DIGITAL Server 500 Series

System Reference

February 1998

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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 tasavirtalitiumpatteri.

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

⚠️ **VARNING!** Det kan förekomma en batteriexplosion om ett litium-jonbatteri 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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Introduction

This guide describes how to operate, configure, and upgrade DIGITAL Server 500 series computers. The information will help to familiarize you with all aspects of your server and provide a reference tool for questions you might have in the future.

Audience

This guide is written specifically for anyone responsible for configuring and expanding a DIGITAL Server 500 series computer.

DIGITAL Server 500

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; 3 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; and a short tower enclosure.
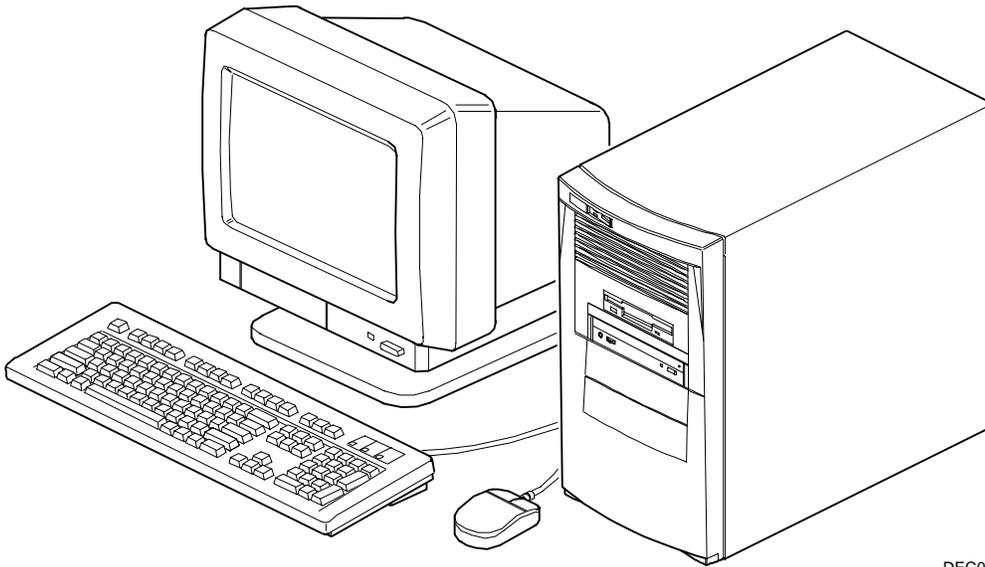
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DIGITAL Server 500

Related Material

A *Quick Setup* guide is available as a supplement to this *System Reference* guide. This guide describes how to initially setup your computer.

A *DIGITAL PC Systems Solutions* manual is available to help you troubleshoot your computer should it fail to operate after initial setup or after installing optional devices.

A *Software Installation* manual explains how to complete the installation of your DIGITAL Server 500. The System CD contains software and other components required to complete server installation, as well as on-line documentation.

A *Warranty and Service Information* booklet is supplied with your computer. This booklet provides warranty information and a listing of phone numbers for technical support.

README files come with the factory installed software and on the supplied CD-ROM disk. This information can help you setup, configure, and operate your computer. DIGITAL recommends that you read this information first.

Windows NT documentation is provided as an on-line help file and in printed form.

