

DIGITAL Server 7100R Series

System Reference

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Digital Equipment Corporation

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Preface *P*

Introduction

This System Reference describes how to operate, upgrade, configure, and troubleshoot your DIGITAL Server 7100R. 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 7100R 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.

The *DIGITAL Rack Installation Guide* provides information on installing the server into a rack.

Audience

This System Reference is written specifically for anyone responsible for operating, configuring, and expanding the DIGITAL Server 7100R.

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 disc.
Locate the major internal components	<i>Quick Reference</i> label on the outside of your server's top cover.
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 files on the Quick Launch CD-ROM.
Run diagnostics	<i>ServerWORKS Quick Launch Getting Started Guide</i> and the Quick Launch program on the supplied CD-ROM disk. Supplied diagnostics documentation which is on the Quick Launch CD-ROM.

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.
- Chapter 4: *Server Management*—describes how to manage your server using a network manager, specifically DIGITAL ServerWORKS Manager.
- Chapter 5: *Processor Module Upgrades*—describes how to upgrade your server with higher-performance processor modules.
- Chapter 6: *Installing Additional Memory*—describes how to install additional memory on the memory modules.
- Chapter 7: *Installing Disk and Tape Drives*—describes how to install optional disk drives, tape drives and an external storage box.
- Chapter 8: *Installing Expansion Boards*—describes how to install ISA, EISA, and PCI expansion boards.

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- Chapter 9: *Connecting SCSI and RAID Adapters*—describes how to connect mass storage devices to an installed SCSI adapter or to supported RAID adapters.
- Chapter 10: *Server Security Features*—describes the various security features that are available to prevent server or data theft.
- Chapter 11: *Troubleshooting*—provides initial and advanced troubleshooting solutions.
- Chapter 12: *User Service Procedures*—describes how to hot swap your server's cooling fans and power supplies. A procedure for replacing a server battery/Real-Time Clock (RTC) is also included.
- Appendix A: *Technical Specifications*—lists server operating specifications. Main logic board and processor module switch information is also included. 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: *SCU Features*—lists the available SCU 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
BIOS	Basic input/output system
CPU	Central processing unit
DIMM	Dual in-line memory module
DMA	Direct memory access
ECC	Error correction code
ECP	Extended capabilities port
EISA	Extended industry standard architecture
EPP	Enhanced parallel port
FDD	Floppy disk drive
FRU	Field replaceable unit
h	An h suffix to a numerical value denotes hexadecimal numbers. For example, 0F8h equals 0F8 hexadecimal.
I/O	Input/output
IRQ	Interrupt request
ISA	Industry standard architecture
KBC	Keyboard controller
MS-DOS™	Microsoft disk operating system
NIC	Network interface card
NOS	Network operating system
OCP	Operator control panel
PCI	Peripheral component interconnect
POST	Power-on self test
RAID	Redundant array of independent devices
RAM	Random access memory

continued

Abbreviation	Meaning
ROM	Read only memory
RSM	Remote server manager
RTC	Real-time clock
SEC	Single edge connector
SBB	Storage building block
SCSI	Small computer system interface
SCU	System Configuration Utility
SMP	Symmetrical multi-processor
VGA	Video graphics array
Windows NT	Microsoft Windows NT operating system software
ZIF	Zero insertion force

Special Notices

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



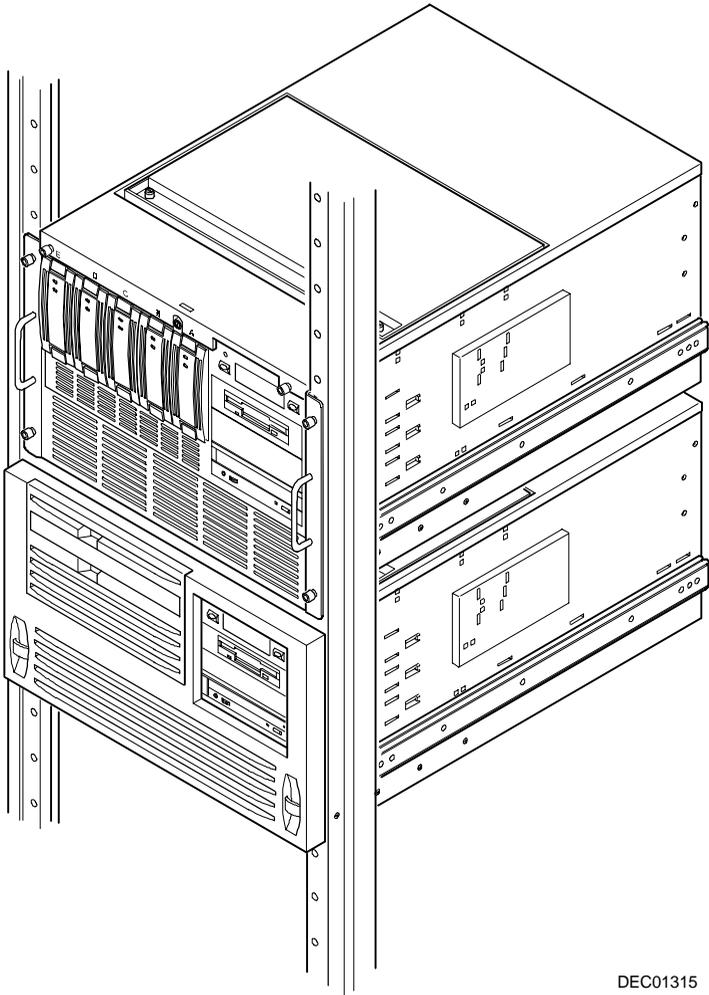
WARNING: Indicates the presence of a hazard that can cause personal injury if the hazard is not avoided.



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



NOTES: Used to provide additional information.



DEC01315

Typical DIGITAL Server 7100R

Introduction

1

The DIGITAL Server 7100R is a high-performance, highly-scalable network and application server featuring the latest in modular processor and storage technology.

The DIGITAL Server provides support for the following features:

Reliability/Availability

<i>Rackmountable</i>	The DIGITAL Server can be mounted into any industry-standard 19-inch rack. Note that the rack, monitor, keyboard, and mouse must be purchased separately.
<i>Pentium Pro Processor Module</i>	Up to four SMP Pentium Pro processors, each with an integrated 512 KB, four way set-associative, write-back cache.
<i>Error Correction Code (ECC) Memory</i>	Maximum expandability with up to 4 GB of ECC protected DIMM memory.
<i>Dual-Channel Storage Backplane</i>	Redundant disk subsystems using dual-channel wide Ultra SCSI or wide Ultra RAID adapters.
<i>Hot Swap Power Supplies</i>	The DIGITAL Server provides one or more hot-swap and redundant 400 W power supplies.
<i>Hot Swap Fans</i>	Automatically turns on redundant fans if a primary fan failure is detected.

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<i>Internal Sensors</i>	Monitors internal server temperatures, fan operation, voltages, and power supply faults.
<i>Hot Swap Capability</i>	Allows replacement of SBB disk drives, power supplies, and fans while the server is operating.
<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>Flexible Memory Architecture</i>	Two memory modules provide a 4-way interleaved memory system, with 128 MB of minimum supported memory and 4 GB of maximum supported memory.
<i>11 I/O Expansion Slots</i>	Seven PCI expansion slots, three EISA slots, and one shared EISA/PCI slot. Dual peer PCI bus design with peak bandwidth of 267 MB/sec.
<i>Integrated SVGA Video Controller</i>	Supports management and configuration applications locally (on the main logic board) without use of an expansion slot.
<i>Wide Ultra SCSI or RAID Adapter</i>	Support for internal narrow and wide Ultra SCSI devices.
<i>Capacity for Eight Internal SCSI Storage Devices</i>	Accommodates up to five Storage Building Blocks (SBBs) and three 5¼-inch half-height drives. Note that the installed 3½-inch diskette drive occupies a 5¼-inch drive bay.
<i>External I/O Ports</i>	Two serial ports and one parallel port to support external options such as a printer, modem, or local terminal.
<i>Wide Ultra SCSI Storage Backplane</i>	Supports high-performance drives for single or dual channel wide Ultra SCSI and wide Ultra RAID configurations.

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>RAM-Based Error Log</i>	Records startup error messages.
<i>Firmware Upgrade Utility</i>	Upgrades firmware versions.
<i>Operator Control Panel (OCP)</i>	Back-lit, 16-character display for diagnostic and error messages.
<i>Hard Drive and Power Supply Indicator Lights</i>	Provides immediate status information on SBB hard drive (activity or failure) and power supply (normal or fault condition).
<i>Key Lock</i>	Limits access to the server's internal components.
<i>Interlock Sensor Switch</i>	Automatically turns off server power if the top panel is removed when the server power is on. This excludes the hot-swap fan access cover.

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 disk 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 Overview and Installation 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 hard disk drives, tape back-up systems, CD-ROMs, or modems that have been factory installed in your server. The documentation and any related diskettes 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 can be used to verify proper hardware installation and isolate intermittent problems that are not detected by the Power-On Self Test (POST).

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

The diagnostic software includes:

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

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 11. Also refer to the AMIDdiag User's Guide, located under "Additional Documentation" 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 disk 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 program that is on your CD-ROM disc.

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 drivers and on-line documentation.
- **System Configuration Utility (SCU)** — This utility allows you to configure your server when relocating, adding, or removing EISA/ISA/PCI expansion boards and when changing your server's factory-defined settings.
- **RAID Configuration Utility** — This utility is available for RAID-ready servers only. This utility allows you to configure your RAID array.
- **BIOS Upgrade Utility** — This utility allows you to update or restore your server's BIOS.
- **SCSI*Select* Utility** — This utility allows you to configure and view settings of the installed Adaptec wide Ultra SCSI adapters and wide Ultra SCSI devices.
- **Diagnostics** — This utility is used to verify server operation.

ServerWORKS Quick Launch

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

System Configuration Utility (SCU)

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

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

Refer to Appendix C, "SCU Features," for more details about the SCU.

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

When to Run the SCU

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

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

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

Configuring Expansion Boards

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

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

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

Starting the SCU

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

You can start the SCU in one of three ways:

1. During the Quick Launch boot process, if you selected “to create a MS-DOS partition,” the SCU was copied to the MS-DOS partition on your hard disk drive. This allows you to run the SCU anytime from the MS-DOS partition.

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

```
SCU.BAT
```

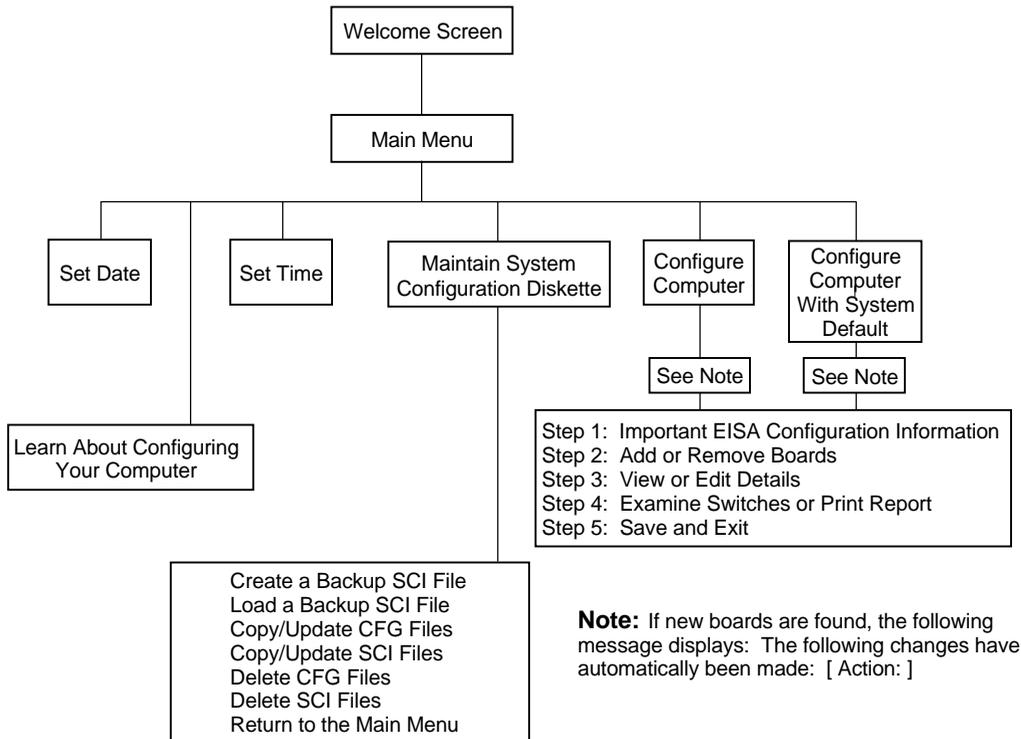
2. Creating a bootable SCU diskette by using the Quick Launch CD-ROM and selecting the *Installations & Utilities* button and then the *Utilities* page. On the *Utilities* page, select the appropriate BIOS level for the server that the SCU is being created for (if this is being done on the server, the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

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

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



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



DEC00456

Figure 2-1. SCU Main Menu Options

Using the SCU

To use the SCU:

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

If POST detects an error refer to Appendix A, "Technical Specifications," and take the appropriate steps to correct the problem. After the problem has been resolved, restart the server.

2. Start the SCU using one of the three methods described previously.
3. Press [Enter] to display the SCU introductory screen.



NOTE: The SCU contains help pop-up screens for any selected menu item. Press [F1] at anytime to display a help screen. Press [Esc] to remove a help screen.

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

Press [Enter] to display the Main menu.

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

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

SCU Keyboard Function Keys

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

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

Configure Computer

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

Select one of the following menu options:

- “Configure Computer with System Default” — Loads the SCU default settings.
- “Configure Computer” — Instructions are displayed. Complete the instructions if you are performing an initial configuration on your server. If this is a subsequent configuration, refer to the appropriate menu item to update your server's configuration.

Refer to Chapter 8, “Installing Expansion Boards,” for board installation information.

Setting the Date and Time

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

To access this menu item:

1. Start the SCU using one of the three methods described in "Starting the SCU."
2. Press [Enter] to display the SCU main menu.
3. Configure your server for the current date and time by selecting the Set Date and Set Time options.

Maintain System Configuration Diskette

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

To access this menu item:

1. Start the SCU using one of the three methods described in "Starting the SCU."
2. Press [Enter] to display the SCU main menu.
3. Select the Maintain System Configuration Diskette option, and then press [Enter].
4. Select a menu item and complete the displayed instructions for that item.

Afterwards, the following menu options are available:

- Create a backup SCI file
- Load a backup SCI file
- Copy/update CFG files
- Copy/update SCI files
- Delete CFG files
- Delete SCI files
- Return to the Main Menu

RAID Configuration Utility

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

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

BIOS Upgrade Utility

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

You can upgrade your server's BIOS to future releases by executing the BIOS upgrade utility (PHLASH.EXE) located in the BIOS update kit. The "BIOS upgrade" switch (J35-SW1) on the main logic board must be set to ON before you can upgrade the system BIOS.

BIOS updates are available on the Internet.

For technical support, use the address:

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

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

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



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

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

SCSISelect Utility

Your DIGITAL server comes with an Adaptec wide Ultra SCSI adapter and a *SCSISelect* configuration utility. This utility allows you to change host adapter settings without opening your server.

Use *SCSISelect* to:

- Check factory default settings for each device on the wide Ultra SCSI bus.
- Change SCSI device settings that might conflict with other SCSI devices.
- Perform low-level formatting on new wide Ultra SCSI disk drives.

To start the *SCSISelect* configuration utility:

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

Diagnostics

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

The diagnostic 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 DOS partition (only if you selected the option to create a DOS partition). This allows you to run the diagnostic software from the DOS partition you created.
- Using the Quick Launch CD-ROM, you can create bootable diagnostic software diskettes. This allows you to run the diagnostic software using the diskettes you created.



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

Refer to Chapter 11, "Troubleshooting," for more information.

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

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

Refer to Chapter 11, "Troubleshooting," for more information.

Server Components

3

Introduction

This chapter shows the location of the DIGITAL Server's internal components and procedures for unlocking and removing the top cover.

Disconnecting External Devices and Power

To disconnect external devices and power, 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 back of the server.
5. Disconnect the monitor's power cord from the external ac outlet and the data cable from the server.

Removing and Installing the Top Cover

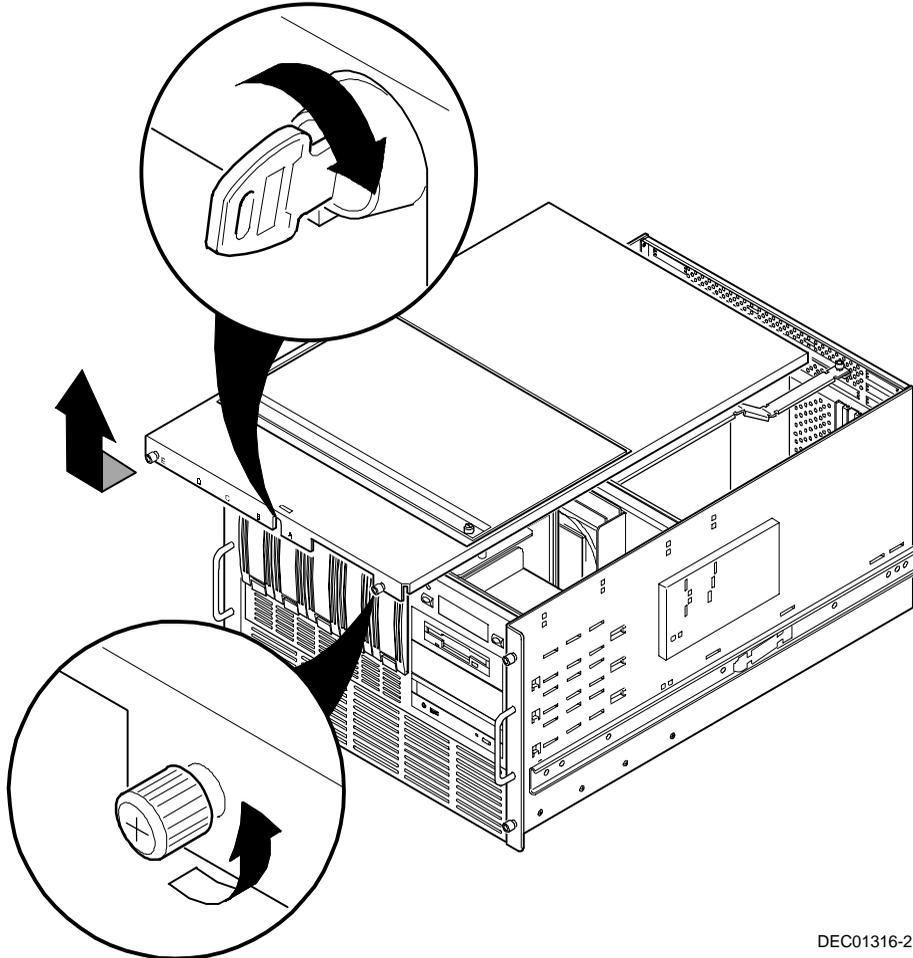
To remove the top cover, perform the following:



WARNING: Removing the top cover activates an interlock switch located on the side of the server. This switch inhibits power to your server when activated. You might injure yourself or damage your server if you attempt to bypass this switch.

Server Components

1. Unlock the top cover by pressing in on the key and then turning it clockwise.
2. Loosen the captive screws securing the top cover to the server's chassis.
3. Carefully slide the top cover forward and lift until it clears the chassis.

