

# DIGITAL Server 1200 Series

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## Service Maintenance Manual

Part Number: ER-H2BWW-SM. A01

**Digital Equipment Corporation**

## **January 1998**

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FCC ID: H2XWW1

**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.

This equipment is in the 2nd Class category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential area.

When used near a radio or TV receiver, it may become the cause of radio interference.

Read the instructions for correct handling.

This equipment meets or exceeds requirements for safety in the U.S. (UL 1950), Canada (CSA C22.2 No. 950), and Europe (EN 60950/IEC 950) with Nordic requirements.

This equipment meets or exceeds the ergonomic requirements of ZH1/618 and is certified to bear the GS mark by TUV Rheinland of Germany.

This equipment has been tested for radio frequency emissions and has been verified to meet VDE 0871 Class B.

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# Preface **P**

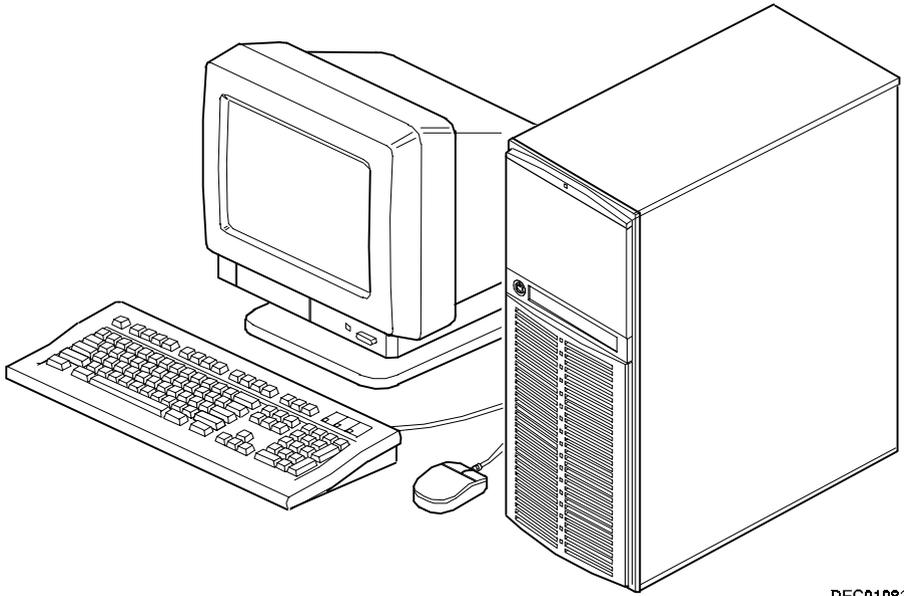
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This *Service Maintenance Manual* is a troubleshooting guide that can be used for reference when servicing DIGITAL Servers.

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.



DEC01083

**Typical DIGITAL Server 1200**

# Product Description

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# 1

## System Introduction

The DIGITAL Server 1200 is a high-performance, highly-scalable entry level network server featuring the latest in modular processor and storage technology.

The DIGITAL Server provides support for the following features:

## Reliability/Availability

<i>Pentium II Processor Module</i>	Pentium II processor module. Each Pentium II processor operates using 168-pin, 72-bit DIMMs, 60 ns access time EDO memory, ECC protected.
<i>Error Correction Code (ECC) Protected Memory</i>	Recovery from most cache and memory errors.
<i>Power Supply</i>	The DIGITAL Server 1200 ships with a 300 watt power supply for normal operation.
<i>Variable Fan Speed</i>	Automatically adjusts fan speed according to internal chassis ambient temperature.
<i>Internal Sensors</i>	Monitors internal server temperatures, fan operation, and voltages for the main logic board and processor module.

## Server Expansion

*Flexible Memory Architecture*

EDO/ECC memory supported. For Pentium II processor modules, you can upgrade to a maximum of 512 MB using DIMM memory.

*Two ISA Expansion Slots, Four PCI Expansion Slots, and One Shared Slot*

Accommodates industry-standard expansion boards such as network, Small Computer System Interface (SCSI), and modems.

*Integrated SVGA Video Controller*

Supports management and configuration applications locally (on the main logic board) without use of an expansion slot.

*Single Channel Wide Ultra SCSI Controller*

Supports narrow, fast wide, and wide Ultra SCSI external and internal devices.

*Capacity for Eight Internal Storage Devices*

Accommodates one CD-ROM drive, a 3 1/2 inch diskette drive, and four 3½-inch, 1.5-inch high or six 3½-inch, 1-inch high hard disk drives.

*Keyboard and Mouse*

Supplied 104-key keyboard and three-button mouse.

*External I/O Ports*

Two serial ports and one Enhanced Parallel Port (EPP) to support external options such as a printer, modem, or local terminal.

*Integrated Network Controller/External Network Port*

DIGITAL Ethernet controller on the main logic board.  
One 10/100Base-T (10/100 Mb/s) port to support an external network connection.

## Server Management and Security

<i>Server Diagnostics</i>	Allows local and remote diagnosis of server problems.
<i>Hardware Configuration</i>	Allows local and remote server configuration.
<i>Unique Asset Management</i>	Unique server identifier in non-volatile memory provides easy asset management.
<i>Firmware Upgrade Utility</i>	Upgrades the firmware versions.
<i>Key Lock</i>	Limits access to the server's internal components.

## 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)

<u>Family Name</u>	<u>Segment</u>
<b>DIGITAL SERVER 500</b>	SUB ENTRY
<b>DIGITAL SERVER 1000</b>	ENTRY
<b>DIGITAL SERVER 3000</b>	DEPARTMENT
<b>DIGITAL SERVER 5000</b>	APPLICATION
<b>DIGITAL SERVER 7000</b>	ENTERPRISE
<b>DIGITAL SERVER 9000</b>	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

## Related Material

The following related material is available:

Document or Software Title	Order Number	Description
Service Quick Reference	ER-H2BWW-SR (English only)	Provides troubleshooting information that can be used when servicing DIGITAL servers.
Installation Guide	ER-H2BWW-IM (Multilanguage)* ER-H2BWW-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-H2BWW-UA (English) ER-H2BWW-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 Label	36-48212-04	Provides an overview of major server components, configuration guidelines, and SCSI cabling information.
Warranty and Service Information	ER-PCWAR-CM (Multilanguage)*	Provides warranty information and a listing of phone numbers for technical support.
DIGITAL Server 1200 Readme First Important Information	ER-H2BWW-AA	Provides information for IRQ assignment.
DIGITAL Server 1200 Readme Important Information	ER-H2BWW-CA	Provides information for setting the clock and date.

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

*continued*

<b>Document or Software Title</b>	<b>Order Number</b>	<b>Description</b>
DIGITAL ServerWORKS software	QB-4WY9A-SA (Multilanguage)*	<p>Contains ServerWORKS Quick Launch and ServerWORKS Manager software and documentation.</p> <p>Quick Launch consists of a bootable CD-ROM disc and Getting Started guide. This program steps the user through the initial server setup and operating system installation.</p> <p>ServerWORKS Manager consists of two CD-ROMs and an Overview and Installation Guide and supporting documentation.</p>
Product README and Revision History Information - Quick Launch CD-ROM	AG-QS62U-BH (English only)	Provides additional product information and product change history.
Option documentation - Quick Launch CD-ROM	AG-QS62U-BH (English only)	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	AG-QS62U-BH (English only)	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

## Latest Product Information and Updates

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

### Entry Server Product Information

Family Name	Model Name	Part Number	Description
DIGITAL Server 1000	DIGITAL Server 1200 2233	FR-H2B3W-AX	6233/512 KERNAL
DIGITAL Server 1000	DIGITAL Server 1200 2233	FR-H2B3W-XA	6233/512 MODEL 1
DIGITAL Server 1000	DIGITAL Server 1200 2233	FR-H2B3W-XD	6233/512 HDD
PowerGrade chip upgrade	DIGITAL Server 1200 PowerGrade Kit	FR-PCH2U-AA	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

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# 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.
- **BIOS Setup Utility** — This utility allows you to configure the server after installing optional ISA/PCI expansion boards and when changing the server's factory-default settings.
- **BIOS Upgrade Utility** — This utility allows you to update or restore the server's BIOS.
- **SCSI *Select* Utility** — This utility allows you to configure and view settings of the installed Adaptec SCSI controller and SCSI devices.
- **Diagnostics**— This utility is used to verify server operation.

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

# BIOS Setup Utility

The BIOS Setup utility enables you to select and store permanently information about the server's hardware and software in the battery-backed memory of the CMOS RAM. This information takes effect each time the server boots and can be changed any time you run setup.

Use the BIOS Setup utility each time you need to reconfigure or expand the server.

The following is an example of a BIOS Setup utility screen.



**CAUTION:** The server was setup for normal operation at the factory and will operate properly without additional configuring.

It is important for you to read carefully and understand this section before attempting to modify the server's factory settings. Changing some settings might cause the server to operate improperly.

Main	Advanced	Security	Boot	Exit
System Time: [13:11:10] System Date: [10/29/1997]				Item Specific Help
Diskette A: [1.44 MB, 3½"] Diskette B: [Disabled]				
Video System: [EGA/VGA] Monitor Type: [Color] >Cache and Shadow >Keyboard Features				
System Memory: 640 KB Extended Memory: 80896 KB At Bus Space: [Disabled] Extended Memory Report: [Compatibility]				

DEC01458

Figure 2-1. Typical BIOS Setup Utility Screen

Use the BIOS Setup utility to:

- Change time and date
- Enable and disable diskette drives A and B
- Select the video system
- Select a monitor type
- Select cache and shadow features
- Select keyboard features
- Change server memory
- Change extended memory
- Enable and disable AT bus space
- Select if extended memory report is compatible



**NOTE:** You will need to change the server's initial setup after reconfiguring the mouse, COM, and LPT ports.

The remainder of this section explains how to run the BIOS Setup utility, maneuver through the options, and perform specific tasks.

## Accessing the BIOS Setup Utility

To access the BIOS Setup utility:

1. Turn on the server and allow the Power-On Self Test (POST) to complete.
2. Make a note of any configuration errors listed, and then press [F2] to display the Main menu.
3. Follow the instructions on the monitor screen and any on-line help pop-up screens to configure the server.

## Helpful Hints

When using the BIOS Setup utility:

- Several keyboard keys are assigned to help you select menus and sub-menus, options, change option values, and display help information. These keys are displayed at the bottom of all menus as follows:

Key	Function
F1	Help (provides a general help screen)
Esc	Exit (Exits the Setup utility and exits sub menu within the Setup utility)
↑↓ arrow keys	Select Item
← → arrow keys	Select Menu
-/+ or spacebar	Change Values
Enter	Select > Sub-Menu
F9	Setup Defaults (Restore all current Setup screen values to their factory default settings)
F10	Previous Values (Restores all BIOS values from the last session)

- Item-specific help is available anytime during the setup process and appears at the right of the setup screen when an option is highlighted.
- Choosing the “Exit” menu allows you to:
  - Select “Save Changes & Exit” to save all Setup values and exit Setup.
  - Select “Exit Without Saving Changes” to exit Setup without recording any changes.
  - Select “Get Default Values” to set all setup options to their factory default values.
  - Select “Load Previous Values” to restore all setup values from the last session.
  - Select “Save Changes” to save all setup selections without exiting Setup.

## Changing the Server's Configuration

The following sections provide detailed information on changing the server's factory configuration. Before changing any setting, make sure you fully read and understand the information provided and view any on-line help for a selected setting.

### Changing Time and Date

To set the time and date:

1. Reboot the server and enter Setup. The following screen appears:

PhoenixBIOS Setup Utility				
Main	Advance	Security	Boot	Exit
System Time: [06:02:44]			System Specific Help	
System Date: [12:12:98]				
F1 Help	↓ Select Item	+ - Change Values	F9 Setup Defaults	
ESC EXIT	↔ Select Menu	Enter Select >	Submenu F10 Save and Exit	

2. Use the Up and Down arrow keys to navigate to the time or date.
3. Type in the desired time or date, or use [+] or [-] to change the field to the desired value,
4. Save the settings in one of two ways:
  - a. Leave the time/date field using the Up and Down arrows. Press F10 to save and exit. After following screen appears, select YES to save the time/date settings:

Set Confirmation Save Configuration changes and Exit now. [YES]                      [NO]
---

Or, save the settings by performing the following:

- b. Press ESC. The Set Confirmation screen appears as above. Select YES to save the time/date settings. EXIT is automatically selected, press ENTER to initiate the save.

## Setting Up Security



**CAUTION:** Be careful not to lose the server keys. Losing these keys prevents you from opening the front panel security door and gaining access to the inside of the server.

The following sections describe the security features available and how to use them.

### Setting Supervisor and User Passwords

The server has password protections that can be set to prevent unauthorized access to server files or to the BIOS Setup utility. If a supervisor password is set, the server prompts you to enter a password before accessing the BIOS Setup utility.

If "Password On Boot" is enabled, and both the supervisor and user passwords are entered, you need to enter either the supervisor or user password to use the server. "Password On Boot" limits who can access the server, and the level of functionality that's available.

Additionally, if after selecting [F2] during the boot sequence, the user password is entered instead of the supervisor password, the Main, Boot, Advanced, and Power menus in the BIOS Setup utility are rendered inaccessible.



**NOTE:** A supervisor password must be set before you can set a user password. If the supervisor password is later deleted, the user password is automatically removed.

Perform the following steps to set a supervisor password:

1. Reboot the server and enter Setup.
2. Highlight the "Security" menu.
3. Highlight "Set Supervisor Password" and press [Enter].
4. Type in a seven (7) digit alpha-numeric supervisor password and then press [Enter].
5. Retype the password as instructed and press [Enter]. (Notice that "Supervisor Password Is" field now indicates Enabled.)
6. If desired, set a user password as follows:
7. Highlight "Set User Password" and press [Enter].