Latest Product Information and Upgrades

Current server utilities and technical support information is available on 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
```

Organization

This guide contains the following:

- Chapter 1: *Beyond Quick Setup*— This chapter describes your computer's front and rear panel components, indicators, and connectors. This chapter also explains how to physically secure your computer to a desk or table, connect optional external devices (such as a printer, etc.), and create a comfortable working environment.

- Chapter 2: *Using the BIOS Setup Utility*—This chapter provides task-based information on how to configure your computer using the BIOS Setup utility.

- Chapter 3: *Server Components*—This chapter provides internal computer component descriptions and locations as well as how to remove the main logic board, replace the battery, and upgrade to a higher-performance processor.

- Chapter 4: *Main Logic Board Expansion*—This chapter explains how to install additional computer memory and video memory.

- Chapter 5: *Adding Expansion Boards*—This chapter explains how to install ISA and PCI expansion boards.

- Chapter 6: *Adding Mass Storage Devices*—This chapter explains how to install and connect optional mass storage devices.

- Chapter 7: *Troubleshooting*—This chapter describes initial and advanced troubleshooting solutions.

- Appendix A: *Technical Specifications*—This appendix lists vital computer operating and performance specifications. Also included is information about your computer's jumper and switch settings.

- Appendix B: *Device Mapping*—This appendix contains tables listing the main logic board's memory map, I/O address map, interrupt map, and DMA map.

- Appendix C: *Video Output Information*—This appendix describes the video modes supported by your DIGITAL Server's video circuitry.

- Appendix D: *BIOS Setup Utility Settings*—This appendix describes how to use the advanced features of the BIOS Setup utility to configure your server.

- Appendix E: *Caring for Your Server*—This appendix provides suggestions for cleaning and moving your server.

Conventions

Convention Example	Description
Quick Setup	Italics are typically used for titles, comments, and references to other sections of this document or other documents.
`c:\windows>`	Monospaced text indicates information that your server or software displays. For example, a directory path or error message.
`SCU.BAT`	Monospaced text can also indicate a command that you need to enter to run an application or utility.
[Enter]	Square brackets surrounding text represents a keyboard key.
[Ctrl]+[Alt]+[Del]	A plus sign indicates that the keys shown should be pressed at the same time.

Abbreviations

Abbreviation	Meaning
BIOS	Basic input/output system
DIMM	Dual in-line memory module
DMA	Direct memory access
DRAM	Dynamic random access memory
ECC	Error correction code
ECP	Extended capabilities port
EDO	Extended data output
EPP	Enhanced parallel port
FRU	Field replaceable unit
FDD	Floppy disk drive
h	An h suffix to a numerical value denotes hexadecimal numbers. For example, 0F8h equals 0F8 hexadecimal.
I/O	Input/output
IRQ	Interrupt request
ISA	Industry standard architecture
KBC	Keyboard controller
MS-DOS™	Microsoft Disk Operating System
MB	Megabyte
NIC	Network interface card
NOS	Network operating system
PCI	Peripheral component interconnect
POST	Power-on self test
RAM	Random access memory
ROM	Read only memory

continued

Abbreviation	Meaning
RSM	Remote server management
RTC	Real-time clock
SCSI	Small computer system interface
USB	Universal serial bus
VGA	Video graphics array
Windows NT	Microsoft Windows NT operating system software

Special Notices

Three kinds of special notices are used in this *System Reference* guide to emphasize specific information.

WARNING: indicates the presence of a hazard that can cause personal injury if the hazard is not avoided.

CAUTION: indicates the presence of a hazard that might cause damage to hardware or that might corrupt software.

NOTES: are used to provide additional information.

Beyond Quick Setup *1*

Introduction

This chapter describes your server's front and rear panel components, indicators, and connectors. This chapter also explains how to physically secure your server to a desk or table, connect optional external devices (such as a printer), and create a comfortable working environment.

Refer to the *DIGITAL Server 500 Series Software Installation* guide for information about how to install the operating system and networking software.

Front Panel Controls and Indicators

Figure Legend	Control or Indicator	Function
A	On/off switch	Turns your server's power on and off.
B	Power LED	Lights when your server is turned on.
C	Reset switch[1]	Resets your server and causes POST to run.
D	Diskette eject button	Releases a 3½-inch diskette from the diskette drive.
E	Drive bay(s)	Enables you to add additional mass storage device(s) to your server.
F	CD-ROM drive	
G	Diskette activity LED	Lights when the diskette drive is in use.
H	Hard disk drive activity LED	Lights when your hard disk drive is in use.
I	Headphone jack[2]	This jack enables you to connect standard stereo headphones to your server.
J	Microphone jack[2]	This jack enables you to connect a standard microphone to your server.

(1) Digital designed the reset button so it does not protrude significantly from the front bezel. This design prevents accidentally resetting the server. To reset your server, use a device such as a pen or pencil to push the reset button.

(2) Not available on all models
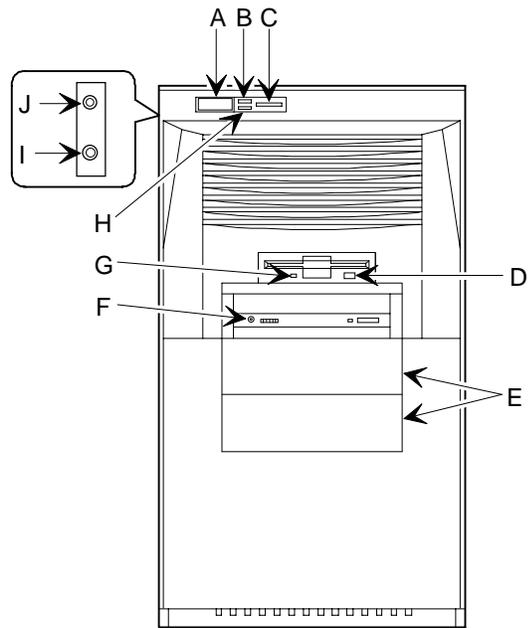
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Figure 1-1. Front Panel Controls and Indicators

Rear Panel Connectors and Voltage Select Switch

Figure Legend	Connector or Switch	Function
A	Voltage select switch	Enables you to select 115 V ac input power or 230 V ac input power.
B	Serial port connector(s)	Enables you to connect serial devices.
C	Video port (VGA connector)	Enables you to connect a high-resolution monitor to your server.
D	USB ports	Enables you to connect Universal Serial Bus (USB) devices.
E	Mouse connector	Enables you to connect a PS/2 style mouse.
F	Keyboard connector	Enables you to connect a keyboard.
G	10Base-T/100Base-TX connector	Enables you to connect to a 10Base-T or 100Base-TX (Twisted-Pair) network.
H	Parallel port connector	Enables you to connect a standard, Enhanced Parallel Port (EPP), or Enhanced Capabilities Port (ECP) parallel printer.
I	Expansion board slots	Enables you to install additional ISA and PCI expansion boards.
J	Chassis lockdown	Enables you to physically anchor your server to a fixed location.
K	ac line connector	Enables you to connect your server to an ac power source.
L	Speaker out	This jack enables you to connect a set of speakers to server.
M	Line in	This jack enables you to connect an audio device to your server.

Beyond Quick Setup
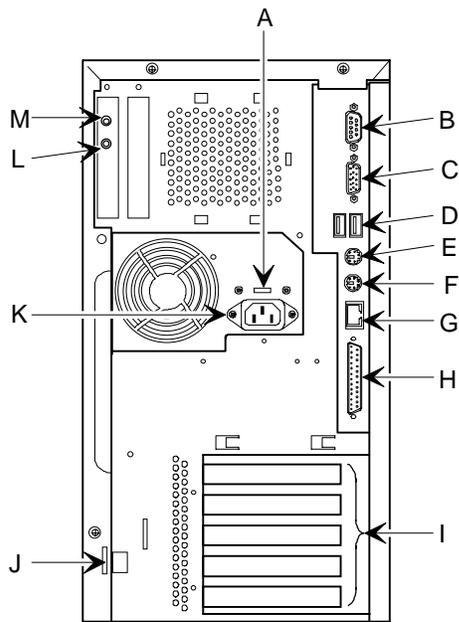
DEC01496-2

Figure 1-2. Rear Panel Connectors and Voltage Select Switch

1-5

Typical CD-ROM Front Panel

The CD-ROM drive shown in Figure 1-3 is a typical front panel, showing the lights, switches, and connectors on most CD-ROM drives. The location of these items might differ depending on your CD-ROM drive.

Legend	Description
A	Headphone jack
B	Volume controls
C	CD loading tray
D	Busy lamp
E	Tray open/close button
F	Emergency eject hole
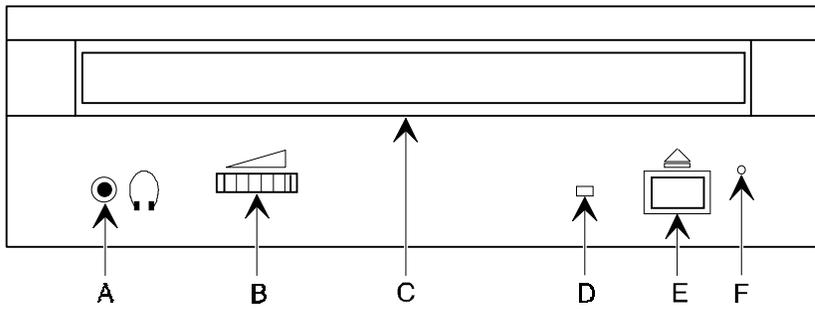
DEC00673

Figure 1-3. Typical CD-ROM Front Panel

Connecting a Local Printer

Perform the following steps to connect a local printer to your server:

1. Look over your printer documentation and perform any pre-installation instructions before attempting to connect it to your server.

2. Make sure your printer and server are turned off.

3. Plug the printer cable into the appropriate printer port (the parallel port for a parallel printer and a serial port for a serial printer).

4. Turn your printer and server on.

5. Configure your printer for operation with your server.

    Refer to your Windows NT Workstation on-line help and printed documentation for instructions on installing your printer's device driver.
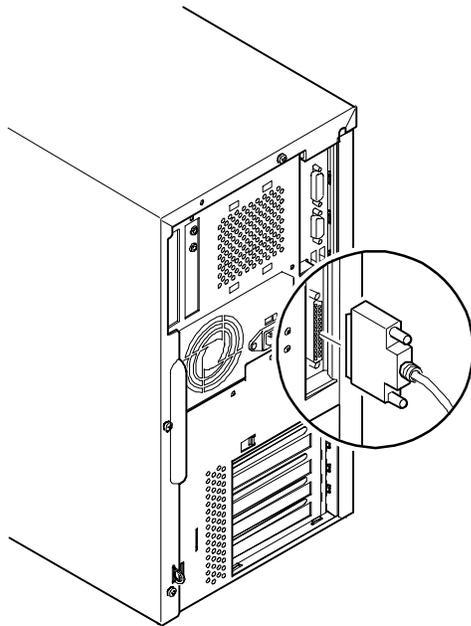
DEC01498-3

Figure 1-4. Connecting a Local Printer

Connecting a Universal Serial Bus (USB) Device

USB simplifies connectivity requirements for plug and play external devices by consolidating ports and eliminating the need to open the server to plug in expansion boards.

If you purchased a USB device for your server, perform the following instructions to connect it:

1. Unpack the USB device.

2. Connect the USB device cable into one of the USB port connectors at the rear of your server.

    Refer to your manufacturer's documentation for installation instructions.
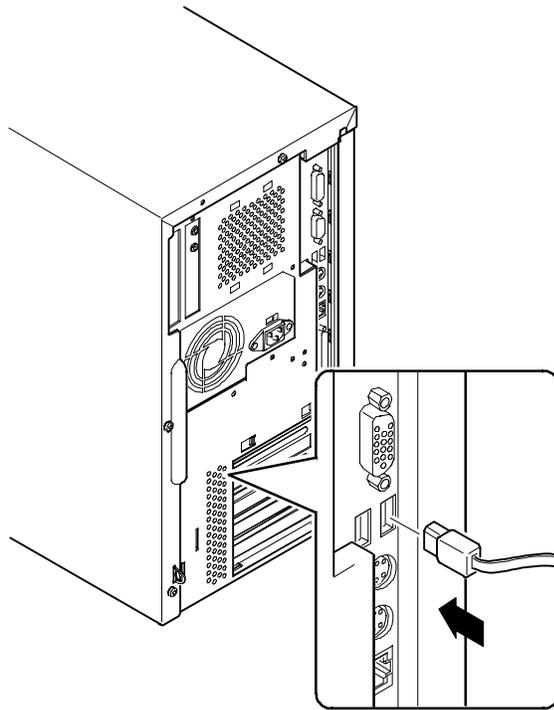
DEC01498-4

Figure 1-5. Connecting a USB Device

Creating a Comfortable Working Environment

Under circumstances of poor posture or poor setup, certain recent scientific articles suggest that injuries may occur. Other articles suggest that there is no cause and effect. Because the safety of our users is a great concern, it is important to take these precautions:

- Be comfortable in your work space.

- Change your posture frequently.

- Proceed according to the recommendations in the following table and figure.

Adjust	So . . .
Chair	Feet are flat on the floor.
	Legs are vertical forming a right angle to the floor.
	Your weight is off your thighs and they are horizontal. Keep the back of your knees away from the seat so you do not compress the area behind them, which could restrict the blood flow.
	Your upper body is erect and your lower back is supported with a backrest.
Keyboard or mouse	Your wrists are straight and do not bend more than 15 degrees. They may be supported when resting but not on sharp edges. Type comfortably, with no more key pressure than needed to feel the contact point.
	Upper arms are straight down at your sides, elbows are close to your sides and support your arm weight. Forearms are at a 70 degree to 90 degree angle.
	If you use a mouse, rest your hand on the mouse so your wrist is not on the work surface. Operate the mouse close to your body's centerline.
Head	Avoid neck strain. Your head should incline downward, but no more than 15 to 20 degrees.

Adjust	So . . .
Monitor	No higher than the level of your eyes and at the correct distance for your vision.
	Avoid eye fatigue, which can be caused by glare, image quality, uncomfortable furniture, eye height, and uncorrected vision. If you cannot focus to read at different distances, you may need special glasses. Relax your eyes periodically by looking at distant objects.
Work breaks	Take periodic work breaks. Morning, lunch, and afternoon breaks during the 8-hour workday meet most recommendations. Take advantage of work breaks to move around and do other activities.
Lighting	Avoid direct lighting or sunlight on the screen, which causes glare and reflections. Place lighting behind or to the side of your work area, and distribute the lighting evenly on your work area.
	Your monitor's screen has an antiglare treatment to reduce glare. Adjust the brightness and contrast controls as needed.
Noise	Keep background noise at a minimum. Background noise above 65 dBA is tiring. Sound-absorbing materials (curtains, carpeting, and acoustic tile) can help reduce background noise.
Temperature	20 to 23 degrees C (68 to 74 degrees F).
Humidity	30% to 70%.
Ventilation	Provide adequate air ventilation to avoid fatigue and to operate the equipment.
Space between set ups	> 70 cm (28 in.) center to center, preferably > 152 cm (60 in.).

IMPORTANT: If you experience pain or discomfort during use of the server, take a rest break and review the instructions for proper ergonomic setup and use. If the pain or discomfort continues after resuming use of the server, discontinue use and report the condition to your job supervisor or physician.
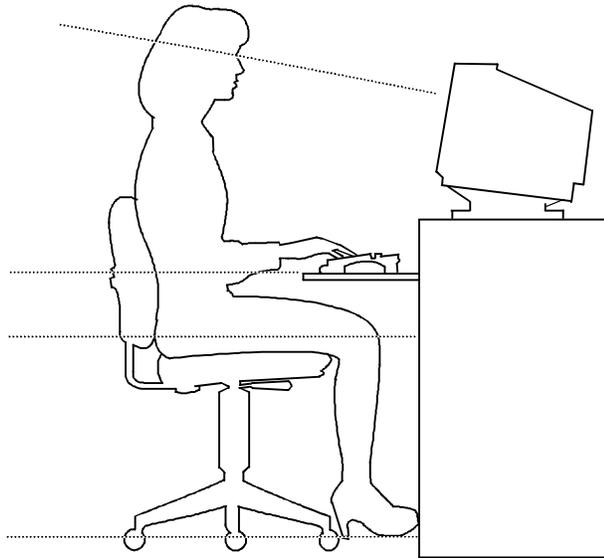
DEC00454

Figure 1-6. Creating a Comfortable Working Environment

Using the BIOS Setup Utility **2**

Introduction

The BIOS Setup utility enables you to select and store permanently information about your 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.

You should use the BIOS Setup utility if you experience problems with your hard disk or if you need to reconfigure or expand your server.

This chapter provides information on how to configure your server using the BIOS Setup utility.

> **CAUTION:** Your server was setup for normal operation at the factory and will operate properly without additional configuration.
>
> It is important for you to read carefully and understand this chapter before attempting to modify your server's factory settings. Changing some settings might cause your server to operate improperly.

For advanced information, see Appendix D, "BIOS Setup Utility Settings."

Using the BIOS Setup Utility

Here are some instances when you might wish to change your server's initial setup. You might need to:

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

Additionally, you will need to change your server's initial setup after:

- Upgrading hardware (such as adding a new hard drive)
- Reconfiguring your 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 your server's BIOS.

