DIGITAL ServerWORKS software kit	Contains an advanced set of diagnostic utilities for identifying and correcting problems on the server. The diagnostic software can be used to verify proper hardware installation and isolate intermittent problems that are not detected by the Power On Self Test (POST). Refer to chapter 2 for information on using the diagnostic utilities.
PC Product Support Information Kit	QA-5RJAA-G8 (English only)	Provides all the latest product documentation for all NTSBU mobile, desktop, and server products.

* Multilanguage includes: English, French, Italian, German, and Spanish

NOTE: Refer to Chapter 2 for procedures on how to create diskettes and view documentation from the Quick Launch CDROM.

Latest Product Information and Updates

Listed below is the current product information and update source locations.

Application Server Product Information

Family Name	Model Name	Part Number	Description	Prioris Family Name
DIGITAL Server 5000	DIGITAL Server 5100 1200	FR-B50WW-AX	6200/256 (PP) - KERNAL	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5100 1200	FR-B50WW-AA	6200/256 (PP)- MODEL 1	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5100 1200	FR-B50WW-AC	6200/256 (PP)- RAID	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5100 1200	FR-B51WW-AX	6200/256MP (PP) - KERNAL	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5100 1200	FR-B51WW-AA	6200/256MP (PP) - MODEL 1	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5100 1200	FR-B51WW-AC	6200/256MP (PP) - RAID	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5105 1200	FR-B52WW-AX	6200/512 (PP) - KERNAL	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5105 1200	FR-B52WW-AA	6200/512 (PP) - MODEL 1	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5105 1200	FR-B52WW-AC	6200/512 (PP) - RAID	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5105 1200	FR-B53WW-AX	6200/512MP (PP) - KERNAL	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5105 1200	FR-B53WW-AA	6200/512MP (PP) - MODEL 1	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5105 1200	FR-B53WW-AC	6200/512MP (PP) - RAID	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5200 2266	FR-B56WW-AX	6266/512 (P2) - KERNAL	Prioris HX 6000 Series
DIGITAL Server 5000	DIGITAL Server 5200 2266	FR-B56WW-AA	6266/512 (P2) - MODEL 1	Prioris HX 6000 Series

continued

Family Name	Model Name	Part Number	Description	Prioris Family Name
DIGITAL Server 5000	DIGITAL Server 5200 2300	FR-J2B6W-AA	6300/512 (P2) - KERNAL	N/A
DIGITAL Server 5000	DIGITAL Server 5200 2300	FR-J2B6W-AX	6300/512 (P2) - MODEL 1	N/A
PowerGrade Chip Upgrade	DIGITAL Server 5000 PowerGrade Kit	FR-PCB5U-AA	6200/512 (PP) PowerGrade Chip Upgrade	Prioris HX 6000 Series PowerGrade
PowerGrade Chip Upgrade	DIGITAL Server 5000 PowerGrade Kit	FR-PCB5U-AB	6200/266 (PP) PowerGrade Chip Upgrade	Prioris HX 6000 Series PowerGrade
PowerGrade Board Upgrade	DIGITAL Server 5200 PowerGrade Kit	FR-PCB4U-AE	6266/256 (P2) PowerGrade Board Upgrade	Prioris HX 6000 Series PowerGrade
PowerGrade Chip Upgrade	DIGITAL Server 5000 PowerGrade Kit	FR-PCB5U-AE	6266/512 (P2) PowerGrade Chip Upgrade	Prioris HX 6000 Series PowerGrade
PowerGrade Chip Upgrade	DIGITAL Server 5000 PowerGrade Kit	FR-PCJ2U-AA	6300/512 (P2) PowerGrade Chip Upgrade	Prioris HX 6000 Series PowerGrade
PowerGrade Board Upgrade	DIGITAL Server 5000 PowerGrade Kit	FR-PCJ2U-AB	6300/512 (P2) PowerGrade Board Upgrade	Prioris HX 6000 Series PowerGrade

Updates

Current server utilities and technical support information is available on the Quick Launch CD-ROM disc and the Internet.

For product information, use the address:

```
http://www.windows.digital.com
```

For technical support, use the address:

```
http://www.windows.digital.com/support/support.asp
```

For access directly to the software library for BIOS and driver updates, use the address:

```
http://www.windows.digital.com/~ftp/00-index.stm
```

Server Software and Utilities *2*

Introduction

This chapter describes the utilities supplied with the server. Server utilities include:

- ServerWORKS Quick Launch — This software is used to install a network operating system onto the server. The CD-ROM also contains various drivers and on-line documentation.

- System Configuration Utility (SCU) — This utility is available to configure the server when relocating, adding, or removing EISA/ISA/PCI expansion boards and when changing the server's factory-defined settings. The SCU is available on the Quick Launch CD-ROM.

- RAID Configuration Utility — This utility is available for RAID-ready servers only. This utility is available to configure the RAID array. The RAID configuration utility is available on the Quick Launch CD-ROM.

- BIOS Upgrade Utility — This utility is available to update or restore the server's BIOS. The BIOS Upgrade Utility is available on the Internet.

- SCSI*Select* Utility — This utility allows you to configure and view settings of the onboard SCSI controller and SCSI devices. The SCSI*Select* Utility is available each time you boot your server.

- Diagnostics — This utility is used to verify server operation. The diagnostics utility is available on the Quick Launch CD-ROM.

ServerWORKS Quick Launch

ServerWORKS Quick Launch is used to install the server's Network Operating System (NOS). In addition to providing quick and seamless NOS installation, Quick Launch also provides drivers, documentation, and the ability to make diskettes of utilities such as diagnostics. For more information, refer to the *Quick Launch Getting Started* Guide.

Creating Diskettes and Viewing On-line Documentation

Use the following procedure to create diskettes using the Quick Launch CD-ROM and to view on-line product documentation.

1. Power on your server and boot the ServerWORKS Quick Launch CD-ROM.

2. Select the "User Documentation" button to view on-line product documentation.

3. From the Quick Launch Main Screen, select the "Installations & Utilities" button and then the Utility tab to create driver and utility diskettes.

4. Insert a DOS-formatted diskette into drive A, and choose the utility or driver you wish to copy and select Continue.

Repeat this procedure for all the utilities and drivers you wish to copy.

System Configuration Utility (SCU)

The server was pre-configured at the factory using the System Configuration Utility (SCU). This means that the server's hardware (Pentium Pro or Pentium II processors, memory, cache, mass storage devices, expansion boards, etc.) has been identified and configured for optimum performance. If you need to make changes to this configuration, DIGITAL recommends that you use the SCU along with the information provided in this section.

Refer to "Starting the SCU" described later in this chapter.

Refer to the ServerWORKS Quick Launch Getting Started Guide and the README.TXT file, which is located on the Quick Launch CD-ROM, for additional information.

When to Run the SCU

Always run the SCU each time you add, remove, or relocate ISA, PCI and/or EISA expansion boards to reconfigure server resources (IRQs). You should also run the SCU if the main logic board has been changed or after adding memory to an installed processor module.

If the main logic board has been changed or if a processor module is added, run the SCU (select the option "Configure Computer") to update the serial numbers of the components. For more information on how to change the serial numbers, refer to Chapter 4, "Obtaining Information About The Server."

Typically, the server displays a message such as `Run SCU Utility.....Press F1 to Continue`. Select how you want to access and run the SCU by following the instructions displayed on the SCU screens.

Configuring Expansion Boards

Each time you add, remove, or relocate any EISA/ISA/PCI expansion board, you need to run the SCU to identify their operating characteristics, server resource requirements, and slot locations. Based on this information, the SCU will then automatically assign the proper server resources to EISA expansion boards, enable PCI boards, and inform you as to what jumper or switch settings need to be manually set on ISA expansion boards to avoid resource conflicts.

The SCU identifies an expansion board's operating characteristics and resource requirements through Configuration (.CFG) files. These files contain main logic board, EISA, PCI, and ISA expansion board vital characteristics and the server resources they require for proper operation. Before you can configure the server, you must copy the CFG files (and overlays if applicable) supplied with the additional EISA expansion boards you installed to either the SCU directory on your hard disk drive or the SCU diskette that you created earlier.

As an added feature, the SCU creates and stores all setup changes in a System Configuration (.SCI) file. This file is automatically generated when you run the SCU. Afterwards, this SCI file can be used on any DIGITAL Server that is identically configured and can serve as a backup to the EISA configuration stored in NVRAM memory.

Starting the SCU

The SCU is located on the ServerWORKS Quick Launch CD-ROM disk. The SCU options are shown in Figure 2-1. If this is your first time using the SCU, it is recommended that you select "Learn About Configuring your Computer" for detailed information on using the SCU. If this is a subsequent session, refer to the appropriate sections in this chapter to change the server's configuration.

You can start the SCU in one of three ways:

1. During the Quick Launch boot process, if a DOS partition was created, the SCU was copied to the partition on the hard disk drive. This allows you to run the SCU anytime from the DOS partition.

   At the MS-DOS prompt change to the SCU directory and type:

   SCU.BAT

2. Creating a bootable SCU diskette by using the Quick Launch CD-ROM and selecting the *Installations & Utilities* button and then the *Utilities* page. On the *Utilities* page, select the appropriate BIOS level for the server that the SCU is being created for (if this is being done on the server, the default BIOS that is highlighted is the BIOS of that server).

   Afterwards, you can run the SCU anytime by booting the diskette you created.

3. You can also run the SCU by inserting the Quick Launch CD-ROM disk, rebooting the server, and pressing and holding the right [ALT] key during the boot process to display the SCU.

   NOTE: If EISA (in some cases, PCI) cards have been added to the server, the SCU will be invoked automatically when you boot from the Quick Launch CD-ROM disc. The .SCI file is not saved when you use this method to run the SCU.

```
                          ┌─────────────────┐
                          │ Welcome Screen  │
                          └────────┬────────┘
                                   │
                          ┌────────┴────────┐
                          │   Main Menu     │
                          └────────┬────────┘
```

| Set Date | Set Time | Maintain System Configuration Diskette | Configure Computer | Configure Computer With System Default |

| | | | See Note | See Note |

Learn About Configuring Your Computer

Step 1: Important EISA Configuration Information
Step 2: Add or Remove Boards
Step 3: View or Edit Details
Step 4: Examine Switches or Print Report
Step 5: Save and Exit

Create a Backup SCI File
Load a Backup SCI File
Copy/Update CFG Files
Copy/Update SCI Files
Delete CFG Files
Delete SCI Files
Return to the Main Menu

Note: If new boards are found, the following message displays: The following changes have automatically been made: [Action:]

DEC00456

Figure 2-1. SCU Main Menu Options

Using the SCU

To use the SCU:

1. Turn on the server and allow the Power-On Self Test (POST) to complete.

    If POST detects an error take the appropriate steps to correct the problem. After the problem has been resolved, restart the server.

2. Start the SCU using one of the three methods described previously.

3. Press [Enter] to display the SCU introductory screen.

    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. If no configuration errors appear, the Welcome screen displays.

    Press [Enter] to display the Main menu.

    If a configuration error appears, the Welcome screen displays information about the error and tells you to reconfigure the server.

5. Step through the menu items to familiarize yourself with the SCU.

SCU Keyboard Function Keys

The following table lists the keyboard function keys used to scroll through the menu screens, and select specific menu items in the SCU.

Keyboard Key	Function
[↓]	Moves the cursor down one menu item.
[↑]	Moves the cursor up one menu item.
[→]	Moves the cursor one character to the right.
[←]	Moves the cursor one character to the left.
[Enter]	Displays the available user-selectable settings for the highlighted option or selects the highlighted menu item.
[F6]	Displays available resources (IRQs) for the highlighted option.
[F10]	Press [F10] to complete a step.
[F1]	Displays the selected menu item's help screen.
[Esc]	Returns the monitor screen to the previously selected menu item.

Configure Computer

This option provides step-by-step instructions on how to configure the server when adding, removing, or relocating expansion boards and when changing operating parameters.

Select one of the following menu options:

- "Configure Computer with System Default" — Loads the SCU default settings.

- "Configure Computer" — Instructions are displayed. Complete the instructions if you are performing an initial configuration on the server. If this is a subsequent configuration, refer to the appropriate menu item to update the server's configuration.

Setting the Date and Time

Use these two SCU options to reset the date and time maintained by the server's battery.

To access this menu item:

1. Start the SCU using one of the three methods described in "Starting the SCU."

2. Press [Enter] to display the SCU main menu.

3. Configure the server for the current date and time by selecting the Set Date and Set Time options.

Maintain System Configuration Diskette

Select this option to maintain Configuration (CFG) files and System Configuration Information (SCI) files.

To access this menu item:

1. Start the SCU using one of the three methods described in "Starting the SCU."

2. Press [Enter] to display the SCU main menu.

3. Select the `Maintain System Configuration Diskette` option, and then press [Enter].

4. Select a menu item and complete the displayed instructions for that item.

Afterwards, the following menu options are available:

- Create a backup SCI file

- Load a backup SCI file

- Copy/update CFG files

- Copy/update SCI files

- Delete CFG files

- Delete SCI files

- Return to the Main Menu

RAID Configuration Utility

RAID-ready DIGITAL Servers include a RAID adapter and RAID configuration utility. The RAID configuration utility appears when you boot the server with the ServerWORKS Quick Launch CD-ROM disc. Use this utility to configure your RAID array.

> **NOTE:** If you are configuring the server for Ultra SCSI, use the DACCF utility for the Mylex controller to enable Ultra SCSI data transfers. Refer to the Ultra SCSI Bus Repeater Module Installation Guide for this procedure.

Refer to the Mylex User's Manuals for more information. These manuals are provided as either printed manuals or are located on the Quick Launch CD-ROM as on-line files under the "User Documentation" button.

BIOS Upgrade Utility

All servers have BIOS software in a flash (ROM) chip located on the main logic board. 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.

You can upgrade the server's BIOS to future releases by executing the BIOS upgrade utility (PHLASH.EXE) located in the BIOS upgrade kit. The "BIOS upgrade" switch (SW1-1) on the main logic board must be set to ON before you can upgrade the system BIOS.

BIOS upgrades are available on the Internet.

For technical support, use the address:

`http://www.windows.digital.com/support/support.asp`

For access directly to the software library for BIOS and driver upgrades, use the address:

`http://www.windows.digital.com/~ftp/00-index.stm`

> **CAUTION:** A crisis recovery diskette should be created before upgrading the server BIOS.

When upgrading the BIOS, you must remove any video option cards and enable the onboard VGA. In the rare event that you may need to use the crisis recovery diskette, the server will require that the onboard VGA be used in this mode.

SCSI*Select* Utility

The DIGITAL server comes with two onboard Adaptec 7880 SCSI controllers and a SCSI*Select* configuration utility.   This utility, located within the server BIOS, allows you to change SCSI controller settings without opening the server.

Use SCSI*Select* to:

- Check factory default settings for each device on the SCSI bus.

- Change SCSI device settings that might conflict with other SCSI devices.

- Perform low-level formatting on new SCSI disk drives.

To start the SCSI*Select* configuration utility:

Press [Ctrl] + [A] when the Adaptec BIOS banner appears during the boot process and before the end of the device information display.

NOTE: If you are configuring the server for Ultra SCSI, use the SCSISelect utility to enable Ultra SCSI data transfers.

Diagnostics

Diagnostic software is shipped with every DIGITAL Server on the Quick Launch CD-ROM. This software contains an advanced set of diagnostic utilities for identifying and correcting problems with the server.   The diagnostic software can be used to verify proper hardware installation and isolate intermittent problems that are not detected by the Power-On Self Test (POST).

The diagnostic program is a stand-alone MS-DOS package that can be run from diskettes or from the DOS partition on the server's hard disk drive.

The diagnostic software includes:

- AMIDiag base diagnostic (processors, memory, and main logic board components tests) from American Megatrends, Inc.

- DIGITAL vendor extended tests (SCSI, network, storage, and RAID)

- Extensive on-line help and the *AMIDiag User's Guide*

  For additional information refer to the AMIDiag User's Guide, located under "Additional Documentation" on the Quick Launch CD-ROM and to the README.TXT file on the diagnostics diskettes.

To access the supplied diagnostic software:

- During the server installation process, the diagnostic software will be automatically copied to a subdirectory on the DOS partition (only if you selected the option to create a DOS partition). This allows you to run the diagnostic software from the DOS partition you created.

- Using the Quick Launch CD-ROM, you can create bootable diagnostic software diskettes. This allows you to run the diagnostic software using the diskettes you created.

  NOTE: DIGITAL strongly recommends that you copy the diagnostics to diskettes and then use these diskettes to run the diagnostics on the server.

To run the diagnostics from the DOS partition, perform the following:

1. At the MS-DOS prompt, type:

    `C:\diag\diagnose.bat`

2. After the server boots, choose MS-DOS from the boot selection.

3. Once the diagnostics begin, the main screen appears.

Refer to Chapter 4, "Troubleshooting," for more information.

To create the diagnostic diskettes from the Quick Launch CD-ROM, perform the following:

1. Insert the Quick Launch CD-ROM into the drive and boot the server or from a PC or workstation, use Windows File Manager or Explorer and run:

    `<cd-rom>:\QLAUNCH.EXE.`

2. From the Quick Launch main menu, select *Installations & Utilities.*

3. Select the *Utilities* tab and then select the server model.

4. Insert a blank MS-DOS formatted diskette into drive A and select *Diagnostics*.

5. Select *Continue*. Afterwards, remove the diskette for safekeeping.

6. Choose the next diagnostic diskette from the list and then select *Continue*. Create all the diskettes labeled "Diagnostics."

    Refer to Chapter 4, "Troubleshooting," for more information.

SCU Features 3

Introduction

After entering the SCU, you can edit a variety of resources and configure the server for the most optimized condition. The following tables list the SCU options that are available in the SCU.

System - DIGITAL Server 5100/5200

Menu Fields	Settings	Comments
System processor type	Not user selectable	Displays the type of the processor that is resident on the processor module.
System processor clock	Not user selectable	Displays the clock of the processor that is resident on the processor module.
System base memory	Not user selectable	Displays the amount of base (conventional) memory each time the server boots.
System extended memory	[memory amount], AT-bus space disabled[1]	Displays the amount of extended memory each time the server boots.
	[memory amount], AT-bus space enabled at F00000h, 1M	You can select disabling or enabling one of three memory ranges that could be used by expansion boards.
System extended memory mode	Compatibility[1] Non-compatibility	Selects the means for supporting extended memory above 64 MB. Select [Compatibility] for using conventional service in BIOS.
		Select [Non-Compatibility] for memory support above 64 MB when using Windows NT v3.1 or above.
System reserved resources	Not user selectable	Displays the SCU configuration and file overlay information. Reserved resources are also shown.
System language	Not user selectable	English only.

[1] Factory default setting

System Management Group

Menu Fields	Settings	Comments
System information	Asset Number	Select [Enter] to display the Asset number of the server and the System ID. The Asset number can be changed by the user.
Main logic board information	Asset Number	Select [Enter] to display main logic board information including Asset number, Serial number, Artwork Revision number, Model number, and System ID. The Asset number is the only item that can be changed by the user.
Processor module information	Asset Number	Select [Enter] to display processor module information including Asset number, Serial number, Artwork Revision number, Model number, and System ID. The Asset number is the only item that can be changed by the user.

(1)   Factory default setting

Diskette Drive Group

Menu Fields	Settings	Comments
Integrated diskette controller	Enabled[1] Disabled	Enables or disables the onboard diskette controller. The onboard diskette controller must be disabled if an external diskette controller performs the interfacing to the diskette drives.
Diskette drive A	Not Installed 5.25" 360 KB drive 5.25" 1.2 MB drive 3.5" 720 KB drive 3.5" 1.44 MB drive[1] 3.5" 2.88 MB drive	Sets the size and density of diskette drives.
Diskette drive B	Not Installed[1] 5.25" 360 KB drive 5.25" 1.2 MB drive 3.5" 720 KB drive 3.5" 1.44 MB drive 3.5" 2.88 MB drive	Sets the size and density of diskette drives.
Exchange diskette drives	Disabled[1] Enabled	Allows you to logically exchange physical diskette drive designation. Enabling this function allows you to boot diskette software that is compatible with physical drive B: instead of physical drive A:.
Diskette write protection	Disabled[1] Enabled	Enables or disables the selected diskette drives to be write-protected at the disk drive level. Enabling this option means writing data to a diskette is prohibited. However, you can still read data from the diskette.

(1)   Factory default setting

Boot Options Group

Menu Fields	Settings	Comments
Boot option	A: then C: [1] C: then A: C: only A: only	Each time the server boots, it will load the operating system from the sequence selected. Note, if "C: then A:" is selected, the Quick Launch CD-ROM might not be bootable.
Boot sequence preference	Embedded PCI SCSI channel A[1] Embedded PCI SCSI channel B PCI slots	Select the channel that the boot device will be attached to. If the boot device is attached to a PCI expansion board, select the PCI slots option and the server will boot from the first boot device found attached to a PCI expansion board as it scans the PCI bus.
POST errors	Enabled[1] Disabled	If enabled, the server pauses and displays POST errors. To continue, Press <F1>.
Diskette check	Enabled[1] Disabled	Enabling this option forces the server to verify the diskette type during boot.
Summary screen	Enabled[1] Disabled	Enables or disables the ability to display the server's configuration during boot.
OCP soft banner	Not installed[1] Installed	If installed, you can define a 16 character string that appears on the Operator Control Panel (OCP).

Integrated Peripherals Group

Menu Fields	Settings	Comments
Video type	VGA or EGA[1] CGA 80 columns Monochrome	Sets the video controller type.
Monitor type	Color[1] Monochrome	Sets the type of monitor connected to the server: Color or Monochrome.
Mouse port	Disabled Enabled[1]	Enables or disables the onboard PS/2 style mouse port.
Parallel port	Disabled	Selects the Enhanced Parallel Port (EPP) mode.
	Compatible mode[1]	Selects the standard printer connection.
	Bi-Directional Mode	Selects the PS/2 compatible mode to receive data.
	EPP 1.7 mode EPP 1.9 mode	Selecting EPP 1.7 or EPP 1.9 is based on what EPP version your printer supports. If you are not sure what version your printer supports, use the default setting.
	ECP mode	Sets the Extended Capabilities Port (ECP) mode.
Serial port 1	Disabled Enable at: 3F8h-3FFh (IRQ4)[1] Enable at: 2F8h-2FFh (IRQ3) Enable at: 3E8h-3Efh (IRQ4) Enable at: 2E8h-2Efh (IRQ3)	Enables or disables onboard serial port 1 at the specified address and IRQ.

[1] Factory default setting

Menu Fields	Settings	Comments
Serial port 2	Disabled Enable at: 3F8h-3FFh (IRQ4) [1] Enable at: 2F8h-2FFh (IRQ3) Enable at: 3E8h-3Efh (IRQ4) Enable at: 2E8h-2Efh (IRQ3)	Enables or disables onboard serial port 2 at the specified address and IRQ.
Embedded PCI SCSI channel A	Enabled[1] Disabled	When enabled, this device will be recognized by the server. When disabled, this will not be recognized by the server and will be ignored during the PCI scan sequence.
Embedded PCI SCSI channel B	Enabled[1] Disabled	When enabled, this device will be recognized by the server. When disabled, this will not be recognized by the server and will be ignored during the PCI scan sequence.
Embedded PCI Ethernet	Enabled[1] Disabled	When enabled, this device will be recognized by the server. When disabled, this will not be recognized by the server and will be ignored during the PCI scan sequence.