8. Type in a seven (7) digit alpha-numeric user password and then press [Enter].
9. To confirm, retype the user password as instructed and press [Enter]. (Notice that “User Password Is” field now indicates Enabled.)
10. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take affect.
11. The server runs the POST and then asks for the password, which has just been set.

## Enabling Password On Boot

When “Password On Boot” is enabled, a screen appears after POST. The screen asks you to enter the supervisor or user password to allow the server to finish the boot sequence.

Perform the following steps to set “Password On Boot”:

1. Reboot the server and enter Setup.
2. Highlight the “Security” menu.
3. Highlight “Password On Boot.”
4. Press the [+] key. (Pressing the [+] key again reverses the action.)
5. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take affect.

## Eliminating User and Supervisor Passwords

To eliminate the server’s password(s):

1. Reboot the server and enter Setup.
2. Enter the supervisor password and press [Enter].
3. Do you wish to eliminate the User Password or the Supervisor Password?

If User Password, select “Set User Password.”

If Supervisor Password, select “Set Supervisor Password.”

4. Press Enter three times.

You have cleared the old password and are returned to the “Security” menu. Verify that the appropriate password is disabled by checking “User Password is” or the “Supervisor Password is” field, whichever is relevant.

5. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take affect.

## Other Security Options

These options can provide further security for the server under certain conditions.



**CAUTION:** Consider the security needs carefully before using the following option. While this option is enabled, the contents of the hard disk drive cannot be backed up to diskettes and the server cannot be booted from a diskette drive.

- If “Password On Boot” is enabled and “Diskette Access” is set to “Supervisor,” entering the supervisor password at boot allows access to a diskette. Entering the user password at boot, however, prevents the server from accessing a diskette.
- *Sign On Banner* – When enabled, allows a custom banner to be displayed every time you turn the server on.
- *Diskette Access* – While enabled, this option prevents the server from accessing a diskette.
- *Network Server* – Locks the keyboard and mouse to prevent tampering during network operation. You must enter a supervisor password to unlock the keyboard and mouse.
- *System BIOS Flash* – When disabled, prevents the server’s BIOS from being flashed (rewritten).

## Cooling Fan Detection

The server's BIOS checks to make sure the server's cooling fan is working before booting. This prevents the server from overheating because of the higher operating temperatures associated with the processors.

## Changing the Boot Sequence

It is sometimes necessary to change the server's boot sequence. Follow the network manual's instructions to determine the correct boot sequence.

To change the boot sequence, proceed as follows:

1. Reboot the server and enter Setup.
2. Highlight the "Boot" menu.

Diskette drive, Hard Disk, and CD-ROM Drive are displayed. The number shows the current ordering. For example, if CD-ROM Drive is 1 and Diskette Drive is 2, the server boots first from the CD-ROM drive. If it is empty, the server goes to the diskette drive and then finally to the hard disk drive.

3. Use the [↑] and [↓] arrows to locate the field you want to change. Then use the [+] to raise the order and [-] to lower it.
4. Press [Esc] twice then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take affect.



**NOTE:** ServerWORKS Quick Launch requires a CD-ROM drive configured as a boot device.

## Speeding up the Boot Process

There are four options for speeding up the boot process. They in essence eliminate or replace displays or checks. To make these changes, proceed as follows:

1. Reboot the server and enter Setup.
2. Highlight the Main menu.
3. Highlight "Boot Options" and then press [Enter].

The following table lists the items displayed and describes them.

Field	Description
Setup prompt	Displays the Setup prompt message during the boot sequence. If disabled, the Setup prompt message will not be displayed. However, you can still access the BIOS Setup utility.
Diskette check	Verifies the diskette boot drive.
POST errors	Pauses and displays the Setup prompt or Resume boot prompt, if an error occurs during the boot sequence. If disabled, the server always attempts to boot.
Sign-on banner	When enabled, displays the DIGITAL logo during POST.

4. Select the item(s) you wish to change and use the [+] or [-] as follows:

Field	Speed Up Boot Selection
Setup prompt	Enable
Diskette check	Disable
POST errors	Disable
Sign-on banner	Disable

5. Press [Esc] twice then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take effect.

## 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 update kit. PHLASH.EXE and BIOS updates 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 updates, 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

Also, when upgrading the BIOS, you must remove any video expansion boards and enable the onboard VGA. In the rare event that you might need to use the crisis recovery diskette, the server will require that the onboard VGA be used in this mode.

Two switches and one BIOS option affect the result of executing the PHLASH.EXE program:

- *BIOS Upgrade Switch (SW1-1)* – This switch, located on the main logic board, must be set to `Enabled` before you can upgrade the server's BIOS.
- *Recovery Mode Switch (SW1-2)* – This switch, located on the main logic board, must be set to `Recovery` so the server BIOS can enter "Recovery Mode."
- *System BIOS Flash (BIOS option)* – This BIOS option must be set to `Enabled` before you can upgrade the server's BIOS.

## **SCSISelect Utility**

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

Use *SCSISelect* 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 *SCSISelect* configuration utility:

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

## 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 software includes:

- AMIDdiag base diagnostic (processors, memory, and main logic board components tests) from American Megatrends
- DIGITAL vendor extended tests (SCSI, network, storage, and RAID)
- Extensive on-line help and the *AMIDdiag User's Guide*

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.

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 the user 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.

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:
2. `<cd-rom>:\QLAUNCH.EXE .`
3. From the Quick Launch main menu, select *Installations & Utilities*.
4. Select the *Utilities* tab and then select the server model.
5. Insert a blank MS-DOS formatted diskette into drive A and select *Diagnostics*.
6. Select *Continue*. Afterwards, remove the diskette for safekeeping.
7. Choose the next diagnostic diskette from the list and then select *Continue*. Create all the diskettes labeled "Diagnostics."

# BIOS Setup Utility Features

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# 3

## Introduction

After entering the BIOS Setup utility, you can edit a variety of resources and configure the server for the most optimized condition. The menu items in the BIOS Setup utility, listed as menu pages below, provide the necessary options to configure the server.

## Main

Menu Fields	Settings	Comments
System time	Current time	Displays the current time.
System date	Current date	Displays the current date.
Diskette drive A/ Diskette drive B	1.44 MB, 3½ <sup>(1)</sup> 2.88 MB, 3½  Not Installed <sup>(1)</sup> 360 KB, 5¼ 1.2 MB, 5¼ 720 KB, 3½	Sets the size and density of diskette drives.
Video system	EGA / VGA <sup>(1)</sup> CGA 80x25 Monochrome	Sets the video controller type.
Monitor type	Color <sup>(1)</sup> Monochrome	Sets the monitor type.
System memory	Not user selectable	Displays the amount of base (conventional) memory each time the server boots.
Extended memory	Not user selectable	Displays the amount of extended memory each time the server boots.
AT bus space	Disabled <sup>(1)</sup>  F00000h, 1 MB	Memory hole not available; upper memory is contiguous.  Sets the memory hole at address F00000 with 1 MB memory available.
Extended memory report	Compatibility <sup>(1)</sup> Non-compatibility	Select the BIOS report mechanism for the amount of external memory.  Select <i>Compatibility</i> when using a conventional operating system.  Select <i>Non-compatibility</i> for extended memory above 64 MB under Windows NT.
<b>Cache and Shadow:</b>		
L1 cache	Enabled <sup>(1)</sup>	Enables the processor's internal L1 cache.
L2 cache	Enabled <sup>(1)</sup> Disabled	Enables or disables the processor's internal L2 cache.

<sup>(1)</sup> Factory default

*continued*

Menu Fields	Settings	Comments
System BIOS shadow	Enabled <sup>(1)</sup>	Always set to Enabled.
System BIOS cache	Enabled <sup>(1)</sup> Disabled	This option enables the server BIOS to be cached in the internal cache. This increases server performance because BIOS instructions are executed in cache instead of RAM.
Video BIOS shadow	Enabled <sup>(1)</sup> 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 video BIOS ROM is shadowed, the ROM information is copied into an appropriate area in DRAM. This increases the server’s performance because the video BIOS instructions are in fast DRAM instead of ROM.  Enabled is the recommended setting.
Video BIOS cache	Enabled <sup>(1)</sup> Disabled	This option enables the video BIOS to be cached in the internal cache. This increases server performance because video BIOS instructions are executed in cache instead of RAM.
Shadow 16 KB C800 - CBFF: CC00 - CFFF: D000 - D3FF: D400 - D7FF: D800 - DBFF: DC00 - DFFF:	Enabled Disabled <sup>(1)</sup>	Enables or disables shadowing of individual segments of ROM to increase server performance.  <b>CAUTION:</b> Some option ROMs do not operate properly when shadowed.

<sup>(1)</sup> Factory default

*continued*

## BIOS Setup Utility Features

Menu Fields	Settings	Comments
<b>Keyboard Features</b>		
NumLock	Auto <sup>(1)</sup> On Off	Turns NumLock on or off each time the server boots.  If Auto is selected, the server will turn on NumLock if it detects a numeric keypad.
Key click	Disabled <sup>(1)</sup> Enabled	Enables or disables the audible key click feature.
Keyboard auto-repeat rate	2/sec 6/sec 10/sec 13.3/sec 18.5/sec 21.8/sec 26.7/sec 30/sec <sup>(1)</sup>	Sets the number of times a second to repeat a keystroke while the key is held down.
Keyboard auto-repeat delay	1/4 sec 1/2 sec <sup>(1)</sup> 3/4 sec 1 sec	Sets the delay time after a key is held down before it begins to repeat a keystroke.

<sup>(1)</sup> Factory default

## Advanced

Menu Fields	Settings	Comments
<b>Integrated Peripherals</b>		
PS/2 mouse	Disabled Enabled <sup>(1)</sup>	Enables or disables the mouse port.
Parallel port	Disabled Enabled Auto OS controlled	Enables or disables the onboard port at the specified address.  <b>NOTE:</b> Two devices cannot share the same IRQ. Also, choosing Disabled makes the parallel port unusable.  Auto is the recommended setting.
Serial port 1	Disabled Enabled Auto OS controlled	Enables or disables onboard serial port 1 at the specified address.  Select Auto unless interrupts IRQ4 and/or IRQ3 are allocated as a server resource.  Two devices cannot share the same IRQ. Choosing Disabled makes serial port 1 unusable. If selecting Auto, Setup configures COM1 to address = 3F8h and IRQ = 4 if they are available.  Auto is the recommended setting.
	If Enabled is selected, the information at the right will appear.	Base I/O address 3F8 <sup>(1)</sup> 2F8 3E8 2E8  Interrupt IRQ3 <sup>(1)</sup> IRQ4 IRQ10 IRQ11

<sup>(1)</sup> Factory default

*continued*

## BIOS Setup Utility Features

Menu Fields	Settings	Comments
Serial port 2	Disabled Enabled Auto OS controlled	<p>Enables or disables onboard serial port 2 at the specified address.</p> <p>Select <code>Auto</code> unless interrupts IRQ4 and/or IRQ3 are allocated as a server resource.</p> <p>Two devices cannot share the same IRQ. Choosing <code>Disabled</code> makes serial port 1 unusable. If selecting <code>Auto</code>, Setup configures COM1 to address = 3F8h and IRQ = 4 if they are available.</p> <p><code>Auto</code> is the recommended setting.</p> <p>If <code>Enabled</code> is selected, the information at the right will appear.</p> <p>Base I/O address            3F8            2F8<sup>(1)</sup>            3E8            2E8</p>

<sup>(1)</sup> Factory default

*continued*

Menu Fields	Settings	Comments
Parallel port mode	Compatible mode (output only)	Sets the onboard parallel port mode.  Standard printer connection.
	Bi-directional mode <sup>(1)</sup>	PS/2 compatible mode and able to receive data.
	EPP 1.7 EPP 1.9	Enhanced parallel port mode.  Selection based on what EPP version the printer supports.
	ECP	Extended capabilities port mode.
	If Enabled is selected, the information at the right will appear.	Base I/O address 378 <sup>(1)</sup> 278 3BC  Interrupt IRQ5 IRQ7 <sup>(1)</sup>

<sup>(1)</sup> Factory default

*continued*

## BIOS Setup Utility Features

Menu Fields	Settings	Comments
Serial port 2		Interrupt IRQ3 <sup>(1)</sup> IRQ4 IRQ10 IRQ11
Floppy disk controller	Enabled <sup>(1)</sup> Disabled	Enables or disables the onboard diskette controller.
	If Enabled is selected, the information at the right will appear.	Base I/O address Primary <sup>(1)</sup> Secondary
Exchange diskette drives	Disabled <sup>(1)</sup> Enabled	Logically exchanges physical diskette drive designations.
Diskette write protection	Disabled <sup>(1)</sup> Enabled	Enables or disables the selected diskette drive's write protect option.
Integrated PCI Ethernet	Enabled <sup>(1)</sup> Disabled	Enables or disables the onboard Ethernet controller.
Integrated PCI SCSI	Enabled <sup>(1)</sup> Disabled	Enables or disables the onboard SCSI controller.
Plug and play OS	No <sup>(1)</sup> Yes	Select Yes if using a Plug & Play operating system such as Windows NT 4.0. Otherwise, select No.
Reset configuration data	No <sup>(1)</sup> Yes	Select Yes to clear the server configuration data if you suspect it is corrupted, which sometimes occurs after a power outage. This option also clears the Plug & Play databases.  After you input the correct settings (or accept the default settings), the server switches this setting back to No.  If you do not need to clear server configuration data, leave the setting at No.
System monitoring warning beep	Enabled <sup>(1)</sup> Disabled	

<sup>(1)</sup> Factory default

*continued*

Menu Fields	Settings	Comments
<b>Advanced Chipset Control</b>		
APIC & MP table	Disabled MPS 1.1 MPS 1.4 <sup>(1)</sup>	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 are created.  <b>NOTE:</b> This parameter must be disabled for NetWare 3.12 single processor systems.
Error correction code	Enabled <sup>(1)</sup> Disabled	Enables or disables the Error Correction Code (ECC).
PCI parity checking	Enabled <sup>(1)</sup> Disabled	Enables or disables the PCI parity checking.