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

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 your 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 your monitor screen and any on-line help pop-up screens to configure your 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 your 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

Your 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 asks 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 your 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 your 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 asks you to enter your supervisor password or user password to allow your 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 your 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

Your 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 your 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 you to protect your hard disk from being corrupted by viruses, which could disable your hard disk.

To write-protect your 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 your 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 your 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.

  Refer to Chapter 3, "Server Components," for more information

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 your 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 your 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 your 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 your server's boot sequence. For example, when connecting to a network. (Follow your 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.

Field	Description
Setup prompt	Displays the Setup prompt message during the boot sequence. If disabled, the Setup prompt message will not be displayed. However, you can still access the BIOS Setup utility.
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:

Field	Speed Up Boot Selection
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."

5. Press the [+] key to sequence through your options, select "Off."

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.

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.

Flash Utility

The DIGITAL Server 500 series has BIOS software in a read-only, non-volatile memory (ROM) chip. This BIOS initializes hardware and boots the operating system when the server is turned on. The BIOS also provides access to other services such as keyboard and disk drives.

The server comes equipped with flash memory. This means that you can restore the server's BIOS simply by running the flash utility. If necessary, you can also upgrade the server's BIOS to future releases by running the flash utility along with any flash BIOS update diskette.

You can download BIOS updates along with the flash utility and instructions on how to flash the server's BIOS from the Internet.

Server Components **3**

Introduction

This chapter shows the location of the DIGITAL Server's internal components and procedures for unlocking and removing the outside cover. Also, the following procedures are detailed:

- Disconnecting external devices and power

- Removing your server's outside cover

- Replacing your server's outside cover

- Chassis lockdown & attaching the hasp

- Removing the main logic board

- Replacing the main logic board

- Replacing the lithium battery

- Installing a higher performance processor

- Installing a voltage regulator

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.

    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 your server to discharge any static electricity.

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

Tools Needed

Prior to installing an option, have the following available:

- A Phillips screwdriver
- An antistatic wrist strap

Static Electricity

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, put on a properly-grounded, anti-static wrist strap.
- Keep circuit boards and components away from non-conductors.
- Keep clothing away from circuit boards and components.
- Keep circuit boards in anti-static bags.
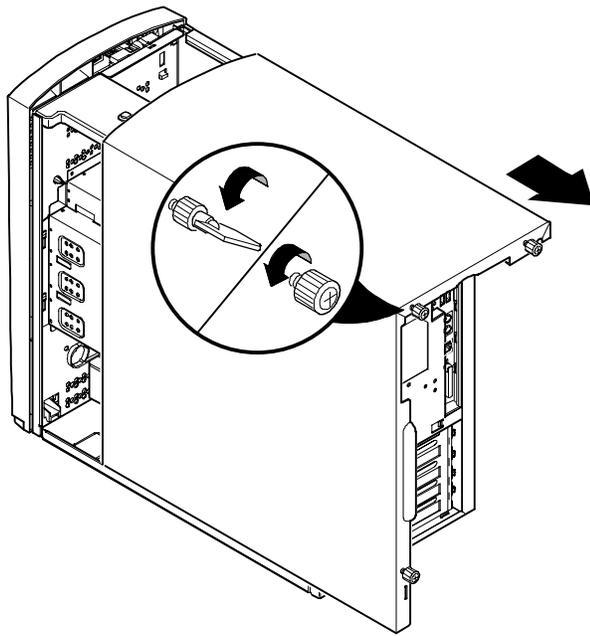
DEC01497-2

Figure 3-1. 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.
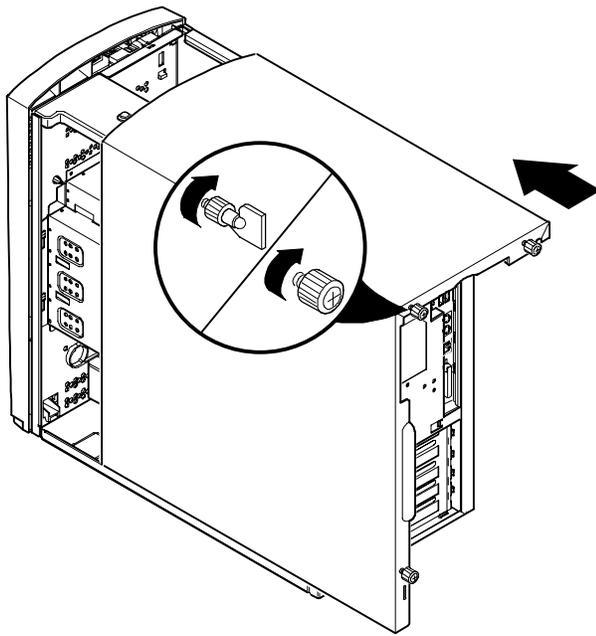
DEC01497-3

Figure 3-2. 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 servers'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.
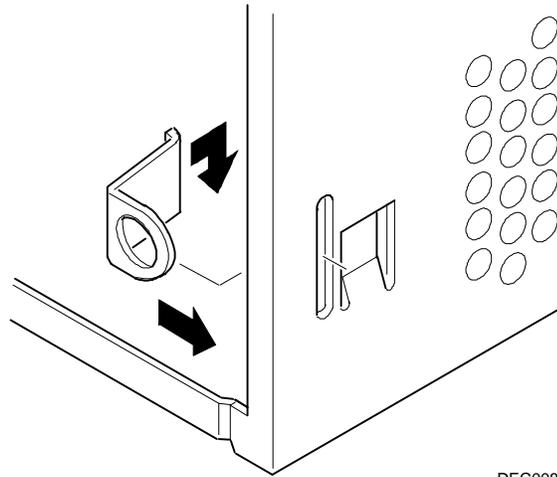
DEC00881

Figure 3-3. Attaching the Hasp

Server Components

Figure Legend	Component
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

A

B

G
F
E

C

D
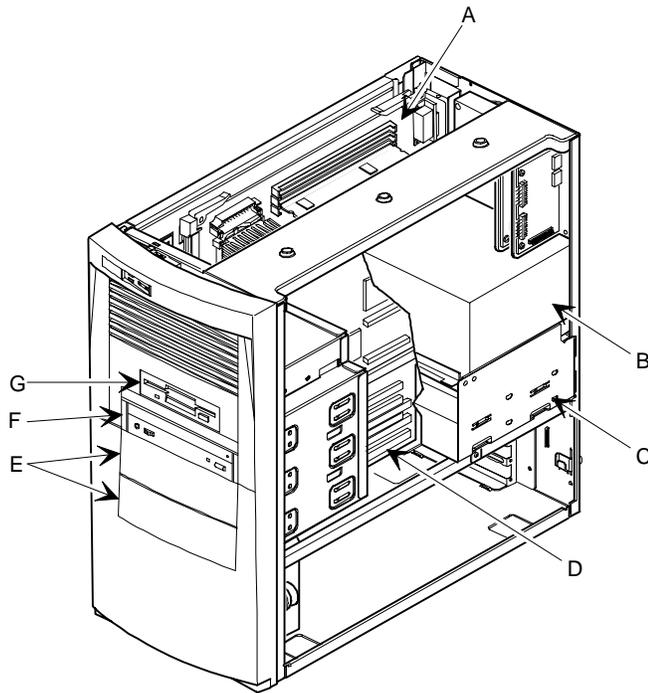
DEC01499

Figure 3-4. Server Components

Main Logic Board Components

Figure Legend	Component
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
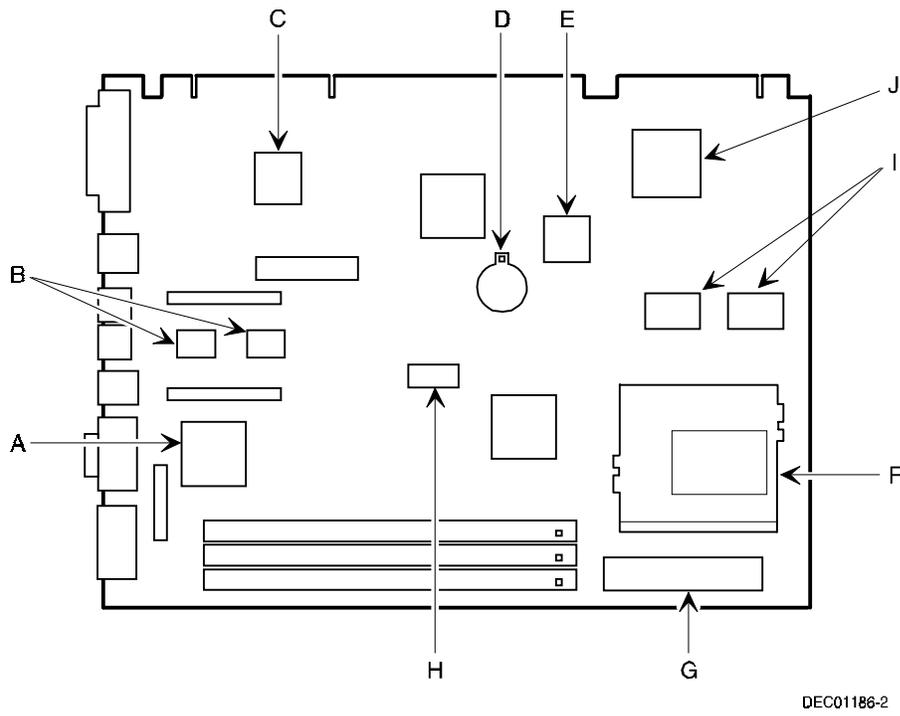
DEC01186-2

Figure 3-5. 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
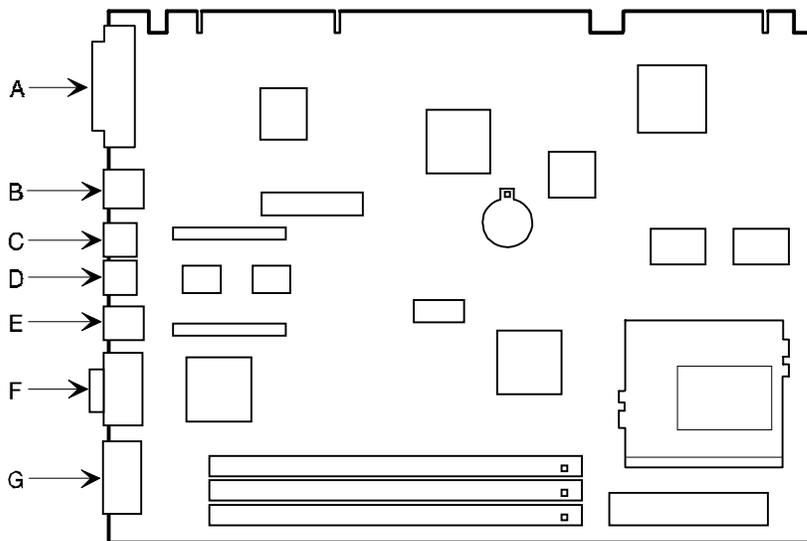
DEC01186-14

Figure 3-6. 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
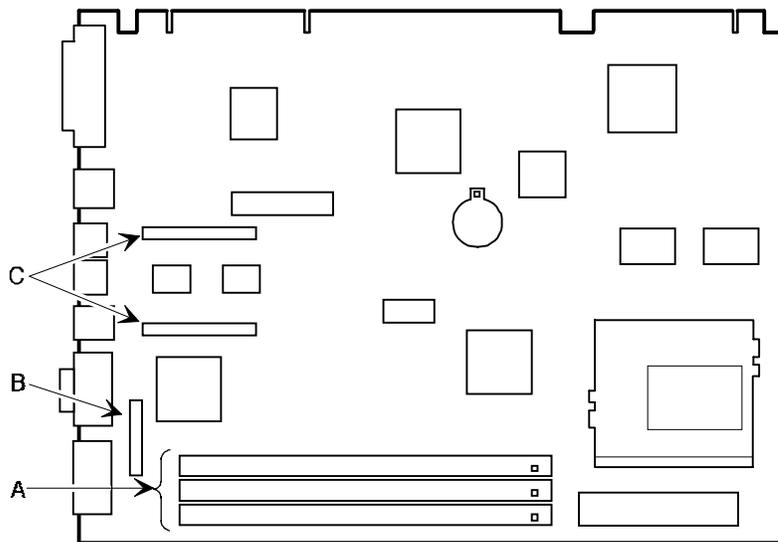
DEC01186-3

Figure 3-7. 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)[1]
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

[1] This connector is used for Fax/Modems with speaker phone capabilities.

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

Item G, Figure 3-8	Description
Pin 1	Audio in (fax/modem)
Pin 2	Ground
Pin 3	Ground
Pin 4	Microphone in (fax/modem)
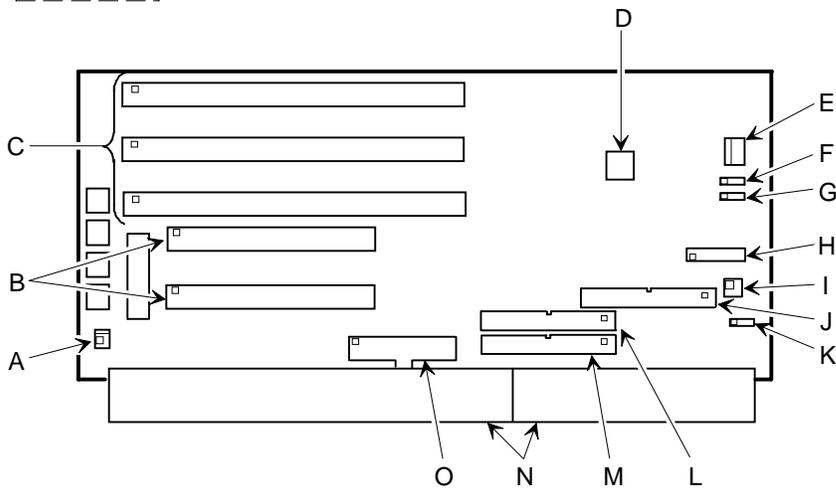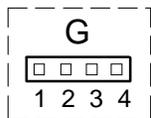
Figure 3-8. System I/O Expansion Card Components and Connectors

Removing the Main Logic Board

To remove the main logic board:

1. Turn off your server and monitor.

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

> ⚠ **WARNING:** Make sure you disconnect the power cords from the server and monitor or the power cords from the power outlets. When only the front panel switches are turned off, dc logic voltage is still present.

3. Remove the outside cover.

4. Pull up on the two latches attached to the main logic board.

   This separates the main logic board from the backplane.

5. Carefully remove the main logic board from the chassis.
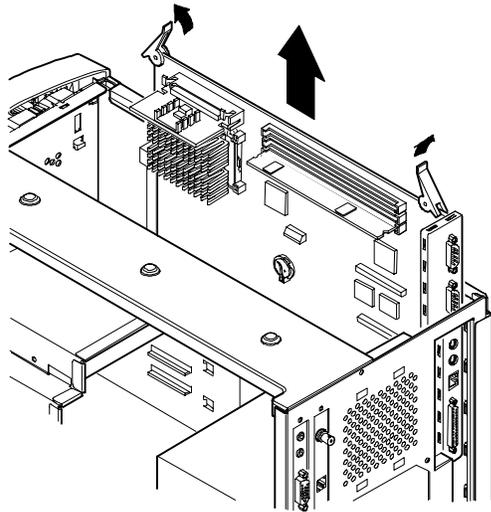
DEC01500

Figure 3-9. Removing the Main Logic Board

Replacing the Main Logic Board

To replace the main logic board:

1. Carefully slide the main logic board into the chassis.

    Make sure the main logic board completely engages the backplane and the two latches fully lock into place.

2. Replace the outside cover.

3. Connect all external devices, ac power, and monitor power.

Replacing the Lithium Battery

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

To replace the Lithium battery, perform the following:

1. Record your server's configuration settings using the BIOS Setup utility.

2. Turn off your server and monitor.

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

4. Remove the outside cover.

5. Lift the retaining clip slightly and push on the battery from the side to slide it out.

> **WARNING:** There is a danger of battery explosion if a lithium battery is incorrectly replaced. To prevent damage to your server, 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 server's battery might be considered hazardous waste. Make sure you follow any state or local statute to properly dispose of the old battery.

6. Install the new battery.

   When installing the new battery, make sure the "+" side faces up.

7. Replace the outside cover.

8. Connect all external devices and restore power.

9. Run the BIOS Setup utility to reconfigure your server using the recorded configuration settings from step 1.

   Refer to Chapter 2, "Using the BIOS Setup Utility."
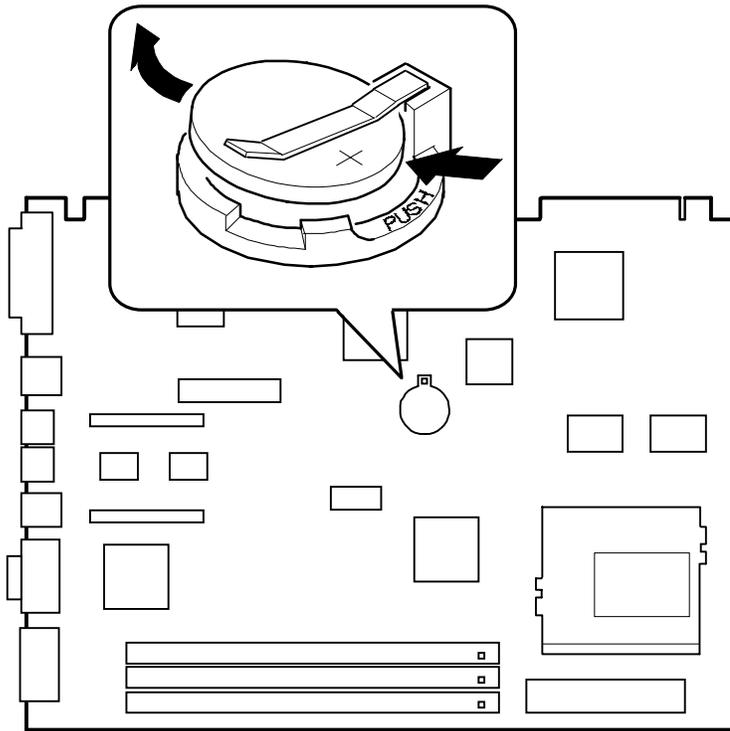
DEC01186-7

Figure 3-10. Replacing the Battery

Installing a Higher Performance Processor

Your server comes with ZIF Socket 7 compatible processor. Improving overall performance is based on your server's main logic board design, the amount of L2 cache and server memory, the video controller type and amount of video memory, as well as the performance characteristics of the installed hard disk drive(s). The following main logic board information is important when selecting a higher performance processor:

- Intel 430TX (Triton-TX) memory and PCI controller

- Switch selectable processor clock input frequency of 233 MHz (refer to Appendix A for switch settings)

- Onboard 512 KB L2 cache

When you upgrade the processor, you might also need to install a new voltage regulator module designed specifically for the processor type.

> **NOTE:** Processor upgrades and voltage regulator requirements change over time. The following table lists Socket 7 compatible processors and voltage regulators available at the time this manual was released.

Processor Type	Clock Speeds	Nominal Voltage	Voltage Regulator Digital Part Number
Intel Pentium MMX (P55C)	233 MHz	2.8 V dc	54-25300-01[1]

[1] Requires processor type jumper selection

To replace a processor:

1. Turn off your server and monitor and then disconnect all external devices, monitor power, and ac power.

   ⚠ **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 your server to discharge any static electricity.

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

2. Remove the outside cover.

3. Using a small screwdriver, release the retaining clip on the heat sink.

   Use caution so as to avoid damaging the main logic board.

4. Separate the heat sink from the processor.

5. Lift the lever up and out to release the processor.

6. Install the new processor.

   Make sure pin 1 on the processor is aligned with pin 1 on the ZIF socket (A, Figure 3-11).

   Once the new processor is in place, return the release lever to its original position.

7. Clean the bottom of the heat sink with a clean cloth dampened with isopropyl alcohol.

8. Spread a smooth thin coat of thermal compound on the bottom of the heat sink.

CAUTION: Make sure the coating is thin enough so the thermal compound does not ooze out.

9. Install the heat sink on the processor and then replace the heat sink clip to secure the heat sink.

10. Set all appropriate processor switches on the main logic board.

    Refer to Appendix A, "Technical Specifications," for switch locations.

11. Replace the outside cover, reconnect all external devices, and then restore power.
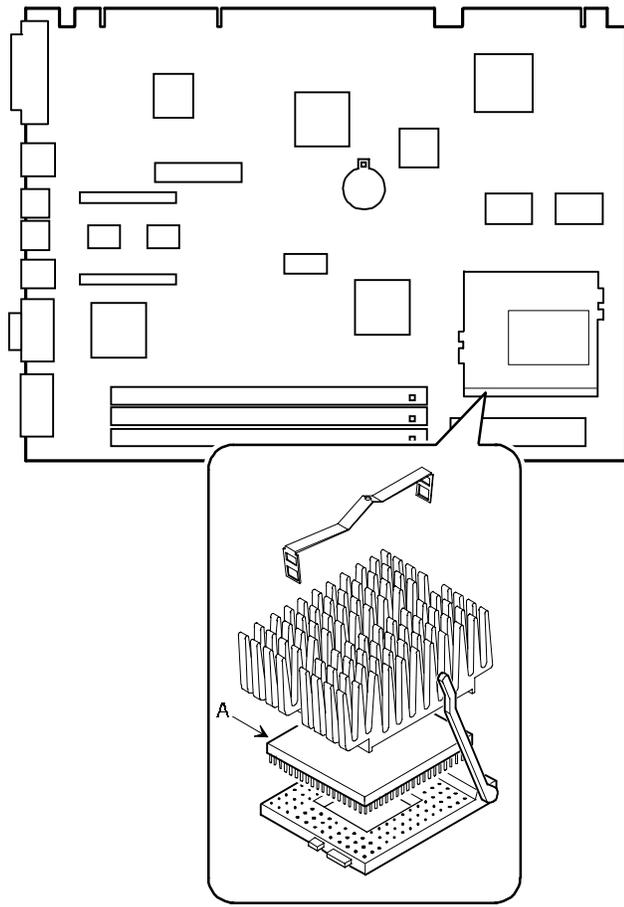
DEC01186-11

Figure 3-11. Installing a New Processor

Installing a Voltage Regulator

If you need to change the voltage regulator, proceed as follows:

1. Turn off your server and monitor.

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

3. Remove the outside cover.

4. Push down on the two plastic clips to release the existing voltage regulator from its socket.

5. Install the new voltage regulator making sure the two plastic clips fully snap into place.

    Make sure the socket on the voltage regulator is aligned with the pins on the main logic board connector.

    Also set voltage selection jumper (if present) to correct setting.

6. Replace the outside cover.

7. Connect all external devices and restore power.
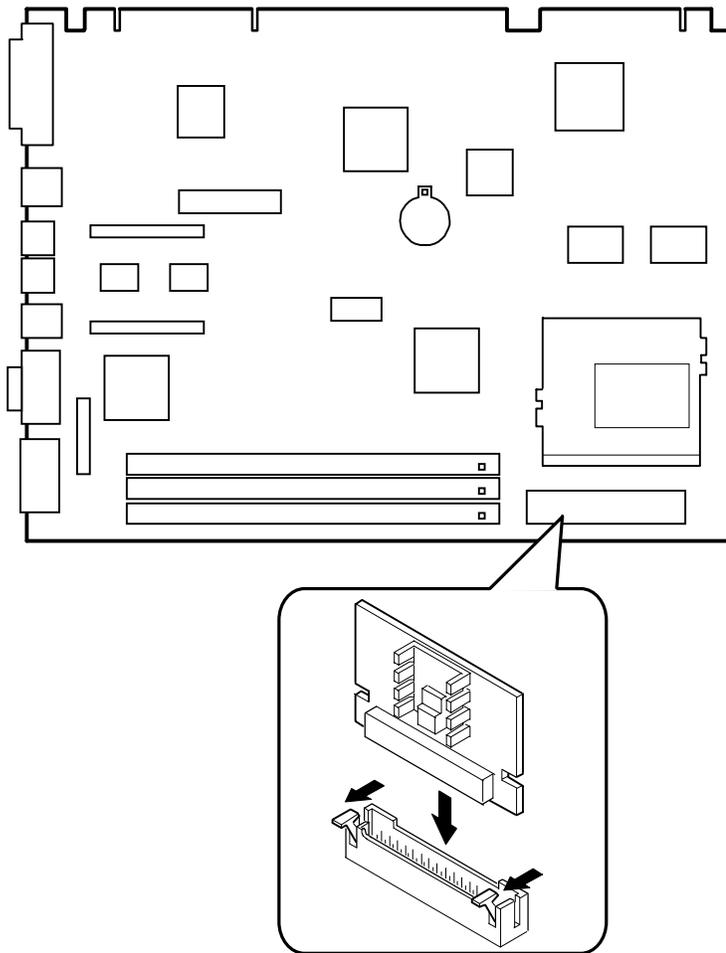
DEC01186-12

Figure 3-12. Installing a Voltage Regulator

Main Logic Board Expansion $\boldsymbol{4}$

Introduction

This chapter provides detailed instructions on installing the following main logic board options:

- Server memory

- Video memory

  Refer to Chapter 3, "Server Components," for information on removing and replacing your server's outside cover.

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.

Main Logic Board Expansion

Server memory is installed using the three DIMM sockets located on the main logic board as shown in Figure 4-1. 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.

4-2
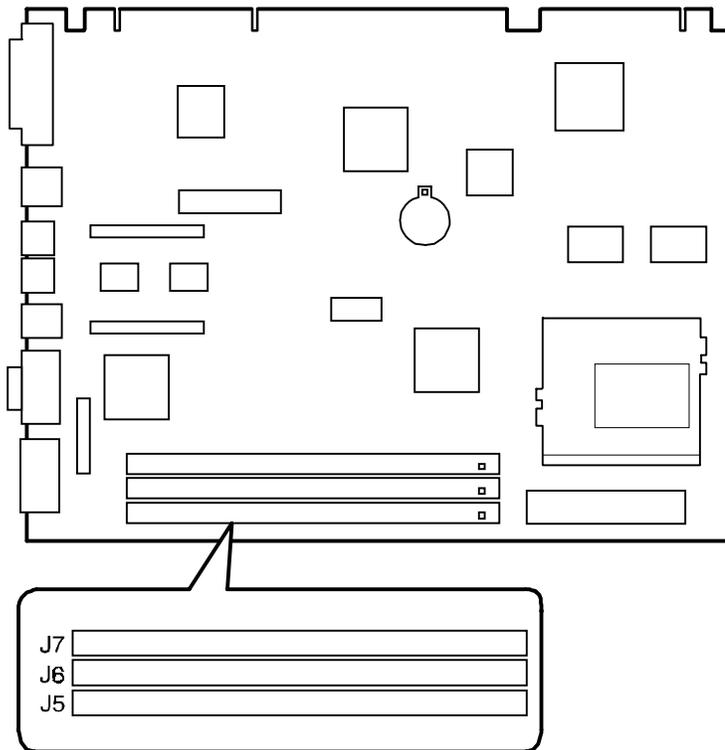
DEC01186-4

Figure 4-1. 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

Installing a DIMM

To install a DIMM, perform the following:

1. Turn off your server and monitor.

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

3. Remove the outside cover.

4. Align the notches on the DIMM with the key notches in the socket.

5. Insert the DIMM straight down into the socket as shown.

   Push down firmly on the DIMM until the two plastic clips snap into place.

6. Replace the outside cover.

7. Connect all external devices and restore power.

DEC01096

Figure 4-2. Installing a DIMM

Installing Video Memory

Your server comes with an S3 ViRGE/GX 2D/3D video controller. In addition, your server also includes 2 MB of SDRAM video memory on the main logic board.

To install an optional video memory daughter card:

1. Turn off your server and monitor.

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

3. Remove the outside cover.

4. Install the optional video memory daughter card.

⚠ **CAUTION:** Make sure the daughter card connectors are correctly aligned with the mating connectors on the main logic board (A, Figure 4-3). Incorrect installation can cause faulty server operation.

5. Replace the outside cover.

6. Connect all external devices and restore power.

Main Logic Board Expansion
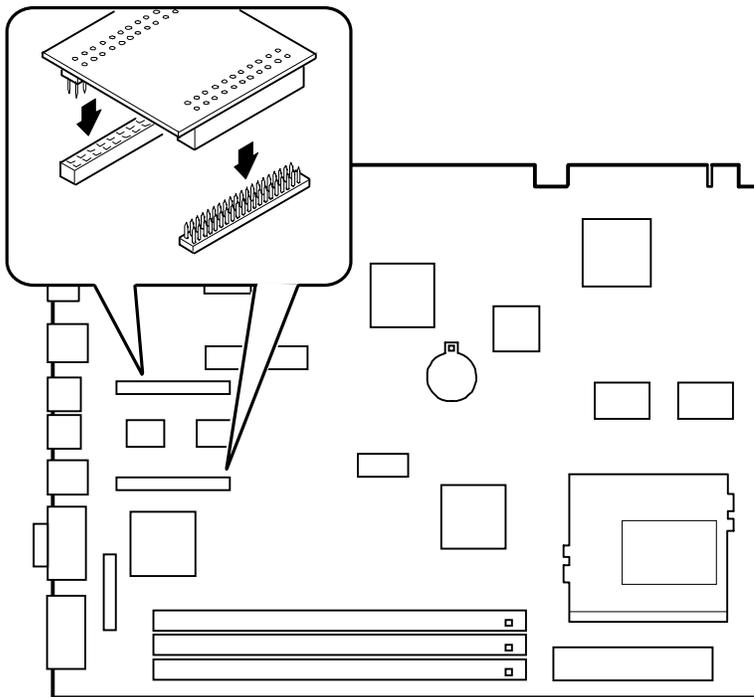
DEC01186-15

Figure 4-3. Video Memory Installation

Adding Expansion Boards 5

Introduction