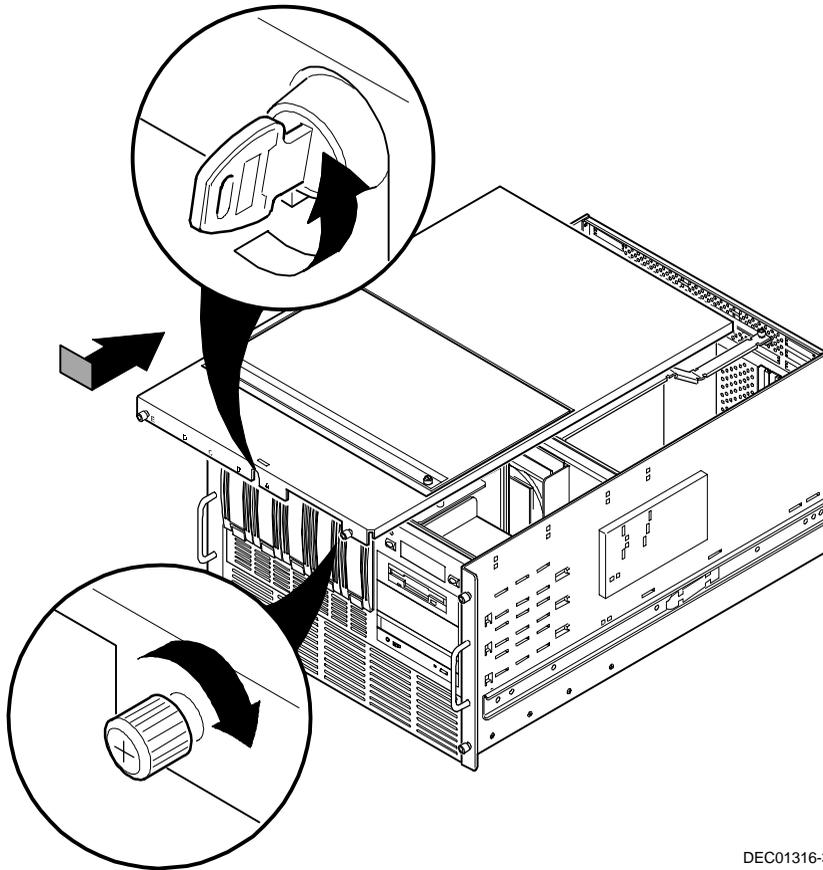


DEC01316-2

Figure 3-1. Unlocking and Removing the Top Cover

To install the top cover.

1. Carefully slide the top cover onto the server's chassis.
2. Secure the top cover to the server's chassis by tightening the captive screws.
3. Lock the top cover.

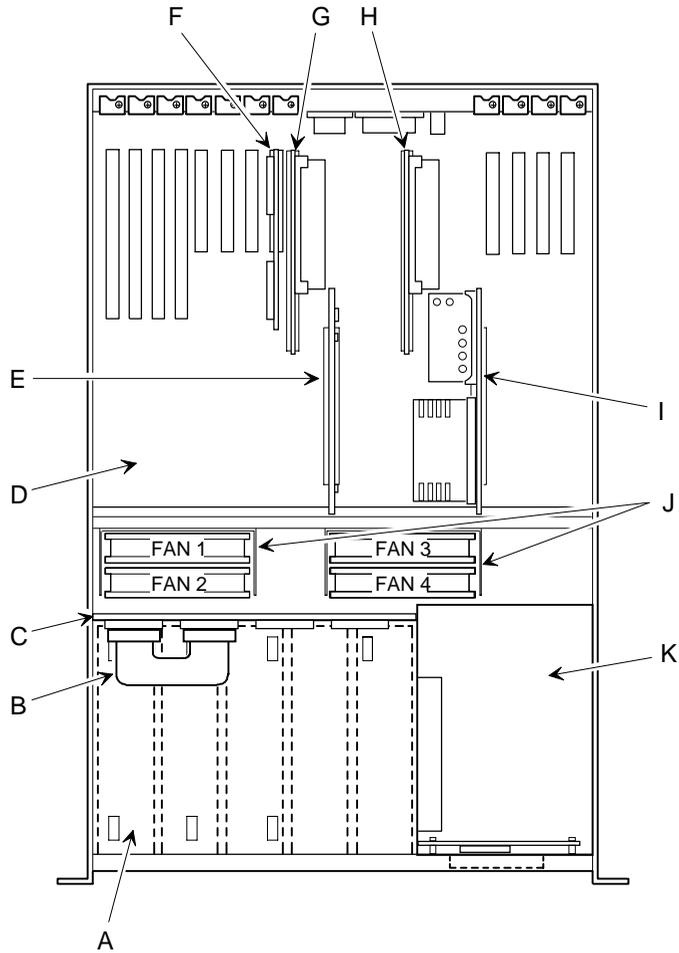


DEC01316-3

Figure 3-2. Installing and Locking the Top Cover

Server Top View

Figure Legend	Component
A	Integral hot-swap drive bay for Storage Building Blocks (SBBs)
B	Storage backplane
C	Main logic board
D	Terminator card or processor module 2
E	Wide Ultra SCSI adapter
F	Memory module 2
G	Memory module 1
H	Processor module 1
I	Cooling fans (4)
J	Top right drive bay
K	Split backplane wide Ultra SCSI jumper cable

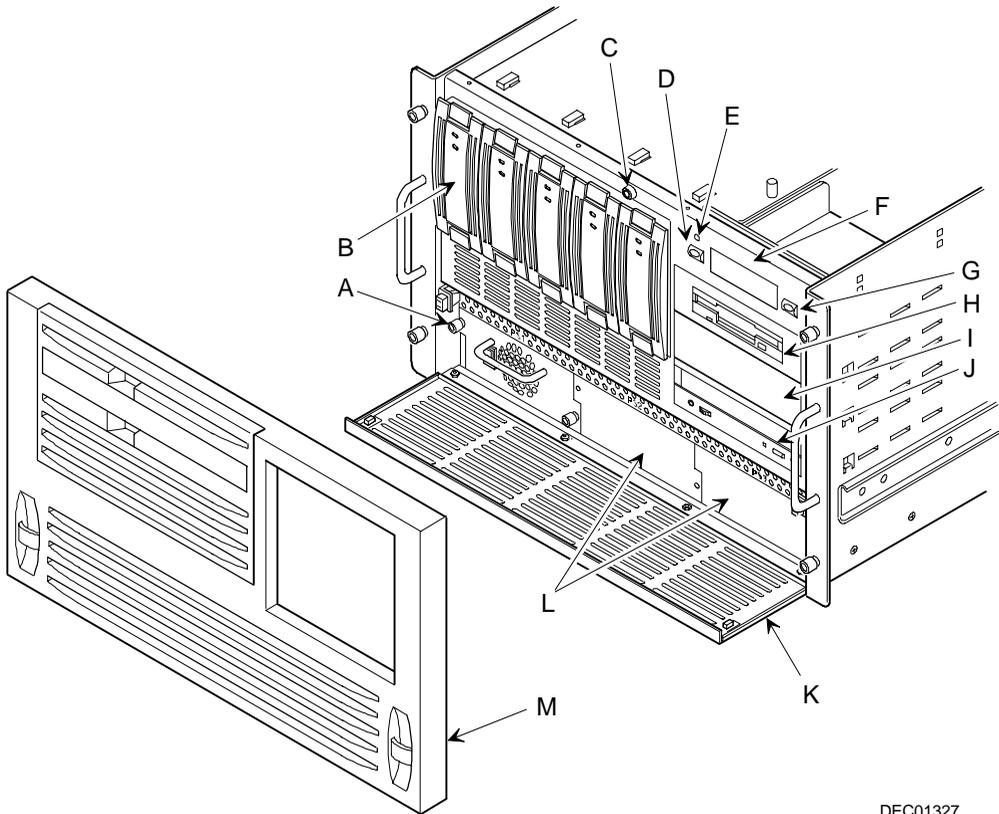


DEC01342-2

Figure 3-3. Server Top View

Server Front View

Figure Legend	Component
A	Power supply
B	Storage Building Blocks (SBBs)
C	Keylock
D	Power button
E	Power indicator
F	Operator Control Panel (OCP)
G	OCP control button
H	3½-inch diskette drive
I	Front access 5¼-inch or 3½-inch half-height drive bay
J	CD-ROM drive
K	Power supply door
L	Optional power supply bays
M	Bezel (if installed)



DEC01327

Figure 3-4. Server Front View

Server Rear View

Figure Legend	Component
A	Eight SCSI knockouts
B	ac power plug
C	Strain relief clamp
D	SCSI adapter connector
E	Two serial ports
F	Video port
G	Parallel port
H	Mouse port
I	Keyboard port

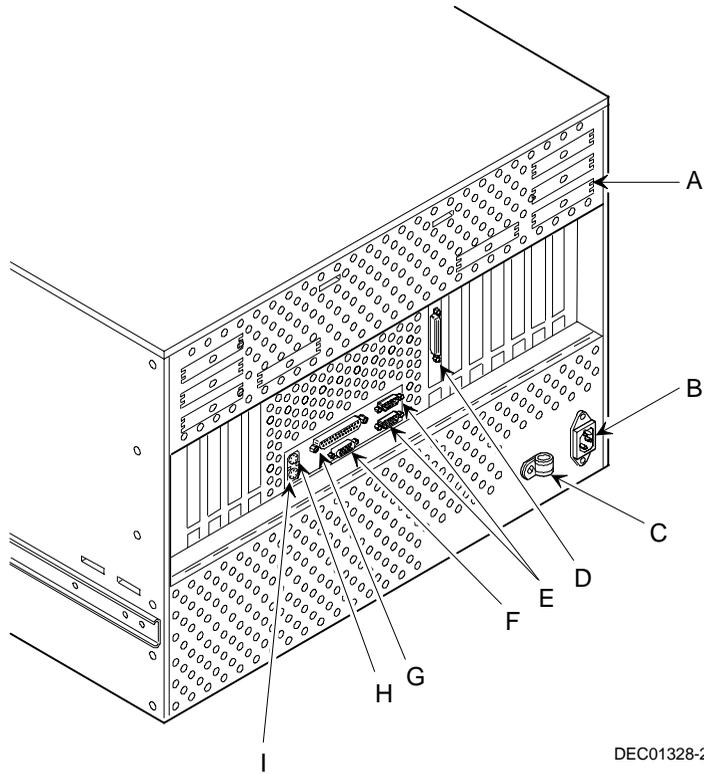
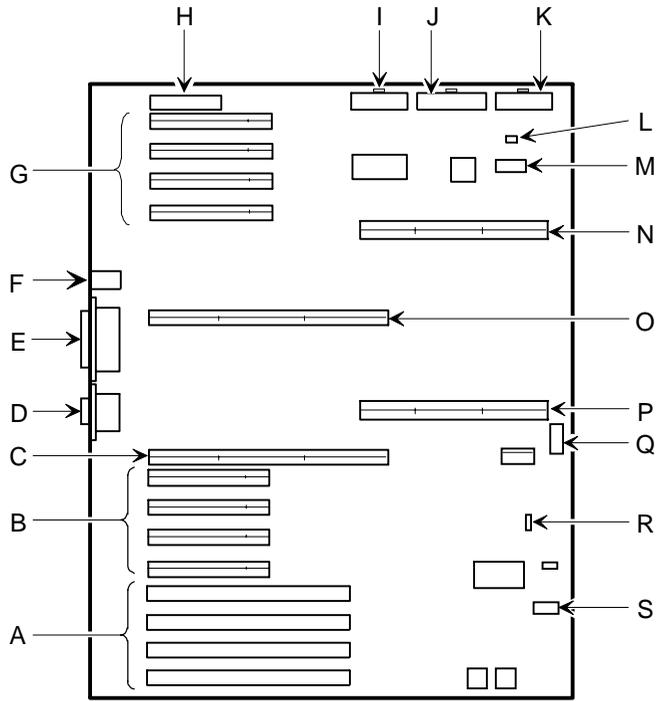


Figure 3-5. Server Rear View

Main Logic Board Connectors

Figure Legend	Connector
A	EISA expansion slots (1 through 4); slot one is a shared EISA/PCI slot
B	Primary PCI expansion slots (1 through 4); slot four is a shared PCI/EISA slot
C	Memory module 2
D	Serial ports
E	Parallel port and video port
F	Mouse and keyboard ports
G	Secondary PCI expansion slots (5 through 8)
H	Diskette drive
I	3.3 V dc power supply
J	5 V dc power supply
K	Power control signal
L	Top cover interlock connector
M	Operator Control Panel (OCP)
N	Processor module 1
O	Memory module 1
P	Processor module 2 or terminator card
Q	Fan connector (fans 1 through 4)
R	Speaker
S	Remote Server Management (RSM)

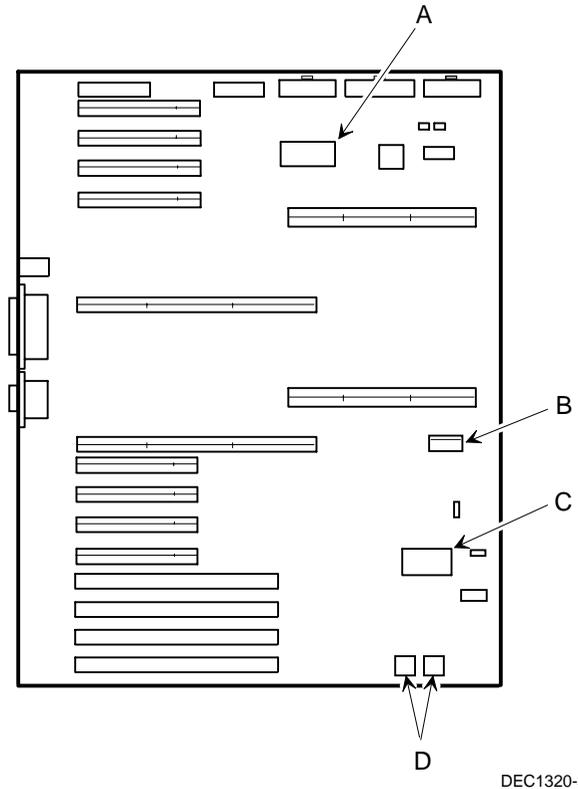


DEC01320-2

Figure 3-6. Main Logic Board Connectors

Main Logic Board Components

Figure Legend	Component
A	8031 ROM
B	Dip switch block (J35)
C	Real-time clock/server battery
D	BIOS flash ROM

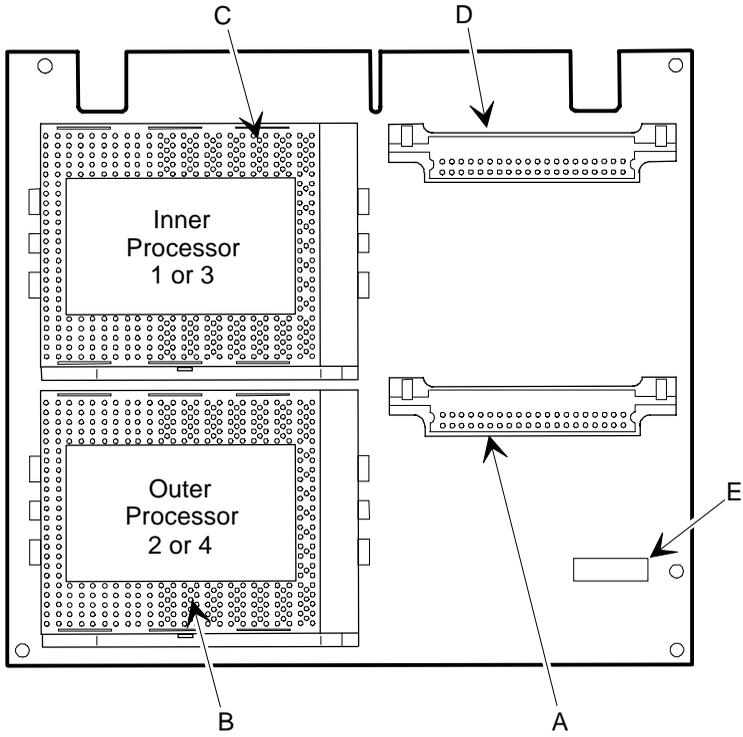


DEC1320-3

Figure 3-7. Main Logic Board Components

Processor Module Components and Connectors

Figure Legend	Component/Connector
A	Outside processor voltage regulator
B	Outside processor ZIF socket
C	Inside processor ZIF socket
D	Inside processor voltage regulator
E	Frequency ratio DIP switches



DEC01408-2

Figure 3-8. Processor Module Components and Connectors

Server Management



Introduction

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

Managing Your Server

The DIGITAL Server allows you to perform the following server management functions:

- Monitor main logic board voltage and cooling fan status via the Operator Control Panel (OCP)
- Monitor processor module voltage, temperature and status via the OCP
- Detect and automatically correct single-bit ECC errors

The DIGITAL Server 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 SCU or through server 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

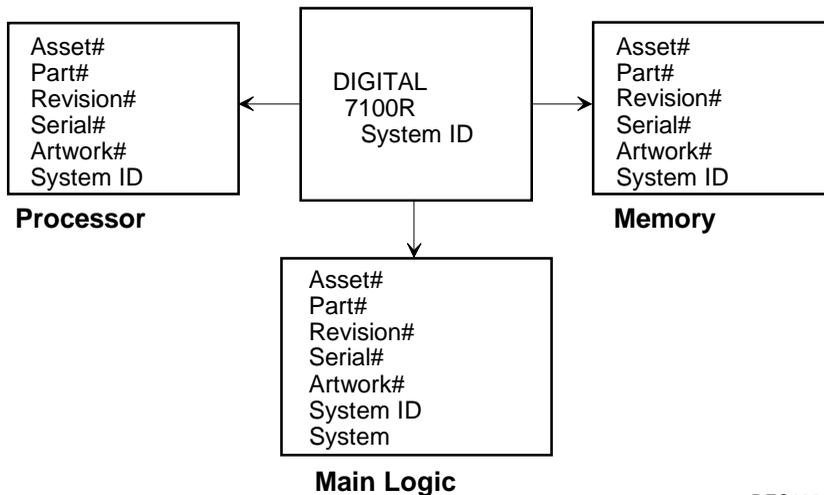
The System ID is also located on the main logic board and processor module. The System ID contains the following information:

- 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 SCU or by using ServerWORKS management software.



DEC1321

Figure 4-1. DIGITAL Server Component Information

Obtaining Information Using the SCU

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

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

Refer to Appendix C, "SCU Features," for more detailed information about the SCU.

Obtaining Information Using Server Management Software

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

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

DIGITAL ServerWORKS Manager allows the Network or Server Administrator to perform the following functions on 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 Overview and Installation Guide for more information on how to use ServerWORKS Manager to view and be notified of events on the server.

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

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

Displaying Server Status Using the Hardware

There are two types of information displayed when 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 POST messages are also displayed on the OCP panel. When an error occurs, an error message is displayed on both the monitor and OCP panel and a beep is sounded from the server's speaker.

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

Refer to Appendix A for server status, OCP and POST messages.

Processor Module Upgrades

5

Introduction

Installing a higher-performance processor module or a second processor module increases the capabilities of your server. This chapter describes the configuration guidelines that must be followed prior to upgrading as well as detailed procedures on removing and installing processor modules.

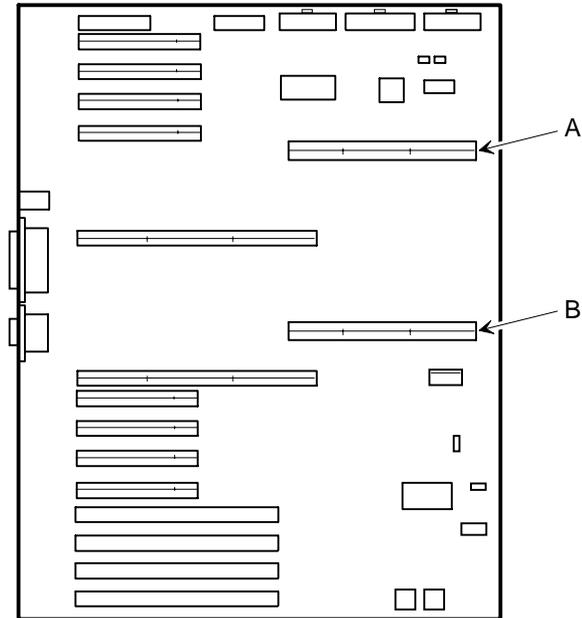
Configuration Guidelines

You can upgrade your server with up to four processors. In order to upgrade your configuration, you must purchase and install the appropriate upgrade kit (processor chip or processor module). Contact your authorized DIGITAL reseller for available options. For details regarding the upgrade, refer to the documentation supplied in the upgrade kit.