<sup>(1)</sup> Factory default

## Security Options

Menu Fields	Settings	Comments
Supervisor password is	Not user selectable (Disabled) <sup>(1)</sup>	Indicates whether or not the supervisor's password is enabled or disabled.
User password is	Not user selectable (Disabled) <sup>(1)</sup>	Indicates whether or not the user's password is enabled or disabled.
Set supervisor password	Press [Enter]	Allows a supervisor password to be set. The supervisor password must be set if a user password is to be used. <b>NOTE:</b> Entering Setup with a supervisor password provides full access to all BIOS Setup utility menus.
Set user password	Press [Enter]	Allows a user password to be set. This password can be set only if a supervisor password is entered. When the user has entered his or her name but the supervisor is not logged in, only the following information is accessible: Supervisor password is Enabled. User password is Enabled. Set user password [press enter] to enter a user password. Password on boot Enabled/Disabled (which ever is in effect). This option is not allowed to change.

<sup>(1)</sup> Factory default

*continued*

Menu Fields	Settings	Comments
Password on boot	Enabled Disabled <sup>(1)</sup>	Enables or disables the enter password on boot option.  If you enable this option, a user or supervisor password must be entered in order for the boot process to complete. If a user or supervisor password is not entered, the operating system cannot be accessed.
Diskette access	Supervisor User <sup>(1)</sup>	Controls access to diskette drives.  If <i>Supervisor</i> is selected, access to the diskette drive is limited to the supervisor, who must enter a password. If <i>User</i> is selected, the diskette drive is accessed by entering either the supervisor or the user password.  Whatever setting is chosen, it only becomes functional if both a <i>Supervisor Password</i> and a <i>User Password</i> have been set (if the <i>User</i> setting is chosen).
Network server	Enabled Disabled <sup>(1)</sup>	When enabled, the system is secured at boot to prevent tampering during network operation
System backup reminder	Enabled Disabled <sup>(1)</sup>	When enabled, displays a backup reminder message at boot.
Virus check reminder	Enabled Disabled <sup>(1)</sup>	When enabled, displays a reminder message to check for viruses at boot.
System BIOS flash	Enabled Disabled <sup>(1)</sup>	When enabled, allows the server BIOS in the flash ROM to update.

<sup>(1)</sup> Factory default

## Boot

Menu Fields	Settings	Comments
Boot sequence	1. A: then C: 2. C: then A: 3. C: only 4. A: only	The numbers refer to the order in which the devices are addressed for the system files needed to boot the system.  To change the order, use the Up and Down cursor keys to select the device you want to move. Then use the + and – keys, on the numeric keypad, to move the device to the desired boot order.
Boot sequence preference	PCI bus	
Setup prompt	Enabled <sup>(1)</sup> Disabled	Enables or disables the <F2> setup prompt each time the server boots.  If <i>Disable</i> is selected, only disable the prompt when informed to press <F2> to enter Setup. Setup can still be entered by pressing <F2> before POST completes.
POST errors	Enabled <sup>(1)</sup> Disabled	Enabling this option causes the server to pause and display a setup entry or resume the boot prompt if an error occurs at boot.  Disabling this option causes the server to always attempt to boot regardless of a setup entry or error.
Floppy check	Enabled Disabled <sup>(1)</sup>	Enabled permits verification of FDD type at boot. Disabled prevents FDD verification and speeds up the boot process.
Sign-on banner	Enabled <sup>(1)</sup> Disabled	Enabling this option causes the DIGITAL logo to appear during POST.

<sup>(1)</sup> Factory default

# Troubleshooting **4**

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## 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 and POST 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 BIOS Setup utility.
- Run the SCSI 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 under "Additional Documentation" 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 *Programs*, then the *MS-DOS Prompt* from the *Start* menu. 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 to load the AMIDiag program. Note that the original CONFIG.SYS and AUTOEXEC.BAT are restored before the diagnostics load.

2. 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

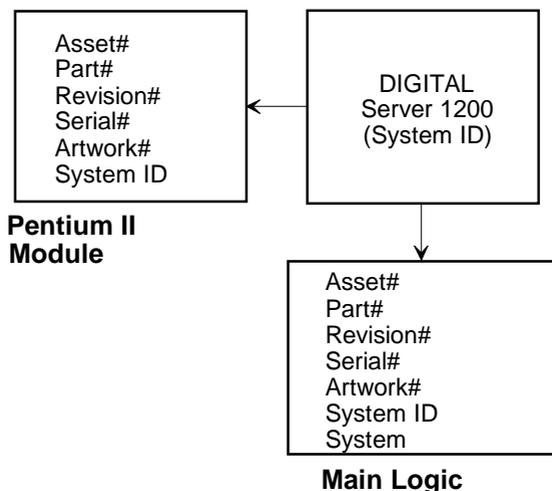
The System ID is also located on the main logic board and processor module. The System ID contains the following information:

- 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 BIOS Setup utility or by using ServerWORKS management software.



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**Figure 4-1. DIGITAL Server Component Information**

## Obtaining Information Using the BIOS Setup Utility

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

You can view the details for the main logic board or processor module by pressing <F3> and then selecting the `SYS` option. Once selected, the Serial number, Revision number and Asset number displays. The BIOS Setup utility 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's 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 (displayed by the yellow fault LEDs located on the main logic board and/or on the monitor screen)

During normal operation, Power On Self Test (POST) and boot messages are displayed on the monitor. Some error messages are also displayed by the server fault status LEDs.

These messages can also be seen by using the DIGITAL ServerWORKS Manager software to monitor the server.

## Server Fault Status

Description	Server Fault LED Indicators				Beep Code
	LED4	LED3	LED2	LED1	
No power, system OK, power on default	Off	Off	Off	Off	
Shutdown, fan fault	Off	Off	Off	On	1-1-1-2
Shutdown, over temperature	Off	Off	On	Off	1-1-1-3
Shutdown, voltage fault	Off	Off	On	On	1-1-1-4
Processor slot 1 terminator not installed	Off	On	Off	Off	1-1-2-1
Wait for system boot	Off	On	Off	On	1-1-2-2
Wait for processor active	Off	On	On	Off	1-1-2-3
Processor slot 2 terminator not installed	Off	On	On	On	1-1-2-4
DIMM bank 0 fault (J1)	On	Off	Off	Off	
DIMM bank 1 fault (J2)	On	Off	Off	On	
DIMM bank 2 fault (J3)	On	Off	On	Off	
DIMM bank 3 fault (J4)	On	Off	On	On	
Reserved	On	On	Off	Off	
Reserved	On	On	Off	On	
Reserved	On	On	On	Off	
Processor module failed	On	On	On	On	1-1-4-4

## POST Messages

The following table lists the messages, both normal and error, that will display on the server's monitor during POST and any beeps that might sound when an error occurs.

### POST/Boot Codes

POST Code Descriptions	Count Down Code(1)	Beep Codes
BIOS ROM checksum		1-2-2-3
Test DRAM refresh		1-3-1-1
Test 8742 keyboard controller		1-3-1-3
Auto size DRAM		1-3-3-1
RAM failure on address line(s)		1-3-4-1
RAM failure on data line(s)		1-3-4-3
Shadow system BIOS ROM		1-4-3-1
Check ROM copyright notice		2-1-2-3
One short beep before boot		1
Initialize VGA		1
Option ROM checksum error		1-2
POST error found		1-1
Ready to boot the flash program		3-1-1
RAM test failed, beep and then halt system		3-3-3-3-3
Unexpected interrupts test	230	2-2-3-1
Shadow option ROMs	220	
Test refresh 512K to 640K DRAM	210	
Extended memory test	200	
Configure advanced cache registers	190	
Enable external and processor caches	180	
Real-time clock test	170	2-4-2-1

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

*continued*

<b>POST Code Descriptions</b>	<b>Count Down Code(1)</b>	<b>Beep Codes</b>
Check for keyboard errors	160	
Setup hardware interrupt vectors	150	
Test co-processor if present	140	
Disable onboard I/O ports	130	
Detect and install external parallel ports	120	
Re-initialize onboard I/O ports	110	
Initialize mouse	100	
Initialize floppy controller	90	
Initialize hard disk controller	80	
Searching other processors	50	
Enable hardware interrupts	20	
Set time of day	10	

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

## Processor Module Voltage and Temperature Ranges

The following tables list the processor module and Voltage Regulator Module (VRM) operating voltage and temperature ranges.

### Processor Module 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

## 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

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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 switch settings incorrectly set.	Set all appropriate switches.
	Processor module has failed.	Replace the processor module.
Power is on, but there is no screen display.	Power supply failed.	Replace the power supply.
	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 <i>Select</i> .
Server operates incorrectly after installing a new processor.	Processor and/or processor module installed incorrectly.	Reinstall processor and/or processor module.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Server operates incorrectly after installing optional expansion board.	Expansion board installed incorrectly.	Remove expansion board and reinstall.
	Expansion board has failed.	Remove expansion board and reboot. If server boots without errors, replace expansion board.
Server operates incorrectly after installing optional memory (DIMMs).	Memory configured incorrectly.	Reboot the server and check for any boot message to identify faulty DIMM(s).  Check that the memory configuration is according to the memory guidelines explained Chapter 5, "Installing Additional Memory."
	DIMMs installed incorrectly.	Remove DIMMs and reinstall.
	DIMMs have failed.	Replace DIMMs.
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 failed.	Replace the keyboard.
	Keyboard connected to the mouse port.	Connect the keyboard to the proper port.

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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 connected to the keyboard port.	Connect the mouse to the proper port.
	Mouse driver not installed.	Install the 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 BIOS Setup utility and disable external cache.

## Disk Drive Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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.
	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 and SCSI device.	Refer to the label on the server's side panel for cabling information.
	In-line SCSI terminator not installed.	Install the in-line SCSI terminator at the rear of the server.
	SCSI device has failed.	Replace the SCSI device.

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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.
	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 and rear panel connector or external SCSI device and rear panel connector.	Refer to the label on the server's side panel for cabling information.
	In-line SCSI terminator not installed.	Install the in-line SCSI terminator.
	SCSI device has failed.	Replace the SCSI device.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Server does not boot from an internal SCSI hard disk drive.	SCSI boot hard disk drive not formatted.	Format the SCSI hard disk drive.  <b>CAUTION:</b> 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 the SCSI device.
	SCSI hard disk drive cannot read or write information.	Incorrect disk drive jumper settings.
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.
SCSI hard disk drive failed.		Replace the SCSI hard disk drive.

## Tape Drive Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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.	Configuration error.	Run the BIOS Setup utility to configure the server for video operation.
	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

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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.
Power is on but indicator shows no activity.	Tray open.	Close the tray.
	No disc or tray is open.	Insert a disc and close the tray.
Disc is spinning but drive is idle.	Check cable connections.	Make sure cables are correctly connected.
	Application software not running.	Run application software.

## Diskette Drive Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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 BIOS Setup utility and set the Diskette Write Protection option to "Disabled."
	Disabled in BIOS Setup utility.	Run the BIOS Setup utility and enable the diskette drive.
Server does not boot from a target diskette drive.	Drive ID incorrectly set.	Make sure the drive ID is correctly set. Refer to the documentation that came with the diskette drive
	Diskette drive not enabled.	Run the BIOS Setup utility and enable the diskette drive.
	Diskette boot option disabled.	Run the BIOS Setup utility 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 BIOS Setup utility and disable the diskette write protection option.

## Flash BIOS Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Cannot flash the server's BIOS	Main logic board switch settings incorrectly set.	Make sure main logic board switch SW1-2 "Recovery Mode" is set to <i>Recovery</i> and SW1-1 "BIOS Upgrade" is set to <i>Enabled</i> .
	BIOS Setup utility switch setting incorrectly set.	Make sure the "System BIOS Flash" option in the BIOS Setup utility is set to <i>Enabled</i> .