Your server's expansion slots are located on a backplane. This chapter describes the location of these slots and provides detailed instructions on installing ISA and PCI expansion boards.

> **NOTE:** Use the ISA Configuration Utility (ICU) supplied on the System CD to correctly assign resources used by the expansion boards. See the Software Installation manual for information on creating an ICU diskette from the System CD to use when configuring your PCI and ISA expansion boards.

Expansion Slots

Your backplane contains six connectors for installing up to five expansion boards:

- Three ISA expansion boards and one PCI expansion board, or

- Two ISA expansion boards and two PCI expansions board (refer to the table).

Expansion Slot Designation	Description
ISA3	Supports full-length industry-standard 16-bit ISA expansion boards
	Uses the first (bottom) expansion slot at the rear panel
ISA2	Supports full-length industry-standard 16-bit ISA expansion boards
	Uses the second expansion slot at the rear panel
ISA1	Supports full-length industry-standard 16-bit ISA expansion boards
	Uses the third expansion slot at the rear panel
	Designated as a shared slot with PCI slot PCI2[1]
PCI2	Supports full-length 32-bit PCI local bus expansion boards
	Uses the fourth expansion slot at the rear panel
	Designated as a shared slot with ISA slot ISA1[1]
PCI1	Supports half-length 32-bit PCI local bus expansion boards
	Uses the fifth (top) expansion slot at the rear panel

[1] An expansion board can reside in either slot ISA1 and PCI2, but not in both slots at the same time. Since these slots have to share the third expansion slot opening at the rear panel, a maximum of four expansion boards can be supported at any one time.

ISA3

ISA2

ISA1

PCI2

PCI1
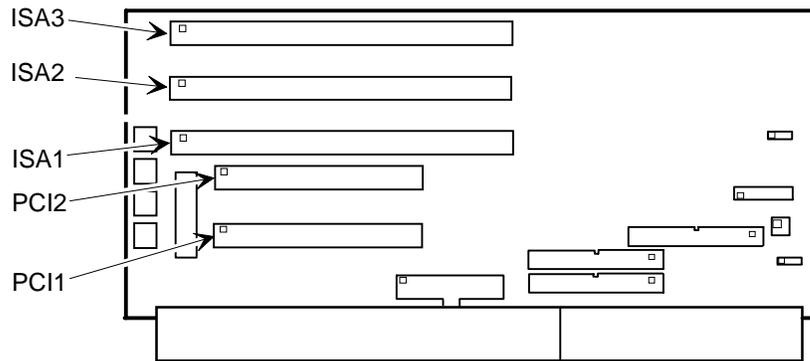
DEC01502-3

Figure 5-1. Expansion Board Slots

Installing Expansion Boards

To install an ISA or PCI local bus expansion board:

> **NOTE:** Read and fully understand your optional expansion board's documentation before installing it.

1. Turn off your server and monitor.

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

3. Remove the outside cover.

4. Rotate the disk drives to make the area more accessible.

5. Unscrew the metal filler plate(s) from the selected expansion slot.
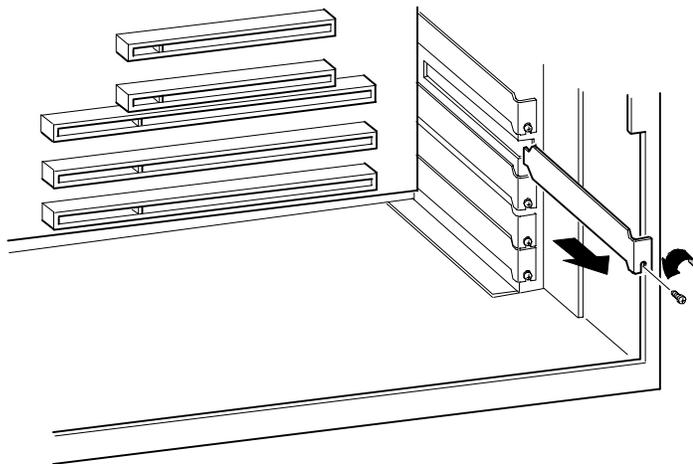
DEC01501-2

Figure 5-2. Removing a Metal Filler Plate

6. Insert the new expansion board into the socket.

    Push the expansion board firmly into place.

7. Secure the expansion board to the slot with the screw removed in step 4.

8. Replace the outside cover.

9. Connect all external devices and restore power.

10. Run the ICU to configure the expansion board.
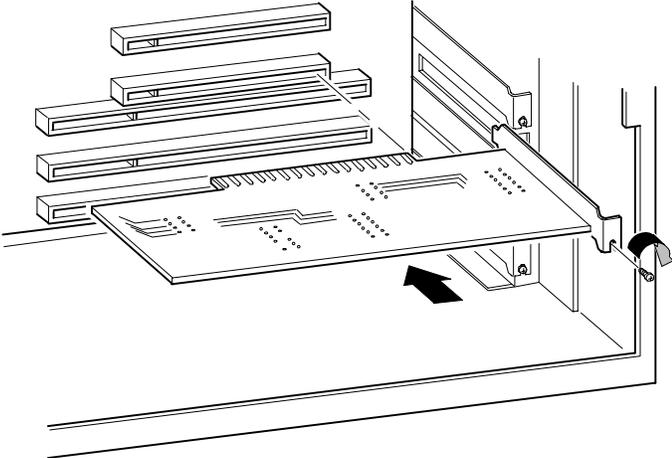
DEC01501-3

Figure 5-3. Installing an Expansion Board

Adding Mass Storage Devices 6

Introduction

This chapter provides detailed information on installing mass storage devices, such as another hard disk drive, a tape drive, or another diskette drive. This chapter also describes how to connect diskette, IDE, and SCSI mass storage devices after installation. Note that these installation instructions are referenced as looking from the front of the server to the rear.

Before Adding Mass Storage Devices

Before adding mass storage devices to your server, review the following installation guidelines:

1. Refer to the manufacturer's instructions for your device to determine if switches or jumper settings need to be set or installed on the device. Set all switches and jumpers accordingly before installing the device.

2. Select an available drive bay and then install the device as instructed in the following sections of this manual.

3. Connect the device to an appropriate interface ribbon cable connector as described in the following sections. Also consider the following cabling guidelines:

   - Your server has two Enhanced IDE (EIDE) drive interface connections labeled "primary" and "secondary" located on the server backplane.

   - Each IDE drive interface connector supports a maximum of two IDE devices.

   - If only one IDE device is connected to the primary or secondary IDE interface, then the IDE device must be attached to the outermost ribbon cable connector.

   - When adding a second IDE hard disk drive to the primary IDE interface, configure the drive for "slave" operation.

−   ATAPI storage devices such as CD-ROM and tape backup drives
    must be connected to the secondary IDE interface. If the ATAPI
    drive is the only device installed on the secondary interface,
    configure the drive for "master" operation. If a hard disk drive is
    also connected to the secondary IDE interface, then configure the
    ATAPI drive for "slave" operation.

> **NOTE:** ATAPI storage devices might require installation of
> special device drivers. Refer to the manufacturer's instructions
> for more information.

−   The 3½-inch diskette drive installed in your server has its device ID
    set to 0.

4. Run the BIOS Setup utility to configure your server so it recognizes the
    newly installed mass storage devices.

    Also, depending on which operating system is installed on your server, you
    might be prompted to perform additional installation procedures for CD-
    ROM or tape backup devices.

5. Refer to your operating system documentation for information on formatting
    hard disk drives and/or creating disk partitions.

Installing Mass Storage Devices

Your server contains six mass storage device bays:

- The top device bay contains a factory installed 3½-inch diskette drive (A, Figure 6-1).

- The second device bay (B, Figure 6-1) contains a factory installed CD-ROM (not available on all models).

- The third and fourth device bays can hold a 3½-inch or 5¼-inch half-height device (C, Figure 6-1). For example, a diskette drive, tape backup drive, or hard disk drive.

- The internal device bay is not accessible from the front of the server and contains a factory installed, low-profile (1-inch high), 3½-inch hard disk drive (D, Figure 6-1). This device bay also has room to install a second low-profile (1-inch high), 3½-inch hard disk drive.

The following procedures and illustrations show a base server configuration. Your specific drive bay configurations and storage devices might vary.
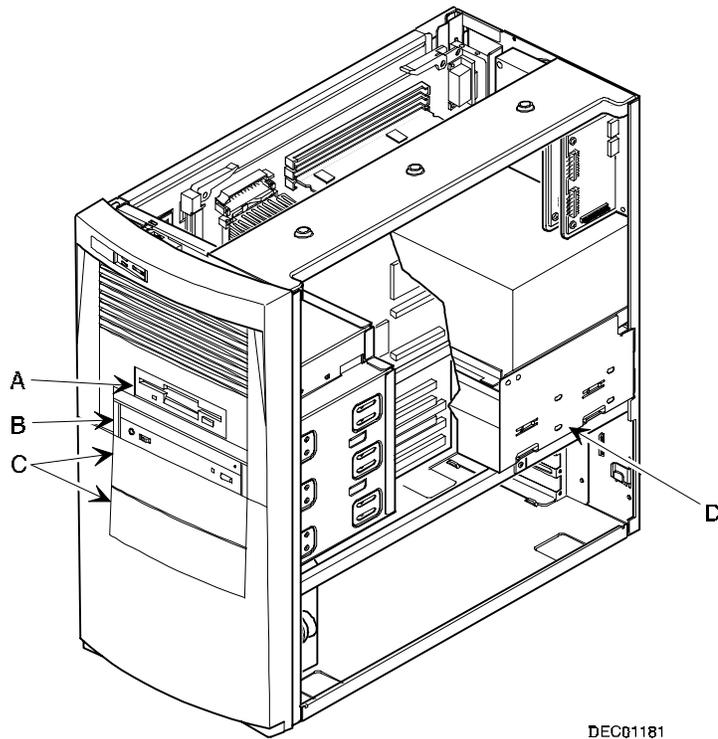
DEC01181

Figure 6-1. Storage Device Bay Locations

Removing the Front Bezel

To install mass storage devices into the front access drive bays you must first remove the front bezel. To remove the bezel:

1. Turn off your server and monitor.

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

3. Remove the outside cover.

4. From the top of the server, looking down towards the bottom-front of the chassis, you should see two tabs from the front bezel. The tabs secure the bezel to the chassis. Find both tabs (one on the left and one on the right).

5. Push both tabs towards the center of your server to release the top of the bezel.

6. Gently pull the top of the bezel approximately an inch away from the top of the chassis.

7. Gently but firmly, pull up on the bezel to detach the bottom bezel mounts.
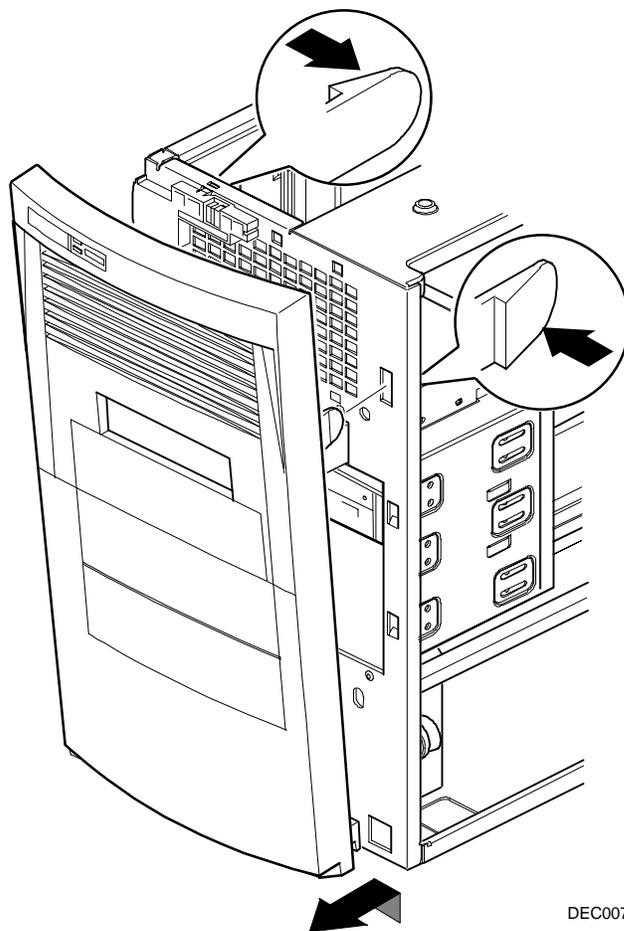
DEC00758-11

Figure 6-2. Removing the Front Bezel

Installing a 3½-Inch Device

The following procedures describe how to install 3½-inch device into a front-access device bay.

> **NOTE:** Refer to the manufacturer's instructions for your device to determine if switches or jumper settings need to be set or installed on the device. Set all switch and jumper settings accordingly.

1. Turn off your server and monitor.

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

3. Remove the outside cover.

4. Remove the front bezel (see Figure 6-2).

5. Remove the EMI shield filler plate and drive rail.

6. Install the brackets and drive rail onto the 3½-inch device.

7. Carefully slide the 3½-inch device into the device bay.

   Secure the device using the supplied mounting screws.

8. Connect the power and data cables to the 3½-inch device.

   Refer to "Connecting Diskette and IDE Devices" later in this chapter.
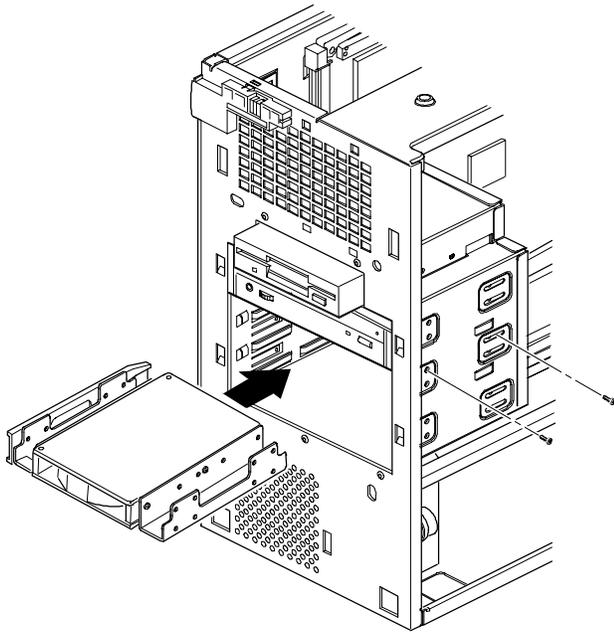
DEC00758-8

Figure 6-3. Installing a 3½-Inch Device

Installing a 5¼-Inch Device

The following procedures describe how to install 5¼-inch device into a front-access device bay.

> **NOTE:** Refer to the manufacturer's instructions for your device to determine if switches or jumper settings need to be set or installed on the device. Set all switch and jumper settings accordingly.

1. Turn off your server and monitor.

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

3. Remove the outside cover.

4. Remove the front bezel (see Figure 6-2).

5. If necessary, remove the filler panel from the front bezel.

6. Remove the EMI shield filler plate (if applicable).

7. Remove the drive rail from the inside of the chassis.

8. Using the supplied drive rail and mounting screws, install the 5¼-inch device into the appropriate device bay.

9. If necessary, replace the filler panel.

10. Connect the power and data cables to the 5¼-inch device.

    Refer to "Connecting Diskette and IDE Devices" later in this chapter.
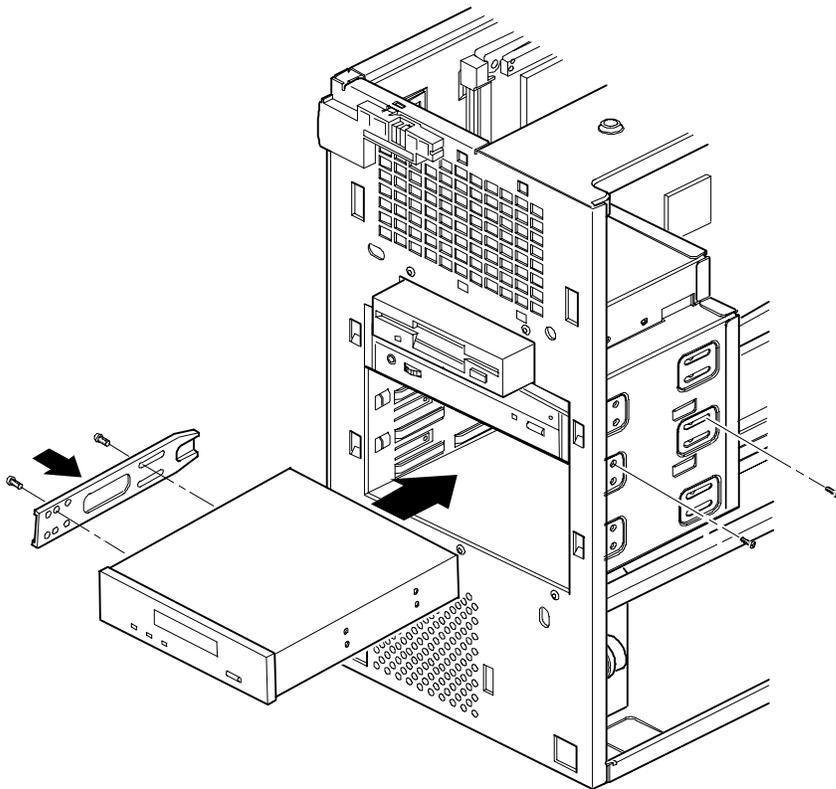
DEC00758-9

Figure 6-4. Installing 5¼-Inch Device

Installing an Internal 3½-Inch Device

The following procedures describe how to install a low profile, 1-inch high, 3½-inch mass storage device into the internal device bay.

> **NOTE:** Refer to the manufacturer's instructions for your mass storage device to determine if switches or jumper settings need to be set or installed on the device. Set all switch or jumper settings accordingly.

1. Turn off your server and monitor.

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

3. Remove the outside cover.

4. Disconnect the data and power cables from the installed hard disk drive.

   Refer to "Connecting Diskette and IDE Devices" later in this chapter.

5. Remove the two screws securing the device bay to the chassis.

6. Swing the device bay away from the chassis to gain access to the upper bay.
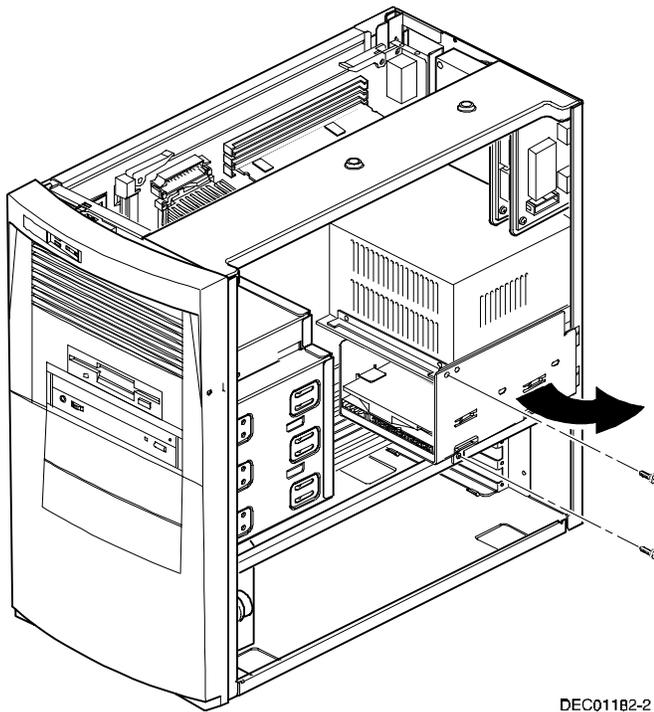
DEC01182-2

Figure 6-5. Accessing the Internal 3½-Inch Device Bay

7. Attach the 3½-inch device to the internal 3½-inch device bay.

    Secure the device using the supplied mounting screws.
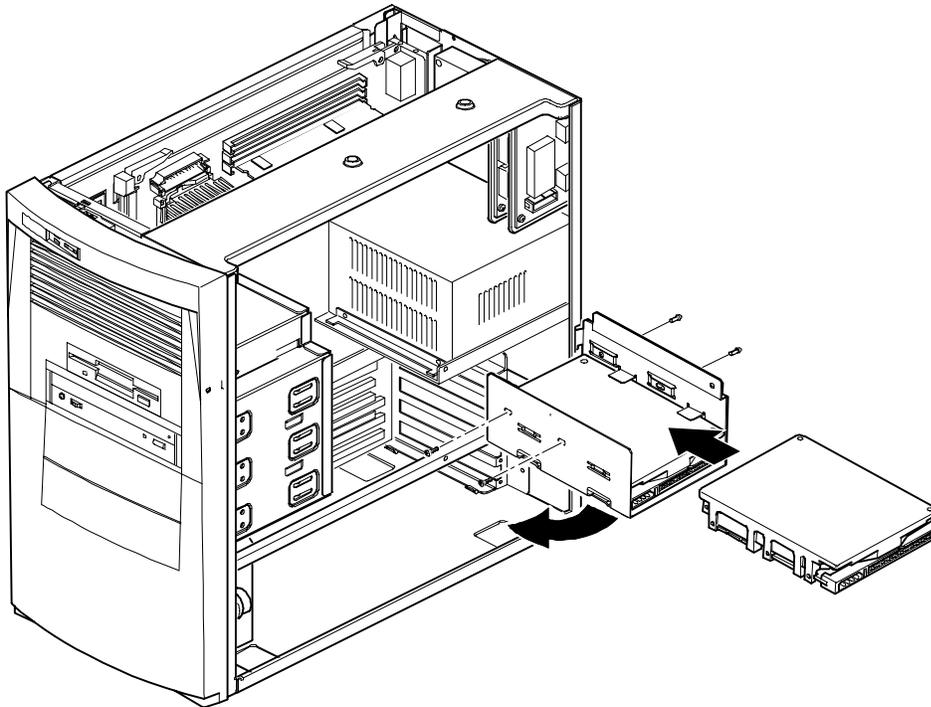
DEC01182-3

Figure 6-6. Attaching a 3½-Inch Device to the Internal 3½-inch Device Bay

8. Secure the internal 3½-inch device bay to the chassis using the screw(s) removed in step 5.

9. Connect the power and data cables.

    Refer to "Connecting Diskette and IDE Devices" later in this chapter.

Connecting Diskette and IDE Devices

To connect a diskette or IDE device, perform the following:

1. Connect the supplied ribbon cable to the device as shown in Figures 6-7 and 6-8.

    NOTE: If only one IDE device is installed, make sure you use the ribbon cable connector furthest from the backplane connector.

    Make sure the cable is connected with the correct orientation. Most cables and connectors are keyed so you cannot connect them backwards. If your cable or device is not keyed, you must connect pin 1 of the cable to pin 1 of the device's connector.

    Pin 1 of the cable is on edge with the colored stripe. Pin 1 of the device's connector should be marked with a number or symbol at one end of the connector or with a number or symbol printed on the circuit board near one end of the connector. If necessary, refer to the device's documentation for pin 1 orientation.

2. Connect a power cable to the device.

3. Replace the outside cover.

4. Connect all external devices and restore power.

5. Run the BIOS Setup utility to configure your server.

    Refer to Chapter 2, "Using the BIOS Setup Utility."

Figure Legend	Diskette Drive Component
A	Power connection
B	Diskette drive
C	Diskette drive connections
D	Backplane diskette drive connection
E	Power supply
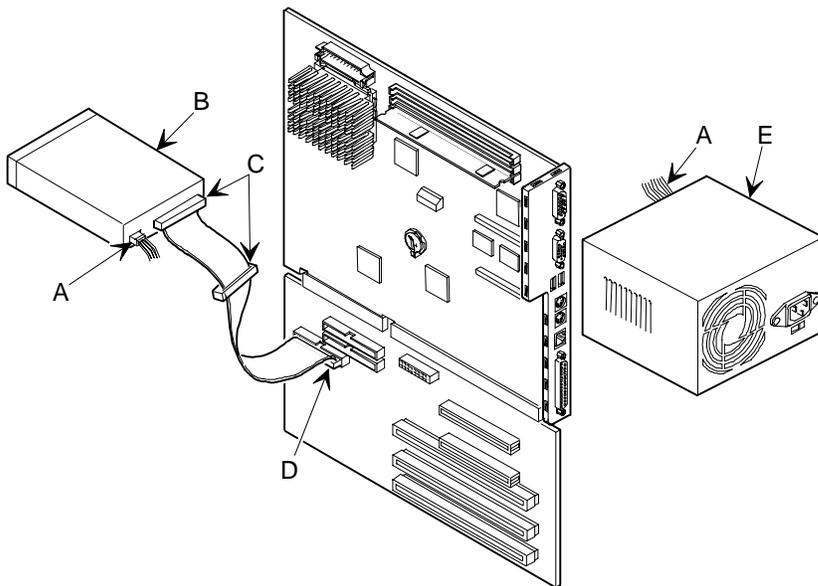
DEC01183-2

Figure 6-7. Diskette Device Data Cable Connections

Figure Legend	IDE Drive Component
A	Backplane IDE drive connection (primary)
B	Power connections
C	Power supply
D	Primary IDE hard disk drive
E	Primary IDE hard disk drive connections
F	Backplane IDE drive connection (secondary)
G	Secondary IDE hard disk drive connections
H[1]	CD-ROM drive

[1] The CD-ROM drive is connected to the secondary IDE port and configured as a master drive.

DEC01184-2
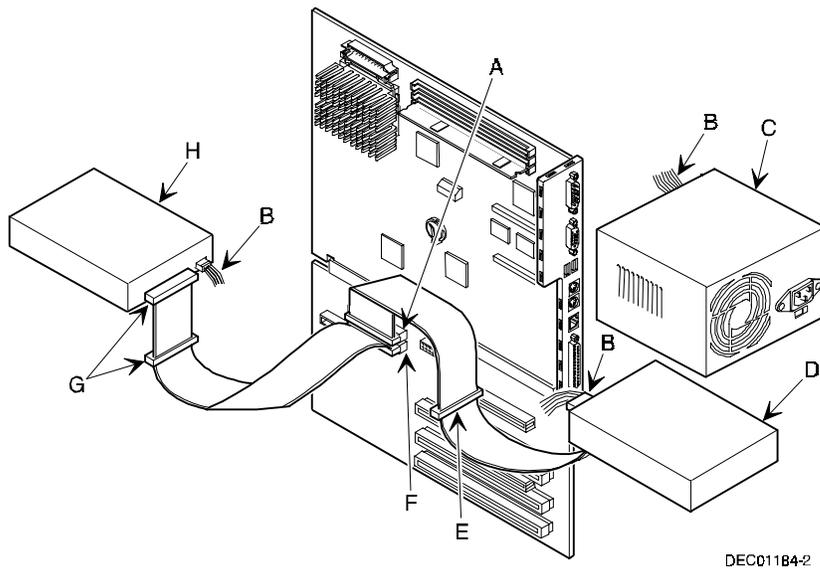
Figure 6-8. IDE Device Data Cable Connections

Adding SCSI Devices

When adding a SCSI device, your server configuration, SCSI adapter, and all SCSI devices must work together for optimum performance. Use the following guidelines to configure your server and all SCSI devices.

- Fast and wide SCSI supports up to 16 devices.

- Each SCSI device attached to the host adapter (including the SCSI adapter) must have a unique SCSI ID. SCSI adapters usually default to SCSI ID 7. Use SCSI ID 0 through 6 (narrow devices) and 0 through 15 (wide and ultra-wide devices) for the remaining SCSI devices. Hard disk drives should be configured to start with SCSI ID 0 and the lower ID numbers.

- Narrow devices on a wide cable count as two SCSI IDs. For example, if the narrow CD-ROM drive is SCSI ID 4, then SCSI ID 12 is no longer available. The narrow CD-ROM device counts as two devices on a 16-bit wide data path.