- Use only DIGITAL-supplied processor modules.
- A processor upgrade can be done by installing a higher-performance processor or processor module.
- If there is no processor module installed in slot 2, a terminator must be installed.
- Processor speed and cache size on a second processor module must be identical to the primary processor module.
- You must run the SCU after installing any processor upgrade. This allows your server to recognize the new processor configuration.

Processor Module Locations

Item A in Figure 5-1 shows the processor module Slot 1 location. Item B in Figure 5-1 shows the processor module Slot 2 location.



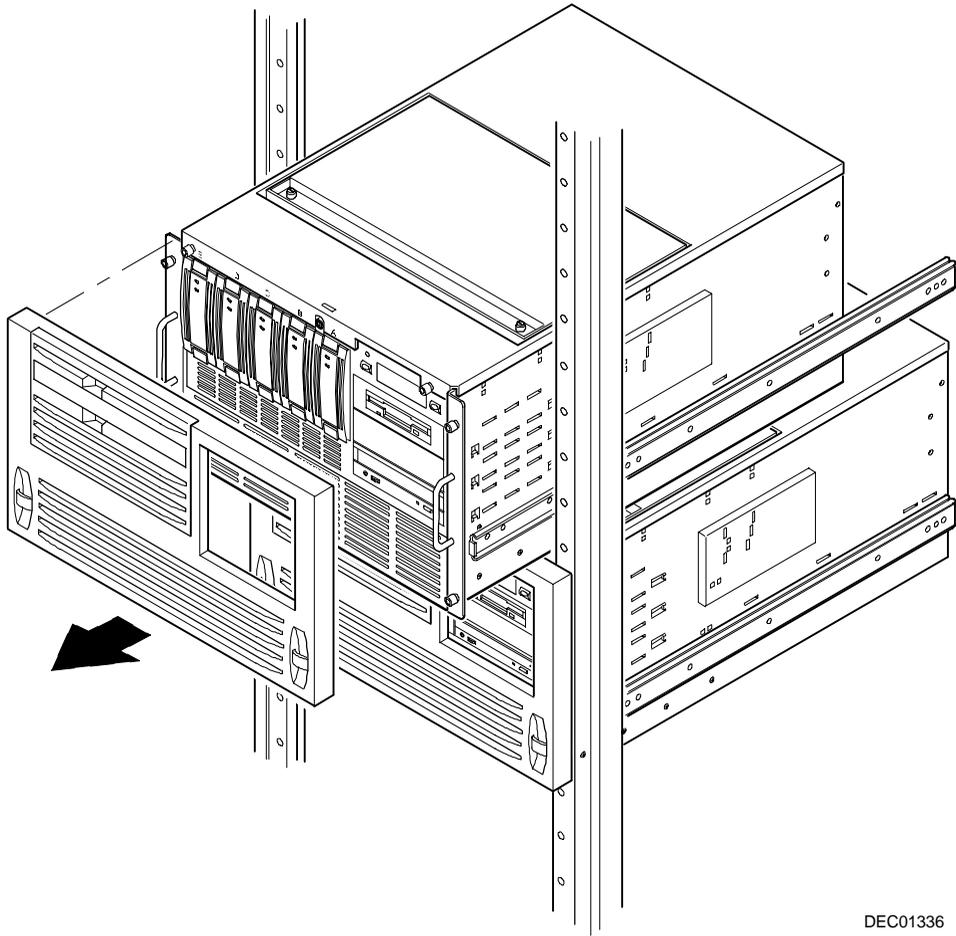
DEC01320-7

Figure 5-1. Processor Module Slot Locations

Installing a Second Processor Module

To install a second processor module:

1. Shut down the operating system software.
2. Turn off your server.
3. Disconnect all external devices, ac power, and monitor power.
4. Remove the front bezel (if installed).
5. Remove the four screws securing the chassis to the rack rails (see Figure 5-2).
6. Slide the chassis forward until it is fully extended (see Figure 5-2).
7. Unlock and remove the top cover (see Figure 3-1).

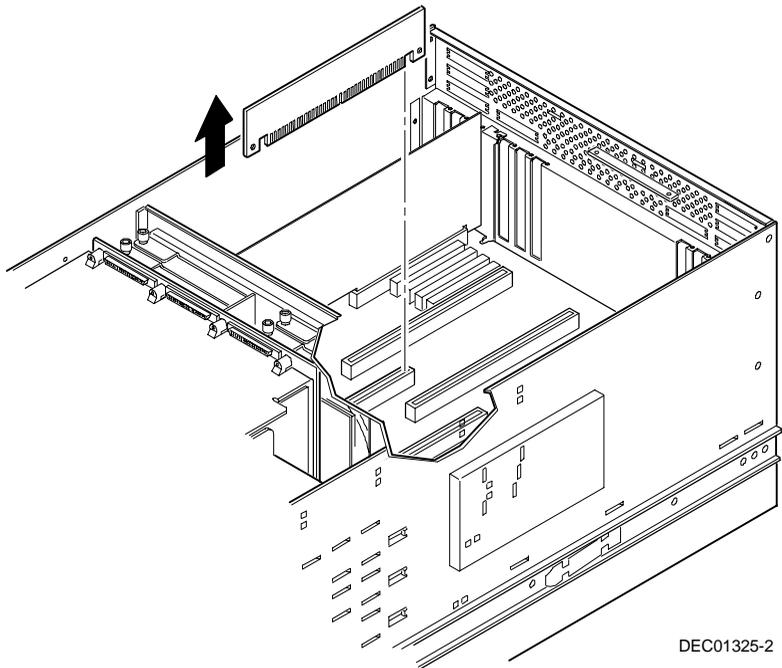


DEC01336

Figure 5-2. Removing the Front Bezel

8. Carefully remove the terminator from the processor module slot 2 and place it in an antistatic package (see Figure 5-3).
9. Remove the processor module and retaining bracket from the antistatic package. Check switch J19 on the processor module for the appropriate switch settings.
10. Remove the voltage regulator modules (VRMs) from their shipping containers.

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

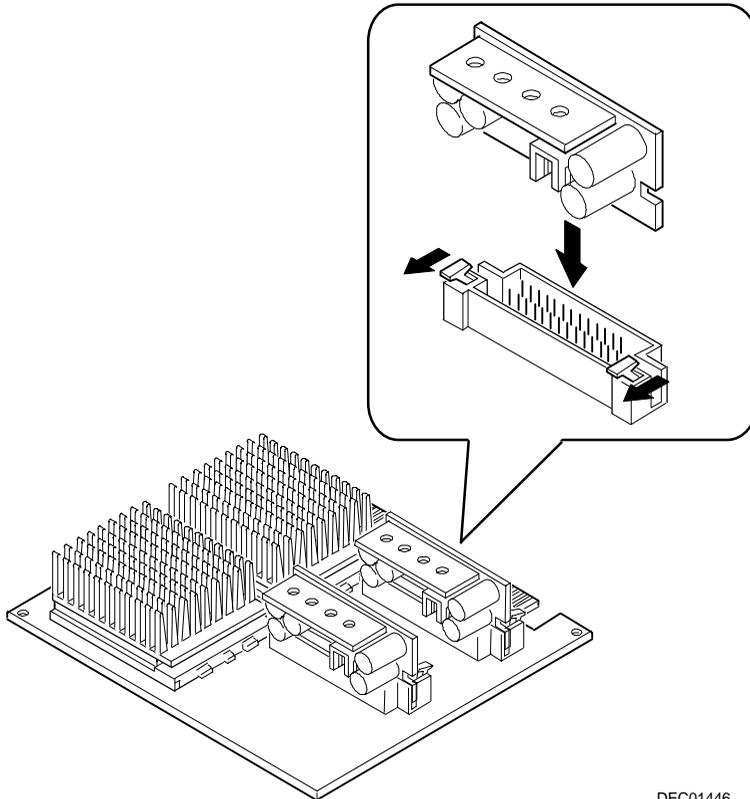


DEC01325-2

Figure 5-3. Removing the Terminator Card

11. Install the VRMs into their appropriate slots on the processor module (see Figure 5-4).

Refer to Appendix A, "Technical Specifications," Figure A-2 for the location of the regulator slots.



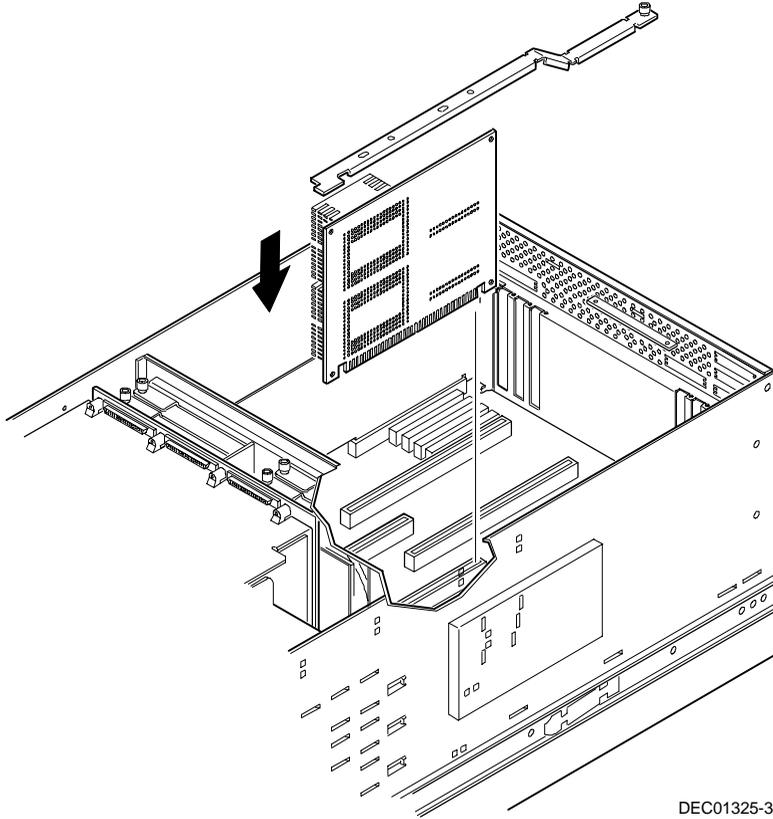
DEC01446

Figure 5-4. Installing a VRM

12. Install the second processor module into the slot on the main logic board (see Figure 5-5).
13. Install the retaining bracket and secure the captive screw located on the bracket to the chassis.



CAUTION: The processor module has two rows of gold fingers on its edge that plug into the main logic board slot. The processor module must be pushed firmly in the slot to engage both rows of gold fingers or your server might not power up on boot.



DEC01325-3

Figure 5-5. Installing a Processor Module

14. Replace and lock the top cover.
15. Slide the chassis into the rack and then secure using the four previously removed screws (see Figure 5-2).
16. If removed, replace the front bezel.
17. Connect all external devices and restore power.
18. Run the SCU, select **Configure Computer**, select **View and Edit Details**, and then select **Save and Exit**.

This allows your server to recognize the new processor module configuration.

Refer to Chapter 2, "Server Software and Utilities."

Processor Compatibility in a Multiprocessor Environment

Intel and DIGITAL recommend using identical steppings/versions of processors within a multiprocessor server whenever possible, since these configurations have received the greatest amount of validation testing. Since it is not possible to validate every combination of processor steppings, each new stepping of a processor is fully validated only against the latest stepping. At press time, there were no known incompatibility issues when mixing processor steppings in a multiprocessor server. Please refer to the README file on the ServerWORKS Quick Launch CD-ROM to view the latest processor compatibility information. If you have any concerns about processor compatibility within a multiprocessor server, please contact your local authorized DIGITAL reseller for assistance.

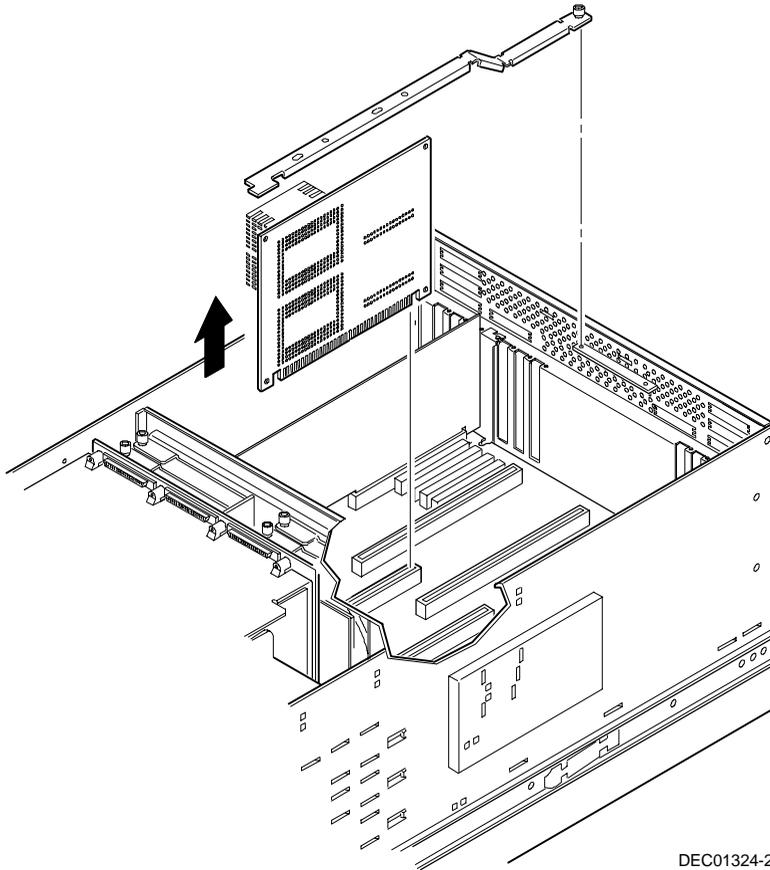
Installing a Processor

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

Removing the Processor Module

1. Power down the server.
2. If installed, remove the front bezel (see Figure 5-2).
3. Remove the four screws securing the chassis to the rack rails (see Figure 5-2).
4. Slide the chassis forward until it is fully extended (see Figure 5-2).
5. Unlock and remove the top cover.
6. Place the antistatic wrist strap on your wrist and connect the grounding clip to a non-painted metal surface of the server's chassis.
7. If applicable, remove the video expansion board.
8. Remove the retainers (see Figure 5-6).
9. Grasping both ends of the processor module, carefully remove it from the main logic board and place it on an antistatic surface.

Processor Module Upgrades

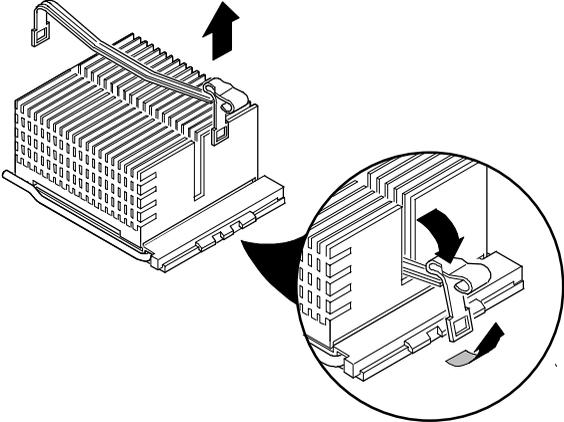


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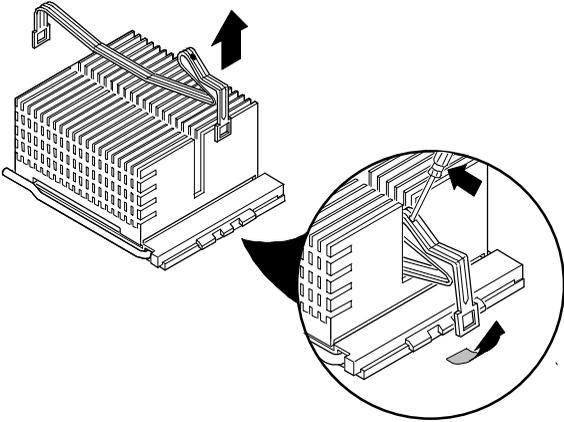
Figure 5-6. Removing the Processor Module

Installing a Processor and Voltage Regulator Module (VRM)

1. Remove the processor from its shipping holder by removing the retaining clip. To remove the clip, press down firmly on the top of the clip. If needed, press down with a small screwdriver in the hole of the second style clip shown in Figure 5-7.



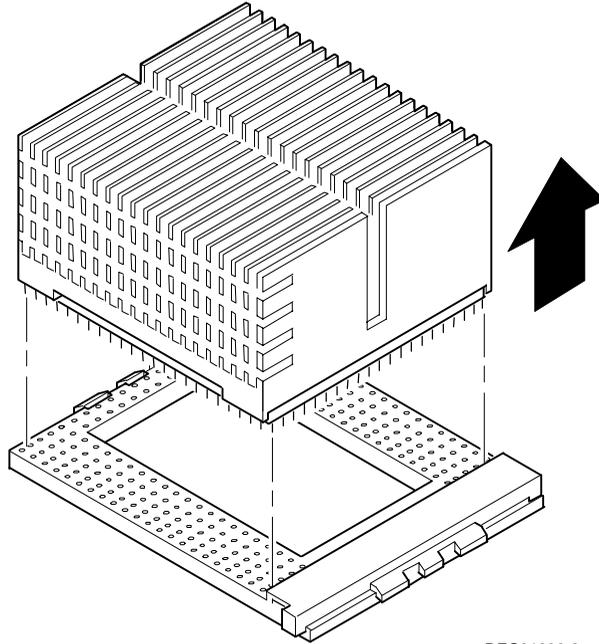
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DEC01211-3

Figure 5-7. Removing the Retaining Clip

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

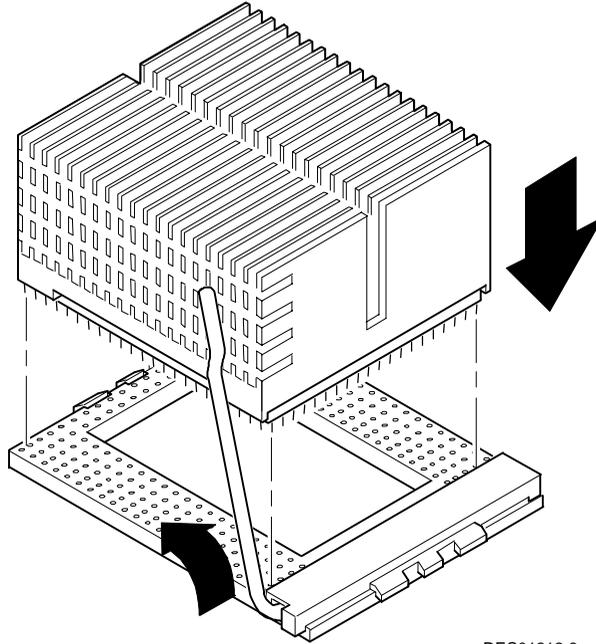


DEC01232-2

Figure 5-8. Removing the Processor/Heat Sink Assembly

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

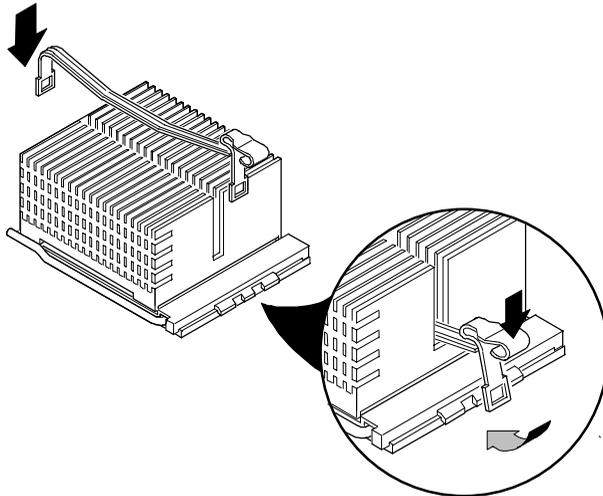
4. Lower the lever to engage the pins (see Figure 5-9).



