

# DIGITAL Server 500 Series

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## Service Maintenance Manual

Part Number: ER-N2DWW-SM. A01

**Digital Equipment Corporation**

**March 1998**

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*DIGITAL Server 500 Series Service Maintenance Manual*

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## **FCC Notice**

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

The user may find the following booklet prepared by the Federal Communications Commission helpful: How to Identify and Resolve Radio-TV Interference Problems. This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402. Stock No. 004-00398-5.

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

## **Canadian DOC Notice**

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.

## VCCI Notice

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.

## German Ergonomic Notice

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

## Safety Requirements

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.



**WARNING:** There is a danger of battery explosion if a lithium battery is incorrectly replaced. To prevent damage to your computer, be sure the + side faces up when installing a new battery. Also, be sure you 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 your locality, your computer's battery might be considered hazardous waste. Make sure you follow any state or local statute to properly dispose of the old battery.



**ADVARSEL:** Der er fare for, at et lithiumbatteri eksploderer, hvis det udskiftes ukorrekt. Undgå, at beskadige din computer - HUSK, at + siden skal vende opad, når du installerer et nyt batteri. Du skal udskifte batteriet med enten et DIGITAL (delnummer 12-41474-05), Toshiba (delnummer CR2032), eller tilsvarende 3 V jævnstrøms lithiumbatteri.

Afhængig af dit lokalområde, er det muligt, at din computers batteri betragtes som farligt affald. Husk, at følge evt. miljølove og lokale bestemmelser, når du kasserer det gamle batteri.



**VAROITUS:** Litiumpatterit voivat räjähtää, jos ne asennetaan väärin. Estääksesi tietokoneesi vaurioitumisen varmista, että patteria asentaessasi sen positiivinen (+) puoli on ylöspäin. Tarkista myös, että käyttämäsi uusi patteri on joko DIGITAL (osa no. 12-41474-05), Toshiba (osa no. CR2032) tai vastaavanlainen 3 voltin tasavirtalitiumpatterii.

Asuinpaikastasi riippuen tietokoneesi patteria voidaan pitää ongelmajätteenä. Pidä huoli, että hävität vanhan patterin voimassa olevien lakien ja asetusten mukaisesti.



**WARNING!** Det kan förekomma en batteriexplosion om ett litiumjonbatteri byts ut på felaktigt sätt. Förhindra att datorn skadas genom att se till att plussidan (+) är uppåtvänd när du sätter i ett nytt batteri. Det gamla batteriet får endast bytas ut mot ett DIGITAL-batteri (artikelnummer 12-41454-05), ett Toshiba-batteri (artikelnummer CR2032) eller ett motsvarande litiumbatteri på 3 volt likström.

Datorbatterier anses vara miljöfarligt avfall i många länder. Du måste följa alla lokala bestämmelser när du avyttrar ett gammalt batteri.

## **Laser Safety Notices**

All CD-ROM drives included in DIGITAL computers are classified as Class 1 laser products and comply with safety standards as set by U.S. government and applicable European agencies.

No hazardous radiation is emitted from this CD-ROM drive; the laser beam is completely enclosed in the CD-ROM subassembly during all customer operation and maintenance. In the event that repair or service of the CD-ROM subassembly is required, only authorized DIGITAL service personnel should perform such repairs.

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# Preface *P*

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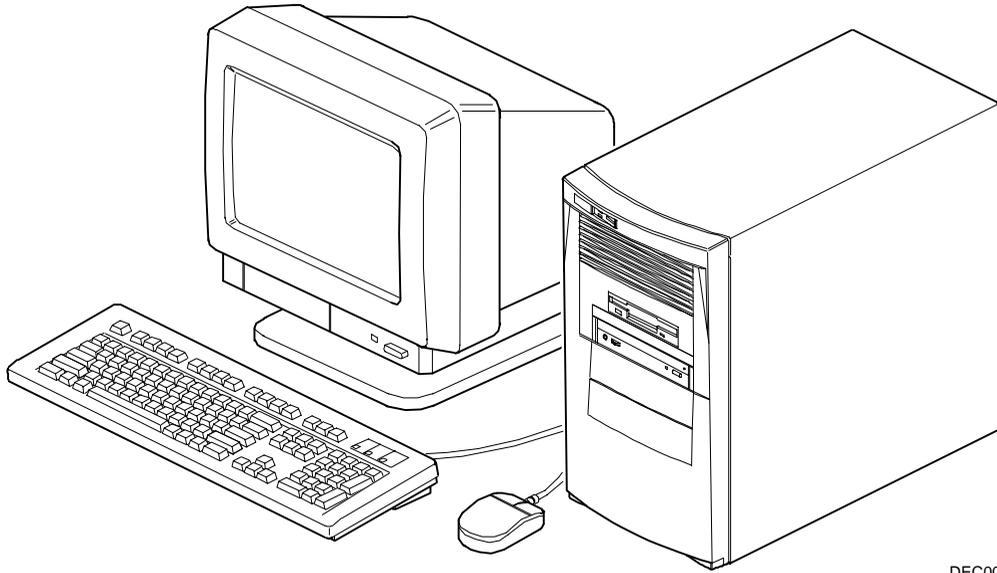
This *Service Maintenance Manual* is a troubleshooting guide that can be used for reference when servicing DIGITAL Servers.

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.

Preface



DEC00746-2

**Typical DIGITAL Server 500**

# Product Description

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# 1

## System Introduction

The DIGITAL Server 500 is a high-performance, highly-scalable sub-entry level network server featuring the latest in modular processor and storage technology.

## Features

- The DIGITAL Server 500 features a single Intel 233 MHz/512 KB cache Pentium processor with MMX™ technology
- Integrated 32-bit PCI DIGITAL 21143 Ethernet chip, 10Base-T/100Base-TX standard
- Three DIMM sockets on the main logic board, supporting from 16 MB to 256 MB SDRAM
- PCI 64-bit S3™ ViRGE/GX graphics accelerator for 2-D and 3-D graphics applications, with 2 MB graphics memory
- Phoenix (Plug and Play) Flash ROM BIOS
- Support for Windows NT and Novell Netware operating systems
- AMI diagnostics support
- Short tower enclosure

## 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.

## Product Description

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-N2DWW-SR (English only)	Provides troubleshooting information that can be used when servicing DIGITAL servers. This manual is a condensed version of the Service Maintenance Manual and is provided in a pocket-size format (4 x 8-inches).
Installation Guide	ER-N2DWW-IM (Multilanguage) <sup>(1)</sup> ER-N2DWW-IJ (Japanese) ER-N2DWW-I3 (Traditional Chinese)	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-N2DWW-UA (English) ER-N2DWW-UJ (Japanese) ER-N2DWW-U3 (Traditional Chinese)	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	36-49499-01	Provides an overview of major server components, connectors, jumpers and switches, and IDE cabling information.
Warranty and Service Information	ER-PCWAR-CM (Multilanguage) <sup>(2)</sup>	Provides warranty information and a listing of phone numbers for technical support.

<sup>(1)</sup> Multilanguage includes: English, French, Italian, German, and Spanish

<sup>(2)</sup> Multilanguage includes: English, French, Italian, German, Spanish, and Brazilian Portuguese

*continued*

## Product Description

<b>Document or Software Title</b>	<b>Order Number</b>	<b>Description</b>
DIGITAL ServerWORKS software	QB-4WY9A-SA (Multilanguage) <sup>(1)</sup>	<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.

<sup>(1)</sup> Multilanguage includes: English, French, Italian, German, and Spanish

## Latest Product Information and Updates

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

### Sub-Entry Server Product Information

Family Name	Model Name	Part Number	Description
DIGITAL Server 500	DIGITAL Server 500 233	FR-N2DWW-AA	6233/32 Model 1
DIGITAL Server 500	DIGITAL Server 500 233	FR-N2DWW-AB	6233/32 HDD

### 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 is used 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 is used to update or restore the server's BIOS.
- **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 the 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 if you experience problems with a hard disk drive or if you need to reconfigure or expand the server.



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

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

*For advanced information, refer to Chapter 3, "BIOS Setup Utility Settings."*

## Server Software and Utilities

Use the BIOS Setup utility to:

- Change time and date
- Alter the server's security level
- Change the boot options
- Reconfigure power management
- Setup the keyboard for comfort and use

In addition, change the server's initial setup after:

- Upgrading hardware (such as adding a new hard drive)
- Reconfiguring the mouse, COM, or LPT ports



**NOTE:** If you do change BIOS settings, make sure you record the new settings and keep this information in a safe place. Should you ever have to reset the settings, such as when you replace your battery, you can use this information to reconfigure the server's BIOS.

## Helpful Hints

When using the BIOS Setup utility consider:

- 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, and are listed in the following table:

Key	Function
F1	Help (provides a general help screen)
Esc	Exit (Exits the Setup utility and exits sub menus within the Setup utility)
↑↓ arrow keys	Select Item
← → arrow keys	Select Menu
-/+ or spacebar	Change Values
Enter	Select > Sub-Menu
F9	Setup Defaults (Sets all Setup options to factory default values)
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 reveals several helpful options:
  - Select “Save Changes & Exit” to save all Setup values and exit Setup.
  - Select “Exit Without Saving Changes” to exit Setup without recording any changes.



**NOTE:** Answer the Warning message carefully.

- 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.

## Accessing the BIOS Setup Utility

To access the BIOS Setup utility, perform the following steps:

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

## Changing Time and Date

There may be instances when it will be necessary, such as daylight savings or if you move to a different time zone, to change the date and/or time that is resident in the server’s BIOS. The following directions show you how this is done.

1. Reboot the server and enter Setup.
2. In the Main menu, using the cursor keys and [Tab], select (highlight) the System Time or System Date field you want to change.
3. Use [+] or [-] to change the field to the desired value.

You can also enter the desired date and time.

4. Save Changes and Exit Setup and allow your server to reboot.

## Setting Up Security

Server security is important to prevent theft or accidental loss of your server software and data. The following sections describe the BIOS security features available and how to use them.

### Setting Supervisor and User Passwords

The server has two password levels 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 enabled, you need to enter either the supervisor or user password to use the server. Password on boot limits who accesses the server and the level of functionality you receive.

Additionally, if after selecting [F2] during the boot sequence, the user password is entered instead of the supervisor password, the Main, Advanced, Boot, 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.)

If desired, set a user password as follows:

1. Highlight “Set User Password” and press [Enter].
2. Type in a seven (7) digit alpha-numeric user password and then press [Enter].
3. To confirm, retype the user password as instructed and press [Enter]. (Notice that “User Password Is” field now indicates Enabled.)
4. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take affect.
5. 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 prompts you to enter the supervisor password 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 your 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), follow the directions given below:

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.

## If You Forget Your Password

Use the following procedure to erase a password from your server.

1. Turn off your server and remove the outside cover.
2. Change switch SW1-2 to clear (switch ON).
3. Reconnect your server and turn it on.
4. Booting your server with this switch in the ON position erases the existing password(s).
5. Turn off your server.
6. Change switch SW1-2 to Normal (switch OFF).
7. Replace outside cover.
8. Reconnect your server and turn it on.
9. Using the BIOS Setup utility, assign a new password.

## Protecting Against Boot Sector Viruses

The server incorporates, in the BIOS Setup utility, selections to protect the BIOS from attacks by viruses.

### Fixed Disk Boot Sector

By write-protecting the boot sector, you can protect the server against viruses that corrupt the boot sector.

The “Fixed Disk Boot Sector” line in the Security menu allows you to enable a very important anti-virus attribute. Selecting “Write-Protect” can help protect the hard disk from being corrupted by viruses, which could disable the hard disk.

To write-protect the fixed disk boot sector:

1. Reboot the server and enter Setup.
2. Highlight the “Security” menu.
3. Highlight “Fixed Disk Boot Sector.”
4. Press the [+] key to enable write-protect (pressing the [+] key again, returns your server to normal).
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.

- 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.



**CAUTION:** Consider the security needs before using the “Password on Boot” 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.

- *Diskette Access* – This option works in conjunction with the “Password on boot” setting and can be set to prevent information on the server’s hard disk drive from being copied to a diskette.

When this option is set to “User” and “Password on boot” is disabled, all users can copy to and from a diskette. When this option is set to “Supervisor” and “Password on boot” is disabled, no one can copy to and from a diskette.

When the “Password on boot” option is enabled and “Diskette Access” is set to “User”, all users can copy to and from a diskette. When this option is set to “Supervisor” and “Password on boot” is enabled, users who log on with a user password cannot copy to and from a diskette; users who log on with a supervisor password can copy to and from a diskette.

- *Custom Sign On Banner* – When enabled, allows a custom banner to be displayed every time you turn your server on.
- *SETUP Prompt* – Found in the “Main” menu under “Boot Options,” this feature allows disabling the [F2] Setup prompt during the boot sequence. Although this feature does not prevent entering setup if you know the setup key, it will help prevent infrequent users from accessing Setup. This feature could prove useful in a school or retail setting.

Toggle the Setup prompt field (press the [+] key) back to Enabled in the “Boot Options” to redisplay the [F2] Setup prompt during the boot sequence.

## Configuring for New Disk Drives

These sections describe how to configure new disk drives in the BIOS Setup utility.

### Diskette Drive Configuration

Diskette drives need to be configured from within the BIOS Setup utility once the new diskette drive is installed.

To configure a newly installed diskette drive, proceed as follows:

1. Reboot the server and enter Setup.
2. Highlight the Main menu.
3. Highlight “Diskette A” or “Diskette B” (depending upon how you connected the diskette drive to your server).
4. Press the [+] key to sequence through the available options.
5. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take affect.

### Hard Disk Drive Configuration

Installing new ANSI-supported IDE hard disks is made easier by the “Autotype” drive detect mode available in the BIOS Setup utility.

#### Autotyping a Hard Disk

To Autotype a newly installed hard disk:

1. Reboot the server and enter Setup.
2. Highlight the “Main” menu.
3. Select an “IDE Adapter” field to assign the new hard disk and press [Enter].
4. Select “Autotype Fixed Disk” and press [Enter].

