

DIGITAL Server 3220/3220R Series System Reference

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DIGITAL Server 3220/3220R Series System Reference

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DIGITAL Server 3220R (Rackmount Model)

FCC Notice — U.S.A.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at his own expense.



CAUTION: Any changes or modifications to this device, which are not identified in this manual, could cause harmful interference and void the user's authority to operate this device.

CSA — Canada

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

VCCI — Japan

This equipment is in the Class I category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radio and TV receivers, etc.

Read the instructions for correct handling.

DIGITAL Server 3220 (Pedestal Model)

FCC Notice — U.S.A.

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.

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

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

CSA — Canada

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

VCCI — Japan

This equipment is a Class II product based on the standard of the Voluntary Control Council for Interference Technology Equipment (VCCI). If it is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

DIGITAL Server 3220/3220R

Ergonomics — Germany

This equipment meets or exceeds the ergonomic requirements of ZH1/618, TÜV, Rheinland, Germany.

Safety Requirements

This equipment meets or exceeds safety requirements in the U.S. (UL 1950), Canada (CSA C22.2 No. 950), and Europe (IEC 950 and TÜV EN60950/A3: 1995). The product is certified to bear the GS-Mark (Geprüfte Sicherheit) and CB certification.

Laser Safety Notice

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

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

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Preface *P*

Introduction

This *System Reference* describes how to operate, upgrade, configure, and troubleshoot your DIGITAL Server 3220/3220R. This *System Reference* will also help to familiarize you with all aspects of the server and provide a reference tool for questions you might have in the future.

If you are initially setting up your server, refer to the DIGITAL Server 3220/3220R Series *Installation Guide*.

The *Installation Guide* identifies all the components that were shipped from the factory as well as how to connect the mouse, keyboard, monitor, and ac power.

The *Installation Guide* shows how to turn your server on for the first time and access the ServerWORKS Quick Launch program. You must run the ServerWORKS Quick Launch program to initially configure your server, create utility and device driver diskettes, and install an operating system.

Audience

This *System Reference* is written specifically for anyone responsible for operating, configuring, and expanding the DIGITAL Server 3220/3220R.

Support Information

A variety of support information is available to help you set up, configure, and operate your DIGITAL Server. This information comes in the form of README information, on-line help, electronic books, or as printed material.

If you want to...	Refer to the...
Set up your server	<i>Installation Guide</i> to unpack, install internal components, connect external devices and power, and access the ServerWORKS Quick Launch program.
Load the supplied ServerWORKS Quick Launch software	<i>ServerWORKS Quick Launch Getting Started</i> guide. README information contained on the ServerWORKS Quick Launch CD-ROM discs.
Locate the major internal components of your server	<i>Quick Reference</i> label on the side panel of the DIGITAL Server 3220 or the top cover of the DIGITAL Server 3220R.
Check the fault status of the server	Fault status LED codes label located on your server's front panel.
Upgrade and configure your server after installing optional components (for example, a processor module, memory, mass storage devices, SCSI or RAID adapters, etc.)	Information supplied in this <i>System Reference</i> . Supplied SCSI, RAID, and other options documentation. These are supplied as either printed manuals or as electronic books on the Quick Launch CD-ROM discs.
Run diagnostics	<i>ServerWORKS Quick Launch Getting Started</i> guide and the Quick Launch program on the supplied CD-ROM discs. Supplied diagnostics documentation which is on the Quick Launch CD-ROM discs.

Organization

This *System Reference* contains the following:

- Chapter 1: *Introduction* — Provides information about your server, such as features, server software and documentation, diagnostic software, server utilities, and technical support.
- Chapter 2: *Server Software and Utilities* — Describes the server software and utilities that are supplied with your server.
- Chapter 3: *Server Components* — Provides information about the server's components and associated procedures such as removing the top cover (DIGITAL Server 3220R only) and side panel (DIGITAL Server 3220 only).
- Chapter 4: *Server Management* — Describes how to manage your server using a network manager, specifically DIGITAL ServerWORKS Manager.
- Chapter 5: *Processor Upgrades* — Describes how to upgrade your server with higher-performance processor modules.
- Chapter 6: *Installing Additional Memory* — Describes how to install additional memory on a processor module.
- Chapter 7: *SCSI Device Configuration*—Describes how to configure SCSI devices for your server.
- Chapter 8: *Installing Storage Devices (DIGITAL Server 3220)* — Describes how to install optional hot swap drives, tape drives, and external SCSI or RAID devices.
- Chapter 9: *Installing Storage Devices (DIGITAL Server 3220R)* — Describes how to install optional hot swap drives, tape drives, and external SCSI or RAID devices.
- Chapter 10: *Installing Expansion Boards* — Describes how to install ISA and PCI expansion boards.

- Chapter 11: *Connecting SCSI and RAID Devices* — Describes how to connect SCSI devices to the onboard SCSI controllers and to supported RAID adapters.
- Chapter 12: *Server Security Features* — Describes the various security features that are available to prevent server or data theft.
- Chapter 13: *Troubleshooting* — Describes initial and advanced troubleshooting solutions.
- Appendix A: *Technical Specifications* — Lists server operating specifications. Also included is switch information on the main logic board and processor module. It also provides a list and description of error messages that might display and error codes that might sound if a failure occurs.
- Appendix B: *Device Mapping* — Provides a series of tables listing mapping and address information related to server memory and various main logic board devices (keyboard controller, interrupt controller, Direct Memory Access (DMA) controller, etc.).
- Appendix C: *BIOS Setup Utility Features* — Lists the available BIOS Setup utility resource and configuration options.
- Appendix D: *Caring For Your Server* — Provides suggestions for cleaning and moving your server.

Conventions

Convention Example	Description
<i>Installation Guide</i>	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
ACPI	Advanced configuration and power management interface
APIC	Advanced programmable interrupt controller
ATAPI	AT attachment packet interface
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 out
EPP	Enhanced parallel port
FDD	Floppy disk drive
FRU	Field replaceable unit
GB	Gigabyte
GUI	Graphical user interface
h	An h suffix to a numerical value denotes hexadecimal numbers. For example, 0F8h equals 0F8 hexadecimal.
HDD	Hard disk drive
I ² C	Inter-integrated circuit
I ₂ O	Intellegent I/O
IDE	Intelligent drive electronics
I/O	Input/output
IOAPIC	Input/output advanced programmable interrupt controller
IOP	Input/output processor

continued

Abbreviation	Meaning
IRQ	Interrupt requests
ISA	Industry standard architecture
KBC	Keyboard controller
LCD	Liquid crystal display
LPT	Line printer (parallel port)
LVD	Low voltage differential
MB	Megabyte
MMX	Multimedia enhancement technology
MS-DOS	Microsoft disk operating system
NIC	Network interface card
NOS	Network operating system
NVRAM	Non-volatile random access memory
OCP	Operator control panel
PCI	Peripheral component interconnect
POST	Power-on self test
RAID	Redundant array of independent disks
RAM	Random access memory
ROM	Read only memory
RSM	Remote server manager
RTC	Real-time clock
SBB	Storage building block
SCA	Single connector attachment
SCSI	Small computer system interface

continued

Preface

Abbreviation	Meaning
SCU	System configuration utility
SDRAM	Synchronous dynamic random access memory
SEC	Single edge contact
SNMP	Simple network management protocol
SMI	System management interrupt
SVGA	Super-video graphics array
USB	Universal serial bus
VGA	Video graphics array
V-NET	Video-network
Windows NT	Microsoft Windows NT operating system software
XD-bus	Utility bus for flashing BIOS and RTC
ZIF	Zero insertion force

Special Notices

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



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

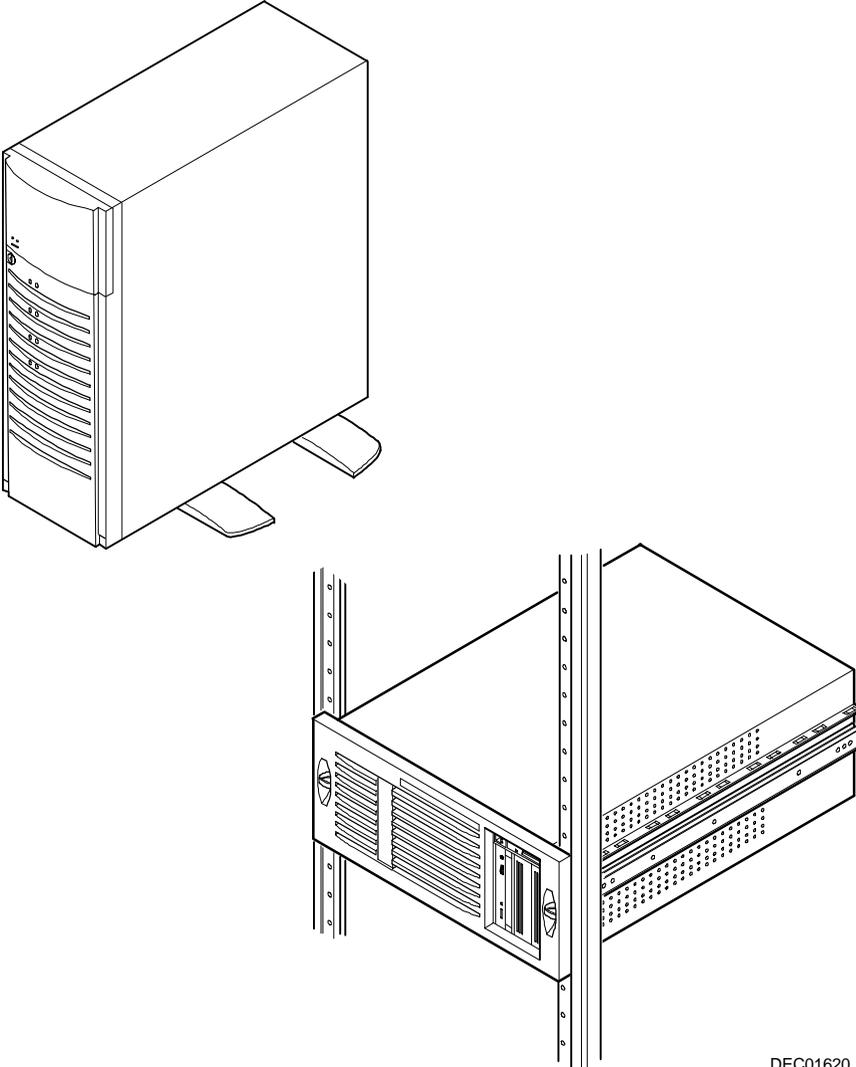


CAUTION: Indicates the presence of a hazard that might cause damage to hardware or that might corrupt software.



NOTES: Used to provide additional information.

Preface



DEC01620

Typical DIGITAL Server 3220 (Top) and 3220R (Bottom)

Introduction

1

The DIGITAL Server 3220 and 3220R are high-performance, highly-scalable departmental servers featuring the latest in modular processor and storage technology. The DIGITAL Server 3220 is a free-standing pedestal server, while the DIGITAL Server 3220R is a rack-mountable server. The DIGITAL Server 3220 includes a monitor, a 104-key keyboard, and a three-button mouse. The DIGITAL Server 3220R can be mounted into any Electronic Industries Association (EIA) standard 19-inch rack. The rack, monitor, keyboard, and mouse must be purchased separately. Both servers support the following features:

Reliability/Availability

<i>Processor Module</i>	Support for one or two processors with 512 KB L2 cache and the Intel BX chipset with 100 MHz bus speed.
<i>Dual-Channel SCSI Controller</i>	Onboard dual-channel SCSI controller with wide Ultra internal signaling and wide Ultra2 for external signaling on SCSI channel 2.
<i>Super I/O Controllers</i>	Diskette drive, 2 serial ports, an ECP/EPP parallel port, 2-channel DMA, and IDE CD-ROM.
<i>Power Supply</i>	300 W power supply with server manageability.

continued

<i>Flexible Memory Architecture</i>	Server memory can be upgraded from 64 MB to a maximum of 1 GB using 64 MB, 128 MB, or 256 MB registered SDRAM DIMMs.
<i>SDRAM DIMMs</i>	168-pin registered SDRAM DIMMs, 10 or faster, with 100 MHz bus speed.
<i>Internal Sensors</i>	Monitors internal server temperatures, fan operation, and voltages for the main logic board and processor module.
<i>Clusters</i>	Supports DIGITAL Clusters for Windows NT and Microsoft Cluster Server (part of Microsoft Windows NT Server, Enterprise Edition) for database and file services failover.

Server Expansion

<i>Expansion Slots</i>	Five PCI expansion slots, one shared PCI/ISA slot, and one dedicated ISA slot.
<i>Internal Storage Devices</i>	Accommodates four half-height or full-height hot swap drives, one CD-ROM (standard), a 3½-inch diskette drive (standard), and two half-height, 5¼-inch devices; or one full-height, 5¼-inch device, such as a tape drive. The model 3220R supports HDD/carrier in both half- and full-height units.
<i>Hot Swap Disk Capability</i>	Supports up to four hot swap drives that can be replaced while the server is operating with a RAID adapter.
<i>Universal Serial Bus</i>	Two integrated USB ports.
<i>External I/O Ports</i>	Two serial ports and one Extended Capabilities Port (ECP)/Enhanced Parallel Port (EPP) to support external options, such as a printer, modem, or local terminal.

continued

<i>External SCSI Port</i>	Your server can be cabled to a rear panel SCSI knockout to provide connection to an external storage box.
<i>Integrated Video and Network Controllers</i>	A Video-Network (V-Net) daughter card on the main logic board provides a video port for connecting to the S3 Trio64V2 video controller and one 10/100Base-T (10/100 Mb/s) Ethernet port (RJ45) for connecting to the DIGITAL Ethernet controller.

Server Management and Security

<i>Server Diagnostics</i>	Allows local and remote diagnosis of server problems.
<i>Hardware Configuration</i>	Allows local and remote server configuration.
<i>Unique Asset Management</i>	Unique server identifier in non-volatile memory provides easy asset management.
<i>BIOS Setup Utility</i>	Allows configuration of your server's factory-default settings.
<i>BIOS and Firmware Upgrade Utility</i>	Upgrades the BIOS and firmware versions.
<i>Drive Status Indicators (LEDs)</i>	Provides immediate status information on hard drive activity or failure.
<i>Server Fault Bus and LED Status</i>	Provides immediate status information on server fan, temperature, voltage, and memory failure.
<i>Key Lock (Model 3220 only)</i>	Limits access to server components. A 45° turn clockwise opens the top door. A 90° rotation opens the bezel and allows access to the side panel thumbscrews, hot swap drives, and other components.

Server Software and Documentation

The following software and documentation are supplied with your server:

- ServerWORKS Manageability Suite — contains ServerWORKS Quick Launch, DIGITAL ServerWORKS Manager, and licenses.
 - ServerWORKS Quick Launch consists of a bootable CD-ROM disc, a companion CD-ROM, and *Getting Started* guide. The Quick Launch program steps you through the initial server setup and operating system installation process.

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

- DIGITAL ServerWORKS Manager consists of two CD-ROMs, an *Installation and User's Guide*, and supporting documentation.

Refer to the DIGITAL ServerWORKS software kit for more information.

- Server documentation box — contains this *System Reference*, an *Installation Guide*, a *Documentation Overview*, Warranty information, and Registration Card.



NOTE: You might have ordered additional options, such as disk drives or modems, that have been installed in your server. The documentation and any related software for these options have also been provided. Save this material for future reference.

Diagnostic Software

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

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

The diagnostic software includes:

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

Refer to Chapter 2, "Server Software and Utilities" for information on creating diagnostic diskettes from the Quick Launch CD-ROM.

For additional information on "When to Use the Diagnostics" and "Running the Diagnostics", refer to Chapter 13. Also refer to the AMIDdiag User's Guide, located on the Quick Launch CD-ROM and to the README.TXT file on the diagnostics diskettes.

Server Utilities and Technical Support

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

For product information, use the address:

<http://www.windows.digital.com>

For technical support, use the address:

<http://www.windows.digital.com/support/support.asp>

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

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

If you need additional information, access "Service Information" located in the ServerWORKS Quick Launch CD-ROM discs.

Server Software and Utilities

2

Introduction

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

- **ServerWORKS Quick Launch** — This software is used to install a network operating system onto the server. The CD-ROM also contains various device drivers and on-line documentation.
- **BIOS Setup Utility** — This utility allows you to configure your server after installing additional options and when changing your server's factory-default settings. The BIOS Setup utility is available each time you boot your server.
- **BIOS Upgrade Utility** — This utility allows you to update or restore your server's BIOS. The BIOS Upgrade utility is available on the Internet.
- **SCSI Configuration Utility** — This utility allows you to configure and view settings of the onboard SCSI controllers and SCSI devices. The SCSI configuration utility is available each time you boot your server.
- **RAID Configuration Utility** — This utility is available for RAID-ready servers only. This utility allows you to configure your RAID array and is available each time you boot your server.
- **Diagnostics** — Diagnostics are used to verify server operation. The diagnostics are available on the Quick Launch CD-ROM discs.

ServerWORKS Quick Launch

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

BIOS Setup Utility

The BIOS Setup utility enables you to select and store 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 each time you need to reconfigure or expand your server.

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



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

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

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

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Figure 2-1. Typical BIOS Setup Utility Screen

Use the BIOS Setup utility to:

- Set time and date
- Change I/O port settings
- Set security options
- Change the boot sequence
- Check system management parameters

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

Accessing the BIOS Setup Utility

To access the BIOS Setup utility:

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

Helpful Hints

When using the System Setup (F2) in the BIOS Setup utility:

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

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

- Item-specific help is available anytime during the setup process and appears at the right of the setup screen when an option is highlighted.

- Choosing the “Exit” menu allows you to:
 - Select “Save Changes & Exit” to save all Setup values and exit Setup.
 - Select “Exit Without Saving Changes” to exit Setup without recording any changes.
 - Select “Get Default Values” to set all setup options to their factory default values.
 - Select “Load Previous Values” to restore all setup values from the last session.
 - Select “Save Changes” to save all setup selections without exiting Setup.

Changing Your Server’s Configuration

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

Changing Time and Date

To change the time and date:

1. Reboot the server.
2. Press <F2> when the DIGITAL logo screen appears.
3. In the Main menu, using the cursor keys and [Tab], select (highlight) the System Time or System Date field you want to change.
4. Use [+] or [-] to change the field to the desired value.

You can also enter the desired date and time by typing the required numbers.

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

Changing I/O Port Settings

The following list shows the settings that can be made to the I/O ports via the *Advanced* section of the BIOS Setup utility.

- PS/2 mouse
- COM1
- COM2
- Parallel port
- Parallel port mode
- Floppy disk controller
- Integrated PCI Ethernet
- Integrated PCI SCSI
- Integrated IDE controller

For more information on changing I/O port settings, refer to Appendix C, “BIOS Setup Utility Features.”

To change the I/O port settings:

1. Reboot the server
2. Press <F2> when the DIGITAL logo screen appears.
3. Select *Advanced*.
4. Select *Integrated Peripherals*.
5. Select the port(s) you wish to change.
6. Use the +/- keys to change values.
7. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take effect.

Assigning IRQs

The following information is important for managing server IRQ assignments.

The default setting for PCI expansion boards is Auto Select, which automatically assigns IRQs to PCI expansion boards. If you have ISA expansion boards or you wish to manually control PCI IRQ assignments, you must do the following to assign IRQs to expansion slots.

1. Reboot the server and press <F2> when the DIGITAL logo screen appears.
2. Select **Advanced** at the top of the screen menu.
3. Select **PCI Configuration**. The following table shows the menu selections.

Advanced

Menu Fields	Settings	Comments
PCI Configuration: [submenu]		
PCI IRQ line #	Disabled	Disables the specific IRQ Line number.
	Auto select ⁽¹⁾	Automatically assigns IRQs to PCI slots.
	3	Select a number to assign to the PCI IRQ line. If the IRQ number is already in use, an asterick (*) appears to the left of the line.
	4	
	5	
	7	
	9	
	10	
	11	
	12	
	14	
	15	
PCI/PNP ISA UMB Region Exclusion		Use this selection to reserve a specific block of upper memory for ISA adapters. Press [Enter] to display memory addresses available.
PCI/PNP ISA IRQ Resource Exclusion		Use this selection to reserve IRQ numbers for ISA adapters. Press [Enter] to display IRQs.

⁽¹⁾ Factory default

Setting Up Security

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

Setting Supervisor and User Passwords

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

If "Password On Boot" is enabled, and both the supervisor and user passwords have been set, you need to enter either the supervisor or user password to use the server. The following list provides more information about setting passwords.

- You must enable the password during boot.
- Setting the supervisor password allows you to make changes to the boot process.
- Setting the user password allows a lower level user to access files.



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 the user password as instructed and press [Enter]. (Notice that “User Password Is” field now indicates Enabled.)
4. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the server so changes immediately take effect.

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 or user password to allow your server to finish the boot process.

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 effect.

Eliminating User and Supervisor Passwords

To eliminate your server’s password(s):

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

If User Password, select “Set User Password.”

If Supervisor Password, select “Set Supervisor Password.”

4. Press [Enter] three times.

You have cleared the old password and are returned to the “Security” menu.

Verify that the appropriate password is disabled by checking “User Password is” or the “Supervisor Password is” field, whichever is relevant.

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

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 carefully 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.

- *Sign On Banner*— When enabled, allows a custom banner to be displayed every time you turn your server on.
- *Diskette Access*— While enabled, this option prevents the server from accessing a diskette.
- *Network Server*— Locks the keyboard and mouse to prevent tampering during network operation. You must enter a supervisor password to unlock the keyboard and mouse.
- *System BIOS Flash*— When disabled, prevents the server’s BIOS from being flashed (rewritten).

Changing the Boot Sequence

It is sometimes necessary to change your server's boot sequence. 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 the BIOS Setup utility.
2. Highlight the "Boot" menu.

If the CD-ROM drive is listed as the first boot device in the BIOS, the server will boot from the CD-ROM drive. Otherwise, the server can be booted from the diskette drive (drive A) or the hard drive (drive C). If the diskette drive (drive A) then the hard drive (drive C) is selected, the server searches the diskette drive (drive A) first to boot the operating system. When no diskette is in the diskette drive (drive A), the server then tries to boot from the hard drive (drive C).

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 effect.

Following is a typical boot sequence:

- CD-ROM
- Diskette drive (drive A)
- Hard drive (drive C)

For more information, refer to the "Server Scan Sequence" section in Chapter 10.

Speeding up the Boot Process

There are four options for speeding up the boot process which, 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 `Boot` menu.

The following table lists and describes the items displayed.

Field	Description
Floppy check	Verifies the diskette boot drive.
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 by pressing <F2> before POST completes.
POST errors	Pauses and displays the Setup prompt or Resume boot prompt, if an error occurs during the boot sequence. If disabled, the server always attempts to boot.
Sign-on banner	When enabled, displays the DIGITAL logo during POST.

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

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

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

Checking System Management Parameters

These screens allow you to see an overview of your server's system and environment parameters, and details of the system assets (environment, memory, POST system, processor module, main logic board, and PCI IRQ assignment). To manage the system:

1. Reboot the server and press <F3> when the DIGITAL logo screen appears.
2. The "Summary" menu appears. Use the [←] and [→] arrows to select the parameter you want to view or change.
3. In screens that are editable, use the [↑] and [↓] arrows to select the field you want to change. Enter the new parameter(s) and then press [Enter] to accept the changes.
4. Press [Esc] then [Enter] to exit system management and reboot the server so changes immediately take effect.

BIOS Upgrade Utility

All servers have BIOS software in a flash (ROM) chip located on the main logic board. This BIOS initializes hardware and boots the operating system when the server is turned on. The BIOS also provides access to other services such as a keyboard and disk drives.

You can upgrade your server's BIOS to future releases by executing the BIOS upgrade utility (PHLASH.EXE) located in the BIOS upgrade kit. PHLASH.EXE and BIOS upgrades are available on the Internet.

For technical support, use the address:

<http://www.windows.digital.com/support/support.asp>

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

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



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

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

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

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

If you are having trouble flashing your server's BIOS, refer to Chapter 13, "Troubleshooting."

SCSI Configuration Utility

Your DIGITAL Server comes with an onboard, dual channel SYMBIOS 896 SCSI controller and a SCSI Configuration utility. This utility, located within the server BIOS, allows you to change SCSI controller settings without opening the server.

Use the SCSI Configuration Utility to:

- Check global factory default settings for each SCSI channel and devices connected to it.
- Change factory default settings for individual SCSI devices.
- Change the device boot order.

To start the SCSI Configuration utility:

Press [Ctrl] + [C] when the following message appears during the boot process:

```
Press Ctrl-C to start Symbios Configuration Utility...
```

This message stays on the screen for about five seconds. If you invoke the Configuration utility, the Main Menu of the Symbios SCSI Configuration utility is displayed.

Main Menu					
	Port	IRQ-----	Status-----	NVRAM	
	Num	Level	Current	Next-Boot	Found
SYM53C896	9000	9	On	On	Yes
SYM53C896	9400	9	On	On	Yes
Change Adapter Status					
Adapter Boot Order					
Additional Adapter Configuration					
Display Mode = Verbose					
Mono/Color					
Language					
Help					
Quit					

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The Main menu fields are described in the table that follows.

Menu Fields	Allows you to...
SYM port number	Change adapter setup specifications and device selections.
Change adapter status	Activate or deactivate an onboard or external SCSI channel and all devices attached to it. The changes take place after a reboot.
Adapter boot order	Change the boot sequence of the adapters in the server.
Additional adapter configuration	Select adapters other than those displayed on the first screen.
Display mode	Select a <code>Verbose</code> or a <code>Terse</code> text.
Mono/Color	Change the screen instantly between <code>Mono</code> and <code>Color</code> .
Language	Select a language for this utility.

Determining Devices Attached to Each SCSI Channel

To check the devices connected to each channel, use the following procedure:

1. Start the Symbios SCSI Configuration utility to display the Main menu.
2. Use the arrow keys to select the SYM port number and press [Return]. The following menu items are displayed:

```
Adapter Setup
Device Selections
Help
Exit this menu
```

3. Choose `Device Selections` to display the SCSI devices attached to this port.
4. Press the [Esc] key to exit from this menu.

For additional information, refer to the Symbios User's Manual on the Quick Launch CD-ROM discs. Select the "User Documentation" button.