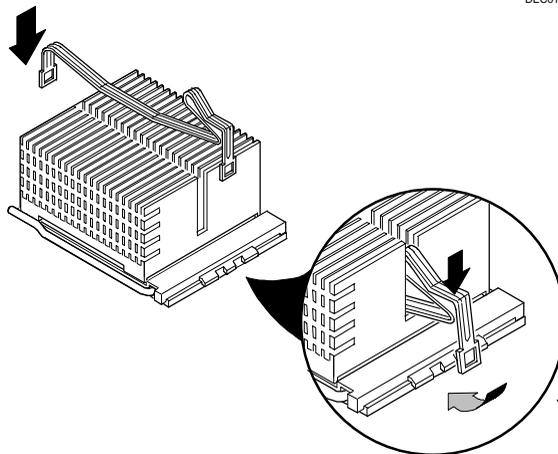
DEC01212-3

Figure 5-9. Installing the New Processor

5. Replace the retaining clip by installing the back side of the clip first, then pressing it into place as shown in Figure 5-10.



DEC01211-4



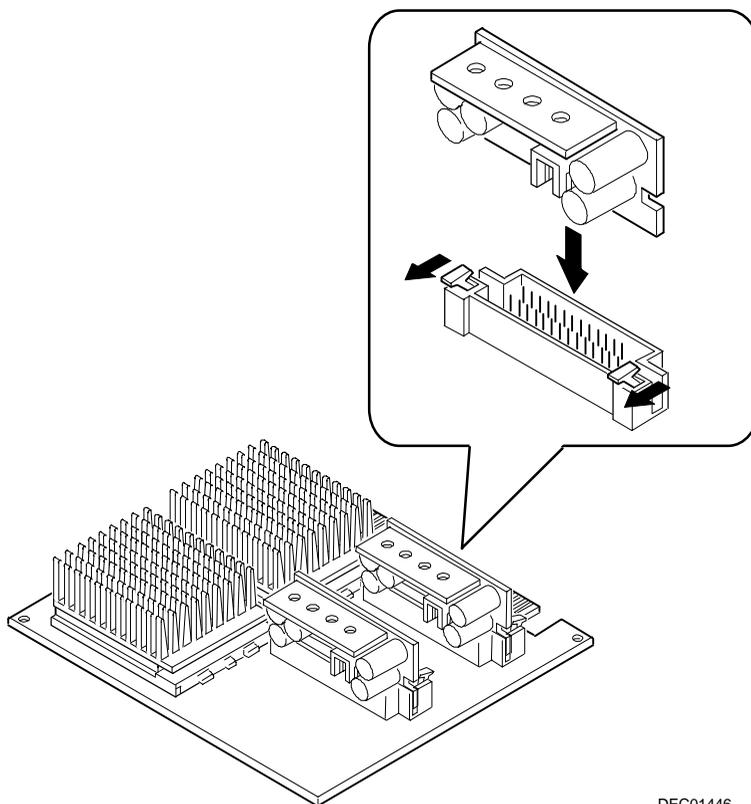
DEC01211-5

Figure 5-10. Installing the Retaining Clip

6. Remove the new VRM from its shipping container.
7. Install the VRM into the empty VRM socket (see Figure 5-11).



NOTE: A voltage regulator module must be installed for each processor that is installed in the server.



DEC01446

Figure 5-11. Installing a VRM

8. Set all appropriate switch settings on the processor module.
Refer to Appendix A, "Technical Specifications," for switch locations.

Installing the Processor Module

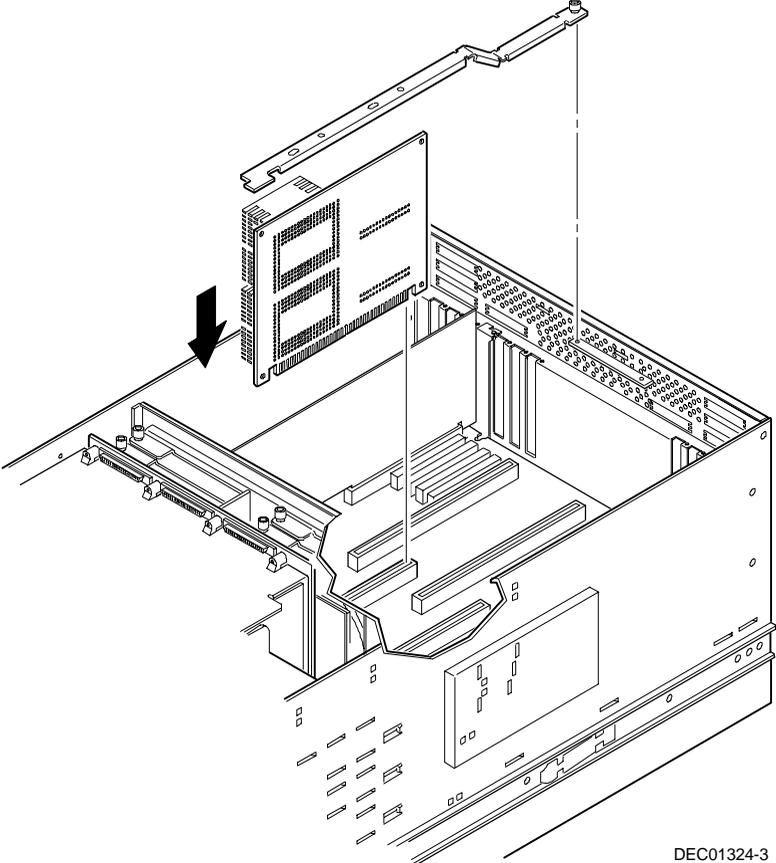
1. Install the processor module into the slot on the main logic board.
2. Secure the processor module to the main logic board using the previously removed retainers.



CAUTION: The processor module has two rows of gold fingers on its edge that plug into the main logic board slot. The processor module must be pushed firmly in the slot to engage both rows of gold fingers or your server might not power up on boot.

Replace the Panel and Reconnect the Cables

1. If applicable, replace the video expansion board.
2. Replace and lock the top cover.
3. Replace the front bezel (if removed).
4. Slide the chassis into the rack and then secure using the four previously removed screws (see Figure 5-2).
5. Connect any cables and power cords previously removed to the back of the server.



DEC01324-3

Figure 5-12. Installing the Processor Module

Run the System Configuration Utility (SCU)

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

To start and run the SCU:

1. Insert the SCU diskette into drive A and turn on your server. The diskette should boot automatically.
2. When the SCU title appears, press any key to continue. Afterwards, follow the instructions on your screen to access the SCU main menu.
3. From the main menu, press the up or down arrow to highlight an item and then press Enter to select it. Press F1 at any time for help about a selection.
4. From the main menu select `Configure Computer` and then `View and Edit Details`.

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

5. Make sure that the boot option is drive "A: then C:"
6. Select `Save and Exit` to configure your server for the processor module.
7. When complete, remove the SCU diskette from drive A.

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

Installing Additional Memory

6

Introduction

Your DIGITAL Server supports up to 4 GB of EDO/ECC server memory using 168-pin Dual In-Line Memory Modules (DIMMs). Memory can be increased by adding DIMMs on the memory modules installed in your server.

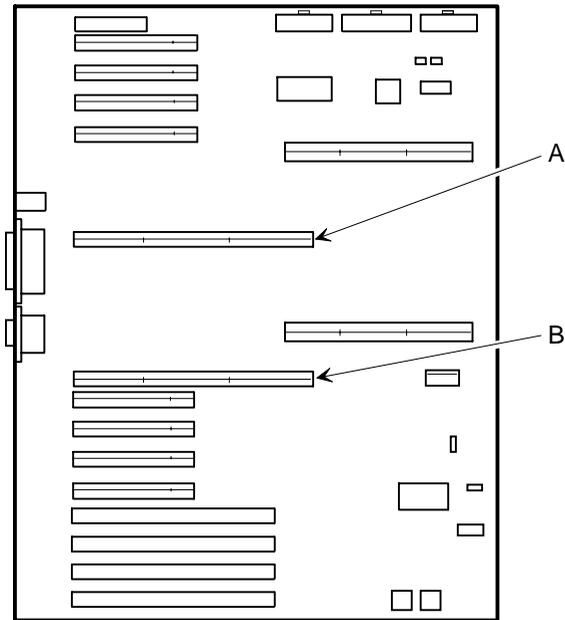
This chapter provides the memory configuration guidelines that must be followed prior to installing additional DIMMs on memory modules 1 and 2. Procedures for removing a memory module and troubleshooting are also included.

The DIGITAL Server provides a 4-way interleaved memory system, with 128 MB (4 x 32 MB) minimum supported memory and 4 GB (16 x 256 MB) of maximum supported memory. Prior to installing any DIMM combination, make sure you read the memory configuration guidelines that follow.

Only install DIMMs supported by Digital Equipment Corporation. DIGITAL does not support server performance, product warranty, or a service call resulting from installing non-qualified DIMMs.

Memory Module Locations

Item A in Figure 6-1 shows the memory module slot 1 location. Item B in Figure 6-1 shows the memory module slot 2 location.



DEC01320-8

Figure 6-1. Memory Module Slot Locations

Supported DIMM Upgrade Kits

The following DIMM upgrade kits are available:

DIMM Size	Order Number	Quantity	Total Capacity
32 MB	FR-PCSMA-AG	4	128 MB
64 MB	FR-PCSMA-AH	4	256 MB
128 MB	FR-PCSMA-AJ	4	512 MB
256 MB	FR-PCSMA-AK	4	1024 MB

Memory Configuration Guidelines

- Install DIMMs supplied by DIGITAL as follows:
 - Install 168-pin, 72-bit EDO/ECC DIMMs operating at 60 ns
 - DIMM capacities supported are 32 MB, 64 MB, 128 MB, and 256 MB

Installing Additional Memory

- Both DIMM memory expansion boards must be installed for proper server operation.
 - Memory banks consists of four DIMM sockets (two DIMM sockets on each memory expansion board). For example, two sockets (J2 and J3) on board 1 with the corresponding two sockets (J2 and J3) on board 2 equals one bank. See Figure 6-2 for DIMM bank locations.

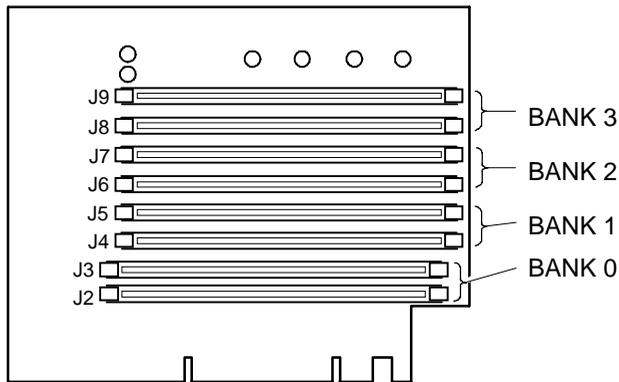


Figure 6-2. DIMM Bank Locations

- Memory banks must be filled completely (with four DIMMs) and consecutively starting with Bank 0.
- Different capacity DIMMs can be installed in subsequent banks. However, within each memory bank, DIMMs must be the same capacity, type, and speed.

Memory Configuration Examples, In Megabytes (MB)

Bank 0				Bank 1				Bank 2				Bank 3				Total
Board 1		Board 2		Board 1		Board 2		Board 1		Board 2		Board 1		Board 2		
J2	J3	J2	J3	J4	J5	J4	J5	J6	J7	J6	J7	J8	J9	J8	J9	
32	32	32	32													128
32	32	32	32	32	32	32	32									256
32	32	32	32	32	32	32	32	32	32	32	32					384
32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	512
64	64	64	64													256
64	64	64	64	32	32	32	32									384
64	64	64	64	32	32	32	32	32	32	32	32					512
64	64	64	64	64	64	64	64									512
64	64	64	64	32	32	32	32	32	32	32	32	32	32	32	32	640
64	64	64	64	64	64	64	64	32	32	32	32					640
64	64	64	64	64	64	64	64	32	32	32	32	32	32	32	32	768
64	64	64	64	64	64	64	64	64	64	64	64					768
64	64	64	64	64	64	64	64	64	64	64	64	32	32	32	32	896
64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	1024
128	128	128	128													512
128	128	128	128	32	32	32	32									640
128	128	128	128	64	64	64	64									768
128	128	128	128	32	32	32	32	32	32	32	32					768
128	128	128	128	64	64	64	64	32	32	32	32					896
128	128	128	128	32	32	32	32	32	32	32	32	32	32	32	32	896
128	128	128	128	64	64	64	64	64	64	64	64					1024
128	128	128	128	64	64	64	64	64	64	64	64	32	32	32	32	1152
128	128	128	128	64	64	64	64	64	64	64	64	64	64	64	64	1280
128	128	128	128	128	128	128	128									1024
128	128	128	128	128	128	128	128	32	32	32	32					1152
128	128	128	128	128	128	128	128	64	64	64	64					1280
128	128	128	128	128	128	128	128	32	32	32	32	32	32	32	32	1280
128	128	128	128	128	128	128	128	64	64	64	64	32	32	32	32	1408
128	128	128	128	128	128	128	128	64	64	64	64	64	64	64	64	1536

continued

Installing Additional Memory

Bank 0				Bank 1				Bank 2				Bank 3				Total
Board 1		Board 2														
J2	J3	J2	J3	J4	J5	J4	J5	J6	J7	J6	J7	J8	J9	J8	J9	
128	128	128	128	128	128	128	128	128	128	128	128					1536
128	128	128	128	128	128	128	128	128	128	128	128	32	32	32	32	1664
128	128	128	128	128	128	128	128	128	128	128	128	64	64	64	64	1792
128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	2048
256	256	256	256													1024
256	256	256	256	32	32	32	32									1152
256	256	256	256	64	64	64	64									1280
256	256	256	256	64	64	64	64	32	32	32	32					1408
256	256	256	256	128	128	128	128									1536
256	256	256	256	256	256	256	256									2048
256	256	256	256	32	32	32	32	32	32	32	32					1280
256	256	256	256	64	64	64	64	64	64	64	64					1536
256	256	256	256	128	128	128	128	32	32	32	32					1664
256	256	256	256	128	128	128	128	64	64	64	64					1792
256	256	256	256	128	128	128	128	128	128	128	128					2048
256	256	256	256	256	256	256	256	32	32	32	32					2176
256	256	256	256	256	256	256	256	64	64	64	64					2304
256	256	256	256	256	256	256	256	128	128	128	128					2560
256	256	256	256	256	256	256	256	256	256	256	256					3072
256	256	256	256	256	256	256	256	256	256	256	256	32	32	32	32	3200
256	256	256	256	256	256	256	256	256	256	256	256	64	64	64	64	3328
256	256	256	256	256	256	256	256	256	256	256	256	128	128	128	128	3584
256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	4096

Upgrading Memory

You can upgrade memory on your DIGITAL Server by adding DIMMs on the installed memory modules. You must add four DIMMs (two DIMM sockets on each memory module) when expanding memory.

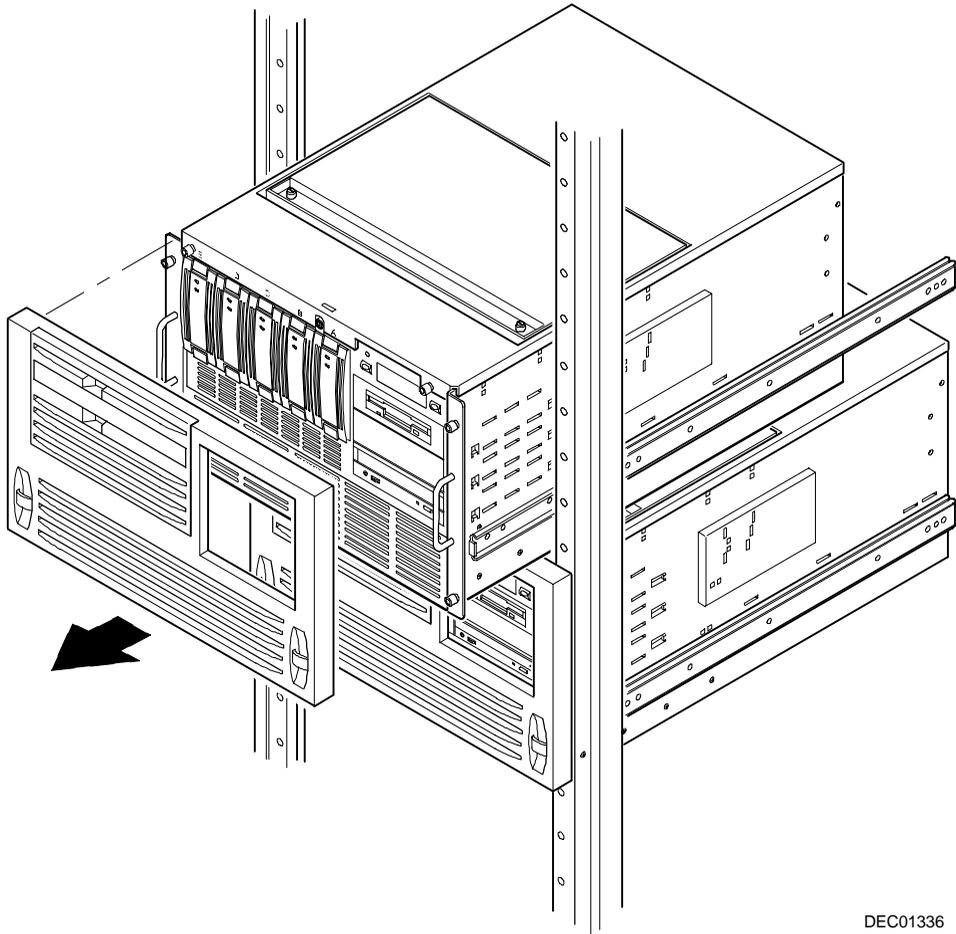
Use the following procedure to install DIMMs:



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. Disconnect the ac power, any and all external devices, and monitor power.
3. If installed, remove the front bezel (see Figure 6-3).
4. Remove the four screws securing the chassis to the rack rails (see Figure 6-3).
5. Slide the chassis forward until it is fully extended (see Figure 6-3).

Installing Additional Memory



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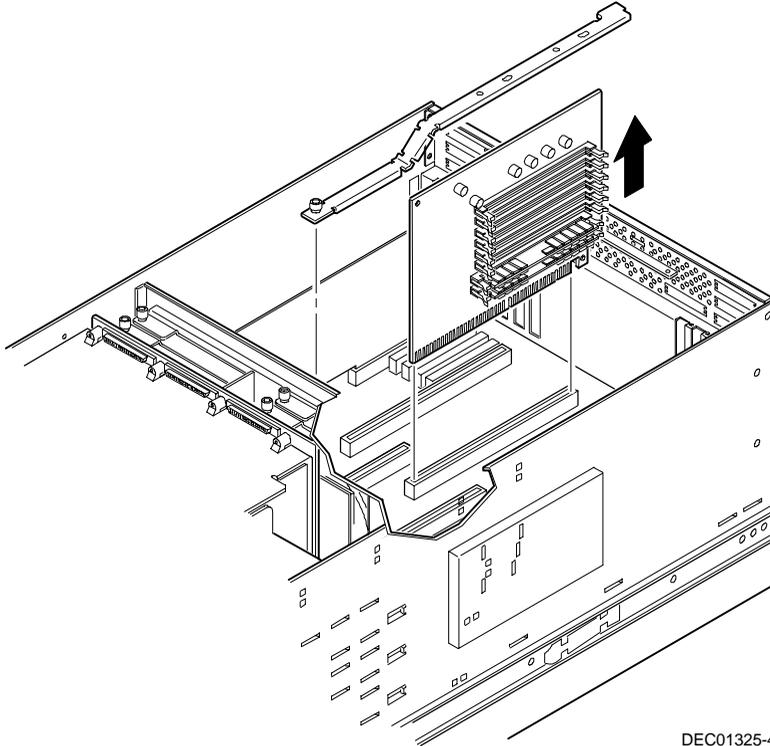
Figure 6-3. Removing the Front Bezel

6. Unlock and remove the top cover (see Figure 3-1).
7. Remove the memory module retaining brackets for memory modules 1 and 2 (see Figure 6-4).