The BIOS Setup utility searches the hard disk and fills-in the disk parameters. If a parameter does not read correctly, follow the “Manually Defining a Hard Disk” procedure given later in this chapter.

5. Press [Esc] once and verify that the selected IDE Adapter field reads correctly for your hard disk.

For example: IDE Adapter 0 Master (C: 835 MB). If the selected IDE Adapter field does not read correctly, follow the “Manually Defining a Hard Disk” procedure given later in this chapter.

6. Press [Esc] once then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take affect. The new hard disk drive will be detected and the “type” field will be set to “Auto.”

### **Manually Defining a Hard Disk**

If the hard disk was not recognized correctly by the Autotype mode in the BIOS Setup utility, or you wish to change your hard disk’s definition, you can manually define the hard disk drive as follows:

1. Reboot the server and enter Setup.
2. Highlight the “Main” menu.
3. Select an “IDE Adapter” field to assign the new hard disk and press [Enter].
4. Fill-in the parameters of the hard disk in the appropriate fields.
5. Press [Esc] once and verify that the selected IDE Adapter field reads correctly for the hard disk. For example: IDE Adapter 0 Master (C: 835 MB).
6. Press [Esc], then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take affect.

## Changing the Boot Sequence

Depending on where you want to boot from, it may be necessary to change the server's boot sequence. For example, when connecting to a network. (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.

If you press [Enter] on the Hard Disk item in the Boot priority list, the Boot Connection Device Menu will appear, allowing you to specify the order in which hard drives are installed during system boot.

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:** To override this BIOS setting, press [Esc] during POST to display the Boot menu. Select a device from the list as the bootable device. You can also enter the BIOS Setup utility from this menu.

When changing the boot sequence, be aware of the following:

- Some CD-ROM drives do not auto-type correctly. This will be apparent during POST, when the CD-ROM identified message is not displayed. In this case, enter BIOS Setup and manually select the hard disk type (CD) for the CD-ROM, instead of allowing Setup to auto-type it.
- Many advanced operating systems, such as Windows NT, modify the boot sector of any hard disk drives that are installed in the server, while the operating system is being installed. This can cause normally bootable hard disk drives to be rendered non-bootable, even though the user did not want this behavior.

In systems where there are two or more bootable hard disk drives, it is recommended that all bootable hard disk drives, other than the target of the new operating system, be removed from the server before installing the new operating system.

Once installation of the new operating system is complete, the other hard disk drives can then be reinstalled. This simple procedure prevents the operating system from modifying the boot sectors of the other bootable drives, thus preserving the capability of choosing one of several hard disk drives from which to boot.

## Speeding up the Boot Process

There are three 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.

<b>Field</b>	<b>Description</b>
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.
POST error	Pauses and displays the Setup prompt or Resume boot prompt, if an error occurs during the boot sequence. If disabled, and an error occurs, a 30-second countdown will display on the screen and the server will again attempt to boot.
Quiet boot	Replaces POST boot messages with a display of the DIGITAL logo.
Summary screen	Displays the server's configuration.
Floppy check	Verifies the floppy boot drive.

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

<b>Field</b>	<b>Speed Up Boot Selection</b>
Setup prompt	Enable
POST error	Disable
Quiet boot	Enable
Summary	Disable
Floppy check	Disable

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

## Resetting Keyboard Features

Several parameters effecting keyboard performance can be altered from within the BIOS Setup utility. They are: “NumLock,” “Key Click,” “Keyboard Auto-Repeat Rate,” and “Keyboard Auto-Repeat Delay.”

- “NumLock” is factory set to “Auto” at boot which means that the number pad is on each time you boot. This is desirable, for example, if you primarily use spreadsheets or accounting software.

If, however, you primarily use a word processor or desktop publishing program, you might wish to leave NumLock off at boot to avoid having to turn it off manually.

- “Key Click,” when enabled, produces an audible “Click” whenever a key is pressed.
- “Keyboard Auto-Repeat Rate” sets the number of times per second a character repeats.

Most keys on the keyboard automatically repeat the character they represent if the keys are held down.

- “Keyboard Auto-Repeat Delay” sets the time that elapses before the character begins repeating.

## Changing the Keyboard Features

To change the keyboard features:

1. Reboot the server and enter Setup.
2. Highlight the “Main” menu.
3. Highlight “Keyboard Features” and press [Enter].

If you wish to leave “NumLock” on, skip steps 6 and 7, otherwise:

4. Highlight “NumLock.”

Press the [+] key to sequence through your options, select “Off.”

5. If you wish to leave “Key Click” disabled, skip steps 8 and 9, otherwise:
6. Select “Key Click.”
7. Press the [+] key to select Enable.

## Server Software and Utilities

If you wish to leave the “Keyboard Auto-Repeat Rate” (the number of times per second a character repeats) the same, skip steps 8 and 9, otherwise:

8. Highlight “Keyboard Auto-Repeat Rate.”
9. Press the [+] key to sequence through the available options.

If you wish to leave the “Keyboard Auto-Repeat Delay” (the time that elapses before the character begins repeating) the same, skip steps 10 and 11, otherwise:

10. Highlight “Keyboard Auto-Repeat Delay.”
11. Press the [+] key to sequence through the available options.
12. 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.

## 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:

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

# BIOS Setup Utility Settings

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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.



**NOTE:** An “\*” that follows an option in the Settings column indicates the factory default setting.

## BIOS Setup Utility Settings

### Main

Menu Fields	Settings	Comments
System time	Current time	Displays the current time.
System date	Current date	Displays the current date.
Language	English*	Language default.
Diskette drive A/ Diskette drive B	MB, 3½* 2.88 MB, 3½  Not Installed* 360 KB, 5¼ 1.2 MB, 5¼ 720 KB, 3½	Sets the size and density of diskette drives.
Integrated IDE adapter	Disabled Both* Primary Secondary	Enabled or disables the local bus IDE adapter. Both enables both the primary and secondary adapters. Primary enables only the primary adapter and Secondary enables only the secondary adapter.
<b>IDE Adapter 0/1 Master/Slave</b>		
Autotype fixed disk	[Press Enter]	Press [Enter] to detect and fill in the installed hard disk drive parameters in the remaining fields.
Type <sup>(1)</sup>	None 1 to 14 Rsrv 16 to 39 User Auto* CD	Selecting 1 to 14 and 16 to 39 automatically fills in the remaining fields in this menu.  Selecting User enables the remaining fields to be filled in manually, using the installed hard disk drive's parameters. <sup>(2)</sup>  If a CD-ROM drive is used for the IDE drive, you must select CD. You can select Auto for an HDD.

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

<sup>(2)</sup> Incorrect settings can cause the server to malfunction.

*continued*

<b>Menu Fields</b>	<b>Settings</b>	<b>Comments</b>
Cylinders <sup>(1)</sup>	0 to 4095	Displays the number of cylinders.
Heads <sup>(1)</sup>	1 to 64	Displays the number of heads.
Sectors/track <sup>(1)</sup>	0 to 63	Displays the number of sectors/track.
Write precomp <sup>(1)</sup>	0 to 4095 None	Displays the number of cylinders that have their write timing changed.
Multi-sector transfers <sup>(1)</sup>	Disabled 2 sectors 4 sectors 8 sectors 16 sectors Auto	Determines the number of sectors per block for multiple sector transfers.  Auto refers to the size the disk returns when queried.
LBA mode control	Disabled Enabled	Enabling this option causes Logical Block Addressing (LBA) instead of cylinders and heads. Select Disabled for IDE hard disk drives that are up to 528 MB in size. When using an IDE drive larger than 528 MB and an operating system that supports LBA, select Enable. MS-DOS and Windows are examples of operating systems that support LBA.
32-bit I/O	Enabled Disabled	Enables or disables the 32-bit, hard disk drive data transfer option. Enabling this option speeds up data transfers; ensure that the HDD supports 32-bit I/O transfers.

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

*continued*

## BIOS Setup Utility Settings

<b>Menu Fields</b>	<b>Settings</b>	<b>Comments</b>
Ultra DMA transfer mode	Disabled Mode 0 Mode 1 Mode 2	Selects the Ultra DMA method to transfer data to and from the HDD.
Transfer mode <sup>(1)</sup>	Standard Fast PIO1 Fast PIO2 Fast PIO3 Fast PIO4 Fast DMA A Fast DMA B Fast DMA F PCI Bus Master DMA	Selects the method to transfer data to and from the HDD. If you select the user autotype for the HDD, Setup automatically selects the optimum transfer mode.

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

<b>Menu Fields</b>	<b>Settings</b>	<b>Comments</b>
Video system	EGA / VGA* CGA 80x25 Monochrome	Sets the video controller type.
<b>Memory and Cache:</b>		
Internal cache	Enabled* Disabled	Enables or disables the processor's internal cache.
External cache	Enabled* Disabled	Enables or disables the external cache.
Cache system BIOS	Enabled* Disabled	This option enables the system BIOS to be cached in the internal cache and external cache (if installed). This increases server performance because BIOS instructions can be executed in cache instead of RAM.  Enabled is the recommended setting.
Cache video BIOS	Enabled* Disabled	This option enables the video BIOS to be cached in the internal cache and external cache (if installed). This increases server performance because video BIOS instructions can be executed in cache instead of RAM.  Enabled is the recommended setting.

*continued*

## BIOS Setup Utility Settings

Menu Fields	Settings	Comments
System BIOS shadow	Enabled*	Always set to Enabled.
Video BIOS shadow	Enabled* Disabled	The main logic board reserves an area of DRAM for a copy of video BIOS ROM. This DRAM called "shadow memory" is write-protected and has the same addresses as the video BIOS ROM locations. When 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.
Shadow memory region C800 - CBFF: CC00 - CFFF: D000 - D3FF: D400 - D7FF: D800 - DBFF: DC00 - DFFF:	Enabled Disabled*	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.
AT bus space	Disabled*  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* Non-compatibility	Select the BIOS report mechanism for the amount of external memory.  Select Compatibility when using a conventional operating system.  Select Non-compatibility for extended memory above 64 MB under Windows NT.

*continued*

Menu Fields	Settings	Comments
<b>Boot Options</b>		
Setup prompt	Enabled* Disabled	Enables or disables the <F2> setup prompt each time the server boots.  If you select Disable, you only disable the prompt informing you when to press <F2> to enter Setup. You can still enter Setup by pressing <F2> before POST completes.
POST errors	Enabled* 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.
Quiet boot	Enabled Disabled*	Enables or disables the display of POST messages. Quiet Boot, when enabled, displays the DIGITAL logo, instead of POST messages.
Summary screen	Enabled* Disabled	Enabling this option causes the server to display configuration parameters (in the form of a summary screen) during boot.
Floppy check	Enabled Disabled*	Enabled permits verification of FDD type at boot. Disabled prevents FDD verification and speeds up the boot process.
FLASH Update	Enabled* Disabled	When enabled, protects against unauthorized FLASH BIOS update for the next boot.
Acpi 4 sec	Enabled Disabled*	Enable or disable Acpi 4 sec power off system.

*continued*

## BIOS Setup Utility Settings

<b>Menu Fields</b>	<b>Settings</b>	<b>Comments</b>
<b>Keyboard Features</b>		
NumLock	Auto* 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* 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*	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* 3/4 sec 1 sec	Sets the delay time after a key is held down before it begins to repeat a keystroke.
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.

## Advanced

Menu Fields	Settings	Comments
<b>Integrated Peripherals</b>		
Mouse port	Disabled Enabled*	Enables or disables the mouse port.
Parallel port	Auto Disabled 3BC, IRQ 7 378, IRQ 7* 278, IRQ 5	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.
Parallel port mode	Compatible mode Bi-directional mode* EPP 1.7 EPP 1.9  ECP-DMA1 mode ECP-DMA3 mode	Sets the onboard parallel port mode.  Standard printer connection.  PS/2 compatible mode and able to receive data.  Enhanced parallel port mode.  Selection based on what EPP version the printer supports.  Only choose a mode that the parallel port device (such as a printer) supports. Check the parallel port device documentation for this information. If this information cannot be located, use the default setting.  Extended capabilities port mode.

*continued*

## BIOS Setup Utility Settings

Menu Fields	Settings	Comments
Serial port	Auto Disabled 3F8, IRQ 4* 2F8, IRQ 3 3E8, IRQ4 2E8, IRQ3	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 you select Auto, Setup configures COM1 to address = 3F8h and IRQ = 4 if they are available.  Auto is the recommended setting.
Diskette controller	Enabled* Disabled	Enables or disables the onboard diskette controller.
Exchange diskette drives	Disabled* Enabled	Logically exchanges physical diskette drive designations.
Diskette write protection	Disabled* Enabled	Enables or disables the selected diskette drive's write protect option.
Integrated audio	Enabled Disabled*	Enables or disables the Sound Blaster Pro-compatible audio chip.
Audio Base I/O	220H* 240H 260H 280H	Onboard audio I/O address. Default assignment is used if Audio is enabled.
IRQ Channel	IRQ5* IRQ7 IRQ9 IRQ11	Determines the system IRQ resource that the sound chip is to use. Default assignment is used if Audio is enabled.
DMA Channel for playback	DMA0 DMA1 DMA3*	Determines the system DMA resource that the sound chip is to use for playback. Default assignment is used if Audio is enabled.
DMA Channel for capture	DMA0 DMA1* DMA3	Determines the system DMA resource that the sound chip is to use for sound capture. Default assignment is used if Audio is enabled.