[1] Factory default setting

Keyboard Features Group

Menu Fields	Settings	Comments
NumLock	Auto[1] Off On	Selects the power on state for Numlock. If Auto is selected, the server turns on Numlock if it detects a numeric keypad.
Key Click	Disabled[1] Enabled	Enables or disables the audible key click feature.
Keyboard auto-repeat rate	30/sec[1] 26.7/sec 21.8/sec 18.5/sec 13.3/sec 10/sec 6/sec 2/sec	Sets the number of times a second to repeat a keystroke while you hold the key down.
Keyboard auto-repeat delay	1/4 sec 1/2 sec[1] 3/4 sec 1 sec	Sets the delay time after a key is held down before it begins to repeat a keystroke.

[1] Factory default setting

Shadow Options Group

Menu Fields	Settings	Comments
Shadow video BIOS ROM	Enabled[1] 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 you shadow video BIOS ROM, the ROM image 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 low speed ROM. For PCI VGA devices, video BIOS is always shadowed in C0000h-C7FFFh, regardless of this field's setting.
Shadow C8000h-CBFFFh	Disabled[1] Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow CC00h-CFFFFh	Disabled[1] Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow D0000h-D3FFFh	Disabled[1] Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow D4000h-D7FFFh	Disabled[1] Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow D8000h-DBFFFh	Disabled[1] Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow DC000h-DFFFFh	Disabled[1] Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.

[1] Factory default setting

Security Options Group

Menu Fields	Settings	Comments
Supervisor password	Not installed[1] Installed	Allows you to set a supervisor password. If set, you will be prompted to enter a password prior to accessing the SCU.
User password	Not installed[1] Installed	Can only be set in the condition that the Supervisor password is set. This password functions with "Password on Boot" or "Quick Lock Hot-Key."
Password on boot	Enabled Disabled[1]	Enables or disables password entry on boot. If enabled, the server will prompt you to enter the password, either the User password or the Supervisor password.
Quick lock hot-key	Disabled[1] [Alt]-[Ctrl]-[F1] through [Alt]-[Ctrl]-[F12]	Enables or disables the Quick Lock function. When enabled, you can lock both the keyboard and PS2 mouse by pressing the defined hot key, [Alt]-[Ctrl]-[key]. During the lock state, if a user password is entered, the keyboard and PS2 mouse will function again.
Diskette access	Supervisor User[1]	If set to supervisor, the diskette can only be accessed if the server is booted via a supervisor password. Otherwise, the diskette is free to be accessed.
Network server	Disabled[1] Enabled	When enabled, the server does not require a keyboard to function and therefore, keyboard error messages which might occur during POST will be ignored.
System backup reminder	Disabled[1] Daily Weekly Monthly	Allows you to display a backup reminder message at boot (daily, every Monday, or the 1st of every month).
Virus check reminder	Disabled[1] Daily Weekly Monthly	Allows you to display a virus check reminder message at boot (daily, every Monday, or the 1st of every month).

[1] Factory default setting

Cache Options Group

Menu Fields	Settings	Comments
L1 cache	Not user selectable; Always enabled	Indicates that the processor L1 cache is enabled.
L2 cache	Not user selectable; Always enabled	Indicates that the processor L2 cache is enabled.
Cache system BIOS ROM	Enabled[1] Disabled	Enables or disables caching request for server BIOS ROM (F0000h to FFFFFh).
Cache video ROM	Enabled[1] Disabled	Enables or disables the server to cache the video BIOS in the C000 to C7FFh segment.

[1] Factory default setting

Advanced Control Group

Menu Fields	Settings	Comments
CPU to PCI Write Posting	Enabled Disabled[1]	Enables processor writes to PCI to be posted in the OPB.
PCI to DRAM Pipeline	Enabled Disabled[1]	Enables pipelining of PCI to DRAM write cycles.
APIC & MP table	Disabled MPS 1.1 MPS 1.4[1]	Applicable to single processor configurations only, always enabled for Multi-Processing (MP) operating system configurations. When set to MPS 1.1 or MPS 1.4, the processor's Advanced Programmable Interrupt Controller (APIC) is enabled, and the MP table used by MP operating systems will be created. **Note**: This parameter must be disabled for NetWare 3.12 single processor systems.
Error Correction Code Interrupt	Enabled[1] Disabled	When ECC is disabled, parity generation and checking is enabled.
PCI Parity Check	Enabled[1] Disabled	Enables or disables the PCI parity checking.

[1] Factory default setting

EISA or PCI Devices Group

Menu Fields	Settings	Comments
EISA [slot#] - [device]		You can edit resources provided by the expansion board's vendor. Please refer to the menu displayed on this item.
PCI [slot#] - [device] PCI function 1	Enabled Disabled	Whenever PCI devices are installed in the PCI slots, the device is automatically added. You can enable or disable this device. If enabled, you can set the related resources based on the menu the SCU displays. The [device] is either SCSI or Ethernet.
Embedded - [device] PCI function 1	Enabled Disabled	Three kinds of PCI devices can be identified as Embedded devices. The first are onboard PCI devices. The second are the PCI devices beyond 10 PCI devices that have been identified and shown as the normal PCI devices. The third are the PCI devices that share the same IRQ with the PCI devices displayed as the normal PCI devices. When enabled, all the resources shown on the menu can be changed.
Embedded - PCI VGA controller PCI function 1	Enabled Disabled	Onboard PCI VGA device.
Standard VGA resources	Enabled Disabled	Enables or disables the compatible VGA resources.

Troubleshooting *4*

Introduction

This chapter provides troubleshooting information. The sections that follow describe specific problems, probable causes, and recommended actions to pursue if the server fails. Information includes:

- Initial Troubleshooting

- Diagnostics

- Obtain Server Information Using the SCU and Server Management Software

- Status, POST, and OCP Messages

- Processor Voltage and Temperature Ranges

- Advanced Troubleshooting

Initial Troubleshooting

Follow these general procedures to troubleshoot the DIGITAL server.

- Record all configuration information and have it readily available.

- Turn off the server, wait until all hard disk drives completely spin down, and then turn it back on.

- Ensure that all cables and connections are secure.

- Make sure all necessary video, printer, and application device drivers are properly installed.

- Try not to troubleshoot more than one problem at a time.

- Try to duplicate the problem.

- Run the diagnostic software.

- Run the SCU.

- Run the SCSI or RAID configuration utility if you have problems after connecting devices.

Diagnostics

The diagnostic software is a versatile tool that can be used to verify proper hardware installation and isolate intermittent problems that are not detected by the Power-On Self Test (POST). You should run the diagnostic software in the following situations:

- The server fails to boot or load the operating system software.

- The server fails to boot or load the operating system software after you add additional hardware such as more memory, additional processors, additional SCSI devices, or expansion boards.

- The operating system hangs repeatedly and no changes have been recently added to the software such as service packs or a new application.

- You suspect a server hardware failure.

- You want to validate server operation.

- An intermittent hardware problem exists.

Running the Diagnostics

To run the AMIDiag base package (Emergency Mode diskette) from a diskette, follow this procedure:

1. Insert the diskette labeled "For Emergency Use" in drive A and then boot the server.

2. Use the arrow keys to highlight the desired test.

3. Press [Enter].

   For additional troubleshooting information refer to the AMIDiag User's Guide, located on the Quick Launch CD-ROM.

Running Quick Tests or Groups of Tests

Function keys can be used to select and run groups of tests. A list of function keys is available by pressing the F9 key. The following list includes examples of how to run Quick Tests or Groups of Tests.

- To run Quick Test, press F8 to select tests, then F10 to run all the selected tests.

- To run all Memory tests, press F6 to select tests listed on the menu, then press F10 to run all the selected tests.

- To run all tests from all menus, press F7 to select all tests, then press F10 to run all the selected tests.

Running DIGITAL Vendor Extended Tests

To run DIGITAL Vendor Extended Tests from a diskette:

1. Insert the DIGITAL Vendor Extended Tests diskette for the selected device and then boot the server or type

   A:\DMENU.

2. Select the desired test.

Each diskette has a README.TXT file with a list of devices that can be tested and additional information about each diagnostic.

Running Diagnostics Tests from the Hard Disk Drive

To run diagnostic tests from the server's hard disk drive, perform the following:

1. Boot the system and select MS-DOS from the boot menu.

2. At the C:\> prompt, type:

   \DIAG\DIAGNOSE.BAT

   This will setup the CONFIG.SYS and AUTOEXEC.BAT files to run the diagnostics and then reboot the server. Select MS-DOS again and the AMIDiag program will load. Note that the original CONFIG.SYS and AUTOEXEC.BAT are restored before the diagnostics load.

3. Select the test or group of tests using the arrow keys and function keys previously defined. DIGITAL Vendor Extended Tests can also be run from the *User* menu.

Obtaining Information about the Server

The DIGITAL Server provides the following system information for the main logic board and the processor module configured on the server:

- Asset number — User definable field for tracking these components

- Part number — DIGITAL part number

- Revision number — Board assembly revision number

- Serial number — Serial number of the board assembly

- Artwork number — Revision of the printed circuit board

The System ID is also located on the main logic board and processor module. The System ID contains the following information:

- Model number — Server model number

- Serial number — Server serial number

- System asset number — User definable field for tracking the system

The main logic board and processor module each contain memory where specific information and System ID information is stored. The main logic board also stores the server's System Asset number (see Figure 4-1).

Information is available for the server's main logic board and processor module (such as part numbers, revisions, serial numbers, etc.). You can also assign Asset numbers to these components. In addition, the software can detect when you change the server configuration by adding or removing either component.

You can obtain information about the server's configuration by running the SCU or by using ServerWORKS management software.

Processor Module
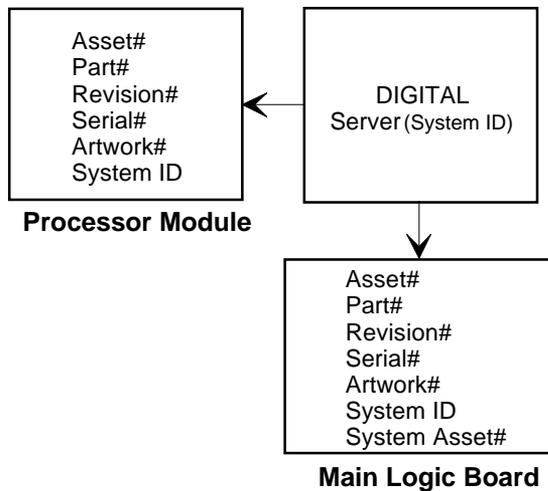
Main Logic Board

DEC01031

Figure 4-1. DIGITAL Server Component Information

Obtaining Information Using the SCU

You can use the SCU to check the Serial number, Revision number, and Asset number for the main logic board and Pentium Pro processor configured in the server. For example, if you change the main logic board or processor module in the server, you must run the SCU to re-synchronize the System ID (server model number and serial number) in the main logic board or processor module's memory. The SCU will check the new main logic board or processor module and detect the System ID mismatch.

You can view the details for the main logic board or processor module simply by selecting either the main logic board or processor module. Once selected, the Serial number, Revision number, and Asset number display. The SCU then lists the server model number and server serial number information stored on the main logic board or processor module. You can then confirm the correct model number and serial number. This data is available on the label located on the server back panel.

Obtaining Information Using Server Management Software

The DIGITAL server is shipped with the DIGITAL ServerWORKS Manager software. ServerWORKS Manager is a workgroup and server management product for DIGITAL's family of servers. ServerWORKS Manager uses the Simple Network Management Protocol (SNMP) environment to assist the Network or Server administrator by constantly monitoring the network for problems.

DIGITAL ServerWORKS Manager is based on an open architecture that enables seamless integration and interoperability with popular enterprise management software packages such as Computer Associates' POLYCENTER Manager/NetView, Hewlett-Packard's OpenView UX for Windows, and IBM's Netview/6000 AIX. Also included with ServerWORKS Manager are Network Operating System (NOS) Agents for Windows NT V3.51 and V4.0, Novell NetWare™ V3.12 and V4.x, and SCO UNIX V5.0. The OS/2 NOS includes its own agent and can also be managed from ServerWORKS Manager.

DIGITAL ServerWORKS Manager allows the Network or Server Administrator to perform the following functions on the server:

- Manage DIGITAL PC print, file, and application servers supported by DIGITAL servers using a Windows-based graphical user interface (GUI) for point and click simplicity.

- Display server component information that provides critical information such as processor and file system utilization and information about the network interface.

- Automatically build a database of the network by Autodiscovering all SNMP network resources and display the nodes discovered during Autodiscovery on a color-coded topological map.

- Poll all network devices at intervals defined by the administrator.

- Perform an in-depth network analysis to continuously monitor the status of the network.

- Set alarms and alerts for specified events on all network devices, as well as the network itself, to spot problems early and avoid costly downtime.

  Refer to the DIGITAL ServerWORKS Manager Overview and Installation Guide for more information on how to use ServerWORKS Manager to view and be notified of events on the server.

You can also manage the DIGITAL Server with other SNMP-based managers.

  Refer to the DIGITAL ServerWORKS Manager Overview and Installation Guide for more information.

Displaying Server Status Using the Hardware

There are two types of information displayed when the DIGITAL Server is operating:

- Normal status messages
- Error messages

During normal operation, Power On Self Test (POST) and boot messages are displayed on the monitor. Some POST messages are also displayed on the OCP panel. When an error occurs, an error message is displayed on both the monitor and OCP panel and a beep is sounded from the server's speaker.

Messages displayed on the OCP panel can also be seen by using the DIGITAL ServerWORKS Manager.

Server Status Messages

Component	Possible Failures	Result
Main logic board voltages: +12, +5, +3.3, and -12V	The voltages are outside of the power good range.	An error message displays and a warning beep sounds.
	The voltage exceeds the upper limit.	The server will shutdown after 5 minutes.
	The voltage falls below the lower limit.	A warning message displays and a warning beep sounds.
Fans 1, 2, 3, 4	The primary fans (fans 1 and 3) fail.	The redundant fans will activate.
	The primary fans (fans 1 and 3) and redundant fans (fans 2 and 4) do not operate.	The server will shutdown after 10 minutes.
Fan 5	The rear fan fails.	A message displays and a warning beep sounds.
CPU module voltages	The voltages are outside of the power good range.	A message displays and a warning beep sounds.
	The voltage exceeds the upper limit.	A warning message displays and a warning beep sounds.
	The voltage falls below the lower limit.	A warning message displays and a warning beep sounds.
CPU failure	A CPU failure:	
	Internal	An error message displays and a warning beep sounds.
	Over temperature	Usually caused by a fan failure and the result is that the server shuts down.
CPUs present	The incorrect number of CPUs are present in the server.	A message displays indicating the number of CPUs are present in the server.

continued

Component	Possible Failures	Result
For Pentium Pro:		
CPU temperature sensing	The temperature exceeds 82 °C (179.6 °F).	The backup fans will activate without any warning.
		If the temperature drops below 80 °C (176 °F), the backup fans will be turned off.
	The temperature exceeds the warning level (>85 degrees C;>185 °F).	A warning message displays and a warning beep sounds. If the temperature exceeds the warning level for more than five minutes, the server will shut down.
	The temperature exceed the upper limit (>90 °C; >194 °F).	The server will shut down.
For Pentium II:		
CPU temperature sensing	The temperature exceeds 72 °C (161.6°F).	Backup fans activate without warning.
		If the temperature drops below 70 °C the backup fans are turned off.
	The temperature exceeds the warning level (>75 °C; >167°F).	A warning message appears and a warning beep sounds. If the temperature exceeds the warning level for more than five minutes, the server automatically shuts down.
	The temperature exceeds the upper limit (>80 °C; >176°F).	The server automatically shuts down.
Power supplies present	The incorrect number of power supplies are present with good status in the server.	A message displays indicating the number of power supplies present in the server.
Power supply failure	The temperature exceeds the upper limit or the voltages are out of range.	Power supply shuts down, an error message displays, and a beep sounds.

POST OCP Messages

For the Pentium Pro processor, the following table lists the messages, both normal and error, that will display on the server's OCP panel during POST and any beeps that might sound when an error occurs.

> **NOTE:** To disable the speaker, press the middle button located below the OCP once after a beep sounds. To enable it, repress the button once.

POST/Boot Codes

POST Code Descriptions	Count Down Code[1]	Normal OCP Display	OCP Error Display	Beep Codes
BIOS ROM checksum				1-2-2-3
Test DRAM refresh				1-3-1-1
Test 8742 keyboard controller				1-3-1-3
RAM failure on address line xxxx				1-3-4-1
RAM failure on data bits xxxx of low byte of memory bus				1-3-4-3
RAM failure on data bits xxxx of high byte of memory bus				1-4-1-1
Check ROM copyright notice				2-1-2-3
Unexpected interrupts test	230	Unexpected int		2-2-3-1

[1] Count down codes are displayed on the server's monitor.

continued

POST Code Descriptions	Count Down Code[1]	Normal OCP Display	OCP Error Display	Beep Codes
Shadow ROMs	220	Shadow ROMs test		
Test DRAM refresh 512K and 640K	210	512-640K DRAM		
Extended memory test	200	Ext. mem test	Memory test fail	
Set cache registers	190	Set cache regs.		
Cache configuration	180	Cache config.	Cache fail	
Real-time clock test	170	Real time clock	RTC fail RTC dead battery CMOS chksum bad	
Keyboard test	160	Keyboard test	KBC-8042 fail Keyboard fail	
Initial hardware interrupt	150	Init HW int		
Co-processor test	140	Co-processor test		
Serial ports test	130	Ser. Ports test		
Parallel ports test	120	Par. Ports test		
Initiate onboard SIO	110	Init super I/O		
Mouse test	100	Mouse test		
Testing diskette drives	90	Floppy disk test	FDD A or B error	
Testing hard disk drives	80	Hard disk test		
CPU search	50	Search other CPU		
Search for option ROMs		Scan option ROM	OPROM chksum bad	1-2
Enable IRQs	20	Enable IRQs		
Setting time of day	10	Set time of day		
One short beep before boot				1

(1)   Count down codes are displayed on the server's monitor.

The following table lists the messages that appear during POST in support of the Pentium II processor module only.

POST Message	Description
PROC 01 present (ID:xxxx, L2:xxxKB)	Indicates 1 or 2 processor(s) found.
PROC 02 present (ID: xxxx, L2:xxxKB)	The ID is the processor ID value that indicates the stepping of the processor. Like stepping chips should be installed on any given Pentium II processor module.
PROC 01 present (ID:xxxx, failed) PROC 02 present (ID:xxxx, failed)	Indicates processor 1 or 2 found, but has failed.
The PROC slot terminator card is not installed	Indicates that for a single Pentium II processor module the second bus is not terminated with a terminator card.
Processor module failed	Indicates that there may be a problem with the Pentium II processor module itself (not the Pentium II processor).

OCP Messages

During certain failure conditions, including out-of-range conditions, an error message will display on the OCP panel and a corresponding error code will sound from the server's speaker.

NOTE: To disable the speaker, press the middle button located below the OCP once after a beep sounds. To enable it, repress the button once.

Hot keys are defined in BIOS as [CTRL] + [ALT] +[1] and enable toggling of the OCP display status messages just as though the OCP button were pressed.

NOTE: Hot keys do not work during POST or during host server request service from the OCP.

If you do not press keys or buttons for some time, the LCD backlight will be disabled until you press a key. The time is set by the host server.

You can examine the server status messages by pressing the OCP switch located on the front panel repeatedly to sequence through the status list. The OCP switch is disabled during POST, during host request service from the 8031, or if an error is detected. The following table lists and describes the status messages and the error messages that display on the server's OCP panel. Also included are possible actions to take if a problem persists.

OCP Status and Error Messages

Status	Normal OCP Display	OCP Error Display	Description of Error Display/Action
CPU ambient temperature			
For Pentium Pro:	CPU1 temp=xxxC	CPU1 over heat	Temperature of CPU 1 is out of range.
	CPU2 temp=xxxC	CPU2 over heat	Temperature of CPU 2 is out of range.
For Pentium II:	PROC1 temp=XXX C	PROC 1 overheat	Temperature of Processor 1 is out of range.
	PROC2 temp=XXX C	PROC 2 overheat	Temperature of Processor 2 is out of range.
			Action: Verify fans are operational.
Power supply status	P/S1 OK	P/S1 fail	Power supply 1 is not working.
			Action: Check that power supply cables and connectors are connected correctly.
Fan status	Sys fans OK	Sys fan 1 fail Sys fan 2 fail Sys fan 3 fail Sys fan 4 fail Sys fan 5 fail	Fan 1 is not working. Fan 2 is not working. Fan 3 is not working. Fan 4 is not working. Fan 5 is not working.
			Action: Check that fan connectors are connected correctly.
CPU status			
For Pentium Pro:	xxxMPn/yy xxx=processor speed n=number of processors y-cache size	CPU1 fail	Internal defect of CPU 1 or internal temperature exceeds the upper limit.
		CPU2 fail	Internal defect of CPU 2 or internal temperature exceeds the upper limit.
For Pentium II:		PROC 1 failure	Internal defect of Processor 1 or internal temperature exceeds the upper limit .
		PROC 2 failure	Internal defect of Processor 1 or internal temperature exceeds the upper limit .

Status	Normal OCP Display	OCP Error Display	Description of Error Display/Action
For Pentium Pro:		No CPU exists	No CPUs are present in the server.
			Action: Reboot server and check if the failed CPU is still malfunctioning during POST.
For Pentium II:		No PROC detected	No processor(s) present in the server.
		PROC module fail	Pentium II processor module failed.
System voltages			
For Pentium Pro:	Sys voltages OK	Sys +12V = xxxV	+12V is out of tolerance.
		Sys +5V = xxxV	+ 5V is out of tolerance.
		Sys 3.4V = xxxV	+3.4V is out of tolerance.
		Sys -12V = -xxxV	-12V is out of tolerance.
			Action: Check that power supply cables and connectors are connected correctly.
For Pentium II:	PROC voltages OK	GTL1 1.5V = x.xxV	Most likely a processor module failure.
		IO VOL 25V = x.xxV	
CPU voltages	CPU voltages OK	VRM1 y.yyV=x.xxV	Voltage Regulator Module (VRM) 1 should be y.yy volts and is being measured at x.xx volts.
		VRM2 y.yyV=x.xxV	VRM 2 should be y.yy volts and is being measured at x.xx volts.
			Action: Diagnose whether the VRM or the CPU module is bad.
Memory size information	xxxxxMB		
System BIOS revision	BIOS Vx.yy		x = main version yy = sub-version
8031 BIOS revision	8031 Vx.yy		x = main version yy = sub-version
System date/time	yyyy/mm/dd hh:mm		yyyy = year mm = month dd = day hh = hour mm = minute

Server CPU Voltage and Temperature Ranges for Pentium Pro

The following tables list the CPU and Voltage Regulator Module (VRM) operating voltage and temperature ranges for the Pentium Pro.