- SCSI device drivers are required to operate your SCSI devices. These device drivers have been factory installed for you.

- Both ends of the SCSI bus must be properly terminated. Your SCSI adapter comes with its SCSI terminators enabled. This properly terminates the SCSI adapter (the first device in the SCSI bus). The supplied SCSI ribbon cable is equipped with an active SCSI terminator installed at the end of the cable (the last device in the SCSI bus).

- If your server boots from a disk drive other than SCSI, make sure all SCSI device drivers are installed on that disk drive. SCSI devices can be used with an IDE drive only if the IDE drive is configured as drive C.

- Make sure the proper BIOS Setup utility options are set for SCSI operation.

- Run the SCSI configuration utility to change host adapter settings to fit your specific configuration.

Refer to the documentation supplied with your SCSI device for more information.

To connect SCSI devices, perform the following:

1. Connect the supplied ribbon cable to the appropriate device(s).

    Make sure the cable is connected with the correct orientation. Most cables and connectors are keyed so you cannot connect them backwards. If your cable or device is not keyed, you must connect pin 1 of the cable to pin 1 of the device's connector.

    Pin 1 of the cable is on edge with the colored stripe. Pin 1 of the device's connector should be marked with an arrow at one end of the connector. If necessary, refer to the device's documentation for pin 1 orientation.

2. Connect a power cable to the device.

3. Replace the outside cover.

4. Connect all external devices and restore power.

5. If you want to fine tune some SCSI settings, you can use the SCSI configuration utility to configure your server by pressing [Ctrl] + [A] when the BIOS banner appears during the boot process.

    Refer to the documentation supplied with your SCSI device for more information.

Figure Legend	Component
A	SCSI hard disk drives
B	Power connection
C	Single-ended active terminator
D	SCSI drive connectors
E	SCSI adapter connector (50-pin narrow)
F	External SCSI connector (68-pin wide)
G	Power supply
H	SCSI adapter connector (68-pin wide)
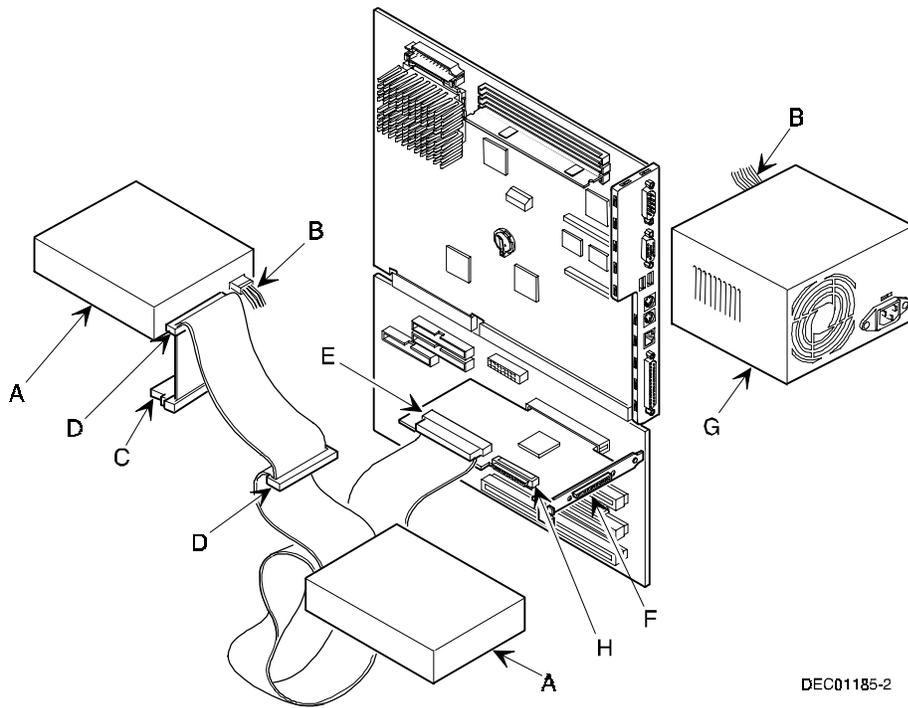
Figure 6-9. SCSI Device Data Cable Connections

Adding Mass Storage Devices

Troubleshooting 7

Introduction

This chapter provides initial troubleshooting procedures. The tables that follow list specific problems, probable causes, and recommended actions to take if your server fails. Tables include:

- Server Troubleshooting

- Tape Drive Troubleshooting

- Disk Drive Troubleshooting

- Monitor Troubleshooting

- Audio Troubleshooting

- CD-ROM Troubleshooting

- Network Troubleshooting

- Diskette Drive Troubleshooting

- Flash BIOS Troubleshooting

   Refer to Appendix A, "Technical Specifications," for a list of messages that might display.

   Refer to the documentation supplied with additional options if you are experiencing problems with specific options that you have installed.

Troubleshooting Tips

Follow these general procedures to troubleshoot your DIGITAL Server.

- Keep it simple, only troubleshoot one problem at a time. Also, only make one change at a time. For example, if your IDE or SCSI hard disk drive fails to boot, do not try all the suggested actions at once. Instead, start with one suggestion such as checking the cables. After securing the cables, try booting your server. If it does not work, try another suggestion.

- Look for abnormal server, keyboard, and monitor LED indications. For example, make sure the power on LED lights when you turn on your server and the drive access indicators light when using either the diskette drive or hard disk drive.

- If there are Power On Self Test (POST) error(s), run the BIOS Setup utility and fix the problem(s) identified by the POST error(s).

- If you installed external devices, make sure all cables are correctly and securely connected to the appropriate devices.

- If you installed devices inside the server, make sure nothing was bumped or jarred loose, and that all cable connections are securely in place.

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

- Make sure all device drivers are installed correctly.

- If your computer hangs, soft boot your computer (press the [Ctrl] + [Alt] + [Del] keys). If your computer fails to boot, turn it off, wait at least 15 seconds (or until the disk drives completely spin down) and then turn it back on.

- Pay close attention to any error message that appears on your screen.

  If the error message is server related, refer to Appendix A, "Technical Specifications," for recommended actions.

- Listen carefully for server errors in the form of beeps. Record the number of beeps and their pattern then check the "Beep Code" descriptions in Appendix A for recommended actions.

- README files might be factory installed, on the CD-ROM disc, or as printed material. This README information can help you setup, configure, and operate your server.

- Run the diagnostics software described later in this chapter.

- If your server will not boot into Windows, use the Emergency Repair Disk you created following the instructions in the *Software Installation* manual to gain access to your server's hard disk drive. Afterwards, troubleshoot your server using the information in this *System Reference* manual and correct any problems.

  NOTE: If DIGITAL support tells you to return a failed component, pack it in its original container and then return it to DIGITAL or your DIGITAL Authorized Distributor as instructed.

  If you are a self-maintenance customer, call your authorized DIGITAL service representative for assistance and recommendations.

Server Troubleshooting

Problem	Possible Cause	Action
No response when the server is turned on.	Server is not plugged in.	Turn off the server, plug it in, and then turn it back on again.
	No power at the wall outlet.	Use another wall outlet.
	Main logic board 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.
	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 *Quick Setup* guide for more information.
Power is on, screen is on, but the server does not respond.	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

Problem	Possible Cause	Action
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.	Contact your Service provider.
	Monitor has failed.	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.
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

Problem	Possible Cause	Action
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

Problem	Possible Cause	Action
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.	Copy the NTLDR file to your hard disk drive's root directory.
		If using the supplied Windows NT Server CD-ROM disk, make the CD-ROM your current drive and then type:
		copy\i386\ntldr c:\
		at the command line prompt.
		If using the supplied Windows NT Server Setup disks, insert Setup Disk #2 into the diskette drive and then type:
		expand ntldr.$ C:\ntldr
		at the command line prompt.

continued

Problem	Possible Cause	Action
"Error 0000001E" (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 *Microsoft Windows NT Server Hardware Compatibility List*.
		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

Problem	Possible Cause	Action
"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 *Services* or *Devices* icons in the *Control Panel* menu to check for status. Also, check the system log in the *Event Viewer* 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

Problem	Possible Cause	Action
	Hard disk boot sector is missing.	Repartition and reformat your hard disk drive.
		Caution: This procedure erases what is currently on your hard disk drive.
		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.
		If you do repartition and reformat your hard disk drive, proceed as follows for DOS-based operating systems such as Windows NT Server.
		Boot from a DOS diskette then enter the following commands:

		`c:`
		`cd\dos`
		`fdisk`

		Follow the instructions on your monitor screen to create a new hard disk boot sector.
	There might be a boot sector virus.	Run anti-virus software.

continued

7-10

Problem	Possible Cause	Action
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

Problem	Possible Cause	Action
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.	Check power and SCSI cables.
	Loose cable connectors.	Secure all cable connections.

continued

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

continued

7-13

Problem	Possible Cause	Action
	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 does not boot from an internal SCSI hard disk drive.	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. **Note:** 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

Problem	Possible Cause	Action
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

Problem	Possible Cause	Action
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 *Warranty and Information* booklet.
	Keyboard controller has failed.	Contact your Service provider.

continued

Problem	Possible Cause	Action
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 *Warranty and Information* 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

Problem	Possible Cause	Action
	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 *Warranty and Information* booklet.
	Mouse controller has failed.	Contact your Service provider.
Mouse sticks.	Mouse trackball dirty.	Clean trackball.
Server operates correctly but application software does not.	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

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

Disk Drive Troubleshooting

Problem	Possible Cause	Action
IDE/SCSI hard disk drive cannot read or write information.	Incorrect disk drive jumper settings.	Refer to the supplied kit installation instructions.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
	IDE/SCSI hard disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
	IDE drive type incorrect.	Run the 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

Problem	Possible Cause	Action
Target diskette drive cannot read or write information.	Diskette is not formatted.	Format the diskette.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write-protected.	Slide the write-protect switch so the hole is not visible (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

Problem	Possible Cause	Action
	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

Problem	Possible Cause	Action
Monitor power indicator is not on.	Monitor is turned off.	Turn on the monitor.
	Power cord is not connected.	Connect the power cord to the 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.
	Power indicator is defective.	Contact your Service provider.
No screen display.	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

Problem	Possible Cause	Action
	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.

Problem	Possible Cause	Action
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

Problem	Possible Cause	Action
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."

Troubleshooting

Problem	Possible Cause	Action
	Bad audio chip or sound card.	Call your Service provider or sound card provider.
	Main logic board has failed.	Contact your Service provider.
External speakers do not work.	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 *Warranty and Information* booklet.
Microphone does not work.	Microphone not connected or improperly connected.	Properly connect the microphone.

continued

Problem	Possible Cause	Action
	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 *Warranty and Information* 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 *Warranty and Information* booklet.

CD-ROM Troubleshooting

Problem	Possible Cause	Action
Cannot access the CD-ROM drive. Error message reading drive x.	Device drivers not installed.	Install correct device drivers.
	No 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.
	Cables have failed.	Contact your Service provider.
Power is on but CD-ROM drive indicator shows no activity.	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

Problem	Possible Cause	Action
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

Problem	Possible Cause	Action
Target diskette drive cannot read or write information.	Diskette is not formatted.	Format the diskette.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write-protected.	Slide the write-protect switch so the hole is not visible.
	Diskette drive is empty.	Insert a diskette.
	Diskette write protection enabled.	Run the 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

Problem	Possible Cause	Action
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

Problem	Possible Cause	Action
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 Recovery and SW1-5 "BIOS write" is set to Enable. 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 Enabled. Refer to Appendix D for more information.

When to Use the 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.

Technical Specifications A

Introduction

This appendix provides information about the following technical characteristics of your server:

- Server specifications
- PCI and ISA expansion slots
- Power supply and input power
- Nominal current requirements