- Carefully remove the memory modules 1 and 2 from the main logic board and place them side-by-side on an antistatic surface.



CAUTION: Never install DIMMs on the memory expansion boards without first removing them from the server.



DEC01325-4

Figure 6-4. Removing a Memory Module

- Unpack the DIMMs and install them in the sockets on the memory expansion boards. Refer to “Memory Configurations” described earlier in this chapter for information on the supported memory configurations).

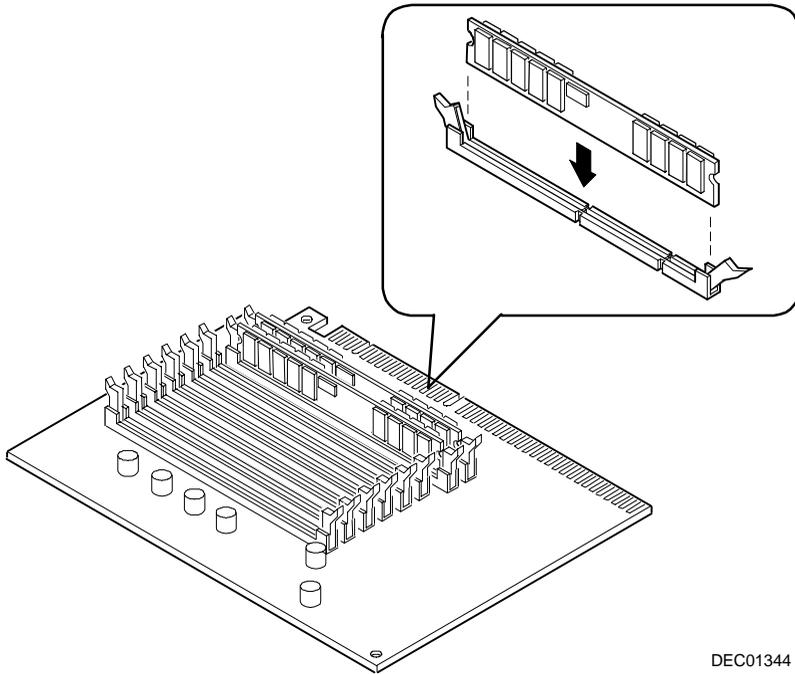
Installing Additional Memory

10. Starting with the first empty bank on both memory modules, orient the DIMM so that the two notches at the bottom edge of the DIMM are aligned with the keyed socket (see Figure 6-5).
11. 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.

12. Continue installing DIMMs in sets of four per bank to complete your memory upgrade.
13. Replace both memory modules and secure them with the retaining brackets.
14. Replace and lock the top cover.
15. Slide the chassis into the rack and then secure using the four previously removed screws (see Figure 6-3).
16. If removed, replace the front bezel (see Figure 6-3).
17. Connect all external devices.
18. Insert the System Configuration Utility (SCU) diskette in drive A and boot the server.
19. Select `Configure Computer` from the main menu.
20. Select `Save and Exit` to configure your server for the additional memory.

Installing Additional Memory



DEC01344

Figure 6-5. Installing a DIMM

Installing Disk and Tape Drives

7

Introduction

Your DIGITAL Server 7100R supports narrow and wide Ultra SCSI devices. The following sections describe the SCSI configuration guidelines that must be adhered to so your server operates correctly after installing and connecting SCSI devices.

Tape Drive Configuration Guidelines

- An optional full-height tape drive requires two 5¼-inch drive bay slots. As a result, either the installed diskette drive or the CD-ROM drive must be removed to free up an additional 5¼-inch drive bay slot.
- Tape devices must have terminators removed or disabled. The SCSI adapter and SCSI cable provide the proper termination.

Hard Disk Drive/SBB Configuration Guidelines

- A maximum of five SBB drives can be installed and configured in the server.
- SBBs must only be installed in the hot-swap bay area.

CD-ROM Drive Configuration Guidelines

- The factory installed narrow SCSI CD-ROM drive has its SCSI ID set to 5.
- The CD-ROM drive should always be connected to the Adaptec SCSI adapter to support the bootable ServerWORKS Quick Launch CD-ROM.

SCSI Configuration Guidelines

The following sections describe the SCSI configuration guidelines that must be adhered to so your server operates correctly after installing and connecting SCSI devices.

SCSI ID and Termination

- Your server supports up to eight internal SCSI devices, including five SBBs, one CD-ROM drive, and two internal half-height devices located in the bays to the right of the SBB area.
- These devices can be connected to either wide or narrow busses, single or multiple channels.

Limitations on connecting these devices might also be based on the manufacturer's design.

- Each device on the channel must be assigned to a unique SCSI ID number. The narrow SCSI bus supports eight devices in the range of 0-7. The wide SCSI bus supports 16 devices in the range of 0-15. In either bus, the SCSI ID "7" usually is assigned to the SCSI controller. This can be changed in the configuration utility.
- Both ends of the SCSI bus must be terminated. One side of the termination will be at the backplane. The other termination can be found on the SCSI adapter.
- If a device such as a CD-ROM drive has a terminator jumper installed, remove it. Otherwise, no other devices will be seen beyond the CD-ROM drive.

Boot Device

- The SCSI adapter with the lowest BIOS address is identified by the server as the “primary” SCSI adapter. When loading the operating system from a SCSI SBB, this primary or boot drive must be connected to the primary SCSI adapter.
- To improve server performance, you might want to distribute the SCSI devices across the SCSI adapters.
- Each operating system has different limitations regarding the number of SCSI adapters that are supported. Refer to your operating system documentation for additional information.

External Channel

- Connecting external Ultra SCSI devices to your server requires an Ultra capable cabinet and an Ultra SCSI channel.
- Extending an internal Ultra SCSI bus is not a supported configuration.
- Each device on the SCSI bus must be assigned a unique SCSI ID number.
- For proper operation, the length of the Ultra SCSI cable must not exceed 20 meters (65.6 ft). If the SCSI adapter is configured for fast-wide operation, the length of the cable cannot exceed 2 meters (6.56 ft)*. This includes the length of the internal cable plus the length of the external cable to the rear panel of the server.
- Properly terminate both ends of the SCSI cable. In most cases, one side of the termination is provided by the SCSI adapter. The last device on the external SCSI bus must also be terminated.

* According to DIGITAL specifications

Storage Backplane

- SBBs must only be installed in the hot-swap bay area.
- A maximum of five SBBs can be installed. Slots are labeled A through E).
- A SCSI ID for each SBB is assigned by switch settings on the storage backplane. These switch settings are accessible from the front of the server by removing SBBs.

Refer to the SCSI bus Target ID Settings table in the Drive ID section.

- The storage backplane is factory-defaulted as one complete channel on a wide Ultra SCSI bus. Split the backplane by removing the jumper cable between SBBs B and D.



NOTE: Using non-Ultra SCSI disk drives in the “hot swap” drive bays is a supported SCSI configuration. However, the maximum Ultra SCSI bus utilization will not be achieved if non-Ultra SCSI devices are active. DIGITAL recommends that you do not mix Ultra and non-Ultra SCSI devices on the same SCSI bus.

Drive ID

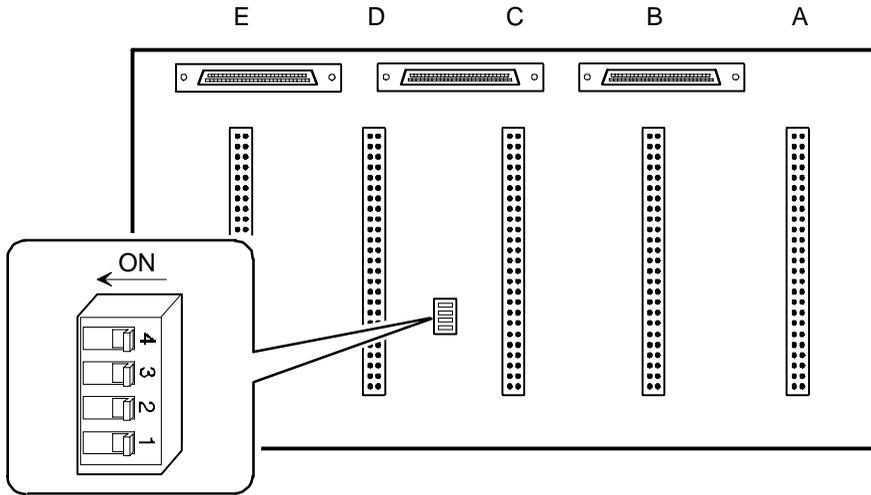
- The SCSI ID addressing is independent of the single or dual SCSI bus arrangement. Make sure you select unique SCSI IDs for all SCSI devices on the SCSI bus.
- You must use a wide SCSI adapter to set SCSI IDs greater than seven.
- Your CD-ROM drive and tape drive IDs must be set manually via jumpers on the device. Refer to your manufacturer's documentation for information on setting drive IDs. The factory installed CD-ROM drive has its SCSI ID set to 5.
- Narrow (8-bit) devices on a wide SCSI cable count as two SCSI IDs. For example, the narrow CD-ROM drive SCSI ID is 5 so SCSI ID 13 is no longer available. The 8-bit CD-ROM device counts as two devices on a 16-bit wide data path. Make sure that a unique SCSI ID is selected for each SCSI device located on each SCSI bus.

Refer to the SCSI bus Target ID Settings table for detailed SCSI ID settings.

SCSI Bus Target ID Settings (SW1 Figure 7-1)

Slot	SCSI ID							
	0	1	2	3	4	5	6	7
1	0	0	8	8	0	0	8	8
2	1	1	9	9	1	1	9	9
3	2	2	10	10	2	2	10	10
4	0	4	0	4	8	12	8	12
5	1	5	1	5	9	10	9	13

Installing Disk and Tape Drives



DEC01326

Figure 7-1. Storage Backplane Switch Location

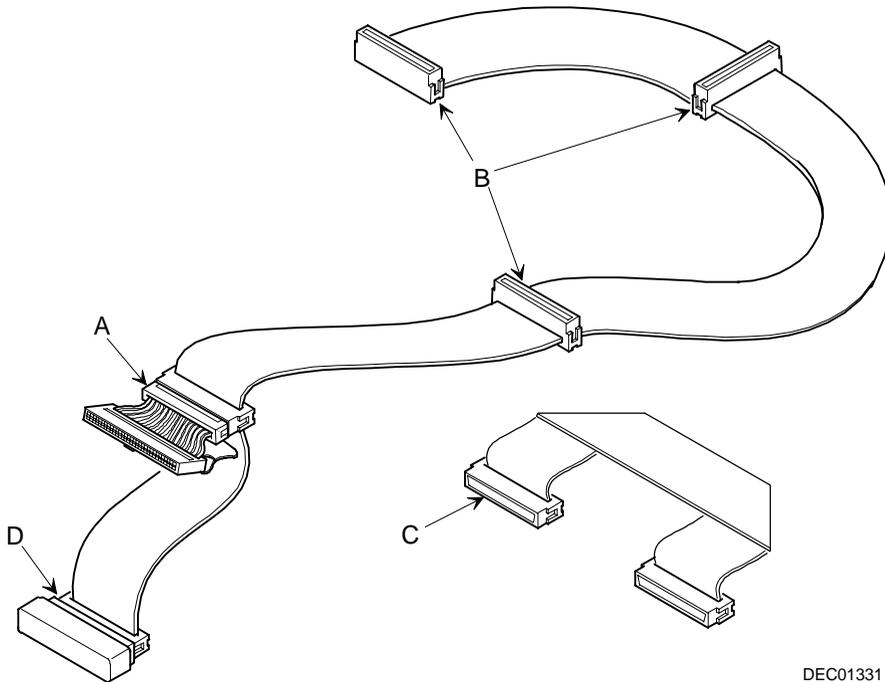
SW1-4	SW1-3	SW1-2	SW1-1	Case
OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	ON	1
OFF	OFF	ON	OFF	2
OFF	OFF	ON	ON	3
OFF	ON	OFF	OFF	4
OFF	ON	OFF	ON	5



NOTE: You need to remove SBBs C and D to gain access to switch SW1 (see Figure 7-1).

Cables

- The standard internal five connector SCSI cable is used for the narrow channel. It includes (see Figure 7-2):
 - Four SCSI 68-pin connectors to connect the wide Ultra SCSI adapter, the storage backplane, CD-ROM drive, and two optional SCSI devices (B, Figure 7-2).
 - One wide-to-narrow adapter to connect to the narrow CD-ROM drive (A, Figure 7-2).
 - One jumper cable for use with a split backplane wide Ultra SCSI configuration (C, Figure 7-2).



DEC01331

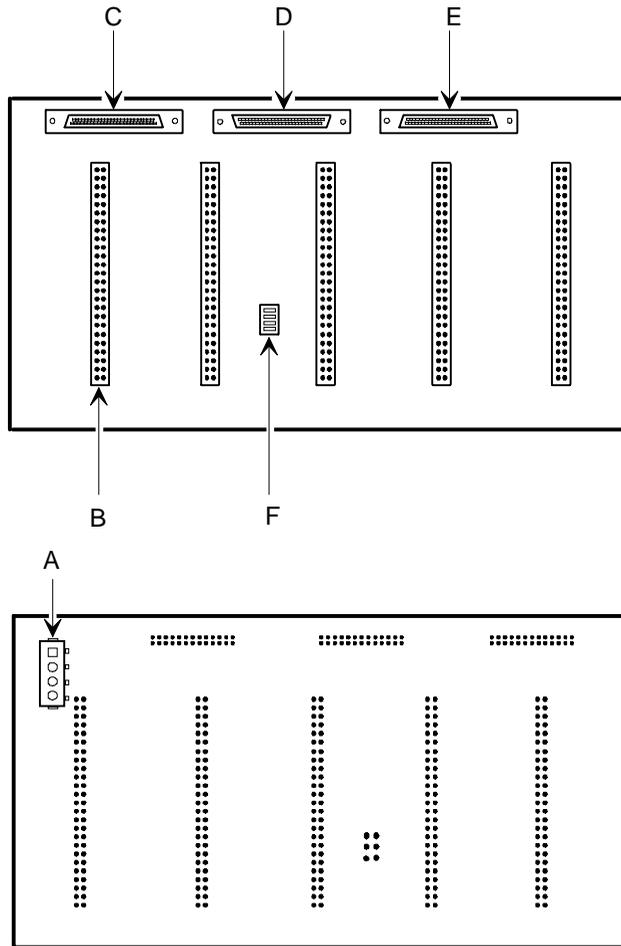
Figure 7-2. SCSI Cables

Storage Backplane

Your storage backplane supports five hot-swap devices split between two SCSI bus sections: SCSI Channel A and SCSI Channel B (see Figure 7-3). SCSI Channel A consists of three SCSI device connections (A, B, and C). SCSI Channel B consists of two SCSI device connections (D and E). These channels can be configured as two independent SCSI buses or as one SCSI bus by installing a SCSI jumper cable (D and E, Figure 7-3).

Figure Legend	Description
A	Power connector
B	Wide Ultra SCSI connectors (SBB)
C	Wide Ultra SCSI 68-pin connectors (Channel B in)
D	Wide Ultra SCSI 68-pinconnectors (Channel A out)
E	Wide Ultra SCSI 68-pinconnectors (Channel A out)
F	SCSI ID switch block

Proper termination is designed into the storage backplane.



DEC01329

Figure 7-3. Storage Backplane

Installing Optional Drives

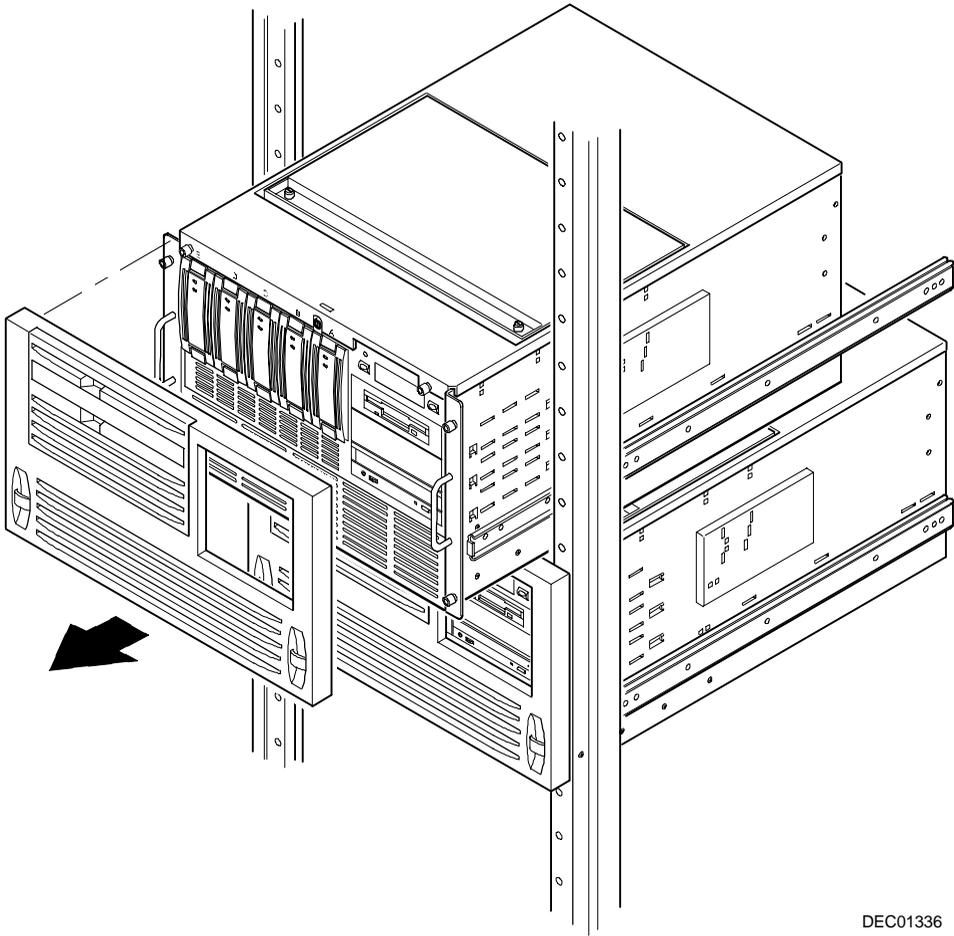
Your server has two drive bay areas. Optional drives such as a diskette drive, a SCSI CD-ROM, and a SCSI tape can be installed in these drive bay areas. The two drive bay areas are:

- Right-front access drive bay area — This area has room for three wide (68-pin) or narrow (50-pin) 5¼-inch or 3½-inch half-height SCSI devices or one full-height and one half-height 5¼-inch or 3½-inch SCSI devices. Devices can include diskette drives, CD-ROMs, or tape drives. Note that if you use a full-height drive, you must remove either the diskette drive or CD-ROM drive.
- Left-front access drive bay area — This area has room for five 3½-inch, wide Ultra SCSI, hot-swap SBB devices.

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

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

1. Turn off your server.
2. Disconnect all external devices, ac power, and monitor power.
3. Remove the front bezel (see Figure 7-4).
4. Remove the four screws securing the chassis to the rack rails (see Figure 7-4).
5. Slide the chassis forward until it is fully extended (see Figure 7-4).
6. Unlock and remove the top cover (see Figure 3-1).