CPU Voltage Range

Nominal	Nominal Tolerance Percentage	Normal Voltage Range	Server Error Occurs	Server Shutdown Occurs
+12	-10 to + 10	+10.8 to +13.2 V	<+9.0 V	>+13.8 V
+5	-5 to + 5	+4.75 to +5.25 V	<+4.3 V	>+5.80 V
+3. 3	-1 to + 1	+3.0 to +3.6 V	<+3.0 V	>+3.81 V
-12	-10 to + 10	-13.2 to -10.8 V	>-9.0 V	<-13.8 V
VGTL	-10 to + 10	+1.35 to +1.65 V	<+1.26 V	>+1.72 V

VRM Voltage Range

VRM Voltage	Power Good Range	Lower Limit	Upper Limit
2.1 V	+1.95 to 2.25 V	<+1.89 V	>+2.31 V
2.2 V	+2.04 to 2.35 V	<+1.98 V	>+2.42 V
2.3 V	+2.14 to 2.46 V	<+2.07 V	>+2.53 V
2.4 V	+2.23 to 2.46 V	<+2.16 V	>+2.64 V
2.5 V	+2.32 to 2.68 V	<+2.25 V	>+2.75 V
2.6 V	+2.42 to 2.78 V	<+2.34 V	>+2.86 V
2.7 V	+2.51 to 2.89 V	<+2.43 V	>+2.97 V
2.8 V	+2.60 to 3.00 V	<+2.52 V	>+3.08 V
2.9 V	+2.70 to 3.10 V	<+2.61 V	>+3.19 V
3.0 V	+2.79 to 3.21 V	<+2.70 V	>+3.30 V
3.1 V	+2.88 to 3.32 V	<+2.79 V	>+3.41 V
3.2 V	+2.97 to 3.42 V	<+2.88 V	>+3.52 V
3.3 V	+3.07 to 3.53 V	<+2.97 V	>+3.63 V
3.4 V	+3.16 to 3.64 V	<+3.06 V	>+3.74 V
3.5 V	+3.25 to 3.75 V	<+3.15 V	>+3.84 V

Server CPU Voltage and Temerature Ranges for Pentium II

The following tables list the CPU and Voltage Regulator Module (VRM) operating voltage and temperature ranges for the Pentium II.

CPU Voltage Range

Nominal	% Range	% Based Voltage Range	Shutdown Value	Hardware Bad Value
+12V	-4 ~ +5%	+11.1 ~ +13.0V	> +13.8V	< +9.0V
+5V	-2%, +5%	+4.80 ~ +5.35V	> +5.80V	< +4.30V
+3.3V	+- 1%	+3.32 ~ +3.54V	> +3.80V	< +3.00V
-12V	+- 10%	-13.7 ~ -10.3V	< -14.2V	> -9.0V
VGTL	+- 10%	+1.32 ~ +1.68V	> +1.80V	< +1.10V
Io Vol	+- 5%	+2.2 ~ +2.8V	> +3.0V	< +1.85V

CPU VRM Range

VRM	Power Good	Shutdown	Hardware Bad
1.80V	+1.67 ~ 1.93V	> +1.98V	< +1.62V
1.85V	+1.72 ~ 1.98V	> +2.04V	< +1.67V
1.90V	+1.77 ~ 2.03V	> +2.09V	< +1.71V
1.95V	+1.81 ~ 2.09V	> +2.15V	< +1.76V
2.00V	+1.86 ~ 2.14V	> +2.20V	< +1.80V
2.05V	+1.90 ~ 2.19V	> +2.26V	< +1.85V
2.1V	+1.95 ~ 2.25V	> +2.31V	< +1.89V
2.2V	+2.04 ~ 2.35V	> +2.42V	< +1.98V
2.3V	+2.14 ~ 2.46V	> +2.53V	< +2.07V
2.4V	+2.23 ~ 2.57V	> +2.64V	< +2.16V
2.5V	+2.32 ~ 2.68V	> +2.75V	< +2.25V
2.6V	+2.42 ~ 2.78V	> +2.86V	< +2.34V
2.7V	+2.51 ~ 2.89V	> +2.97V	< +2.43V
2.8V	+2.60 ~ 3.00V	> +3.08V	< +2.52V
2.9V	+2.70 ~ 3.10V	> +3.19V	< +2.61V
3.0V	+2.79 ~ 3.21V	> +3.30V	< +2.70V
3.1V	+2.88 ~ 3.32V	> +3.41V	< +2.79V
3.2V	+2.97 ~ 3.42V	> +3.52V	< +2.88V
3.3V	+3.07 ~ 3.53V	> +3.63V	< +2.97V
3.4V	+3.16 ~ 3.64V	> +3.74V	< +3.06V
3.5V	+3.25 ~ 3.75V	> +3.84V	< +3.15V

Advanced Troubleshooting

DIGITAL has a Customer Replaceable Unit (CRU) process during the warranty period for:

- DIGITAL monitors with screens less than 20 inches

- Mice

- Keyboards

- Speakers

- Other parts as defined by DIGITAL as CRUs

The DIGITAL CRU process provides for overnight shipment of the part directly to the customer site. Customers are billed for the specified part if they fail to return the part to DIGITAL within ten days of the replacement unit shipment.

In the following troubleshooting tables, "CRU Process" means that when a process is determined to be broken, use the previously-described CRU process.

> **NOTE:** The following troubleshooting suggestions are not in any specific order. They are merely a list of possible problems and solutions.

Server Troubleshooting

Problem	Possible Cause	Action
No response when the server is turned on.	Server is not plugged in.	Turn off the server, plug it in, and then turn it back on again.
	No power at the wall outlet.	Use another wall outlet.
	Main logic board failed.	Replace the main logic board.
	Main logic board switches incorrectly set.	Set all appropriate switches.
	Processor module has failed.	Reseat the processor module.
	Processor module switches incorrectly set.	Make sure all switches are correctly set.
	Side panels removed.	Install side panels.
	Power supply failed.	Replace the power supply.
Power is on, but there is no screen display.	Brightness and contrast controls are not correctly set.	Adjust the brightness and contrast controls.
	Monitor is off.	Turn on the monitor.
	Monitor cable is incorrectly installed.	Check all monitor connections.
	Incorrect video drivers installed.	Install the correct video drivers.
	Video controller has failed.	Replace the main logic board.
	Monitor has failed.	Replace the monitor.
Server does not boot from CD-ROM drive.	CD-ROM drive is not connected to the Adaptec controller.	Connect the CD-ROM to the Adaptec controller.
	CD-ROM drive not configured as a bootable device.	Change the CD-ROM setting to "bootable" using SCSI*Select*.
	CD-ROM disc is not bootable.	Upgrade server to the latest BIOS.

continued

Problem	Possible Cause	Action
Server operates incorrectly after installing a processor module.	Processor module installed incorrectly.	Reinstall processor module.
	SCU indicates an error after installing a processor module.	Remove processor module (for Pentum II module, replace the terminator and reboot). If server boots without errors, replace processor module.
Server operates incorrectly after installing optional expansion board.	Expansion board installed incorrectly.	Remove expansion board and reinstall.
	Did not run SCU to configure expansion board after installation.	Run the SCU to properly configure expansion board.
	Did not install CFG file for expansion board.	Run SCU and add CFG file (if necessary).
	Expansion board has failed.	Remove expansion board and reboot. If server boots without errors, replace expansion board.
Server operates incorrectly after installing optional memory (SIMMs/DIMMs).	Memory configured incorrectly.	Reboot the server and check for any boot message to identify faulty DIMM(s)/SIMM(s).
		Check that memory configuration is according to guidelines in Chapter 5.
	SIMMs/DIMMs installed incorrectly.	Remove SIMMs/DIMMs and reinstall.
	SIMMs/DIMMs have failed.	Replace SIMMs/DIMMs.
	Processor module installed incorrectly.	Reinstall processor module.
	Processor module failed.	Replace processor module.

continued

Problem	Possible Cause	Action
No response to keyboard commands.	Keyboard might be password protected by a local or remote control program.	Enter the keyboard password.
	Keyboard is not connected.	Power down the server and connect the keyboard.
	Keyboard is connected to the mouse port.	Power down the server and connect the keyboard to the keyboard port.
	Keyboard failed.	Replace the keyboard.
No response to mouse commands.	Mouse might be password protected by a local or remote control program.	Enter the keyboard and mouse password.
	Mouse is not connected.	Power down the server and connect the mouse.
	Mouse is connected to the keyboard port.	Power down server and connect the mouse to the mouse port.
	Mouse driver not installed.	Install appropriate mouse driver.
	Mouse trackball dirty.	Clean trackball.
	Mouse failed.	Replace the mouse.
Server operates correctly but application software does not.	Application software installed incorrectly.	Refer to the application software documentation.
	Having external cache enabled causes conflict with application software.	Run the SCU and disable external cache.

Disk Drive Troubleshooting

Problem	Possible Cause	Action
Server does not recognize an internal SCSI device.	SCSI device jumpers incorrectly set.	Refer to the supplied kit installation instructions.
	SCSI ID conflicts.	Refer to the supplied kit installation instructions and to the storage backplane jumper configuration.
	Terminating resistors not removed from the SCSI device.	Remove terminating resistors. Refer to the supplied kit installation instructions.
	SCSI controller has failed.	Replace the main logic board.
	Loose SCSI cable.	Secure all cable connections.
	SCSI cable incorrectly installed between SCSI controller, SCSI device or backplane.	Check all cables.
	SCSI device has failed.	Replace SCSI device.

Problem	Possible Cause	Action
Server does not recognize an external SCSI device.	SCSI device jumpers incorrectly set.	Refer to the supplied kit installation instructions.
	SCSI ID conflicts.	Refer to the supplied kit installation instructions and to the storage backplane jumper configuration.
	Terminating resistors not removed from the SCSI device.	Remove terminating resistors. Refer to the supplied kit installation instructions.
	Storage backplane terminated.	Remove termination from the storage backplane.
	SCSI controller has failed.	Replace the main logic board.
	Loose SCSI cable.	Secure all cable connections.
	SCSI cable incorrectly installed between SCSI controller and rear panel connector or external SCSI device and rear panel connector.	Check all cables.
	SCSI device has failed.	Replace SCSI device.

continued

Problem	Possible Cause	Action
Server does not boot from an internal SCSI hard disk drive.	Boot device not attached to the SCSI adapter at the lowest ROM address.	Run the SCU to define the server boot device.
	PCI/EISA scanning order incorrect.	Refer to the bus scanning examples in the *System Reference* manual.
	Bootable CD-ROM drive not connected to the primary SCSI controller.	Connect the CD-ROM to the SCSI controller.
	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 SCSI boot hard disk drive.	Properly install all required SCSI device drivers.
	Operating system software is not installed on the SCSI boot hard disk drive.	Install the appropriate operating system.
	Requested partition does not exist.	Partition the SCSI hard disk drive and then reload the operating software.
	SCSI boot hard disk drive at wrong SCSI address.	Set SCSI boot hard disk drive to lowest "primary" SCSI address.
	SCSI device has failed.	Replace SCSI device.
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.
	SCSI hard disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
SBB failure.	Check SBB status LEDs for a drive failure indication.	Replace the SBB.

SBB Troubleshooting

Problem	Possible Cause	Action
SBB fault LED lit.	Disk drive failed.	Replace disk drive.
SBB activity and fault LEDs lit.	Disk drive hung or has failed.	Replace disk drive.
SBB fault LED flashing.	Disk drive failed and is spinning down.	Replace disk drive.

Tape Drive Troubleshooting

Problem	Possible Cause	Action
Tape will not load.	Tape inserted incorrectly.	Insert the tape with the arrow on the cassette pointing towards the drive.
Cannot write data to a tape.	Tape write-protected.	Slide the write-protect tab on the cassette to the closed position.
Tape will not eject.	Tape jammed in drive.	Using a small screwdriver, rotate the motor shaft clockwise to bring threading mechanism to the initial loading position.
		If necessary, press the ratchet mechanism to tighten the tape before ejecting.
		Continue to turn the motor shaft clockwise until the tape can be lifted out of the drive mechanism and ejected from the drive.

Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator is not on.	Monitor is turned off.	Turn on the monitor.
	Power cord is not connected.	Connect the power cord to the server.
	No power at wall outlet.	Use another outlet.
	Power indicator is defective.	Replace the monitor.
No screen display.	Monitor brightness and contrast controls are incorrectly set.	Adjust the monitor brightness and contrast controls.
	Monitor has failed.	Replace the monitor.
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.
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. Refer to the documentation supplied with the monitor.

CD-ROM Troubleshooting

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

Diskette Drive Troubleshooting

Problem	Possible Cause	Action
Target diskette drive cannot read or write information.	Diskette is not formatted.	Format the diskette.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write-protected.	Slide the write-protect switch so the hole is not visible.
	Diskette drive is empty.	Insert a diskette.
	Diskette write protection enabled.	Run the SCU and set the Diskette Write Protection option to "Disabled."
	Disabled in SCU.	Run the SCU and enable the diskette drive.
Server does not boot from a target diskette drive.	Diskette drive not enabled.	Run the SCU and enable the diskette drive.
	Diskette boot option disabled.	Run the SCU and set boot option to A then C.
	Diskette does not contain start-up files.	Insert a diskette with the correct start-up files.
	Diskette drive is empty.	Insert a diskette that contains an operating system.
	Diskette is worn or damaged.	Try another diskette.
	Loose cables.	Secure all cable connections.
Cannot write to target diskette drive.	Diskette drive write protected.	Run the SCU and disable the diskette write protection option.

RAID Troubleshooting

Problem	Possible Cause	Action
SBB fault LED lit.	Disk drive failed.	Replace disk drive.
SBB activity and fault LEDs lit.	Disk drive hung or has failed.	Replace disk drive.
SBB fault LED flashing.	Disk drive failed and is spinning down.	Replace disk drive.
SBB fault status is either on or off; fault status LED flashing.	Disk drive is active and spinning down due to a fault.	Correct the fault or replace the disk drive.
Replaced SBB drive does not spin up to speed.	SBB drive not seen by RAID host adapter.	Manually rebuild the SBB drive.
		Remove the SBB drive, wait 20 seconds, reinsert SBB drive. Wait one minute and then rebuild the SBB drive.
Multiple SBB drives have failed.	No power available.	Restore power, run the RAID configuration utility and change the state of any failed (FLD) SBB drive to optimal (OPT).
		Run the RAID configuration utility and check for bad blocks on the SBB drives. Repair any bad blocks.
SBB drive not seen by RAID host adapter.	SCSI cable not connected.	Check all SCSI connections.
	Incorrect SCSI termination.	Properly terminate the SCSI bus.
	Duplicate SCSI IDs on the bus.	Check SBB drive SCSI ID settings.
	Defective SBB drive.	Replace SBB drive.
	SBB drive improperly inserted.	Reinsert SBB drive.
	Defective RAID adapter SCSI channels.	Replace the RAID adapter.

FRU Replacement **5**

Introduction

The following sections list the Illustrated Parts Breakdown (IPB) part numbers and related replacement procedures.

> **NOTE:** Customer installable devices, such as expansion boards, memory, and disk drives are discussed in the *System Reference* Manual.

Server Front View

Figure Legend	Orderable Spare Part	Description
1	70-31674-05/-06 70-31901-05/-06	Enclosure assembly, frost white Enclosure subassembly (without power supply), frost white
2	70-31898-03	Front bezel assembly, frost white
3	74-49277-01	Push button (3)
4	54-23594-01	OCP module
5	30-43447-01	LCD,DV16100 S2FTLY
6	70-31897-01 70-31897-02	Caster left (front and back) Caster right (front and back)
7	12-39309-04	Speaker assembly, 270 mm
8	74-49365-01	Drive bracket (CD-ROM, right side)
9	12-43231-04	Front keylock assembly
10	70-30796-05	Cover assembly, 5.25-inch drive, frost white
11A 11B	74-48642-01 74-48642-02	SBB rail, right SBB rail, left
12	70-31906-02	Door assembly, frost white
13	70-31675-02	Side panels (left and right), frost white
14	30-48019-01	5.25-inch, half-height quad speed CD-ROM, frost white
15	00-PCXRJ-AD	3.5-inch, floppy disk drive, 1.44 MB, frost white
16	RZ28C-VW RZ29C-VW	2 GB 3.5-inch SCSI BB 4 GB 3.5-inch SCSI BB
17	70-31918-02	Brake assembly, frost white
18	70-31927-02	Door assembly, driver
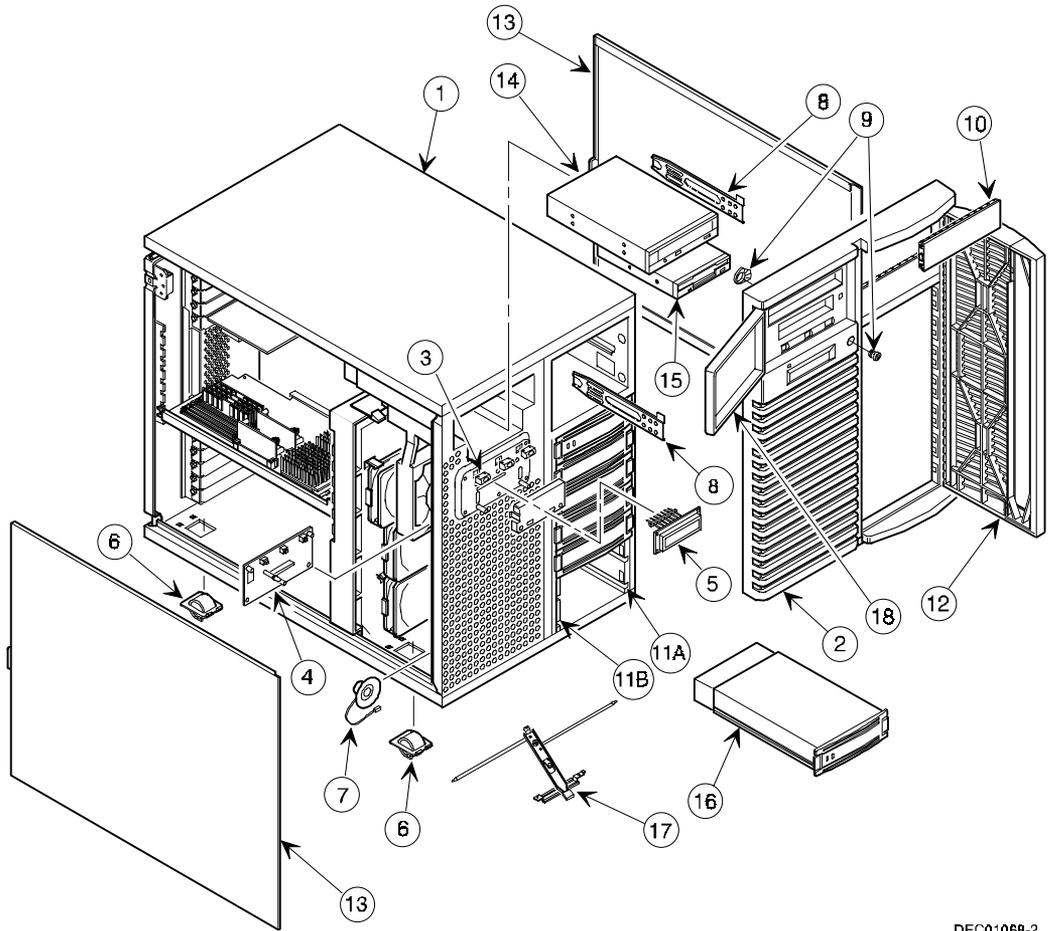
Figure 5-1. Server Front View

Server Left-Side View (Pentium Pro Processor)

Figure Legend	Orderable Spare Part	Description
1A	12-41569-02	Primary fan
1B	12-41569-06	Secondary fan
2	17-04096-01	Flat 10-pin cable assembly (OCP power/data cable)
3	21-39151-01	Real-time clock (server battery)
	(or substitute part 21-39151-02)	
4	54-24568-01/-02	Main logic board
5	54-24576-01 or 54-25310-01	Module, 10/100Base-T Ethernet daughter card
		NOTE: items 4 and 5 must be used together as follows: 54-24568-01 must be used with 54-24576-01 and 54-24568-02 must be used with 54-25310-01.
6	54-24590-01	Processor module without Processor
	70-32544-01	Single P6 200 256 cache Processor module
	70-32544-02	Dual P6 200 256 cache Processor module
	70-32544-03	Single P6 200 512 cache Processor module
	70-32544-04	Dual P6 200 512 cache Processor module
7	70-32520-01	Retainer assembly (for Processor module)
8	20-47282-17	EDO SIMM, 8 MB
	54-24123-AA	EDO SIMM, 64 MB
	20-47283-17	EDO SIMM, 16 MB
	20-47281-17	EDO SIMM, 32 MB
	54-24123-AA	SIMM, 128 MB Fast Page
9	17-03460-08	Flat 34-pin cable assembly (for diskette drive)
10	17-03895-06	50-pin SCSI cable assembly (five connectors), for CD-ROM
11	17-04143-04	68-pin SCSI cable assembly (two connectors unshielded) (2)
12	17-04142-01	Cable assembly, 68-pin conductor, SCSI-3, 1 male connector, 1 female connector (connects to external SCSI knockout).
13	54-24052-01	Processor module VRMs
14A	12-44211-01	Primary fan
14B	12-44211-01	Secondary fan

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Figure 5-2. Server Left-Side View (Pentium Pro Processor)

Server Left-Side View (Pentium II Processor)

Figure Legend	Orderable Spare Part	Description
1A	12-41569-02	Primary fan
1B	12-41569-06	Secondary fan
2	17-04096-01	Flat 10-pin cable assembly (OCP power/data cable)
3	21-39151-01	Real-time clock (server battery)
	(or substitute 21-39151-02)	
4	54-24568-01/-02	Main logic board
5	54-24576-01 or 54-25310-01	Module, 10/100Base-T Ethernet daughter card
		NOTE: items 4 and 5 must be used together as follows: 54-24568-01 must be used with 54-24576-01 and 54-24568-02 must be used with 54-25310-01.
6	54-25304-01 54-25440-01 FR-PCB4U-AE FR-PCJ2U-AB	Processor module without processor (266 MHz) Processor module without processor (300 MHz) Processor module with single processor, terminator, and VRM (266 MHz) Processor module with single processor, terminator, and VRM (300 MHz)
7	70-32520-01	Retainer assembly (for Processor module)
8	20-47083-D7 70-47167-D7 20-45608-D7	32 MB DIMM 64 MB DIMM 128 MB DIMM
9	17-03460-08	Flat 34-pin cable assembly (for diskette drive)
10	17-03895-06	50-pin SCSI cable assembly (five connectors), for CD-ROM
11	17-04143-04	68-pin SCSI cable assembly (two connectors unshielded) (2)
12	17-04142-01	Cable assembly, 68-pin conductor, SCSI-3, 1 male connector, 1 female connector (connects to external SCSI knockout).
13	20-48989-01	Processor module VRM
14A	12-44211-01	Primary fan
14B	12-44211-01	Secondary fan

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Figure 5-2. Server Left-Side View (Pentium II Processor)