*continued*

Menu Fields	Settings	Comments
FM Synthesis I/O address	388H* 390H 398H 3A0H	Sets base I/O address for FM synthesis device. Default assignment is used if Audio is enabled.
WSS I/O address	530H* 604H E80H F40H	Sets base I/O address for Windows Sound System device. Default assignment is used if Audio is enabled.
4236 Control Base	Enabled* Disabled	Enables or disables setting the Crystal 4236 Control I/O base. Default assignment is used if Audio is enabled.
4236 Control I/O Base Address	F00H* F10H F20H F30H	Sets Crystal 4236 Control I/O base. Default assignment is used if Audio is enabled.
System IRQs Configuration	Auto* Manual	When <b>AUTO</b> is selected the IRQ list (shown below) is hidden, and Plug & Play determines the IRQ settings.  When <b>MANUAL</b> is selected, you can manually set IRQs, and the Plug & Play option will not be available.
IRQ 9 reserved for Legacy ISA card	Yes No*	
IRQ 9 reserved for Legacy ISA card	Yes No*	
IRQ 9 reserved for Legacy ISA card	Yes No*	
IRQ 9 reserved for Legacy ISA card	Yes No*	
IRQ 9 reserved for Legacy ISA card	Yes No*	

*continued*

## BIOS Setup Utility Settings

Menu Fields	Settings	Comments
Plug & Play O/S	Yes No*	Select <b>Yes</b> if using a Plug & Play operating system such as Windows 95. Otherwise, select <b>No</b> .
Reset configuration data	Yes No*	Select <b>Yes</b> to clear the system 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 correct settings (or accept the default settings), the server switches this setting back to <b>No</b> .  If you do not need to clear system configuration data, leave the setting at <b>No</b> .
Large disk access mode	DOS* Other	Select <b>DOS</b> if you have MS-DOS installed.  Select <b>Other</b> if you have another operating system installed.  A large disk drive constitutes one that has more than 1024 cylinders, 16 heads, or 63 tracks per sector.
Integrated network controller (if available)	Enabled* Disabled	Enables or disables the onboard DIGITAL 21143 Network controller.
Remote Network Wake-up	Disabled* Magic Packet SecureON	Not recommended for Server use.
Client operation	Enabled* Disabled	Not recommended for Server use.

## Security Options

Menu Fields	Settings	Comments
Supervisor password is	Not user selectable (Disabled)*	Indicates whether or not the supervisor's password is enabled or disabled.
User password is	Not user selectable (Disabled)*	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.

*continued*

## BIOS Setup Utility Settings

<b>Menu Fields</b>	<b>Settings</b>	<b>Comments</b>
Set user password	Press [Enter]	<p>Allows a user password to be set.</p> <p>This password can be set only if a supervisor password is entered.</p> <p>When the user has entered his or her name but the supervisor is not logged in, only the following information is accessible:</p> <p>Supervisor password is Enabled.</p> <p>User password is Enabled.</p> <p>Set user password [press enter] to enter a user password.</p> <p>Password on boot Enabled/Disabled (which ever is in effect). This option is not allowed to change.</p> <p>Custom sign on banner Enabled/Disabled (which ever is in effect). This option is not allowed to change.</p>

*continued*

<b>Menu Fields</b>	<b>Settings</b>	<b>Comments</b>
Password on boot	Enabled Disabled*	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.
Custom sign on banner is	Not user selectable (Disabled)*	Indicates whether the custom sign on banner is enabled or disabled.
Custom sign on banner	Press [Enter]	Press [Enter] to enter a custom sign on banner that displays during POST.  For example, the user might enter "Welcome to John's machine." The maximum number of characters is 50.
Diskette access	Supervisor* User	Controls who has access to diskette drives.  If Supervisor is selected, access to the diskette drive is limited to the supervisor, who must enter his or her password. If User is selected, the diskette drive can be accessed by entering either the supervisor or the user password.  Whatever setting is chosen, it only becomes functional if both a Supervisor Password and a User Password have been set (if you choose User for the setting).

*continued*

## BIOS Setup Utility Settings

<b>Menu Fields</b>	<b>Settings</b>	<b>Comments</b>
Fixed disk boot sector	Normal* Write protect	Write protects the boot sector on the hard disk drive.
System Backup Reminder	Enabled Disabled*	When enabled, displays a backup reminder message at boot (can be set to daily, every Monday, or 1st of every month)
Virus Check Reminder	Enabled Disabled*	When enabled, displays a reminder message to check for viruses at boot (can be set to daily, every Monday, or 1st of every month)

## Power

Menu Fields	Settings	Comments
Power management	Enabled* Disabled	Not recommended for Server use.
System standby timer	Disabled* 1 min. 5 min. 10 min. 20 min. 30 min.	Not recommended for Server use.
System suspend timer	Disabled* 1 hour 1.5 hour 2 hour 3 hour 4 hour	Not recommended for Server use.
Resume on Modem Ring	Off* On	When ON, wakes up the system when an incoming call is detected on the modem.
Resume on Time	Off* On	When ON, wakes up the system at a specific time, set by the Programmable Power On feature.
Programmable Power On	Disable* Enable	Sets the time for system wake up by Resume on Time.

## Boot

Menu Fields	Settings	Comments
Boot device sequence	1. Diskette Drive* 2. Hard Drive* 3. CD-ROM Drive*	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 ↑ and ↓ 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.

# Troubleshooting **4**

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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
- POST and Boot Messages
- POST Execution Messages
- Beep Codes
- 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 ICU or SCSI configuration utility if you have problems after connecting devices.

## Diagnostics

The diagnostic software is a versatile diagnostic 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, SCSI devices, or expansion boards.
- The operating system hangs repeatedly and no changes have been recently added to the software such as service packs or a new application.
- You suspect a server hardware failure.
- You want to validate server operation.
- An intermittent hardware problem exists.

## Running the Diagnostics

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

1. Insert the diskette labeled "For Emergency Use" in drive A and then boot the server.
2. Use the arrow keys to highlight the desired test.
3. Press [Enter].

*For additional troubleshooting information refer to the AMIDiag User's Guide, located on the System CD.*

## 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 the Diagnostics Tests from the Server's 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.
2. At the C:\> prompt, type:

```
\DIAG\DIAGNOSE .BAT
```

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

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

## POST Messages

The POST displays messages to alert you to errors in hardware, software, and firmware or to provide operating information about your server.

Each time the POST displays a message on your screen, the server's speaker beeps twice. If an error occurs before the monitor is initialized, specific beep codes sound to alert you to a problem. The following table lists a general grouping of system messages. In addition, each message is accompanied by text describing the message and in most cases, a recommended solution to the problem. Italics indicate variable parts of a message such as memory addresses, hexadecimal values, and so on. These messages can differ at each occurrence.



**NOTE:** When making any changes to the BIOS, always set “Reset Configuration Data” to “Yes” to ensure that the changes are made. In addition, be sure to always save the changes before exiting the BIOS Setup utility.

## POST and Boot Messages

Message	Description/Solution
Asynchronous Synchronous Burst Synchronous Pipeline Burst Passed	Where <i>nnnn</i> is the amount of server cache (in kilobytes) that tested successfully.
Diskette drive A error	Run the BIOS Setup utility. Check all connections. If the problem persists, contact your Service provider.
Diskette drive B error	
Entering SETUP	BIOS Setup utility runs.
Extended RAM Failed at offset: <i>nnnn</i>	Extended memory failed or configured incorrectly.  Make sure SIMMs are installed correctly (Refer to your <i>System Reference</i> guide). If the problem persists, contact your Service provider.  Run the BIOS Setup utility and restore all settings to original values.
Extended RAM Passed	Where <i>nnnn</i> is the amount of extended memory (in kilobytes) that tested successfully.
Failing Bits: <i>nnnn</i>	<i>nnnn</i> is a map of the bits at the RAM address which failed the memory test.  Run the BIOS Setup utility and restore all to original values.  If the problem persists, contact your Service provider.
Fixed Disk 0 Failure	Run the BIOS Setup utility. Check all connections. If the problem persists, contact your Service provider.
Fixed Disk 1 Failure	Fixed disk controller failure
Incorrect Drive A type - run SETUP	Diskette drive A and/or B not correctly identified in the BIOS Setup utility.
Incorrect Drive B type - run SETUP	Run the BIOS Setup utility and properly identify diskette drive A and/or B.

*continued*

## Troubleshooting

<b>Message</b>	<b>Description/Solution</b>
Invalid NVRAM media type	NVRAM access failed. Run the BIOS Setup utility and restore all settings to original values. If the problem persists, contact your Service provider.
Keyboard controller error Keyboard error Keyboard locked - Unlock key switch	Check the keyboard connection. If the connection is secure, the keyboard or keyboard controller might have failed. If the problem persists, contact your Service provider.
Monitor type does not match CMOS - Run SETUP	Run the BIOS Setup utility and set the correct monitor type.
Operating system not found	The operating system cannot be found on drive A or drive C. Run the BIOS Setup utility and correctly identify drive A or drive C. Correctly install the operating system. Refer to the supplied operating system documentation.
Press <F1> to resume, <F2> to Setup	This message appears after any recoverable error message. Press [F1] to reboot or [F2] to enter the BIOS Setup utility to make any necessary changes.
Real time clock error	Server battery failed BIOS test. Replace server battery and then run the BIOS Setup utility to restore previous configuration information.
Shadow RAM Failed at offset: <i>nnn</i>	Shadow RAM failed. Run the BIOS Setup utility and disable failed shadow memory region.
<i>Nnnn</i> Shadow RAM passed	Where <i>nnnn</i> is the amount of shadow RAM (in kilobytes) that tested successfully.

*continued*

Message	Description/Solution
RTC is dead - Replace and run SETUP	Replace the server battery and then run the BIOS Setup utility to restore previous configuration information.
System BIOS shadowed	This indicates that your server's BIOS was successfully copied to shadow RAM.
System cache error - Cache disabled	RAM cache failed. Run the BIOS Setup utility and restore all settings to original values. If the problem persists, contact your Service provider.
System CMOS checksum bad - run SETUP	Correct the address conflict using the BIOS Setup utility. If the problem persists, contact your Service provider.
System RAM failed at offset: <i>nnnn</i>	System RAM failed. Run the BIOS Setup utility and restore all settings to original values. If the problem persists, contact your Service provider.
<i>nnnn</i> System RAM passed	Where <i>nnnn</i> is the amount of system RAM (in kilobytes) that tested successfully.
System timer error	Your server's timer test failed. Run the BIOS Setup utility and restore all settings to original values. If the problem persists, contact your Service provider.
UMB upper limit segment address: <i>nnnn</i>	Displays the address of the upper limit of UMB. This indicates the released segments of the BIOS that can be reclaimed by a virtual memory manager.
Video BIOS shadowed	This indicates that your server's video BIOS was successfully copied to shadow RAM.
Invalid system configuration data. Please run the configuration utility.	Run the BIOS Setup utility. Under the "Advanced" section, toggle down to the "Reset Configuration Data" selection. Change the setting to "YES", save changes and then exit the BIOS Setup utility. Your server will then reboot without displaying the error message.

## POST Execution Messages

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

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

## Beep Codes

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

The following table lists other fatal errors and their associated beep codes. Each code represents the number of short beeps that are grouped together. Fatal errors (errors that lock up your server) are generally the result of a failed main logic board or some other add-on component (SIMM, BIOS, server battery, etc.). If you cannot resolve problems using the troubleshooting procedures in Chapter 7, contact your Service provider.

## Troubleshooting

<b>Beep Code</b>	<b>Error</b>
1	One short beep before boot
1-2	Search for option ROMs
1-2-2-3	BIOS ROM checksum
1-3-1-1	Test DRAM refresh
1-3-1-3	Test keyboard controller
1-3-4-1	Test 512K base address lines
1-3-4-3	Test 512K base memory
1-4-1-1	Test memory bus
2-1-2-3	Check ROM copyright notice
2-2-3-1	Test for unexpected interrupts

## 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 failure.	Contact your authorized service provider.
	Main logic board jumpers incorrectly set.	Set all appropriate jumpers.
	Power supply has failed.	Contact your authorized service provider.
Power is on, screen is on, but the server does not respond.	Voltage select switch is set incorrectly.	Make sure the setting on the back of your server matches your country's voltage requirements. Refer to the supplied <i>Quick Setup</i> guide for more information.
	Keyboard not connected, mouse not connected, or both might be in the wrong port.	Connect the keyboard and/or mouse. If already connected, confirm that each device is in the appropriate port.

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Power is on, but there is no screen display.	Brightness and contrast controls are not correctly set.	Adjust the brightness and contrast controls.
	Monitor is off.	Turn on the monitor.
	Monitor cable is incorrectly installed.	Check all monitor connections.
	Incorrect video drivers installed.	Install the correct video drivers.
	Video controller has failed. Monitor has failed.	Contact your Service provider. Try another monitor. If the new monitor operates correctly, replace the old monitor following the Customer Replacement Unit process described in the <i>Warranty and Information</i> booklet.
Server does not boot from CD-ROM drive.	CD-ROM drive is not connected to the IDE interface.	Connect the CD-ROM to the IDE interface (see Chapter 6).
	CD-ROM drive is not configured as a bootable device.	Change the boot sequence to point to the CD-ROM using the BIOS Setup Utility (see Chapter 2).
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 an optional expansion board.	Expansion board installed incorrectly.	Remove the expansion board and reinstall.
	Did not run the ISA Configuration Utility (ICU) to configure an expansion board before installation.	Run the ICU to properly configure the expansion board and then reboot your server.
	Expansion board has failed.	Remove expansion board and reboot. If server boots without errors, replace expansion board.
Server operates incorrectly after installing optional DIMMs.	Memory configured incorrectly	Reboot the server and check for any boot message to identify faulty DIMM(s).
	DIMMs installed incorrectly.	Remove DIMMs and reinstall.
	DIMMs have failed.	Replace DIMMs.
Server fails to retain setup information.	Server battery has failed.	Replace server battery.
	Discharge CMOS jumper set to "Discharge."	Set discharge CMOS jumper to "Normal."
Server displays HIMEM.SYS errors.	Unstable memory at the specified address.	Run diagnostics.
		Replace faulty DIMM(s).