DEC01336

Figure 7-4. Removing the Front Bezel

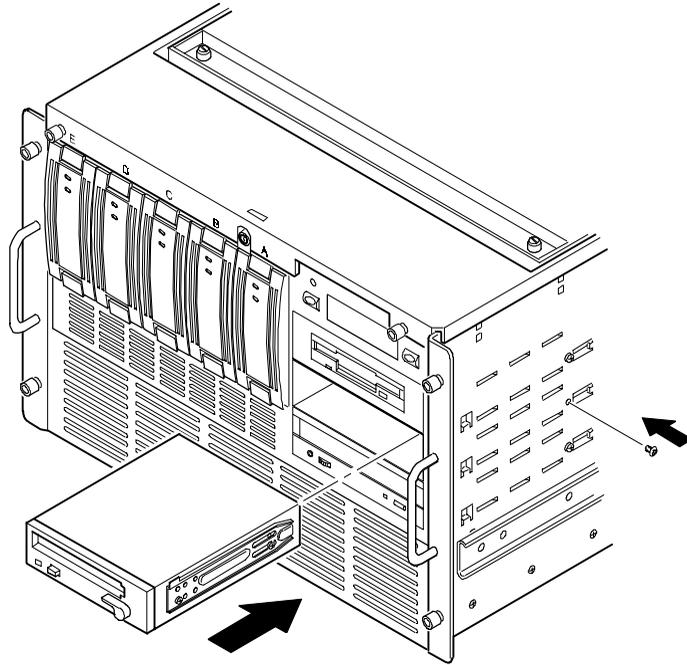
Installing Disk and Tape Drives

7. Remove the plastic filler panel by pushing it out from inside the server.
8. Remove the rails from the drive bay (inside, left and right) and attach them to the device.
9. Insert the device into the drive bay slot from the front.
10. Secure the device to the slot using the supplied mounting screw.
11. If applicable, replace the plastic filler panel.
12. Replace the front panel.
13. Connect the appropriate power and wide SCSI cables to the device.

Refer to Chapter 9, "Connecting SCSI and RAID Adapters," for more information.



NOTE: To connect a narrow SCSI device, a wide-to-narrow SCSI cable adapter must be used.



DEC01330-2

Figure 7-5. Installing a Half-Height 5 1/4-Inch Device Into the Right-Front Drive Bay

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

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

1. Turn off your server.
2. Disconnect all external devices, ac power, and monitor power.
3. Remove the front bezel (see Figure 7-4).
4. Remove the four screws securing the chassis to the rack rails (see Figure 7-4).
5. Slide the chassis forward until it is fully extended (see Figure 7-4).
6. Unlock and remove the top cover.
7. Remove the front panel.
8. Remove the plastic filler panel by pushing it out from inside the server.
9. Remove either the CD-ROM drive or the 3¼-inch floppy drive by removing the chassis mounting screw and sliding the drive out.
10. Transfer the side rails from the removed device to the full height 5¼-inch device to be installed.
11. Insert the device into the drive bay from the front.
12. Secure the device using the supplied mounting screw.
13. If applicable, replace the plastic filler panels.
14. Replace the front panel.
15. Connect the appropriate power and wide SCSI cables to the device.

Refer to Chapter 9, "Connecting SCSI and RAID Adapters," for more information.



NOTE: If you removed the diskette drive, make sure you run the SCU to disable all options associated with the diskette drive.

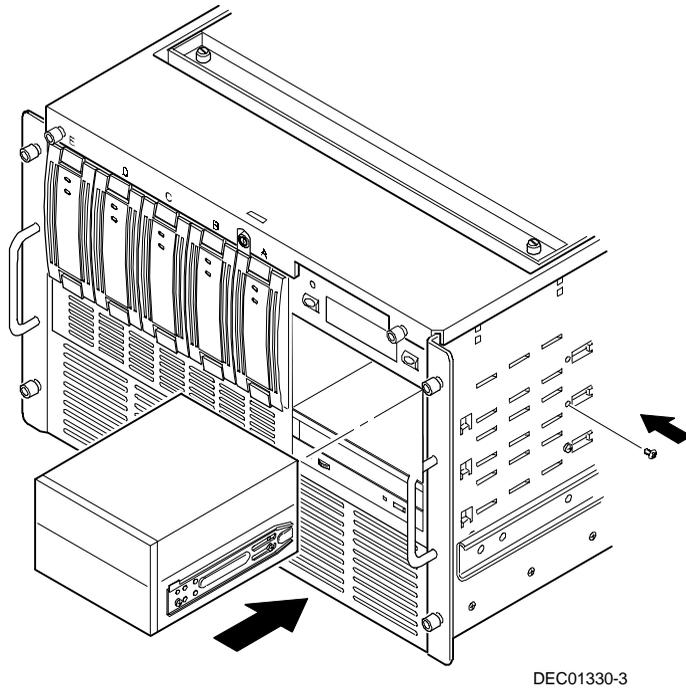
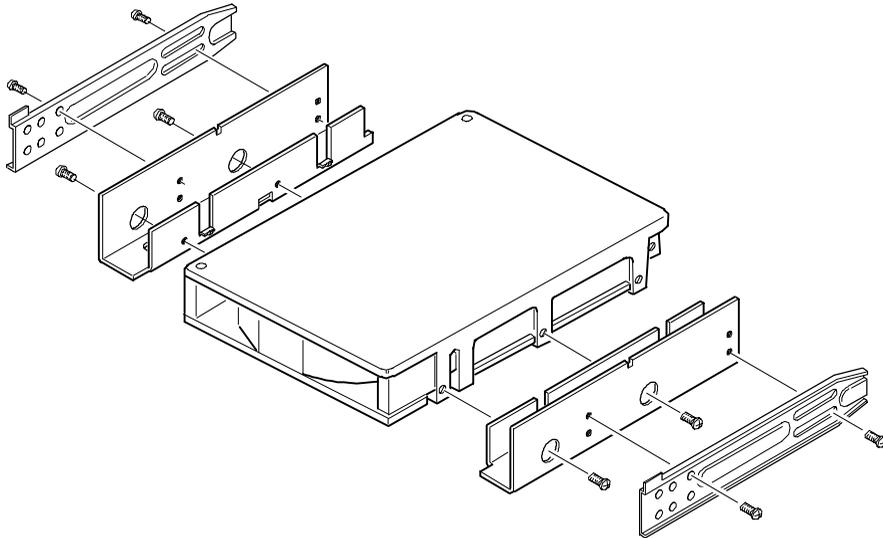


Figure 7-6. Installing a Full-Height 5 1/4-Inch Device Into the Right-Front Drive Bay

Expansion Brackets

You can install 3½-inch half-height devices into the right-front drive bay. If you plan to install a 3½-inch device in a 5¼-inch drive bay slot, you must first install expansion brackets onto the device (see Figure 7-7). Expansion brackets are either supplied with the device or can be purchased from DIGITAL. Contact your local authorized DIGITAL reseller for additional information.



DEC01341

Figure 7-7. Installing Expansion Brackets

Hot-Swap Drive Bay

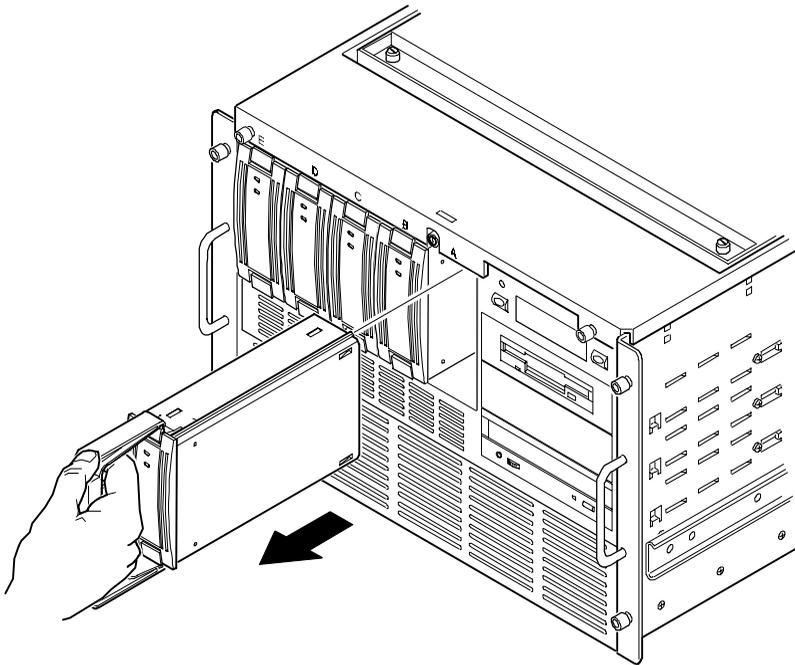
Hot-swapping allows you to remove or install an SBB while the server remains on-line and active but not accessing the device being swapped. This eliminates interference with the server's operation. For SBBs, you can use the hot-swap method to replace a device providing that the device is not active (green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



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

Use the following procedure to install or replace an SBB:

1. Remove the front bezel (if installed).
2. Remove the filler panel or SBB by pressing in and holding the handle in the middle of the supplied extractor tool (see Figure 7-8).
3. Using the extractor tool, pull the SBB out.
4. Insert the new SBB into the guide slots and push it in until it is fully seated and the mounting tabs engage the shelf.



DEC01330-4

Figure 7-8. Installing a Device Into the Hot-Swap Drive Bay

SBB LED Status Indicators

The hot-swap backplane monitors SBB status to identify error conditions or failures. This status is displayed on the SBB LEDs. The top LED displays the device activity status and the bottom LED displays the fault status.

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



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

For RAID servers, a failed SBB can be removed without the loss of data if the server is configured for RAID with mirroring or one disk from RAID Level 5; otherwise, data will be lost. Refer to Chapter 9 for RAID configuration guidelines.

- The bottom LED (amber) is the SBB fault LED and indicates an error condition when it is either on or flashing.



NOTE: This LED only lights if a RAID SCSI controller supporting DEC fault bus is used to drive the storage backplane.

SBB Status LEDs

Green Activity Status LED	Amber Fault Status 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 status, device is hung. Replace SBB.
Off	On	Fault status, device is inactive and spun down. Replace SBB.
On	Flashing	Fault status, device is active and spinning down due to a fault.

External Storage

You can use additional SCSI cables and/or host adapters to connect external SCSI devices to your server. Consult your DIGITAL sales representative for information on SCSI options and cables.

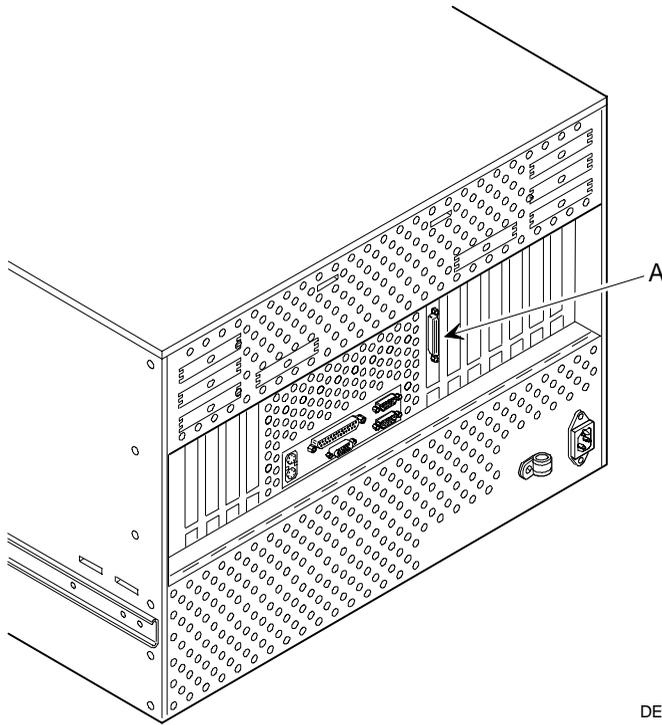
Connecting an External Device to a Wide Ultra SCSI Adapter



NOTE: Connecting external SCSI devices at Ultra SCSI speeds require an Ultra SCSI capable cabinet and a dedicated Ultra SCSI channel. Extending an internal Ultra SCSI bus is not a supported configuration.

To connect an external Ultra SCSI device to an Ultra SCSI adapter:

1. Power down the DIGITAL Server.
2. Attach the connector of the external Ultra SCSI cable to the external connector on the Ultra SCSI adapter (A Figure 7-9).
3. Connect the external Ultra SCSI device making sure the external device is properly terminated. If the SCSI adapter is configured for Ultra SCSI operation, the cable can be up to 20 meters (65.60 ft) in length. If the SCSI adapter is configured for fast-wide SCSI operation, the cable length cannot exceed the 2 meter (6.56 ft) limitation.
4. Restore server power.



DEC01328-3

Figure 7-9. External SCSI Adapter

Installing Expansion Boards

8

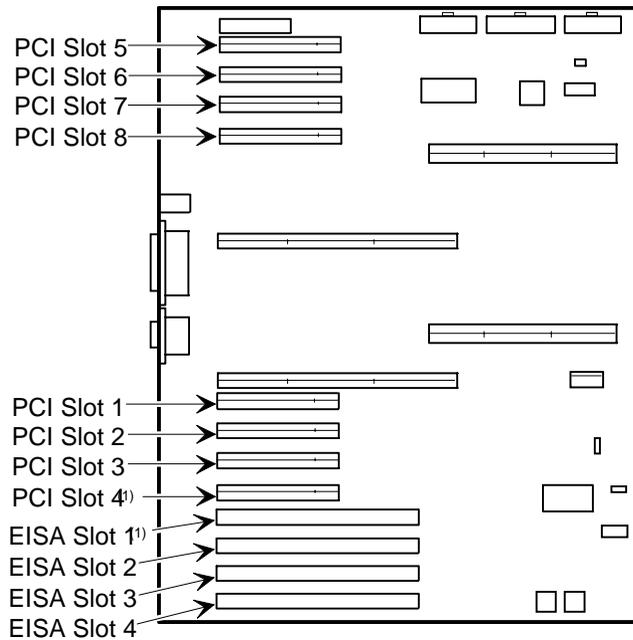
Introduction

This chapter contains the configuration guidelines that must be followed prior to installing ISA, EISA or PCI expansion boards as well as detailed installation procedures. Note that EISA and PCI expansion boards can be SCSI, RAID, and Network Interface Cards (NIC).

ISA/EISA Expansion Board Configuration Guidelines

- EISA slots one through four support industry-standard 32-bit EISA expansion or 16-bit ISA boards.
- EISA slot one is designated as a shared slot with PCI slot four. This means that only one expansion board can reside in EISA slot one or PCI slot four at any one time.
- ISA/EISA boards should be installed starting in EISA slot two. Install the shared EISA slot one last.
- You must run the SCU **after** installing any EISA expansion board.
- You must run the SCU **before** installing any ISA expansion board to view assigned IRQs and addresses for other options.
- An optional Remote Server Management (RSM) card can be installed in EISA slot 1.

Installing Expansion Boards



DEC01320-5

(1) PCI slot 4 and EISA slot 1 share an expansion slot at the rear of the server

Figure 8-1. Expansion Board Slot Locations

PCI Expansion Board Configuration Guidelines

- PCI slots one through eight support bus mastering 32-bit PCI expansion boards.
- PCI slot four is designated as a shared slot with EISA slot one. This means that only one expansion board can reside in PCI slot four or EISA slot one at any one time.
- PCI video expansion boards should always be installed in PCI slot one.



NOTE: It is recommended that you run the SCU after you install a PCI video expansion board to reallocate the onboard video resources.

- The SCU automatically scans the PCI bus and will assign an IRQ and I/O port address for any new PCI board installed in the server.

Configuring Your EISA/PCI Expansion Boards Using the SCU

When installing EISA and PCI expansion boards in your server, the SCU must be run to configure these boards.

For EISA expansion boards, the SCU will allow you to review the default IRQ and change it if necessary. This value is saved in the SCI file and can be loaded using that file when the SCU is rerun.

For PCI expansion boards, the SCU will autodetect the boards and assign IRQ and I/O port addresses to these boards. Each PCI slot can have up to 4 IRQs assigned to it for use by the adapter. ROM addresses for the PCI expansion boards will be assigned based on the PCI scan order and the available addresses not already assigned to ISA or EISA expansion boards.

Identifying the Server Boot Device

The server boot device can be defined in the SCU. For a bootable CD-ROM or SBB drive to be the boot device, it must be attached to a SCSI adapter which has the lowest ROM address on either the EISA or PCI bus. The SCSI adapter must be installed on EISA or PCI bus 0. Your server is configured from the factory with bootable CD-ROM support for the Quick Launch program. In the event that the CD-ROM does not boot:

1. Verify that the “Bootable CD-ROM” is enabled in the *SCSISelect* utility (under Advanced Configuration Options).

Refer to the “SCSISelect Utility” section in Chapter 2.

2. Ensure that the CD-ROM drive is correctly attached to the Adaptec SCSI adapter and that the adapter is the lowest ROM address of all the storage devices in the server.

Additionally, when the Quick Launch CD-ROM creates and loads utilities onto the hard disk drive’s partition on the server, it will choose the first hard disk drive that is found during the server scan sequence.

Server Bus Scan Order

ROM addresses on PCI expansion boards are assigned based on the PCI scan order and what addresses are available at the time of the scan. The bus scan order is as follows:

1. The EISA bus is scanned first, in ascending order from slot 1 to 4. This means that if there is an EISA SCSI adapter and a PCI SCSI adapter in the server, the EISA SCSI adapter will be scanned first followed by the PCI SCSI adapter. The EISA ROM address will be either its default setting or what was last set using the SCU. The PCI SCSI adapter will be assigned the next available ROM address.

2. The PCI bus is then scanned in this order:

PCI slots 1-4 are fixed to be on PCI bus 0, and are scanned in ascending order. Each slot represents a different PCI device number on PCI bus 0 as shown below:

- Slot 1 PCI Bus 0, Device 6
- Slot 2 PCI Bus 0, Device 7
- Slot 3 PCI Bus 0, Device 8
- Slot 4 PCI Bus 0, Device 9

For each adapter found, the server scans to see if there are any additional PCI busses on that adapter. As PCI busses are detected, they are assigned the next available PCI bus number in sequence.

Adapters such as the Adaptec 2940W and the RAID controllers (1, 2 or 3 channel), have no additional PCI busses on board. They would represent a single device on PCI bus 0 if installed in PCI slots 1-4.

In the case of the Adaptec 3940UW, there is one additional PCI bus onboard with two wide Ultra SCSI channels. If the 3940UW wide Ultra SCSI adapter is installed in slot 1 of PCI bus 0, then the PCI bus on the 3940UW would be assigned as PCI bus 1, the two wide Ultra SCSI channels on that adapter would be seen as devices on PCI bus 1.

Once all the adapters on PCI bus 0 (slots 1-4) have been scanned, the secondary PCI bus is scanned (slots 5-8). This PCI bus is assigned the next available bus number. Thus the slot assignments would be:

- Slot 5 PCI Bus N+1, Device 1
- Slot 6 PCI Bus N+1, Device 2
- Slot 7 PCI Bus N+1, Device 3
- Slot 8 PCI Bus N+1, Device 4

Where N is the last PCI bus number assigned.

Examples of EISA/PCI Scan Order

Example 1:

PCI Slot 1	PCI wide Ultra SCSI adapter, such as a 3940UW Drive at SCSI ID 0
EISA Slot 4	EISA RAID adapter, such as a RAID 3 channel Drive on Channel 1 SCSI ID 0 Drive on Channel 2 SCSI ID 4 Drive on Channel 3 SCSI ID 2

Assume for this example that the RAID controller ROM address is defaulted to CC000h. Assume also that we have used the RAID configuration utility to create a server logical drive 0. Given this example, the RAID adapter on the EISA bus would be scanned first, with a ROM address of CC000h. The 3940UW Adaptec adapter on the PCI bus would be scanned next. The 3940UW requires 32 KB for initialization (even though it only occupies 10 KB after optimization). As there is only 16KB ROM address space between C8000h and CC000h, the 3940UW would be assigned the next 32KB block of ROM address space starting at D0000h. The server logical drive 0 on the RAID adapter would be the boot device.