RAID Configuration Utility

If a RAID adapter is installed in the server, the RAID configuration utility appears when you boot your server. If desired, you can skip this utility, or use this utility to configure your RAID array during initial setup.

Refer to the RAID User's Manual on the Quick Launch CD-ROM discs. Select the "User Documentation" button.

Diagnostics

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

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

To access the supplied diagnostic software:

- During your server installation process, the diagnostic software will be automatically copied to a subdirectory on the Quick Launch MS-DOS partition (only if you selected the option to create a partition). This allows you to run the diagnostic software from the MS-DOS partition you created.
- Using the Quick Launch CD-ROM, you can create bootable diagnostic software diskettes. This allows you to run the diagnostic software using the diskettes you created.



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

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

1. At the MS-DOS prompt, type:

```
C:\diag\diagnose.bat
```

2. After the server boots, choose MS-DOS from the boot selection.
3. Once the diagnostics begin, the main screen appears.

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

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

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

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

Refer to Chapter 13, "Troubleshooting," for more information on using the diagnostics software.

Server Components

3

Introduction

This chapter shows the location of your DIGITAL Server's internal components and procedures for unlocking and removing the access panels. A procedure for installing a new Real-Time Clock (RTC) battery is also included.

Disconnecting External Devices and Power

Before removing any access 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 power source.

Unlocking the Server (Model 3220)

1. Unlock the server's front bezel by depressing and rotating the key 90° clockwise.
2. Swing the bezel open.

Keylock Function

- Depress and rotate the key 45° for access to the control panel and upper drive bays.
- Depress and rotate the key 90° for access to the side panel thumbscrews and hot swap drives.



CAUTION: Keep your keys in a safe place. They are not easily duplicated or replaced.

Removing the Front Bezel

The front bezel is the hinged door running the full height of the server. If necessary, you can remove the front bezel by lifting it up and away from the chassis.

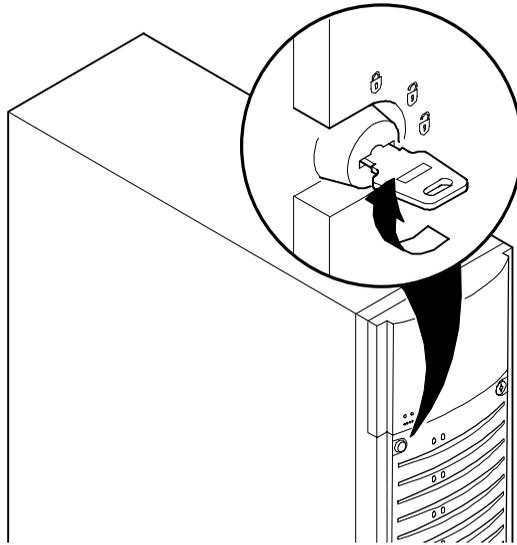
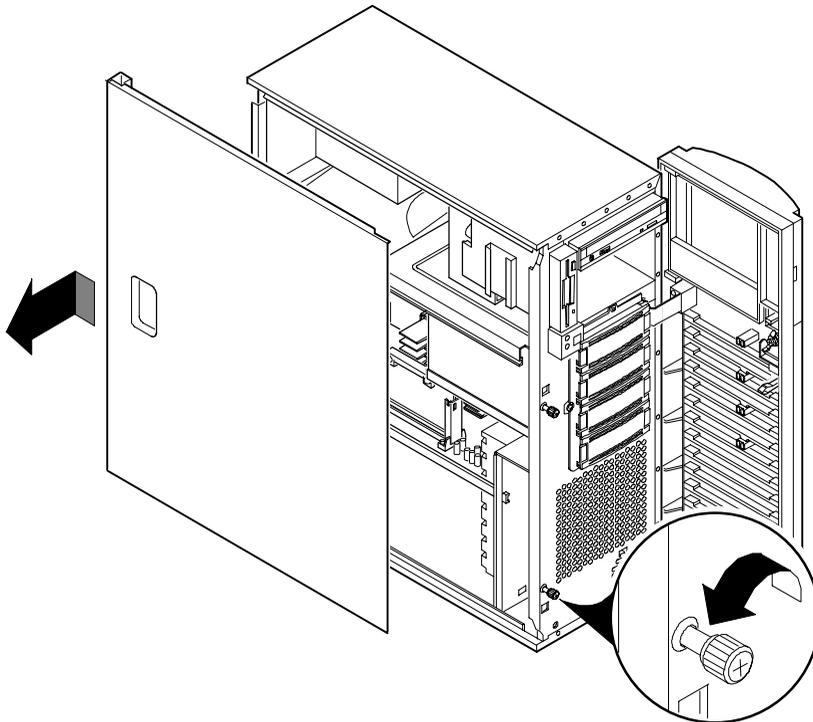


Figure 3-1. Front-Access Security Door and Front Bezel Lock

Removing and Installing the Side Panel (Model 3220)

1. Loosen the two thumbscrews that secure the side panel to the chassis.
2. Slide the side panel to the rear of the server and then pivot it down to remove it.

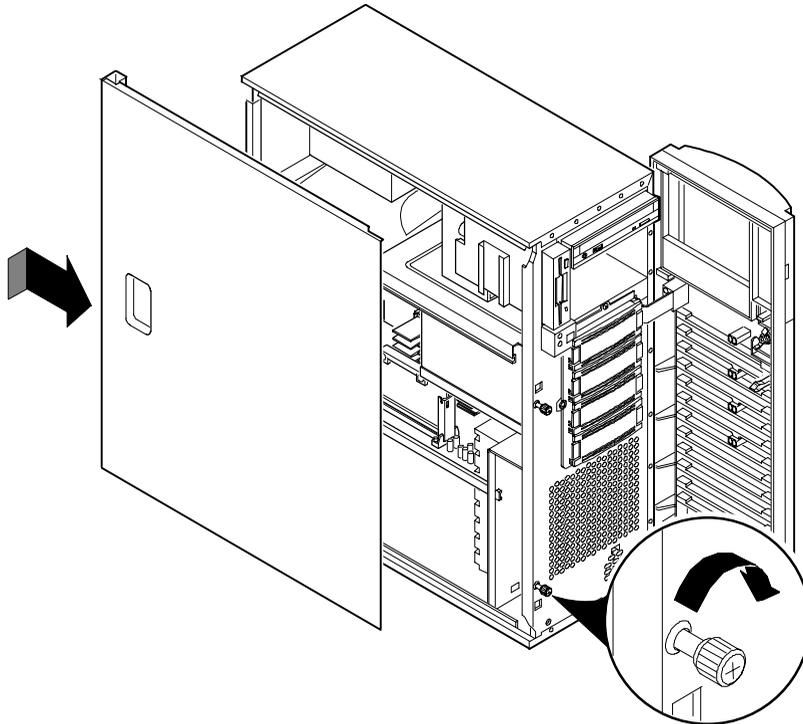


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Figure 3-2. Removing the DIGITAL Server 3220 Side Panel

To install the side panel.

1. Pivot the side panel up and then slide it to the front of the server.
2. Secure the side panel to the chassis using the two thumbscrews.
3. Close and lock the server's front bezel.



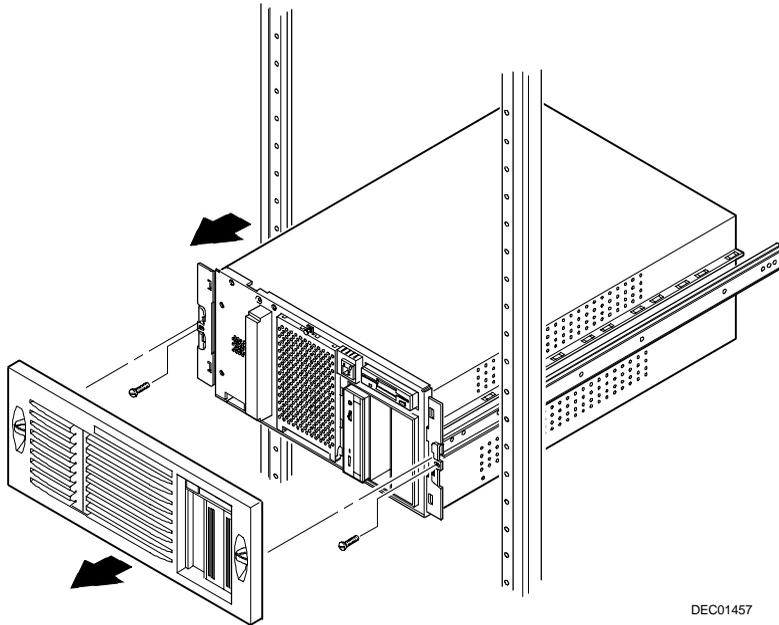
DEC01627-3

Figure 3-3. Installing the DIGITAL Server 3220 Side Panel

Removing the Server from the Rack (Model 3220R)

You must remove the server from the rack prior to accessing internal components. To remove the server:

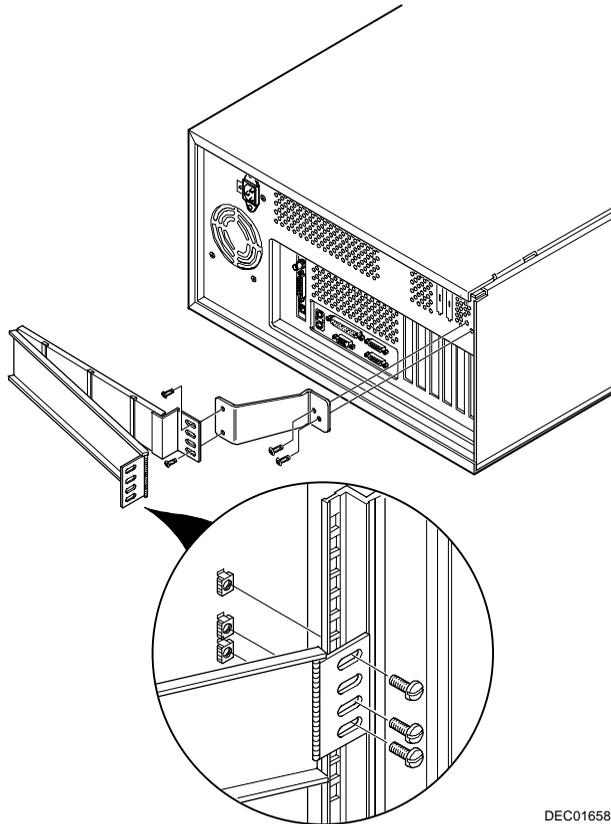
1. Remove the front bezel (see Figure 3-4).
2. Remove all cabling from the server.
3. Disconnect the cable management arm from the server (see Figure 3-5).



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Figure 3-4. Removing the Server from the Rack

4. Remove the two screws securing the server to the rack and then slide it out (see Figure 3-4).
5. Place the server on a flat surface.



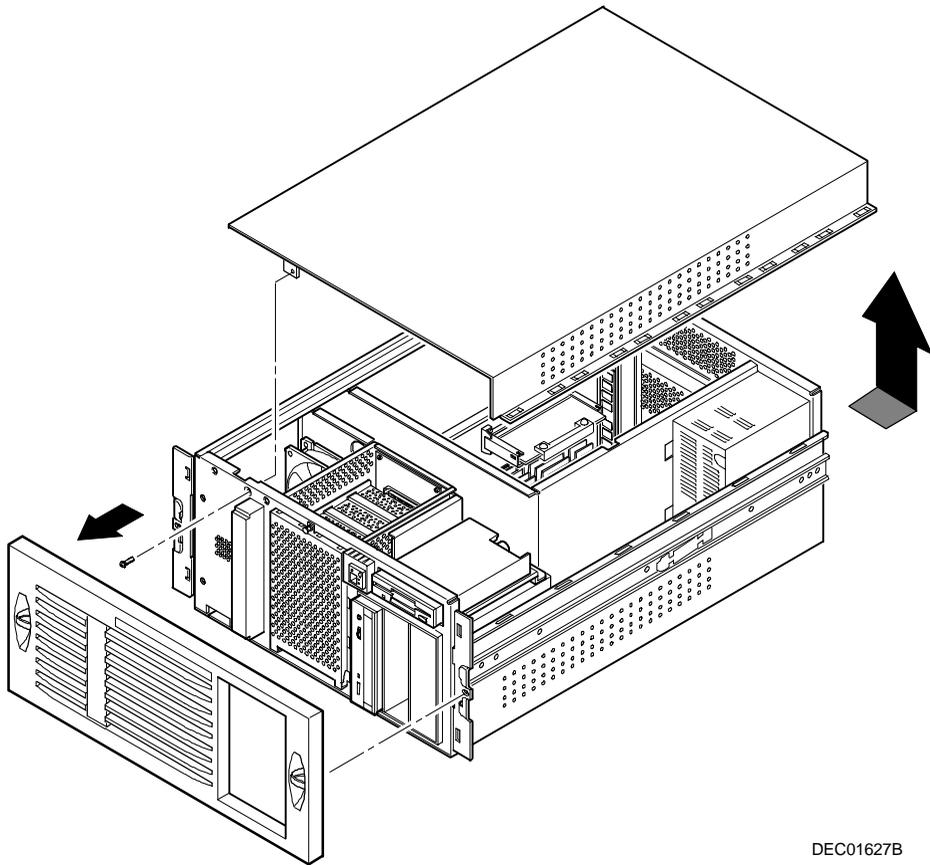
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Figure 3-5. Disconnecting the Cable Management Arm

Removing and Installing the Top Cover (Model 3220R)

To remove the top cover, perform the following:

1. Remove the front bezel.
2. Remove the screw securing the top cover to the server's chassis.
3. Carefully slide the top cover toward the rear of the chassis until the locking tabs are clear from their slots.
4. Carefully lift the top cover up and then forward until it clears the chassis.



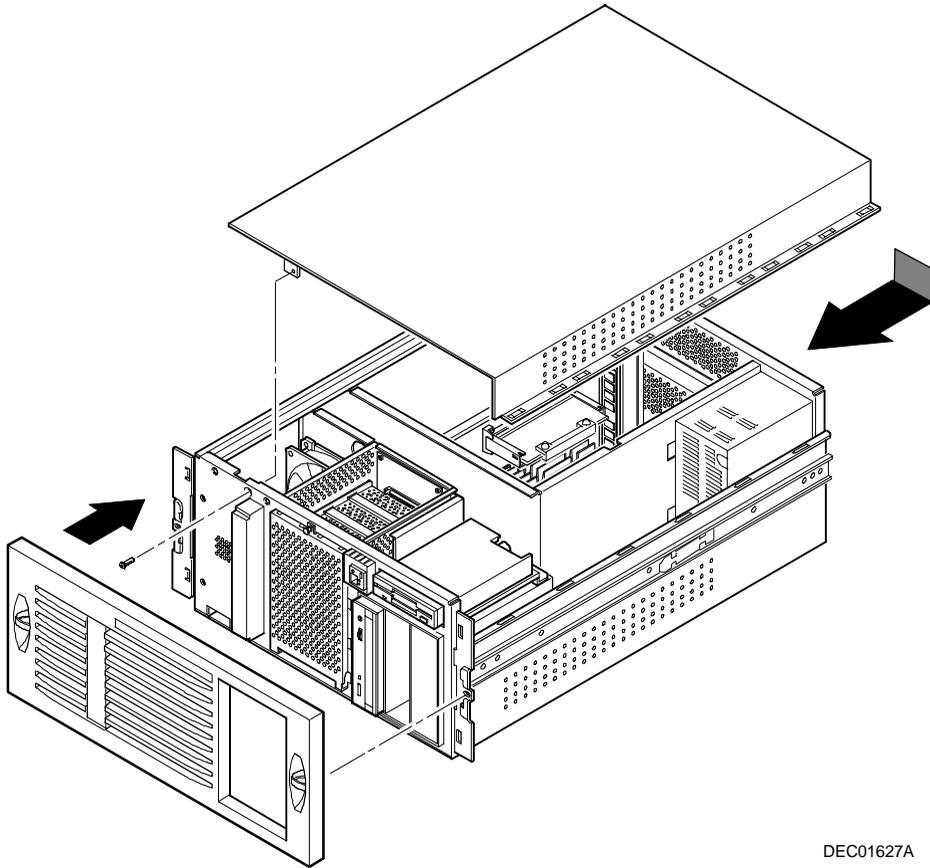
DEC01627B

Figure 3-6. Removing the DIGITAL Server 3220R Top Cover

Server Components

To install the top cover.

1. Carefully slide the top cover onto the server's chassis making sure that all locking tabs fit into their slot openings.
2. Slide the top cover forward to secure the locking tabs into their slots.
3. Secure the top cover to the chassis using the previously removed screw.
4. Align the front bezel and then snap it into place.



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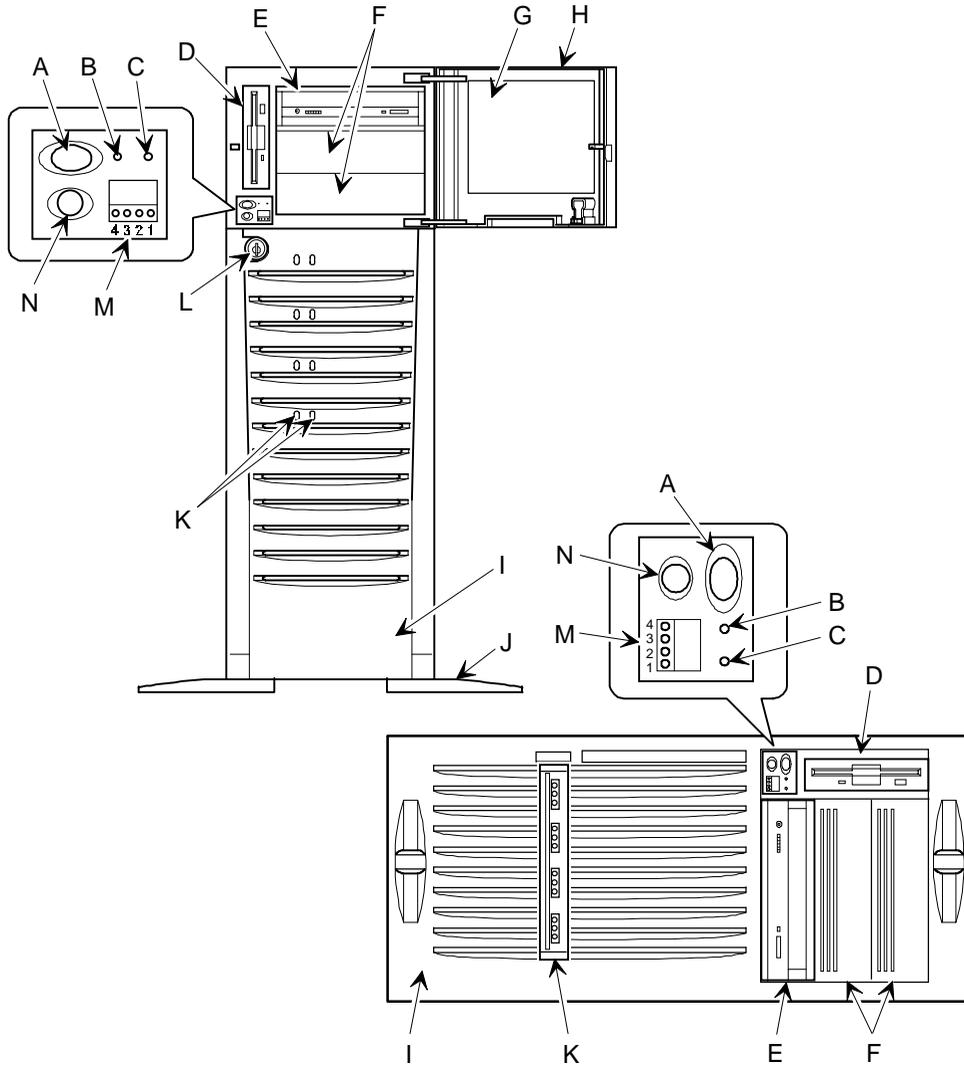
Figure 3-7. Installing the DIGITAL Server 3220R Top Cover

Front View

Figure Legend	Component
A	Power button
B	Power indicator
C	Disk drive activity indicator
D	3½-inch diskette drive
E	IDE CD-ROM drive
F	Front access 5¼-inch half-height drive bays
G ⁽¹⁾	Fault status LED label (model 3220 only)
H	Removable media access door (model 3220 only)
I	Front bezel
J	Stabilizing feet (model 3220 only)
K	Hot swap drive LED status indicators
L	Three-way security lock (model 3220 only)
M ⁽²⁾	Fault status LEDs
N	Reset button

⁽¹⁾ For the model 3220, the fault status LED label is located at the back of the removable media access door.
For the model 3220R, this label is located behind the front bezel at the lower-left corner of the chassis.

⁽²⁾ For the model 3220 only, the four internal fault status LEDs appear as one indicator with the front door closed. You must open the front door to view a specific LED fault code.



DEC01621-2

Figure 3-8. DIGITAL Server 3220/3220R Front View

Internal View

Figure Legend	Component
A	Video/Ethernet daughter card
B	Hot swap drive bay cooling fan (model 3220 only)
C	Power supply
D	Removable media drive bays
E	Hot swap drive bay
F	Main logic board cooling fan
G	Speaker
H	Main logic board
I	Processor and memory module with retainer

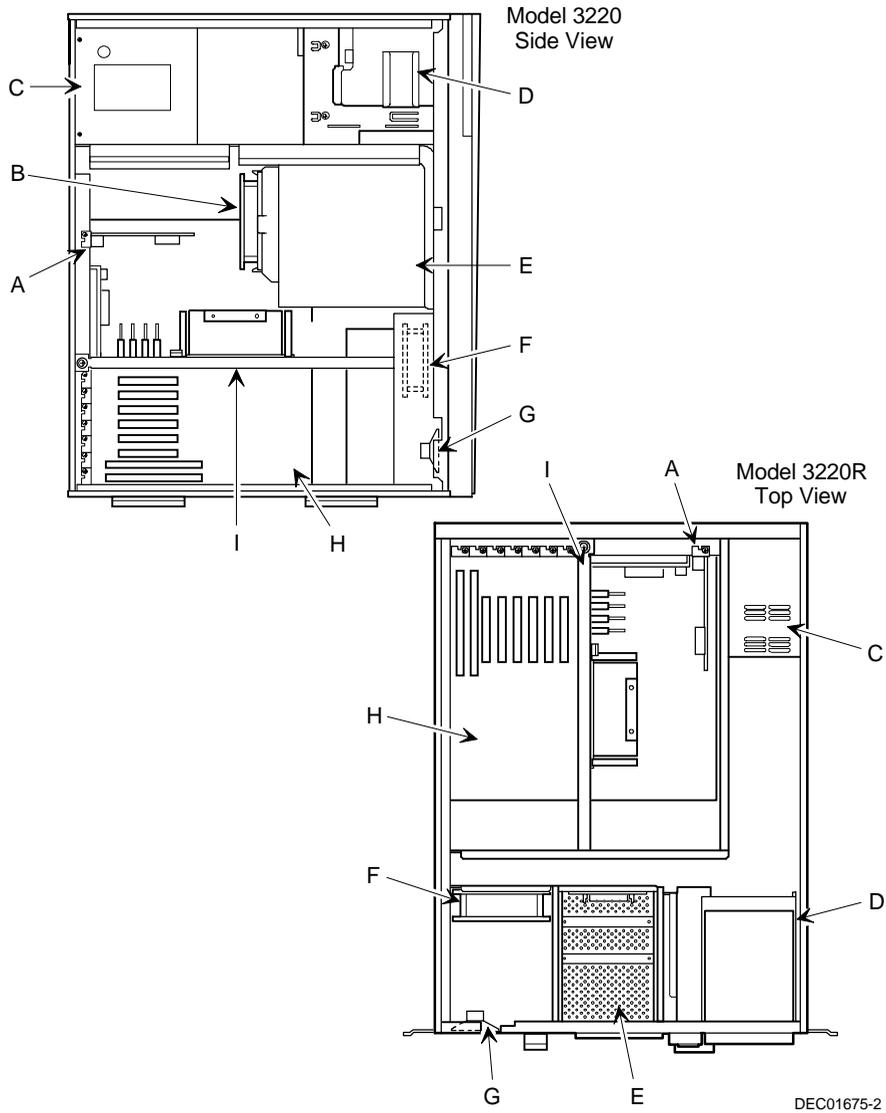


Figure 3-9. DIGITAL Server 3220/3220R Internal View

Rear View

Figure Legend	Component
A	One dedicated ISA expansion slot
B	One shared ISA/PCI expansion slot
C	Five dedicated PCI expansion slots
D	USB ports
E	Serial ports
F	Keyboard and mouse ports
G	Video port
H	10/100Base-T connector (RJ45)
I	SCSI knockouts
J	ac power input plug
K	Voltage selection switch
L	Parallel port
M	Security hold-down bar (model 3220 only)
N	Cable management arm attachment holes (model 3220R only)