Server Right-Side/Rear View

Figure Legend	Orderable Spare Part	Description
1	70-31919-01	Side panel lock assembly
2	12-37977-04	Rear keylock assembly
3	70-31909-01	Microswitch cable assembly
4	74-48303-01	I/O expansion board cover bracket
5	30-43120-01	Power supply (1)
6	70-31890-01	Wire assembly (three wires)
7	70-31894-01	Wire assembly (12 wires)
8	70-31928-01	System power wire assembly
9	17-04143-02	68-pin SCSI cable assembly (jumper cable)
10	12-41768-03	SCSI terminator 68-position single-ended
11	54-23384-02	Hot-swap backplane module
12	12-41569-07	Fan assy, 120 x 120 MM
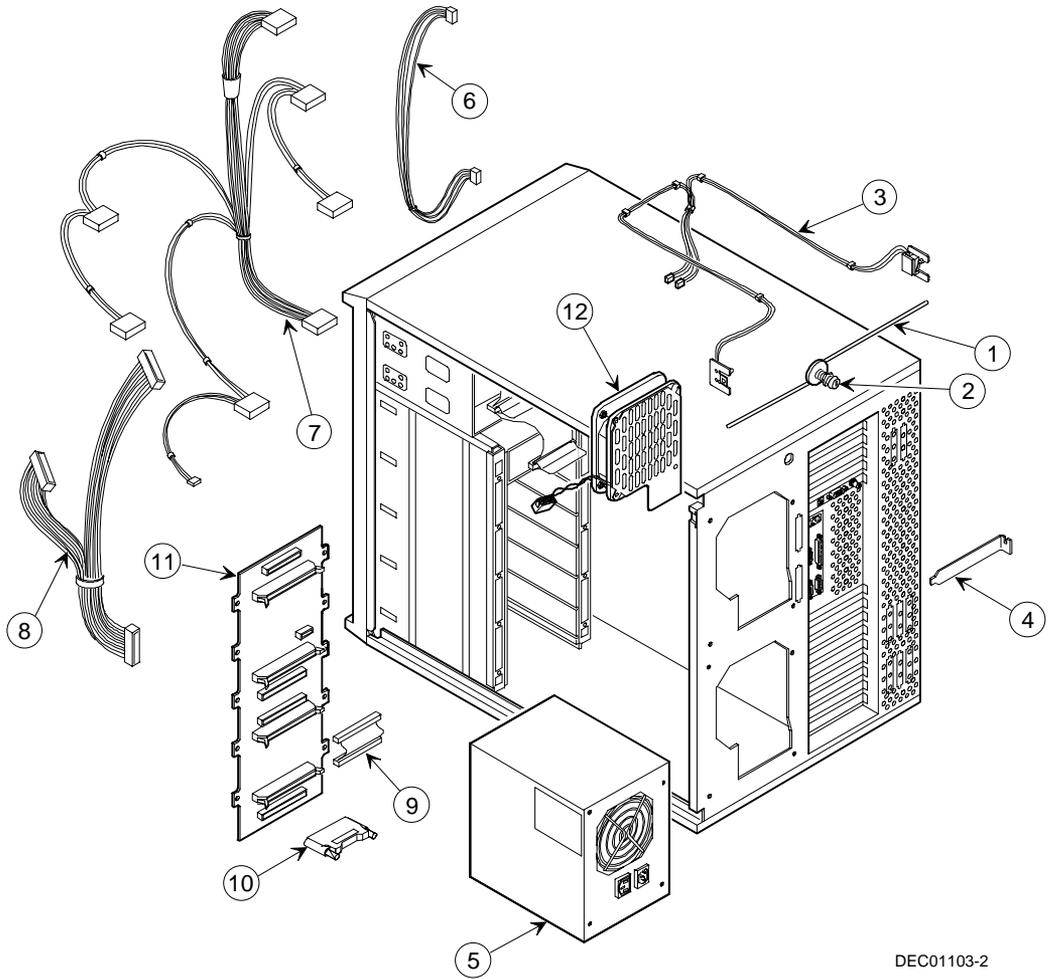
Figure 5-3. Server Right-Side/Rear View

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Miscellaneous

Orderable Spare Part	Description
30-42584-01	Proteon EISA token ring NIC
30-41854-01	14.4 bps data/fax modem
30-42291-01	28.8 data/14.4 fax modem
30-43529-02	Adapter, host, PCI SCSI wide 2-channel (3940W)
30-48127-01	Adaptec 3940UW
30-46890-02	Rev C controller, 2-channel, RAID with battery (FR-PCTAR-BD)
30-48115-02	Rev E controller, 2-channel, RAID with battery (FR-PCTAR-BD)
30-47636-01	Battery backup (FR-PCTAR-UB)
PCXLA-NA	Keyboard, frost white
PCXLN-AB	PS/2 2-button mouse, frost white
54-25302-02	Terminator Card
70-31468-44	4 GB 5400 RPM Ultra Wide SBB (FR-CECAA-CA)
30-49113-01	1 Channel PCI RAID Ultra Wide adapter with EDRAM (FR-PCTAR-GA)
30-49113-02	2 Channel PCI RAID Ultra Wide adapter with EDRAM (FR-PCTAR-GB)
30-49113-03	3 Channel PCI RAID Ultra Wide adapter with EDRAM (FR-PCTAR-GC)
30-48622-01	DLT 7000 35/70 GB (FR-PCXLT-AD)
30-48985-01	SCSI Bus Expander (FR-PCSBR-AA)
FR-CK450-RP	RAID Array 450 NT Cluster Kit, pedestal
54-24602-01	PCI Fast Ethernet 10/100 (Digital Equipment Corp.)(FR-DE500-AA)
30-48628-01	PCI Fast Ethernet 10/100 (FR-PCXDN-BA)

Labels and Nameplates

Orderable Spare Part	Description
74-49386-43	Nameplate, DIGITAL Server 5000
36-44556-01	Warning label, power switch
36-45369-05	Label, user info guide (right)
36-45369-04	Label, user info guide (left)

Service Procedures

The following sections provide detailed service instructions for DIGITAL Servers.

CAUTION: 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. To prevent damage to circuit boards and/or components:

- Before touching any circuit board or component, touch the metal frame of the server to discharge any static electricity.

- Keep circuit boards and components away from non-conductors.

Recommended Tools

Have the following tools available:

- Multimeter (4½-inch digit)

- Phillips screwdriver

- Antistatic wrist strap (recommended, but not required)

BIOS Version Information

For access directly to the software library for BIOS upgrades, use the following Internet address:

```
http://www.windows.digital.com/~ftp/00-index.stm
```

Disconnecting External Devices and Power

Before removing the side panels, perform the following:

1. Secure the server using the brake (see Figure 5-4).

2. Shut down any applications that are currently running, then shut down the operating system.

3. Turn off power to all external devices connected to the server.

4. Turn the server off.

5. Unplug the power cord from the wall outlet.

   Disconnect the monitor's power cord from the external ac outlet and the data cable from the server.
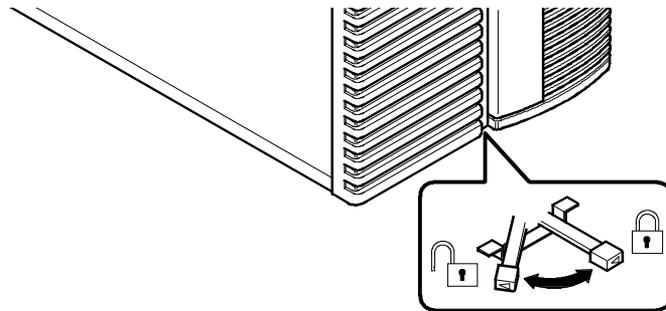
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Figure 5-4. Server Brake

Removing the Side Panels

To remove the side panels, perform the following:

⚠️ **WARNING:** Removing the side panels activates two interlock switches located at the top-left and top-right of the server. These switches inhibit power to the server when activated. You might injure yourself or damage the server if you attempt to bypass these switches.

1. Unlock the side panels.

2. Slide the panels to the rear of the server.
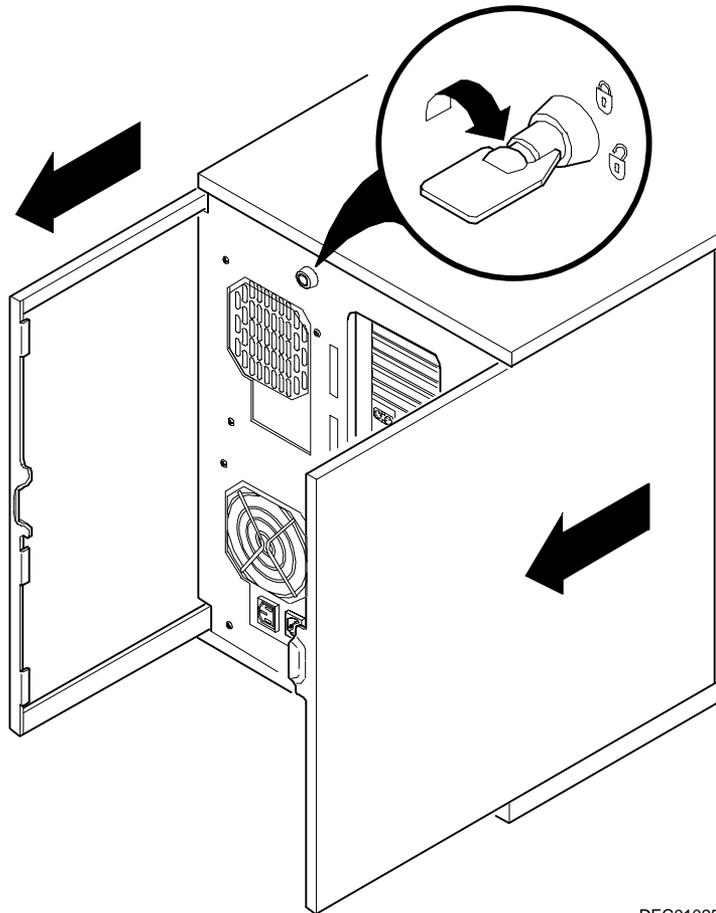
DEC01025-2

Figure 5-5. Unlocking and Removing the Side Panels

Server Front View

Figure Legend	Component
A	CD-ROM drive
B	3½-inch diskette drive
C	Front access 5¼-inch or 3½-inch half-height drive bays
D	3-way security lock
E	Integral hot-swap device bay for Storage Building Blocks (SBBs)
F	Power, OCP, and reset buttons
G	Brake
H	Operator control panel (OCP)
I	Power indicator
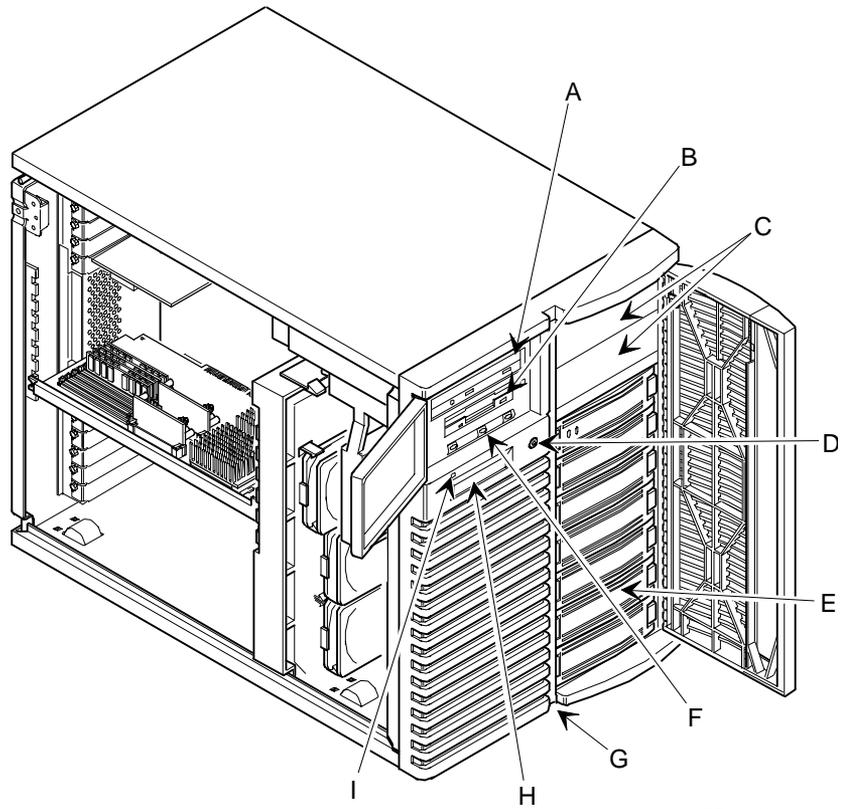
Figure 5-6. Server Front View

DEC01026-2

Server Left Side View

Figure Legend	Component
J	Redundant cooling fans
K	Cooling fans
L	Casters
M	Five EISA expansion slots
N	Pentium Pro processor module or Pentium II processor module
O	Three primary PCI slots
P	Location of main logic board
Q	Ethernet daughter card
R	Three secondary PCI slots
S	Power switch interlock
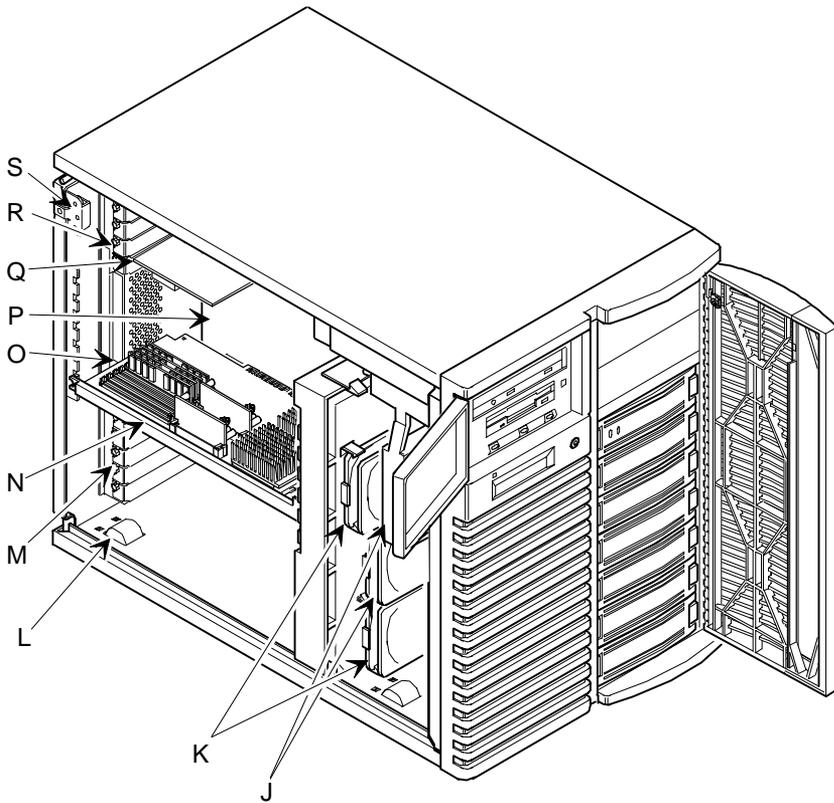
DEC01026-3

Figure 5-7. Server Left Side View

Server Right Side View

Figure Legend	Component
J	Rear fan
K	Power interlock switch
L	Power supply
M	Storage backplane SCSI terminator
N	SCSI address jumpers (J181)
O	Storage backplane
P	Jumper cable
Q	Power plug
R	Wide SCSI 68-pin connector

NOTE: If installing a second redundant power supply, you must remove the rear fan, item J, and disconnect it from the main logic board.
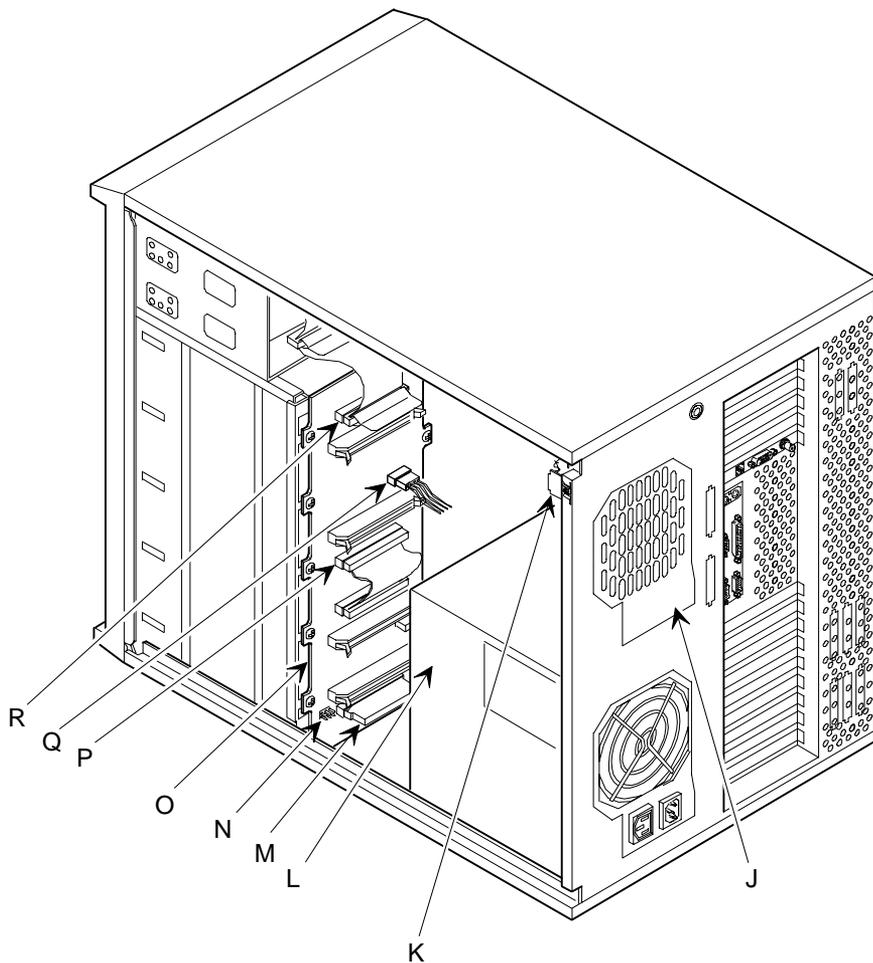
DEC01027-2

Figure 5-8. Server Right Side View

Server Rear View

Figure Legend	Component
A	SCSI knockouts (back panel)
B	Keylock
C	10Base-T connector (RJ45)
D	10Base-2 connector (BNC)
E	10Base-5 connector (AUI)
F	Keyboard and mouse ports
G	Parallel port
H	SVGA graphics port
I	Serial ports
J	ac power plug
K	ac power out/monitor plug
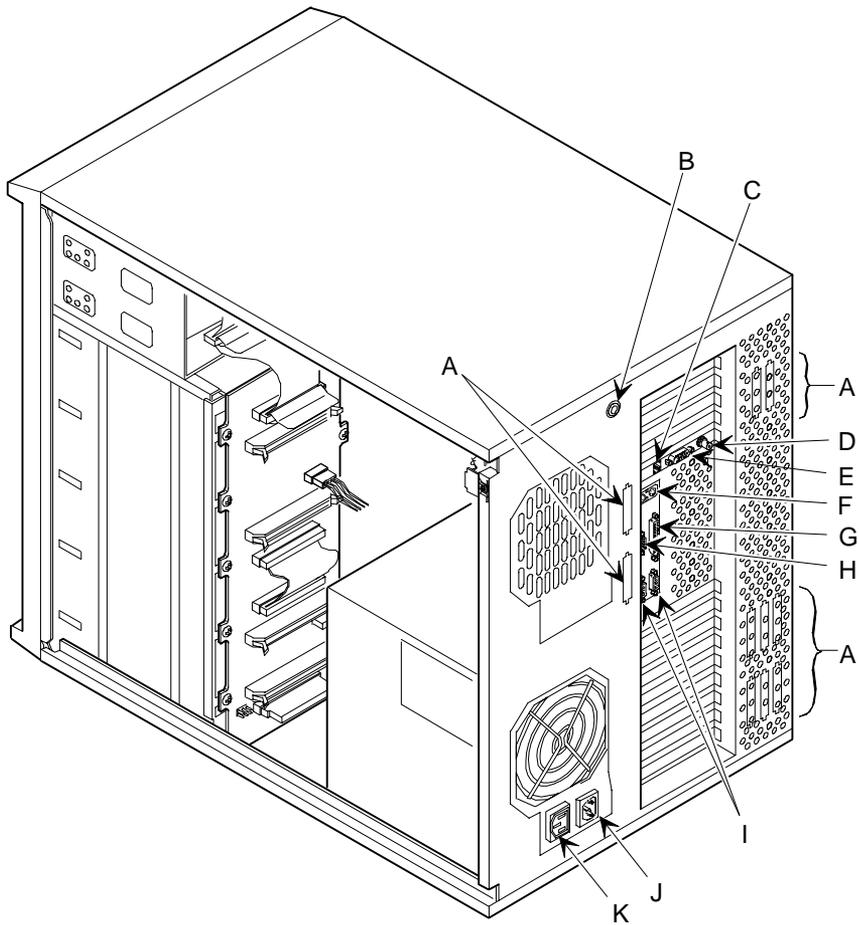
DEC01027-3

Figure 5-9. Server Rear View

Main Logic Board Connectors

Figure Legend	Connector
A	EISA expansion slots (1 through 5)
B	Remote Server Management (RSM)
C	Primary PCI expansion slots (1 through 3) [1]
D	Serial ports
E	Parallel port and video port
F	Mouse and keyboard ports
G	Ethernet daughter card connector
H	Secondary PCI expansion slots (4 through 6) [1]
I	Diskette drive
J	68-pin wide SCSI connector (channel B)
K	Fan 5 (rear fan)
L	3.3 V dc power
M	5 V dc power supply
N	Power control signal
O	Operator Control Panel (OCP)
P	68-pin wide SCSI connector (channel A)
Q	50-pin narrow SCSI connector (channel A)
R	Fan 2 (redundant)
S	Fan 1
T	Pentium Pro processor module or Pentium II processor module
U	Fan 4 (redundant)
V	Speaker
W	Fan 3
X	MREQ slot 5 jumper
Y	MREQ slot 4 jumper

(1) PCI slots 1 through 3 do not support 3.3V. If your PCI expansion board needs 3.3V, use PCI slots 4
    through 6.
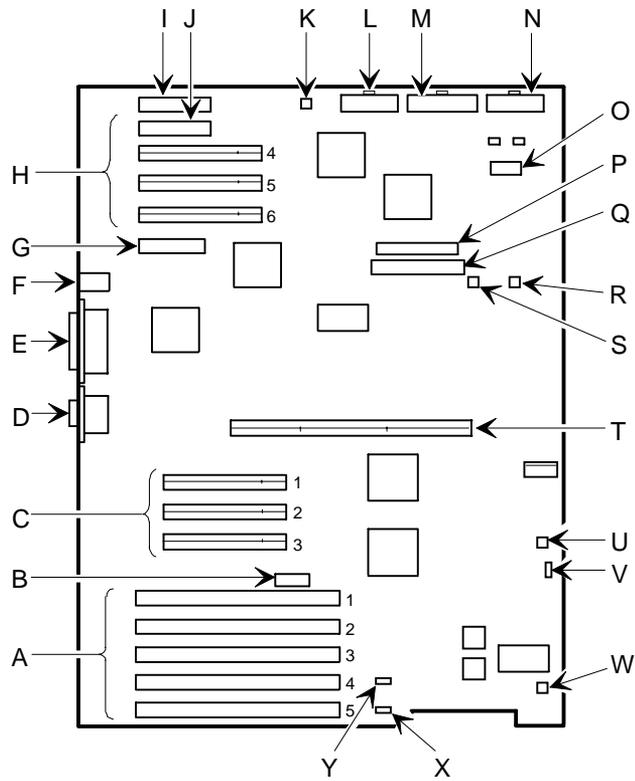
DEC01028-2