# FRU Replacement **5**

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## Introduction

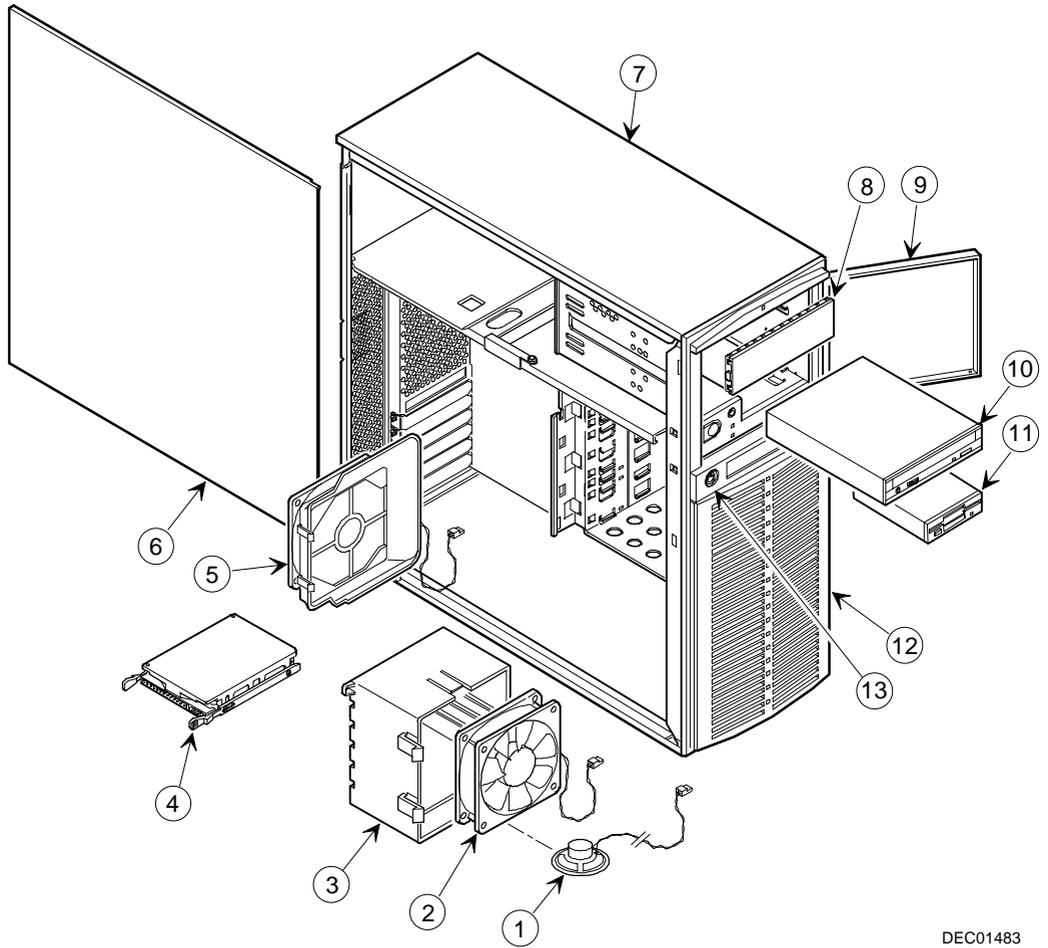
The following sections list the Illustrated Parts Breakdown (IPB) part numbers and related replacement procedures.



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

## Server Left Side View

Figure Legend	Orderable Spare Part	Description
1	12-39309-02	Speaker assembly
2	12-39657-02	Fan assembly, lower
3	74-52012-01	Fan holder (lower fan)
4	30-48202-01	HDD, 2 GB, SCSI HDD, 4 GB, SCSI
5	12-39657-02	Fan assembly, upper
6	70-32567-01	Side panel assembly, frost white
7	70-33203-01	Enclosure
8	70-30796-06	Cover assembly (5.25-inch), frost white Used when 5.25-inch drive is not installed
9	74-48747-01	Door assy, drive, amber/smoke
10	30-48116-02	5.25-inch, half-height SCSI CD-ROM
11	PCXRJ-AD	3.5-inch, floppy disk drive, 1.44 MB, frost white
12	74-48576-02	Front bezel, frost white
13	12-43231-01	Keylock assembly

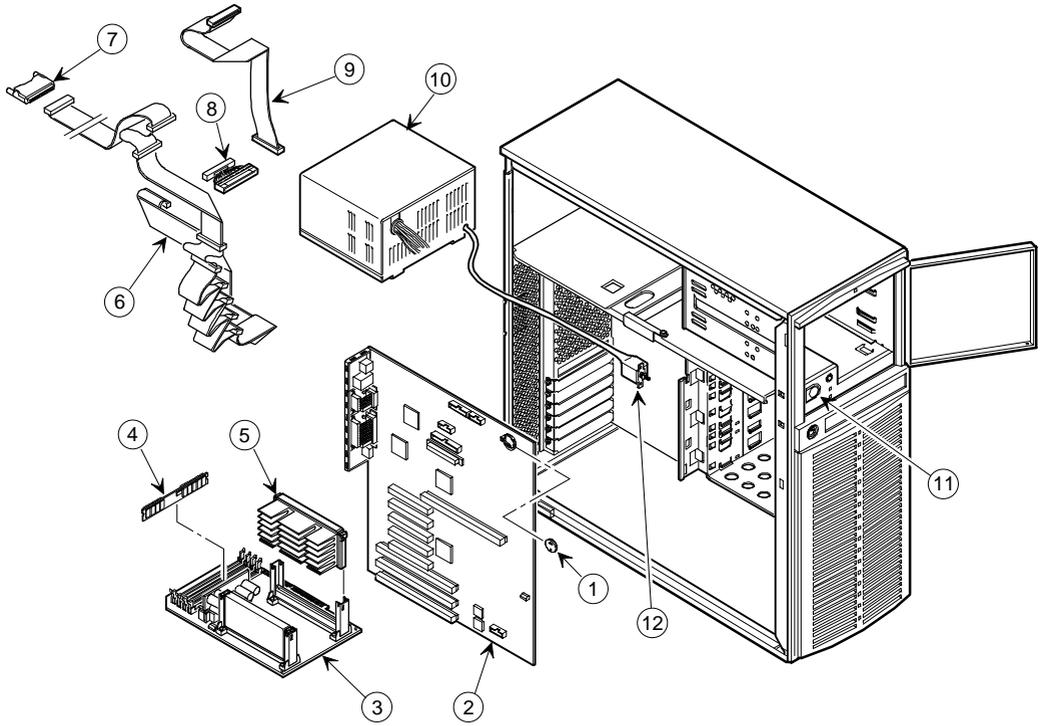


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**Figure 5-1. Server Left Side View (1 of 2)**

## Server Left-Side View (continued)

Figure Legend	Orderable Spare Part	Description
1	12-41474-05	Server battery
2	54-25418-01	Main logic board
3	54-25420-01	Processor module
4	54-24354-DA	DIMM, 8MB
	54-24340-CA	DIMM, 16 MB
	54-24329-DA	DIMM, 32 MB
	54-24821-DA	DIMM, 64 MB
	54-24823-DA	DIMM, 128 MB
5	70-32720-06	Pentium II processor
6	17-04144-03	Cable assembly (68-pin SCSI)
7	12-41768-02	SCSI Terminator, 68-pin
8	17-04009-02	Cable assembly (68 to 50 adapter)
9	17-03460-10	Cable assembly, flat 34-pin, (for diskette drive)
10	30-47661-03	Power Supply, 300 W
11	74-47828-01	Power button
12	70-32570-01	Control panel



DEC01484

**Figure 5-2. Server Left-Side View (2 of 2)**

## Miscellaneous

Orderable Spare Part	Description
70-32720-03	Processor kit
30-46729-02	Adaptec, host adapter, PCI SCSI ultra wide 2-channel
BA356-SC	Expansion cabinet (external)
30-47646-01	RAID battery backup
PCXLA-NA	Keyboard, frost white
PCXLN-AA	PS/2 2-button mouse, frost white
RZ1CB-GA	4 GB Ultra Wide HDD (7200 rpm)
RZ1DB-GA	9 GB Ultra Wide HDD (7200 rpm)
TZK1X-CE	2 GB tape backup drive
TLZ07-CA	4 GB tape backup drive
30-48628-01	10/100 PCI Fast Ethernet
74-52013-01	Card guide
17-03565-03	External SCSI cable (68-pin, 2 m, HD)
17-04107-03	External SCSI cable (68-pin, 1.5 m)
17-04154-01	External SCSI cable (68-pin, 2 m, HD)
17-04154-02	External SCSI cable (68-pin, 2 m, HD)
17-04495-04	Wire harness assembly (200 mm)
17-04495-05	Wire harness assembly (230 mm)
17-04495-06	Wire harness assembly (290 mm)

## Labels and Nameplates

Orderable Spare Part	Description
	Nameplate, DIGITAL Server 1200
36-44556-01	Warning label, power switch
36-48212-04	Label, left side panel, DIGITAL Server 1200

## 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 workstation 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 and driver updates, use the address::

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

## **Disconnecting External Devices and Power**

Before removing the side panel, perform the following:

1. Shut down any applications that are currently running, then shut down the operating system.
2. Turn off power to all external devices connected to the server.
3. Turn the server off.
4. Unplug the power cord from the wall outlet.
5. Disconnect the monitor's power cord from the external ac outlet and the data cable from the server.

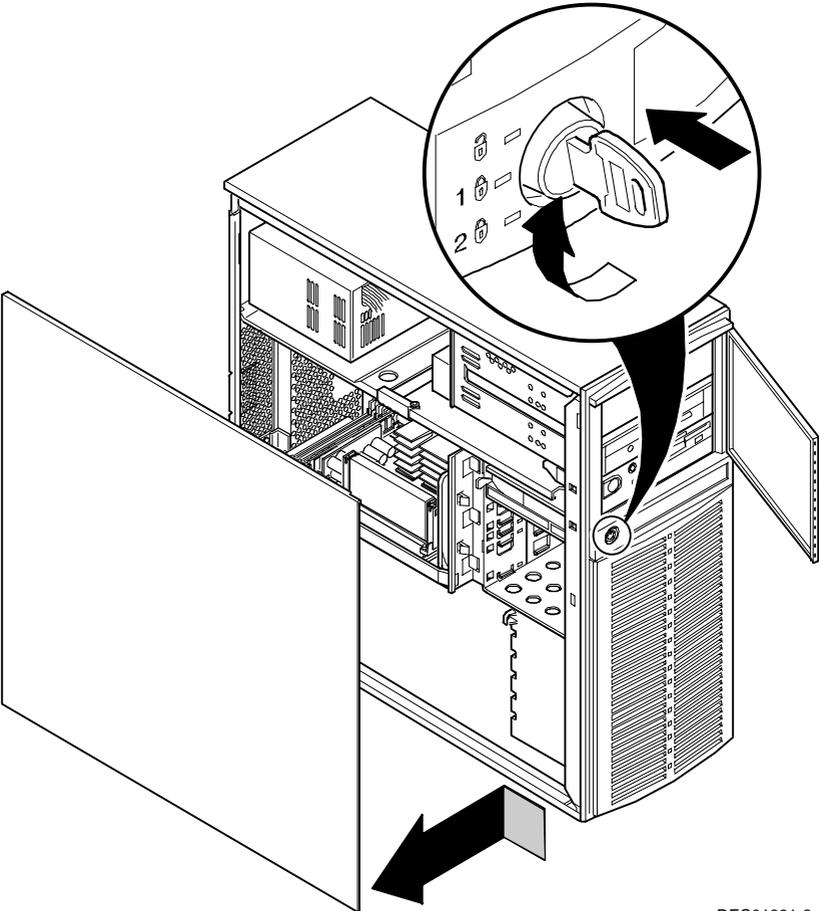
## Removing and Installing the Side Panel

To remove the side panel, perform the following:



**NOTE:** Position 2 of the keylock locks the side panel; position 1 keeps the side panel locked with the server powered up.

1. Insert the key into the keylock at position 2.
2. Push in on the key and then turn it clockwise to the unlock position.
3. Slide the panel to the rear of the server and then away from the chassis.

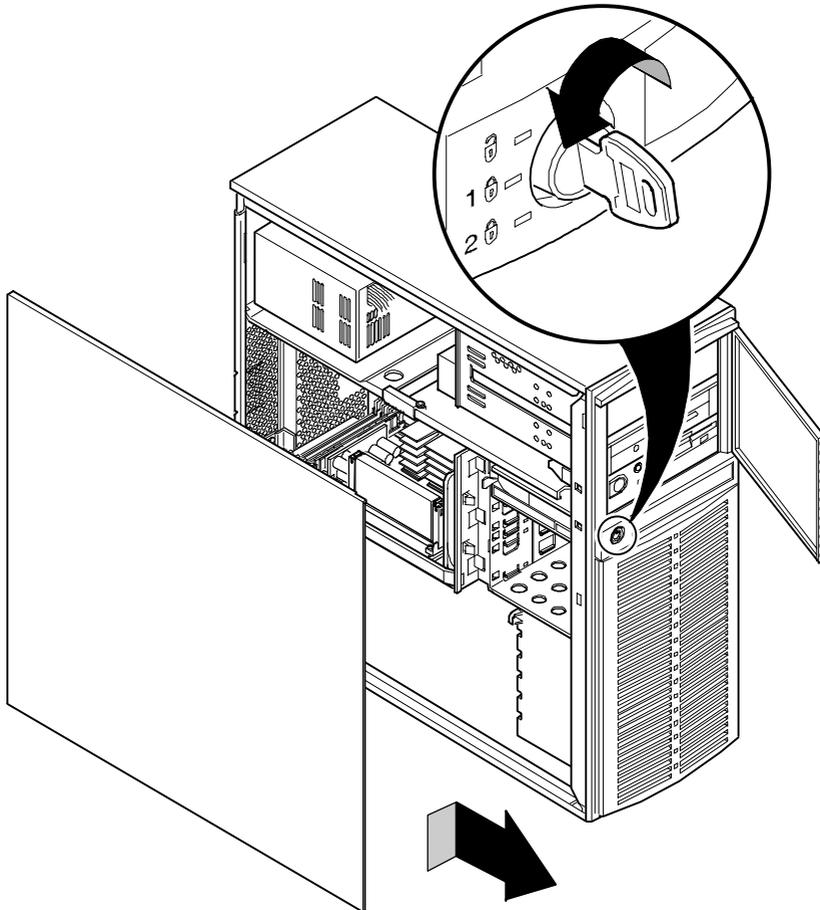


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**Figure 5-3. Unlocking and Removing the Side Panel**

To install the side panel.