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Server displays a System Error F002 message (Windows NT Server)	Faulty hardware.	Run the supplied diagnostic software to identify the faulty hardware. Replace the faulty hardware or contact your Service provider.
"Couldn't Find NTLDR" (Windows NT Server)	NTLDR file is missing from the root directory of your hard disk drive.	<p>Copy the NTLDR file to your hard disk drive's root directory.</p> <p>If using the supplied Windows NT Server CD-ROM disk, make the CD-ROM your current drive and then type:</p> <pre>copy\i386\ntldr c:\</pre> <p>at the command line prompt.</p> <p>If using the supplied Windows NT Server Setup disks, insert Setup Disk #2 into the diskette drive and then type:</p> <pre>expand ntldr.\$ C:\ntldr</pre> <p>at the command line prompt.</p>

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
"Error 000001E" (Windows NT Server)	Your hard disk drive might have corrupted system files.	Run chkdsk on your hard disk drive to correct any corrupted files. Also make sure your optional hardware is on the supplied <i>Microsoft Windows NT Server Hardware Compatibility List</i> .  If the problem still exists, contact your Service provider.
"Error 0x00000069 or 0x00000067" (Windows NT Server)	Windows NT Server unable to communicate with your server's hard disk drive controller.	Using the BIOS Setup utility, slow down the DMA transfer rate of the controller.  Make sure both ends of the SCSI bus are terminated.  Make sure there are no IRQ or memory address conflicts.  Make sure NTDETECT.COM is in the root directory of your boot drive partition.  Make sure there are no missing Windows NT Server system files.  Reload the Windows NT Server operating system files.  If the problem still exists, contact your Service provider.

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
"NMI Hardware Error" (Windows NT Server)	Faulty hardware.	Make sure all main logic board, DIMM, processor, VRM, video memory, and expansion board connectors are clean and properly seated in their respective sockets.  Run the supplied diagnostic software to identify the faulty hardware. Replace the faulty hardware or contact your Service provider.
Services or subsystems do not start properly (Windows NT Server)	Improper configuration, files missing or files not installed.	Use the <i>Services</i> or <i>Devices</i> icons in the <i>Control Panel</i> menu to check for status. Also, check the system log in the <i>Event Viewer</i> for entries relating to the problem.  If the problem still exists, contact your Service provider.
Server does not boot from an IDE hard disk drive.	IDE drive type incorrect.	Run the BIOS Setup utility to identify the correct drive type.  See drive type label on drive or consult drive documentation.
	Loose cable connectors.	Secure all cable connections.
	Onboard IDE interface disabled.	Run the BIOS Setup utility and set the Local Bus IDE Adapter to "Primary," "Secondary," or "Both."

*continued*

## Troubleshooting

Problem	Possible Cause	Action
	<p data-bbox="516 340 736 392">Hard disk boot sector is missing.</p> <p data-bbox="516 1003 784 1055">There might be a boot sector virus.</p>	<p data-bbox="827 340 1150 392">Repartition and reformat your hard disk drive.</p> <p data-bbox="827 404 1150 479"><b>Caution:</b> This procedure erases what is currently on your hard disk drive.</p> <p data-bbox="827 491 1163 621">You might want to try repairing the hard disk drive using a disk drive repair utility. Disk drive repair utilities can be purchased from your local software supplier.</p> <p data-bbox="827 633 1137 760">If you do repartition and reformat your hard disk drive, proceed as follows for DOS-based operating systems such as Windows NT Server.</p> <p data-bbox="827 772 1170 824">Boot from a DOS diskette then enter the following commands:</p> <pre data-bbox="827 836 908 899">c : cd \dos fdisk</pre> <p data-bbox="827 911 1163 986">Follow the instructions on your monitor screen to create a new hard disk boot sector.</p> <p data-bbox="827 998 1049 1025">Run anti-virus software.</p>

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Server does not boot from an IDE hard disk drive.	IDE hard disk is connected to the wrong IDE connector.	Connect the boot disk to the primary IDE connector on the backplane.
	Operating system software is not installed on the IDE hard disk drive.	Install the appropriate operating system.
	IDE hard disk drive is not correctly formatted or the requested partition does not exist.	Format the IDE hard disk drive or partition the IDE hard disk drive using the supplied operating system software.
	There is no software on the requested partition.	Install software on the requested partition.
	IDE hard disk drive jumpers incorrectly set.	Refer to the supplied IDE hard disk drive kit installation instructions.
	IDE hard disk drive has failed.	Contact your Service provider.
	IDE hard disk drive ribbon cable has failed.	Contact your Service provider.
	IDE controller has failed.	Contact your Service provider.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Server does not recognize an internal or external SCSI hard disk drive or device.	SCSI device jumpers incorrectly set.	Refer to the supplied SCSI device kit installation instructions.
	SCSI ID conflicts.	Refer to the supplied SCSI device kit installation instructions on setting SCSI IDs.
	Terminating resistors not removed from the SCSI device.	Remove terminating resistors. Refer to the supplied kit installation instructions.
	SCSI option not enabled in BIOS Setup utility.	Run the BIOS Setup utility and enable SCSI option.
	SCSI cable not terminated.	Terminate each end of the SCSI cable.
	SCSI device not plugged in. Loose cable connectors.	Check power and SCSI cables. Secure all cable connections.

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Server does not recognize an internal or external SCSI hard disk drive or device.	Hard disk boot sector is missing.	<p>Repartition and reformat your hard disk drive.</p> <p><b>Caution:</b> This procedure erases what is currently on your hard disk drive.</p> <p>You might want to try repairing the hard disk drive using a disk drive repair utility. Disk drive repair utilities can be purchased from your local software supplier.</p> <p>If you do repartition and reformat your hard disk drive, proceed as follows for DOS-based operating systems such as Windows NT Server.</p> <p>Boot from a DOS diskette then enter the following commands:</p> <pre>c: cd\dos fdisk</pre> <p>Follow the instructions on your monitor screen to create a new hard disk boot sector.</p>
	There might be a boot sector virus.	Run anti-virus software.
	Loose cable connectors.	Secure all cable connections.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Server does not boot from an internal SCSI hard disk drive.	SCSI adapter has failed.	Contact your Service provider.
	SCSI ribbon cable has failed.	Contact your Service provider.
	SCSI device has failed.	Contact your Service provider.
	Server not configured for SCSI hard disk drive operation.	Run the BIOS Setup utility and set the IDE controller option to "Disabled." This disables the onboard IDE interface. <b>Note:</b> If you have both IDE and SCSI hard disk drives installed, your server uses the IDE hard disk drive as the boot device.
	Operating system software is not installed on the SCSI 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.
	Loose cable connectors.	Secure all cable connections.
	SCSI adapter has failed.	Contact your Service provider.
	SCSI ribbon cable has failed.	Contact your Service provider.
	SCSI hard disk drive has failed.	Contact your Service provider.

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Server does not boot from a target diskette drive.	Onboard diskette controller disabled.	Run the BIOS Setup utility and set the diskette controller option to "Enabled."
	Diskette drive not enabled.	Run the BIOS Setup utility to enable the diskette drive
	BIOS Setup diskette write option enabled.	Enter your user password. If a supervisor password is required, see your system supervisor or system manager.
	Incorrect diskette drive type.	Run the BIOS Setup utility and select the correct drive type.
	Diskette boot option disabled.	Run the BIOS Setup utility and set the proper boot sequence.
	Diskette might not be bootable.	Use a bootable diskette.
	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 cable connectors.	Secure all cable connections.
	Diskette access requires a supervisor password.	See your supervisor or system manager.
	Diskette access requires a user password.	Enter your user password.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
No response to keyboard commands.	Keyboard is password protected.	Enter the keyboard password.
	Keyboard is not connected.	Power down the server and connect the keyboard.
	Keyboard is connected to the mouse port.	Power down the server and connect the keyboard to the keyboard port.
	Keyboard has failed.	If available, try another keyboard. If the new keyboard operates correctly, replace the old keyboard following the Customer Replacement Unit process described in the <i>Warranty and Information</i> booklet.
	Keyboard controller has failed.	Contact your Service provider.

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Keyboard keys type incorrectly.	Incorrect language selected.	Select the correct language.
	Keyboard has failed.	If available, try another keyboard. If the new keyboard operates correctly, replace the old keyboard following the Customer Replacement Unit process described in the <i>Warranty and Information</i> booklet.
No response to mouse activity.	Mouse is password protected	Enter the mouse password.
	Mouse is not connected.	Power down the server and connect the mouse.
	Mouse is connected to the keyboard port.	Power down the server and connect the mouse to the mouse port.
	Mouse driver not installed.	Install the appropriate mouse driver. Refer to your supplied application software documentation.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Mouse sticks.  Server operates correctly but application software does not.	Onboard mouse controller disabled.	Run the BIOS Setup utility and set the mouse port option to "Enable."
	Mouse has failed.	If available, try another mouse. If the new mouse operates correctly, replace the old mouse following the Customer Replacement Unit process described in the <i>Warranty and Information</i> booklet.
	Mouse controller has failed.	Contact your Service provider.
	Mouse trackball dirty.	Clean trackball.
	Application software installed incorrectly.	Refer to your application software documentation.
	Having external cache enabled causes conflict with application software.	Run the BIOS Setup utility and disable external cache.

## 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.

## Disk Drive Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
IDE/SCSI hard disk drive cannot read or write information.	Incorrect disk drive jumper settings.	Refer to the supplied kit installation instructions.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
	IDE/SCSI hard disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
	IDE drive type incorrect.	Run the BIOS Setup utility to identify the correct drive type.
	Onboard IDE interface disabled.	Run the BIOS Setup utility and set the Local Bus IDE Adapter to "Both."
	IDE/SCSI hard disk drive has failed.	Contact your Service provider.
	IDE/SCSI controller has failed.	Contact your Service provider.
	IDE/SCSI ribbon cable has failed.	Contact your Service provider.

*continued*

<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 (3½-inch diskette) or uncover the write-protect notch (5¼-inch diskette).
	Diskette drive is empty.	Insert a diskette.
	Onboard diskette controller disabled.	Run the BIOS Setup utility and set the diskette controller option to "Enabled".
	Diskette write protection is enabled.	Run the BIOS Setup utility and set the diskette write protection to "Disabled."
	Loose cable connectors.	Secure all cable connections.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
	Diskette drive has failed.	Contact your Service provider.
	Diskette drive controller has failed.	Contact your Service provider.
	Diskette drive ribbon cable has failed.	Contact your Service provider.
	Diskette access requires supervisor password.	Reboot computer and enter supervisor password. Afterwards, run BIOS Setup utility and set "Diskette Access" option to "User."
Target diskette drive does not format diskettes.	Diskette write protection is enabled.	Run the BIOS Setup utility and set the diskette write protection to "Disabled."
	Diskette drive has failed.	Contact your Service provider.

## 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 computer.
	No power at wall outlet.	Use another outlet.
	Monitor has failed.	If available, try another monitor. If the new monitor operates correctly, replace the old monitor following the Customer Replacement Unit process described in the Warranty and Information booklet.
	Video controller has failed.	Contact your Service provider.
No screen display.	Power indicator is defective.	Contact your Service provider.
	Configuration error.	Run the BIOS Setup utility to configure the computer for correct video operation.
	Monitor brightness and contrast controls are incorrectly set.	Adjust the monitor brightness and contrast controls.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
	The monitor-off timer shut off the monitor.	Press [Shift] to reactivate monitor.
No monitor display while loading Windows video drivers.	Monitor type incorrectly set.	Set the correct monitor type using the appropriate utility.
	Wrong Windows driver loaded.	Load the correct video driver.
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.
	Wrong refresh rate set.	Select VGA mode to boot at a default rate and then correct the refresh rate.
Color monitor displaying monochrome.	Computer was turned on before the monitor was turned on.	Turn off the computer, turn on the monitor, then turn the computer back on.

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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 your monitor.
Monitor display not centered while loading Windows video drivers.	Monitor type incorrectly set.	Set the correct monitor type.
Monitor display disappears.	Screen display sized incorrectly.	Correctly size screen display.

## Audio Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Audio does not work.	Power to speakers not turned on.	Check the batteries or AC adapter connection to be sure speakers are getting power. Make sure the power switch on the master speaker is set to ON.
	Sound, MIDI, mixer drivers not installed.	Check the error messages for the necessary drivers. In Windows Control Panel, select "System", then "Device Manager" and install the necessary driver(s).
	Address contention. Two or more devices might be trying to access the same address.	Check IRQ, I/O address, and DMA settings in Windows NT Server, or BIOS Setup. Change settings as required.
	Cables loose or not properly connected.	Make sure speaker and microphone plugs are in correct jacks. Reconnect cables.
	Onboard audio controller disabled.	Run the BIOS Setup utility and set the Integrated Audio to "Enabled."

*continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
External speakers do not work.	Bad audio chip or sound card.	Call your Service provider or sound card provider.
	Main logic board has failed.	Contact your Service provider.
	Speakers not connected or improperly connected.	Properly connect the speakers.
	Check speaker batteries or ac adapter have failed.	Replace speaker batteries or AC adapter. Refer to the documentation that came with your speakers.
	Speakers have failed.	If available, try another set of speakers. If the new speakers operate correctly, replace the old speakers following the Customer Replacement Unit process described in the <i>Warranty and Information</i> booklet.
Microphone does not work.	Microphone not connected or improperly connected.	Properly connect the microphone.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
	Microphone has failed.	If available, try another microphone. If the new microphone operates correctly, replace the old microphone following the Customer Replacement Unit process described in the <i>Warranty and Information</i> booklet.
	Headphones have failed.	If available, try another set of headphones. If the new headphones operate correctly, replace the old headphones following the Customer Replacement Unit process described in the <i>Warranty and Information</i> booklet.

## 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 disk in the CD-ROM drive.	Insert a disk.
	CD-ROM drive tray is open.	Close the tray.
	Onboard IDE interface disabled (if IDE CD-ROM)	Run the BIOS Setup utility and set the Local Bus IDE Adapter to "Enabled."
	CD-ROM has failed.	Contact your Service provider.
Power is on but CD-ROM drive indicator shows no activity.	Cables have failed.	Contact your Service provider.
	No CD-ROM disk or CD-ROM drive tray is open.	Insert a disk and close the tray.
	Check cable connections.	Make sure cables are correctly connected.
	CD-ROM has failed.	Contact your Service provider.
	Cables have failed.	Contact your Service provider.
CD-ROM disk is spinning but CD-ROM drive is idle.	Application software not running.	Run application software.