Figure 5-10. Main Logic Board Connectors

Main Logic Board Components

Figure Legend	Component
A	SVGA graphic controller
B	Ethernet controller
C	SCSI controllers
D	8031 ROM
E	Dip switch block
F	Real-time clock/server battery
G	BIOS flash ROM
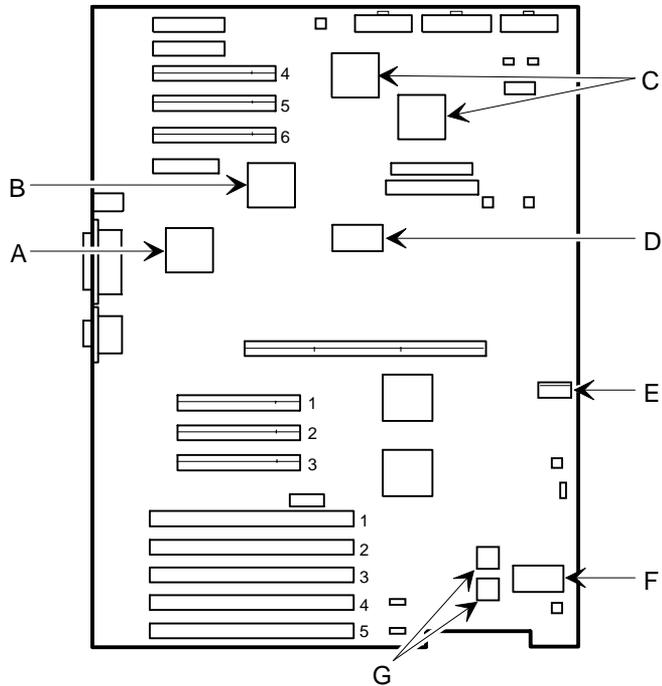
DEC01028-3

Figure 5-11. Main Logic Board Components

Pentium Pro Processor Module Components and Connectors

Figure Legend	Component/Connector
A	Eight memory SIMM sockets
B	Pentium Pro processor #1 ZIF socket
C	Pentium Pro processor #2 ZIF socket
D	Voltage Regulator Module (VRM) slot, processor 2
E	Voltage Regulator Module (VRM) slot, processor 1
F	Frequency ratio DIP switches
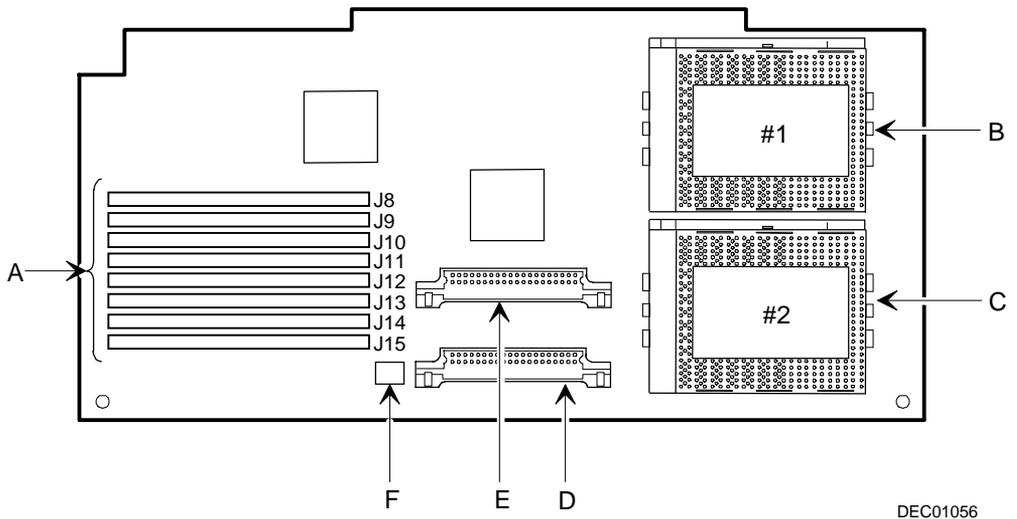
DEC01056

Figure 5-12. Pentium Pro Processor Module Components and Connectors

Pentium II Processor Module Components

Figure Legend	Component/Connector
A	Pentium II processor
B	Pentium II processor slot or terminator card
C	Dip switch for processor settings
D	Four DIMM sockets
E	Voltage Regulator Module (VRM) slot, processor 2
F	Voltage Regulator Module (VRM) slot, processor 1
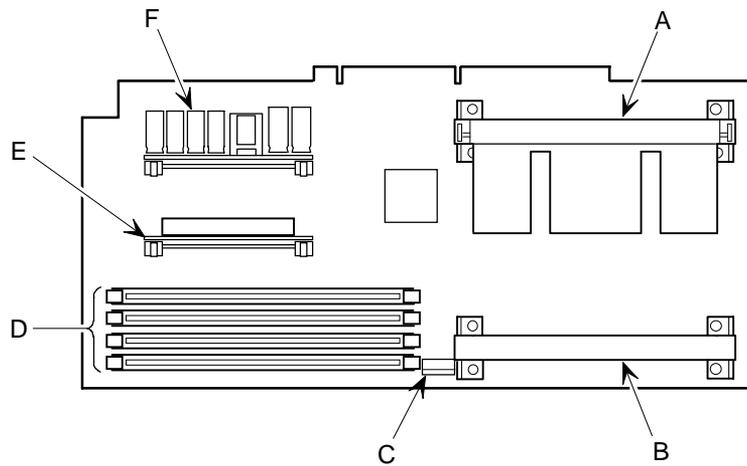
DEC001248-2

Figure 5-13. Pentium II Processor Module Component Locations

Ethernet Daughter Card Components and Connectors

Figure Legend	Component/Connector
A	10/100Base-T connector (RJ45)
B	10Base-5 connector (AUI)
C	10Base-2 connector (BNC)
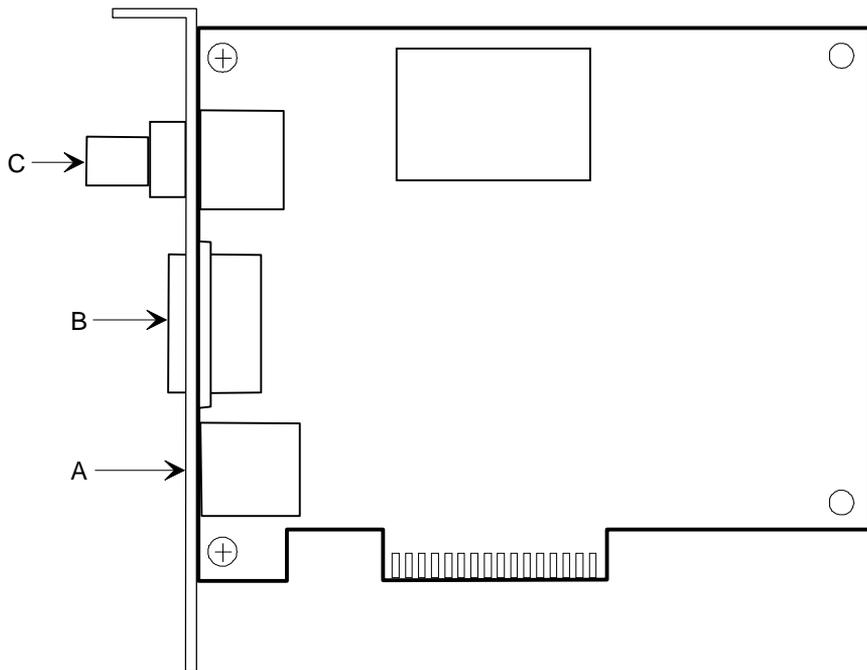
DEC01030-2

Figure 5-14. Ethernet Daughter Card Components and Connectors

Jumpers and Switch Settings

The following table lists the main logic board switch settings, jumper settings, and factory-default settings. Figure 5-15 shows the switch and jumper locations.

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.

Feature	Function	Setting	Description
BIOS upgrade	Disabled Enabled[1]	SW1-1, off SW1-1, on[1]	The main logic board's flash BIOS upgrade switch must be set to the disabled (OFF) position to prevent unauthorized personnel from loading a new server BIOS. Loading a new server BIOS might allow someone to override other server security features or introduce a virus into the server.
Recovery mode	Normal mode[1] Recovery mode	SW1-2, off[1] SW1-2, on	If a BIOS upgrade failed, refer to the README.TXT file that came with the BIOS upgrade.
Boot block update	Disabled[1] Enabled	SW1-3, off[1] SW1-3, on	Set this switch to the password clear (ON) position and then restart the server to reset the password.
Password clear	Normal[1] Password clear	SW1-4, off[1] SW1-4, on	If you forget your password, set this switch to the password clear (ON) position and then restart the server.
RSM installed	Installed Not installed[1]	SW1-5, off SW1-5, on[1]	If DIGITAL's Remote Server management (RSM) option is added to the server, connect the RSM reset cable to connector RSM and change the switch position to the installed (OFF) position.
NVRAM	Normal operation[1] Clear	SW1-6, off[1] SW1-6, on	Clears contents of NVRAM. Set only in the case when a configuration change using the SCU did not complete successfully (e.g. power failed while configuring), or a configuration was defined which no longer allows the server to boot. The BIOS settings will return to their default values, and the SCU will need to be rerun to reconfigure the server.
Reserved	Reserved	SW1-7, off[1]	This switch should always be OFF.
Reserved	Reserved	SW1-8, off[1]	This switch should always be OFF.
MREQ slot 4	No delay[1] delay one EISA clock	J56, pins 1 and 2[1] J56, pins 2 and 3	Allows you to delay a memory request to EISA slot 4 by one EISA clock or no delay. **Note:** If the installed EISA expansion board has an Intel 82355 BMIC chip, the jumper should be set to delay one EISA clock.
MREQ slot 5	No delay[1] delay one EISA clock	J57, pins 1 and 2[1] J57, pins 2 and 3	Allows you to delay a memory request to EISA slot 5 by one EISA clock or no delay. **Note:** If the installed EISA expansion board has an Intel 82355 BMIC chip, the jumper should be set to delay one EISA clock.

(1) Factory default setting

ON = switch closed; OFF = switch open

DEC01028-6
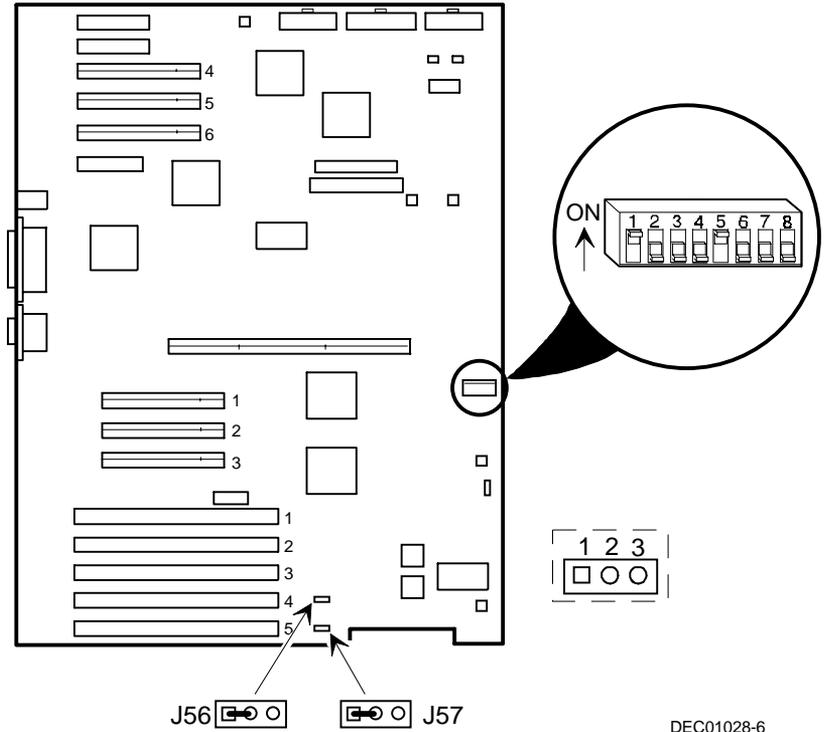
Figure 5-15. Main Logic Board Switch and Jumper Locations

Pentium Pro Processor Module Switch Settings

The following table lists the Pentium Pro processor module switch settings. Figure 5-16 shows the switch locations.

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.

Speed		Position	Switches	SW4 Switch Settings
133 MHz	❑	UP		■ ■ ■ ■
	■	DOWN	1, 2, 3, 4	
166 MHz	❑	UP	2	■ ❑ ■ ■
	■	DOWN	1, 3, 4	
200 MHz	❑	UP	3	■ ■ ❑ ■
	■	DOWN	1, 2, 4,	
233 MHz	❑	UP	2, 3,	■ ❑ ❑ ■
	■	DOWN	1, 4	
266 MHz	❑	UP	4	■ ■ ■ ❑
	■	DOWN	1, 2, 3	
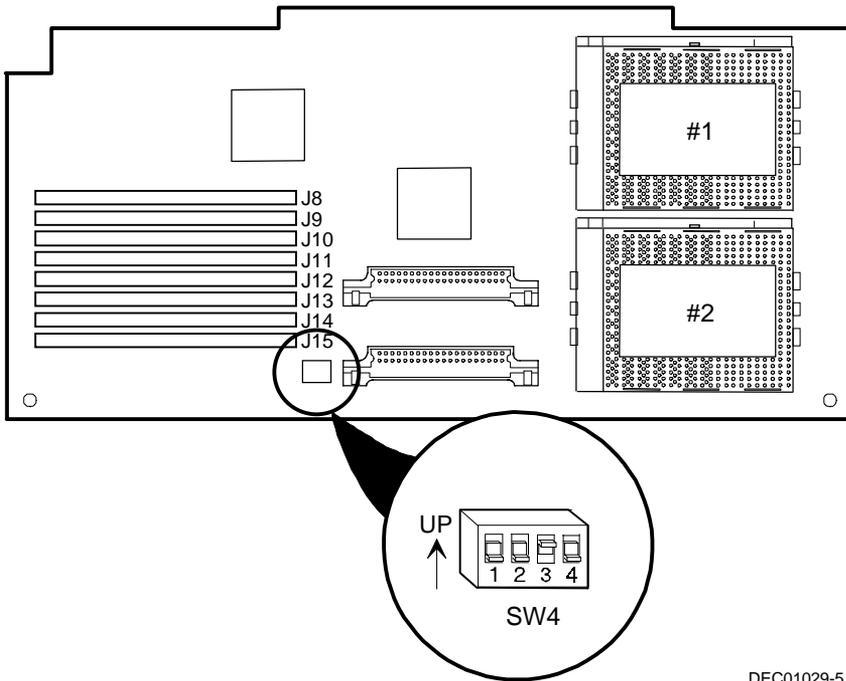
DEC01029-5

Figure 5-16. Pentium Pro Processor Module Switch Locations

Pentium II Processor Module Switch Settings

The following table lists the Pentium II processor module switch settings. Figure 5-17 shows the switch locations.

> ⚠ **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.

Processor Clock Speed Switch Settings

The following table provides the switch settings for a number of available Pentium II processors.

Speed		Position	Switches	J19 Switch Settings
200 MHz[1]	❏ ■	UP DOWN	2, 5, 6, 7, 8 1, 3, 4	■□■■□□□□
233 MHz[1]	❏ ■	UP DOWN	1, 2, 5, 6, 7, 8 3, 4	□□■■□□□□
266 MHz	❏ ■	UP DOWN	3, 5, 6, 7, 8 1, 2, 4	■■□■□□□□
300 MHz	❏ ■	UP DOWN	1, 3, 5, 6, 7, 8 2, 4	□■□■□□□□
333 MHz[2]	❏ ■	UP DOWN	2, 3, 5, 6, 7, 8 1, 4	■□□■□□□□
366 MHz[2]	❏ ■	UP DOWN	1, 2, 3, 5, 6, 7, 8 4	□□□■□□□□
400 MHz[2]	❏ ■	UP DOWN	4, 5, 6, 7, 8 1, 2, 3	■■■□□□□□
433 MHz[2]	❏ ■	UP DOWN	1, 4, 5, 6, 7, 8 2, 3	□■■□□□□□
466 MHz[2]	❏ ■	UP DOWN	2, 4, 5, 6, 7, 8 1, 3	■□■□□□□□
500 MHz[2]	❏ ■	UP DOWN	1, 2, 4, 5, 6, 7, 8 3,	□□■□□□□□
533 MHz[2]	❏ ■	UP DOWN	3, 4, 5, 6, 7, 8 1, 2	■■□□□□□□

[1] Processor speeds not supported.
[2] The processor speeds indicated above are anticipated future processor products. This does not
constitute a promise of the availability of such a processor, but should it be made available some time
in the future, these are the needed switch settings to support such a processor.
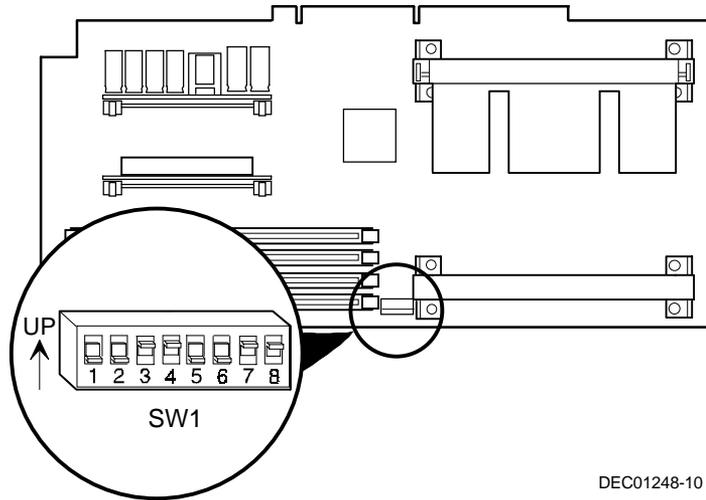
DEC01248-10

Figure 5-17. Pentium II Processor Module Switch Settings

Installing Additional SIMM Memory

Pentium Pro-based DIGITAL Servers support up to 1 GB of EDO memory or Fast-Page memory using single in-line memory modules (SIMMs). The server's memory can be increased by adding or replacing SIMMs on the installed processor module.

The server has a minimum supported memory of 32 MB. Memory is configured in banks, with each bank containing two SIMMs. The processor module contains Banks 0 through 3, with two SIMMs per bank.

 CAUTION: Only install SIMMs sold by Digital Equipment Corporation.

Server SIMMs Requirements

|	
Supported SIMMs	36-bit SIMMs, 60 ns access time, EDO memory
	or
	36-bit SIMMs, 60 ns access time, Fast-Page memory
Supported densities	For EDO memory 8MB, 16MB, and 32MB For Fast-Page memory 64MB or 128MB
Minimum server memory supported	32 MB
Maximum server memory supported	1 GB

Memory Configuration Guidelines

NOTE: Before you begin, create an SCU diskette using Quick Launch. You must run the SCU after installing any memory upgrade. This allows the server to recognize the new memory configuration.

The memory configuration guidelines for the DIGITAL server are as follows:

- Each memory bank on the processor module must contain two SIMMs which must be the same size and type.

- Install memory starting at Bank 0, then Bank 1, then Bank 2, and Bank 3 last.

- Add two SIMMs at a time to fill up a bank.

- Mix EDO and Fast Page memory by bank only.
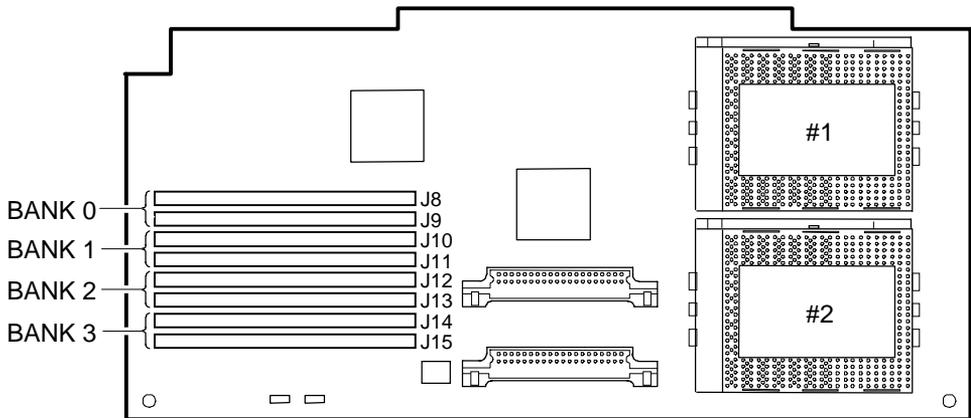
DEC01029-3

Figure 5-18. Processor Module SIMM Bank Locations

Upgrading Memory

You can upgrade memory on the DIGITAL server by adding or replacing SIMMs on the installed processor module. You must add two SIMMs (per bank) when expanding memory starting from Bank 0.

Memory Troubleshooting

The DIGITAL server's Power On Self Test (POST) can detect memory size, type, and errors when it boots. The memory size, type, and error can be isolated to a pair of SIMMs on the installed processor module. The SIMM type can be either Fast-Page memory (FP) or Extended Data Out (EDO) memory. The memory error message format is:

```
<Type of Error> <Location> <Size> <Type>
```

The examples for a single bit memory error:

- Correctable Error J8/J9 zz MB FPM SIMMs

- Correctable Error J10/J11 zz MB EDO SIMMs

The examples for multiple bits memory error:

- Uncorrectable Error : J12/J13 zz MB FPM SIMM's

- Uncorrectable Error : J14/J15 zz MB EDO SIMM's

Where:

<Type of Error>	Correctable error	
	Uncorrectable error	
<Location>	Processor Module	J8/J9
	Processor Module	J10/J11
	Processor Module	J12/J13
	Processor Module	J14/J15

If a correctable error occurs, the BIOS will display: "Press <F1> to resume" after the server boots.

If an uncorrectable error occurs, the server will halt after the memory test.

To isolate to the failing SIMM, replace one of the two SIMMs which was indicated in the POST error message with a similar SIMM and then rerun POST. If the same error message occurs, replace the second SIMM with the SIMM that was previously removed.

Installing Additional DIMM Memory

Pentium II-based DIGITAL Servers provide an EDO/ECC memory system. Depending on the model, the minimum supported memory is 32 MB. The maximum supported memory is 512 MB. When configuring total server memory (DIMM combinations), make sure that you reference the DIMM memory configuration table and follow all DIMM memory configuration guidelines.

CAUTION: Only install DIMMs sold by Digital Equipment Corporation.

Memory Configuration Guidelines

NOTE: Before you begin, create an SCU diskette using Quick Launch. You must run the SCU after installing any memory upgrade. This allows the server to recognize the new memory configuration

- Supported DIMMs: 168 pin, 72-bit 60 ns access time. EDO memory, ECC protected.