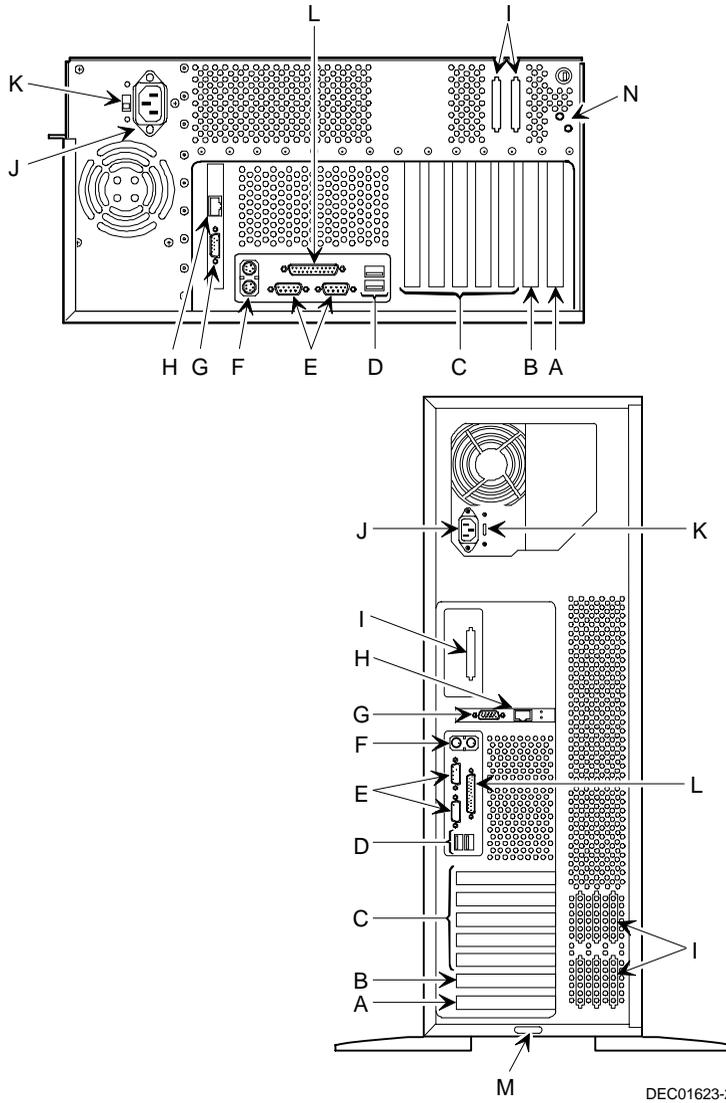
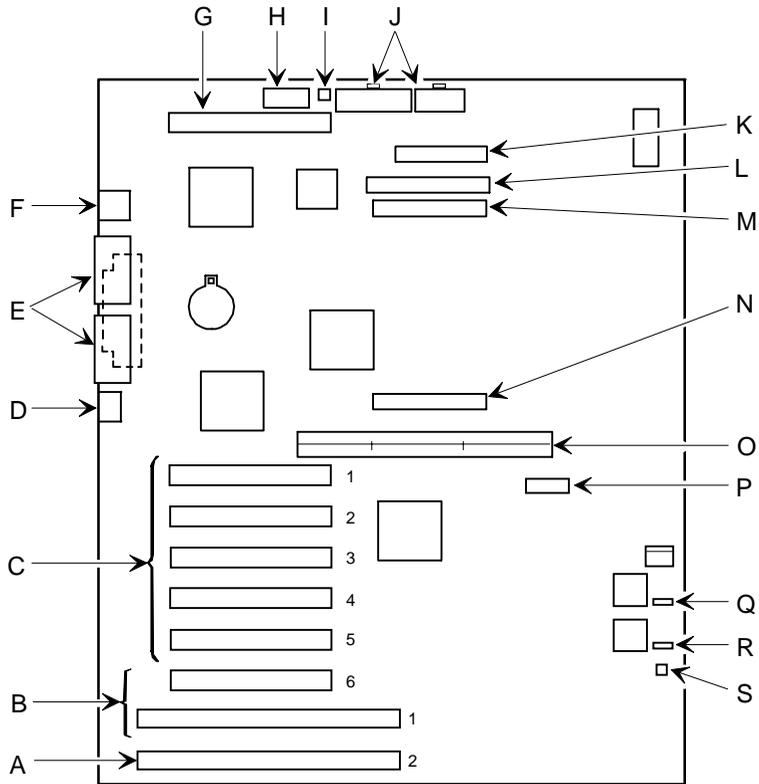


Figure 3-10. DIGITAL Server 3220/3220R Rear View

Main Logic Board Connectors

Figure Legend	Connector
A	Dedicated ISA expansion slot (slot 2)
B	Shared PCI/ISA expansion slots (PCI slot 6; ISA slot 1)
C	PCI expansion slots (slots 1-5)
D	USB ports
E	Two serial ports and one parallel port
F	Mouse and keyboard ports
G	Video/Ethernet daughter card connector
H	OCP Connector (for model 3220R)
I	Fan 2 connector (for model 3220 hot swap drive bay)
J	Power supply connectors
K	Diskette drive connector
L	IDE connector for CD-ROM drive
M	Channel 1 SCSI connector
N ⁽¹⁾	Channel 2 SCSI connector
O	Processor and memory module connector
P	RSM connector
Q	Hard disk drive LED connector
R	Speaker connector
S	Fan 1 connector

⁽¹⁾ If a dual processor module is installed, this connector is hidden.

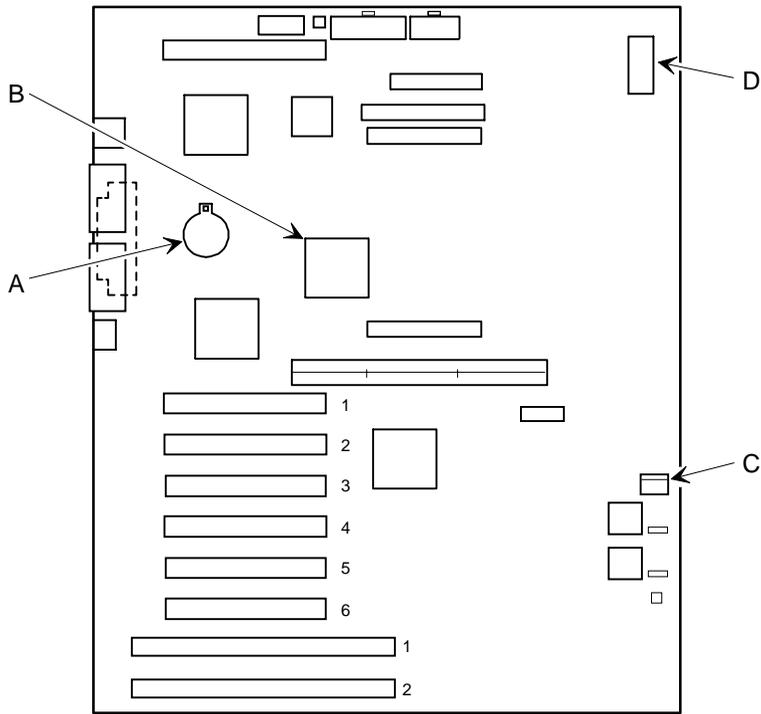


DEC01624-2

Figure 3-11. Main Logic Board Connectors

Main Logic Board Components

Figure Legend	Component
A	Real-time clock battery
B	SCSI controller
C	Switch block (SW1)
D	BIOS flash ROM



DEC01624-3

Figure 3-12. Main Logic Board Components

Processor Module Components

Figure Legend	Component/Connector
A	Processor 1
B	Processor 2 slot or terminator card
C	Switch for processor clock speed settings
D	Four DIMM sockets

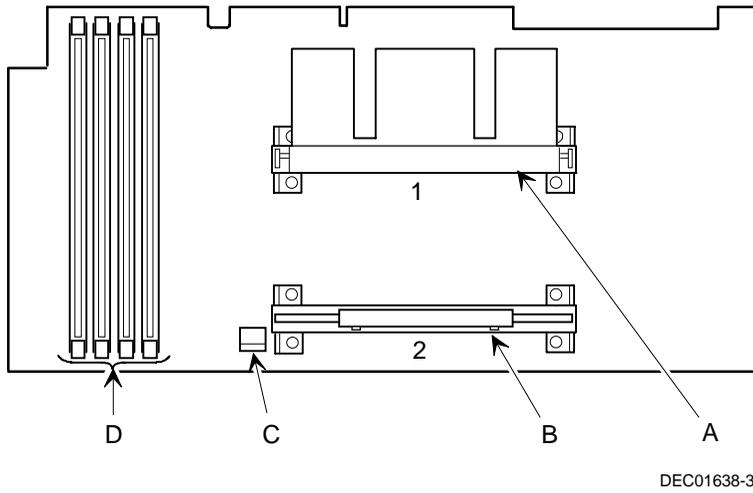


Figure 3-13. Processor Module Components

Video/Ethernet Daughter Card Connectors and Indicators

Figure Legend	Connector
A	Video graphics port
B	Network link indicator (green)
C	Network activity indicator (yellow)
D	10/100Base-T connector (RJ45)

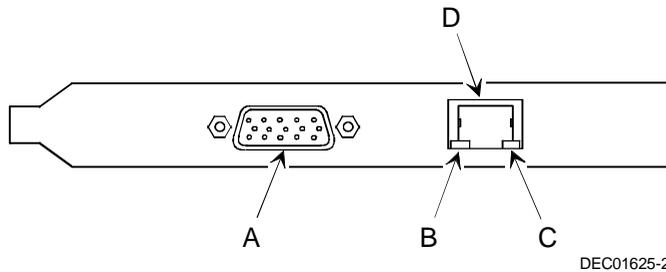


Figure 3-14. Video/Ethernet Daughter Card Connectors

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.

Replacing the Real Time Clock (RTC) Battery

Your server's battery runs the server clock and retains any setup information when it is turned off. If your server ever fails to retain the correct date, time, or configuration settings when it is turned on, you need to replace your server's RTC battery. Also, make sure you replace the battery with either a DIGITAL part number 12-41474-05, Toshiba (P/N CR2032), or equivalent 3 V dc Lithium battery. This part can be obtained through your DIGITAL service provider.



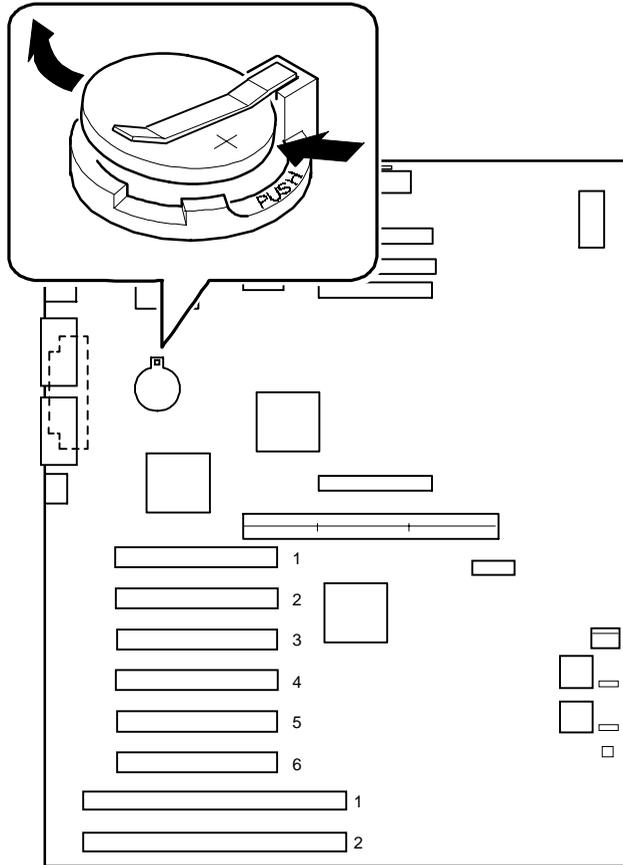
WARNING: There is a danger of battery explosion if a lithium battery is incorrectly replaced. To prevent damage to your server, be sure the + side faces up when installing a new battery.

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.

To replace the battery/RTC, perform the following:

1. If you have not already done so, record server configuration settings using the BIOS Setup utility.
2. Turn off your server.
3. Disconnect external devices (if any), ac power, and monitor power.
4. For the DIGITAL Server 3220 only, unlock and open the front bezel, loosen the two thumbscrews, and then remove the side panel (see Figure 3-2).
5. For the DIGITAL Server 3220R only:
 - a. Remove the front bezel (see Figure 3-4).
 - b. Disconnect all cables from the rear of the server.
 - c. Disconnect the cable management arm (see Figure 3-5).
 - d. Remove the two screws securing the server to the rack and then slide it out (see Figure 3-4).
 - e. Remove the top cover (see Figure 3-6).

6. Lift the retaining clip slightly and push on the battery from the side to slide it out (see Figure 3-15).



DEC01624-4

Figure 3-15. Replacing the Server Battery/RTC

Server Components

7. Install the new battery/RTC (Figure 3-15). When installing the new battery, make sure the “+” side faces up.
8. For the DIGITAL Server 3220 only, replace the side panel and then close and lock the front bezel (see Figure 3-3).
9. For the DIGITAL Server 3220R only:
 - a. Replace the top cover (see Figure 3-7).
 - b. Slide the server into the rack and then secure it using the two previously removed screws (see Figure 3-4).
 - c. Connect the cable management arm (see Figure 3-5).
 - d. Replace the front bezel (see Figure 3-4).
 - e. Connect any previously removed cables to the rear of the server.
10. Restore power, reboot and then run the BIOS Setup utility to configure your server.

Refer to Chapter 2, “Server Software and Utilities,” for information on using the BIOS Setup utility.

Server Management



Introduction

The DIGITAL Server 3220/3220R is configured with hardware that supports server management, including an 8031 processor with multiple I²C busses for server status reporting.

Managing Your Server

The server allows you to perform the following management functions:

- Monitor main logic board voltage and cooling fan status
- Monitor processor module voltage, temperature and status
- Detect and automatically correct single-bit ECC errors

The DIGITAL Server 3220/3220R allows you to manage your server and its main components by:

1. Obtaining information about the main logic board and the processor module.
2. Notifying you of any changes to the main logic board or processor module on your server.

Information can be obtained either through the BIOS Setup utility or through system management software, such as the DIGITAL ServerWORKS Manager.

Obtaining Information about Your Server

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

- Asset number — User-definable field for tracking these components
- Part number — DIGITAL part number
- Revision number — Board assembly revision number
- Serial number — Serial number of the board assembly
- Artwork number — Revision of the printed circuit board

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

- Model number — Server model number
- Serial number — Server serial number
- System asset number — User-definable field for tracking the system

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

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

You can obtain information about your server's configuration by running the BIOS Setup utility or by using the ServerWORKS management software.

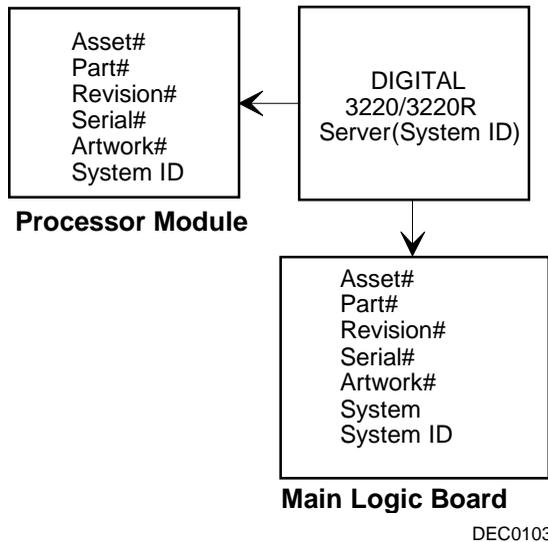


Figure 4-1. DIGITAL Server Component Information

Obtaining Information Using the BIOS Setup Utility

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

You can view the details for the main logic board or processor module by pressing <F3> and then selecting the `SYS` option. The BIOS Setup utility lists the server model number and server serial number information stored on the main logic board or processor module. You can then confirm the correct model number and serial number. This data is available on the label located on the server's back panel.

Refer to Appendix C, "BIOS Setup Utility Features," for more detailed information about the BIOS Setup utility.

Obtaining Information Using Server Management Software

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

DIGITAL ServerWORKS Manager is based on an open architecture that enables seamless integration and interoperability with popular enterprise management software packages such as Computer Associates' POLYCENTER Manager/NetView, Hewlett-Packard's OpenView UX for Windows, and IBM's Netview/6200 AIX. Also included with the DIGITAL ServerWORKS Manager are Network Operating System (NOS) Agents for Windows NT V4.x, Novell NetWare™ V3.12, V3.2, and V4.x, and SCO UNIX V5.x. The OS/2 NOS includes its own agent and can also be managed from ServerWORKS Manager.

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

- Manage DIGITAL PC print, file, and application servers supported by DIGITAL Servers using a Windows-based graphical user interface (GUI) for point and click simplicity.
- Display server component information that provides critical information such as processor and file system utilization and information about the network interface.
- Automatically build a database of the network by Autodiscovering all SNMP network resources and display the nodes discovered during Autodiscovery on a color-coded topological map.
- Poll all network devices at intervals defined by the administrator.
- Perform an in-depth network analysis to continuously monitor the status of the network.
- Set alarms and alerts for specified events on all network devices, as well as the network itself, to spot problems early and avoid costly downtime.

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

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

Refer to the DIGITAL ServerWORKS Manager Installation and User's Guide for more information.

Displaying Server Status Using the Hardware

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

- Normal status messages
- Error messages

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

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

Refer to Appendix A for server fault status LED and POST messages.

Processor Upgrades

5

Introduction

Installing a second processor increases the capabilities of your DIGITAL Server 3220/3220R. This chapter describes the configuration guidelines that must be followed prior to upgrading your server as well as detailed procedures on removing and installing a processor module.

Processor Configuration Guidelines

To upgrade to a dual processor configuration you must purchase and install a processor upgrade kit. Contact your authorized DIGITAL sales representative for more information.

Apply the following guidelines to your processor upgrade:

- Single processor modules must be installed in the primary processor socket (CPU1) and have a termination card installed in the second processor socket (CPU2). The termination card must be removed prior to installing a second processor.
- If two processor are installed, they must be the same speed.
- DIGITAL recommends that dual processor configurations use processors with identical stepping (manufacturing revision). Processors with different stepping might not function properly. You can use the processor ID number that appears during the Power-On Self Test (POST) for each processor to help you determine stepping. This information is found in the README files on the Quick Launch CD-ROM discs.

Processor Upgrades

- Use only DIGITAL-supplied processor modules and DIMMs.
- Use an anti-static wrist strap when servicing any part of the server.

Refer to Appendix A, "Technical Specifications" for specific POST messages.

Please refer to the README file on the ServerWORKS Quick Launch CD-ROM discs to view the latest processor compatibility information. Also, contact your DIGITAL sales representative or reseller for future processor upgrades and BIOS revisions.

Removing the Processor Module

To remove the processor module:

1. Power down the server.
2. Disconnect ac power and monitor power.
3. Remove the side panel or top cover to access the processor module.
Refer to Chapter 3, "Server Components," for more information.
4. Place the antistatic wrist strap on your wrist and connect the grounding clip to a non-painted metal surface of the server's chassis.
5. Loosen the screw (A, Figure 5-1) and then remove the retainer.
6. Pull the processor module straight out of its socket.

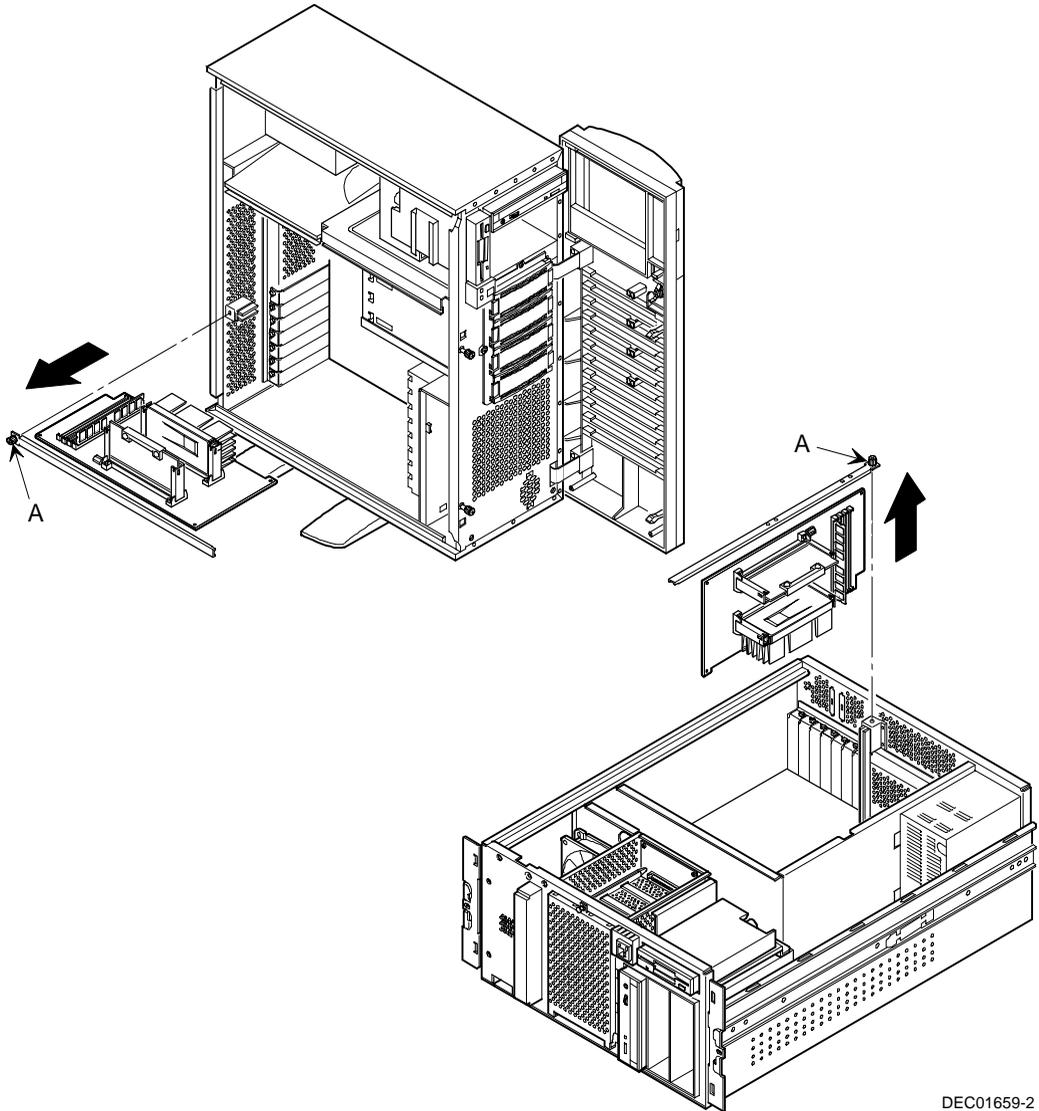
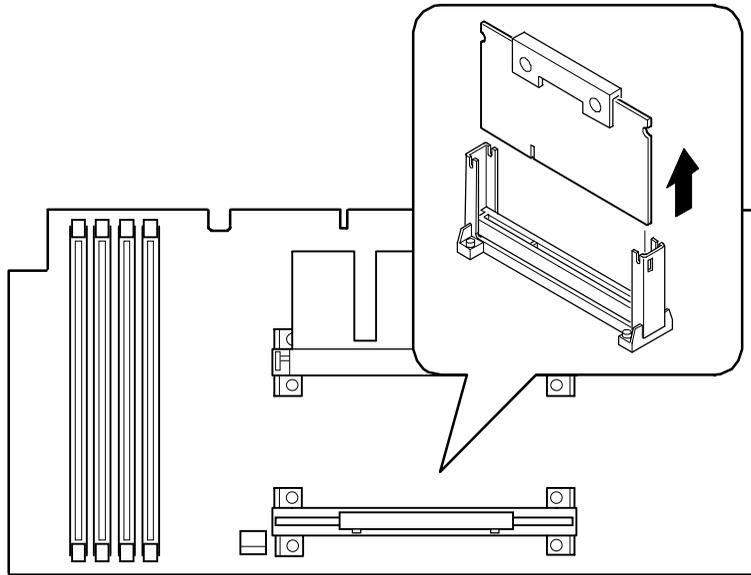


Figure 5-1. Removing the Processor Module

DEC01659-2

Removing the Terminator Card

To remove the terminator card from the processor module, grasp the terminator by each end and pull up (see Figure 5-2).

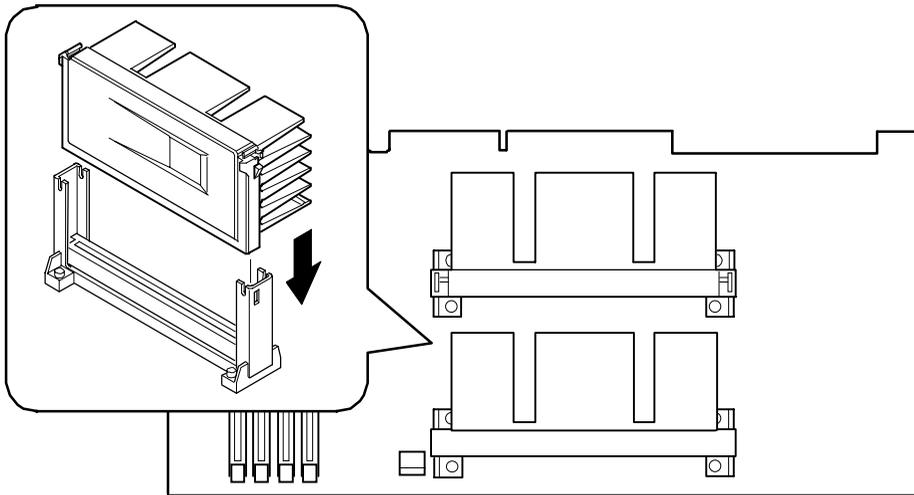


DEC01638-4

Figure 5-2. Removing the Terminator Module

Installing a Second Processor

1. Remove the processor from its shipping container.
2. Insert the processor into this slot (see Figure 5-3).
3. Press down on the processor so the two plastic tabs at each side lock it securely in the socket.