## Network Interface Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Power is on, LAN address is installed on server; system hangs.	Incorrect software installed or software installed incorrectly.	Contact system administrator or network coordinator.
Network doesn't start.	Network cable not connected or is loose.	Connect cable. Also, make sure no more than one Ethernet cable is connected at one time.
	Adapter card is not seated securely	Turn your server off, reset the adapter card, then turn your server back on.
	Conflict exists with another device adapter; incorrect IRQ setting.	Check BIOS setup or Windows NT settings.
	Network cable has failed.	Contact your system administrator or network coordinator.
	Onboard network controller disabled.	Run the BIOS Setup utility and set Integrated Ethernet to "Enabled."
Onboard network controller has failed.	Contact your Service provider.	

## 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.

*continued*

## Troubleshooting

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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 SW1-3 "Recovery Mode" is set to <i>Recovery</i> and SW1-5 "BIOS write" is set to <i>Enable</i> . Refer to Appendix A for switch locations.
	BIOS Setup Utility switch setting incorrectly set.	Make sure the "Flash Update" option in the BIOS Setup Utility is set to <i>Enabled</i> . Refer to Appendix D for more information.

# FRU Replacement **5**

## Introduction

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



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

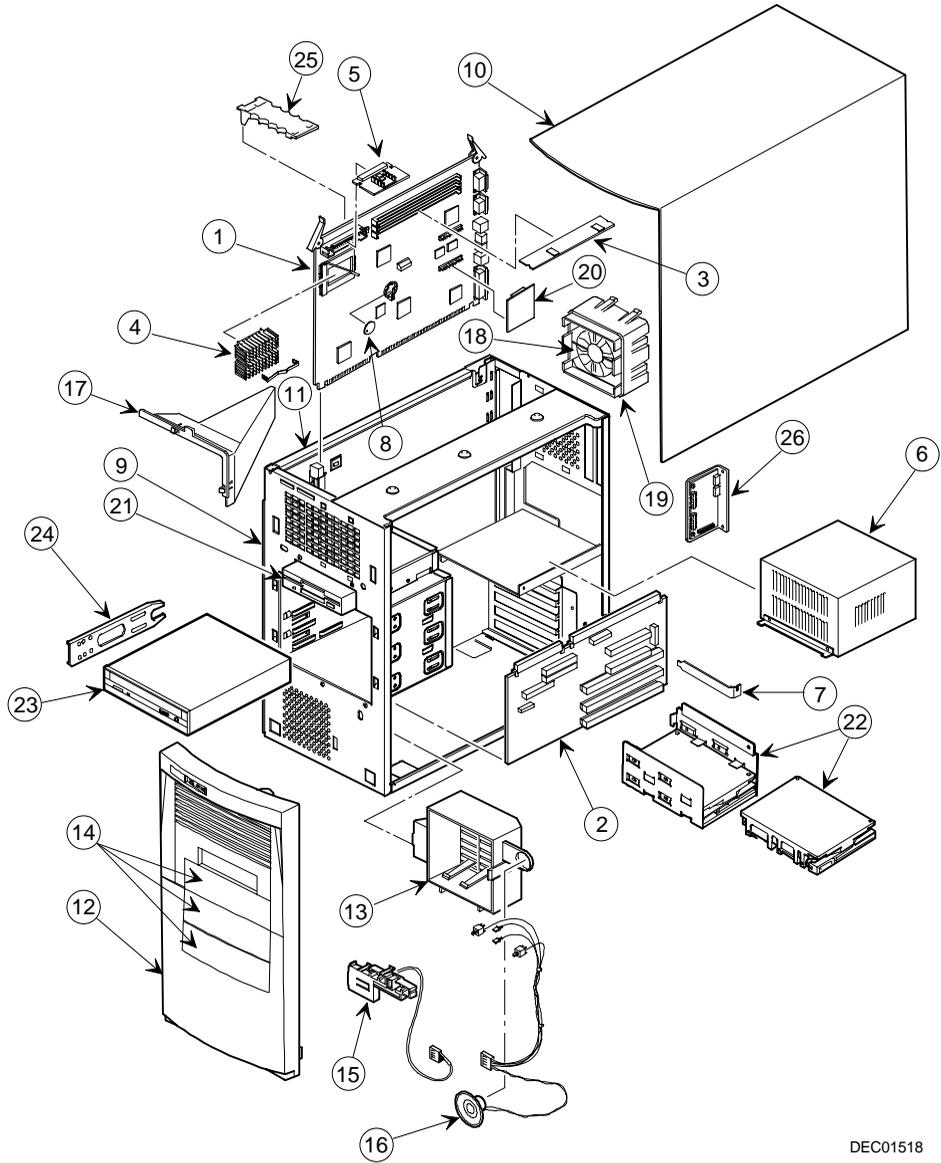
## DIGITAL Server 500 Series

Figure Legend	Spare Part Number	Exchangeable Part Number	Description
1	54-25334-04		Main logic board
2	54-25332-03		Riser card
3	20-47177-D2		DIMMs, SDRAM, 16 MB
	54-25084-CA		DIMMs, SDRAM, 32 MB
	54-25092-AA		DIMMs, SDRAM, 64 MB
	54-25092-CA		DIMMs, SDRAM, 128 MB
4	70-32719-11		CPU assembly
5	54-25300-01		Module, voltage regulator

*continued*

## FRU Replacement

<b>Figure Legend</b>	<b>Spare Part Number</b>	<b>Exchangeable Part Number</b>	<b>Description</b>
6	30-48258-01		Power supply, short tower, 200 W
7	74-50747-01		Option filler plate
8	12-41474-05		Battery, 3 VDC lithium, CR2032
9	70-32678-04		Enclosure
10	70-32803-01		Cover, L-shape
11	74-50757-01		Side panel
12	70-32680-01		Bezel, with filler panels
13	74-50755-01		Guide, option cards
14	74-50860-01		Bezel blank, 5.25" drive, top
	74-50861-01		Bezel blank, 5.25" drive, middle
	74-50862-01		Bezel blank, 5.25" drive, bottom
15	74-50863-01		Front panel control board module
16	17-04372-02		Speaker/LED, switch wire harness assembly
17	74-51237-01		Air duct
18	12-45246-04		Fan
19	74-51236-01		Fan mount, universal
20	54-24622-01		SGRAM, 1 MB upgrade
	54-24622-02		SGRAM, 2 MB upgrade
21	PCXRJ-AD		1.44 MB floppy disk drive frost white flat bezel
22	PCXRA-AV		ULTRA HDD, 2.0 GB, 3.5-inch
	PCXRA-AS		ULTRA HDD, 3.2 GB, 3.5-inch
	PCXRA-AT		ULTRA HDD, 4.0 GB, 3.5-inch
	PCXRA-AU		ULTRA HDD, 6.4 GB, 3.5-inch
23	PCXRN-AR		CD-ROM drive
24	74-49365-01		Drive rail
25	74-51880-01		Retaining bracket
26	54-24538-02		Rear panel module card



DEC01518

Figure 5-1. DIGITAL Server 500 Series

## Enclosure

Spare Part Number	Exchangeable Part Number	Description
12-44147-01		Screw, captive 6-32
12-47296-01		Key lock (optional on some models)
74-48510-01		Expansion bracket, 5.25" to 3.5"
74-49836-01		Bumper for MLB
74-50737-01		Card guide, MLB
74-50752-01		Bracket EMI shield, 5.25"
74-50804-01		Rubber feet
74-50911-01		Bracket, I/O expansion
74-51001-01		Bracket, hasp, short tower
74-51171-01		3.5" FDD shield, blank
74-51239-01		Filler, vent cover, bottom front
74-51733-01		Support, MLB
90-08020-01		Screw, machine 6-32 pan .187 XRCS (HDD)
90-11334-01		Screw, machine 6-32 pan .256 XRCS CSZ
90-40217-01		Screw, machine M3 pan 5mm XRCS CSZ (FDD and CD-ROM)

## Cables

<b>Spare Part Number</b>	<b>Exchangeable Part Number</b>	<b>Description</b>
17-03460-12		Floppy cable assembly, flat, 34 position, 430 mm
17-03461-14		IDE cable assembly, flat 40 position, 200 mm, one connector
17-04278-02		Wire harness assembly, 3P + 4P
17-04373-01		Wire harness assembly, shield
70-31909-03		Cable assembly, microswitch

## Options

Spare Part Number	Exchangeable Part Number	Description
DE500-BA		10/100Base Ethernet adapter
30-48202-01		ULTRA wide SCSI HDD, 2.0 GB
RZ1CB-GA		ULTRA wide SCSI HDD, 4.0 GB (7200)
30-48748-02		ULTRA wide SCSI HDD, 4.0 GB (5400)
RZ1DB-GA		ULTRA wide SCSI HDD, 9.0 GB
30-46729-03		2940 adapter
PCXLA-NA		Keyboard, frost white, North America
PCXLN-AB		Mouse, 2-button, frost white, single pack
PCXLN-AD		Mouse, 3-button, frost white, single pack
PCXRJ-AA		Trimode 3.5" FDD
PCXRN-AH	PCXRN-AI	12X IDE CD-ROM drive
PCXRN-AJ		16X IDE CD-ROM drive
PCXRN-AN	PCXRN-AM	24X IDE CD-ROM drive
PCXRN-AR		32X IDE CD-ROM drive
TZK1X-CE		SCSI QIC tape, 2.5 GB
TLZ07-CA		4/8 GB DAT tape (7000)

## Service Procedures

The following sections provide detailed service instructions for the 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

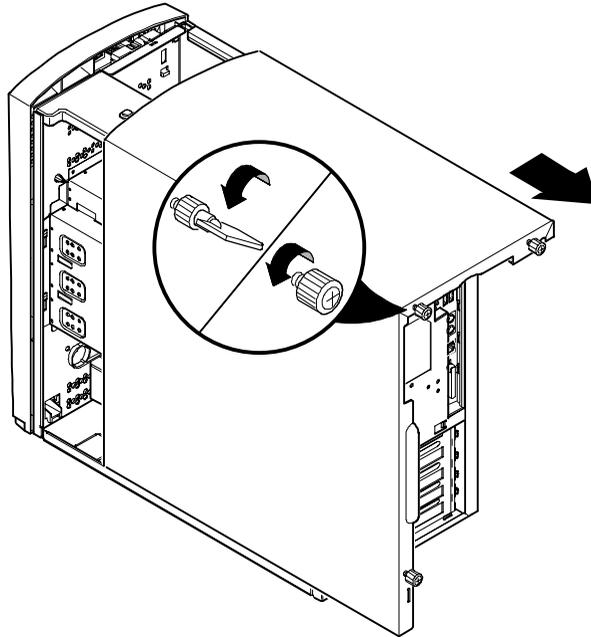
Before removing the side panel, perform the following:

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 your Server's Outside Cover

To remove your server's outside cover:

1. Turn off power to all external devices connected to your server.
2. Turn your server off.
3. Unplug your server and monitor power cord from the wall outlet.
4. For servers without a chassis lock, go to step 4a. For servers with a chassis lock, go to step 4b.
  - a. Release the outside cover by loosening the rear-panel thumbscrew(s).
  - b. Unlock the outside cover by inserting the key and turning it counter clockwise.
5. Slide the outside cover backwards.
6. Carefully lift the outside cover away from the chassis.



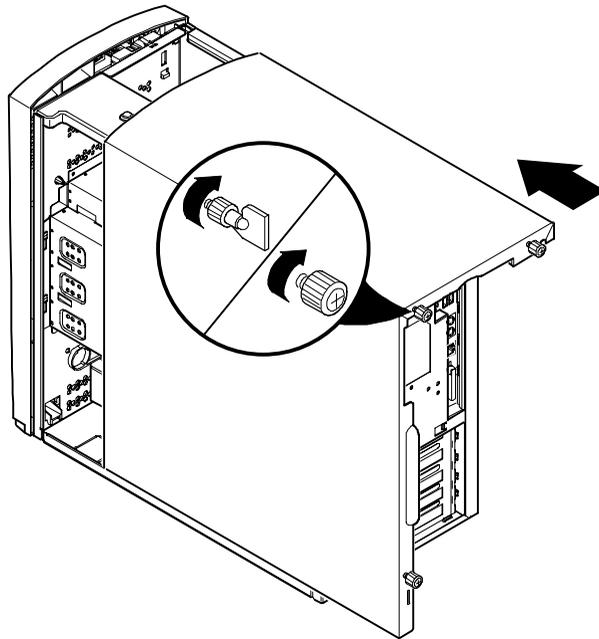
DEC01497-2

**Figure 5-2. Removing the Outside Cover**

## Replacing your Server's Outside Cover

To replace the outside cover:

1. Replace the outside cover by sliding it onto the chassis.
2. For servers without a chassis lock, go to step 2a. For servers with a chassis lock, go to step 2b.
  - a. Secure the outside cover to the chassis using the rear panel thumbscrew(s).
  - b. Secure the outside cover to the chassis by inserting the key and turning it clockwise.



DEC01497-3

**Figure 5-3. Replacing the Outside Cover**

## Chassis Lockdown

A chassis lockdown hasp is located on your server's rear panel, in the lower-left corner. It is either secured to the outside cover or to the side of the chassis. When locked, the hasp prevents others from opening and removing the server's outside cover. With the hasp in place, you can use a chain or cable lock to secure your server.

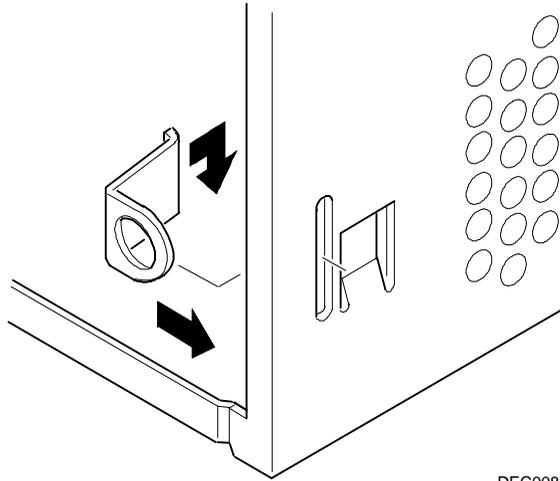
To secure your server:

1. Turn off the power to all external devices connected to your server.
2. Turn your server off.
3. Unplug the power cord from the wall outlet.
4. Disconnect the power cord from your server.
5. Remove the outside cover.