- Supported densities: DIMMs are available in 32 MB, 64 MB, and 128 MB.

- Maximum memory: 512 MB.

- Each memory bank on the processor module will accommodate one DIMM memory module.

- Install DIMM memory modules starting with bank 0 (J15). See Figure 5-19 for DIMM socket locations.

- DIMM memory capacities can be mixed.

J15 (Bank 0)
J16 (Bank 1)
J17 (Bank 2)
J18 (Bank 3)

DEC001248-3
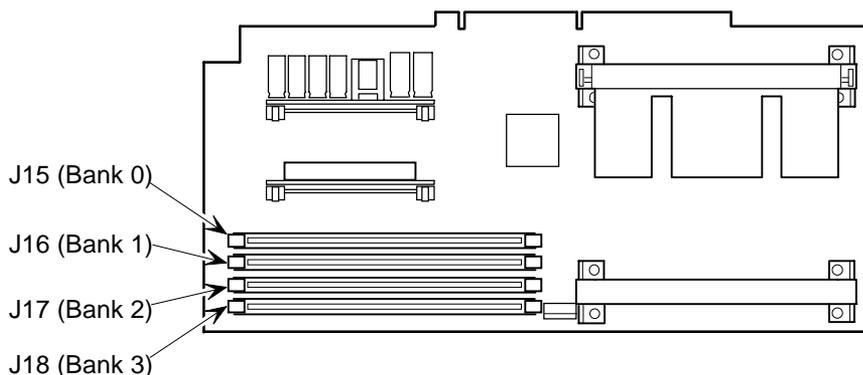
Figure 5-19. DIMM Socket Locations

Memory Configurations

Bank 0 (J15)	Bank 1 (J16)	Bank 2 (J17)	Bank 3 (J18)	Total Memory
32 MB				32 MB
64 MB				64 MB
64 MB	32 MB			96 MB
64 MB	64 MB			128 MB
64 MB	32 MB	32 MB		128 MB
64 MB	64 MB	64 MB		192 MB
64 MB	32 MB	32MB	32MB	160 MB
64 MB	64 MB	32 MB	32 MB	192 MB
64 MB	64 MB	64 MB	32 MB	224 MB
64 MB	64 MB	64 MB	64 MB	256 MB
128 MB				128 MB
128 MB	64 MB	32 MB		224 MB
128 MB	128 MB			256 MB
128 MB	128 MB	64 MB	32 MB	352 MB
128 MB	128 MB	128 MB		384 MB
128 MB	128 MB	128 MB	64MB	448 MB
128 MB	128 MB	128 MB	128 MB	512 MB

Table does not list all possible configurations

Memory Troubleshooting

The DIGITAL Server's Power-On Self Test (POST) can detect memory errors when it boots. The error can be isolated to a single DIMM on the processor module.

The memory error message format is:

```
<Type of error>:       <Location>
```

Where:

```
<Correctable Error>:  <Jxx xxMB EDO DIMM>
```

If the error is correctable when the server boots, the BIOS displays the following:

```
 Press <F1> to resume
```
```
<Uncorrectable Error>:      <Jxx xxMB EDO DIMM>
```

If the error is uncorrectable, the server halts after the memory test.

```
<Configuration Error>:      <Jxx xxMB EDO DIMM>
```

This indicates that an error occurred while reading the memory configuration. The problem is either the DIMM, the processor module, or the main logic board. In all cases, the server halts when this error occurs and the faulty DIMM must be replaced immediately.

Removing and Replacing the Power Supply

1. Turn off the server.

2. Remove the ac power cord and monitor cables, if applicable.

3. Unlock and remove the right side panel.

4. Disconnect the wire harness connectors from the power supply.

5. Remove the four screws from the rear of the chassis.

6. Remove the power supply.

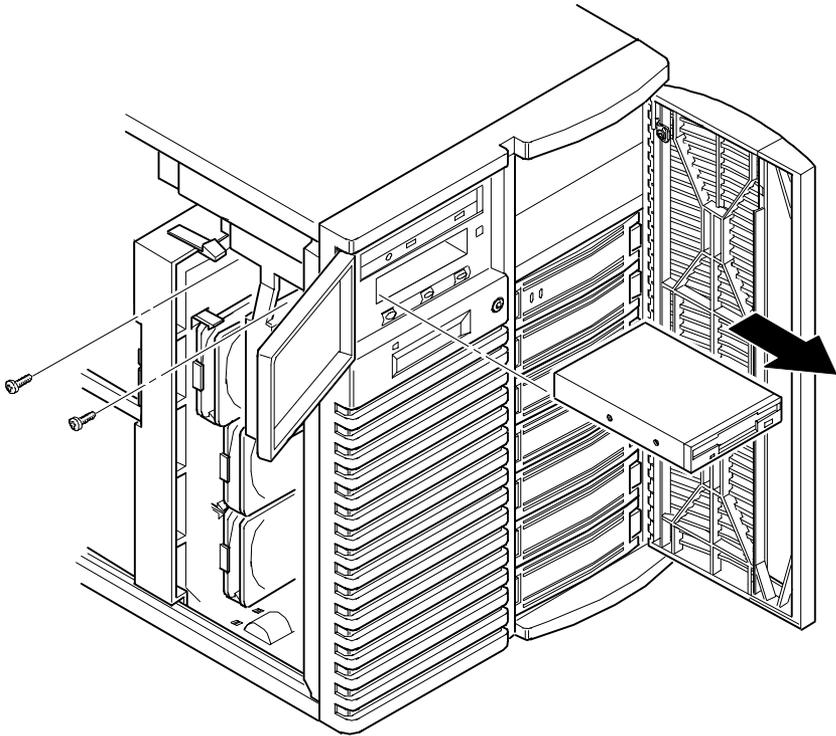7. Replace the power supply by performing the removal steps in reverse order.
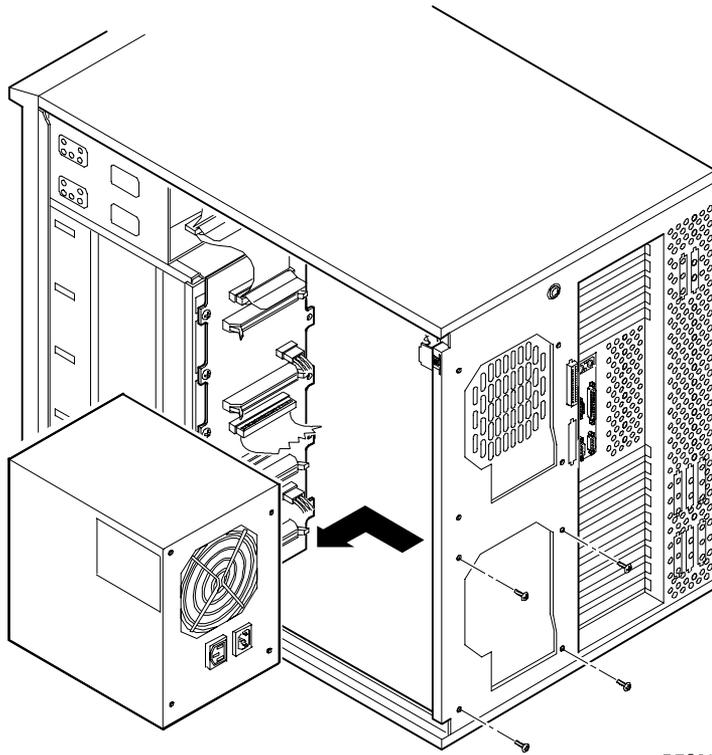
DEC01071

Figure 5-20. Removing and Replacing the Power Supply

Removing and Replacing the Diskette Drive

1. Turn off the server.

2. Unlock and remove the left side panel.

3. Open the door.

4. Disconnect the power and data cables from the drive.

5. Remove the two screws from the drive bay.

6. Slide the drive out from the front of the drive bay.

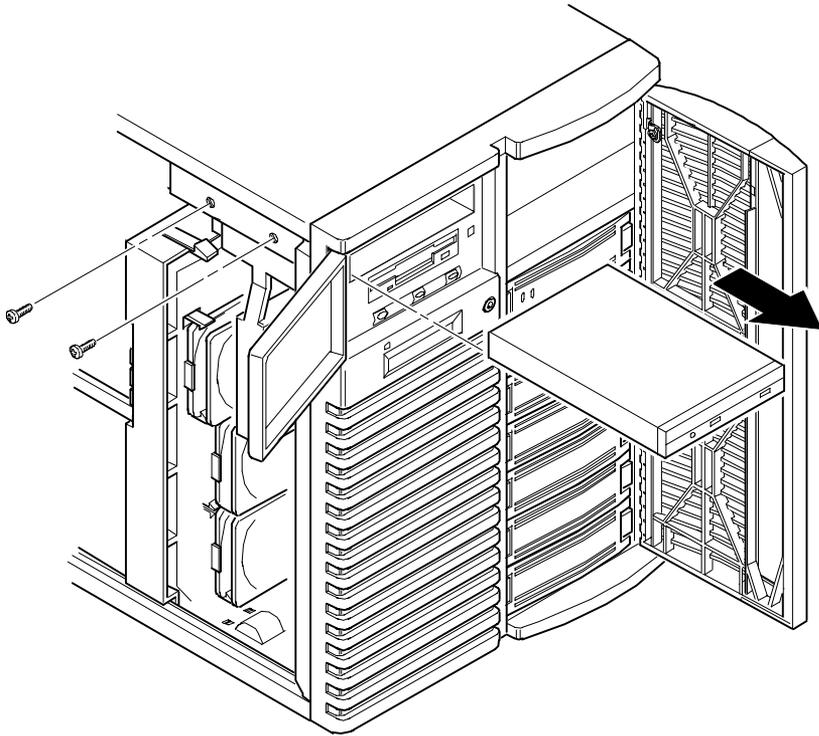7. Replace the diskette drive by performing the removal steps in reverse order.

DEC01077-2

Figure 5-21. Removing and Replacing the Diskette Drive

Removing and Replacing the CD-ROM Drive

1. Turn off the server.

2. Unlock and the remove left side panel.

3. Open the door.

4. Disconnect the power and data cables from the CD-ROM drive.

5. Remove the two screws from the drive bay.

6. Slide the drive out from the drive bay by applying pressure at the rear of the CD-ROM drive.

7. Remove the right side bracket from the right side of the CD-ROM drive.

8. Set jumpers on the new CD-ROM drive identical to those on the removed CD-ROM drive.

9. Replace the CD-ROM drive by performing the removal steps in reverse order.

DEC01077-3

Figure 5-22. Removing and Replacing the CD-ROM Drive

Removing and Replacing a Cooling Fan

The following procedure can be used to remove primary cooling fan 1, secondary cooling fan 4, and primary cooling fan 3.

1. Turn off the server.

2. Unlock and remove the left side panel.

3. Disconnect the fan cable from the main logic board.

4. Release the fan from the plastic tabs.

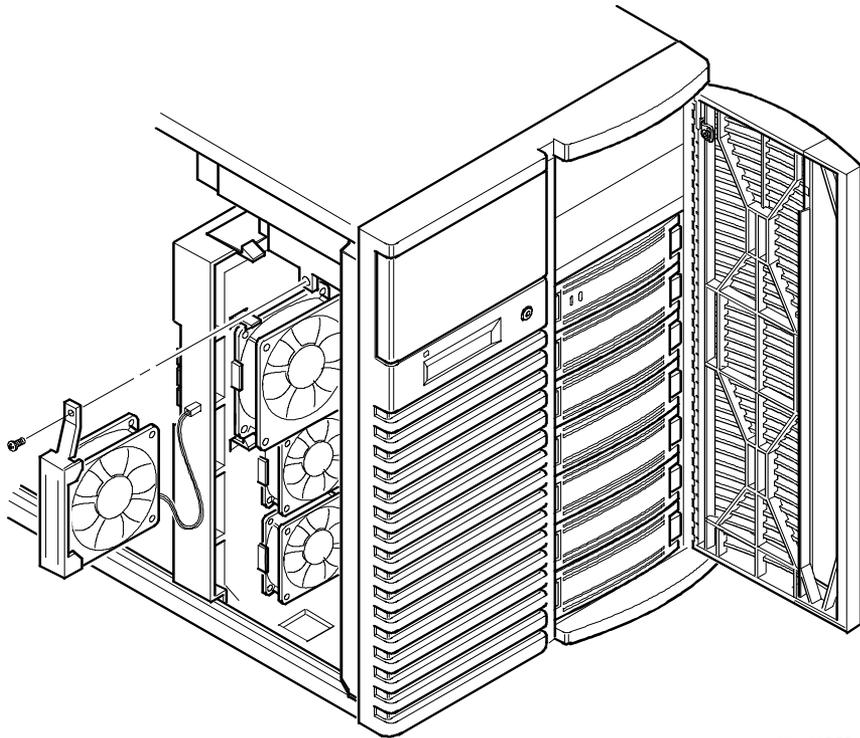5. Remove the fan from the chassis.

6. Replace the fan by performing the removal steps in reverse order.
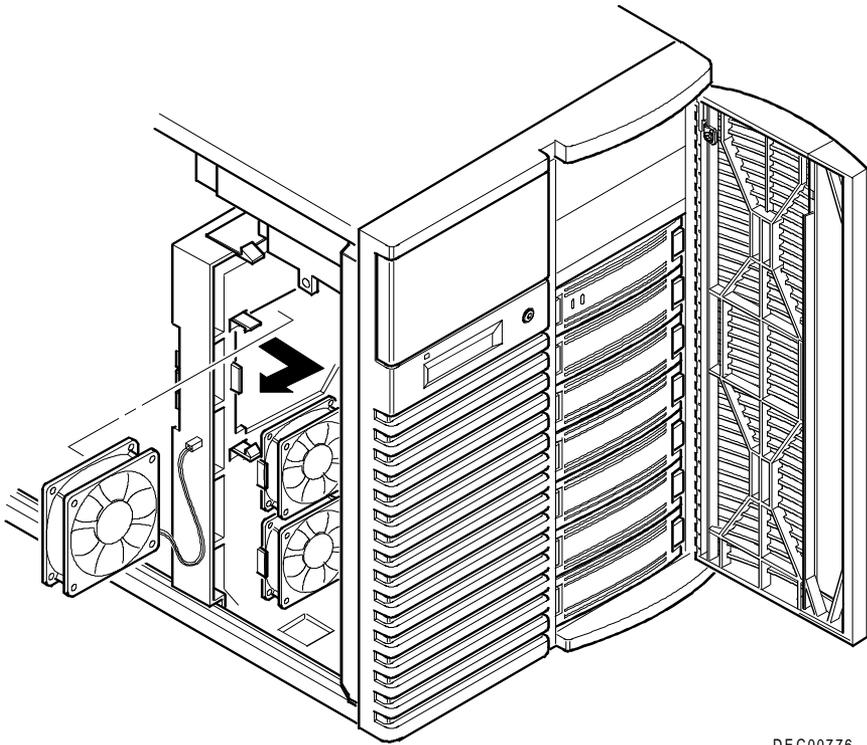
DEC00776

Figure 5-23. Removing and Replacing a Cooling Fan

Removing and Replacing the Secondary Cooling Fan 2

1. Turn off the server.

2. Unlock and remove the left side panel.

3. Disconnect the fan cable from the main logic board.

4. Remove the screw.

5. Remove the fan from the chassis.

6. Remove the fan from the bracket.

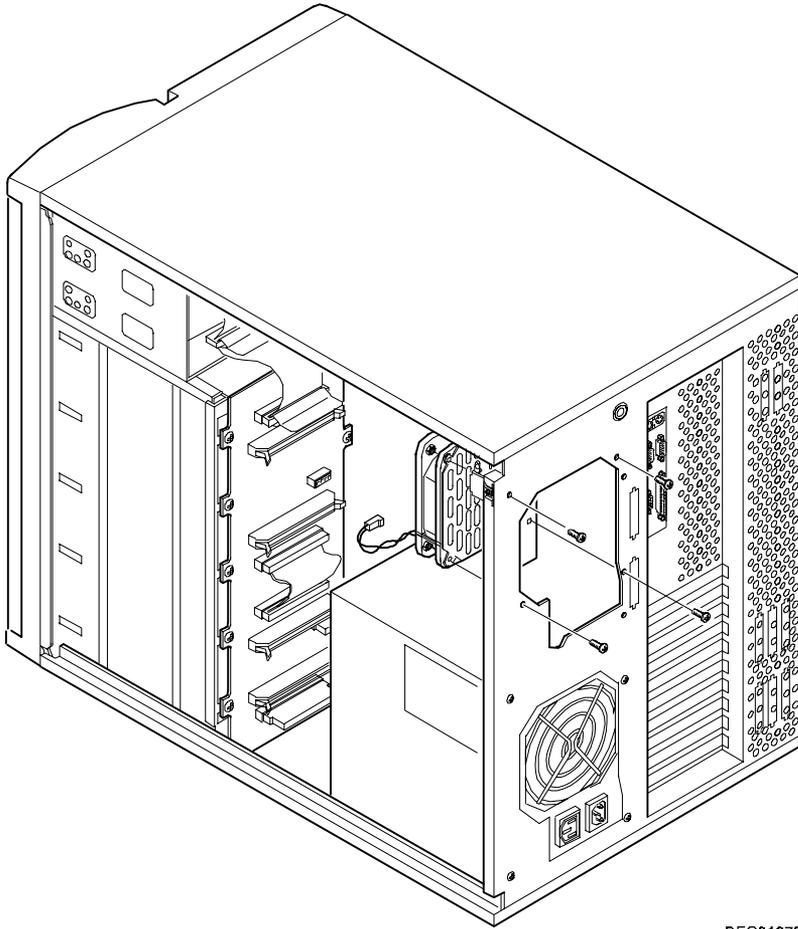7. Replace the fan by performing the removal steps in reverse order.

DEC00777

Figure 5-24. Removing and Replacing the Secondary Cooling Fan 2

Removing and Replacing Cooling Fan 5

1. Turn off the server.

2. Unlock and remove the left and right side panel.

3. Disconnect the fan cable from the main logic board.

4. Remove the four screws securing the fan and brace to the chassis.

5. Remove the fan and brace from the chassis.

6. Remove the four screws securing the fan to the bracket.

7. Replace the fan and bracket by performing the removal steps in reverse order.

DEC01078

Figure 5-25. Removing and Replacing Cooling Fan 5

Removing and Replacing the Speaker

1. Turn off the server.
2. Unlock and remove the left side panel.
3. Disconnect the speaker cable from the main logic board.
4. Remove the speaker from the chassis.
5. Replace the speaker by performing the removal steps in reverse order.
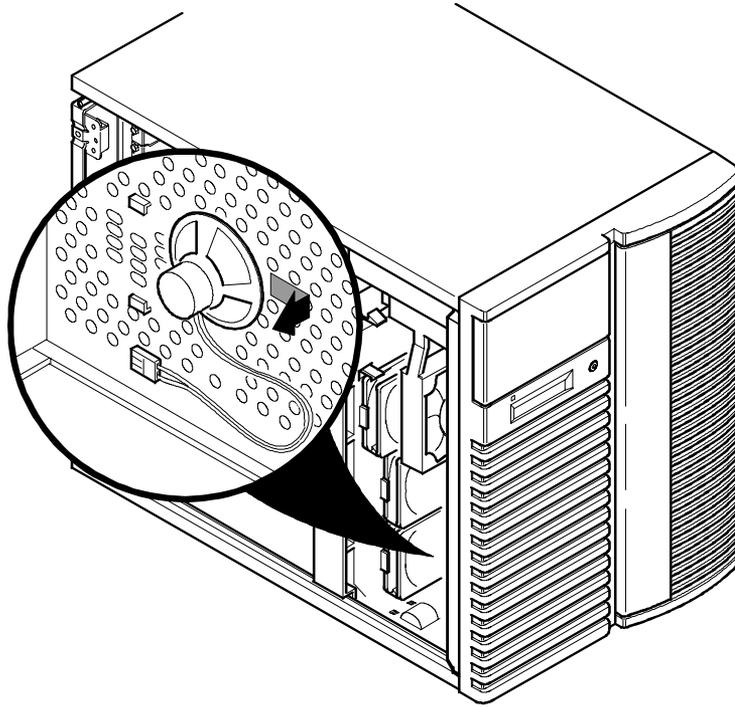
DEC00778

Figure 5-26. Removing and Replacing the Speaker

Removing and Replacing the Main Logic Board

1. Turn off the server.

2. Disconnect all external cables from the I/O expansion modules located at the rear of server.

3. Unlock and remove the left side panel.

4. Disconnect all cables from the main logic board.

5. Record all EISA and PCI slot assignments before removing the expansion boards.

6. Remove the expansion boards, CPU module, and network card.

7. Remove the two screws securing the main logic board to the chassis (A, Figure 5-27).

8. Loosen the seven standoff screws (B, Figure 5-27).

9. Slide the main logic board to the right to release it from the standoffs.

10. Remove the main logic board from the chassis.

11. Configure switch SW1 on the new main logic board.

12. If the new main logic board does not have a battery/RTC, remove the battery/RTC from the old main logic board and replace it on the new main logic board.

13. Align the main logic board over the seven standoff screws and then slide it to the left.

14. Reinstall and tighten the two screws removed in step 7.

15. Tighten the seven standoff screws loosened in step 8.

16. Using the side panel label as a reference, reconnect all cables to the main logic board.

17. Using information recorded in step 5, reinstall the expansion boards, CPU module, and network card to their original configuration.

18. Reconnect all external and internal cable connections.

19. Reinstall and lock the left and right side panel.

20. Turn on the server.

21. Run the SCU to configure the server and restore the system management information.
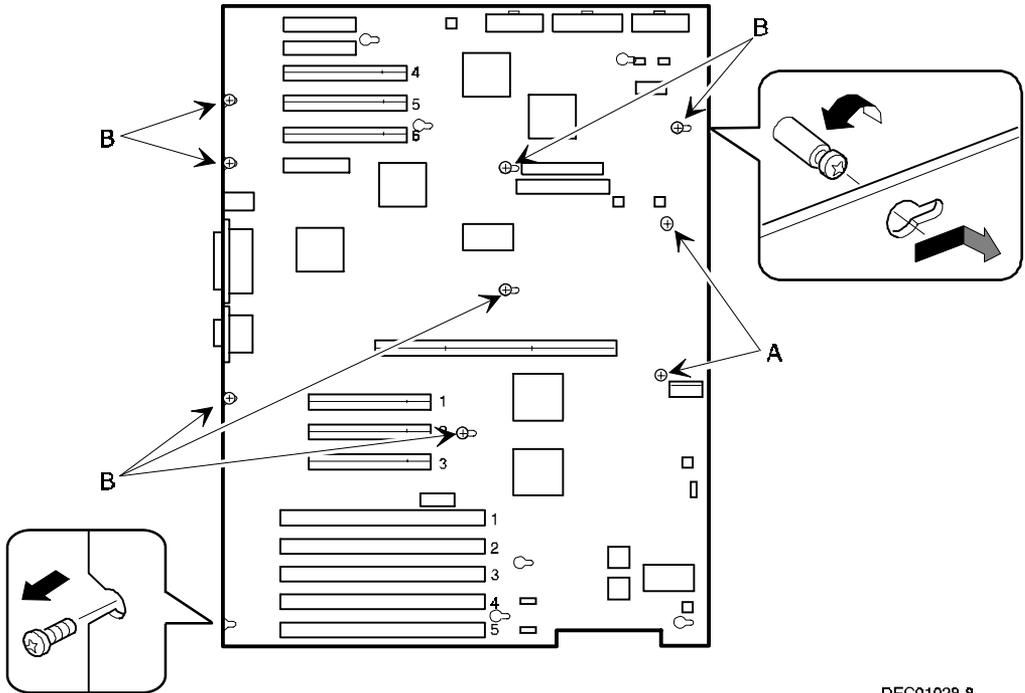
DEC01028-8

Figure 5-27. Removing and Replacing the Main Logic Board

Removing and Replacing the Server Battery/Real Time Clock (RTC)

The server's 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, you need to replace the server's battery/RTC. The DIGITAL part number for this device is 21-39151-02.