DEC01638-5

Figure 5-3. Installing the Second Processor

Installing the Processor Module

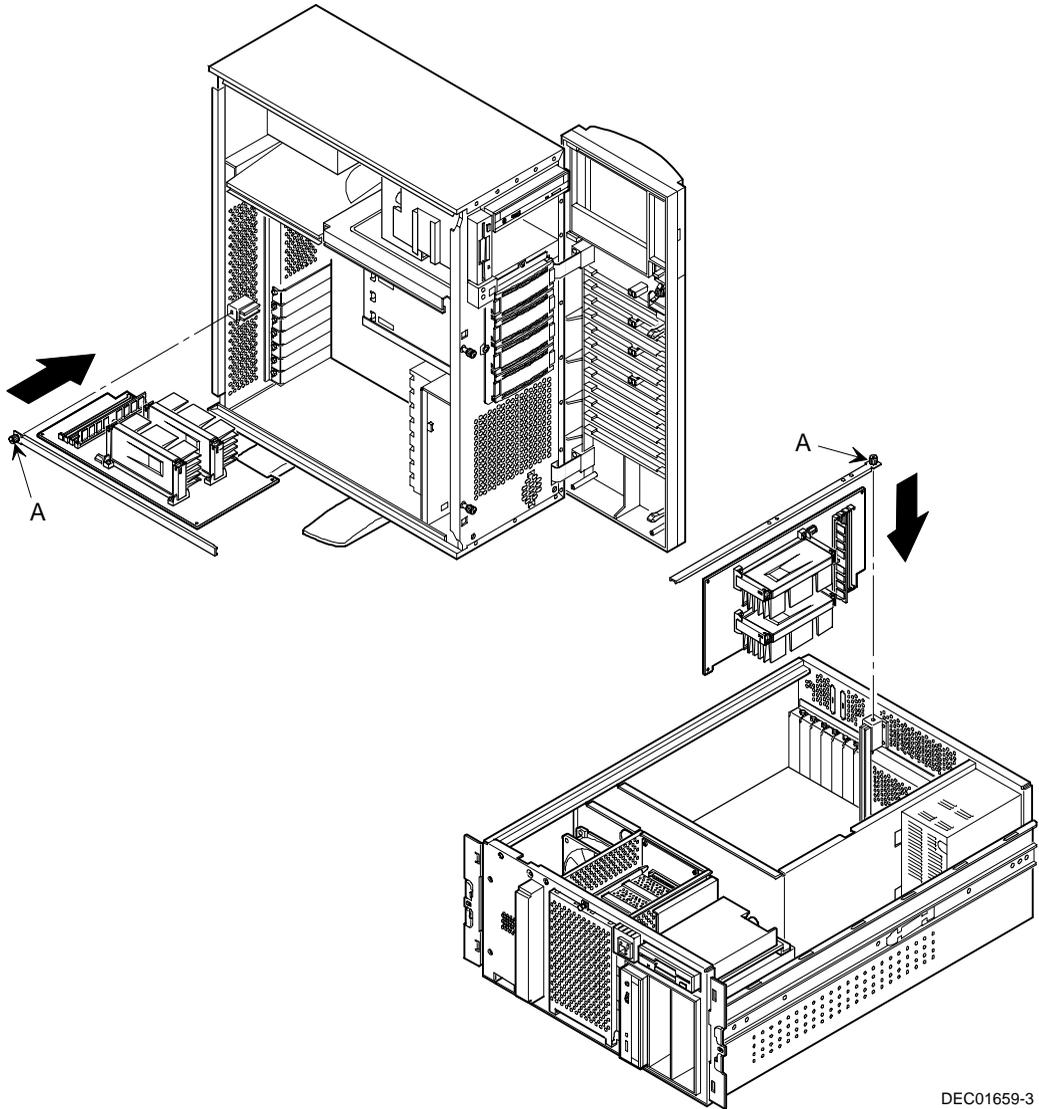
1. If you are changing processor speeds, set all appropriate switch settings on the processor module. Otherwise, current switch settings apply.

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

2. If you are installing additional memory as part of this procedure, refer to Chapter 6, "Installing Additional Memory," for more information.
3. Install the processor module.
4. Install the retainer and then tighten the thumbscrew (A, Figure 5-4).
5. Replace the side panel or top cover.

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

6. Connect all external devices and restore power. Afterwards, your server automatically recognizes both processors.



DEC01659-3

Figure 5-4. Installing the Processor Module

Run the System ID Configuration Utility

If you upgraded your server with a new processor, you need to run the System ID utility (SIDUTIL) to store the new model information in your server memory. To run the SIDUTIL:

1. Insert the bootable Quick Launch CD-ROM disc in the CD-ROM drive.
2. Select the `Installation and Utilities` button on the main screen.
3. Select the `Utilities` tab.
4. Insert a blank formatted diskette into drive A.
5. Select the `System Identification Utility` and then select `Continue`.
6. After creating the diskette, exit Quick Launch.
7. From drive A, run `SIDUTIL`.

Example: `A:\>SIDUTIL`

8. Using the arrow keys, highlight the correct server model name/part number/description for your server. Match the processor type and cache size with the line items displayed to select the new DIGITAL Server model.

The System ID Configuration Utility appears on your monitor screen.

The description of the System ID information currently on the main logic board appears at the first line in the following format:

Example:

DIGITAL Server 3225

FR-B4BAW-AA

where 3225 is the model name and FR-B4BAW-AA is the part number.

The following description is an example: 400/512 PII 64 MB.

9. After selecting the correct description, press [Enter]. A new System ID is stored in the main logic board memory. The changed model name and part numbers appear at the top of the menu in the current field.
10. To exit SIDUTIL, press [Esc].

Installing Additional Memory

6

Introduction

Your server supports 168-pin DIMM memory modules that use registered Synchronous Dynamic Random Access Memory (SDRAM) technology. Your server requires at least 64 MB of memory. Adding more memory enables your server to run larger, more complicated software and run it more quickly. Registered SDRAM DIMMS are available in 64 MB, 128 MB and 256 MB sizes to expand your server memory up to 1GB.

Server memory is installed using the four DIMM sockets located on the processor module, as shown in Figure 6-1.

When adding memory, make sure you reference the memory configuration table and follow the memory expansion guidelines.



CAUTION: DIMMs must be ordered separately. Only install DIMMs supported by Digital Equipment Corporation. DIGITAL does not support server performance, product warranty, or service calls resulting from installing non-qualified DIMMs.

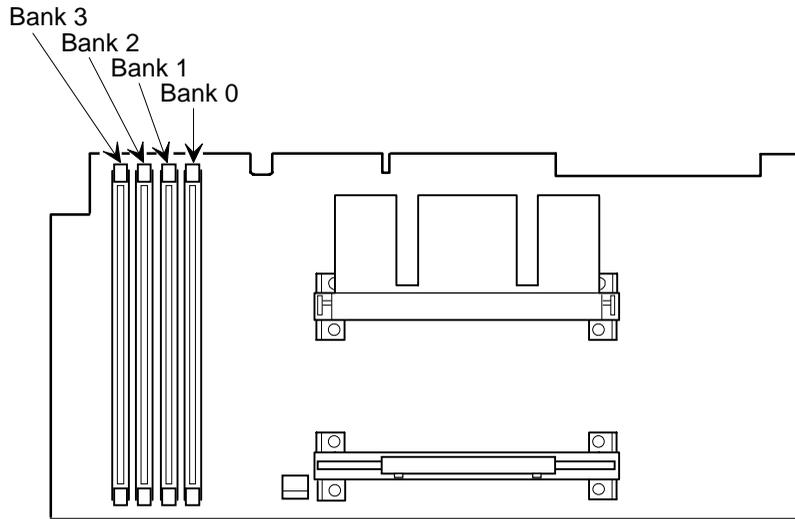
Server DIMM Requirements

- Supported DIMMs: 168-pin registered SDRAM with ECC.
- DIMMs should have an access time of 10 ns or faster.
- Supported densities: DIMMs are available in 64 MB, 128 MB, and 256 MB of ECC protected memory.
- Maximum memory: 1 GB.

Memory Configuration Guidelines

The memory configuration guidelines for the DIGITAL Server 3220/3220R are as follows:

- Each memory bank on the processor module accommodates one DIMM.
- Install DIMMs starting with Bank 0. See Figure 6-1 for Bank locations.
- DIMM capacities can be mixed.
- Use only registered SDRAM DIMMs supported by Digital Equipment Corporation.



DEC01638-6

Figure 6-1. DIMM Bank Locations

Memory Configurations

The following table lists examples of memory configurations and the mixing of memory sizes.

Bank 0	Bank 1	Bank 2	Bank 3	Total Memory
64 MB				64 MB
64 MB	64 MB			128 MB
64 MB	64 MB	64 MB		192 MB
64 MB	64 MB	64 MB	64 MB	256 MB
128 MB				128 MB
128 MB	64 MB			192 MB
128 MB	128 MB			256 MB
128 MB	128 MB	64 MB		320 MB
128 MB	128 MB	128 MB		384 MB
128 MB	128 MB	128 MB	64 MB	448 MB
128 MB	128 MB	128 MB	128 MB	512 MB
256 MB				256 MB
256 MB	64 MB			320 MB
256 MB	128 MB			384 MB
256 MB	256 MB			512 MB
256 MB	256 MB	64 MB		576 MB
256 MB	256 MB	128 MB		640 MB
256 MB	256 MB	128 MB	64 MB	704 MB
256 MB	256 MB	256 MB		768 MB
256 MB	256 MB	256 MB	64 MB	832 MB
256 MB	256 MB	256 MB	128 MB	896 MB
256 MB	256 MB	256 MB	256 MB	1 GB

Table does not list all possible configurations

Installing DIMMs on the Processor Module

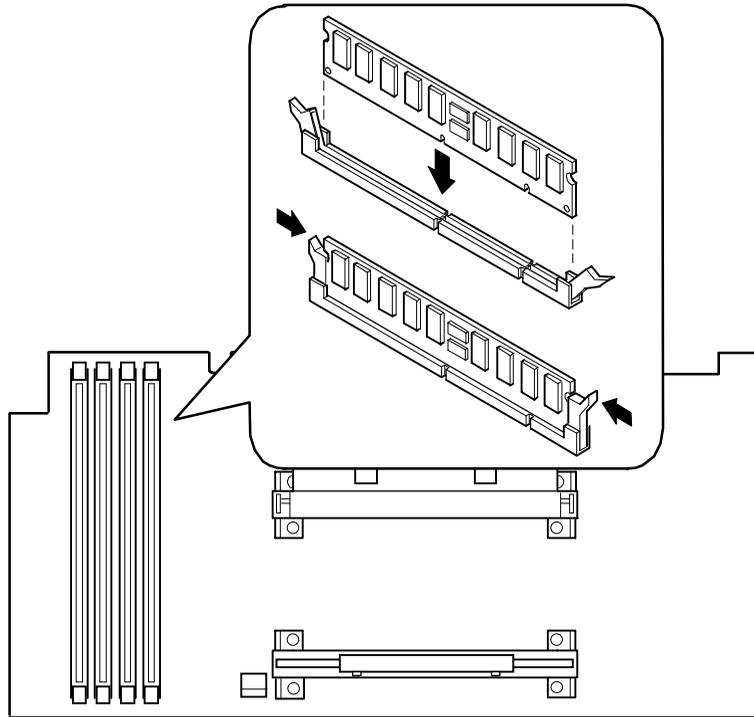
Use the following procedure to install DIMMs:



CAUTION: To avoid possible damage to the components, place the antistatic wrist strap on your wrist and connect the grounding clip to a non-painted metal surface of the server's chassis.

1. Power down your server.
2. Remove the side panel or top cover.
Refer to Chapter 3, "Server Components," for more information.
3. Remove the processor module.
4. Unpack the DIMMs. Refer to "Memory Configurations" described earlier in this chapter for information on the supported memory configurations.
5. Install DIMMs starting with the next available Bank on the processor module, orient the DIMM so that the two notches at the bottom edge of the DIMM are aligned with the keyed socket (see Figure 6-2).

Installing Additional Memory



DEC01638-7

Figure 6-2. Installing a DIMM

6. Insert the DIMM straight down into its socket. Apply equal pressure to both ends of the DIMM until it fully seats in the socket.

The plastic hold-down/ejector tabs snap into place when the DIMM is inserted correctly.

7. Continue installing DIMMs to complete your memory upgrade.
8. Replace the processor module.
9. Replace the side panel or top cover.

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

10. Connect all external devices and restore power.
11. Reboot the server to configure it for the additional memory.

For more information, refer to Chapter 2, "Server Software and Utilities," for information on using the BIOS Setup utility.

Memory Troubleshooting

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

The memory error message format is:

<Type of error>: <Location>

This indicates that an error occurred while reading the memory configuration. The problem is either the DIMM or the processor module. In both cases, the server halts when this error occurs.

Where:

<Correctable Error>: <Jxx xxMB SDRAM DIMM>

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

Press <F1> to resume

Press the <F1> key to continue booting the server. The memory error is automatically corrected.

<Uncorrectable Error>: <Jxx xxMB SDRAM DIMM>

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

<Configuration Error>: <Jxx xxMB SDRAM DIMM>

If an uncorrectable error occurs, the server halts after the memory test and the faulty DIMM must be replaced immediately.

SCSI Device Configurations

7

Introduction

Your DIGITAL Server 3220/3220R supports wide Ultra internal SCSI disk drives and wide Ultra2 (LVD) for external devices on SCSI channel 2. The following sections describe the SCSI configuration guidelines that must be adhered to, so your server operates correctly after installing and connecting SCSI devices.

The server supports two SCSI channels. Channel 1 is used to connect internal SCSI devices. Channel 2 is used to connect external SCSI devices.

Storage Configuration Guidelines

- The server supports up to seven internal storage devices, including one CD-ROM drive, one diskette drive, two 5¼-inch drives, and four hot swap drives.
- The CD-ROM drive is attached to the IDE controller.
- The CD-ROM drive is scanned first when the server boots. If a bootable CD-ROM disc is placed in the CD-ROM drive, it will boot in place of drive A or drive C.
- The BIOS boot settings determine the boot order of storage devices.

SCSI Configuration Guidelines

- The SCSI controller has two buses, Channel 1 and Channel 2, which are typically used as follows:

Location	Mode	SCSI technology	Bus Speed	Max. Devices	Max. Bus Length
Internal channel 1	Single-ended	Wide Ultra SCSI	40 Mbytes/s	8	1.5 m
External channel 2	LVD	Wide Ultra2 SCSI	80 Mbytes/s	16	12 m

- Both ends of each SCSI bus must be terminated. The main logic board termination is set automatically. The other termination on Channel 1 is set on the storage backplane.
- External SCSI connections must be to the second SCSI bus (Channel 2). Use the SCSI knockouts at the rear of the server and the supplied SCSI cable.
- The Channel 2 bus length is measured from the main logic board (with termination enabled) Channel 2 connector to the end of the external bus.
- All devices on a SCSI bus require a unique SCSI ID. SCSI ID 7 is assigned to the SCSI controller.
- If a single-ended device is added to a bus with LVD devices, the bus becomes single-ended.

Tape Drive Configuration Guidelines

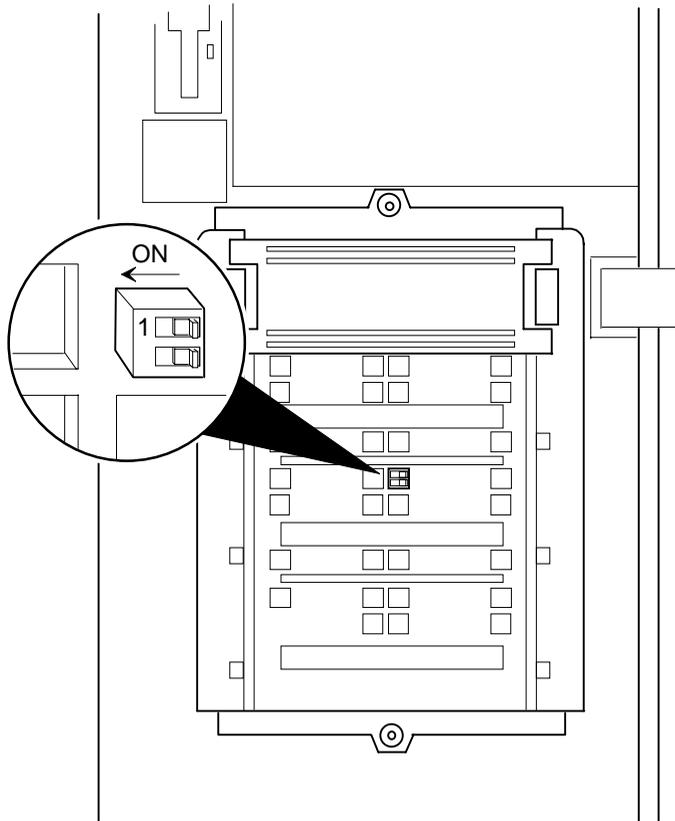
- Tape drives should be installed in the 5¼-inch drive bays.
- A full-height tape drive occupies two half-height 5¼-inch drive bays.
- Termination must be removed from SCSI tape devices. Termination is provided by the SCSI adapter and the cable.
- You must manually set the SCSI ID on tape drive(s). Refer to your manufacturer's documentation for information on setting drive IDs.
- Use the SCSI Configuration utility to configure tape drive(s).

Hot Swap Drive Configuration Guidelines

- A maximum of four hot swap drives can be installed and configured in the server.
- Hot swap drives must only be installed in the hot swap drive bay.
- SCSI ID addressing is fixed on the storage backplane as ID 0, 1, 2, and 3 from top to bottom. See Figures 7-1 and 7-2 for SCSI ID assignments and slot locations.
- All hot swap drives in model 3220R require drive carriers.

SCSI IDs (Model 3220)

Switch Position Setting	SCSI ID			
Top switch, (SW1-1) OFF	0	1	2	3
Top switch, ON	8	9	10	11
Bottom switch (SW1-2)	No connection			



DEC01064

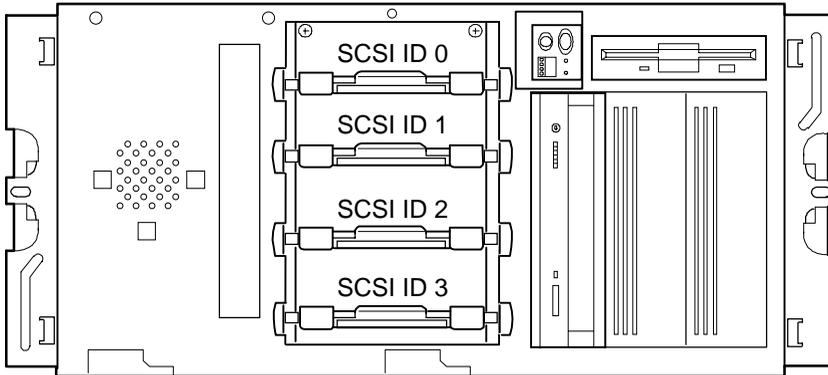
Figure 7-1. Model 3220 Storage Backplane Switch Location



NOTE: You need to remove the third hot swap drive from the top to gain access to switch SW1.

SCSI IDs (Model 3220R)

The SCSI ID addressing for the DIGITAL Server 3220R is fixed on the storage backplane as shown in Figure 7-2.



DEC01436

Figure 7-2. Model 3220R Storage Backplane SCSI Drive IDs

RAID Configuration Guidelines

- Fault management must be supported and enabled by an optional RAID adapter for disk drive hot swapping.
- When adding a RAID adapter to a server that does not have RAID installed, use the RAID software to configure your server for RAID operation.
- Select the disk drives in the hot swap drive bays for hot-swap support in a RAID server.
- Use the same capacity drives in a RAID group; otherwise, the difference in drive capacity will be lost.
- Using external storage, the maximum number of logical drives in a RAID group is 32.
- To maximize the I/O performance of your multi-channel RAID subsystem with external storage, connect each disk drive in a RAID group on a separate SCSI channel. This enables the RAID adapter concurrent access to all hot swap drives.
- Supported RAID levels include: 0, 1, 0+1, 5, and RAID 7 (JBOD).

RAID	Description	Drives Per RAID Group
0	Striping - no redundancy	2 - 8
1	Mirroring	2
0 + 1	Striping and mirroring	3 - 8
5	Striping with parity	3 - 8
7	Single disk - no redundancy (factory default)	1

Note: Each RAID server comes configured as RAID 7 or JBOD (Just a Bunch of Disks)

Cables

Your server comes with the following cabling arrangements:

- One IDE cable with two connectors (one to the main logic board, the other to an IDE device).
- Wide SCSI cable with two connectors connected to the wide SCSI connector on the main logic board and to the bottom 68-pin wide SCSI connector on the storage backplane.
- SCSI cable for SCSI channel 2 with two connectors (not connected).

Refer to Chapter 11, "Connecting SCSI and RAID Devices," for cabling diagrams.

Installing Storage Devices (DIGITAL Server 3220)

8

Introduction

Your DIGITAL Server 3220 has two drive bay areas:

- Top drive bay area—This area has one 5¼-inch IDE CD-ROM drive, one 3½-inch diskette drive (both standard) and room for two 5¼-inch half-height SCSI devices or one full-height, 5¼-inch device.
- Hot swap (lower) drive bay area—This area has room for four 3½-inch wide SCSI Storage Building Block (SBB) devices capable of “hot swapping,” exchanging the device while the server is powered on and not accessing the device.

Installing a Half-Height 5¼-Inch Device into the Top Drive Bay

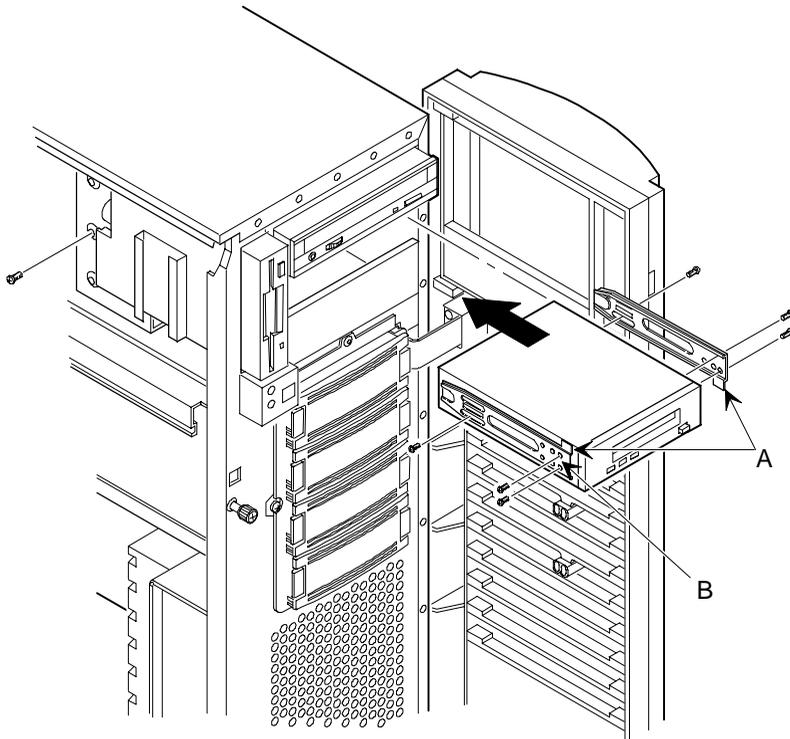
To install a half-height 5¼-inch device into one of the top drive bay slots, perform the following:

1. Turn off your server.
2. Disconnect all external devices, ac power, and monitor power.
3. Unlock and open the front bezel, loosen the thumbscrews, and remove the side panel.
4. Remove the front plastic filler panel.

Installing Storage Devices (DIGITAL Server 3220)

5. Attach the supplied drive brackets to the device.
 - a. Ensure that the tab on the left bracket is up (A, Figure 8-1) and the tab on the right bracket is down.
 - b. Install two screws in the front holes (B, Figure 8-1) and in one rear slot. (When installed, the labeling on the right bracket will be upside down.)
6. Insert the device into the drive bay slot from the front.
7. Secure the device to the slot using the supplied pan-head mounting screw.

Refer to Chapter 11, "Connecting SCSI Devices and RAID Adapters," for power and SCSI cable connections.



DEC01660-2

Figure 8-1. Installing a Half-Height 5 1/4-Inch Device Into the Top Drive Bay

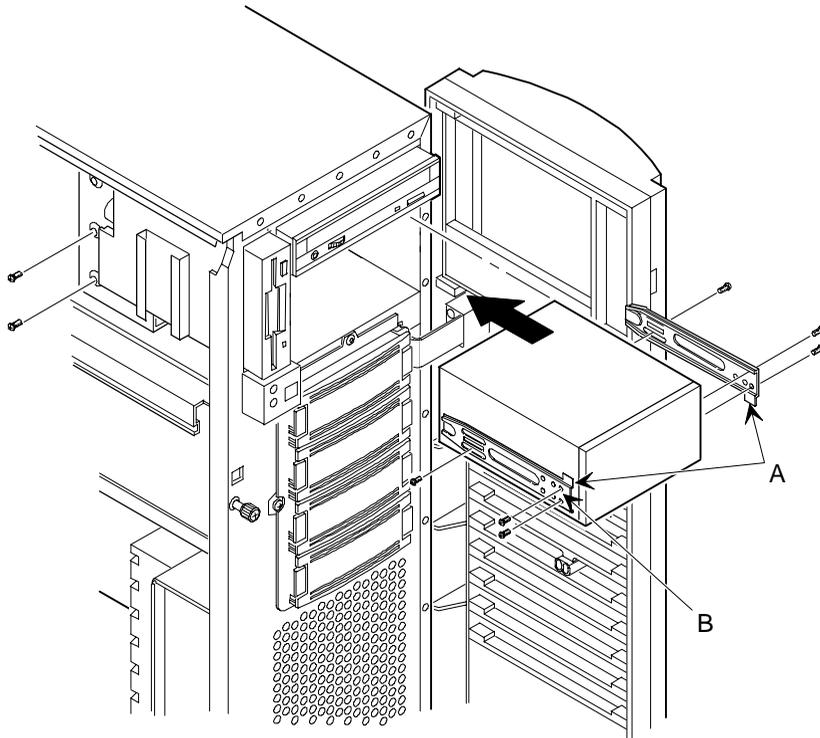
Installing a Full-Height 5¼-Inch Device into the Top Drive Bay

To install a full-height 5¼-inch device into the top drive bay slots, perform the following:

1. Turn off your server.
2. Disconnect all external devices, ac power, and monitor power.
3. Unlock and open the front bezel, loosen the thumbscrews, and remove the side panel.
4. Remove the front plastic filler panels.
5. Attach the supplied drive brackets to the device.
 - a. Ensure that the tab on the left bracket is up (A, Figure 8-2) and the tab on the right bracket is down.
 - b. Install two screws in the front holes (B, Figure 8-2) and in one rear slot. (When installed, the labeling on the right bracket will be upside down.)
6. Insert the device into the drive bay from the front.
7. Secure the device using the supplied mounting screws.

Refer to Chapter 11, "Connecting SCSI Devices and RAID Adapters," for power and SCSI cable connections.