1. Slide the panel to the front of the server.
2. Lock the side panel.

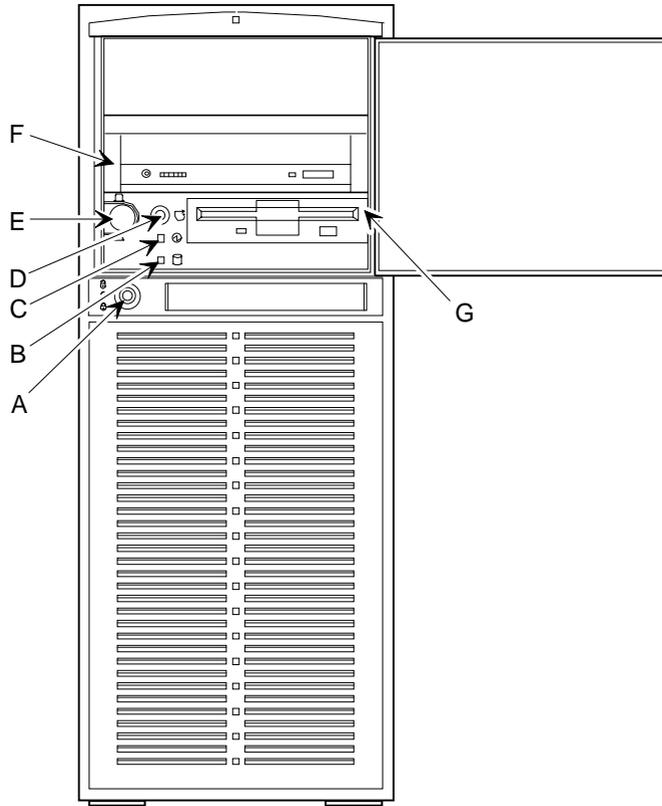


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**Figure 5-4. Installing the Side Panel**

## Server Front View

<b>Figure Legend</b>	<b>Component</b>
A	Security door lock/chassis lock
B	Hard disk drive indicator
C	Power indicator
D	Reset button
E	Power on/off button
F	CD-ROM drive
G	3½-inch diskette drive

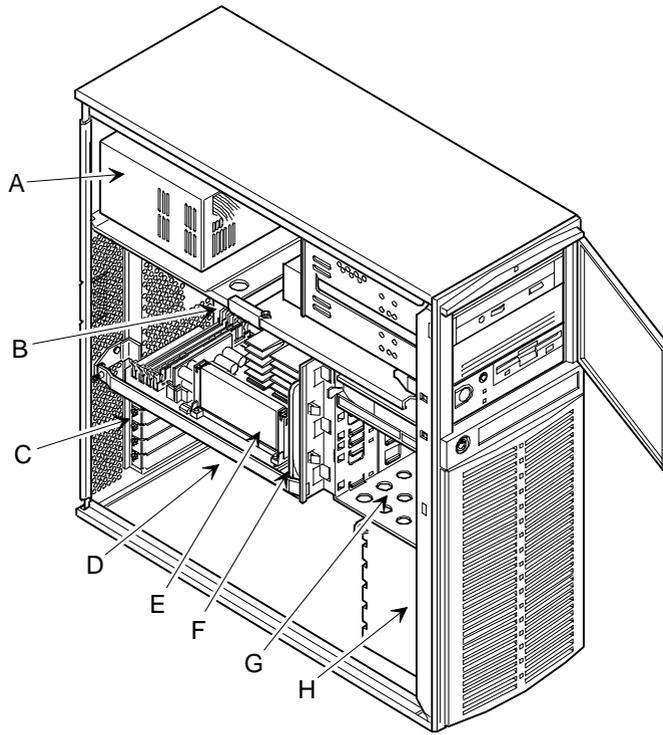


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**Figure 5-5. Server Front View**

## Server Left Side View

<b>Figure Legend</b>	<b>Component</b>
A	Power supply
B	Location of main logic board
C	Rear panel expansion board slots
D	Two ISA expansion slots Four PCI expansion slots One shared ISA/PCI slot
E	Pentium II processor module
F	Upper fan assembly
G	Internal 3½-inch drive bays
H	Lower fan assembly



DEC01391-4

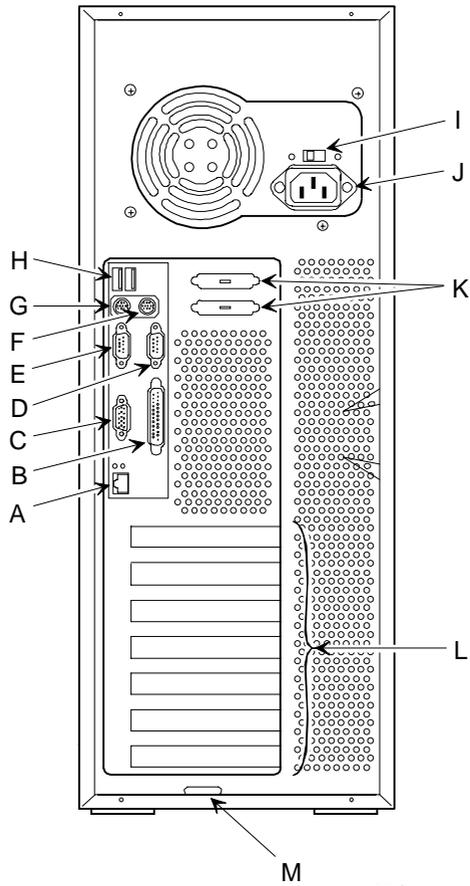
**Figure 5-6. Server Left Side View**

## Server Rear View

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<b>Figure Legend</b>	<b>Component</b>
A	10Base-T/100Base-T connector (RJ45)
B	Parallel port
C	Video port
D	Serial port (COM1)
E	Serial port (COM2)
F	Keyboard port
G	Mouse port
H	USB ports
I	Voltage select switch
J	ac line connector
K	SCSI knockouts
L	Expansion board slots
M	Padlock ring

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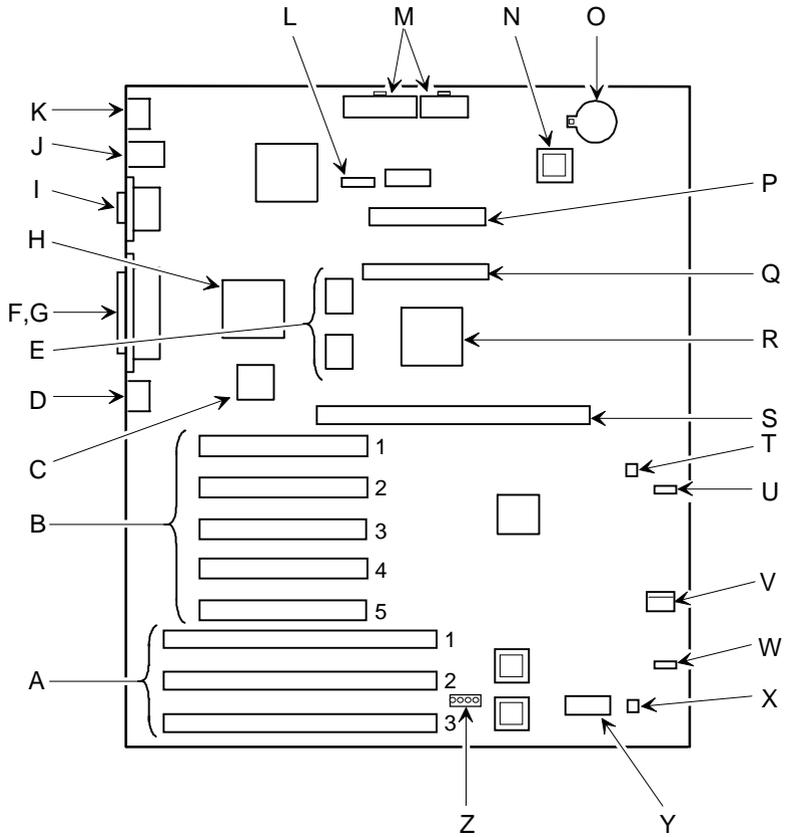


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**Figure 5-7. Server Rear View**

## Main Logic Board Components and Connectors

Figure Legend	Component/Connector
A	ISA expansion slots (1 through 3)
B	PCI expansion slots (1 through 5)
C	DIGITAL 21143 network controller
D	10Base-T/100Base-T network connector
E	Video memory
F	Parallel port
G	Video port
H	S3 Trio64V2/GX video controller
I	Serial ports
J	Keyboard and mouse ports
K	USB ports
L	Front panel connector
M	Power connector
N	Flash ROM
O	Server battery
P	Diskette drive connector
Q	Wide SCSI connector
R	Adaptec 7880 SCSI controller
S	Pentium II processor module
T	Fan 1 connector
U	External hard disk drive display connector
V	Dip switch for main logic board settings
W	Speaker connector
X	Fan 2 connector
Y	Remote Server Monitor (RSM) connector
Z	Yellow fault LEDs



DEC01395-2

**Figure 5-8. Main Logic Board Components and Connectors**

## Processor Module Components/Conectors

Figure Legend	Component/Connector
A	Dip switch for processor settings
B	Voltage Regulator Module (VRM) slot (VRM used only when a second processor is installed)
C	DIMM sockets
D	Processor 1
E	Processor 2 (or terminator)

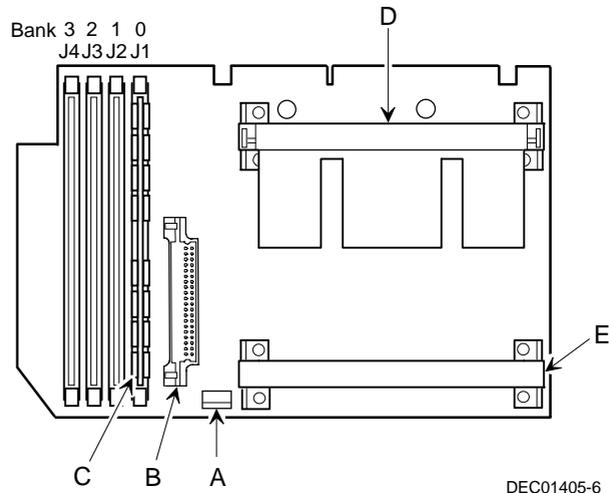


Figure 5-9. Processor Module Component Locations

## Main Logic Board Switch Settings

The following table lists the main logic board switch and factory-default settings. Figure 5-10 shows the switch locations.

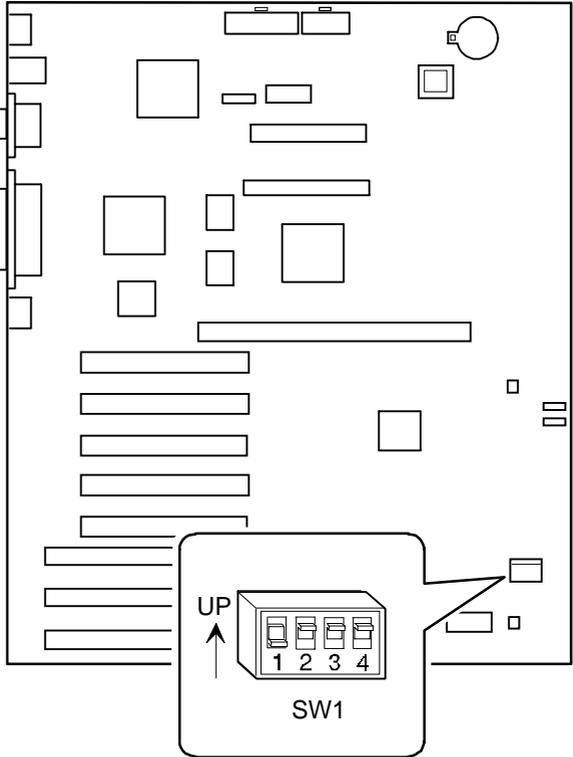


**CAUTION:** Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the server chassis. A static discharge from fingers can result in permanent damage to electronic components.

Feature	Function	Setting	Description
BIOS upgrade	Disabled Enabled <sup>(1)</sup>	SW1-1, up SW1-1, down <sup>(1)</sup>	The main logic board's flash BIOS upgrade switch must be set to the disabled (UP) 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 <sup>(1)</sup> Recovery	SW1-2, up <sup>(1)</sup> SW1-2, down	If the BIOS upgrade failed, refer to the README.TXT file that came with the BIOS upgrade.
Clear password	Disabled <sup>(1)</sup> Enabled	SW1-3, up <sup>(1)</sup> SW1-3, down	Set this switch to the password clear (DOWN) position and then restart the server to reset the password.
Clear CMOS	Disabled <sup>(1)</sup> Enabled	SW1-4, up <sup>(1)</sup> SW1-4, down	Clears CMOS of all BIOS setup information. Use the Enabled setting when the server will not boot, and BIOS setup cannot be accessed due to configuration data corruption. This switch must be set back to Disabled before rebooting the server.

(1) Factory default setting

UP = switch closed; DOWN = switch open



DEC01395-

**Figure 5-10. Main Logic Board Switch Locations**

## Pentium II Processor Clock Speed Switch Settings

The following table provides the switch settings for a number of available Pentium II processors. The switches are set correctly for the Pentium II processor that came with the server you purchased. You only need to change the Pentium II processor switch settings, that is SW1, should you upgrade to another Pentium II processor.

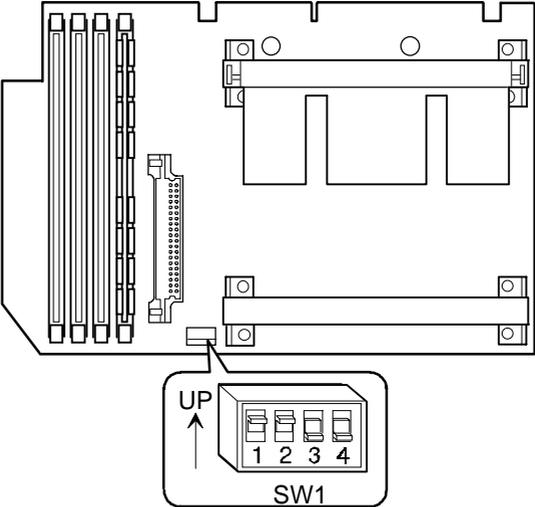


**CAUTION:** Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the server chassis. A static discharge from fingers can result in permanent damage to electronic components.