To replace the battery/RTC, perform the following:

1. If you have not already done so, record server configuration settings using the SCU.

2. Turn off the server.

3. Disconnect external devices, ac power, and monitor power.

4. Unlock and remove the left side panel.

5. Remove the old battery/RTC (see Figure 5-28).

> **CAUTION:** Depending on locality, the server's battery/RTC might be considered hazardous waste. Make sure to follow any state or local statute to properly dispose of the old battery/RTC because of its imbedded lithium battery.

6. Install the new battery/RTC. Make sure pin 1 of the battery/RTC is aligned with pin one on the socket (A, Figure 5-28).

> **CAUTION:** Danger of explosion if the server battery/RTC is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

7. Replace and lock the left side panel.

8. Connect external devices and restore power.

9. Reboot and run the SCU:

   a. Select `Configure Computer` from the SCU screen.

   b. Select `View and Edit Details` from the displayed screen.

   c. Edit the configuration settings to match what was recorded in step 1.

   d. Select `Save and Exit` to configure your server.

   Refer to Chapter 2, "Server Software and Utilities."
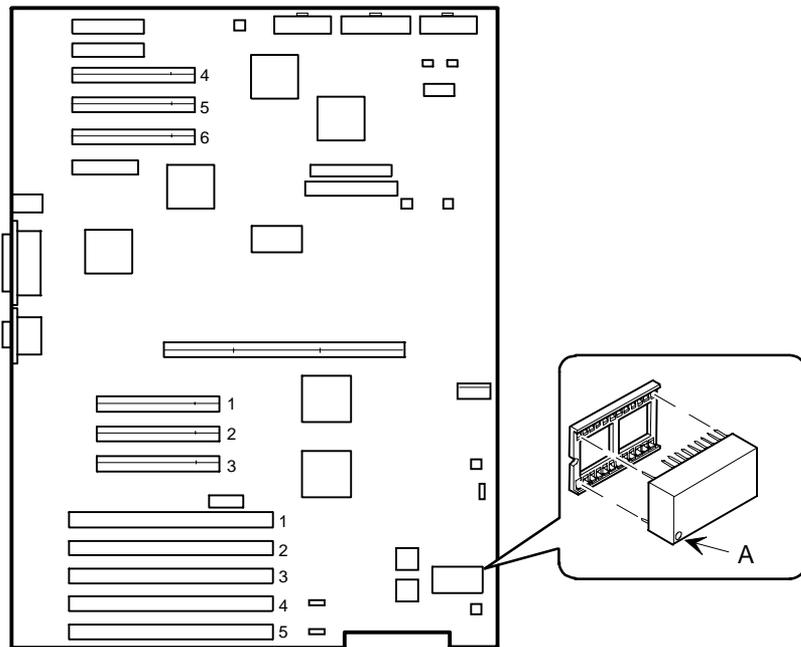
DEC01028-4

Figure 5-28. Replacing the Server Battery/RTC

Removing and Replacing the Storage Backplane

1. Turn off the server.

2. Unlock and remove the right side panel.

3. Record all cable configuration information.

4. Disconnect all cables and terminators.

5. Before removing SBB devices, record how they are configured.

6. Remove all devices connected to storage backplane.

7. Remove the ten screws.

8. Remove the storage backplane from the chassis.

9. Configure the J181 jumpers located on new storage backplane so they are identical to settings on storage backplane being replaced. Also configure jumper cables and terminators as they were previously configured on the storage backplane being replaced.

10. Install the new storage backplane into the chassis.

11. Reinstall and tighten the ten screws securing the storage backplane in chassis.

12. Using the configuration information recorded in step 5, replace the SBB devices.

13. Using the cabling information recorded in step 3, reconnect the cables and terminators.

14. Replace and lock the right side panel.
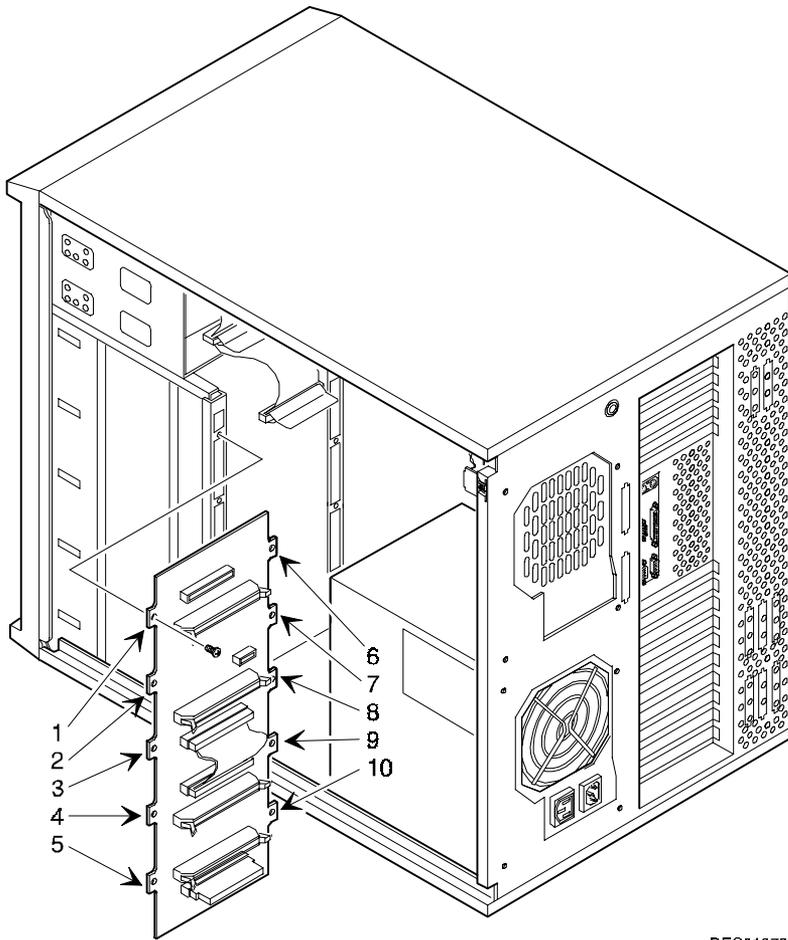
DEC01079

Figure 5-29. Removing and Replacing the Storage Backplane

Removing and Replacing a Caster

1. Turn off the server.

2. Carefully lay the server on its side.

   Note that the right and left casters are different.

3. If removing the left- or right-front caster, release the server brake. Otherwise, skip to step 4.

4. Remove the screw.

5. Release the caster from metal tab.

6. Remove the caster from the chassis.

7. Replace the caster by performing the removal steps in reverse order.
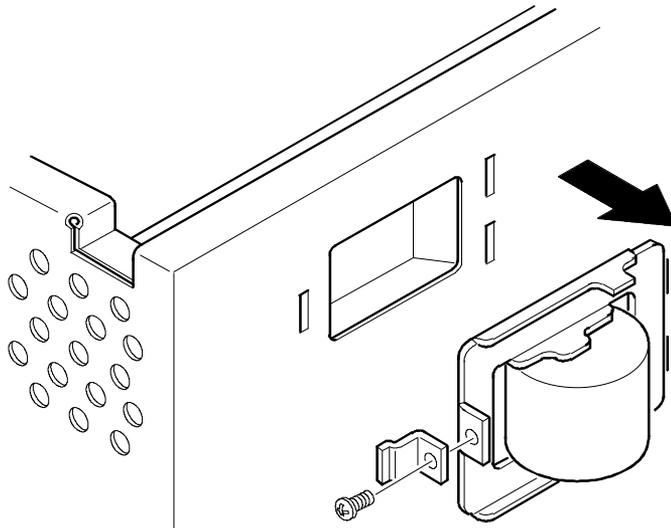
DEC00779

Figure 5-30. Removing and Replacing a Caster

Processor Module Upgrades **6**

Introduction

DIGITAL sells processor upgrade kits known as PowerGrade kits. Installing a PowerGrade kit increases the capabilities of the server. This chapter describes the configuration guidelines that must be followed prior to adding a Pentium Pro or Pentium II processor as well as detailed procedures on removing and installing processor modules.

> **NOTE:** Installing an additional processor or changing processor cards might involve updating the server's BIOS. To do this, you need to remove any video option card, if installed, and enable the internal SVGA controller. Once the BIOS update process successfully completes, you can then reinstall any video option card. You **must** install the new BIOS before installing another processor.

Processor Compatibility in a Multiprocessor Environment

DIGITAL recommends using identical steppings/versions of processors within a multiprocessor system whenever possible, since these configurations have received the greatest amount of validation testing. Since it is not possible to validate every combination of processor steppings, each new stepping of a processor is fully validated only against the latest stepping. Refer to the readme file on the ServerWORKS Quick Launch CD-ROM to view the latest processor compatibility information.

Boot the Quick Launch CD-ROM and Create Diskettes

If the PowerGrade kit contained a new CD-ROM, perform this procedure to obtain new diskettes. During this procedure, you will create a crisis recovery diskette, BIOS upgrade diskette, and a System Configuration Utility (SCU) diskette. The Quick Launch CD-ROM contains the latest BIOS, crisis recovery software, and SCU.

1. Power on your server and boot the ServerWORKS Quick Launch CD-ROM.

2. Select the "User Documentation" button, then view the Readme file for CPU compatibility issues.

3. From the Quick Launch Main Screen, select the "Installations & Utilities" button and then the Utility tab.

4. Insert a DOS-formatted diskette into drive A, and choose "Crisis Recovery Diskette," and select Continue.

5. Insert another diskette into drive A, choose "BIOS Phlash Diskette," and select Continue.

6. Insert another diskette into drive A, choose "System Configuration Utility (SCU)" diskette, and select Continue.

7. Select the BIOS version that you created in step 5 to create the appropriate SCU diskette.

8. Select Exit to end Quick Launch and remove the CD-ROM.

Upgrade the BIOS

If you need to update the BIOS because of a change in processor speed, processor type, or cache size, you will first need to remove any video option card installed and enable the onboard SVGA controller. Once the BIOS process completes successfully, you can then enable the reinstall the video option card. You **must** upgrade the BIOS before installing a second processor or processor module.

> **NOTE:** The BIOS upgrade switch SW1-1 on the main logic board must be set to ON before you can upgrade the system BIOS.

Update the BIOS

Use the following procedure to update the BIOS:

1. Power up and boot the server with the BIOS Upgrade diskette in drive A.

2. Change the directory to "upgrade":

    ```
    A:\cd upgrade
    ```

3. At the MS-DOS prompt, type `phlash` and press Enter. The following message appears:

    ```
                      ***Warning***

    You are about to erase the system BIOS in this machine. Are
    you absolutely sure? Press "Y" to continue.
    ```

4. Select "Y", and the BIOS upgrade continues until the system reboots.

    NOTE: DO NOT power down the system once this procedure has started. If the system loses power, or if at the end of this procedure the system fails, refer to "Troubleshooting – Using the Crisis Recovery Diskette if Necessary."

5. Remove the diskette from Drive A.

Pentium Pro Processor Upgrades

Installing a higher-performance Pentium Pro processor module increases the capabilities of the server. This section describes the configuration guidelines that must be followed prior to upgrading the server, as well as detailed procedures on removing and installing a Pentium Pro processor module.

> **NOTE:** If the DIGITAL server came with a Pentium II processor module, refer to the section, "Pentium II Processor Upgrades," for detailed information on upgrading to a higher-performance Pentium II processor.

Configuration Guidelines

> **NOTE:** Before you begin, create an SCU diskette using Quick Launch. You must run the SCU after installing any processor upgrade. This allows the server to recognize the new processor configuration.

- There are two Pentium Pro upgrade types:

  1. A processor upgrade that enables you to upgrade from a single Pentium Pro processor to a dual Pentium Pro processor configuration.

  2. A single Pentium II processor module upgrade that enables you to upgrade from a Pentium Pro processor module configuration to a Pentium II processor module configuration.

- Use only DIGITAL-supplied Pentium Pro processor modules.

- A Pentium Pro processor upgrade can be done by installing a higher-performance Pentium II processor module or a second Pentium Pro processor.

Installing a Processor

The following sections provide detailed instructions on how to perform a processor installation.

Removing the Pentium Pro Processor Module

1. Power down the server.

2. Place the antistatic wrist strap on your wrist and connect the grounding clip to a non-painted metal surface of the server's chassis.

3. Using a Phillips screwdriver, unscrew and remove the processor module retaining bracket (Figure 6-1).

4. Grasping both ends of the processor module, carefully remove it from the main logic board and place it on an antistatic surface.
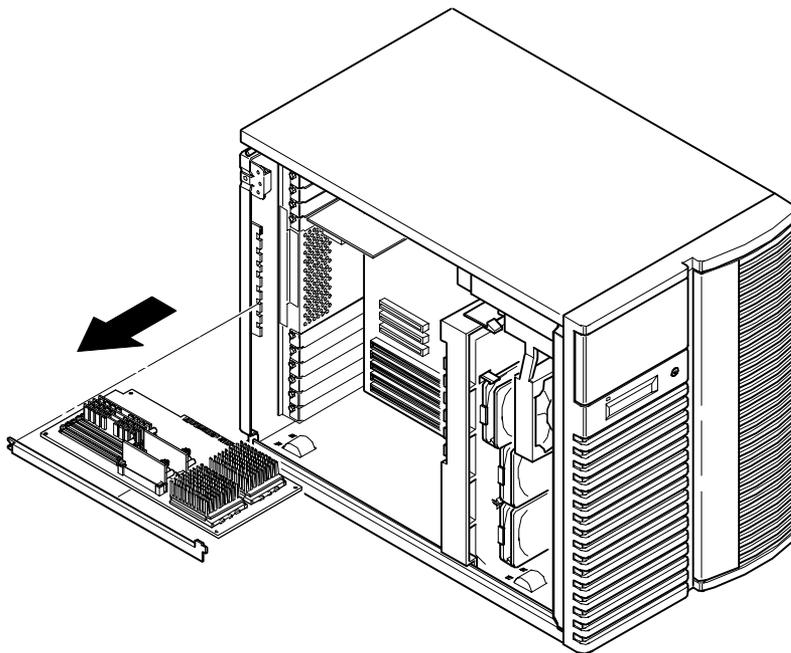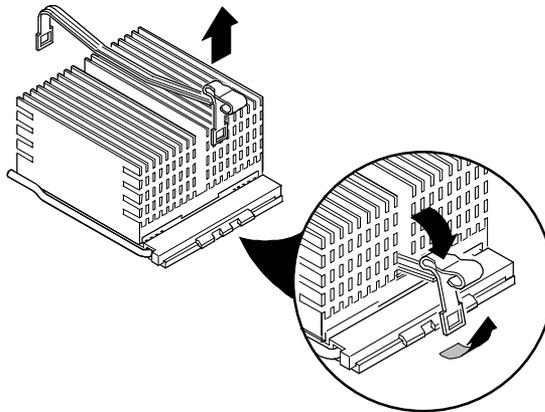

DEC01024

Figure 6-1. Removing the Processor Module

Installing a Pentium Pro Processor and Voltage Regulator Module (VRM)

1. Remove the processor from its shipping holder by removing the retaining clip. To remove the clip, press down firmly on the top of the clip. If needed, press down with a small screwdriver in the hole of the second style clip shown in Figure 6-2.
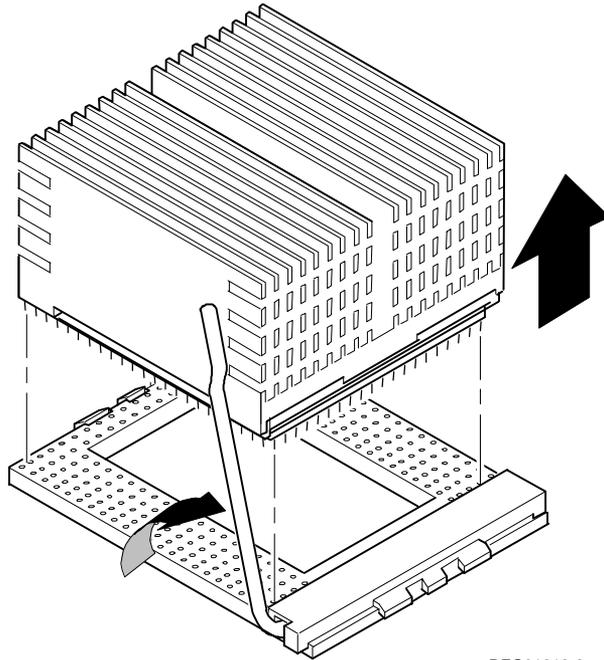

DEC01211-2
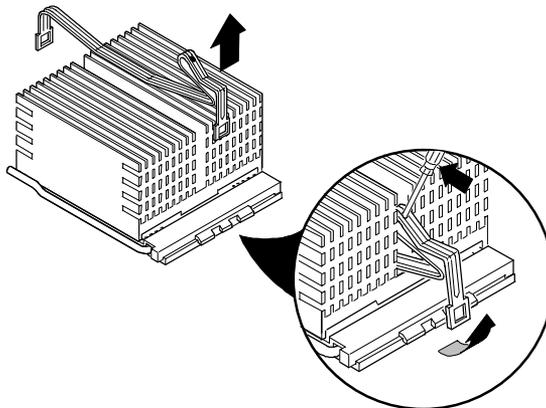
DEC01211-3

Figure 6-2. Removing the Retaining Clip

2. Remove the processor/heat sink assembly from its shipping holder. Do not pull the heat sink off of the processor. Use care not to bend the pins.
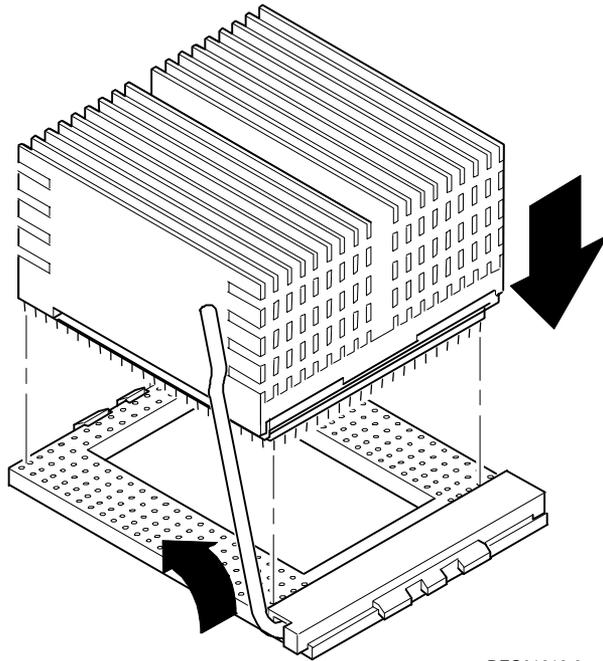
DEC01212-2

Figure 6-3. Removing the Processor/Heat Sink Assembly

3. On the processor module, lift up on the lever of the empty processor socket. Position the pins of the new processor in the socket of the processor module. Note that the pins are denser on one side for correct orientation.

4. Lower the lever to engage the pins (Figure 6-4).

DEC01212-3

Figure 6-4. Installing the New Processor

5. Replace the retaining clip by installing the back side of the clip first, then pressing it into place as shown in Figure 6-5.
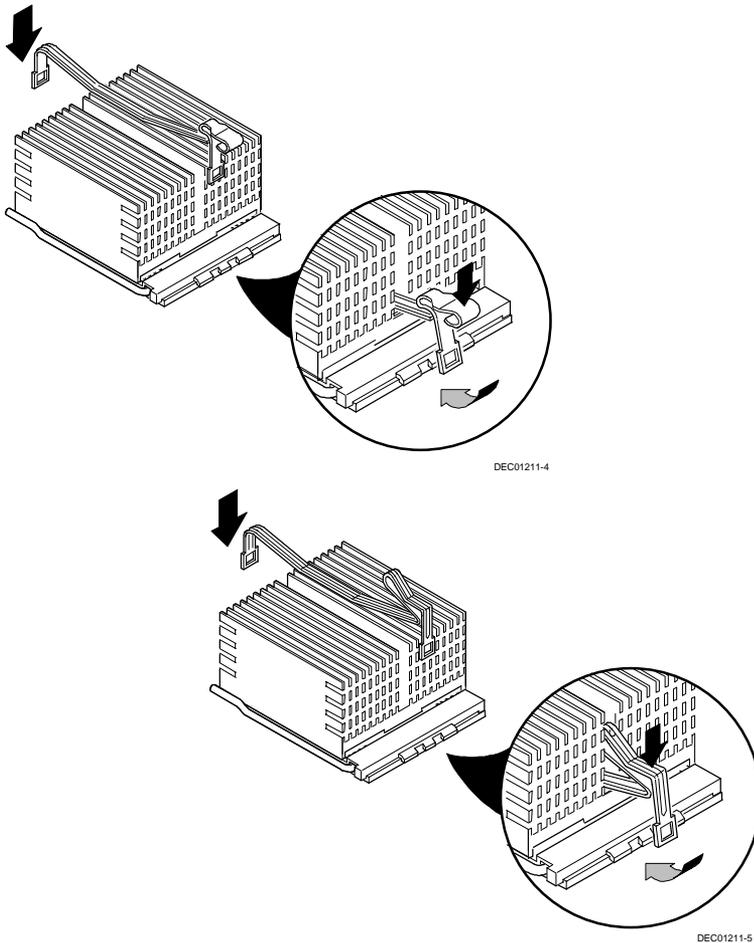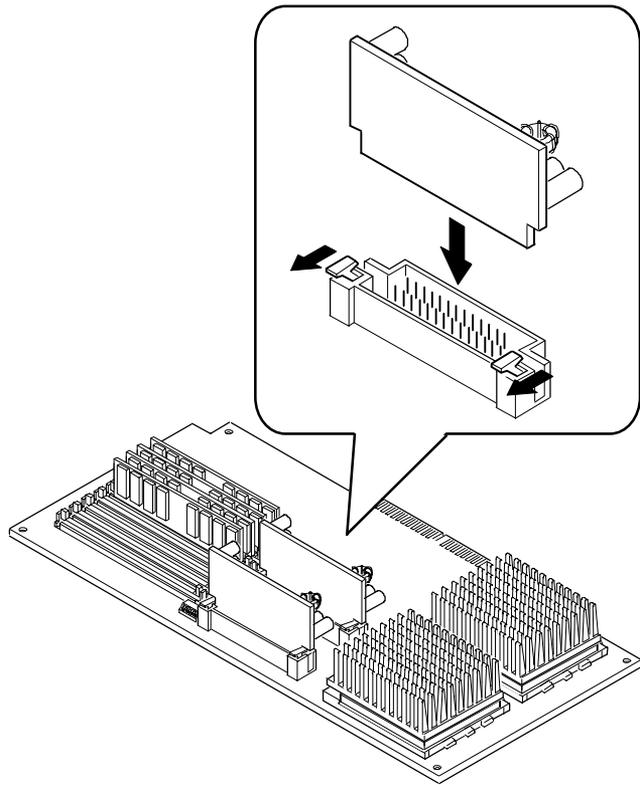
DEC01211-4