Installing Storage Devices (DIGITAL Server 3220)

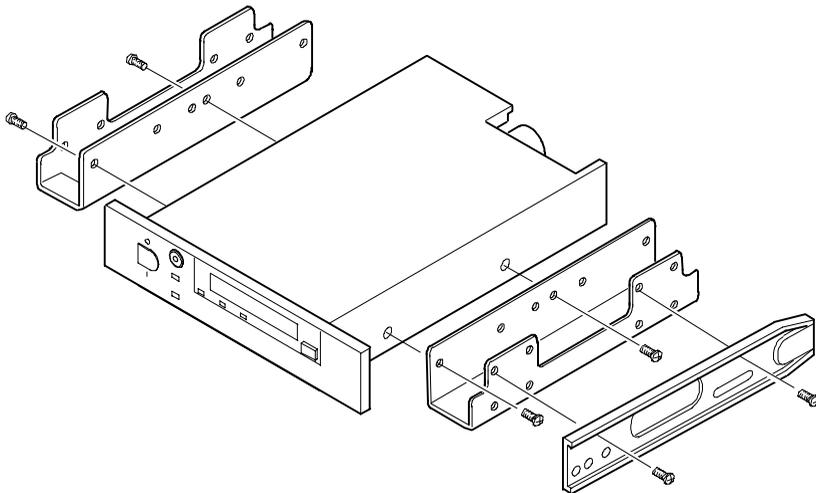


DEC01660-3

Figure 8-2. Installing a Full-Height 5 1/4-Inch Device Into the Top Drive Bay

Expansion Brackets

You can install 3½-inch half-height devices in the front access drive bay. If you plan to install a 3½-inch device in a 5¼-inch drive bay slot, you must first install the 3½-inch expansion brackets onto the device, as shown in Figure 8-3. The expansion brackets are either supplied with the device or can be purchased from DIGITAL. Contact your local DIGITAL sales representative for additional information. Afterwards, install the 3½-inch device following the procedures described in “Installing a Half-Height 5¼-Inch Device into the Top Drive Bay.”



DEC01447

Figure 8-3. Installing 3½-Inch Expansion Brackets

Hot-Swap Drive Bay

Hot-swapping allows you to remove or install a hot swap drive while the server remains on-line and active but not accessing the device being swapped. This eliminates interference with the server's operation. For hot swap drives, you can use the hot-swap method to replace a device providing that the device is not active (green activity LED is off).



NOTE: You might need to reconfigure your server to recognize the devices you installed.

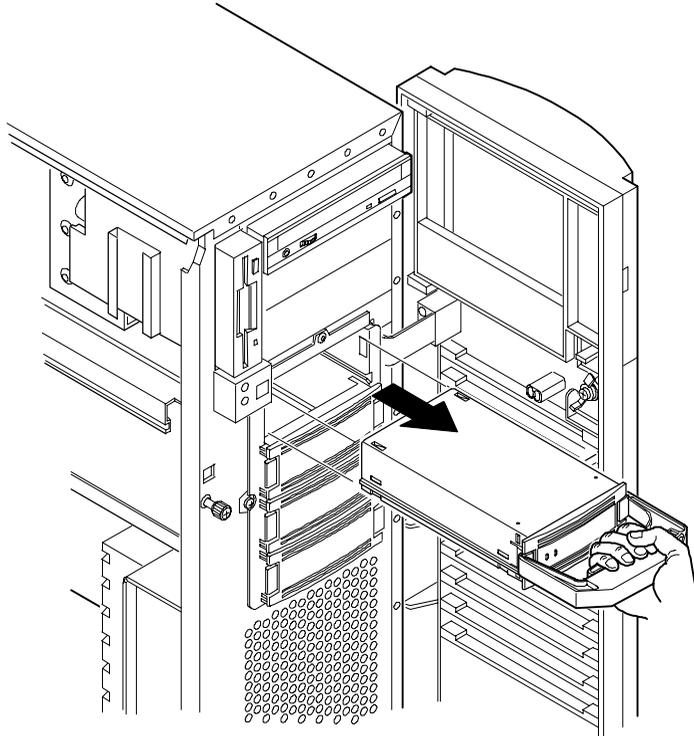


CAUTION: To avoid possible damage to components, place an antistatic wrist strap on your wrist and then connect the grounding clip to a non-painted metal surface on your server's chassis.

Use the following procedure to install or replace a hot swap drive:

1. Unlock and open the front bezel.
2. Remove the filler panel or hot swap drive by pressing in and holding the handle in the middle of the extractor tool (see Figure 8-4).
3. Using the extractor tool, pull the hot swap drive out.
4. Insert the new hot swap drive into the guide slots and push it in until it is fully seated and the mounting tabs engage the shelf.
5. Close and lock the front bezel.

Installing Storage Devices (DIGITAL Server 3220)



DEC01058-3

Figure 8-4. Removing a Device from the Hot-Swap Drive Bay

Hot Swap Drive Status Indicators

The hot-swap backplane monitors the hot swap drives to identify error conditions or failures. This status is displayed on the LEDs. The left LED displays the device activity status. The right LED is the fault LED.

- Activity Status — the left LED (green) is on or flashing when the hot swap drive is active.



CAUTION: For non-RAID adapters, removing a hot swap drive when the left LED is on or flashing can cause the loss or corruption of data.

- Fault LED — for RAID adapters, the right LED (amber) is the hot swap drive fault LED and indicates an error condition when it is either on or flashing.

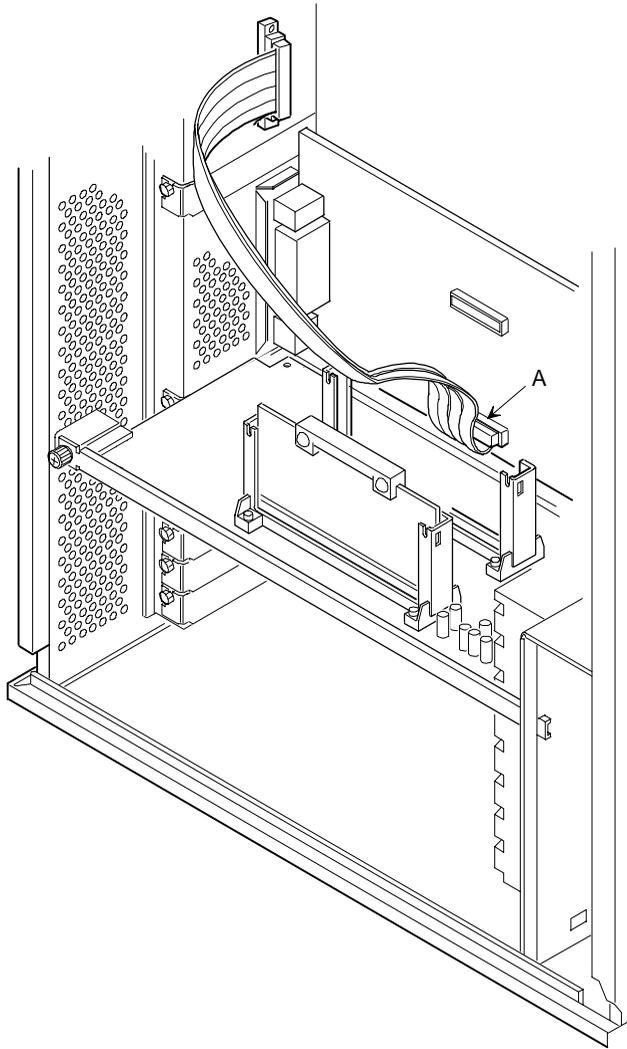
Hot Swap Drive Status LEDs

Green Activity Status LED	Amber Fault LED	Indication
On	Off	Device is operating properly.
Flashing	Off	Device is operating properly.
Off	Off	Device is inactive and operating normally. There is no fault.
On	On	Fault: Device is hung. Replace hot swap drive.
Off	On	Fault: Device is inactive and spun down. Replace hot swap drive.
On	Flashing	Fault: Device is active and spinning down due to a fault.

Installing the External Wide SCSI Cable Assembly

To connect the external wide SCSI cable assembly:

1. Power down the server.
2. Unlock and open the front bezel, loosen the thumbscrews, and remove the side panel.
3. If processor 2 (CPU2) is installed, you need to remove the processor module to gain access to the SCSI channel 2 connector on the main logic board.
4. Connect one end of the external wide SCSI cable assembly to the SCSI channel 2 connector on the main logic board.
5. Remove any cover plate from the appropriate SCSI knockout at the rear of the server.
6. Remove one of the hex-head screws from the end of the external wide SCSI assembly and then loosen the other.
7. Thread the cable through the nylon cable clamps at the top of the chassis divider. Do not block the air flow from the fan.
8. Insert the cable connector through the knockout and secure it in place with the hex-head screws.
9. Continue with connecting an “External SCSI Storage Box” described later in this chapter. Otherwise, attach a terminator to the external wide SCSI connector at the rear of the server.



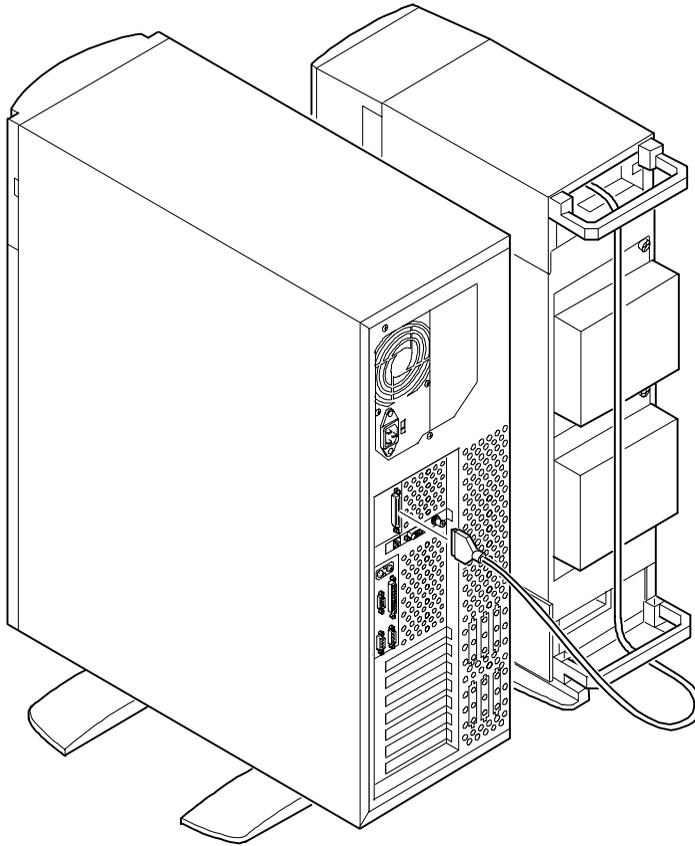
DEC01684-3

Figure 8-5. Installing the External Wide SCSI Cable Assembly

Connecting an External SCSI Storage Box

To connect an external SCSI storage box:

1. Power down the server.
2. Remove any terminator from the external wide SCSI connector at the rear of the server.
3. Connect the external SCSI storage box cable to the external SCSI connector at the rear of the server making sure it is properly terminated.



DEC01059

Figure 8-6. Connecting an External SCSI Storage Box

Installing Storage Devices (DIGITAL Server 3220R)



Introduction

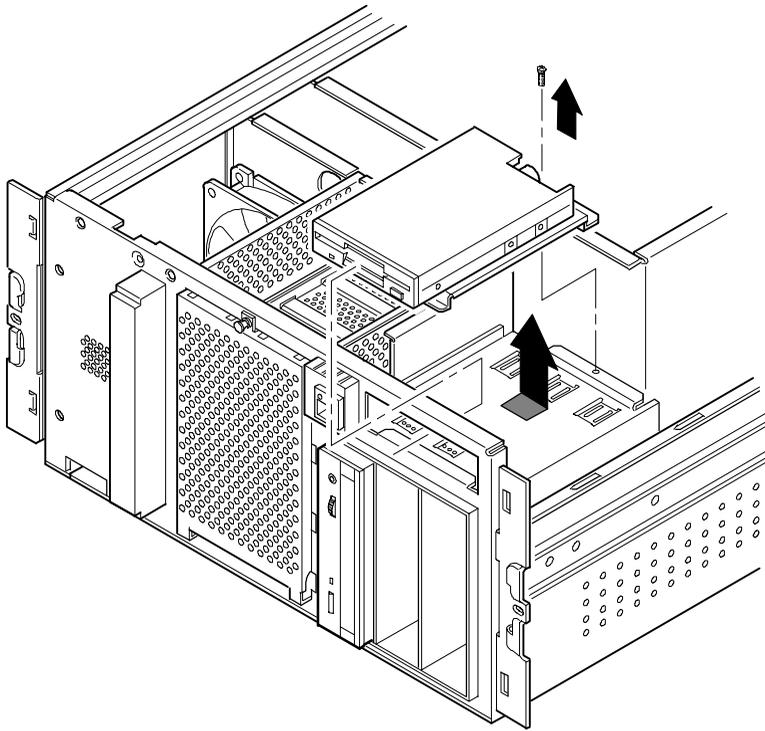
Your DIGITAL Server 3220R has two drive bay areas:

- Front access drive bay area—This area has one 5¼-inch IDE CD-ROM drive, one 3½-inch diskette drive (both standard) and room for two 5¼-inch half-height SCSI devices or one full-height, 5¼-inch device.
- Hot swap drive bay area—This area has room for four 3½-inch hot swap drives. “Hot swapping” enables you to exchange devices while the server is powered on as long as the device is not being accessed.

Installing a Half-Height 5¼-Inch Device into the Front Access Drive Bay

To install a half-height 5¼-inch device into one of the front access drive bay slots, perform the following:

1. Turn off your server.
2. Remove the front bezel.
3. Remove the screws securing the server to the rack and then slide it out.
4. Remove the screw securing the top cover to the server.
5. Remove the top cover.
6. Disconnect the power and data cables from the diskette drive.
7. Remove the screw securing the diskette drive to the chassis and then remove the drive (see Figure 9-1).



DEC01433-5

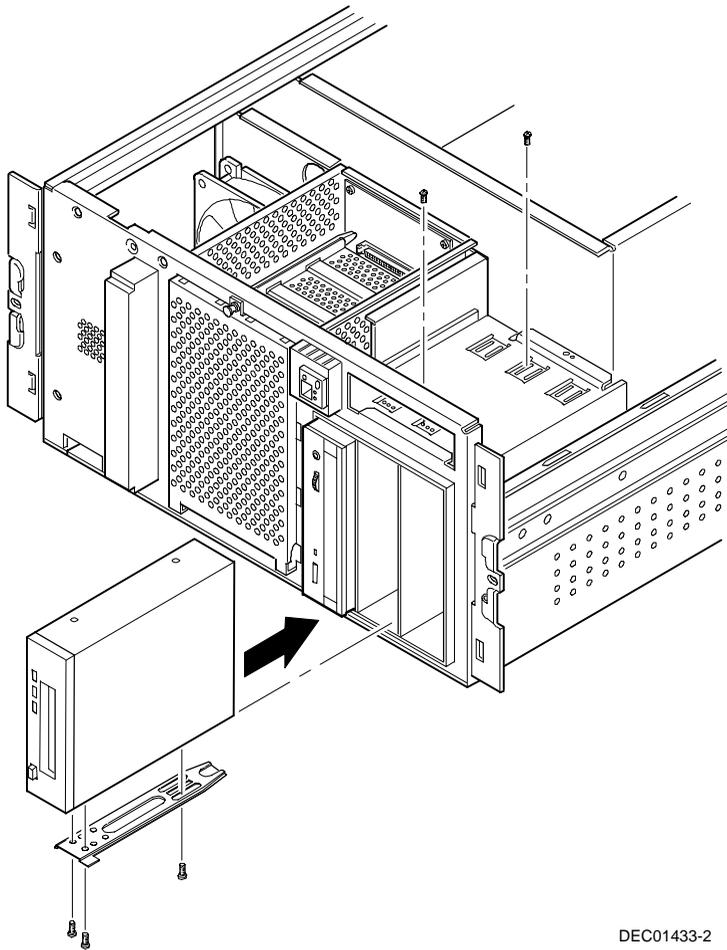
Figure 9-1. Removing the Diskette Drive

Installing Storage Devices (DIGITAL Server 3220R)

8. Remove the bracket from the drive bay (inside, bottom) and attach it to device being installed (see Figure 9-2).
9. Slide the device into the drive bay.
10. Secure the device to the slot using the supplied mounting screws.
11. Replace the diskette drive.
12. Connect the power and data cables to the diskette drive.

Refer to Chapter 11, "Connecting SCSI Devices and RAID Adapters," for power and SCSI cable connections.

Installing Storage Devices (DIGITAL Server 3220R)



DEC01433-2

Figure 9-2. Installing a Half-Height 5 1/4-Inch Device Into the Front Access Drive Bay

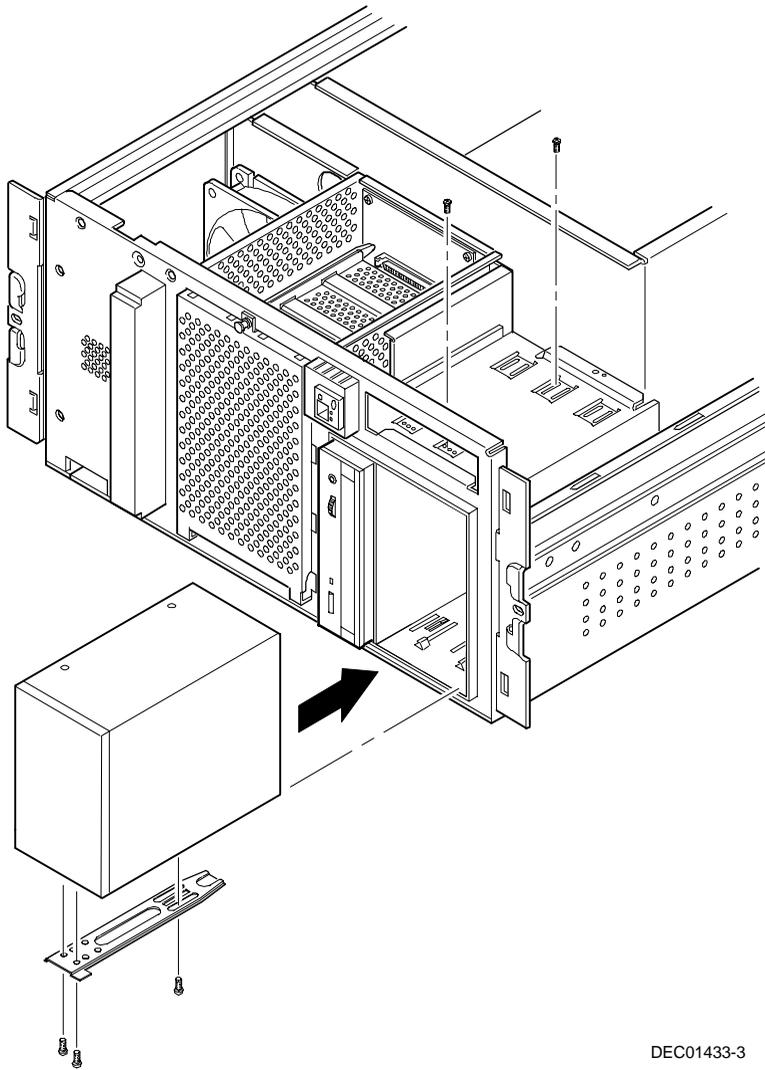
Installing a Full-Height 5¼-Inch Device into the Front Access Drive Bay

To install a full-height 5¼-inch device into the front access drive bay slots, perform the following:

1. Turn off your server.
2. Remove the front bezel.
3. Remove the screws securing the server to the rack and then slide it out.
4. Remove the screw securing the top cover to the server.
5. Remove the top cover.
6. Disconnect the power and data cables from the diskette drive.
7. Remove the bracket from the drive bay (inside, bottom) and attach it to device (see Figure 9-3).
8. Remove the divider plate from between the two right-most drive bays.
9. Secure the device to the slot using the supplied mounting screws.
10. Replace the diskette drive.
11. Connect the power and data cables to the diskette drive.

Refer to Chapter 11, "Connecting SCSI Devices and RAID Adapters," for power and SCSI cable connections.

Installing Storage Devices (DIGITAL Server 3220R)



DEC01433-3

Figure 9-3. Installing a Full-Height 5 1/4-Inch Device Into the Front Access Drive Bay

Expansion Brackets

You can install 3½-inch half-height devices in the front access drive bay. If you plan to install a 3½-inch device in a 5¼-inch drive bay slot, you must first install the 3½-inch expansion brackets onto the device, as shown in Figure 8-3. The expansion brackets are either supplied with the device or can be purchased from DIGITAL. Contact your local DIGITAL sales representative for additional information.

Hot-Swap Drive Bay

For hot swap drives, you can use the “hot swapping” method to replace a device providing that the device is not active (green activity LED is off). Hot-swapping allows you to remove or install a hot swap drive while the server remains online and active, but not accessing the drive being swapped. This eliminates interference with the server's operation.



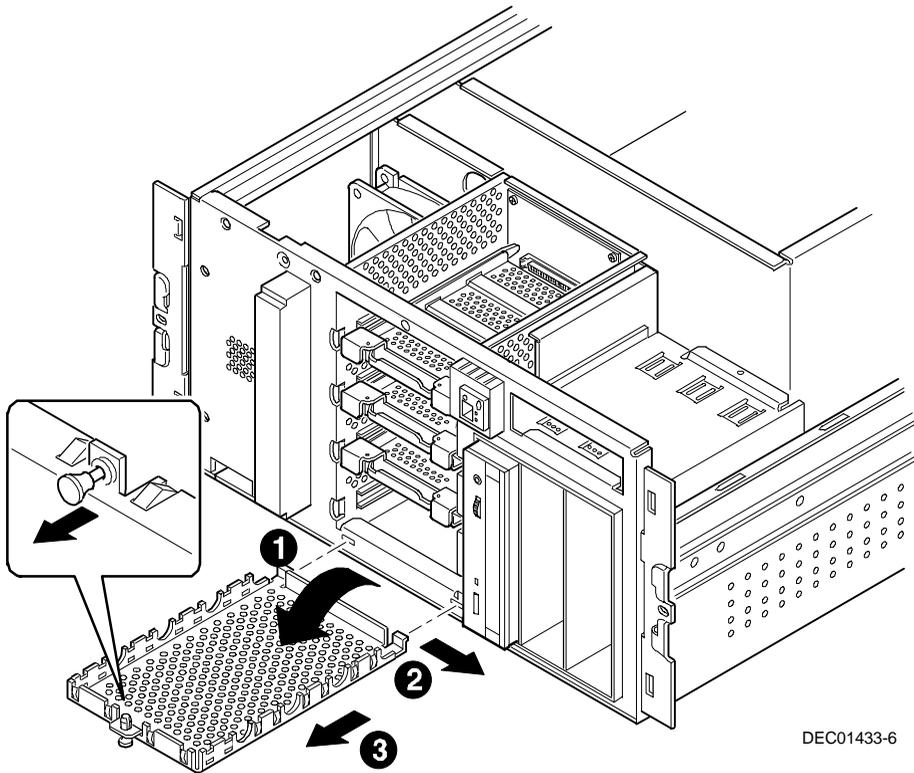
NOTE: You might need to reconfigure your server to recognize the devices you installed.



CAUTION: To avoid possible damage to components, place an antistatic wrist strap on your wrist and then connect the grounding clip to a non-painted metal surface on your server's chassis.

Use the following procedure to install or replace an hot swap drive:

1. Remove the front bezel.
2. Remove the hot swap drive bay cage cover by first pulling it forward, sliding it to the right, and then by bringing it forward. (see Figure 9-4).

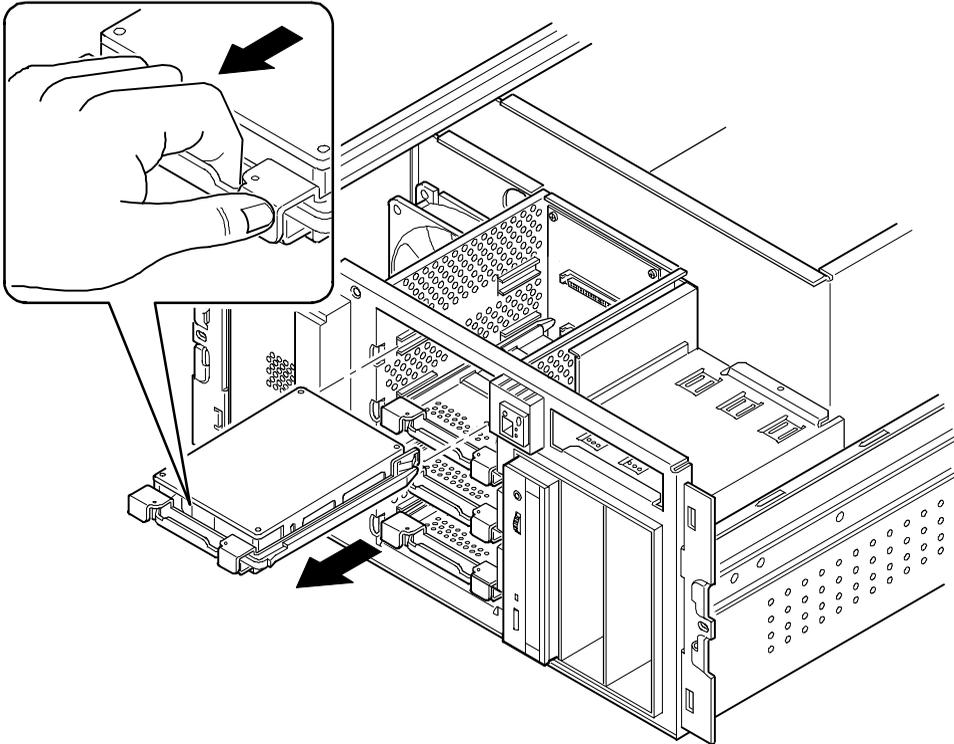


DEC01433-6

Figure 9-4. Removing the Hot Swap Drive Bay Cage Cover

Installing Storage Devices (DIGITAL Server 3220R)

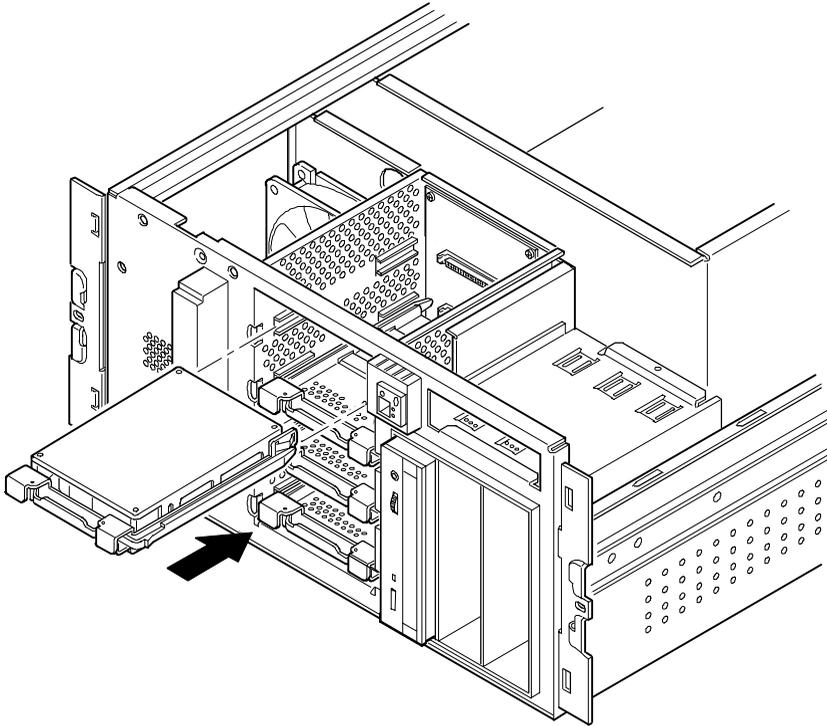
3. Remove the hot swap drive assembly by pulling or grasping the handle, and carefully sliding the assembly out. Do not forcibly remove the hot swap drive assembly.