Processor Speed	SW1-1	SW1-2	SW1-3	SW1-4
233 MHz	UP	UP	DOWN	DOWN
266 MHz <sup>(1)</sup>	DOWN	DOWN	UP	DOWN
300 MHz <sup>(1)</sup>	UP	DOWN	UP	DOWN
333 MHz <sup>(1)</sup>	DOWN	UP	UP	DOWN
366 MHz <sup>(1)</sup>	UP	UP	UP	DOWN
400 MHz <sup>(1)</sup>	DOWN	DOWN	DOWN	UP
433 MHz <sup>(1)</sup>	UP	DOWN	DOWN	UP
466 MHz <sup>(1)</sup>	DOWN	UP	DOWN	UP
500 MHz <sup>(1)</sup>	UP	UP	DOWN	UP
533 MHz <sup>(1)</sup>	DOWN	DOWN	UP	UP

(1) The processor speed indicated above are anticipated future processor products. This does not constitute a promise 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.

UP = switch open; DOWN = switch closed



DEC01405-4

**Figure 5-11. Pentium II Processor Module Locations**

## Installing Additional Memory

The DIGITAL Server provides an EDO/ECC memory system. 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 configuration table and follow all DIMM memory configuration guidelines.



**CAUTION:** Only install DIMMs supported by Digital Equipment Corporation.

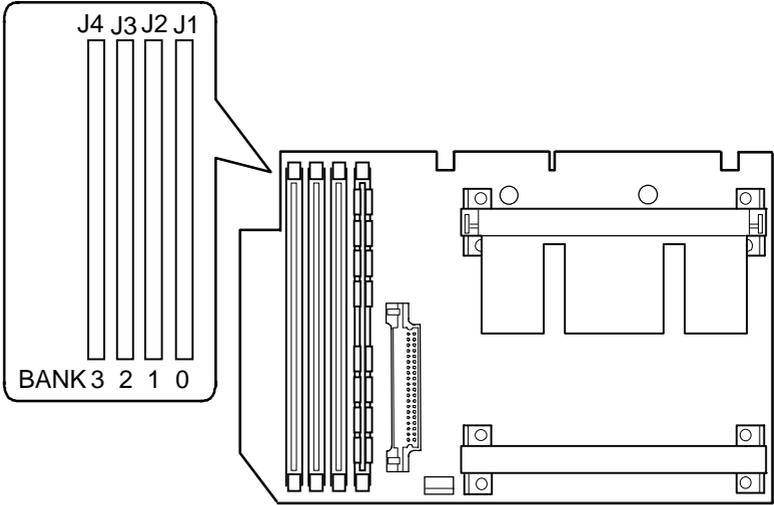
## Server DIMMs Requirements

- Supported DIMMs: 72-bit DIMMs, single-banked, ECC/EDO protected memory
- Supported densities: 16, 32, 64, and 128 MB of ECC/EDO protected memory
- Minimum server memory supported: 32 MB
- Maximum server memory supported: 512 MB (ECC protected memory)

## Memory Configuration Guidelines

The memory configuration guidelines for the DIGITAL Server 1200 are as follows:

- Each memory bank on the processor module accommodates one DIMM.
- Install DIMMs starting with Bank 0 (J1). See Figure 5-12 for DIMM socket locations.
- You can mix different DIMM capacities.



DEC01405-5

**Figure 5-12. DIMM Bank Locations**

## Memory Configurations

Bank 0 (J1)	Bank 1 (J2)	Bank 2 (J3)	Bank 3 (J4)	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	32 MB	32 MB	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	64 MB	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>

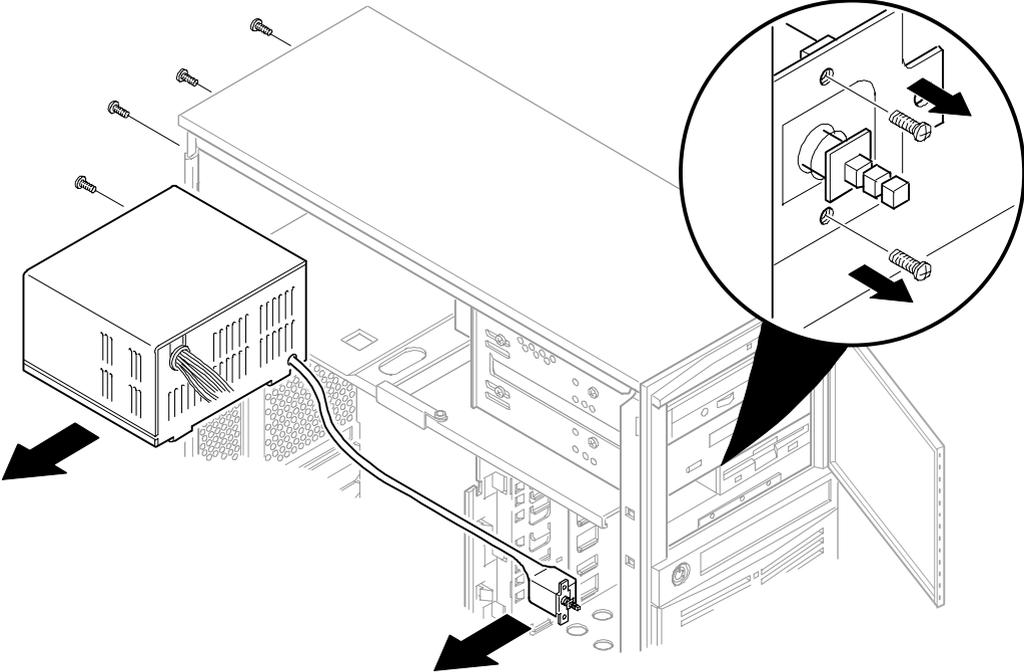
If the error is uncorrectable, the server halts after the memory test.

<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, and in all cases halts the server. If this occurs, the DIMM must be replaced immediately.

## Removing and Replacing the Power Supply and Control Assembly

1. Open the security door.
2. Turn off the server.
3. Disconnect the ac power cord.
4. Unlock and remove the side panel.
5. Remove the front bezel.
6. Disconnect all the wire power harness connectors from the main logic board and peripheral devices.
7. Remove the two screws securing the control assembly to the chassis.
8. Remove the power supply retaining screws from the rear of the chassis.
9. Remove the power supply and control assembly.
10. Replace the power supply and control assembly by performing the removal steps in reverse order.
11. Set 115/230 power supply switch to proper input voltage setting.

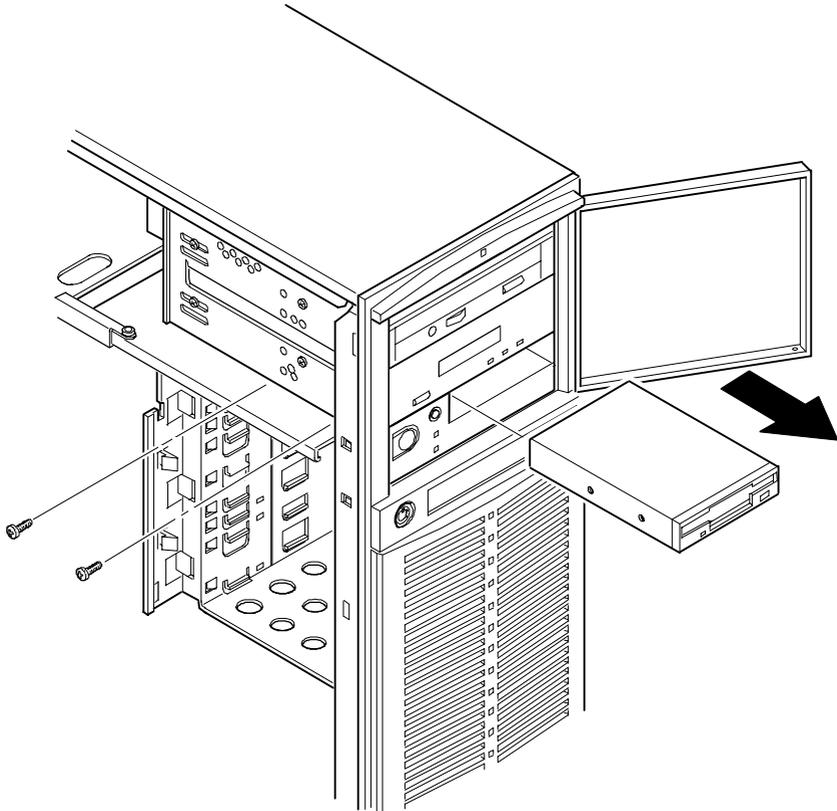


DEC01485

**Figure 5-13. Removing and Replacing the Power Supply and Control Assembly**

## Removing and Replacing the Diskette Drive

1. Open the security door.
2. Turn off the server.
3. Disconnect the ac power cord.
4. Unlock and remove the side panel.
5. Disconnect the power and data cables from the drive.
6. Release peripheral device power cables from retaining clips.
7. Remove the drive retaining screws.
8. Slide the drive toward the front, then out from the drive bay.
9. Replace the diskette drive by performing the removal steps in reverse order.

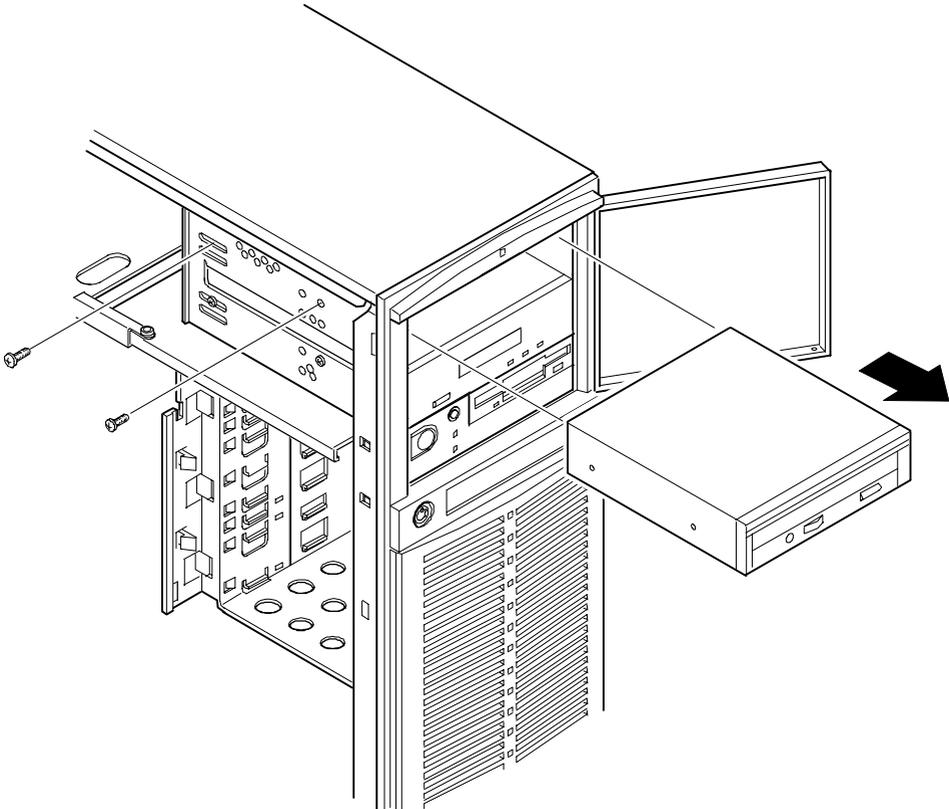


DEC01486-2

**Figure 5-14. Removing and Replacing the Diskette Drive**

## Removing and Replacing the CD-ROM Drive

1. Open the security door.
2. Turn off the server.
3. Disconnect the ac power cord.
4. Unlock and remove the side panel.
5. Disconnect the power, data, and (if installed) audio cables from the CD-ROM drive.
6. Remove the retaining screws from the drive bay.
7. Slide the drive out from front of the drive bay by applying pressure at the rear of the CD-ROM drive.
8. Set jumpers on the new CD-ROM drive identically to those on the removed CD-ROM drive.
9. Replace the CD-ROM drive by performing the removal steps in reverse order.



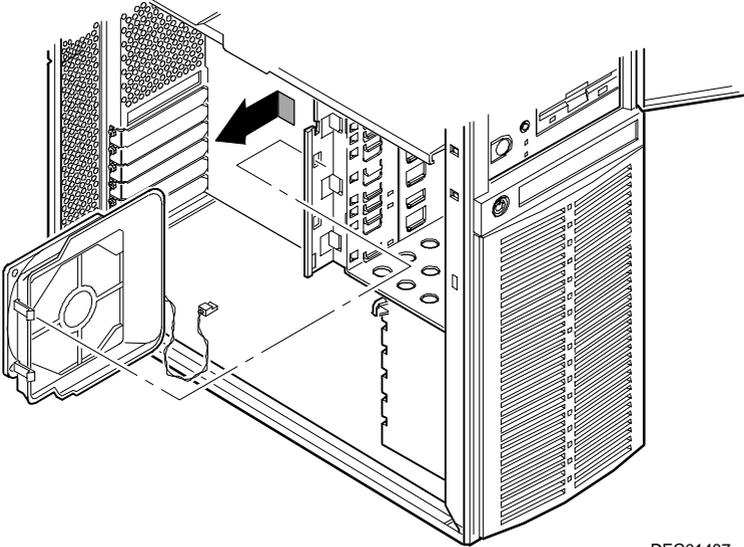
DEC01486-3

**Figure 5-15. Removing and Replacing the CD-ROM Drive**

## Removing and Replacing the Upper Cooling Fan

The following procedure can be used to remove the upper cooling fan.