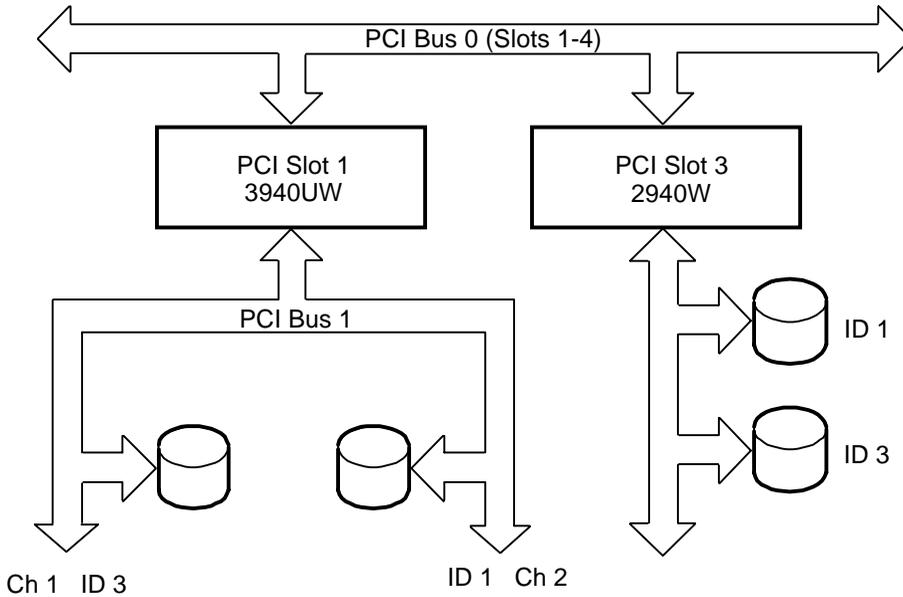
To boot from a bootable drive on the 2940W, the SCU would have to be run to change the address of the RAID adapter to a higher address, such as D0000h, and then the SCU would assign C8000h to the 2940W, and that drive would become the boot device.

Example 2:

PCI Slot 1	PCI wide Ultra SCSI adapter, such as a 3940UW Drive on Channel 1 SCSI ID 3 Drive on Channel 2 SCSI ID 1
PCI Slot 3	PCI wide Ultra SCSI adapter, such as a 2940W Drives at SCSI ID 1, 3

In this example, the scanning begins with PCI slot 1 (PCI bus 0) and the 3940UW.

The 3940UW contains a PCI bus internally, and that bus is scanned next (PCI bus 1). Channel 1 and then Channel 2 of the 3940UW are detected in that order. Finally the 2940W is detected in PCI slot 3. The first device found during the scan that is bootable will be the boot device. So, if all the drives in this example were bootable, then the boot device would be the first drive detected during the scan, which is the drive on Channel 1 of the 3940UW (see Figure 8-2).



DEC00830

Figure 8-2. EISA/PCI Scan Order

Identifying PCI Devices in the SCU

The SCU automatically scans for PCI devices and assigns resources to them. PCI devices appear in the SCU as either assigned to a slot, or as embedded devices.

If a PCI expansion board uses one or more interrupts, but none of the interrupts are shared, then the SCU will contain an entry for each interrupt used by that PCI expansion board. As an example, the Adaptec 3940UW wide Ultra SCSI adapter has a PCI-to-PCI bridge chip with two devices behind it, each requiring an interrupt. If the expansion board were installed in PCI Slot 1, the entry in the SCU might look similar to this:

- PCI 1 PCI SCSI Adapter IRQ15
- PCI 1 PCI SCSI Adapter IRQ14

If a PCI expansion board uses one or more interrupts, but the interrupts are shared, then the SCU will display an entry for an interrupt in that slot, and the remaining devices that share that interrupt will be shown as “embedded” devices. Consider the Adaptec 3940UW SCSI adapter. This adapter has a PCI-to-PCI bridge chip with three devices sharing one interrupt and the fourth device using a second interrupt. If this expansion board were installed in PCI Slot 4, the entry in the SCU might look similar to this:

- PCI 4 PCI SCSI Adapter IRQ10
- PCI 4 PCI Memory Controller IRQ2(9)
- Embedded PCI SCSI Adapter
- Embedded PCI SCSI Adapter

In this case, the two interrupts are shown, with devices sharing the interrupt shown as embedded devices.

Onboard devices always appear as embedded devices. The onboard VGA controller, as an example, would appear as:

- Embedded VGA

When the number of PCI devices exceeds 10, any additional devices will appear as embedded devices, even if they require an IRQ assigned to them. The embedded devices are listed in the order in which they were detected. To associate embedded devices with particular PCI expansion boards, you must know the number of devices (excluding PCI-to-PCI bridges, which are not listed in the SCU) on each PCI expansion board. If there are many embedded devices, start matching the PCI expansion boards in the highest slot number with the embedded devices at the bottom of the list (above the embedded VGA device). As an example, assume that a server has two Adaptec 3940UW SCSI adapters installed, one in PCI Slot 1 and the other in PCI Slot 2. The SCU might show the following:

- PCI 1 PCI SCSI Adapter IRQ15
- PCI 1 PCI Memory Controller IRQ14
- PCI 2 PCI SCSI Adapter IRQ10
- PCI 2 PCI Memory Controller IRQ2(9)
- Embedded PCI SCSI Adapter
- Embedded VGA

In this case, the first two embedded references are devices on the SCSI adapter in PCI Slot 1, while the last two are associated with the SCSI adapter in PCI Slot 2.

Advanced Menu in the SCU

The Advanced menu in the SCU allows you to lock/unlock resources and view system resource assignments. To enter this menu, run the SCU and select View or edit details (Step 3). Press F7 for the Advanced menu. A description of each of the options in the Advanced menu follows.

Locking of Resources

The SCU allows you to lock resources for any EISA/PCI expansion board installed in the server. This allows you to assign resources to that expansion board (such as an IRQ), and then to keep those resources assigned to that expansion board even if the SCU is rerun. PCI option ROM addresses are assigned by the BIOS and cannot be set or locked using the SCU.

To lock a resource:

1. Enter the Advanced menu in the SCU.

The first item in this list is Lock/unlock boards.

2. Press [Enter] to select.

The list of integrated and installed options is shown.

3. Move to the option whose resources you want to lock and press [Enter].

An exclamation point (!) appears to the left of that option indicating that the resources associated with that option have been fixed and will not change when the SCU is run.

To unlock the resource:

1. Press [Enter].

The exclamation point disappears.

2. Press [F10] to complete this operation.

View Additional System Information

The SCU provides information to the user regarding resource assignments and availability. Information on installed expansion boards, assigned and available resources can also be viewed.

To view additional system information:

1. Enter the `Advanced` menu in the SCU.
2. Select `View Additional System Information` menu.
3. Select `Board Specifications` to view slot allocations.
4. Select `System Specifications` to view detailed information for each EISA/PCI device including board ID, length, etc.
5. Select `Used Resources` to view IRQ, I/O Port, and memory assignments.
6. Select `Available Resources` to view unassigned IRQs, DMAs, I/O ports, and memory addresses.

Set Verification Mode Menu

The SCU allows you to select whether you would like to be automatically notified of changes in your server's configuration, or whether you would like to verify the configuration manually.

To set your server's verification mode:

1. Enter the `Advanced` menu in the SCU.
2. Select `Set Verification mode` menu.
3. Choose `Automatic` to enable the server to verify the configuration routinely when the SCU is invoked, or select `Manual` to enable verification of the configuration using the `Verify` option in the `Step 3` screen.

Maintain SCI File Menu

You can save the system configuration information to a file as follows:

1. Enter the `Advanced` menu in the SCU.
2. Select `Maintain SCU Files` menu.
3. Select `Open . . .` to display information from a previously created `.SCI` file. The current configuration information will be lost.
4. Select `Save as . . .` to save the current configuration information to a file.

Installing Expansion Boards

The following sections describe how to install ISA, EISA, and PCI expansion boards. Detailed procedures on running the SCU before installing ISA expansion boards and after installing EISA and PCI expansion boards are also included.

Adding ISA Expansion Boards

Perform the following steps before installing ISA expansion boards:

1. Start the SCU using one of the three methods described in Chapter 2, "Starting the SCU."
2. Select step 2 from the `Configure Computer` menu: "Adding and Removing Boards," and update the list of expansion boards and options to include any ISA expansion boards you are going to install in your server.
3. Select "Step 4: Examine Switches or Print Report," to check the required switch and jumper settings of the ISA expansion boards.
4. Select "Step 5: Save and Exit," to save your configuration and exit the SCU.
5. Turn off your server and install the ISA expansion boards, manually setting the necessary switches and jumpers.

Refer to "Installing ISA Expansion Boards."

Installing ISA Expansion Boards

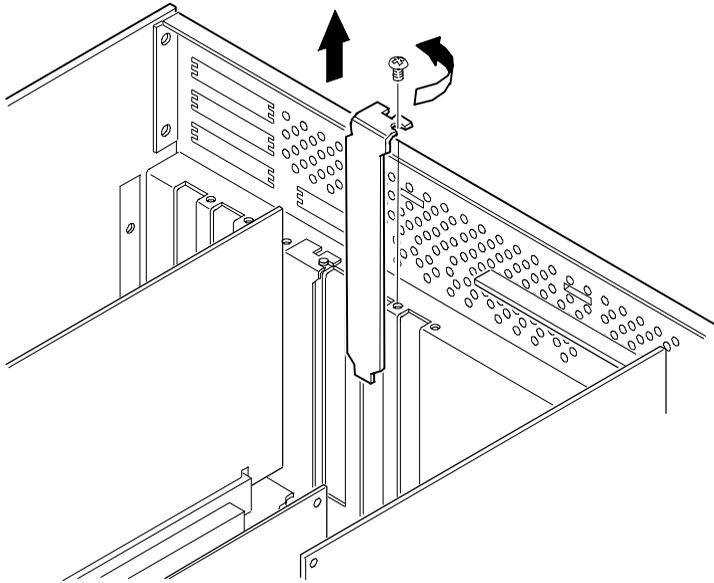
To install an ISA expansion board:



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

1. Run the SCU.
2. Turn off your server.
3. Disconnect the external devices, ac power, and monitor power.
4. If installed, remove the front bezel (see Figure 7-4).
5. Remove the four screws securing the chassis to the rack rails (see Figure 7-4).
6. Slide the chassis forward until it is fully extended (see Figure 7-4).
7. Unlock and remove the top cover (see Figure 3-1).
8. Unscrew and remove the metal filler plate from the selected ISA expansion slot.

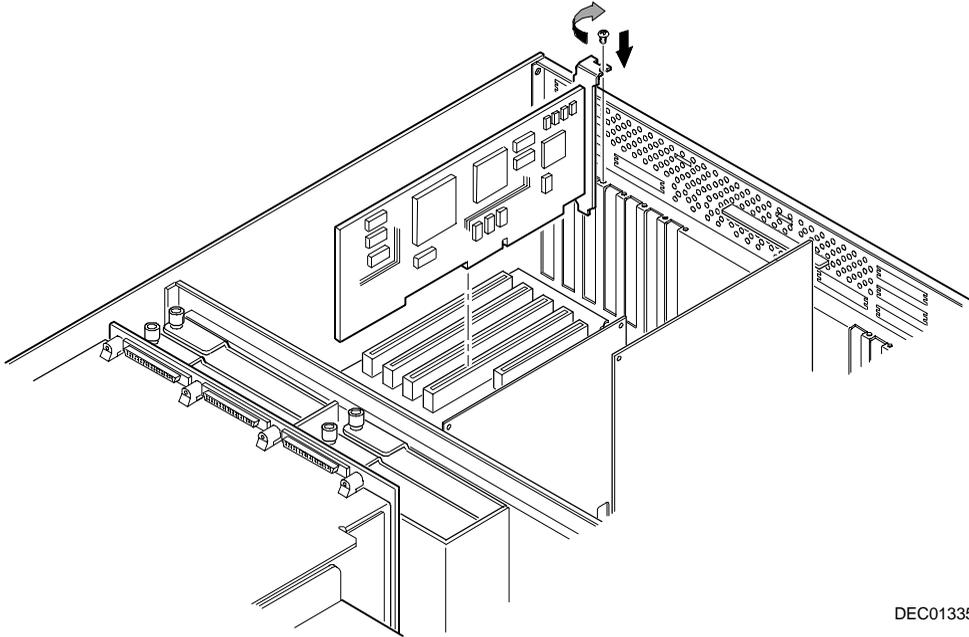
Installing Expansion Boards



DEC01334

Figure 8-3. Removing a Metal Filler Plate

9. Insert the new ISA expansion board into the socket and push it firmly into place.



DEC01335-2

Figure 8-4. Installing an ISA Expansion Board

10. Secure the ISA expansion board to the slot with the screw removed in step 5.
11. Slide the chassis into the rack and then secure using the four previously removed screws (see Figure 7-4).
12. Replace and lock the top cover.
13. Connect all external devices and restore power.

Installing EISA Expansion Boards

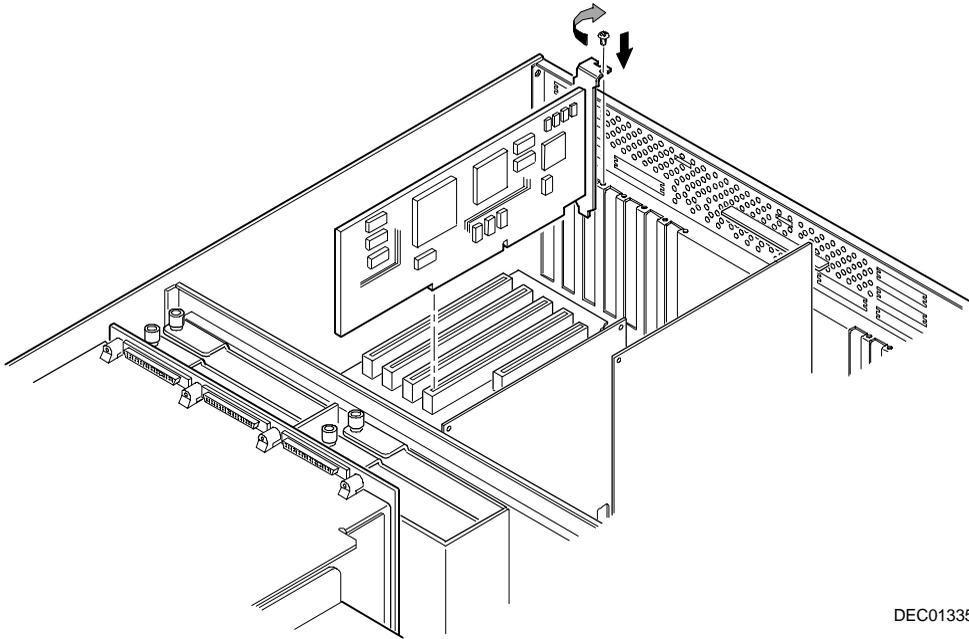
To install an EISA expansion board:



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

1. Turn off your server.
2. Disconnect all external devices, ac power, and monitor power.
3. If installed, remove the front bezel (see Figure 7-4).
4. Remove the four screws securing the chassis to the rack rails (see Figure 7-4).
5. Slide the chassis forward until it is fully extended (see Figure 7-4).
6. Unlock and remove the top cover (see Figure 3-1).
7. Unscrew and remove the metal filler plate from the selected EISA expansion slot (see Figure 8-3).
8. Insert the new EISA expansion board into the socket and push it firmly into place.
9. Secure the EISA expansion board to the slot with the screw removed in step 4.
10. Slide the chassis into the rack and then secure using the four previously removed screws (see Figure 7-4).
11. Replace and lock the top cover.
12. Connect all external devices and restore power.
13. Run the SCU.

Refer to "Adding EISA Expansion Boards" for detailed information on running the SCU.



DEC01335-3

Figure 8-5. Installing an EISA Expansion Board

Adding EISA Expansion Boards

Perform the following steps after installing EISA expansion boards:

1. Start the SCU using one of the three methods described in Chapter 2, "Starting the SCU."

After your server boots, the following message appears:

```
EISA Configuration Error - Run Configuration  
Utility
```

This indicates that the EISA configuration changed since the last time the configuration was saved.

Installing Expansion Boards

2. Press [Enter] to display the SCU main menu and then [Enter] again to continue.

The SCU requests that you load all appropriate .CFG files for the newly installed EISA expansion boards. Afterwards, the SCU displays the `Configure Computer` menu.

3. From the `Configure Computer` menu, select “Step 3: View or Edit Details,” to verify that all EISA expansion boards were installed and configured correctly.



NOTE: An EISA expansion board might require an IRQ to be set. If so, select that board and choose an IRQ from the list provided. This list displays IRQs that are either not assigned or can be re-assigned. If you select an IRQ that conflicts with another expansion board in your server, a menu appears informing you of the expansion board that is in conflict, its current settings, and the settings that will change if you choose to set that IRQ.

4. Select “Step 5: Save and Exit,” to save your configuration and exit the SCU.

Installing PCI Expansion Boards

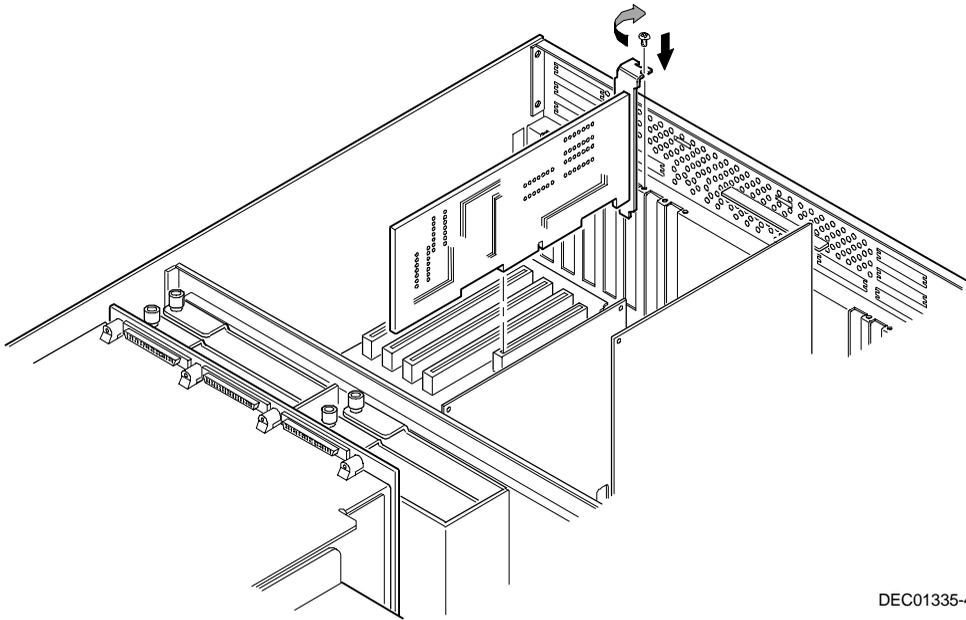
To install a PCI expansion board:



NOTE: Read and fully understand your optional expansion board’s documentation before installing the expansion board.

1. Turn off your server.
2. Disconnect all external devices, ac power, and monitor power.
3. If installed, remove the front bezel (see Figure 7-4).
4. Remove the four screws securing the chassis to the rack rails (see Figure 7-4).
5. Slide the chassis forward until it is fully extended (see Figure 7-4).
6. Unlock and remove the top cover (see Figure 3-1).

7. Unscrew and remove the metal filler plate from the selected PCI expansion slot.
8. Insert the new PCI expansion board into the socket and push it firmly into place.



DEC01335-4

Figure 8-6. Installing a PCI Expansion Board

9. Secure the PCI expansion board to slot with the screw removed in step 4.
10. Slide the chassis into the rack and then secure using the four previously removed screws (see Figure 7-4).
11. Replace and lock the top cover.
12. Connect all external devices and restore power.
13. Run the SCU.

Refer to "Adding PCI Expansion Boards" for detailed information on running the SCU.

Adding PCI Expansion Boards



CAUTION: Before installing a PCI video expansion board, make sure the appropriate PCI slot options group is enabled. Failure to do so might cause your server to operate incorrectly.

Perform the following steps after installing PCI expansion boards:

1. Start the SCU using one of the three methods described in Chapter 2, “Starting the SCU.”
2. Press [Enter] to display the SCU welcome screen and then [Enter] again to continue.
3. From the `Configure Computer` menu, select “Step 3: View or Edit Details”.
4. The SCU automatically scans for PCI devices and will assign resources to them. Verify that the resources assigned (e.g., IRQ’s) are supported by the PCI device under the operating system you are loading onto your server.

Refer to the documentation that shipped with your PCI device.