## Attaching the Hasp

To attach the hasp:

1. Insert the hasp tab, with the lock/cable hole, through the slot in the rear panel.
2. Slide the foot of the hasp behind the rear panel tongue and seat the foot securely.
3. Replace the outside cover, carefully sliding the left, rear-edge slot over the hasp.
4. Connect the power cord to your server and to the wall outlet.
5. Turn on all external devices and then turn on your server.

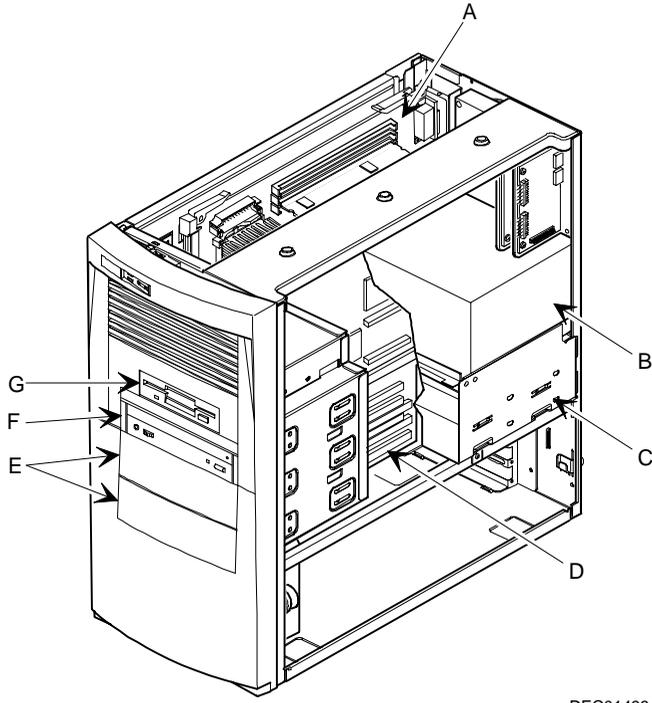


DEC00881

**Figure 5-4. Attaching the Hasp**

## Server Components

<b>Figure Legend</b>	<b>Component</b>
A	Main Logic Board (MLB)
B	Power supply
C	Internal 3½-inch drive bay(s)
D	Backplane
E	Front access 5¼-inch drive bay(s)
F	Front access 5¼-inch drive bay with CD-ROM
G	3½-inch diskette drive

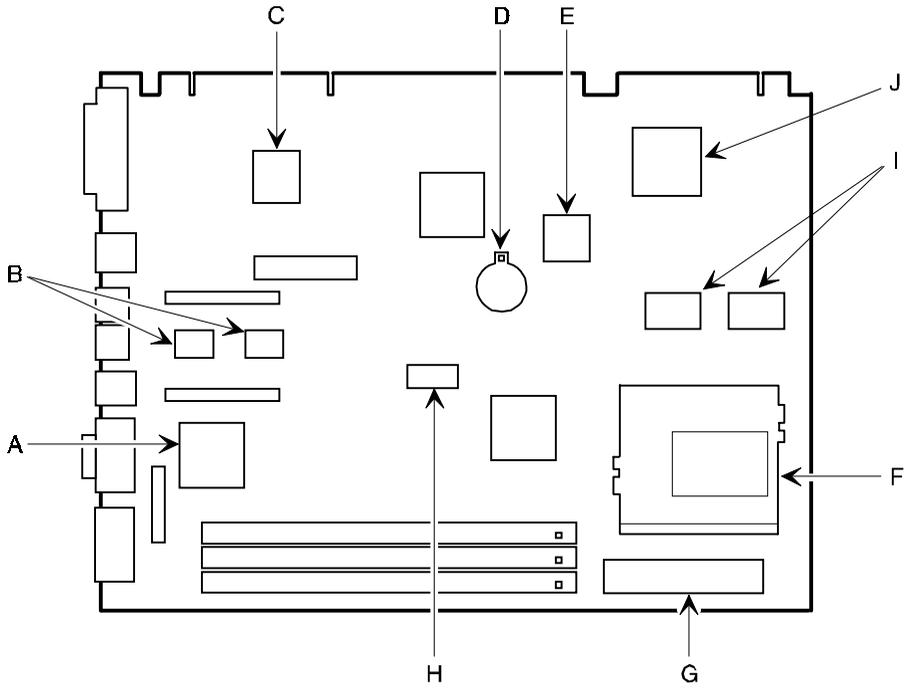


DEC01499

**Figure 5-5. Server Components**

## Main Logic Board Components

<b>Figure Legend</b>	<b>Component</b>
A	Video controller
B	Onboard video memory
C	Ethernet controller
D	Server battery
E	Server flash and video BIOS
F	Intel Pentium Processor
G	Voltage regulator module
H	Dip switches
I	Onboard 256 KB Pipeline Burst cache
J	Super I/O controller

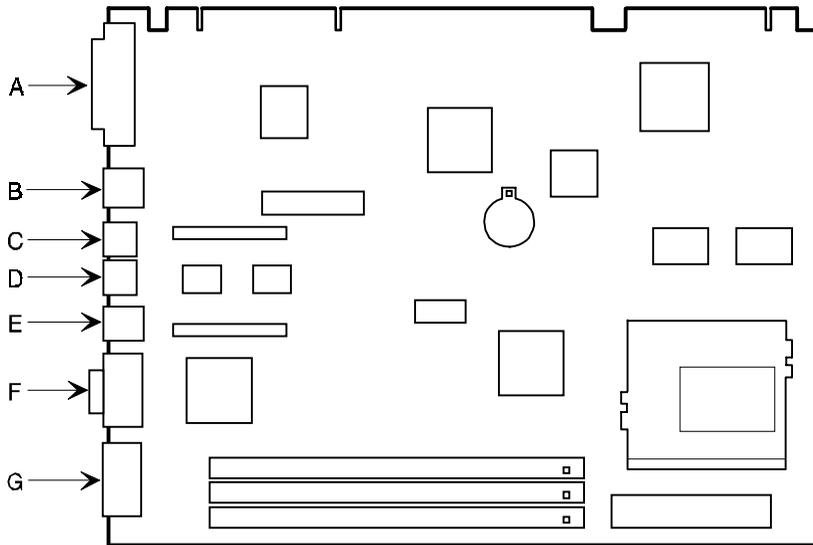


DEC01186-2

**Figure 5-6. Main Logic Board Components**

## Main Logic Board Connectors (Rear Panel)

Figure Legend	Connector
A	Parallel port
B	10/100BaseTX network port
C	Keyboard port
D	Mouse port
E	Two USB ports
F	Video (VGA) port
G	Serial port

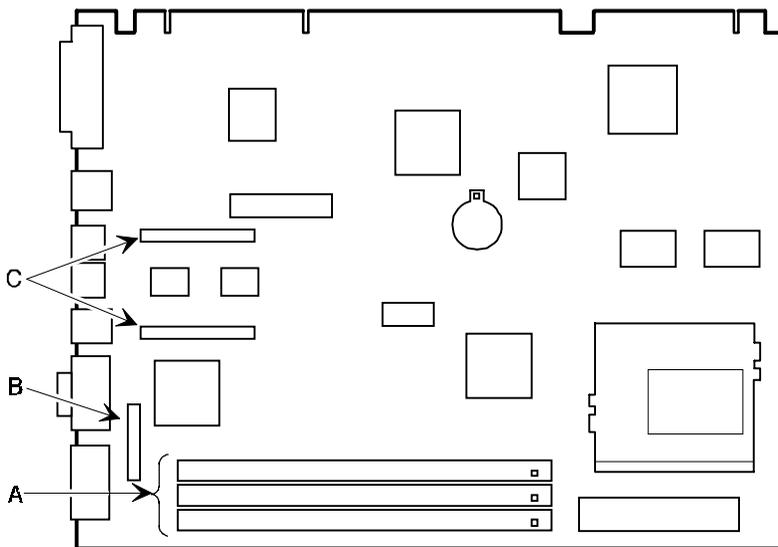


DEC01186-14

**Figure 5-7. Main Logic Board Components (Rear Panel)**

## Main Logic Board Connectors

Figure Legend	Connector
A	Three 168-pin, DIMM, 64-bit SDRAM sockets
B	VGA feature connector (output only)
C	Video memory (SDRAM) upgrade connectors



DEC01186-3

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

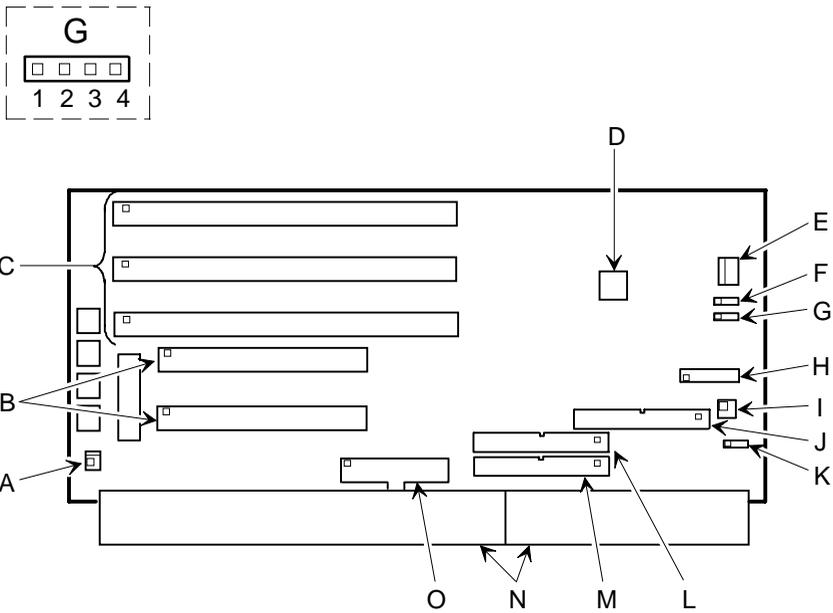
## System I/O Expansion Card Components and Connectors

Figure Legend	Connector
A	Micro switch connector
B	PCI expansion board connectors
C	ISA expansion board connectors
D	Crystal CS4236B audio controller (not available on all models)
E	Audio rear panel connector
F	CD-ROM audio input connector (CD-IN)
G	Fax/modem audio input connector (F/M IN) <sup>(1)</sup>
H	Control panel connector
I	Fan connector (user option)
J	Diskette drive connector
K	SCSI LED connector
L	Secondary IDE drive connector (recommended for an installed CD-ROM drive)
M	Primary IDE drive connector
N	Main logic board connectors
O	Power connector

<sup>(1)</sup> This connector is used for Fax/Modems with speaker phone capabilities.

**Fax/Modem Audio Input Connector (F/M IN)**

Item G, Figure 5-9	Description
Pin 1	Audio in (fax/modem)
Pin 2	Ground
Pin 3	Ground
Pin 4	Microphone in (fax/modem)



DEC01257-2

**Figure 5-9. System I/O Expansion Card Components and Connectors**

## Main Logic Board Switch Settings

The switch settings located on the main logic board can be set to control many features in your server. Use the following tables and figure to locate the switch settings on the main logic board and then modify the settings for desired results.



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

Feature	Function	Setting	Description
Bus clock	66 MHz 60 MHz	SW1-1, ON <sup>(1)</sup> SW1-1, OFF	Determines the processor and PCI clock speed for the installed processor. This switch must be set along with the SW1-7 and SW1-8 processor Core/Bus frequency Ratio switches. Refer to the Processor Clock Speed Switch Settings table.
Clear Password	Clear Normal <sup>(1)</sup>	SW1-2, ON SW1-2, OFF <sup>(1)</sup>	If you forget your password, via BIOS Setup, set this switch to ON and then restart the server.

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

*continued*

Feature	Function	Setting	Description
Recovery mode	Recovery Normal <sup>(1)</sup>	SW1-3, ON SW1-3, OFF <sup>(1)</sup>	If your flash BIOS upgrade failed, set this switch to ON so you can boot your server from a Crisis Recovery diskette. Refer to the README.TXT provided with the flash BIOS upgrade.
Clear CMOS	Clear Normal <sup>(1)</sup>	SW1-4, ON SW1-4, OFF <sup>(1)</sup>	Clears CMOS of all BIOS setup information. Use the Clear setting when your server will not boot, and BIOS setup cannot be accessed due to configuration data corruption. This switch must be set back to Normal before rebooting your server.
BIOS write	Enable Disable <sup>(1)</sup>	SW1-5, ON SW1-5, OFF <sup>(1)</sup>	When disabled, prevents corruption or reprogramming of BIOS boot block data. Updating the BIOS boot block data is normally reserved for factory use only, unless instructed otherwise by your Service provider.
Reserved	Reserved	SW1-6, ON SW1-6, OFF <sup>(1)</sup>	Reserved for future use.
processor core/ Bus frequency ratio	2/1	SW1-7, ON SW1-8, OFF	Sets processor clock speed x 2
	3/1	SW1-7, OFF SW1-8, ON	Sets processor clock speed x 3
	3/2	SW1-7, OFF SW1-8, OFF	Sets processor clock speed x 1.5
	5/2	SW1-7, ON <sup>(1)</sup> SW1-8, ON <sup>(1)</sup>	Sets processor clock speed x 2.5  Must be set with SW1-1 processor/bus clock speed switch to match processor clock speed. For example, 66 MHz x 3 = 200 MHz processor. Refer to the Processor Clock Speed Switch Settings table.