DEC01211-5

Figure 6-5. Installing the Retaining Clip

6. Remove the new VRM from its shipping container.

7. Install the VRM into the empty VRM socket (see Figure 6-6).

> **NOTE**: A voltage regulator module must be installed for each processor that is installed in the server.
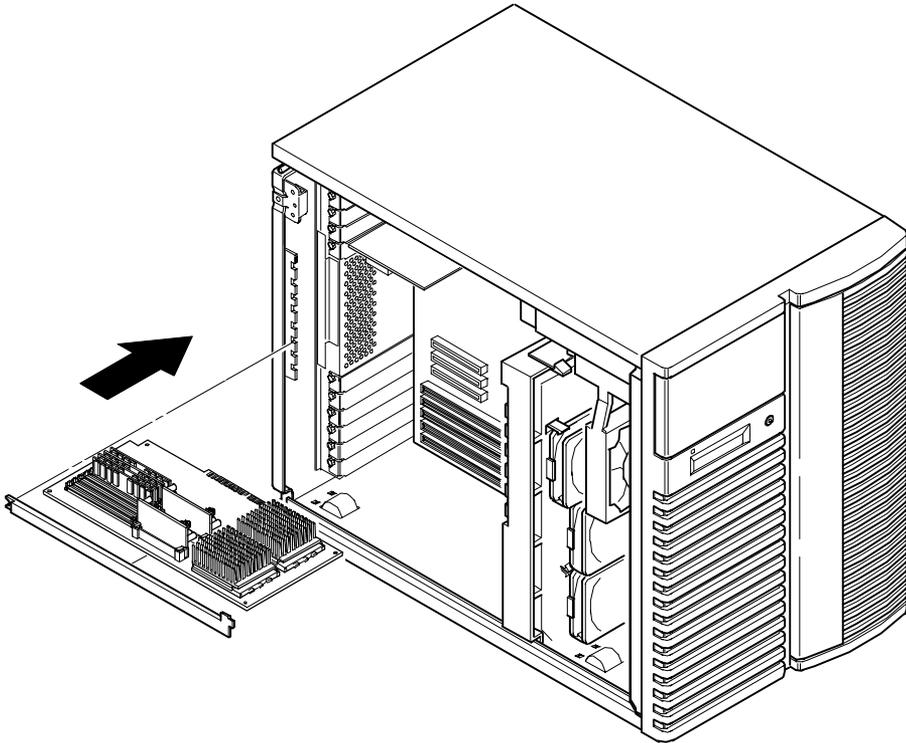
DEC01032-3

Figure 6-6. Installing a VRM

8.   Set all appropriate switch settings on the processor module.

Installing the Pentium Pro Processor Module

1. Install the processor module into the slot on the main logic board.

2. Secure the processor module to the main logic board using the previously removed retaining bracket and screw.

DEC01024-3

Figure 6-7. Installing the Processor Module

Replace the Panel and Reconnect the Cables

1. Install the left side panel and lock the server. The server will not power up with the side panel removed.

2. Connect any cables and power cords previously removed to the back of the server.

    Refer to Run the System ID Configuration Utility and Run the System Configuration Utility (SCU) sections later in this chapter to complete the installation.

Pentium II Processor Upgrades

Installing a higher-performance Pentium II processor increases the capabilities of the server. This section describes the configuration guidelines that must be followed prior to adding a processor as well as detailed procedures on removing and installing a Pentium II processor module.

> **NOTE:** If the DIGITAL server came with a Pentium Pro processor module, refer to the previous section, "Pentium Pro Processor Upgrades," for detailed information on upgrading to a higher-performance Pentium Pro processor module.

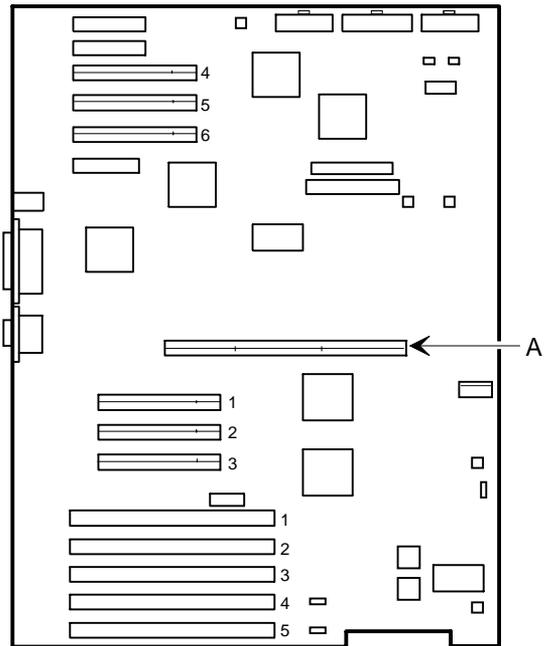## Processor Module Configuration Guidelines

> **NOTE:** Before you begin, create an SCU diskette using Quick Launch. You must run the SCU after installing any processor upgrade. This allows the server to recognize the new processor configuration

There is only one Pentium II processor upgrade. You can upgrade from a single processor configuration to a dual processor configuration.

- Single processor modules must be installed in the primary Slot 1 socket (Processor 1) and have a termination card installed in the second Slot 1 socket (Processor 2). The termination card must be removed prior to installing a second processor.

- A VRM must be installed for each processor installed in the processor module.

- DIGITAL recommends that dual processor configurations use processors with identical stepping (manufacturing revision). Processors with different stepping might not function properly. Stepping information appears during the Power-On Self Test (POST) for each processor.

- Use only DIGITAL-supplied Pentium II processor modules

Processor Configurations

The server supports two processor configurations: a processor module with one processor or a processor module with two processors. A dual Pentium II processor module is the only upgrade kit available for DIGITAL Servers supporting Pentium II processors. Item A in Figure 6-8 shows the processor module slot.


DEC01028-7

Figure 6-8. Processor Module Slot Location

Upgrading to a Dual Processor Configuration

To upgrade from a single-processor configuration to a dual-processor configuration:

1. Power down the server.

2. Disconnect all external devices, ac power, and monitor power.

3. Remove the side panel.

4. Place the antistatic wrist strap on your wrist and connect the grounding clip to a non-painted metal surface of the server's chassis.

5. Remove the processor module and place it on an antistatic surface.
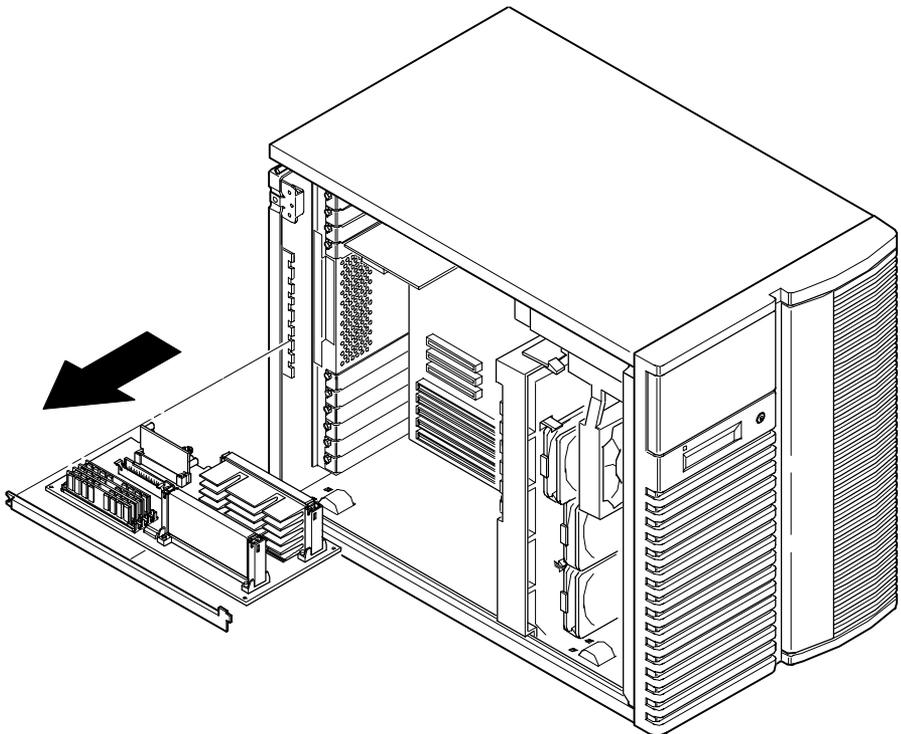
DEC01280-2

Figure 6-9. Removing the Processor Module

6. Remove the terminator module from the processor module (see Figure 6-10). Grasp the terminator by each end and pull up.
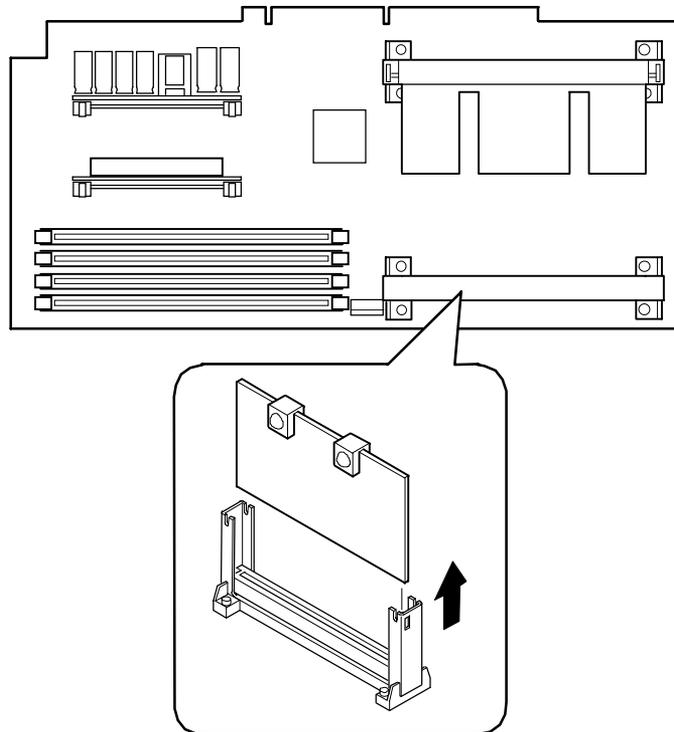
DEC001248-6

Figure 6-10.   Removing the Terminator Module

7. Remove the new processor from its shipping container.

8. Insert the new processor into this slot (see Figure 6-11).

9. Secure the new processor to its socket by pushing out on the two plastic tabs at each side.
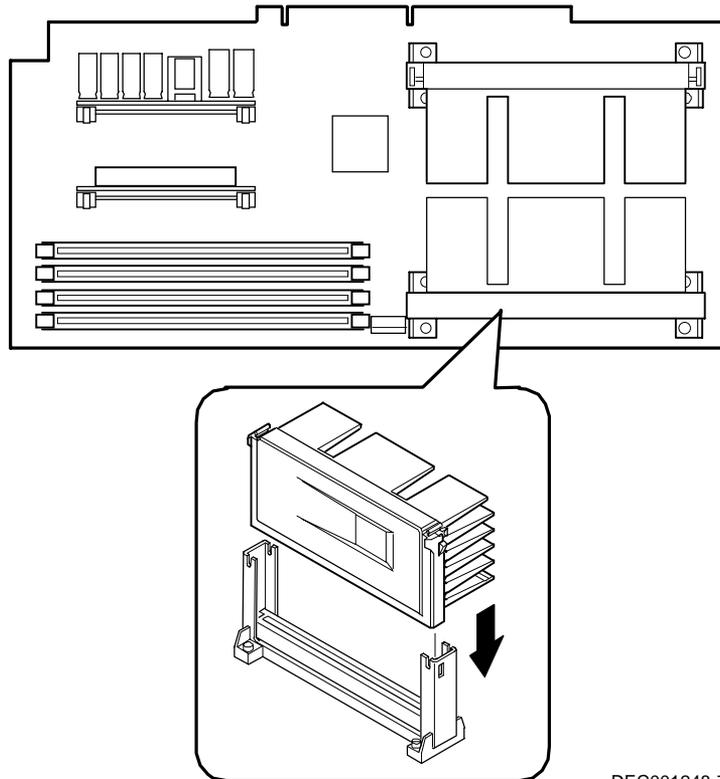
DEC001248-7

Figure 6-11. Installing the Second Processor

10. Remove the new VRM from its shipping container.

11. Install the second VRM into the empty VRM socket (see Figure 6-12).

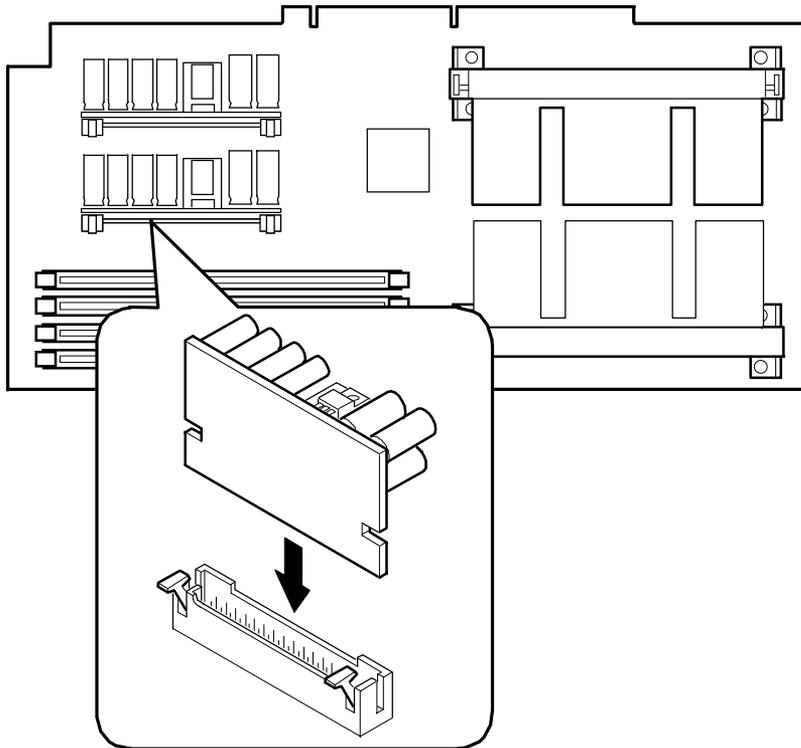**NOTE**: A VRM must be installed for each processor installed in the processor module.

DEC001248-9

Figure 6-12.   Installing a VRM

12. Set all appropriate switch settings on the processor module.

13. Install the processor module.
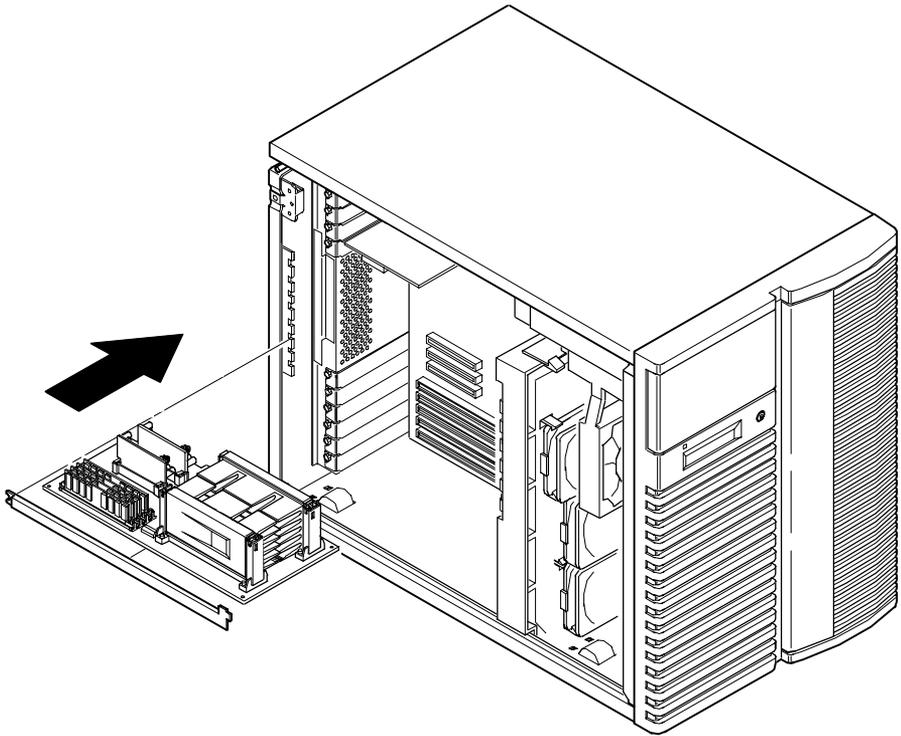
DEC01280-4

Figure 6-13. Installing the Processor Module

14. Replace the side panel.

15. Connect all external devices and restore power.

    *Refer to Run the System ID Configuration Utility and Run the System
    Configuration Utility (SCU) sections later in this chapter to complete the
    installation.*

System Identification (ID) Configuration Utility

Each system main logic board contains a unique ID called the System ID, which allows application software to determine what system the electronics reside in. This System ID is stored also on CPU cards and memory cards in the system. When the SCU is launched, if there is a mismatch between the System ID on the main logic board and that stored on the CPU and/or memory cards, then the SCU will flag that a mismatch occurred and ask you to enter the correct system part number from the label on the rear of the system.

The System ID on the main logic board, in certain situations, may change. Known cases where this occurs include:

- If the main logic board is replaced in the field because it is defective, the new main logic board will need to be assigned a System ID that reflects the system in which the board is installed.

- When a system has a CPU upgrade installed, which results in a new system part number, then the System ID will also need to be reprogrammed to reflect the new system part number.

The *System ID Configuration Utility* (SIDUTIL.EXE) allows you to modify the System ID field. This utility is located on the System BIOS floppy that you created from the Quick Launch CD-ROM.

Run the System ID Configuration Utility

If you upgraded your server with a new cpu type (Pentium Pro to Pentium II) or increased the cache size, you need to run the System ID utility to store the new model in your server memory. This utility is located on the BIOS diskette that you created from the Quick Launch CD-ROM.

To run the SIDUTIL:

1. Install the BIOS diskette in drive A: and boot the server.

2. Select item "2. Exit."

3. At the A:\ > prompt, type SIDUTIL

    The System ID Configuration Utility main menu is displayed.

    The description of the System ID information currently on the main logic board will be displayed on the first line in the following format:

    Example:

    ```
    DIGITAL Server 5100 1200 R  FR-B51WW-AA 6200/256 (PP)-MODEL 1
    ```

    where 5100 1200 R is the model name, FR-B51WW-AA is the part number, and the remaining text is a description.

4. Use the Page up/Page down arrow keys to highlight the correct system model name/part number/description for this system. If installing an upgrade kit, match the processor type and cache size with the line items displayed to select the new DIGITAL Server model.

5. After selecting the correct string, press Enter. A new System ID will be stored in the main logic board memory. The changed model name and part numbers will be displayed at the top of the menu in the current field.

6. To exit the utility, press Escape.

This utility is located on the BIOS diskette that you created from the Quick Launch CD-ROM.

Run the SCU

Power up and boot the server from the SCU diskette. The SCU enables you to check or change the server's configuration. Run the SCU to configure the server for the new processor or processor module.

To start and run the SCU:

1. Insert the SCU diskette into drive A and turn on the server. The diskette should boot automatically.

2. When the SCU title appears, press any key to continue. Afterwards, follow the instructions on your screen to access the SCU main menu.

3. From the main menu, press the up or down arrow to highlight an item and then press Enter to select it. Press F1 at any time for help about a selection.

4. From the main menu select `Configure Computer` and then `View and Edit Details`.

   For example: If you install a video option card, select the *Advanced Control Group* and disable the *Embedded - PCI VGA controller*.

5. Make sure that the boot option is drive "A: then C:"

6. Select `Save` and `Exit` to configure the server for the processor module.

7. When complete, remove the SCU diskette from drive A.

   Refer to Chapter 2, "Server Software and Utilities," for additional information on running the SCU.

Troubleshooting

Using the Crisis Recovery Diskette if Necessary

If you updated the BIOS, the Crisis Recovery Diskette may be used <u>only</u> if the server's BIOS fails or if the BIOS upgrade is unsuccessful.

When using the Crisis Recovery diskette, you must remove any video option card and enable the on-board VGA.

1. Turn off the server and set SW1-2 on the main logic board to ON (Recovery mode).

2. Insert the Crisis Recovery diskette into drive A: and reboot the server.

   NOTE: Remember to return switch SW1-2 to the Normal position after using the Crisis Recovery diskette.

Device Mapping 7

Introduction

This chapter provides a series of tables listing map and address information related to server memory and various main logic board devices (such as keyboard controller and interrupt controller).

The server memory and address locations are allocated at the factory to operate within a standard 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 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 SCU.

> **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. If not, contact the option or software manufacturer for further information.

Processor Memory Address Map

Address Range	Function	Size
00000 to 9FFFF	Main memory	640 KB
A0000 to BFFFF	PCI/EISA/ISA video buffer memory	128 KB
C0000 to C7FFF	Video memory BIOS	32 KB
C8000 to DFFFF	PCI/EISA/ISA expansion board BIOS and buffer memory	96 KB
E0000 to EFFFF	EISA/ISA adapter RAM (non-shadow)	64 KB
F0000 to FFFFF	System BIOS memory	64 KB

I/O Address Map

Range (hexadecimal)	Function
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)
2E8	COM4 (if enabled)
2F8	COM2 (if enabled)
378 to 37F	LPT1 (if enabled)
3BC to 3BE	LPT3 (if enabled)
3E8	COM3 (if enabled)
3F0 to 3F7	Diskette controller (if enabled)
3F8	COM1 (if enabled)

Server Interrupt Levels

Interrupt Number	Interrupt Source
IRQ1	Keyboard controller
IRQ3	COM2, COM4 (if enabled)
IRQ4	COM1, COM3 (if enabled)
IRQ6	Diskette controller (if enabled)
IRQ7	LPT1, LPT2, LPT3 (if enabled)
IRQ12	Mouse interrupt
IRQ13	Math co-processor

PCI Configuration Space Address Map

PCI Bus No.	Device No.	Device
0	00h	Host bridge
0	07h	EISA bridge
0	0Dh	PCI slot 1
0	0Eh	PCI slot 2
0	0Fh	PCI slot 3
0	11h	Secondary PCI bridge
0	12h	PCI VGA Trio 64
1	08h	PCI slot 4
1	09h	PCI slot 5
1	0Ah	PCI slot 6
1	0Dh	DC21143 Ethernet controller
1	13h	Primary and secondary Adaptec 7880 Ultra SCSI controllers

Service Notes A

Service Notes

Service Notes