- Power supply and power cord requirements
- Main logic board jumpers and switches
- If you forget your password

Server Specifications.

The following sections list your server's performance, dimensions, and environmental specifications

Features

Feature	Specification
Chipset	Intel 430TX PCIset (Triton TX)
External L2 cache	512 KB on-board
Video memory	2 MB SDRAM
Video Controller	S3 ViRGE/GX 2D/3D
Network	Single-chip Digital 21143 PCI Ethernet LAN controller
	Supports 10Base-T (Twisted-Pair) and 100Base-TX (Fast Ethernet) connections
Audio	Crystal CS4236B single-chip controller with 16-bit stereo audio, dual DMA support, and full duplex operation (not available on all models)

Performance Specifications

Attributes	Specification
ISA clock	7.5/8.33 MHz
PCI clock	30 MHz/33 MHz
Data I/O ISA PCI	 8-bit and 16-bit 32-bit
Main logic board memory	168-pin, DIMM, 64-bit SDRAM (66 MHz or greater) 32 MB minimum (expandable up to 256 MB using 128 MB DIMMs)
Server BIOS	2 megabit Flash ROM
Video BIOS	32 Kb included in the Flash ROM
IDE interface	Ultra DMA 33 capabilities

Server Dimensions

Dimension	Specification
Width	215.9 mm (8.5 in.)
Depth	444.5 mm (17.5 in.)
Height	406.4 mm (16.0 in.)
Weight	15.2 kg (33.6 lb)

Shipping/Packaging Dimensions

Dimension	Specification
Width	535.94mm (21.1 in.)
Depth	628.65 mm (24.75 in.)
Height	419.1 mm (16.5 in.)
Weight	18.14 Kg (40 lbs.)

Environmental Specifications

Attributes	Specification
Operating temperature	10 °C to 40 °C (50 °F to 104 °F)
Storage temperature	−40 °C to 66 °C (−40 °F to 150.8 °F)
Operating humidity (noncondensing)	10% to 90% relative humidity, maximum wet bulb 40 °C (104 °F)
Storage humidity (noncondensing)	10% to 95% relative humidity, maximum wet bulb 65 °C (149 °F)
Altitude Operating Nonoperating	3,660 m (12,000 ft) maximum 12,200 m (40,000 ft) maximum
Nonoperating shock	30 G, 11 ms halfsine

Environmental Monitoring

The DIGITAL Server 500 series contains internal circuitry that monitors the various internal environmental operating conditions of the system.

Operating Temperature

Internal chassis temperature is constantly monitored to ensure that the processor is within specified operational tolerances. A variable speed fan controls cooling ventilation to the processor as needed. The system speaker sounds an alarm tone when the processor temperature exceeds defined limits. Fan operation is shut down during low power, system suspend modes, reducing acoustic noise emissions.

Processor Voltage

Operating voltage of the processor and system circuitry is very important to system reliability. If voltages within the server vary from pre-defined ranges, the system speaker sounds an alarm.

ISA Expansion Slots

The maximum available +5 V dc current allowable to any ISA expansion slot depends upon the following parameters:

- Power supply capacity

- The +5 V dc requirements of the main logic board

- The +5 V dc requirements of the peripherals

- The power demands of all other slots in use

PCI Local Bus Expansion Slots

Your server's backplane contains two or three PCI local bus expansion slots. These slots support:

- Universal 3.3 V dc and 5 V dc PCI expansion boards

- Standard power PCI expansion slots (up to 25 watts)

- Bus mastering

Input Power Requirements

Rated Voltage Range	Maximum Range	Rated Input Current @ 200 W	Operating Frequency Range
100 V ac - 120 V ac	88 V ac - 135 V ac	2.5 A	47 Hz - 63 Hz
220 V ac - 240 V ac	176 V ac - 265 V ac	1.3 A	47 Hz - 63 Hz

Power Supply Requirements

Your server's power supply provides six dc voltages: +12 V dc, −12 V dc, +5 V dc, -5 V dc, 5 VSB, and +3.3 V dc. These voltages are used by the various components within the server.

Current Requirements

Your server's power supply provides a maximum current requirement of 200 W.

- +3.3 V   0 A min, 14.0 A max.

- +5 V   2.0 A min, 22.0 A max.

- +12 V   0 A min, 6.0 A max.

- -5 V   0 A min, 0.5 A max.

- −12 V   0 A min, 0.5 A max.

- 5 VSB   0 A min, 0.5 A max.

Power Cord Requirements

⚠ **WARNING:** Do not attempt to modify or use an external 100 V ac (Japan only) or 115 V ac power cord for 220-240 V ac input power. Modifying either power cord can cause personal injury and severe equipment damage.

The power cord used with this server must meet the following criteria:

- UL and CSA Certified cordage rated for use at 250 V ac with a current rating that is at least 125% of the current rating of the product. In Europe, the cordage must have the <HAR> mark.

- The ac plug is terminated in a grounding-type male plug designed for use in the region. It must also have marks showing certification by an agency acceptable in the region.

- The connector at the server end is an IEC type CEE-22 female connector.

- The maximum length is 4.5 meters (14.5 feet).

Environmental Features

This product has been designed with several features intended to reduce environmental impact in manufacturing, use, and end-of-life disposition.

Ozone Depleting Substances (ODS)	This product and its shipping package do not contain nor are they manufactured with Class I ODS, as defined in Title VI, section 611 of the clean air act amendments of 1990.
Use of asbestos	Digital Equipment Corporation does not use asbestos in any form in the manufacturing of its products.
Recycled paper in documentation	User documentation is printed on paper with a post-consumer recycled content of between 10 and 60%.
Use of PVC in enclosure pieces	Polyvinylchloride (PVC) is not used in plastic enclosure pieces.
Design for disassembly/re-cycling	This product has been designed for ease of disassembly so that materials can be easily separated for recycling at the end of the product's useful life. One type of fastener is generally used to minimize tools required to disassemble. Plastic components have been marked with standard identification symbols to facilitate separation for recycling. Snap fit fastening techniques have been used, where possible, to reduce disassembly effort. Fastening of dissimilar materials can be disconnected, allowing materials to be separated for recycling.
Environmental packaging features	The outer container on this product is made from unbleached, natural Kraft corrugated fiberboard which can be readily recycled in most areas. Protective cushioning pieces are made from expandable polypropylene which is more efficient than other foams and requires less material to provide equivalent protection, thereby reducing packaging waste. The cushioning pieces are marked with the Society of the Plastics Industry (SPI) material identification symbol for polypropylene to facilitate recycling.

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[1] 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[1]	SW1-2, ON SW1-2, OFF[1]	If you forget your password, via BIOS Setup, set this switch to ON and then restart the server.

[1] Factory default setting

continued

A-9

Feature	Function	Setting	Description
Recovery mode	Recovery Normal[1]	SW1-3, ON SW1-3, OFF[1]	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[1]	SW1-4, ON SW1-4, OFF[1]	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[1]	SW1-5, ON SW1-5, OFF[1]	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[1]	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[1] SW1-8, ON[1]	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.

[1] 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
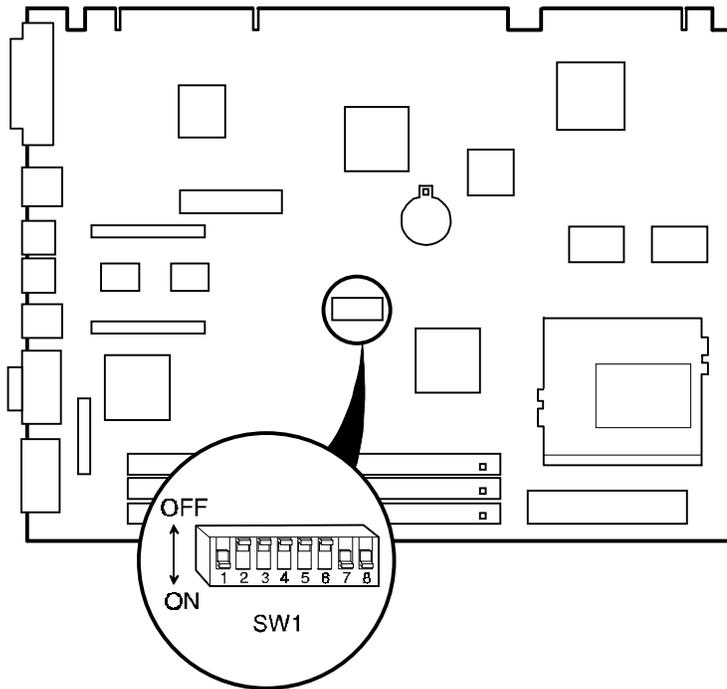
DEC01186-13

Figure A-1. Main Logic Board Switch Locations

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 *nnnn* is the amount of server cache (in kilobytes) that tested successfully.
Diskette drive A error Diskette drive B error	Run the BIOS Setup utility. Check all connections. If the problem persists, contact your Service provider.
Entering SETUP	BIOS Setup utility runs.
Extended RAM Failed at offset: *nnnn*	Extended memory failed or configured incorrectly. Make sure SIMMs are installed correctly (Refer to your *System Reference* 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 *nnnn* is the amount of extended memory (in kilobytes) that tested successfully.
Failing Bits: *nnnn*	*nnnn* 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 Fixed Disk 1 Failure	Run the BIOS Setup utility. Check all connections. If the problem persists, contact your Service provider. Fixed disk controller failure
Incorrect Drive A type - run SETUP Incorrect Drive B type - run SETUP	Diskette drive A and/or B not correctly identified in the BIOS Setup utility. Run the BIOS Setup utility and properly identify diskette drive A and/or B.

continued

Message	Description/Solution
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	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.
Keyboard error	
Keyboard locked - Unlock key switch	
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: *nnnn*	Shadow RAM failed.
	Run the BIOS Setup utility and disable failed shadow memory region.
Nnnn Shadow RAM passed	Where *nnnn* 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: *nnnn*	System RAM failed. Run the BIOS Setup utility and restore all settings to original values. If the problem persists, contact your Service provider.
nnnn System RAM passed	Where *nnnn* 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: nnnn	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.

Message	Description
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.

Beep Code	Error
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

Technical Specifications

Device Mapping B

Introduction

This appendix 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.

Refer to Chapter 2, "Using the BIOS Setup Utility," for additional information.

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

Range (hexadecimal)	Function
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

Interrupt Number	Interrupt Source
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

Video Output Information *C*
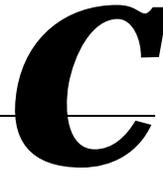
Introduction

Your server can be used with a variety of industry-standard VGA analog monitors. These servers also support several PCI local bus video adapters as well as many industry-standard ISA video adapters.

CAUTION: Your monitor's capabilities must match the capabilities of the onboard video controller or an optional video adapter if you select a video resolution higher than 640 x 480. Failure to match video capabilities can damage your monitor.

Also, do not connect a low-resolution monitor to a server that has been configured with high-resolution video drivers. High-resolution drivers can damage a low-resolution monitor.

NOTE: Refer to your monitor's documentation and the following table to determine the maximum video resolution of your monitor and onboard video controller. If you are using an optional video adapter, refer to the documentation supplied with that adapter to determine the maximum video resolution.

Video Output Information

Video Resolution Modes

16-bit Mode [1]	8-bit Mode	Screen Resolution	Bits/ Pixel	Refresh Rate (Hz)	Horizontal Frequency (Khz)	Dot Clock (MHz)	Memory Required (MB)
N/A	00	Text - 40x25	B/W	70			1
N/A	01	Text - 40x25	4	70			1
N/A	02	Text - 80x25	B/W	70			1
N/A	03	Text - 80x25	4	70			1
N/A	04	320x200	4	70			1
N/A	05	320x200	4	70			1
N/A	06	640x200	2	70			1
N/A	07	Text - 80x25	B/W	70			1
N/A	0D	320x200	4	70			1
N/A	0E	640x200	4	70			1
N/A	0F	640x350	B/W	70			1
N/A	10	640x350	4	70			1
N/A	11	640x480	2	60			1
N/A	12	640x480	4	60	31.469	25.175	1
N/A	13	320x200	8	70			1
100	68	640x400	8	70			1
101	69	640x480	8	60	31.469	25.175	1
101	69	640x480	8	72	37.861	31.5	1
101	69	640x480	8	75	37.5	31.5	1
101	69	640x480	8	85	43.269	36	1
102	6A	800x600	4	56	35.156	36	1
102	6A	800x600	4	60	37.879	40	1
102	6A	800x600	4	72	48.077	50	1
102	6A	800x600	4	75	46.875	49.5	1

[1] Modes 00 - 13 are Standard VGA modes; Modes 118 - 11A are ViRGE/GX modes only, Modes 207 - 218 are User-defined modes

continued

16-bit Mode [1]	8-bit Mode	Screen Resolution	Bits/ Pixel	Refresh Rate (Hz)	Horizontal Frequency (Khz)	Dot Clock (MHz)	Memory Required (MB)
102	6A	800x600	4	85	53.674	56.25	1
103	6B	800x600	8	56	35.156	36	1
103	6B	800x600	8	60	37.879	40	1
103	6B	800x600	8	72	48.077	50	1
103	6B	800x600	8	75	46.875	49.5	1
103	6B	800x600	8	85	53.674	56.25	1
104	6C	1024x768	4	43	35.522	44.9	1
104	6C	1024x768	4	60	48.363	65	1
104	6C	1024x768	4	70	56.476	75	1
104	6C	1024x768	4	75	60.023	78.75	1
104	6C	1024x768	4	85	68.677	94.5	1
105	6D	1024x768	8	43	35.522	44.9	1
105	6D	1024x768	8	60	48.363	65	1
105	6D	1024x768	8	70	56.476	75	1
105	6D	1024x768	8	75	60.023	78.75	1
105	6D	1024x768	8	85	68.677	94.5	1
106	6E	1280x1024	4	43	46.433	78.75	1
106	6E	1280x1024	4	60	63.981	108	1
106	6E	1280x1024	4	75	79.976	135	1
106	6E	1280x1024	4	85	91.146	157.5	1
107	6F	1280x1024	8	43	46.433	78.75	2
107	6F	1280x1024	8	60	63.981	108	2
107	6F	1280x1024	8	75	79.976	135	2
107	6F	1280x1024	8	85	91.146	157.5	2

[1] Modes 00 - 13 are Standard VGA modes; Modes 118 - 11A are ViRGE/GX modes only, Modes 207 - 218 are User-defined modes

Video Output Information

16-bit Mode [1]	8-bit Mode	Screen Resolution	Bits/ Pixel	Refresh Rate (Hz)	Horizontal Frequency (Khz)	Dot Clock (MHz)	Memory Required (MB)
109	55	132x25 Chars	4	70			1
10A	54	132x43 Chars	4	70			1
10D	65	320x200	15	70			1
10E	66	320x200	16	70			1