1. Turn off the server.
2. Disconnect the ac power cord.
3. Unlock and remove the side panel.
4. Remove the processor module.
5. Disconnect the fan cable from the main logic board.
6. Press the plastic tabs to release the fan from the fan housing.
7. Remove the fan from the fan housing.
8. Replace the fan by performing the removal steps in reverse order.

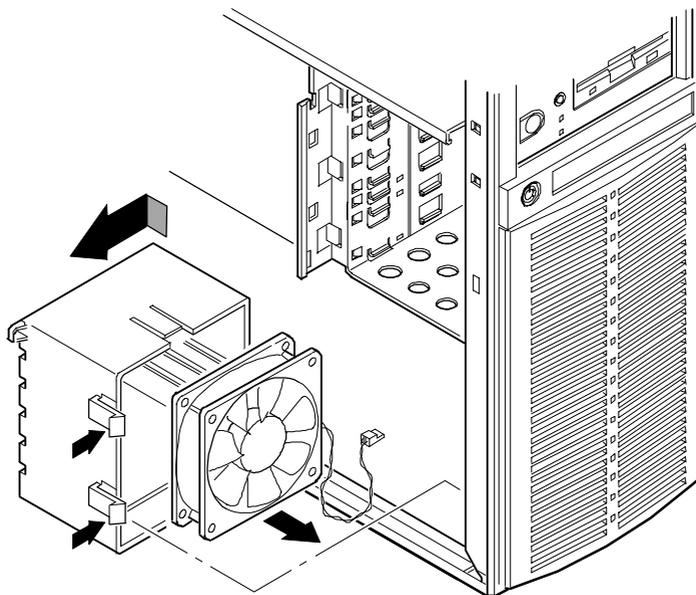


DEC01487

**Figure 5-16. Removing and Replacing the Upper Cooling Fan**

## Removing and Replacing the Lower Cooling Fan

1. Turn off the server.
2. Disconnect the ac power cord.
3. Unlock and remove the side panel.
4. Disconnect the fan cable and speaker cable from the main logic board.
5. Press the plastic tabs to release the lower fan housing.
6. Remove the lower fan housing.
7. Remove the fan from the lower fan housing.
8. Replace the fan by performing the removal steps in reverse order.

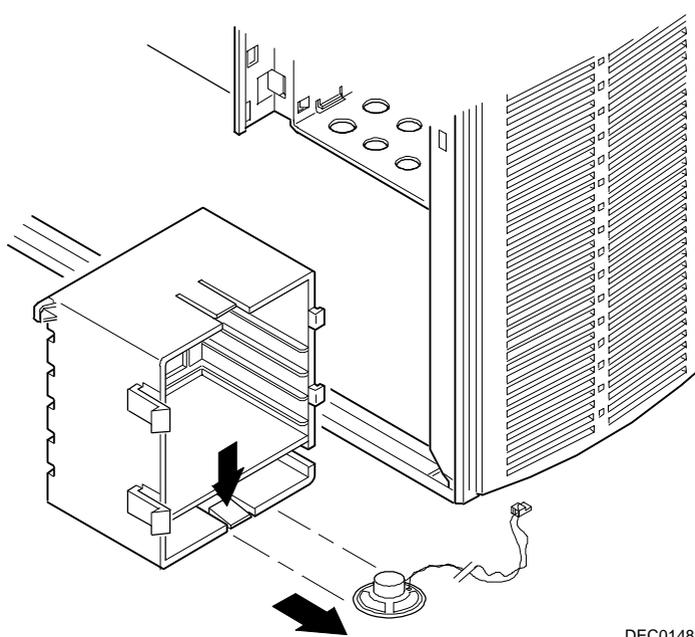


DEC01488

**Figure 5-17. Removing and Replacing the Lower Cooling Fan**

## Removing and Replacing the Speaker

1. Turn off the server.
2. Disconnect the ac power cord.
3. Unlock and remove the side panel.
4. Disconnect the fan and speaker cable from the main logic board.
5. Press the plastic tabs to release the lower fan housing.
6. Remove the lower fan housing.
7. Remove the speaker from the lower fan housing.
8. Replace the speaker by performing the removal steps in reverse order.

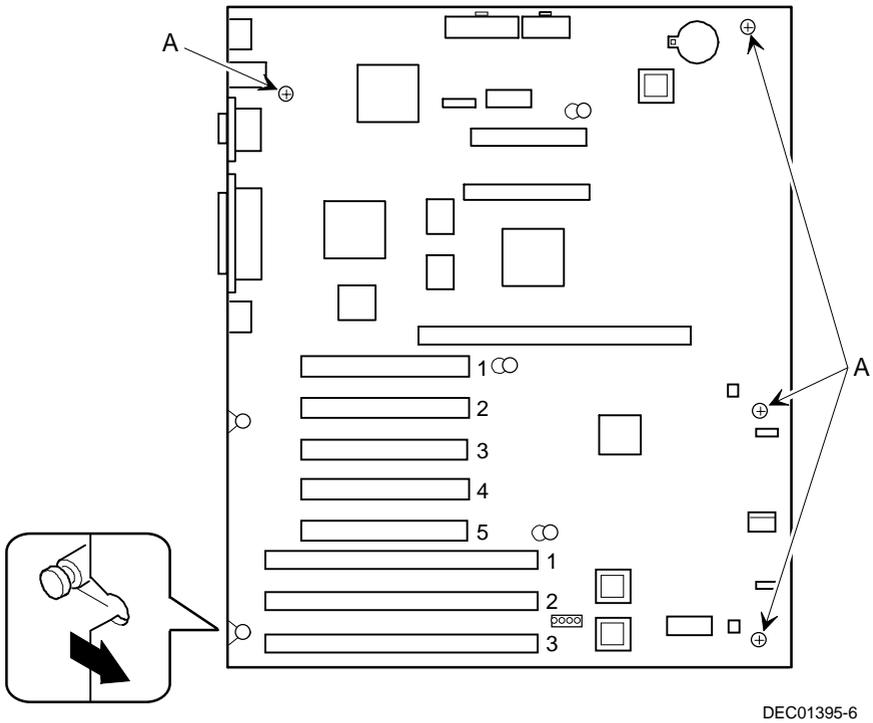


DEC01489

**Figure 5-18. Removing and Replacing the Speaker**

## Removing and Replacing the Main Logic Board

1. Turn off the server.
2. Remove ac power cable.
3. Disconnect all external cables from the I/O expansion modules located at the rear of server.
4. Unlock and remove the side panel.
5. Disconnect all cables from the main logic board.
6. Record all ISA and PCI slot assignments before removing the expansion boards.
7. Remove the expansion boards.
8. Remove and retain screws from the main logic board (A, Figure 5-19).
9. Lift the main logic board away from the chassis.
10. Configure the jumpers on the new main logic board.
11. If the new main logic board does not have a Lithium battery/RTC, remove the Lithium battery/RTC from the old main logic board and replace it on the new main logic board.
12. Align the main logic board over the standoffs; install and tighten screws removed in step 7.
13. Using the side panel Quick Reference label, reconnect all cables to the main logic board.
14. Using information recorded in step 6, install the expansion boards in their original configuration.
15. Reconnect all external and internal cable connections.
16. Replace and lock the side panel.
17. Turn on the server.
18. Run the BIOS Setup utility to configure the server and restore the system management information.



DEC01395-6

**Figure 5-19. Removing and Replacing the Main Logic Board**

## Removing and Replacing the Lithium Battery

The server comes with a Lithium 3 V dc wafer-style battery. If the server fails to retain the correct date, time, or configuration settings when turned on, you need to replace the battery.

To replace the Lithium battery, perform the following:

1. Record server configuration settings using the BIOS Setup utility.
2. Turn off the server.
3. Disconnect external devices, ac power, and monitor power.
4. Unlock and remove the side panel.
5. Lift the retaining clip slightly and push on the battery from the side to slide it out.

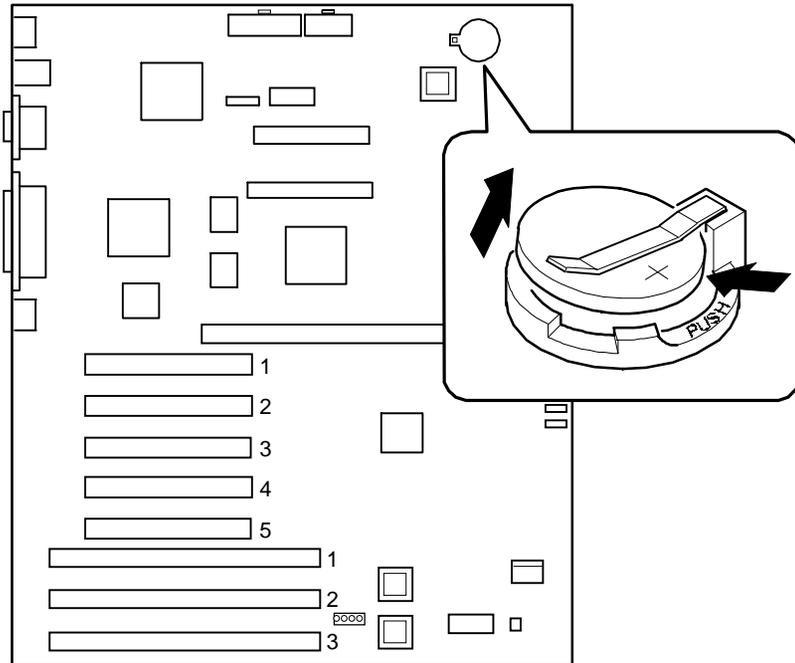


**WARNING:** There is a danger of battery explosion if a lithium battery is incorrectly replaced. To prevent damage to the server, be sure the + side faces up when installing a new battery. Also, be sure to replace the battery with either a DIGITAL (P/N 12-41474-05), Toshiba (P/N CR2032), or equivalent 3 V dc lithium battery.

Depending on locality, the server's battery might be considered hazardous waste. Follow any state or local statutes to properly dispose of the old battery.

6. Install the new battery.  
When installing the new battery, make sure the “+” side faces up.
7. Replace and lock the side panel.
8. Connect external devices and restore power.
9. Run the BIOS Setup utility to reconfigure the server using the recorded configuration settings from step 1.

*Refer to Chapter 2, “Server Software and Utilities.”*



DEC01395-3

**Figure 5-20. Replacing the Battery**

# Processor Module Upgrades

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# 6

## Introduction

The Pentium II processor module comes with a single Pentium II processor installed. Installing a second Pentium II processor increases the capabilities of the server. This chapter describes the configuration guidelines that must be followed prior to upgrading as well as detailed procedures on removing and installing the Pentium II processor module.

## Processor Module Configuration Guidelines

You can upgrade the server to a dual Pentium II processor configuration. To upgrade, you must purchase and install the items supplied in the Pentium II processor upgrade kit.

- Single processor configurations can be installed in either slot. A termination card must be installed in the other slot. The termination card must be removed prior to installing a second processor.
- A VRM must be installed when a second Pentium II processor is installed.
- DIGITAL recommends that dual processor configurations use Pentium II 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. The processors IDs are also displayed with both IDs being identical.

## Processor Module Upgrades

- Use only DIGITAL-supplied processor modules.
- Use an antistatic wrist strap when servicing any part of the server.  
*Refer to Chapter 4, “Troubleshooting” for specific POST messages.*

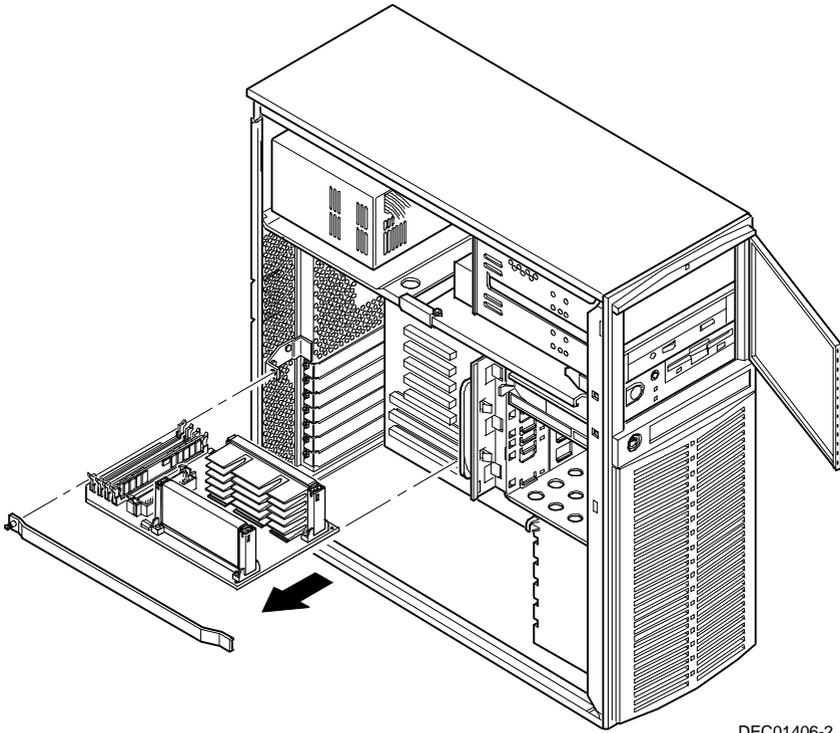
## Processor Configurations

- One Pentium II processor with 512 KB cache
- Two Pentium II processors with 512 KB cache (each processor)

## Processor Upgrade Procedures

To upgrade from a single Pentium II processor configuration to a dual Pentium II processor configuration:

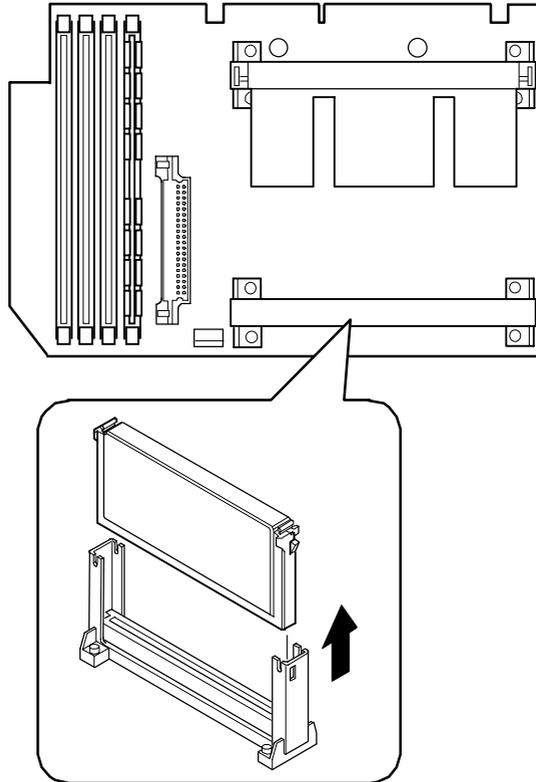
1. Shut down the operating system software.
2. Power down the server.
3. Disconnect all external devices, ac power, and monitor power.
4. Remove the side panel.
5. Place the antistatic wrist strap on your wrist and connect the grounding clip to a non-painted metal surface of the server’s chassis.
6. Loosen the retaining bracket, remove the processor module, and then place it on an antistatic surface.