DEC01433-7

Figure 9-5. Removing the Hot Swap Drive and Drive Tray

4. Align the new hot swap drive and drive tray in the appropriate slot and then push in until the a click is heard. This indicates that the hot swap drive is fully seated into the storage backplane (see Figure 9-6).
5. Replace the hot swap drive bay cage cover.
6. Replace the front bezel.



DEC01433-4

Figure 9-6. Installing a Hot Swap Drive Into the Hot Swap Drive Bay

Hot Swap Drive Status LED Indicators

The storage backplane monitors hot swap drive status to identify error conditions or failures. The following list describes each LED.

- The top LED (green) is the activity status LED and is on or flashing when the hot swap drive is active.



CAUTION: For non-RAID adapters, removing a hot swap drive when the top LED is on or flashing can cause the loss or corruption of data.

- The center LED (amber) is the fault LED and indicates an error condition when it is either on or flashing.
- The bottom LED (green) indicates that the hot swap drive is installed and powered on.

Hot Swap Drive Status LEDs

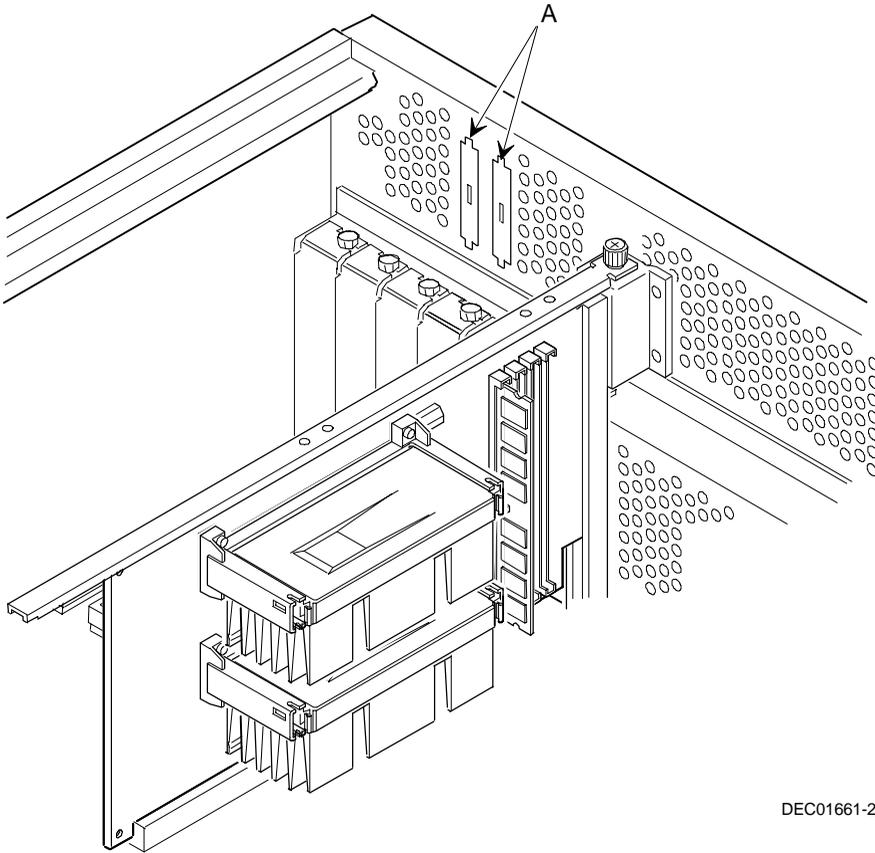
Activity Status LED (Top) Green	Fault Status LED (Center) Amber	Drive Present, Power On LED (Bottom) Green	Indication
Off	Off	On	Drive is present with power.
Flashing	Off	On	Drive is present with power and is being accessed.
Off	On	On	Drive can be replaced. Steady yellow fault light indicates the drive has a problem. Power to the drive is off.
Off	Slow flashing	On	Drive must not be replaced at this time. A slowly flashing yellow fault light indicates a drive that has just been replaced is in recovery mode (drive array being built), or drive failed and is spinning down. Power to the drive is on.
Off	Off	Off	There is no drive installed in the hot swap drive bay, or the drive is not fully seated in the bay.

Connecting the External Wide SCSI Cable Assembly

To connect the external wide SCSI cable assembly:

1. Power down the server.
2. Remove the front bezel.
3. Remove the screws securing the server to the rack and then slide it out.
4. Remove the screw securing the top cover to the server.
5. Remove the top cover.
6. If processor 2 (CPU2) is installed, you need to remove the processor module to gain access to the SCSI channel 2 connector on the main logic board.
7. Using a screwdriver, gently pry away the appropriate SCSI knockout located at the rear panel (A, Figure 9-7).

Installing Storage Devices (DIGITAL Server 3220R)



DEC01661-2

Figure 9-7. SCSI Knockout Locations

Installing Storage Devices (DIGITAL Server 3220R)

8. Connect the wide SCSI 68-pin unshielded cable connector to the SCSI channel 2 connector on main logic board. (A, Figure 9-8).

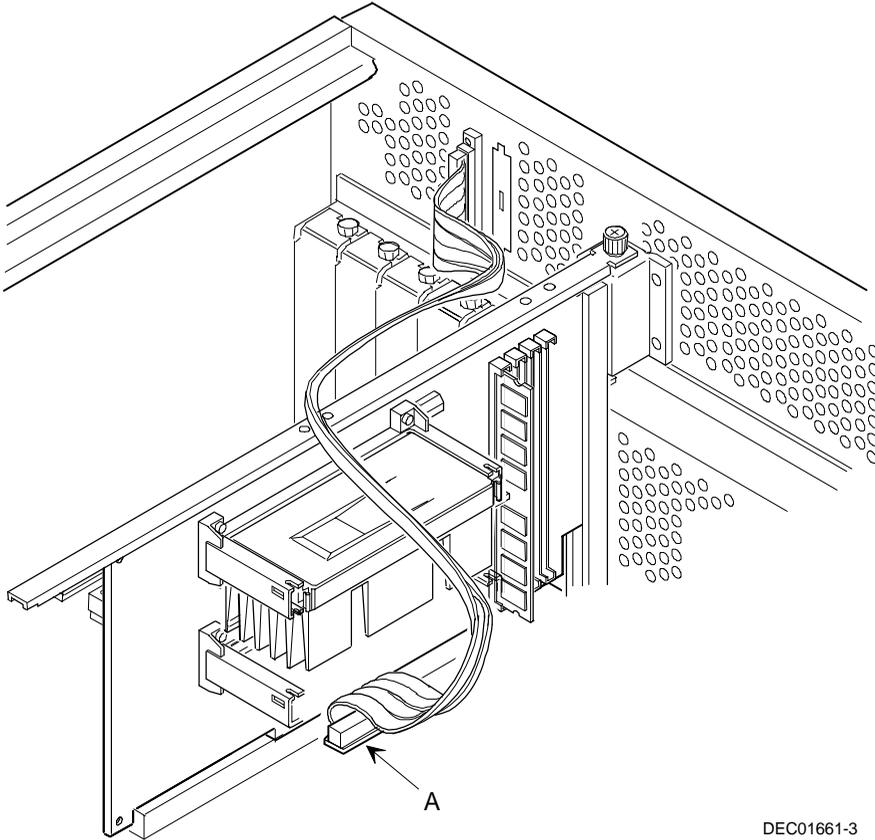
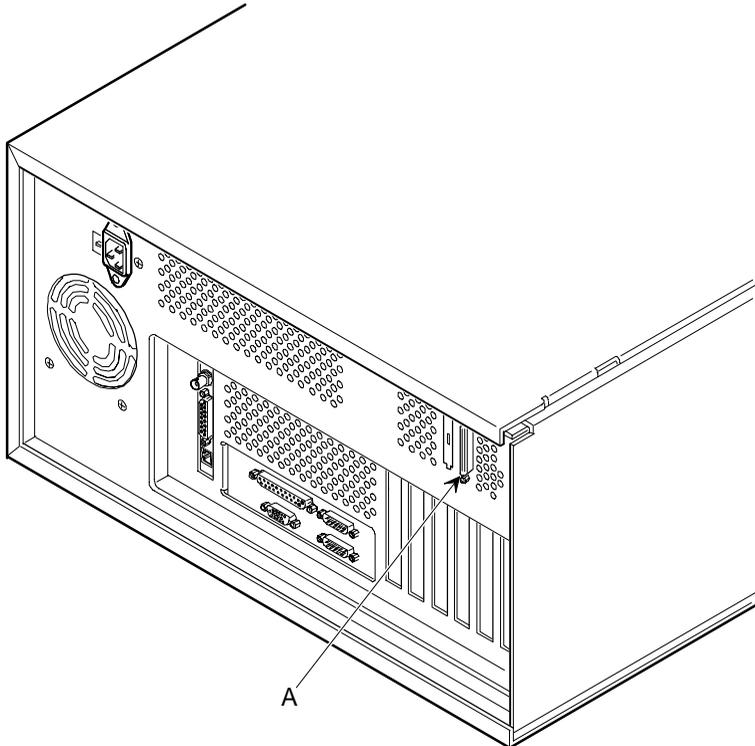


Figure 9-8. Cable Connections

9. Screw the appropriate (wide SCSI 68-pin) external shielded connector to the outside of the knockout panel.
10. Connect the external SCSI device making sure the external device is properly terminated (A, Figure 9-9).

11. If you are not attaching an external device at this time, attach a terminator to the external wide SCSI connector at the rear of the server.



DEC01435

Figure 9-9. Connecting an External SCSI Device

Installing Expansion Boards

10

Introduction

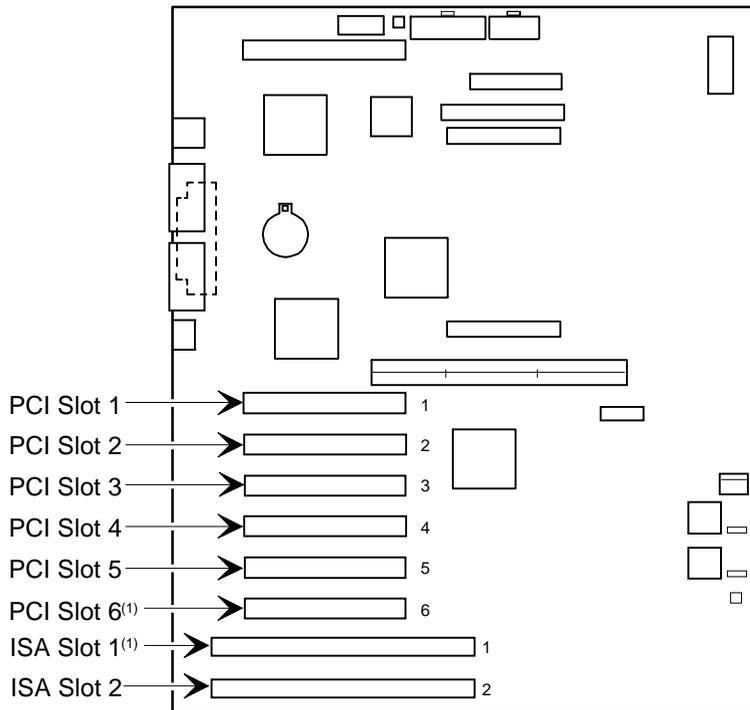
This chapter contains the configuration guidelines that must be followed prior to installing ISA or PCI expansion boards as well as detailed installation procedures.

The BIOS detects ISA and PCI boot devices and expansion boards. ISA devices have jumpers or switches that determine their bus address. PCI devices have their addresses assigned dynamically by the BIOS, in ascending order beginning with the first available address (the lower the address, the higher the priority of the device).

ISA Expansion Board Configuration Guidelines

- The two ISA slots support industry-standard 16-bit ISA expansion boards.
- Quick Launch detects PCI, SCSI, and RAID devices; it does not detect ISA devices.

Installing Expansion Boards



DEC01624-5

⁽¹⁾ PCI slot 6 and ISA slot 1 share an expansion slot at the rear of the server. Only one expansion board can be installed in either one of these slots at any one time.

Figure 10-1. Expansion Board Slot Locations

PCI Expansion Board Configuration Guidelines

When installing expansion boards or other bootable devices, consider the following:

- All PCI slots support bus mastering.
- PCI expansion boards should be installed starting in PCI slot one. Install a PCI expansion board in the “shared PCI slot” (slot 6) last.
- The assignment for the boot device depends on which boot device occurs first on the bus.
- The BIOS assigns addresses starting with the first available address.
- The lower the address, the higher the priority that is assigned to the device.



NOTE: If you want a PCI device to be the bootable device, do not set the address jumpers or switches for an ISA device to address C8000h.

Configuring PCI Expansion Boards Using the BIOS Setup Utility

When installing PCI expansion boards in your server, the BIOS Setup utility must be run to configure these boards. The BIOS Setup utility then will automatically detect any expansion board during a server boot. The ROM addresses for these PCI expansion boards will be assigned based on the PCI scan order and address availability.

Boot Devices

The BIOS Setup utility allows you to define the boot device location as:

- Onboard SCSI controller
- PCI expansion slot (default)
- ISA expansion slot

The BIOS assigns addresses beginning at the first available address — the lower the address, the higher the priority assigned to that device.

Server Boot Sequence

The server boot sequence is as follows:

1. If the CD-ROM drive is listed as the first boot device in the BIOS, the server boots from the CD-ROM drive.
2. If a bootable CD-ROM is not present, the operating system can boot from either the diskette drive (drive A) or the hard drive (drive C) using the BIOS Setup utility as follows:
 - a. If the diskette drive (drive A) is selected first and then the hard drive (drive C), the server searches the diskette drive (drive A) first to boot the operating system. If a diskette is not present in the diskette drive (drive A), the server attempts to boot from the hard drive (drive C).
 - b. If the hard drive (drive C) is selected first and then the diskette drive (drive A), the server searches the hard drive (drive C) first to boot the operating system. If the hard drive (drive C) does not contain the boot information, the server attempts to boot from the diskette drive (drive A).

The hard drive (drive C) can be attached to the onboard SCSI controller, an ISA expansion board, or a PCI expansion board.

The location of the hard drive (drive C) is determined by the server scan sequence described next.

Server Scan Sequence

If the boot device is neither the CD-ROM drive or the diskette drive, then the operating system will be found on drive C. The location of drive C can be determined as follows:

1. The search for a bootable device begins from a low ROM address to a high ROM address (starting at C8000h through EFFFFh). The boot device with the lower address is assigned higher priority (this is drive C).
2. When the server BIOS detects PCI expansion boards with ROMs installed in PCI slots, it copies all the ROMs of the expansion boards to C8000 - DFFFF areas in ascending order. The first scanned PCI expansion board occupies the address area starting from the first available area. This could be C8000 if C8000 is available. The second scanned PCI expansion board occupies the second available address area behind C8000, and so forth.
3. If a bootable ISA expansion board is configured to occupy the C8000 region, the server BIOS puts the existing PCI devices behind that region. When the ISA expansion board is configured to occupy the C8000 address, PCI bootable devices are not the first bootable device drive C.

PCI Scan Sequence

The server PCI slot sequence is listed in the following table:

Priority	Slot Number
1	1 (Bus 0, device 0Dh)
2	2 (Bus 0, device 0Eh)
3	Proprietary slot (Bus 0 - ENET: device 0Eh, VGA: device 12h)
4	3 (Bus N + 1, device 08h)
5	4 (Bus N + 1, device 09h)
6	5 (Bus N + 1, device 0Ah)
7	6 (Bus N + 1, device 0Bh)

The PCI scanning sequence is based on the following:

1. The bus scanning sequence is in ascending order starting from bus 0, which contains slot 1, slot 2, and the proprietary slot.



NOTE: If you want a PCI device to be the bootable device, do not set the address jumpers or switches for an ISA device to address C8000h.

Installing Expansion Boards

2. There is an onboard PCI-to-PCI bridge (PPB) attached to bus 0, which bridges to slots 3, 4, 5, and 6.
3. The bus scanning process is in a recursive loop. The following explains this loop:
 - If the server BIOS detects a PCI-to-PCI bridge chip (PPB) on the current Bus N, the bus number of the PPB is assigned as N + 1. The server BIOS does not scan the next device or slot on the current bus (Bus N). Instead, it scans the first device of Bus N + 1 and, if the first device is not PPB, it then scans the second device of Bus N + 1.
 - If the first device of Bus N + 1 is PPB, the bus number of the PPB on Bus N + 1 is assigned as Bus N + 2. Once a PPB is found, the scan path goes to that PPB until no PPB is found again. Afterwards, it moves to the next device.
 - The bus scanning process is recursive until no additional PPB devices are found. The server BIOS then scans the other devices on the last found PPB, and then goes back to the upper level bus and continues to scan other devices. Being recursive, the server BIOS returns to Bus N.

Installing Expansion Boards

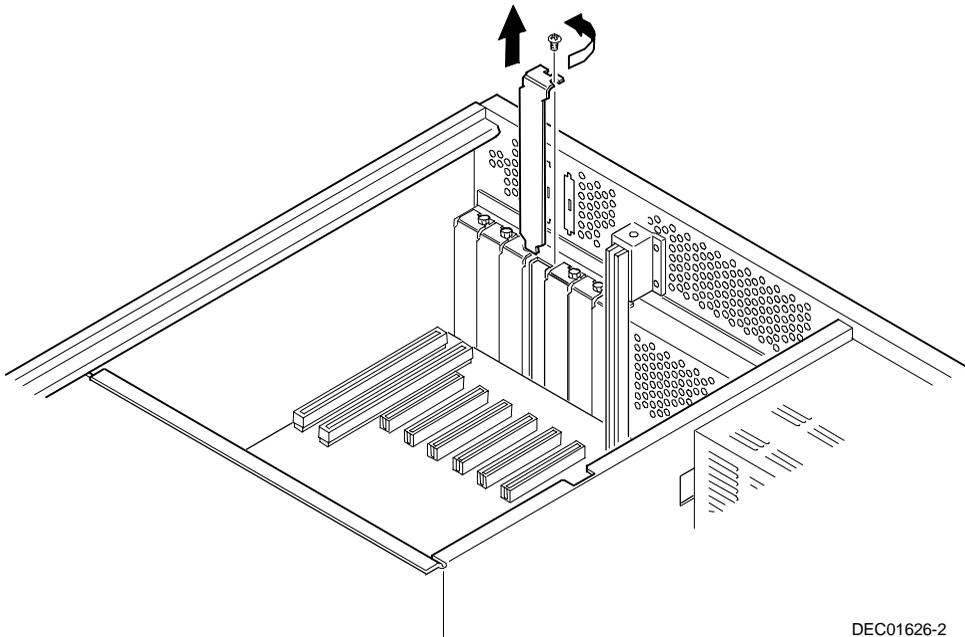
The following procedure describes how to install ISA and PCI expansion boards.

1. Turn off your server.
2. Remove the appropriate access panel.



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

3. Unscrew and remove the metal filler plate from the desired PCI or ISA expansion slot.
4. Discard the filler plate, but retain the screw.



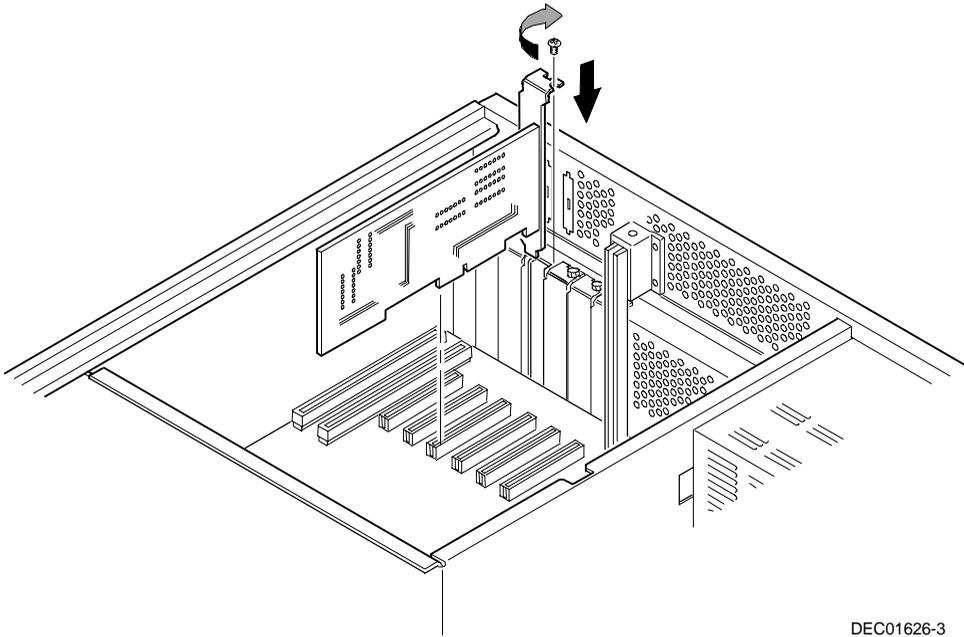
DEC01626-2

Figure 10-2. Removing a Metal Filler Plate

Installing Expansion Boards

5. Insert the new expansion board into the socket from which the filler plate has been removed, and push the board firmly into place.
6. Secure the expansion board with the screw removed from the filler plate.
7. Replace the appropriate access panel.
8. Restore power and reboot the server.

For information on assigning IRQs, refer to Chapter 2, "Server Software and Utilities,"



DEC01626-3

Figure 10-3. Installing an Expansion Board

Connecting SCSI and RAID Devices

11

Introduction

This chapter contains the cabling configurations that must be followed when connecting SCSI and RAID devices.

Refer to Chapter 7, "SCSI Device Configurations," for detailed information on SCSI configuration guidelines.

SCSI Cable Configurations

The following sections describe the available SCSI cable configurations for your DIGITAL Server.

Wide Ultra SCSI Cable Configuration

To connect wide Ultra SCSI devices, perform the following:

1. Power down the server.
2. Disconnect all peripheral devices from the server.
3. Remove the access panel(s).
4. Connect the cables as shown in Figure 11-1.

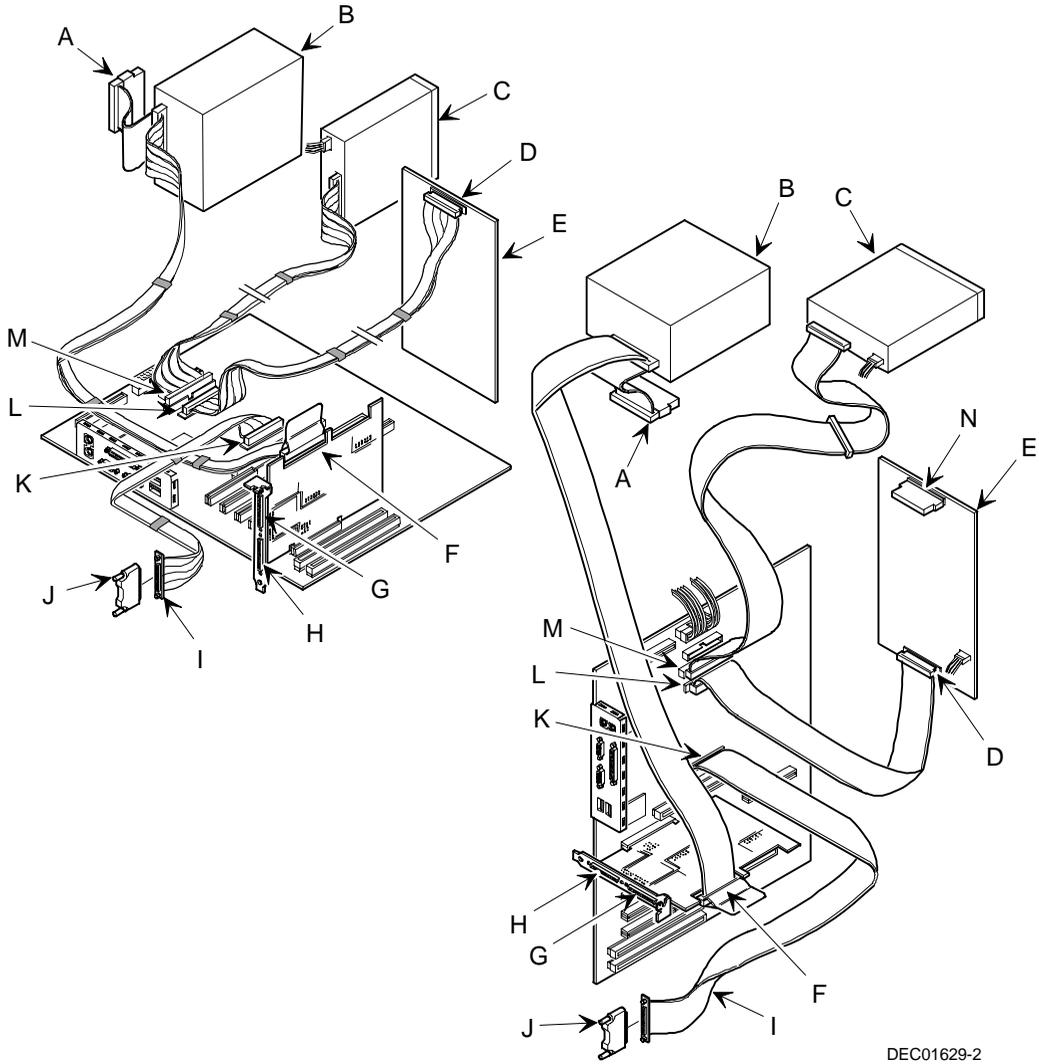
Use the nylon cable clamps to dress the cables properly. Do not block the air flow from the fan.