<sup>(1)</sup> Factory default setting  
OFF = Up; ON = down

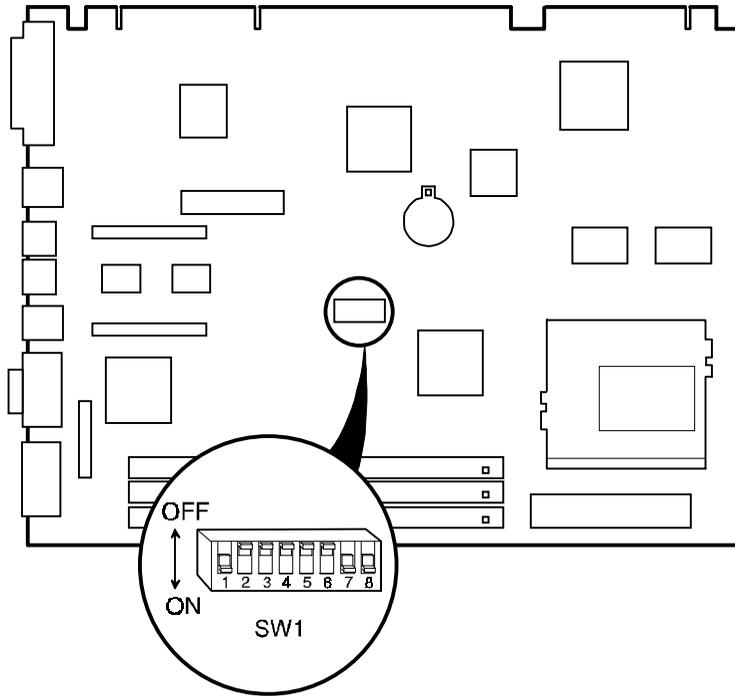
## Intel Pentium Processor Clock Speed Settings

The following table provides the switch settings for a number of available Pentium processors. The switches are set correctly for the processor that came with the server you purchased. You only need to change the processor switch settings, that is SW1, should you upgrade to another 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 your fingers can result in permanent damage to electronic components.

Processor Speed	SW1-1	SW1-6	SW1-7	SW1-8
90 MHz	Off	Off	Off	Off
120 MHz	Off	Off	On	Off
133 MHz	On	Off	On	Off
150 MHz	Off	Off	On	On
166 MHz	On	Off	On	On
200 MHz	On	Off	Off	On
233 MHz	On	Off	Off	Off
266 MHz	On	On	On	Off
300 MHz	On	On	On	On
333 MHz	On	On	Off	On
366 MHz	On	On	Off	Off



DEC01186-13

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

## Installing Additional Server Memory

Your server supports 168-pin DIMM memory modules utilizing Synchronous Dynamic Random Access Memory (SDRAM) technology. SDRAMs operate at speeds of 66 MHz (or greater) over a local memory bus, which is much faster than SIMMs using ECC or EDO memory.

Adding more memory may enable your server to run larger, more complicated software and run it more quickly. DIMMs are available in 16 MB, 32 MB, 64 MB, and 128 MB memory module sizes to expand server memory up to 256 MB. Contact your local DIGITAL sales representative for ordering information.

Server memory is installed using the three DIMM sockets located on the main logic board as shown in Figure 5-11. Sockets J7 and J6 can accept single or dual bank DIMMs, while socket J5 can accept only single bank DIMMs.

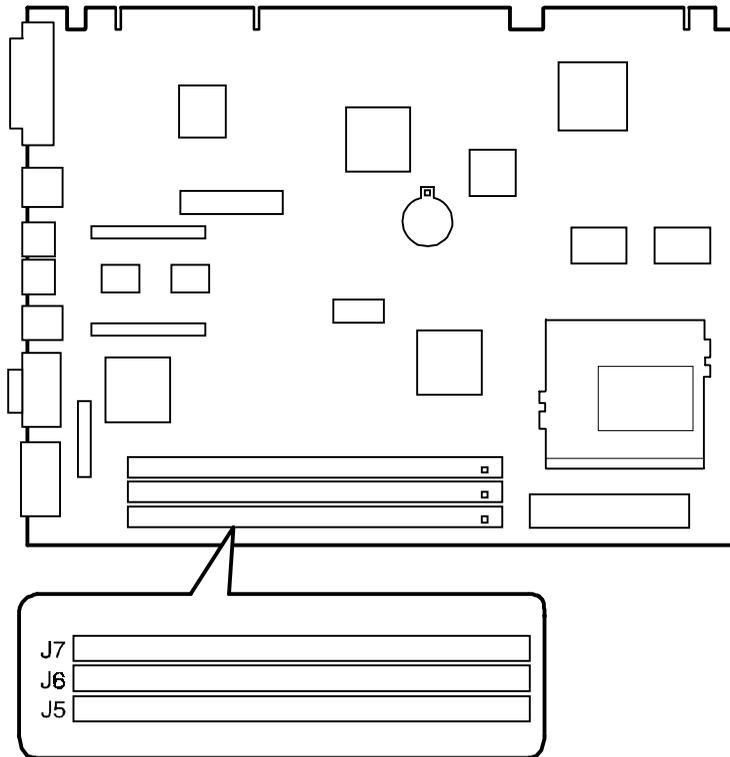
When adding memory make sure you reference the memory configuration table and follow these memory expansion guidelines:

- Install 168-pin DIMMs using 66 MHz (or faster), 64-bit SDRAMs.



**NOTE:** Install DIMMs supplied by Digital Equipment Corporation and qualified vendors. DIGITAL does not support server performance, product warranty, or service calls resulting from installation of non-qualified DIMMs.

- Single bank DIMMs are available in 16 MB and 64 MB memory modules. Single bank DIMMs have memory chips on only one side of the module.
- Dual bank DIMMs are available in 32 MB and 128 MB memory modules. Dual bank DIMMs have memory chips on both sides of the module.
- Memory sockets J7 and J6 support double banks of SDRAM DIMMs. Memory socket J5 supports only single bank SDRAM DIMMs and 16 Mbit technology.
- When installing 256 MB of total server memory you must leave socket J5 empty.



DEC01186-4

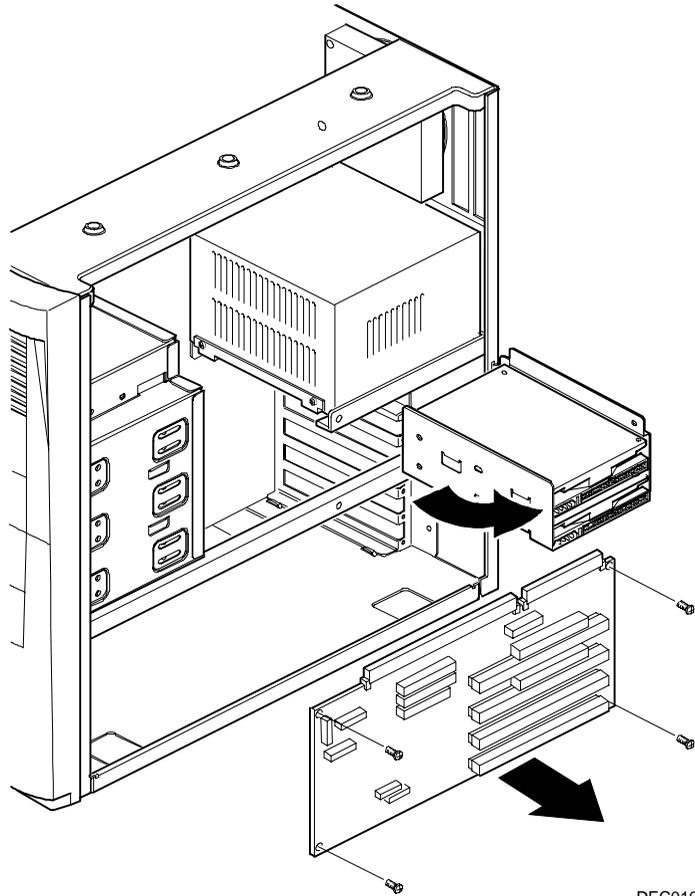
**Figure 5-11. DIMM Socket Locations**

## Memory Configurations

Socket J5	Socket J6	Socket J7	Total
	16 MB	16 MB	32 MB
16 MB	16 MB	16 MB	48 MB
	32 MB	16 MB	48 MB
16 MB	32 MB	16 MB	64 MB
	64 MB	16 MB	80 MB
	128 MB	16 MB	144 MB
		32 MB	32 MB
	16 MB	32 MB	48 MB
16 MB	16 MB	32 MB	64 MB
	32 MB	32 MB	64 MB
16 MB	32 MB	32 MB	80 MB
	64 MB	32 MB	96 MB
	128 MB	32 MB	160 MB
		64 MB	64 MB
	16 MB	64 MB	80 MB
	32 MB	64 MB	96 MB
	64 MB	64 MB	128 MB
	128 MB	64 MB	192 MB
		128 MB	128 MB
	16 MB	128 MB	144 MB
	32 MB	128 MB	160 MB
	64 MB	128 MB	192 MB
	128 MB	128 MB	256 MB

## Removing the Backplane

1. Turn off the computer, monitor, and then disconnect power from the computer.
2. Remove the outside cover.
3. Remove the screw from the internal drive bay.
4. Swing the drive bay away from the chassis.
5. Remove any expansion boards.
6. Disconnect all power, video, disk and diskette cables.
7. Remove the main logic board.
8. Remove the screws at the rear holding the backplane to the chassis.
9. Remove the backplane.

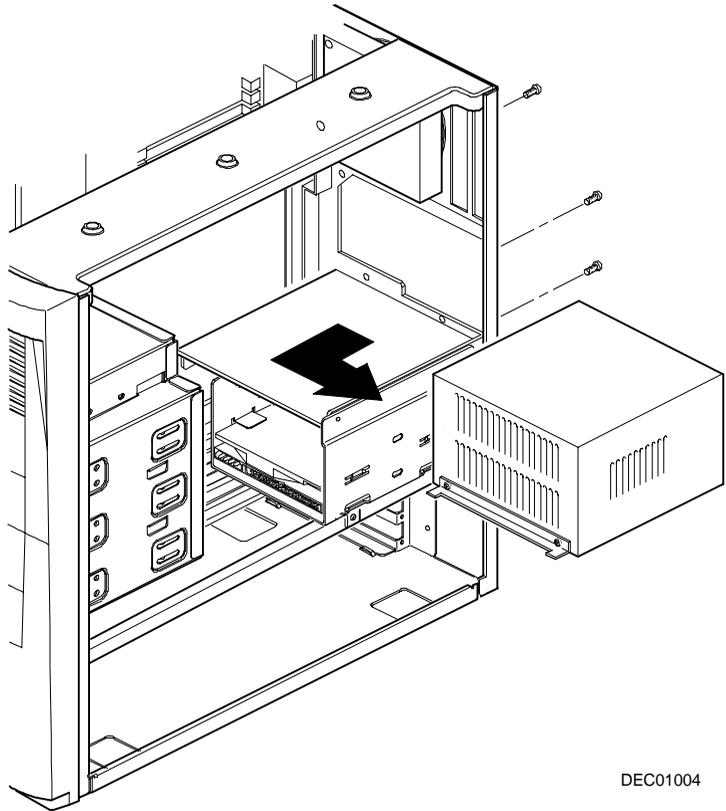


DEC01007

**Figure 5-12. Removing the Backplane**

## **Removing the Power Supply**

1. Turn off the computer, monitor, and then disconnect power from the computer.
2. Remove the outside cover.
3. Disconnect the power cable from the backplane.
4. Disconnect all power cables from all devices.
5. Remove the screws from the power supply.
6. Remove the power supply.

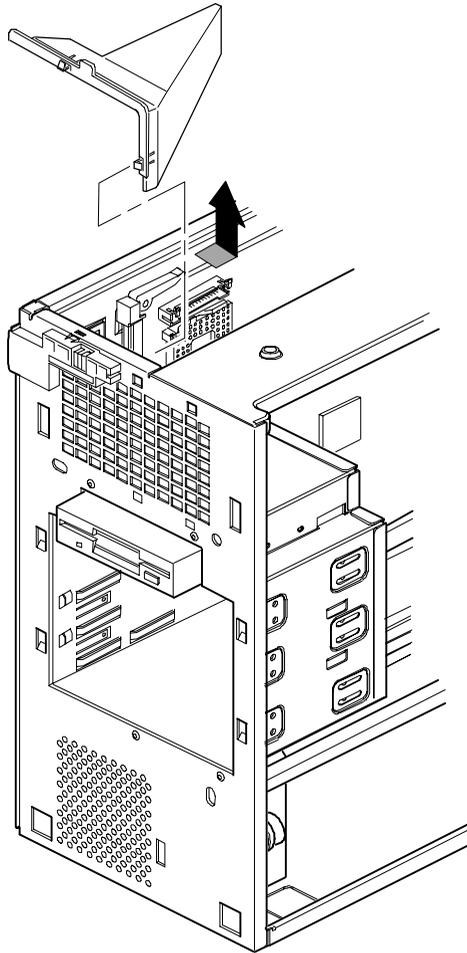


DEC01004

**Figure 5-13. Removing the Power Supply**

## **Removing the Front Air Duct**

1. Turn off the computer, monitor, and then disconnect power from the computer.
2. Remove the outside cover.
3. Remove the front bezel.
4. Press in on the tabs to release the front air duct.
5. Remove the front air duct.