DEC01406-2

**Figure 6-1. Removing a Processor Module**

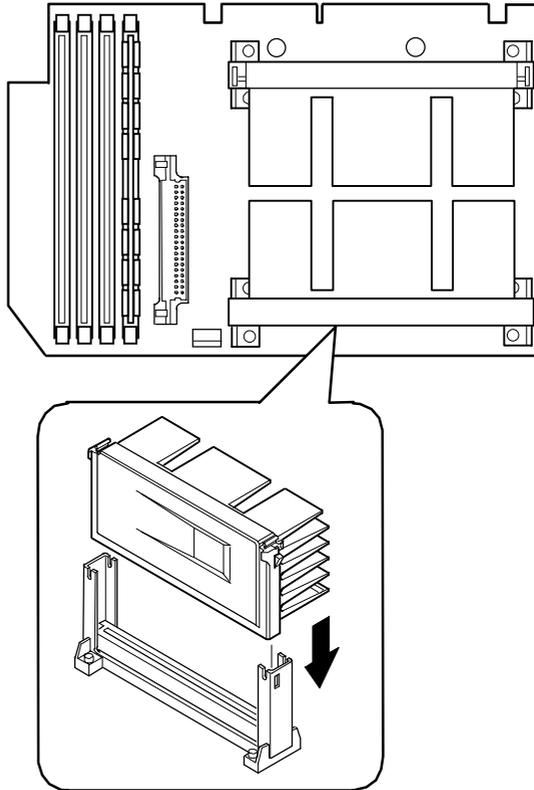
7. Remove the terminator card from the processor module (see Figure 6-2). Grasp the terminator by each end and pull up.



DEC01405-3

**Figure 6-2. Removing the Terminator Module**

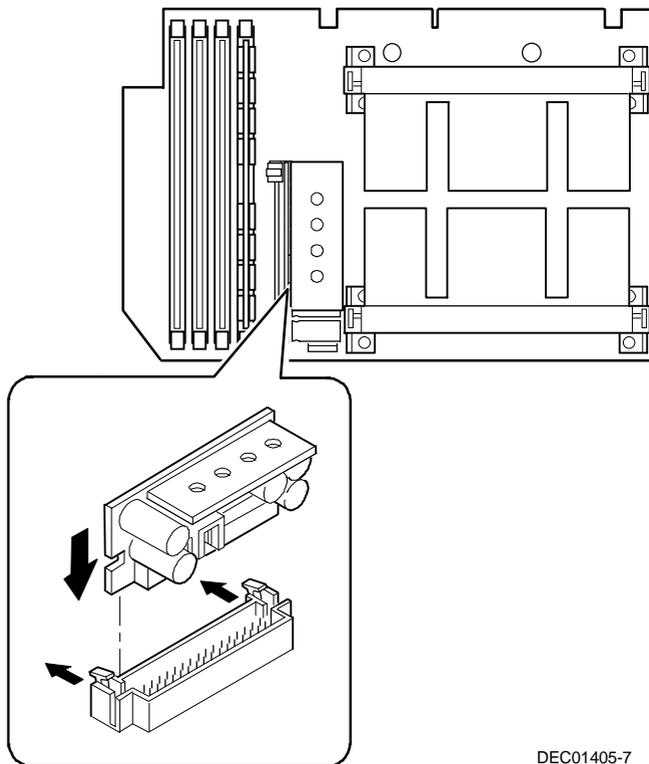
8. Remove the new processor from its shipping container.
9. Insert the new processor into this slot (see Figure 6-3).
10. Secure the new processor to its socket by pushing out on the two plastic tabs at each side.



DEC01405-2

**Figure 6-3. Installing the Second Processor**

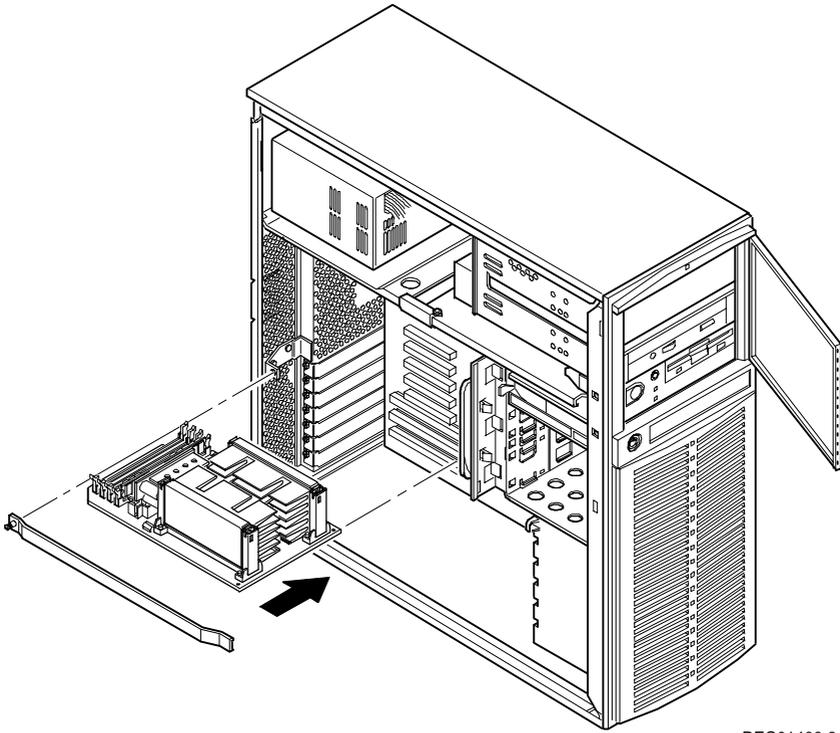
11. Insert the VRM into the dedicated slot on the processor module.



DEC01405-7

**Figure 6-4. Installing the VRM**

12. Set all appropriate switch settings on the processor module.
13. Install the processor module and then secure it to the chassis using the previously removed retaining bracket.



DEC01406-3

**Figure 6-5. Installing the Processor Module**

14. Replace the side panel.
15. Connect all external devices and restore power.

## Pentium II Processor Clock Speed Switch Settings

The following table provides the switch settings for a number of available Pentium II processors. The switches are set correctly for the Pentium II processor that came with the server. You only need to change the Pentium II processor switch settings, that is SW1, if you upgrade to another Pentium II processor.

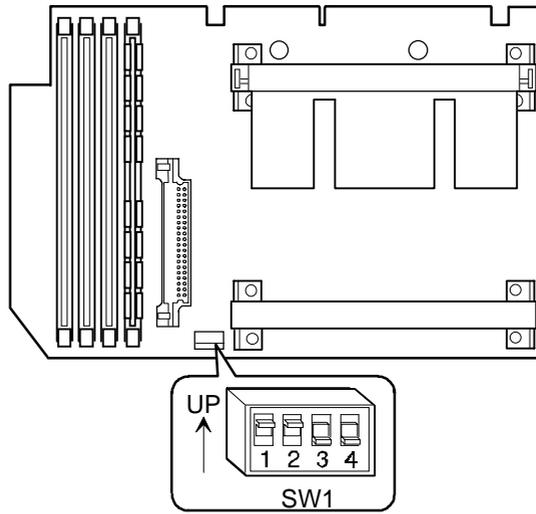


**CAUTION:** Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the server chassis. A static discharge from fingers can result in permanent damage to electronic components.

Processor Speed	SW1-1	SW1-2	SW1-3	SW1-4
233 MHz	UP	UP	DOWN	DOWN
266 MHz <sup>(1)</sup>	DOWN	DOWN	UP	DOWN
300 MHz <sup>(1)</sup>	UP	DOWN	UP	DOWN
333 MHz <sup>(1)</sup>	DOWN	UP	UP	DOWN
366 MHz <sup>(1)</sup>	UP	UP	UP	DOWN
400 MHz <sup>(1)</sup>	DOWN	DOWN	DOWN	UP
433 MHz <sup>(1)</sup>	UP	DOWN	DOWN	UP
466 MHz <sup>(1)</sup>	DOWN	UP	DOWN	UP
500 MHz <sup>(1)</sup>	UP	UP	DOWN	UP
533 MHz <sup>(1)</sup>	DOWN	DOWN	UP	UP

(1) The processor speed indicated above are anticipated future processor products. This does not constitute a promise 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.

UP = switch open; DOWN = switch closed



DEC01405-4

**Figure A-2. Pentium II Processor Switch Location**

## Introduction

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

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 BIOS Setup utility.



**CAUTION:** Before changing any memory or address location, refer to the documentation supplied with the optional device, expansion board, or software application and make sure adequate information is available. 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/ISA video or SMM buffer memory	128 KB
C0000 to DFFFF	PCI/ISA expansion board BIOS and buffer memory	128 KB
E0000 to EFFFF	ISA adapter RAM (non-shadow)	64 KB
F0000 to FFFFF	ISA adapter RAM (non-shadow) system BIOS	64 KB

## I/O Address Map

Range (hexadecimal)	Function
060 to 064	Keyboard/mouse controller
0F8 to 0FF	Math co-processor
1F0 to 1F7	IDE controller (if enabled)
378 to 37F	LPT2 (if enabled)
2E8	COM4 (if enabled)
2F8	COM2 (if enabled)
3BC to 3BF	LPT1 (if enabled)
278 to 27F	LPT3 (if enabled)
3E8	COM3 (if enabled)
3F0 to 3F5	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	ISA bridge
0	08h	PCI slot 1
0	09h	PCI slot 2
0	0Ah	PCI slot 3
0	0Ch	AIC7880 Ultra SCSI controller
0	0Dh	Ethernet controller
0	12h	Video controller

# IRQ Assignment

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## IRQ Assignment Procedure

The following procedure allows assignment of system IRQs to PCI and ISA slots when there are more than two PCI option cards to install.

1. During boot, a screen appears with the DIGITAL banner in the upper left, and in the upper right "F2 for Setup" and "F3 for System Management". Press F3 to initiate the System Manager.
2. The following screen appears. Use the arrow keys to highlight PCI.

## IRQ Assignment

Summary	Environment	Memory	POST	SYS	MLB	CPU
<PCI>	Exit					
PCI IRQ Assignment						
Integrated - PCI Universal Serial Bus Controller (USB)				[IRQ 11]	[Enabled]	
Integrated - PCI VGA Compatible						
Integrated - PCI SCSI Bus Controller				[IRQ 10]	[Enabled]	
Integrated - PCI Ethernet Controller				[IRQ 15]	[Enabled]	
PCI Slot 1 - PCI SCSI Bus controller				[IRQ 5]	[Disabled]	
PCI Slot 1 - PCI Empty						
PCI Slot 1 - PCI Ethernet controller				[IRQ 14]	[Enabled]	
PCI Slot 1 - PCI Empty						
PCI Slot 1 - PCI Memorycontroller				[IRQ 14]	[Disabled]	
Reserved IRQ for ISA card					[None]	
Reserved IRQ for ISA card					[None]	
Reserved IRQ for ISA card					[None]	
<> Select Menu      ^ Select Item      [Enter] Edit. Accept						



**NOTE:** Only occupied PCI slots display IRQ assignment and Enabled/Disabled fields. When multi-function devices are present, only one of the devices is displayed. ISA assignment takes priority over PCI.

3. Use the arrow keys to highlight [Enabled] for USB and press [Enter] twice to disable it.
4. Use the arrow keys to select the IRQ to change.

5. Press [Enter] to edit. A display of all available IRQs appears. Black IRQs are available for selection, gray IRQs are in use and not available. Use the arrow keys to select an IRQ.

00
01
02
03
04
<b>05</b>
06
07
08
09
<b>10</b>
<b>11</b>
12
13
14
15
None

6. To Save, press ESC. At the top of the screen, the selection goes to Exit.
7. The screen displays Press [Enter] to POST. Press Enter and the system will reboot and save the changes.

## Service Notes

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# A

Service Notes



Service Notes