Connecting SCSI and RAID Devices

5. Replace the access panel(s).
6. Connect all external devices and then power on your server.
7. Run the SCSI Configuration utility to configure your server.

Refer to Chapter 2, "Server Software and Utilities," and your SCSI documentation for additional configuration information.

Figure 11-1 Legend	Component
A	Cable terminator
B	SCSI tape drive
C	IDE CD-ROM drive
D	68-pin SCSI connector to storage backplane (SCSI channel 1)
E	Storage backplane
F	SCSI adapter
G	External connector SCSI adapter channel 0
H	External connector SCSI adapter channel 1
I	68-pin SCSI cable to SCSI knockout
J	External terminator
K	SCSI channel 2 connector
L	SCSI channel 1 connector
M	IDE connector
N	68-pin single-ended SCSI terminator (model 3220 only)



DEC01629-2

Figure 11-1. Wide Ultra SCSI Cable Configuration

RAID Cable Configuration

To connect SCSI devices using a RAID adapter, perform the following:



NOTE: Your DIGITAL Server also supports two-channel and three-channel RAID adapters. Contact your DIGITAL sales representative for more information.

1. Power down the server.
2. Disconnect all peripheral devices from the server.
3. Remove the access panel(s).
4. Connect the cables as shown in Figure 11-2.

Use the nylon cable clamps to dress the cables properly. Do not block the air flow from the fan (if present).

5. Replace the access panels.
6. Connect all external devices and then power on your server.
7. Run the SCSI and/or RAID utilities to configure your server.

Refer to Chapter 2, "Server Software and Utilities," and to your SCSI and RAID documentation for additional configuration information.

Figure 11-2 Legend	Component
A	Cable terminator
B	SCSI tape drive
C	IDE CD-ROM drive
D	68-pin SCSI connector to storage backplane (RAID channel 0)
E	Storage backplane
F	RAID adapter channel 0 connector
G	External connector RAID adapter channel 0
H	External connector RAID adapter channel 1
I	68-pin SCSI cable to SCSI knockout
J	External terminator
K	SCSI channel 2 connector
L	SCSI channel 1 connector
M	IDE connector
N	68-pin single-ended SCSI terminator (model 3220 only)

Server Security Features

12

Introduction

Server security is important to prevent theft or accidental loss of software and hardware. The DIGITAL Servers 3220/3220R provide the following levels of physical security:

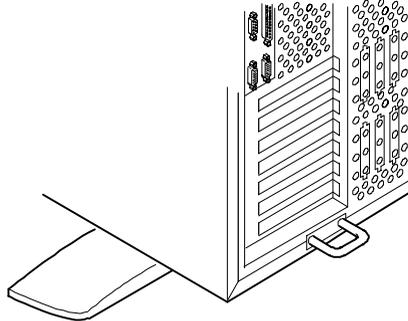
- Hold-down bar at the rear of the chassis (model 3220 only).
- Front-access security door and front bezel lock (model 3220 only).
- DIGITAL racks with locks are available for use with the DIGITAL Servers.

The following security features are available on the DIGITAL Servers 3220/3220R using the BIOS Setup utility.

- Supervisor password.
- Additional security features.

Hold-Down Bar (Model 3220)

At the rear of the DIGITAL Server 3220 chassis on the bottom is a rectangular hold-down bar that pulls out. You can use this bar to secure the server to the floor or to a desk using a locking cable.



DEC01106

Figure 12-1. Hold-Down Bar

Front-Access Security Door and Front Bezel Lock (Model 3220)

The DIGITAL Server 3220 has a three-way keylock used to prevent unauthorized access to the front-access security door and front bezel. To open the front-access security door, insert the key into the keylock at the top position, depress and turn the key clockwise to the first unlock position (45°). To open the front bezel, continue to turn the key clockwise to the second unlock position (90°).



CAUTION: Be careful not to lose your server keys. Write the key number in your manual and keep the key in a secure place. Losing these keys prevents you from removing the side panel, opening the front-access security door, and opening the front bezel. Contact your authorized service provider or authorized dealer for information on replacing lost keys.

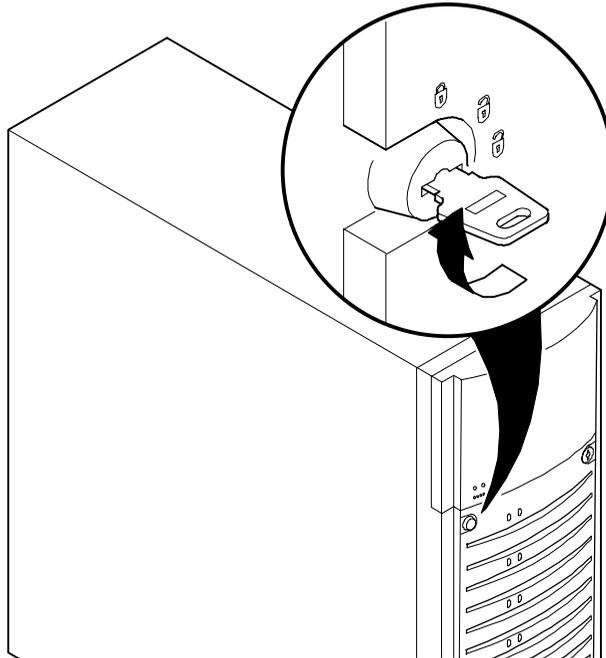


Figure 12-2. Front-Access Security Door and Front Bezel Lock

Supervisor Password

Your server has password protection that you can set to prevent unauthorized access to your server files. If you set a supervisor password, you will be prompted to enter it prior to accessing the BIOS Setup utility. If “Password On Boot” is enabled, you will be prompted to enter a password before your operating system boots.

Refer to Chapter 2, “Server Software and Utilities,” for more information.

If You Forget Your Password

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

1. Turn off your server and remove the appropriate panel to access the main logic board.
2. Change switch SW1-3 to ON (Password Clear position).

Refer to Appendix A, “Technical Specifications,” Main Logic Board Switch Settings, and Figure A-1 for additional information.

3. Reconnect your server and turn it on.

Booting the server with this switch in the down (ON) position erases the existing password(s).

4. Turn off the server.
5. Change switch SW1-3 to OFF (Normal position).
6. Replace the access panel.
7. Reconnect your server and turn it on.
8. Using the BIOS Setup utility, assign a new password.

Refer to Appendix C, “BIOS Setup Utility Features,” for more information.

Additional Security Features

Additional server security features are available as options in the BIOS Setup utility and through main logic board switch settings.

The BIOS Setup utility includes the following setup options to improve server security:

- *Sign On Banner*— When enabled, allows a custom banner to be displayed every time you turn your server on.
- *Diskette Access*— While enabled, this option prevents the server from accessing a diskette.
- *Network Server*— Locks the keyboard and mouse to prevent tampering during network operation. You must enter a supervisor password to unlock the keyboard and mouse.
- *System BIOS Flash*— When disabled, prevents the server's BIOS from being flashed (rewritten).

Troubleshooting **13**

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
- Disk Drive Troubleshooting
- Hot Swap Drive Troubleshooting
- Tape Drive Troubleshooting
- Monitor Troubleshooting
- CD-ROM Troubleshooting
- Diskette Drive Troubleshooting
- RAID Troubleshooting Hot Swap Drives

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

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

Initial Troubleshooting

Follow these general procedures to troubleshoot your DIGITAL Server.

- Record all configuration information and have it readily available.
- Turn off your server, wait until all disk drives completely spin down, and then turn it back on.

Refer to Appendix A, "Technical Specifications," if the POST detects an error.

- Ensure that all cables and connections are secure.
- Make sure all necessary video, printer, and application device drivers are properly installed.
- Try not to troubleshoot more than one problem at a time.
- Try to duplicate the problem.
- Run the diagnostic software. Refer to the next section "When to Use the Diagnostics."
- Run the SCSI configuration utility if you have problems after connecting devices.
- Run the BIOS Setup utility (F2).
- Run the System Management utility (F3) to check IRQ settings.

Refer to Chapter 2, "Server Software and Utilities," to ensure the server is correctly configured for all installed hardware and software.

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

Refer to Chapter 2, "Server Software and Utilities," for additional information.

- Contact DIGITAL Services for software or hardware related problems.



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

If you are a self-maintenance customer, call your authorized DIGITAL service provider for assistance and recommendations. Refer to the "Service Information" area on the Quick Launch CD-ROM for the phone numbers in your area or to the Warranty and Service Information Booklet supplied with your DIGITAL Server documentation.

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

Running the Diagnostics

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

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

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

Running Quick Tests or Groups of Tests

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

- To run Quick Test, press F8 to select tests, then F10 to run all the selected tests.
- To run all Memory tests, press F6 to select tests listed on the menu, then press F10 to run all the selected tests.
- To run all tests from all menus, press F7 to select all tests, then press F10 to run all the selected tests.

Running DIGITAL Vendor Extended Tests

To run DIGITAL Vendor Extended Tests from a diskette:

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

```
A:\DMENU.
```

2. Select the desired test.

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

Running 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 server and select MS-DOS from the boot menu.
2. At the C:\> prompt, type:

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

This sets up the CONFIG.SYS and AUTOEXEC.BAT files to run the diagnostics and reboots the server. Select MS-DOS again, then the diagnostics will load. The original CONFIG.SYS and AUTOEXEC.BAT are restored before the diagnostics load.

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

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 power source.	Use another power source.
	Main logic board failed.	Contact your authorized service provider.
	Main logic board switches incorrectly set.	Set all appropriate switches.
	Processor module has failed.	Reseat the processor module.
	Processor module switches incorrectly set.	Make sure all switches are correctly set.
	Power supply failed.	Contact your authorized service provider.
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.
	Video/Ethernet daughtercard not seated properly.	Remove and reseat the video/Ethernet daughter card.

continued

Problem	Possible Cause	Action
Power is on, but there is no screen display.	Incorrect video drivers installed.	Install the correct video drivers.
	Video controller has failed.	Contact your authorized service provider.
	Monitor has failed.	Replace monitor or contact your authorized service provider.
Server does not boot from the CD-ROM drive.	CD-ROM drive is not connected to the IDE controller.	Connect the CD-ROM to the IDE connector located on the main logic board (Refer Chapter 3).
	CD-ROM disc is not bootable.	Insert a bootable CD-ROM disc.
Server operates incorrectly after installing a processor module.	Processor module installed incorrectly.	Reinstall processor module.
	BIOS Setup utility indicates an error after installing a processor module.	Remove processor module and reboot. If server boots without errors, replace processor module.
	Mismatched stepping.	Check processor stepping information. Refer to Chapter 5.

continued

Troubleshooting

Problem	Possible Cause	Action
Server operates incorrectly after installing optional expansion board.	Expansion board installed incorrectly.	Remove expansion board and reinstall.
	IRQ conflict.	Run System Management <F3> to check <PCI> status of IRQ assignments. Refer to Chapter 2 and Appendix C.
	Expansion board has failed.	Remove expansion board and reboot. If server boots without errors, replace expansion board.
Server operates incorrectly after installing memory.	Memory configured incorrectly.	Reboot the server and check for any boot message to identify faulty DIMM(s). Check that memory configuration is according to the memory guidelines explained in Chapter 6.
	DIMMs installed incorrectly.	Remove DIMMs and reinstall.
	DIMMs have failed.	Replace DIMMs.
	Processor module installed incorrectly.	Reinstall processor module.
	Processor module failed.	Replace processor module.

continued

Problem	Possible Cause	Action
No response to keyboard commands.	Keyboard might be password protected by a local or remote control program.	Enter the keyboard password.
	Keyboard is not connected.	Power down the server and connect the keyboard.
	Keyboard is connected to the mouse port.	Power down the server and connect the keyboard to the keyboard port.
	Keyboard failed.	Replace keyboard or contact your authorized service provider.
No response to mouse commands.	Mouse might be password protected by a local or remote control program.	Enter the keyboard and mouse password.
	Mouse is not connected.	Power down the server and connect the mouse.
	Mouse is connected to the keyboard port.	Power down the server and connect the mouse to the mouse port.
	Mouse driver not installed	Install the appropriate mouse driver.
	Mouse trackball dirty.	Clean trackball.
	Mouse failed.	Replace mouse or contact your authorized service provider.
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. Refer to Chapter 2 and Appendix C.

Disk Drive Troubleshooting

Problem	Possible Cause	Action
----------------	-----------------------	---------------

Troubleshooting

Server does not recognize an internal SCSI device.	SCSI ID conflicts.	Refer to the supplied kit installation instructions and to the storage backplane switch configuration in Chapter 7.
	Termination not removed from the SCSI device.	Remove termination. Refer to the supplied kit installation instructions.
	SCSI controller has failed.	Contact your authorized service provider.
	Loose SCSI cable.	Secure all cable connections.
	SCSI cable incorrectly installed between SCSI controller, SCSI device or backplane.	Refer to Chapter 11 for cabling information.
	SCSI device has failed.	Replace SCSI device.

continued

Problem	Possible Cause	Action
Server does not recognize an external SCSI device.	SCSI device jumpers incorrectly set.	Refer to the supplied kit installation instructions.
	SCSI ID conflicts.	Refer to the supplied kit installation instructions and to the storage backplane switch configuration in Chapter 7.
	Termination not removed from the SCSI device.	Remove termination. Refer to the supplied kit installation instructions.
	SCSI controller has failed.	Contact your authorized service provider.
	Loose SCSI cable.	Secure all cable connections.
	SCSI cable incorrectly installed between main logic board and rear panel connector or external SCSI device and rear panel connector.	Refer to Chapter 11 for cabling information.
	SCSI device has failed.	Replace SCSI device.

continued

Troubleshooting

Problem	Possible Cause	Action
Server does not boot from an internal drive.	Drive not formatted.	Format the drive.
		CAUTION: Formatting the drive will destroy all data on the drive.
	SCSI device drivers not installed or incorrectly installed on the drive.	Properly install all required SCSI device drivers.
	Operating system software is not installed on the drive.	Install the appropriate operating system.
	Requested partition does not exist.	Partition the drive and then reload the operating software.
Drive cannot read or write information.	Boot drive at wrong SCSI address.	Set boot drive to lowest "primary" SCSI address.
	Drive has failed.	Replace drive.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
Drive failure.	Drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
	Check drive status LEDs for a drive failure indication.	Refer to Chapters 8 and 9 for additional information.

Hot Swap Drive Troubleshooting (Model 3220)

Problem	Possible Cause	Action
Drive fault LED lit.	Drive failed.	Replace hot swap drive.
Drive activity and fault LEDs lit.	Drive is hung or has failed.	Replace hot swap drive.
Drive fault LED flashing.	Drive is in recovery mode or has failed and is spinning down.	Allow the drive array to build or fully spin down.

Hot Swap Drive Troubleshooting (Model 3220R)

Problem	Possible Cause	Action
Drive status LED lit.	Drive failed.	Replace hot swap drive.
Drive status and fault status LEDs lit.	Drive is hung or has failed.	Replace hot swap drive.
Fault status LED flashing.	Drive is in recovery mode or has failed and is spinning down.	Allow drive array to build or fully spin down.
Disk drive present LED off.	No drive installed or not fully seated in the drive bay.	Reseat the drive or make sure the installed drive is fully seated in the drive bay.

Tape Drive Troubleshooting

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

Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator is not on.	Monitor is turned off.	Turn on the monitor.
	Power cord is not connected.	Connect power cord to the server.
	No power at wall outlet.	Use another outlet.
No screen display.	Power indicator is defective.	Contact your authorized service provider.
	Configuration error.	Run the BIOS Setup utility to configure the server for video operation.
	Monitor brightness and contrast controls are incorrectly set.	Adjust the monitor brightness and contrast controls.
Distorted, rolling, or flickering screen display, or wrong/uneven color.	Monitor has failed.	Replace monitor, or contact your authorized service provider.
	Monitor incorrectly adjusted.	Adjust accordingly.
Color monitor displaying monochrome.	Monitor signal cable incorrectly installed.	Straighten any bent connector pins and then reconnect.
	Server was turned on before the monitor was turned on.	Turn off the server, turn on the monitor, then turn the server back on.
Monitor fails to switch to high-resolution mode.	Appropriate high-resolution video drivers are not installed or incorrectly installed.	Correctly install all appropriate high-resolution video drivers. Refer to the documentation supplied with your monitor.

CD-ROM Troubleshooting

Problem	Possible Cause	Action
Cannot access the CD-ROM drive. Error message reading drive x.	Device drivers not installed.	Install correct device drivers.
	No disc in the CD-ROM drive.	Insert a disc.
	On the CD-ROM drive, slave jumper selected instead of master	Change master/slave switch jumper to master.
	IDE cable disconnected.	Properly connect the IDE cable. Refer to Chapter 11.
	Tray open.	Close the tray.
Power is on but indicator shows no activity.	No disc or tray is open.	Insert a disc and close the tray.
	Check cable connections.	Make sure cables are correctly connected.
Disc is spinning but drive is idle.	Application software not running.	Run application software.

Diskette Drive Troubleshooting

Problem	Possible Cause	Action
Target diskette drive cannot read or write information.	Diskette is not formatted.	Format the diskette.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write-protected.	Slide the write-protect switch so the hole is not visible.
	Diskette drive is empty.	Insert a diskette.
	Diskette write protection enabled.	Run the BIOS Setup utility and set the Diskette Write Protection option to "Disabled."
Server does not boot from a target diskette drive.	Disabled in BIOS Setup utility.	Run the BIOS Setup utility and enable 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.

RAID Troubleshooting Hot Swap Drives

Problem	Possible Cause	Action
Replaced drive does not spin up to speed.	Drive not seen by RAID host adapter.	Manually rebuild the drive. Remove the drive, wait 20 seconds, reinsert drive. Wait one minute and then rebuild the drive.
Multiple drives have failed.	No power available.	Restore power, run the RAID configuration utility and change the state of any failed (FLD) drive to optimal (OPT). Run the RAID configuration utility and check for bad blocks on the drives. Repair any bad blocks.
Drive not seen by RAID adapter.	SCSI cable not connected.	Check all SCSI connections.
	Incorrect SCSI termination.	Properly terminate the SCSI bus.
	Duplicate SCSI IDs on the bus.	Check drive SCSI ID settings.
	Defective drive.	Replace drive.
	Drive improperly inserted.	Reinsert drive.
	Defective RAID adapter.	Replace the RAID adapter or contact your authorized service provider.

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 SW1-2 "Recovery Mode" is set to Recovery and SW1-1 "BIOS Protection" is set to Normal. Refer to Appendix A for switch locations.
	BIOS Setup utility switch setting incorrectly set.	Make sure the "System BIOS Flash" option in the BIOS Setup utility is set to Enabled. Refer to Chapter 2 for more information.

Technical Specifications



Introduction

This appendix provides the following technical characteristics for your server:

- Server specifications
- ISA expansion slots
- PCI expansion slots
- Power supply input power requirements
- Power supply output specifications
- Power cord requirements
- Environment features
- Main logic board switch settings
- Processor module switch settings
- Server fault status
- POST messages
- Processor module voltage and temperature ranges

Server Specifications

The following sections list the server performance, dimensions and environmental specifications.

DIGITAL Server 3220/3220R Performance Specifications

Attributes	Specification
Bus clock	
ISA	8.33 MHz
PCI	33 MHz
Data I/O	
ISA	8-bit and 16-bit
PCI	32-bit
Memory ⁽¹⁾	168-pin, 72-bit registered SDRAM DIMMs with 100 MHz bus speed. 64 MB to 1 GB memory capacity.
System flash ROM BIOS	8 megabit Phoenix BIOS

⁽¹⁾ Refer to Chapter 6 for additional memory information

DIGITAL Server 3220 Dimensions

Dimension	Specification
Width	215 mm (8.5 in.)
Length (without bezel)	482,6 mm (19 in.)
Length (with bezel)	540 mm (21.2 in.)
Height	630 mm (24.8 in.)
Weight (no expansion boards)	22,6 kg (50 lb.)

DIGITAL Server 3220R Dimensions

Dimension	Specification
Width	482,6 mm, fits standard (19.0 in.) EIA 310-D (RETMA) cabinet
Depth	638 mm (25.1 in.)
Height	223 mm (8.77 in.) fits 8¼-inch (5U) high opening in standard EIA 310-D (RETMA) cabinet
Weight	22 kg (48.4 lb.)

Environmental Specifications

Attributes	Specification
Operating temperature	10°C to 35°C (50°F to 95°F)
Storage temperature	-20°C to 65°C (-4°F to 149°F)
Operating humidity (noncondensing)	20% to 80% relative humidity, maximum wet bulb 35°C (95°F)
Storage humidity (noncondensing)	10% to 90% relative humidity, maximum wet bulb 65°C (149°F)
Altitude	
Operating	2,438 m (8,000 ft) maximum
Nonoperating	4,876 m (16,000 ft) maximum
Shipping vibration	IAW Federal Standard 101, method 5019
Nonoperating shock	30 G, 25 ms halfsine

ISA Expansion Slots

The main logic board contains one dedicated ISA expansion slot and one shared ISA expansion slot. These slots support +5 V dc expansion boards.

PCI Expansion Slots

The main logic board contains five dedicated PCI expansion slots and one shared PCI expansion slot. These slots support:

- 5 V dc 32-bit PCI connector type
- 5/3.3 V dc universal PCI connector types
- Bus mastering

Power Supply Input Power Requirements

The 300 W power supply provides five dc voltages: +12 V dc, -12 V dc, +5 V dc, -5 V dc, and 3.3 V dc. The following table lists the input power requirements.

Rated Voltage Range	Maximum Range	Rated Input Current	Operating Frequency
100 V ac - 120 V ac	88 V ac - 132 V ac	7 A	47 Hz - 63 Hz
220 V ac - 240 V ac	176 V ac - 264 V ac	3.5 A	47 Hz - 63 Hz

Power Supply Output Specifications

Your server's power supply provides the following output ratings:

- +5 V dc 2.0 A min, 40 A max.
- +3.3 V dc 0 A min, 30 A max.
- +12 V dc 0 A min, 12 A max.
- -12 V dc 0 A min, 0.5 A max.
- -5 V dc 0 A min, 0.3 A max.
- +5 VSB 0 A min, 0.1 A max.

Power Cord Requirements

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/recycling	This product has been designed for ease of disassembly, so 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 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.

Acoustic Levels

Declared values as per ISO 9296 and ISO 7779:

Product	Sound Power Level $L_{WA,d}$, B		Sound Pressure Level $L_{pA,m}$, dBA (Bystander positions)	
	Idle	Operate	Idle	Operate
DIGITAL Server 3220/3225				
with 0 x HDD	4.8	4.8	30	30
with 1 x HDD	5.2	5.6	36	38
DIGITAL Server 3220R/3225R				
with 0 x HDD	5.7	5,7	39	39
with 1 x HDD	5.7	6,0	39	42

Current values for specific configurations are available from DIGITAL representatives.

1 B = 10 dBA

Main Logic Board Switch Settings

The following table lists the main logic board switch settings and factory-default settings. Figure A-1 shows the switch locations.

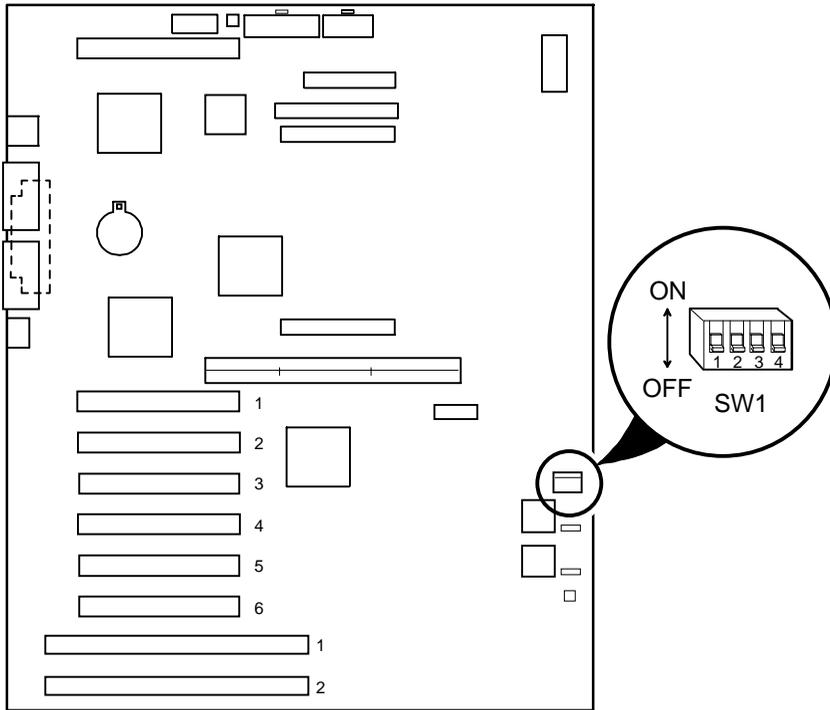


CAUTION: Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the server chassis. A static discharge from your fingers can result in permanent damage to electronic components.