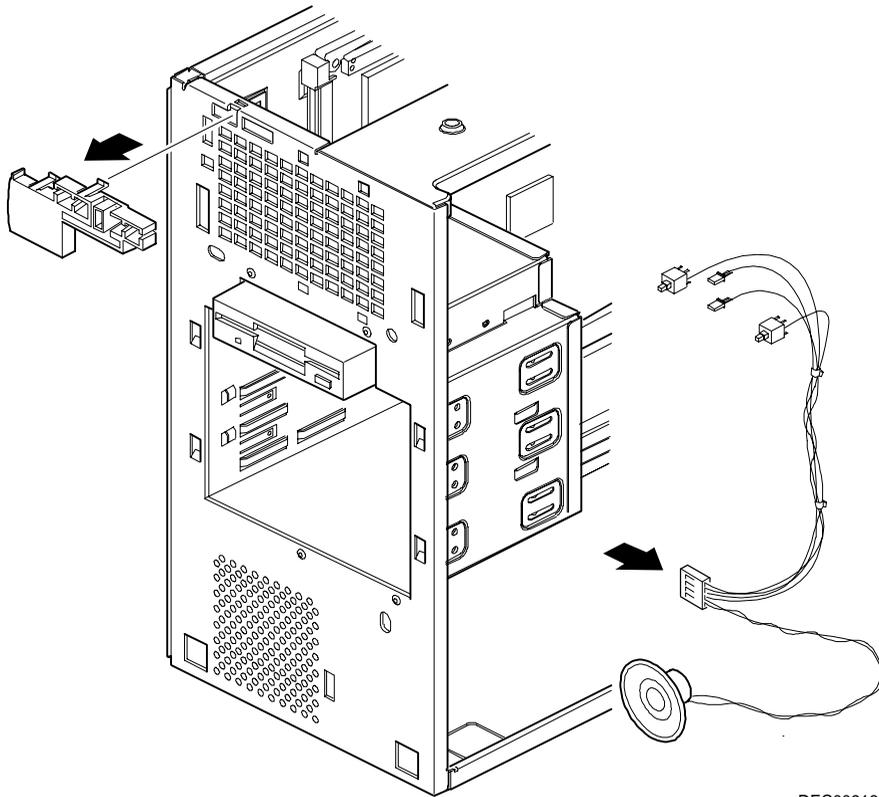
DEC01008

**Figure 5-14. Removing the Front Air Duct**

## Removing the Control Panel Assembly and Cable

1. Turn off the computer, monitor, and then disconnect power from the computer.
2. Remove the outside cover.
3. Remove front bezel.
4. Remove the front air duct.
5. Push in on the tabs to disengage the control panel assembly.
6. Disconnect the cables from the control panel assembly noting the following when you reconnect.
  - White and black is the reset switch.
  - White, black, and red is the power switch.
  - Red and black is hard disk drive activity LED.
  - Yellow and black is the power LED. It is on top of the hard disk drive indicator.
7. Slide the cables through the slots.

The cables and their attached switch or indicators are now inside the computer.
8. Unplug the cable connection from the backplane.
9. Rotate the speaker to remove it from the option card assembly.
10. Remove the control panel assembly cables from the computer.

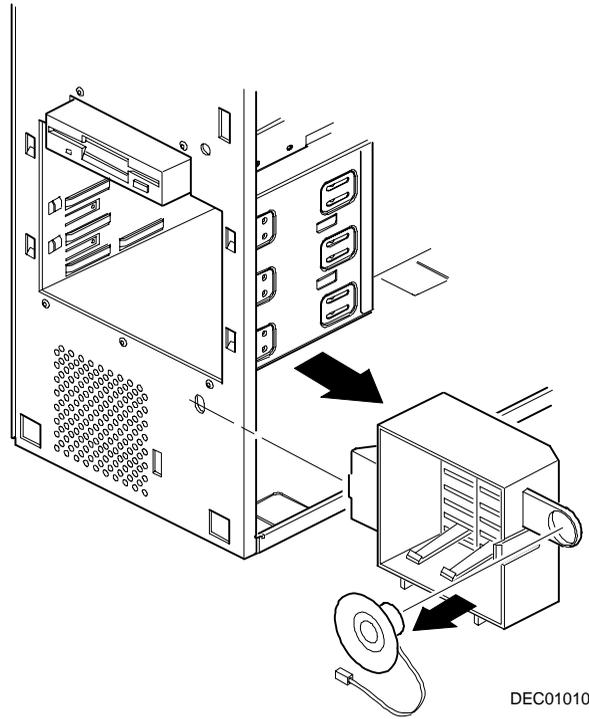


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**Figure 5-15. Removing the Control Panel Assembly and Cable**

## **Removing the Option Card Guide and Speaker Assembly**

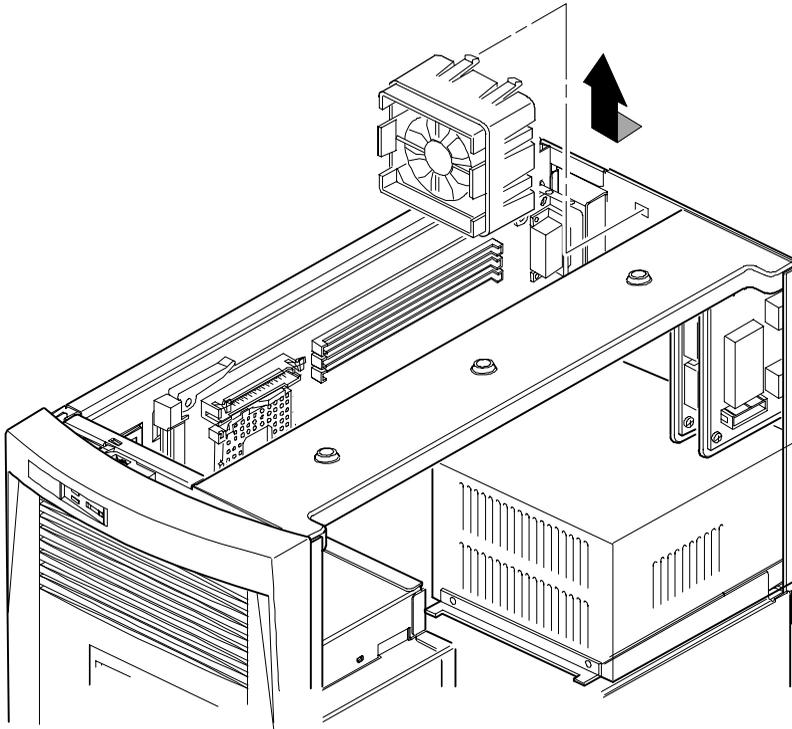
1. Turn off the computer, monitor, and then disconnect power from the computer.
2. Remove the outside cover.
3. Push in on the tab to release the option card guide and speaker assembly.
4. Remove the option card guide and speaker assembly.



**Figure 5-16. Removing the Option Card Guide and Speaker Assembly**

## **Removing the Top-Rear Fan Assembly**

1. Turn off the computer, monitor, and then disconnect power from the computer.
2. Remove the outside cover.
3. Disconnect the fan assembly from the backplane.
4. Push in on the tabs to release the fan assembly.
5. Remove the fan assembly.



DEC01231

**Figure 5-17. Removing the Top-Rear Fan Assembly**

## Removing the Wire Assembly, Headphone/Microphone

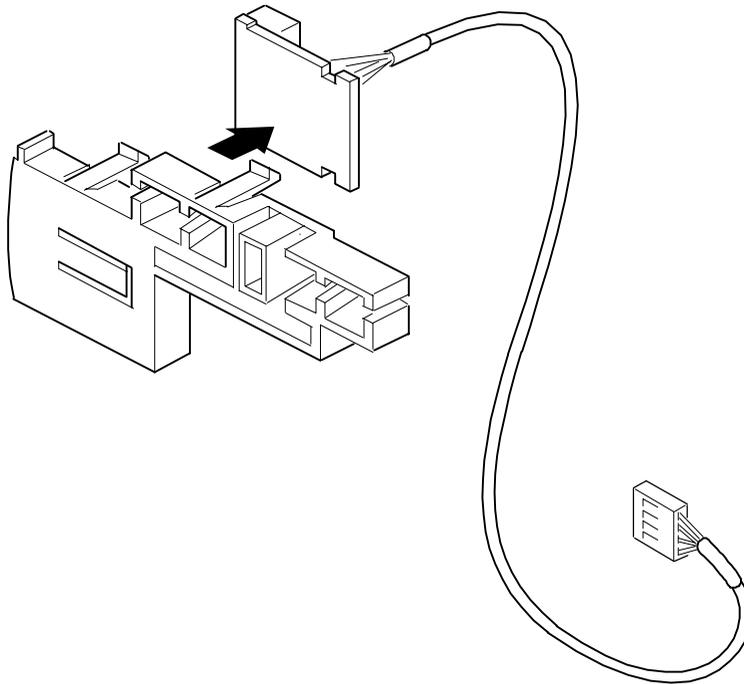
1. Turn off the computer, monitor, and then disconnect power from the computer.
2. Remove the outside cover.
3. Remove the front bezel.
4. Push in on the tabs to disengage the control panel assembly.

The headphone and microphone connections are on a card inside the control panel assembly. This card is attached to the cable.

5. Remove the headphone and microphone card from the control panel assembly.

Push down on the headphone and microphone card to release it from the tabs and then slide the card back.

6. Unplug the other side of the cable from the backplane.
7. Slide the card through the appropriate front slot and then remove the headphone and microphone cable.

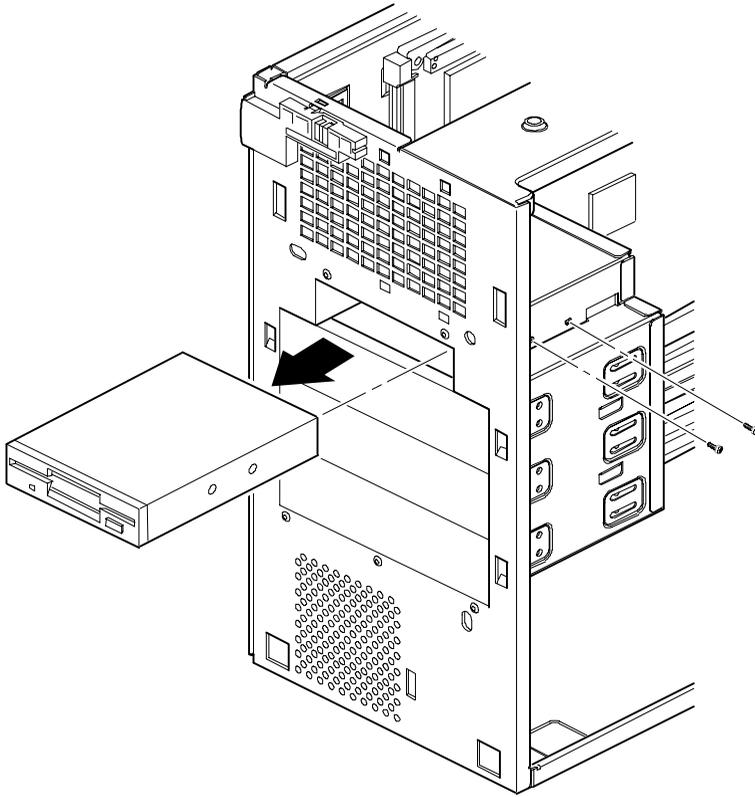


DEC00917

**Figure 5-18. Removing the Wire Assembly, Headphone/Microphone**

## Removing the Diskette Drive

1. Turn off the computer, monitor, and then disconnect power from the computer.
2. Remove the outside cover.
3. Remove the front bezel.
4. Remove all power and data cables from the diskette drive.
5. Remove the screws.
6. Remove the diskette drive.



DEC00888-2

**Figure 5-19. Removing the Diskette Drive**

## Introduction

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

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



**CAUTION:** Before changing any memory or address location, refer to the documentation supplied with the optional device, expansion board, or software application and make sure adequate information is available. If not, contact the option or software manufacturer for further information.

## Full Range Processor Memory Address Map

Range	Function	Size
0 to 9FFFFh	Base memory	640 KB
A0000h to BFFFFh	Video RAM	128 KB
C0000h to C7FFFh	Video BIOS	32 KB
C8000h to DFFFFh	BIOS extension ROM (AT bus used)	96 KB
E0000h to FFFFFh	PnP BIOS/APM BIOS	128 KB
100000h to FFFFFFFh	Extended memory	255 MB

## I/O Address Map

Range (hexadecimal)	Function
000 - 00F	DMA controller one
020 - 021	Interrupt controller one
040 - 043	Interval timer
060 - 06F	Keyboard controller
070 - 07F	Real-Time Clock (RTC), NMI
080 - 08F	DMA page register
0A0 - 0A1	Interrupt controller two
0C0 - 0CF	DMA controller two
0F0	Clear math co-processor busy
0F1	Reset math co-processor
0F8 - 0FF	Math co-processor
170 - 177	Secondary IDE controller
1F0 - 1F7	Primary IDE controller
278 - 27A	LPT2
2E8 - 2EF	COM4

*continued*

## Device Mapping

<b>Range (hexadecimal)</b>	<b>Function</b>
2F8 - 2FF	COM2
320 - 321	MIDI MPU
378 - 37A	LPT1
388 - 38B	Audio, FM music synthesizer
3BC - 3BE	LPT3
3E8 - 3EF	COM3
3F0 - 3F7	Diskette (floppy disk) controller
3F6 - 3F7	Primary/secondary IDE controller (alt status, device address)
3F8 - 3FF	COM1
4D0	Edge/level control register - INTCNTRL1
4D1	Edge/level control register - INTCNTRL2
CF8 - CFF	PCI configure space control register
0FF0	Programming chip select
22 - 3F	Programming chip select

## Server Interrupt Levels

<b>Interrupt Number</b>	<b>Interrupt Source</b>
IRQ0	Timer tick
IRQ1	Keyboard controller
IRQ2	Cascade interrupt
IRQ3	COM2, COM4, if enabled
IRQ4	COM1, COM3, if enabled
IRQ5	Audio, if enabled
IRQ6	Diskette (floppy disk) drive, if enabled
IRQ7	LPT1, LPT3, if enabled
IRQ8	Real Time Clock (RTC)
IRQ9	Available
IRQ10	Available
IRQ11	Available
IRQ12	Mouse interrupt, if enabled
IRQ13	Math co-processor
IRQ14	IDE primary, if enabled
IRQ15	IDE secondary, if enabled

## DMA Channel Assignment

Channel	Controller	Function
0	1	Available
1	1	Audio (if enabled)
2	1	Diskette (floppy disk) controller, if enabled
3	1	ECP
4	2	Cascade DMA
5	2	Audio
6	2	Available
7	2	Available

**Service Notes**

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Service Notes



Service Notes