10F	67	320x200	32	70			1
110	70	640x480	15	60	31.469	25.175	1
110	70	640x480	15	72	37.861	31.5	1
110	70	640x480	15	75	37.5	31.5	1
110	70	640x480	15	85	43.269	36	1
111	71	640x480	16	60	31.469	25.175	1
111	71	640x480	16	72	37.861	31.5	1
111	71	640x480	16	75	37.5	31.5	1
111	71	640x480	16	85	43.269	36	1
112	72	640x480	32	60	31.469	25.175	2
112	72	640x480	32	72	37.861	31.5	2
112	72	640x480	32	75	37.5	31.5	2
112	72	640x480	32	85	43.269	36	2
113	73	800x600	15	56	35.156	36	1
113	73	800x600	15	60	37.879	40	1
113	73	800x600	15	72	48.077	50	1
113	73	800x600	15	75	46.875	49.5	1
113	73	800x600	15	85	53.674	56.25	1
114	74	800x600	16	56	35.156	36	1
114	74	800x600	16	60	37.879	40	1
114	74	800x600	16	72	48.077	50	1

[1] Modes 00 - 13 are Standard VGA modes; Modes 118 - 11A are ViRGE/GX modes only, Modes 207 - 218 are User-defined modes

16-bit Mode [1]	8-bit Mode	Screen Resolution	Bits/ Pixel	Refresh Rate (Hz)	Horizontal Frequency (Khz)	Dot Clock (MHz)	Memory Required (MB)
114	74	800x600	16	75	46.875	49.5	1
114	74	800x600	16	85	53.674	56.25	1
115	75	800x600	32	56	35.156	36	2
115	75	800x600	32	60	37.879	40	2
115	75	800x600	32	72	48.077	50	2
115	75	800x600	32	75	46.876	49.5	2
115	75	800x600	32	85	53.674	56.25	2
116	76	1024x768	15	43	35.522	44.9	2
116	76	1024x768	15	60	48.363	65	2
116	76	1024x768	15	70	56.476	75	2
116	76	1024x768	15	75	60.023	78.75	2
116	76	1024x768	15	85	68.677	94.5	2
117	77	1024x768	16	43	35.522	44.9	2
117	77	1024x768	16	60	48.363	65	2
117	77	1024x768	16	70	56.476	75	2
117	77	1024x768	16	75	60.023	78.75	2
117	77	1024x768	16	85	68.677	94.5	2
118	78	1024x768	32	43	35.522	44.9	4
118	78	1024x768	32	60	48.363	65	4
118	78	1024x768	32	70	56.476	75	4
118	78	1024x768	32	75	60.023	78.75	4
118	78	1024x768	32	85	68.677	94.5	4
119	79	1280x1024	15	43	46.433	78.75	4
119	79	1280x1024	15	60	63.981	108	4
119	79	1280x1024	15	75	79.976	135	4

[1] Modes 00 - 13 are Standard VGA modes; Modes 118 - 11A are ViRGE/GX modes only, Modes 207 - 218 are User-defined modes

Video Output Information

16-bit Mode [1]	8-bit Mode	Screen Resolution	Bits/ Pixel	Refresh Rate (Hz)	Horizontal Frequency (Khz)	Dot Clock (MHz)	Memory Required (MB)
119	79	1280x1024	15	85	91.146	157.5	4
11A	7A	1280x1024	16	43	46.433	78.75	4
11A	7A	1280x1024	16	60	63.981	108	4
11A	7A	1280x1024	16	75	79.976	135	4
11A	7A	1280x1024	16	85	91.146	157.5	4
120	7C	1600x1200	8	48	62.5	135	2
120	7C	1600x1200	8	60	75	162	2
207	4E	1152x864	8	60			1
212	51	640x480	24	60			1
215	56	512x384	8	70			1
216	57	512x384	15	70			1
217	58	512x384	16	70			1
218	59	512x384	32	70			1

[1] Modes 00 - 13 are Standard VGA modes; Modes 118 - 11A are ViRGE/GX modes only,
Modes 207 - 218 are User-defined modes

BIOS Setup Utility Settings *D*

Introduction

The following Help topics list the BIOS options that can be updated or modified by using the BIOS Setup utility, according to the various sub-menus under which they appear.

- *Main Menu Options* — Sets basic server configuration options (time, date, video, etc.).

- *Advanced Options* — Sets advanced features to increase server performance (COM ports, LPT ports, etc.).

- *Security Options* — Sets passwords and user privileges.

- *Power Options* — Sets power saving options to increase the life of the server.

- *Boot Options* — Sets the boot sequence of the server.

- *Exit* — Provides options for saving changes and leaving the BIOS Setup utility. Refer to "Navigating," in the BIOS Setup utility, for additional information.

> **NOTE:** The following tables list the BIOS Setup Menu options available for the DIGITAL Server 500 series. Note that an " * " that follows an option in the Settings column indicates the factory default setting.

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	Sets the size and density of diskette drives.
	Not Installed* 360 KB, 5¼ 1.2 MB, 5¼ 720 KB, 3½	
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.
IDE Adapter 0/1 Master/Slave		
Autotype fixed disk	[Press Enter]	Press [Enter] to detect and fill in the installed hard disk drive parameters in the remaining fields.
Type[1]	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.[2] If a CD-ROM drive is used for the IDE drive, you must select CD. You can select Auto for an HDD.

[1] These fields are automatically filled in if the server auto-detected an installed hard disk drive.
[2] Incorrect settings can cause the server to malfunction.

continued

Menu Fields	Settings	Comments
Cylinders[1]	0 to 4095	Displays the number of cylinders.
Heads[1]	1 to 64	Displays the number of heads.
Sectors/track[1]	0 to 63	Displays the number of sectors/track.
Write precomp[1]	0 to 4095 None	Displays the number of cylinders that have their write timing changed.
Multi-sector transfers[1]	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.

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

continued

Menu Fields	Settings	Comments
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[1]	Standard Fast PIO1 Fast PIO2 Fast PIO3 Fast PI04 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.

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

Menu Fields	Settings	Comments
Video system	EGA / VGA* CGA 80x25 Monochrome	Sets the video controller type.
Memory and Cache:		
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.

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.
		
		CAUTION: Some option ROMs do not operate properly when shadowed.

AT bus space	Disabled*	Memory hole not available; upper memory is contiguous.
	F00000h, 1 MB	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.

Menu Fields	Settings	Comments
Boot Options		
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

Menu Fields	Settings	Comments
Keyboard Features		
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
Integrated Peripherals		
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. **NOTE:** Two devices cannot share the same IRQ. Also, choosing Disabled makes the parallel port unusable. Auto is the recommended setting.
Parallel port mode		Sets the onboard parallel port mode.
	Compatible mode	Standard printer connection.
	Bi-directional mode*	PS/2 compatible mode and able to receive data.
	EPP 1.7 EPP 1.9	Enhanced parallel port mode. Selection based on what EPP version the printer supports. 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.
	ECP-DMA1 mode ECP-DMA3 mode	Extended capabilities port mode.

continued

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 AUTO is selected the IRQ list (shown below) is hidden, and Plug & Play determines the IRQ settings. When MANUAL 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*	

BIOS Setup Utility Settings

Menu Fields	Settings	Comments
Plug & Play O/S	Yes No*	Select Yes if using a Plug & Play operating system such as Windows 95. Otherwise, select No.
Reset configuration data	Yes No*	Select Yes 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 No.
		If you do not need to clear system configuration data, leave the setting at No.
Large disk access mode	DOS* Other	Select DOS if you have MS-DOS installed.
		Select Other 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.
		NOTE: Entering Setup with a supervisor password provides full access to all BIOS Setup utility menus.

continued

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

continued

Menu Fields	Settings	Comments
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

Menu Fields	Settings	Comments
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.

Caring For Your Server   *E*

Introduction

This appendix describes how to:

- Clean the outside of the server

- Clean the monitor screen

- Clean the mouse

- Pack and move the server

CAUTION: Make sure you turn off the server and disconnect any external devices before doing any cleaning. When using a moistened cloth for cleaning, do not allow any excess fluid to leak into the server, keyboard, or monitor. Wait until the server is completely dry before applying power.

Cleaning the Server

Clean the outside of the server periodically with a soft cloth. Use a cloth lightly moistened with a mild detergent solution. Do not use solvents or abrasive cleaners.

Cleaning the Screen

If the monitor screen gets dirty, clean it with a sponge or chamois cloth lightly dampened with a glass cleaning solution. Do not use solvents or abrasive cleaners.

Cleaning the Mouse

If your mouse cursor moves erratically across the screen, the ball on the bottom of the mouse is probably dirty.

Perform the following steps to clean a mouse ball:

1. Turn the mouse over and release the ball cover.

2. Place the mouse cover and ball on a clean surface.

3. Lightly dampen a cotton swab with a mild detergent, and clean the ball and the inside of the mouse.

4. Replace the ball and mouse ball cover.

Moving the Server

Perform the following steps before shipping or moving the server:

1. Back up all files stored on all hard disk drives.

2. Turn off the server (the monitor automatically shuts off).

3. Disconnect the power cord from the wall outlet, then from the back of the server.

4. Disconnect the monitor cable from the back of the server.

5. Disconnect the keyboard cable from the back of the server.

6. Disconnect the mouse cable from the back of the server.

7. Disconnect any other external peripheral devices, such as printers and modems.

8. Insert a drive protection card in the 3½-inch diskette drive. If you do not have a drive protection card, use a blank diskette.

9. Package the server as described in the following section, "Packing the Server."

Packing the Server

If you are moving the server a short distance (from one room to another in the same building), you do not have to pack the server. If you are shipping the server or moving it by vehicle, pack the server to avoid damage.

Pack the server in the original packing material and containers. If you did not save the boxes and packing material, use a sturdy carton and cushion the server well to avoid damage.

Installing the Server at a New Location

After moving the server to a new location, follow the instructions in the *Installation Guide* to unpack and install it.

Glossary *G*

address

A specific location or range of locations in your computer's memory or in a port (such as a parallel or serial port). Memory addresses specify the location of information, while I/O addresses specify the location of a port used by a particular component of your computer.

application

A program or set of programs that operate in conjunction with an operating system, also called "application software." Categories of application software include word processors, databases, spreadsheets, and telecommunications software. Specific examples of application software include WordPerfect, Lotus 1-2-3, and Procomm Plus.

base memory

Memory accessible to MS-DOS, up to a maximum of 640 KB; also called "conventional memory." See also expanded memory (EMS) and extended memory (XMS).

Basic Input/Output System (BIOS)

Abbreviated as BIOS and pronounced "by-oss." The BIOS enables your computer to control major input/output devices such as the keyboard and disk drives.

batch file

A defined series of commands saved in a file, which can then be executed as a unit in order to save time and/or keystrokes. MS-DOS batch files have the extension .BAT. Batch files created for other operating systems, such as Windows 95 or Windows NT Workstation, might have other extensions.

baud

A unit of speed in data transmission, as one bit per second for binary signals. See also bits-per-second (bps).

bit

The smallest unit of electronically stored information, represented by the binary digits 0 or 1. See also byte.

bits per second

Abbreviated as bps. The number of binary digits transmitted by an electronic device (such as a modem) in one second. Also see baud and bit.

board

A device containing electronic circuitry and microprocessors. Usually used in connection with a modifying word, as follows:

- main logic board - The primary electronic component of your computer

- expansion board - A board which enhances your computer's abilities in some way

- video board - A board which enables your computer to display information on a monitor

booting

The process of self-testing and computer configuration that completes each time your computer is turned on (a "hard boot") or restarted (a "soft boot" or "reboot") by pressing the reset button or the [Ctrl]-[Alt]-[Del] key combination. This might include a memory test, loading of device drivers via CONFIG.SYS, and execution of the AUTOEXEC.BAT file.

byte

The amount of storage space used to represent one character (such as a letter or number). One byte contains eight bits. The following table describes other commonly-used units of electronic storage space. These units are typically used to describe amounts of available memory.

Kilobit (Kb)	1,024 bits
Kilobyte (KB)	1,024 bytes
Megabit (Mb)	1,048,576 bits
Megabyte (MB)	1,048,576 bytes
Gigabyte (GB)	1,073,741,824 bytes

cache memory

A block of reserved memory that improves computer performance by minimizing the number of processor memory accesses. The computer achieves this by storing recently used data or instructions in reserved memory, where it can be retrieved more quickly.

CD-ROM