Feature	Function	Setting	Description
BIOS Protection	Normal BIOS protection on ⁽¹⁾	SW1-1, off ⁽¹⁾ SW1-1, on	Set this switch ON to prevent unauthorized personnel from loading a new server BIOS.
Recovery mode	Normal Recovery mode	SW1-2, off ⁽¹⁾ SW1-2, on	If your BIOS upgrade failed, refer to the README.TXT file that came with the BIOS upgrade.
Password clear	Normal ⁽¹⁾ Password clear	SW1-3, off ⁽¹⁾ SW1-3, on	If you forget your password, set this switch to the <code>Password Clear</code> (ON) position and then restart your server. Refer to Chapter 12 for more information.
CMOS clear	Normal ⁽¹⁾ CMOS clear	SW1-4, off ⁽¹⁾ SW1-4, on	This switch is set to <code>Normal</code> (OFF) at the factory. Setting the switch ON clears all data in CMOS, such as passwords, date, and configuration settings. The BIOS will then use the default configuration.

⁽¹⁾ Factory default setting

ON = switch up; OFF = switch down



DEC01624-6

Figure A-1. Main Logic Board Switch Locations

Processor Module Switch Settings

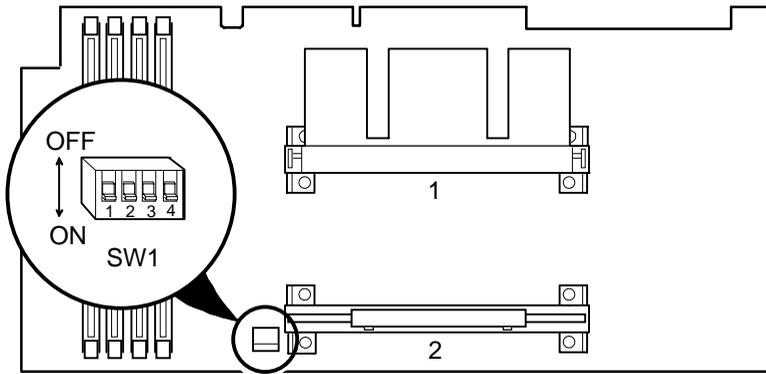
The following table lists the switch settings of various processor speeds and does not indicate processor availability. The switches are set correctly for the processor that came with the server you purchased. You only need to change the processor switch settings, that is SW1, should you upgrade to another processor. Figure A-2 shows the switch locations.



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

Processor Speed	SW1-1	SW1-2	SW1-3	SW1-4
350 MHz	OFF	OFF	ON	ON
400 MHz	ON	ON	OFF	ON
450 MHz	OFF	ON	OFF	ON

ON = switch down; OFF = switch up



DEC01638-2

Figure A-2. Processor Module Switch Settings

Server Fault Status

Description	Server Fault LED Indicators			
	LED4	LED3	LED2	LED1
No power, server ready, power ON default	○	○	○	○
Shutdown, fan fault	○	○	○	●
Shutdown, over temperature	○	○	●	○
Shutdown, voltage fault	○	○	●	●
Processor slot 1 terminator not installed	○	●	○	○
Main logic board POST failure	○	●	○	●
Boot strap processor failure	○	●	●	○
Processor slot 2 terminator not installed	○	●	●	●
DIMM 1 fault	●	○	○	○
DIMM 2 fault	●	○	○	●
DIMM 3 fault	●	○	●	○
DIMM 4 fault	●	○	●	●

● = on; ○ = off

POST Messages

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

POST/Boot Codes

POST Code Descriptions	Count Down Code ⁽¹⁾	Beep Codes
BIOS ROM checksum		1-2-2-3
Autosize DRAM		1-3-3-1
Test SDRAM refresh		1-3-1-1
Test 8742 keyboard controller		1-3-1-3
RAM failure on address line(s)		1-3-4-1
RAM failure on data line(s)		1-3-4-3
Check ROM copyright notice		2-1-2-3
Unexpected interrupts test	230	2-2-3-1
Shadow ROMs	220	1-4-3-1
Test 512K to 640K SDRAM	210	
Extended memory test	200	
Configure advanced cache register	190	
Enable external and CPU cache	180	
Real-time clock test	170	1-4-2-1
Keyboard test	160	
Initialize hardware interrupts	150	
Co-processor test	140	
Serial ports test	130	
Parallel ports test	120	

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

continued

Technical Specifications

POST Code Descriptions	Count Down Code ⁽¹⁾	Beep Codes
Initialize onboard super I/O	110	
Initialize mouse	100	
Testing diskette drive controller	90	
Testing hard disk controller	80	
Searching the other processor	50	
Option ROM checksum error		1-2
Enabling IRQs	20	
Setting time of day	10	
POST error found		2
Ready to boot		1

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

Processor Module Voltage and Temperature Ranges

The following tables list the operating voltage and temperature ranges for the processor module.

Processor Voltage Range

	Normal	Error Range	Error Based Voltage Range	Power Good Voltage	Shutdown Voltage Value	Bad Voltage Value
CPU I/O voltage	2.5V	± 5%	+2.375 ~ 2.625V	+2.2 ~ 2.8V	> +3.0V	< +1.85V
Vtt of GTL	1.5V	± 10%	+1.35 ~ 1.65V	+1.32 ~ 1.68V	> +1.8V	< +1.10V

Processor Voltage Range (V_{ccp})

V_{ccp}	$\pm 7\%$ Power Good Range	+10% Shutdown Value	-10% Hardware Bad Value
1.80V	1.6740 ~ 1.9260V	> +1.980V	< +1.620V
1.85V	1.7205 ~ 1.9795V	> +2.035V	< +1.665V
1.90V	1.7670 ~ 2.0330V	> +2.090V	< +1.710V
1.95V	1.8135 ~ 2.0865V	> +2.145V	< +1.755V
2.00V	1.8600 ~ 2.1400V	> +2.200V	< +1.800V
2.05V	1.9065 ~ 2.1935V	> +2.255V	< +1.845V
2.10V	1.9530 ~ 2.2470V	> +2.310V	< +1.890V
2.20V	2.0460 ~ 2.3540V	> +2.420V	< +1.980V
2.30V	2.1390 ~ 2.4610V	> +2.530V	< +2.070V
2.40V	2.2320 ~ 2.5680V	> +2.640V	< +2.160V
2.50V	2.3250 ~ 2.6750V	> +2.750V	< +2.250V
2.60V	2.4180 ~ 2.7820V	> +2.860V	< +2.340V
2.70V	2.5110 ~ 2.8890V	> +2.970V	< +2.430V
2.80V	2.6040 ~ 2.9960V	> +3.080V	< +2.520V
2.90V	2.6970 ~ 3.1030V	> +3.190V	< +2.610V
3.00V	2.7900 ~ 3.2100V	> +3.300V	< +2.700V
3.10V	2.8830 ~ 3.3170V	> +3.410V	< +2.790V
3.20V	2.9760 ~ 3.4240V	> +3.520V	< +2.880V
3.30V	3.0690 ~ 3.5310V	> +3.630V	< +2.970V
3.40V	3.1620 ~ 3.6380V	> +3.740V	< +3.060V
3.50V	3.2550 ~ 3.7450V	> +3.850V	> +3.150V

Processor Temperature Sensing

Description	Possible Failures	Result
Temperature	The temperature exceeds 85 °C (185 °F)	Displays an error message and warning beep. Server shuts down after five minutes.
	The temperature exceeds 90 °C (194 °F)	Server immediately shuts down.

Device Mapping *B*

Introduction

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

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



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

Processor Memory Address Map

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

I/O Address Map

Range (hexadecimal)	Function
060, 064	Keyboard/mouse controller
0F0 to 0FF	Math co-processor
1F0 to 1F7	IDE controller (if enabled)
278 to 27F	LPT2 (if enabled)
2E8	COM4 (if enabled)
2F8	COM2 (if enabled)
378 to 37F	LPT1 (if enabled)
3BC to 3BE	LPT3 (if enabled)
3E8	COM3 (if enabled)
3F0 to 3F7	Diskette controller (if enabled)
3F8	COM1 (if enabled)

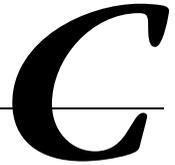
Server Interrupt Levels

Interrupt Number	Interrupt Source
IRQ1	Keyboard controller
IRQ3	COM2, COM4 (if enabled)
IRQ4	COM1, COM3 (if enabled)
IRQ6	Diskette controller (if enabled)
IRQ7	LPT1, LPT2, LPT3 (if enabled)
IRQ10	COM2, COM4 (if enabled)
IRQ11	COM1, COM3 (if enabled)
IRQ12	Mouse interrupt
IRQ13	Math co-processor

PCI Configuration Space Address Map

PCI Bus No.	Device No. (Address No.)	Device
0	00h (AD11)	Host bridge (PAC)
0	07h (AD18)	IDE controller
0	0Dh (AD24)	PCI slot 1
0	0Eh (AD25)	PCI slot 2
0	0Fh (AD26)	Ethernet controller
0	11h (AD28)	Secondary bridge (PPB)
0	12h (AD29)	PCI VGA controller
1	08h (SAD24)	PCI slot 3
1	09h (SAD25)	PCI slot 4
1	0Ah (SAD26)	PCI slot 5
1	0Dh (SAD27)	PCI slot 6
1	13h (SAD30)	SCSI controller (Symbois 896)

BIOS Setup Utility Features



Introduction

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

BIOS Setup (F2)

This section provides example tables and displays for the BIOS Setup utility.

Main

Menu Fields	Settings	Comments
System time	Current time	Displays the current time.
System date	Current date	Displays the current date.
Diskette A	Disabled 360 KB, 5¼ 1.2 MB, 5¼ 720 KB, 3½ 1.44 MB, 3½ ⁽¹⁾ 2.88 MB, 3½	Sets the size and density of the diskette drive.
Primary Master	None Auto CD-ROM ⁽¹⁾ User	Determines which device will be the primary bus master. Press [Enter] to display fields.
Video system	EGA / VGA ⁽¹⁾ CGA 80x25 Monochrome	Sets the video controller type.
Monitor type	Color ⁽¹⁾ Monochrome	Sets the monitor type.
Cache and Shadow	[submenu]	Press [Enter] to display fields.
Keyboard Features	[submenu]	Press [Enter] to display fields.
System memory	Not user selectable	Displays the amount of base (conventional) memory each time the server boots.
Extended memory	Not user selectable	Displays the amount of extended memory each time the server boots.
AT bus space	Disabled ⁽¹⁾	Memory hole not available; upper memory is contiguous.

⁽¹⁾ Factory default

continued

Menu Fields	Settings	Comments
	F00000h, 512 KB	Sets the memory hole at address F00000 with 512 KB memory available.
Extended memory report	Compatibility ⁽¹⁾ Non-compatibility	Select the BIOS report mechanism for the amount of external memory. Select <i>Compatibility</i> when using a conventional operating system. Select <i>Non-compatibility</i> for extended memory above 64 MB under Windows NT.
Primary Master: [submenu]		
Auto		Automatically determines the hard device and parameters of that device installed in the system.
Multi-sector transfers	Disabled ⁽¹⁾	Not user selectable.
LBA mode control	Disabled ⁽¹⁾	Not user selectable.
32-bit I/O	Enabled Disabled ⁽¹⁾	Enables 32-bit IDE.
Transfer mode standard	Standard ⁽¹⁾	Not user selectable.
CD-ROM		Allows you to select the CD-ROM as the primary bus master.
Multi-sector transfers	2, 4, 8, 16 Disabled ⁽¹⁾	Specifies the number of sectors per block for multiple sector transfers.

⁽¹⁾ Factory default

continued

BIOS Setup Utility Features

Menu Fields	Settings	Comments
LBA mode control	Enabled Disabled ⁽¹⁾	Enables the use of logic block addressing instead of cylinders, heads, and sectors.
32-bit I/O	Enabled Disabled ⁽¹⁾	Enables 32-bit IDE.
Transfer mode standard	Standard ⁽¹⁾ Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4 FPIO 3/DMA 1 FPIO 4/DMA 2	Select the method for optimum data transfer.
User		
Cylinders	0 - 65535	Allows you to enter the installed disk drive parameters from the manufacturer's specifications for cylinders, heads, and sectors.
Heads	1 - 16	
Sectors	0 - 63	
Maximum capacity	Not selectable	The maximum capacity of the disk drive is displayed.
Multi-sector transfers	2, 4, 8, 16 Disabled ⁽¹⁾	Specifies the number of sectors per block for multiple sector transfers.
LBA mode control	Enabled Disabled ⁽¹⁾	Enables the use of logic block addressing instead of cylinders, heads, and sectors.
32-bit I/O	Enabled Disabled ⁽¹⁾	Enables 32-bit IDE.
Transfer mode standard	Standard ⁽¹⁾ Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4 FPIO 3/DMA 1 FPIO 4/DMA 2	Select the method for optimum data transfer.

⁽¹⁾ Factory default

continued

Menu Fields	Settings	Comments
Cache and Shadow: [submenu]		
L1 cache	Enabled ⁽¹⁾	Always set to Enabled. Not selectable.
L2 cache	Enabled ⁽¹⁾ Disabled	Enables the processor's internal L2 cache.
System BIOS shadow	Enabled ⁽¹⁾	Always set to Enabled. Not selectable.
System BIOS cache	Enabled ⁽¹⁾ Disabled	Enables the server BIOS to be cached in the internal cache to increase server performance, because BIOS instructions are executed in cache instead of RAM.
Video BIOS shadow	Enabled ⁽¹⁾ Disabled	Copies the video BIOS to shadow RAM for improved performance.
Shadow 16 KB at C800 - CBFF: CC00 - CFFF: D000 - D3FF: D400 - D7FF: D800 - DBFF: DC00 - DFFF:	Enabled Disabled ⁽¹⁾	Enables or disables shadowing of individual segments of ROM to increase server performance. CAUTION: Some option ROMs do not operate properly when shadowed.

⁽¹⁾ Factory default

continued

BIOS Setup Utility Features

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

⁽¹⁾ Factory default

continued

Advanced

Menu Fields	Settings	Comments
Integrated Peripherals	[submenu]	Press [Enter] to display fields.
Advanced Chipset Control	[submenu]	Press [Enter] to display fields.
PCI Configuration	[submenu]	Press [Enter] to display fields.
Plug & Play O/S	No ⁽¹⁾ Yes	Select Yes if using a Plug & Play operating system; otherwise, select No .
Reset configuration data	Yes No ⁽¹⁾	Select Yes to clear the system configuration data if it is suspected to be corrupted, which sometimes occurs after a power outage. This option also clears the Plug and Play databases. After entering the correct settings (or accepting the default settings), the computer switches this setting back to No . If it is not necessary to clear system configuration data, leave the setting at No .
Onboard SCSI BIOS	Enabled ⁽¹⁾ Disabled	Enables or disables the onboard SCSI BIOS. Set to disabled when installing a new adapter board with a later BIOS revision.
Legacy USB support	Enabled ⁽¹⁾ Disabled	Enables support for Legacy Universal Serial Bus

⁽¹⁾ Factory default

continued

BIOS Setup Utility Features

Menu Fields	Settings	Comments
System monitoring warning beep	Enabled ⁽¹⁾ Disabled	Enables or disables the 8031 warning beep.
Integrated Peripherals: [submenu]		
PS/2 mouse	Disabled Enabled Auto detect ⁽¹⁾	Enables, disables, or auto detects the mouse port.
Local bus IDE adapter	Disabled Primary ⁽¹⁾	Enables or disables the local bus IDE adapter.
Serial port A	Disabled Enabled Auto ⁽¹⁾	Enables, disables, or auto detects an available address and IRQ for the serial port A. Select <code>Auto</code> unless interrupts IRQ4 and/or IRQ3 are allocated as a server resource. Two devices cannot share the same IRQ. Choosing <code>Disabled</code> makes serial port A unusable. Choosing <code>Auto</code> automatically configures COM1 to address = 3F8h and IRQ = 4 if they are available.
	If <code>Enabled</code> is selected, the information at the right will appear.	Base I/O address 3F8 ⁽¹⁾ 2F8 3E8 2E8 Interrupt IRQ3 IRQ4 ⁽¹⁾ IRQ10 IRQ11

⁽¹⁾ Factory default

continued

Menu Fields	Settings	Comments
Serial port B	Disabled Enabled Auto ⁽¹⁾	Enables, disables, or auto detects an available address and IRQ for serial port B. Choosing Disabled makes serial port B unusable. Choosing Auto automatically configures COM2 to address = 2F8h and IRQ = 3 if they are available.
	If Enabled is selected, the information at the right will appear.	Base I/O address 3F8 2F8 ⁽¹⁾ 3E8 2E8 Interrupt IRQ3 ⁽¹⁾ IRQ4 IRQ10 IRQ11
Parallel port	Disabled Enabled Auto ⁽¹⁾	Enables, disables, or auto detects an available address and IRQ for the parallel port. Auto is the recommended setting.

⁽¹⁾ Factory default

continued

BIOS Setup Utility Features

Menu Fields	Settings	Comments
	If Enabled is selected, the information at the right will appear.	Base I/O address: 378 ⁽¹⁾ 278 3BC Interrupt: IRQ5 IRQ7 ⁽¹⁾
Parallel port mode	Output only Bi-directional ⁽¹⁾ EPP ECP	Sets the onboard parallel port mode for the Enable and Auto settings. Standard printer connection. PS/2 compatible mode to transmit and to receive at the same time. Enhanced parallel port mode. Extended capabilities port mode.
Floppy disk controller	Enabled ⁽¹⁾ Disabled Auto	Enables, disables, or auto detects the onboard diskette controller.
Base I/O address	If Enabled is selected, the information at the right will appear. Primary ⁽¹⁾ Secondary	Base I/O address Primary ⁽¹⁾ Secondary Sets the base I/O address for the diskette drive controller
Diskette write protection	Enabled Disabled ⁽¹⁾	Enables or disables the diskette drive's write protect option.

⁽¹⁾ Factory default

continued

Menu Fields	Settings	Comments
Integrated PCI Ethernet	Enabled ⁽¹⁾ Disabled	Enables or disables the onboard Ethernet controller.
Integrated PCI SCSI	Enabled ⁽¹⁾ Disabled	Enables or disables the onboard SCSI controller.
Advanced Chipset Control: [submenu]		
APIC & MP table	Disabled 1.1 1.4 ⁽¹⁾	Configures the MP specification revision level.
Error correction code	Enabled ⁽¹⁾ Disabled	Enables or disables the Error Correction Code (ECC).
PCI Configuration: [submenu]		
PCI IRQ line #	Disabled Auto select ⁽¹⁾ 3 4 5 7 9 10 11 12 14 15	Assigns IRQs to PCI slots. An asterick (*) appears to the left of the line if the IRQ is in use.
PCI/PNP ISA UMB Region Exclusion		Press [Enter] to display addresses.
PCI/PNP ISA IRQ Resource Exclusion		Press [Enter] to display IRQs.

⁽¹⁾ Factory default

continued

BIOS Setup Utility Features

Menu Fields	Settings	Comments
PCI/PNP ISA UMB Region Exclusion: [submenu]		
C800 - CBFF	Available ⁽¹⁾	Reserves a specific block of upper memory for use by legacy ISA devices.
CC00 - CFFF	Reserved	
D000 - D3FF		
D400 - D7FF		
D800 - DBFF		
DC00 - DFFF		
PCI/PNP ISA IRQ Resource Exclusion: [submenu]		
IRQ 3	Available ⁽¹⁾	Reserves the specified IRQ for use by a legacy ISA device.
IRQ 4	Reserved	
IRQ 5		
IRQ 7		
IRQ 9		
IRQ 10		
IRQ 11		
IRQ 12		
IRQ 15		

⁽¹⁾ Factory default

Security Options

Menu Fields	Settings	Comments
Set supervisor password	Press [Enter].	<p>Allows a supervisor password to be set.</p> <p>The supervisor password must be set if a user password is to be used.</p> <p>NOTE: Entering Setup with a supervisor password provides full access to all BIOS Setup utility menus.</p>
Set user password	Press [Enter].	<p>Allows a user password to be set.</p> <p>This password can be set only if a supervisor password is entered.</p>
Password on boot	Enabled Disabled ⁽¹⁾	<p>Enables or disables the enter password on boot option.</p> <p>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.</p>

⁽¹⁾ Factory default

continued

BIOS Setup Utility Features

Menu Fields	Settings	Comments
Diskette access	Supervisor User ⁽¹⁾	Controls who might have access to diskette drives. If <code>Supervisor</code> is selected, access to the diskette drive is limited to the supervisor, who must enter a password. If <code>User</code> is selected, the diskette drive is accessed by entering either the supervisor or the user password. Whatever setting is chosen, it only becomes functional if both a <code>Supervisor Password</code> and a <code>User Password</code> have been set (if the <code>User</code> setting is chosen).
Network server	Enabled Disabled ⁽¹⁾	When enabled, the system is secured at boot to prevent tampering during network operation.
System backup reminder	Disabled ⁽¹⁾ Daily Weekly Monthly	When enabled, displays a backup reminder message at boot, daily, every Monday, or the 1 st of each month.
Virus check reminder	Disabled ⁽¹⁾ Daily Weekly Monthly	When enabled, displays a reminder message to check for viruses at boot, daily, every Monday, or the 1 st of each month.
System BIOS flash	Enabled Disabled ⁽¹⁾	When enabled, allows the server BIOS in the flash ROM to update.

⁽¹⁾ Factory default

Boot

Menu Fields	Settings	Comments
Floppy check	Enabled Disabled ⁽¹⁾	Enabled permits verification of FDD type at boot. Disabled prevents FDD verification and speeds up the boot process.
Setup prompt	Enabled ⁽¹⁾ Disabled	Enables or disables the <F2> setup prompt each time the server boots. Disables the prompt "Press <F2> to enter Setup". Setup can still be entered by pressing <F2> before POST completes.
POST errors	Enabled ⁽¹⁾ 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.
Sign-on banner	Enabled ⁽¹⁾ Disabled	Enabling this option causes the DIGITAL logo to appear during POST.
Boot device priority	1. ATAPI CD-ROM drive 2. Diskette drive 3. Hard drive	Allows you to select the boot drive options. To change the order, use the Up and Down cursor keys to select the device you want to move. Then use the + and – keys, on the numeric keypad, to move the device to the desired boot order.
Hard drive	1. Onboard SCSI controller 2. Bootable add-in cards	Selects the ROM scan sequence to determine which device will be the boot device. The first device encountered with bootable media will be the boot device.

(1) Factory default

System Management (F3)

This section provides example tables and displays for each System Management utility.

Summary — System Summary

Menu Fields	Settings	Comments
Processor 1	350 MHz PII, L1/L2=, ID=	Indicates processor speed, installed status, cache size, and ID number.
Processor 2	350 MHz PII, L1/L2=, ID=	
Co-processor	Installed	Internal component of processor.
System RAM	64 MB	RAM size.
System BIOS	1.0	BIOS version being used.
PS/2 mouse	Installed	Mouse installed
Diskette A	1.44 MB 3½-inch	Size and availability.
Parallel port	Bi-directional, 0378, IRQ7	Parallel port mode selected and availability and assigned IRQ.
Serial port 1	03F8, IRQ4	Availability and assigned IRQ.
Serial port 2	02F8, IRQ3	Availability and assigned IRQ.
E-net address	0000F87AA3E9	Ethernet address.

Environment — Environment Monitoring and Summary

Menu Fields	Settings	Comments
Processor 1 status	OK	No problem.
Processor 2 status	OK	No problem.
Processor 1 temperature	43 °C	Actual temperature.
Processor 2 temperature	34 °C	Actual temperature.
Processor 1 VRM 2.0 V	2.01 V	VRM voltage.
Processor 2 VRM 2.0 V	2.06 V	VRM voltage.
Processor GTL 1.5 V	1.50 V	Gunning transistor logic.
Processor IO 2.5 V	2.52 V	
Sys 12 V	11.8 V	Server 12 V voltage rating.
Sys 5 V	5.06 V	Server 5 V voltage rating.
Sys 3.3 V	3.32 V	Server 3.4 V voltage rating.
Sys -12 V	-12.10 V	Server -12 V voltage rating.
P/S status	OK	Power supply status OK.
Fan 1 status	OK	Fan 1 status OK.
Fan 2 status	OK	Fan 2 status OK (model 3220).

Memory — Memory Slots Information

Slot	Type	Size	Speed	Status
Bank 0	SDRAM	64M	10 ns	OK
Bank 1	SDRAM	64M	10 ns	OK
Bank 2	SDRAM	64M	10 ns	ECC ⁽¹⁾
Bank 3	SDRAM	64M	10 ns	OK

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(1) ECC here indicates that one bit error correction occurred.

POST — POST Error Summary

Contains a POST error summary if post fails.

SYS — System Asset Number and I/O Management

You can only change the Asset# in the following display.

Enter Required Parameters For The Selected Items:			
Assembly	System		
Asset#	2224Z		
System ID	FR-B488W-AA		
Model#	3220 2350		
Serial#	TA 12345678		
System IDs Of Each Assembly			
Assembly	Model#	Serial#	
Main Logic Board	P3220-AA	TA 12345678	
Processor Module	P3220-4G		

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MLB — Main Logic Board Asset Number Management

```

Assembly:           Main Logic Board
Asset#:             2224Z
Part#:              54-25442-01
Revision:           AX01
Serial#:            TA2544679
Artwork#:           B01
    
```

DEC01595

CPU — Processor Module Asset Number Management

```

Assembly:           Processor Module
Asset#:             2224Z
Part#:              54-xxxxxx-xx
Revision:           AX01
Serial#:            DVT2544831
Artwork#:           B01
    
```

DEC01596

PCI — PCI IRQ Assignment Status

```

Integrated  Universal Serial Bus (USB) [IRQ09][Enable]
Integrated  SCSI bus controller A      [IRQ10][Enable]
Integrated  SCSI bus controller B      [IRQ10][Enable]

PCI Slot 1  Empty
PCI Slot 2  Empty
PCI Slot 3  Empty
PCI Slot 4  Raid Controller            [IRQ15][Enable]
PCI Slot 5  Empty
PCI Slot 6  Empty

Proprietary Slot-Ethernet controller [IRQ11][Enable]
          VGA-compatible controller [Not required]
    
```

DEC01597

Caring For Your Server *D*

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.
3. Disconnect the power cord from the outlet and the back of the server.
4. Disconnect the other cables from the back of the server.
5. Insert a drive protection card in the 3½-inch diskette drive. If you do not have a drive protection card, use a blank diskette.
6. Use two people to lift or move the server.
7. Package the server as described in the following section, "Packing the Server."

Packing the Server



CAUTION: Do not ship the server with an external terminator installed. Having the terminator installed during shipping might damage the cable connector.

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.

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