Compact Disk-Read Only Memory. The CD-ROM drive and CD-ROM disk comprise an integral part of a multimedia computer system. The disk stores a very large amount of audio, video, graphic and/or encyclopedic information that is read by the drive for use in a computer application. Because the disk is read only, you cannot write to the disk from your computer's hard drive, floppy drive, or from your computer's memory.

A type of memory that uses very little power. CMOS memory is often used to store information such as the time and date for your computer's internal clock.

cursor

A line, block, or other indicator on your monitor screen. The cursor identifies the point at which typed characters or other information will appear on the screen. Note that while a mouse or other pointing device can often be used to move the cursor, the mouse-pointer and a normal cursor might appear in different places on your screen.

DDC

Display Data Channel - a feature that queries the monitor to identify itself to the computer which then chooses the optimal refresh rate for the monitor.

device driver

A file that gives your computer specific information on operating a particular physical device (such as a CD-ROM drive or a mouse) or application software (such as a memory manager). Device drivers are usually loaded into memory each time your computer boots if they are listed in your CONFIG.SYS file.

DIMM

A Dual In-line Memory Module. DIMMs are small memory cards (sometimes called "sticks") that can be used to increase the amount of Synchronous Dynamic Random Access Memory (SDRAM) in your computer.

Direct Memory Access (DMA)

DMA displays or delivers information from your computer's memory without making use of the processor. Devices with DMA capability (for example, many sound cards) must be properly configured in order for your computer to recognize and make use of this ability.

DPMS

1. Display Power Management Signaling. Technology that enables video controller circuitry to control the operating condition of a monitor, thereby decreasing the monitor's energy consumption.

2. DOS Protected Mode Services. A way for a software application to access extended memory, often by use of a specialized device driver. Examples of software that uses DPMS include certain versions of Stacker and PKZip.

Enhanced Parallel Port (EPP)

An option available in your computer's BIOS which affects the way a printer attached to your parallel port communicates with your computer. If your printer supports this standard, enabling the EPP option will allow faster printing. This specification also provides a parallel port with the expansion bus ability to support up to 64 external devices, such as: disk drives, tape drives, CD-ROM drives, and other mass-storage devices.

expanded memory (EMS)

Memory beyond 640 KB that can only be accessed by use of expanded memory manager software. Expanded memory can be provided by installing an expanded memory expansion board, or by using software that enables extended memory to simulate expanded memory. Some application software requires expanded memory in order to operate correctly.

Extended Capabilities Port (ECP)

An option available in your computer's BIOS which affects the way a printer attached to your parallel port communicates with your computer. If your printer supports this standard, enabling the ECP option will allow faster printing.

extended memory (XMS)

Memory beyond 1 MB that can only be accessed by use of extended memory manager software (such as HIMEM.SYS, included with MS-DOS and Windows). Some application software, including Windows and Windows-based software, requires extended memory in order to operate correctly. Extended memory can be added to your computer, within specified limits, by installing SIMMs.

fast ethernet

Fast Ethernet is a new technology that can be integrated into current 10Base-T Local Area Networks (LANs) and allow them to scale easily to 100 Mb/s. Fast Ethernet provides higher bandwidth without a major change in infrastructure.

firmware

Information that is permanently stored in your computer's ROM and cannot be changed. This might consist of application software and/or configuration information about certain aspects of the computer. Your computer's BIOS (see Basic Input/Output System) is an example of firmware.

graphical user interface

Abbreviated as GUI. The visual "desktop" image generated by software such as Windows, that allows you to operate your computer by using a mouse or other pointing device to manipulate icons that might represent application software, files containing data, and/or operating system commands. An alternative to a command line.

hardware

Computers, printers, modems and other physical devices for managing electronically stored information.

icon

A symbol or picture on your monitor screen that represents a file, a software application, an operating system command, or some other form of stored information. Groups of icons might sometimes be referred to as button bars or toolbars.

interrupt

An event, condition, or instruction which causes your computer to temporarily stop performing a task, but does so in a way that permits the task to be resumed and completed later. For example, not using your keyboard or mouse for several minutes might cause a screen saver program to interrupt another software application. Interrupts also occur within your computer's memory that cannot be easily detected by users.

IRQ

A hardware setting which instructs your computer how to allocate memory resources between various components of the system. For example, serial ports COM1 and COM3 are often assigned to the same IRQ setting. If IRQ settings are not properly allocated to the various components of your computer (such as expansion boards), your computer might not be able to operate all of the affected components.

An IRQ setting on a given component establishes an interrupt condition for that component.

jumper

Jumper pins allow you to set specific computer parameters. They are set by changing the pin location of jumper blocks. A jumper block is a small, plastic-encased conductor (shorting plug) that slips over the pins. To change a jumper setting (make sure that your computer is turned OFF), remove the jumper from its current location with your fingers. Position the jumper over the two pins designated for the desired setting. Press the jumper evenly onto the pins; being careful not to bend the pins.

Kbyte

A Kilobyte (Kbyte, KB) is a unit, usually of computer storage space, equal to 1,024 bytes. Also see byte and bit.

LPB

Live Play Back. This is a feature of some multimedia video playback, video adapters that allows fast-frame digital video. Also see JPEG and MPEG.

mapping

The process of identifying specific addresses and locations within your computer's memory, and describing what kinds of information might be found at those locations. Sometimes referred to as device mapping or memory mapping.

media

Physical objects or devices used for storing information. These might include floppy disks, hard disk drives, CD-ROM disks, and PCMCIA cards.

memory

The electronic space in which information can be stored and/or processed. Types of memory include Random Access Memory (RAM), Read-Only Memory (ROM), expanded memory (EMS) and extended memory (XMS).

memory-resident

A condition in which software remains loaded in your computer's memory but does not operate until and unless it is activated by the user or by another software application. For example, a virus-detection program might be memory-resident.

microprocessor

A computer chip that processes electronic information and instructions, such as Intel's Pentium or Pentium Pro computer chips. Note, however, that not all microprocessors are central processing units.

modem

A device for transmitting electronic information from one computer to another at high speeds over telephone lines.

multimedia

A form of electronic information that combines pictures, sounds, and text in an integrated manner. CD-ROM hardware and software is usually required to make use of information stored in the form of multimedia.

onboard video

Video controller circuitry that is incorporated into a computer's main logic board, so that you do not need a separate video adapter to display information on a monitor.

operating system

The software that tells your computer how to manage and process electronically stored information, enables it to run application software, and controls the flow of information between various parts of your computer system. Windows 95 and Windows NT Workstation, OS/2, and UNIX are operating systems.

PCI

Peripheral Component Interconnect - provides fast, 32-bit, I/O data transfer.

Pel - Picture Element, also known as Pixel

The smallest graphic unit that can be displayed on the screen of your monitor. This unit is usually a single-colored dot; the size of the dot is determined by the dot pitch of your monitor (typically .25 mm to .42 mm).

port

The physical connection between your computer and a peripheral device, such as a printer, mouse, or SCSI device.

Parallel ports, also called LPT ports, are typically used to connect your computer to a printer. Serial ports, also called COM ports, can be used to connect your computer to a variety of devices, including a mouse, a modem, and some printers. Other types of ports can include keyboard ports, mouse ports, and SCSI ports. See EPP.

Power-On Self Test (POST)

A series of diagnostic tests performed by your computer every time it is turned on (but not necessarily every time it is booted).

quiet boot

Inhibits the display of POST messages. Quiet boot, when enabled, displays the Digital logo, instead of POST messages.

Random Access Memory (RAM)

Abbreviated as RAM; also called read/write memory. The memory your computer uses to manage information and software while that information and software is in use. Information stored only in RAM is lost when your computer is turned off.

Read-Only Memory (ROM)

Abbreviated as ROM. Information or software stored in ROM is permanent, cannot be altered, and remains intact when your computer is turned off. Note that you cannot move or copy information into ROM from other areas of your computer's memory. In some cases, however, you can copy information from ROM into other areas of your computer's memory.

ROM BIOS

See Basic Input/Output System and Read-Only Memory. ROM BIOS software enables your computer to control major input/output devices such as the keyboard and disk drives.

SCSI device

Hardware that communicates with your computer via a specific data-transmission technology (Small Computer System Interface). Devices that use the SCSI interface include CD-ROM drives and some hard disk drives.

Synchronous Dynamic Random Access Memory (SDRAM)

DRAM that uses a clock to synchronize memory commands with the installed processor. Its the fastest memory technology available today.

Synchronous Graphical Random Access Memory (SGRAM)

Graphic-specific RAM that synchronizes with the memory clock. Also adds features that improve graphics performance.

software

A program or set of programs that operate in conjunction with an operating system, also called "application software." Categories of application software include word processors, databases, spreadsheets, and telecommunications software. Specific examples of application software include Word for Windows, MS Excel, and Procomm Plus.

system utilities

Software designed to increase your computer's efficiency, determine whether it is operating properly, and/or correct problems that might arise as you use your computer. Some system utility software might be provided with your computer (such as a Setup program). Other utility software is available from various commercial and non-commercial sources. Examples of utility software include Stacker, PKZip, and Norton Utilities.

upper memory

The area of memory between base memory (640 KB) and 1 MB. When properly configured, Windows 95 or Windows NT Workstation can load device drivers, and memory-resident software into upper memory. While the upper memory area can be configured as expanded memory, expanded memory is not limited to the upper memory area.

Universal Serial Bus (USB)

The USB is a new industry standard bi-directional bus designed to work with the PC architecture for connecting slow and medium speed (12 Mb/s) external peripherals to computer systems in a dynamically attachable, consistent, structured and low-cost manner. USB has capabilities similar to today's PC external peripheral connections (serial ports, parallel ports, keyboard and mouse ports), but extends them in several significant ways.

video adapter

Also called a video controller or video board. A board that enables your computer to display information on a monitor screen.

video controller

The electronic circuitry which enables your computer to display information on a monitor screen. This might be provided on a video adapter or on the main logic board. In the latter case, it is referred to as onboard video.

Windows

Software that provides a graphical user interface for use in operating your computer.

ZIF socket

Zero Insertion Force socket - These sockets are provided for easy upgrade of processors. They require no tools for removing and replacing the processor chip.

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