Press [F6] to display the IRQ currently assigned and + or - to scroll through the remaining un-assigned IRQs to select the one you want.



NOTE: You can view IRQ assignments at any time while you are running the SCU by pressing [F7]. The “View Additional System Information” screen displays. Select either `Used Resources` or `Available Resources` from this screen.

It is recommended that you run the SCU after you install a PCI video expansion board to reallocate the onboard video.

Make sure you switch the video signal cable from the onboard video connector to the connector on the PCI video expansion board.

5. Select “Step 5: Save and Exit,” to save your configuration and exit the SCU.

Relocating Expansion Boards

Perform the following steps **before** relocating an ISA expansion board and **after** relocating an EISA or PCI expansion board.

1. Start the SCU using one of the three methods described in Chapter 2, "Starting the SCU."
2. Press [Enter] to display the SCU main menu and then [Enter] again to continue.
3. Select step 2 from the `Configure Computer` menu: `Adding and Removing Boards.`"
4. Highlight the expansion board you want to relocate, press [Enter], and then follow the instructions displayed on your monitor screen.
5. Select "Step 5: Save and Exit," to save your configuration and exit the SCU.

If there are no resource conflicts, the new configuration information is saved to the .SCI file. If there is a conflict, you must resolve it before you can complete your server's configuration.



NOTE: If you run the SCU from the ServerWORKS Quick Launch CD-ROM disk, the .SCI file is not saved. To save the .SCI file, you need to rerun the SCU from either your hard disk drive or from the SCU diskette you created.

Connecting SCSI and RAID Adapters



Introduction

This chapter contains the configuration guidelines that must be followed when connecting SCSI or RAID adapters to optional disk drives and tape drives.

SCSI Configuration Guidelines

- Wide SCSI supports up to 16 devices per channel.
- Mixing non-Ultra SCSI disk drives in the hot-swap drive bays is a supported Ultra SCSI configuration. However, the maximum Ultra SCSI bus utilization will not be achieved if the non-Ultra SCSI devices are active.
- Ultra SCSI supports data transfer rates of up to 40 MB/sec.
- Narrow devices on a wide cable count as two SCSI IDs. For example, the narrow CD-ROM drive SCSI ID is 5 so SCSI ID 13 is no longer available. The narrow CD-ROM device counts as two devices on a 16-bit wide data path.
- DIGITAL recommends that you use all wide Ultra SCSI capable devices on the wide Ultra SCSI bus for maximum server performance.
- Run the SCSI and/or RAID configuration utility to change SCSI adapter settings to fit your specific configuration.

Refer to Chapter 7 for additional SCSI configuration guidelines.

RAID Configuration Guidelines

- Fault management must be supported and enabled by the RAID adapter for disk drive hot swapping.
- When adding a RAID host 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 SBB bays for hot-swap support in a RAID server.
- Use the same capacity disk drives in a RAID group, otherwise the difference in disk drive capacity will be lost.
- The maximum number of logical disk drives in a RAID group is 32.
- To maximize the I/O performance of your multi-channel RAID subsystem, connect each disk drive in a RAID group on a separate SCSI channel. This enables the RAID adapter concurrent access to all disk drives.
- Supported RAID levels include: 0, 1, 0+1, 5, and RAID 7 (JBOD).

RAID	Description	Drives Per RAID Group (3 Channel)
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
		(minimum to maximum)

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

SCSI Adapter Cable Configurations

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

Two Channel SCSI Configuration

To connect SCSI devices to two separate SCSI channels, perform the following:

1. Power down the server.
2. Disconnect all peripheral devices from the server.
3. If installed, remove the front bezel (see Figure 7-4).
4. Remove the four screws securing the chassis to the rack rails (see Figure 7-4).
5. Slide the chassis forward until it is fully extended (see Figure 7-4).
6. Unlock and remove the top cover (see Figure 3-1).
7. Connect the wide Ultra SCSI cables as shown in Figure 9-1.
8. Slide the chassis into the rack and then secure using the four previously removed screws (see Figure 7-4).
9. Replace and lock the top cover.
10. Connect all external devices and then power on your server.
11. Run the SCU or SCSI configuration utility to configure your server.

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



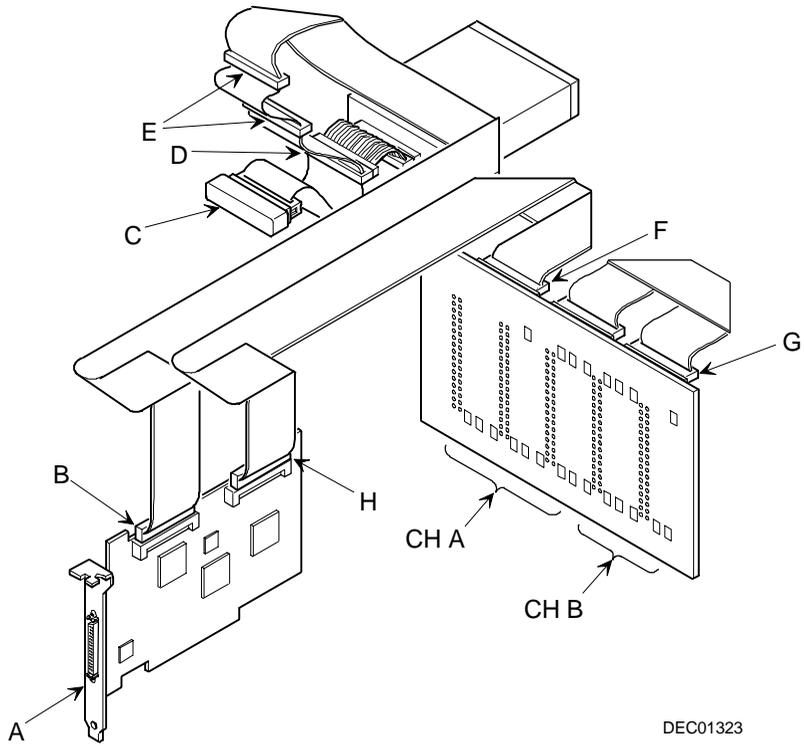
NOTE: Servers with this configuration are shipped with an additional terminator to enable you to split the storage backplane.

If you are using only wide Ultra SCSI drives, you must enable Ultra SCSI data transfers using the SCSI configuration utility. Refer to "Enable Wide Ultra SCSI Data Transfers" later in this chapter.

Connecting SCSI and RAID Adapters

Figure 9-1 Legend	Component
A	External SCSI connector
B	Wide Ultra SCSI adapter (channel A)
C	SCSI terminator
D	Wide-to-narrow SCSI 50-pin adapter to CD-ROM drive
E	Spare wide SCSI connectors for optional devices in the right-front drive bay
F	Wide Ultra SCSI connection to backplane (channel B)
G	Wide Ultra SCSI jumper cable connecting backplane Channel A to backplane Channel B
H	Wide Ultra SCSI adapter (channel B)

Proper termination is designed into the storage backplane



DEC01323

Figure 9-1. Two Channel SCSI Configuration

Three Channel SCSI Configuration

To connect SCSI devices to three separate SCSI channels, perform the following.

1. Power down the server.
2. Disconnect all peripheral devices from the server.
3. If installed, remove the front bezel (see Figure 7-4).
4. Remove the four screws securing the chassis to the rack rails (see Figure 7-4).
5. Slide the chassis forward until it is fully extended (see Figure 7-4).
6. Unlock and remove the top cover (see Figure 3-1).
7. Connect the cables as shown in Figure 9-2.
8. Slide the chassis into the rack and then secure using the four previously removed screws (see Figure 7-4).
9. Replace and lock the top cover.
10. Connect all external devices and then power on your server.
11. Run the SCU and/or RAID utilities to configure your server.

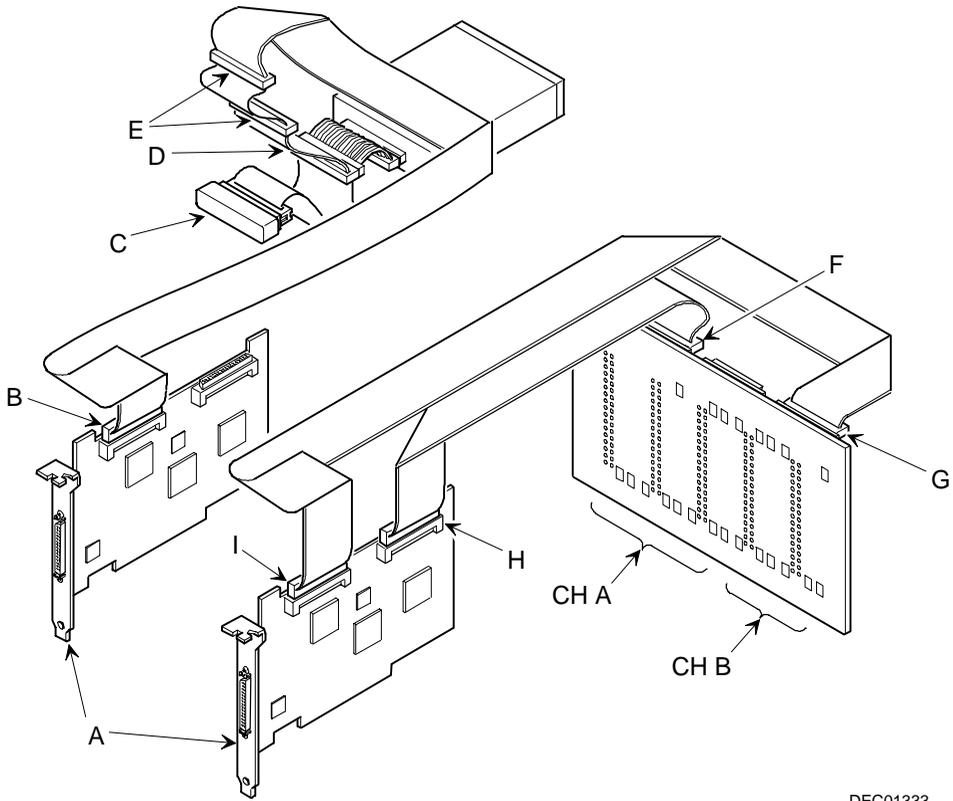
Refer to Chapter 2, "Server Software and Utilities," and to your SCSI and RAID documentation for additional configuration information.



NOTE: To take advantage of the full capabilities of wide Ultra SCSI drives, you must enable Ultra SCSI data transfers using the SCSI configuration utility. Refer to "Enable Wide Ultra SCSI Data Transfers" later in this chapter.

Figure 9-2 Legend	Component
A	External SCSI connector
B	Connection from wide Ultra SCSI adapter (channel A)
C	Wide SCSI terminator
D	Wide-to-narrow SCSI 50-pin adapter to CD-ROM drive
E	Wide SCSI connectors to top-right drive bay
F	Backplane, wide SCSI 68-pin connector
G	Backplane, wide SCSI 68-pin connector
H	Connection from wide Ultra SCSI adapter (channel B)
I	Connection from wide Ultra SCSI adapter (channel A)

Connecting SCSI and RAID Adapters



DEC01333

Figure 9-2. Three Channel SCSI Configuration

Enable Ultra SCSI Data Transfers (Adaptec SCSI Channel)

If you ordered wide Ultra SCSI drives your server is already configured for Ultra SCSI data transfers. If you are changing your drives from fast, wide SCSI to wide Ultra SCSI, you must use the following procedure to enable wide Ultra SCSI data transfers on a non-RAID Ultra SCSI channel.

1. Boot your server.
2. When the message "Press Ctrl/A for the SCSI Select Utility" appears on your monitor screen, press Ctrl/A.
3. Select "Configure/View Host Adapter Settings."
4. Select "Advanced Configurations."
5. In the "Support for Ultra SCSI Speed" option, select "Enabled."
6. Press the [Esc] key three times.
7. At the "Exit Utility ?" prompt, select "Yes."
8. Press any key to reboot your server.

Enable Ultra SCSI Data Transfers (RAID Channel)

If you ordered wide Ultra SCSI drives your server is already configured for Ultra SCSI data transfers. If you are changing your drives from fast, wide SCSI to wide Ultra SCSI, you must use the following procedure to enable wide Ultra SCSI data transfers on a RAID Ultra SCSI channel.

1. Insert the Mylex DACCF utility in drive A.
2. At the MS-DOS prompt type: CD DACCFG [Enter] then type DACCF [Enter], to invoke the Disk Array Controller utility.
3. Select "SCSI Xfr Parameters."
4. Type the channel number (0, 1, 2) and press Enter, or press Enter to accept the default.
5. Select the "Data Transfer Rate (MHz)", press the Enter key to change the value until "20 MHz" is displayed.
6. Press the [Esc] key two times.
7. Select "Yes" to save the configuration.
8. Reboot your server.

Server Security Features *10*

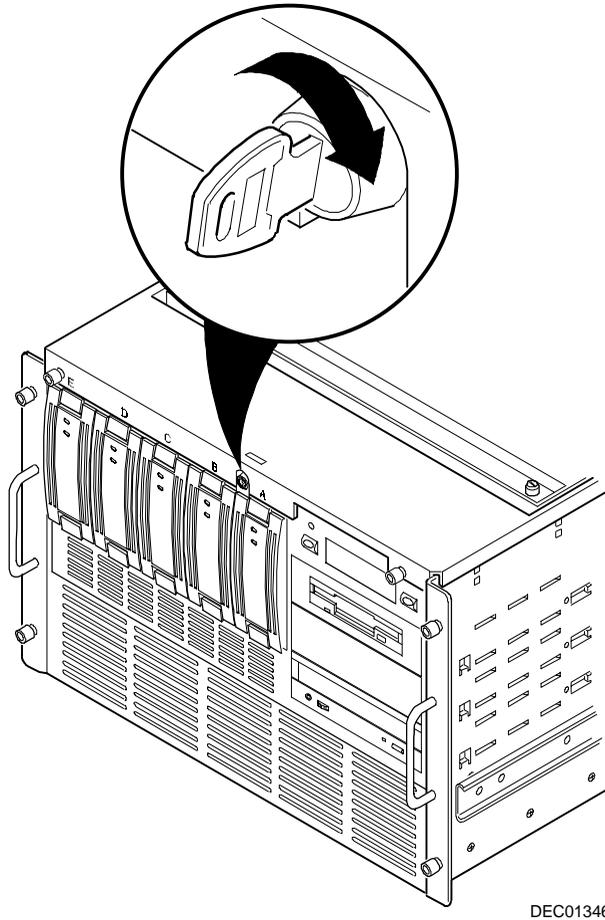
Introduction

Server security is important to prevent theft or accidental loss of software and hardware. The DIGITAL Server provides the following levels of protection:

- Top cover lock—located at the front of your server.
- Supervisor password
- Additional security features

Top Cover Security Lock

Your server has a keylock used to prevent unauthorized access to the internal components of your server. To unlock the top cover, insert the key into the keylock, push in, and then turn the key clockwise.



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Figure 10-1. Top Cover Security Lock

Supervisor Password

Your server has a password level 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 SCU. If "Password On Boot" is enabled, you will be prompted to enter a password before your operating system boots.

Perform the following steps to set a supervisor password:

1. Turn on your server and allow the POST to complete.

If POST detects an error refer to Appendix A, "Technical Specifications," and take the appropriate steps to correct the problem. After the problem has been resolved, restart the server.

2. Either start the SCU from the MS-DOS partition or insert the SCU diskette into drive A and soft boot (reset) your server.
3. Press [Enter] to display the Main menu, select the `Configure Computer` option, then select the `View and edit details` option.
4. Highlight the `Security Options Group` and then press [Enter].
5. Highlight the `Supervisor Password` field and then press [Enter].
6. Select `Installed`.
7. Type in a supervisor password and then press [Enter].

To confirm, type in your supervisor password a second time and then press [Enter].

8. Highlight the `Password On Boot` field and select `Enabled` if desired.
9. Exit the SCU and reboot your server so changes immediately take effect.

Your server runs the POST and then prompts you for the supervisor password you set.

If You Forget Your Password

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

1. Turn off your server and remove the top cover.
2. Change switch J35-SW4 to password clear (switch down).

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

4. Turn off your server and remove the top cover.
5. Change switch J35-SW4 to normal mode (switch up).
6. Reconnect your server and turn it on.
7. Using the SCU, assign a new password.

Refer to Appendix C, "SCU Features," for more information.

Additional Security Features

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

The SCU includes the following setup options to improve server security:

- **Diskette Access** — Setting this option to either `Supervisor` or `User` controls who has access to any installed diskette drive.
- **Network Server** — Setting this option to `Enabled` will allow the server to boot without a keyboard connected to the server.
- **Fixed Disk Boot Sector** — Setting this option to `Write Protected` prevents writing to the hard disk drive boot sector.

Troubleshooting **11**

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
- SBB Troubleshooting
- Tape Drive Troubleshooting
- Monitor Troubleshooting
- CD-ROM Troubleshooting
- Diskette Drive Troubleshooting
- RAID Troubleshooting

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

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

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 hard 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 “Running the Diagnostics.”
- Run the SCU.

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 utility 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” on the Quick Launch CD-ROM for the phone numbers in your area or to the Warranty 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 under "Additional Documentation" on the Quick Launch CD-ROM.

Running Quick Tests or Groups of Tests

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

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

Running DIGITAL Vendor Extended Tests

To run DIGITAL Vendor Extended Tests from a diskette:

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

```
A:\DMENU.
```

2. Select the desired test.

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

Running the Diagnostics Tests from the Server's Hard Disk Drive

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

1. Boot the system and select *Programs*, then the *MS-DOS Prompt* from the *Start* menu.
2. At the C:\> prompt, type:

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

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

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

Server Troubleshooting

Problem	Possible Cause	Action
No response when the server is turned on.	Server is not plugged in.	Turn off the server, plug it in, and then turn it back on again.
	No power at the wall outlet.	Use another wall outlet.
	Main logic board failed.	Contact your authorized service representative.
	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.
	Terminator card not seated properly (1P and 2P configurations only).	Reseat terminator card.
	Terminator card not installed.	Install terminator card.
	Top cover removed.	Install top cover.
Power supply failed.	Contact your authorized service representative.	

continued

Problem	Possible Cause	Action
Power is on, but there is no screen display.	Brightness and contrast controls are not correctly set.	Adjust the brightness and contrast controls.
	Monitor is off.	Turn on the monitor.
	Monitor cable is incorrectly installed.	Check all monitor connections.
	Incorrect video drivers installed.	Install the correct video drivers.
	Video controller has failed. Monitor has failed.	Contact your authorized service representative. Replace monitor or contact your DIGITAL service representative.
Server does not boot from CD-ROM drive.	CD-ROM drive is not connected to the Adaptec controller.	Connect the CD-ROM to the Adaptec controller. Refer to Chapter 9.
	CD-ROM drive not configured as a bootable device.	Change the CD-ROM setting to "bootable" using <i>SCSISelect</i> .
	CD-ROM disk is not bootable.	Contact your DIGITAL service representative for the latest BIOS.
Server operates incorrectly after installing a processor module.	Processor module installed incorrectly.	Reinstall processor module.
	SCU indicates an error after installing a processor module.	Remove processor module and reboot. If server boots without errors, replace processor module.

continued

Troubleshooting

Problem	Possible Cause	Action
Server operates incorrectly after installing optional expansion board.	Expansion board installed incorrectly.	Remove expansion board and reinstall.
	Did not run SCU to configure expansion board after installation.	Run the SCU to properly configure expansion board. Refer to Chapter 8.
	Did not install CFG file for expansion board.	Run SCU and add CFG file (if necessary).
	Expansion board has failed.	Remove expansion board and reboot. If server boots without errors, replace expansion board.
Server operates incorrectly after installing optional memory (DIMMs).	Memory configured incorrectly.	Reboot the server and check for any boot message to identify faulty DIMM(s)/SIMM(s). Check that the memory configuration is according to the memory guidelines explained Chapter 6, "Installing Additional Memory."
	DIMMs installed incorrectly.	Remove DIMMs and reinstall.
	DIMMs have failed.	Replace DIMMs.
	Memory module installed incorrectly.	Reinstall memory module.
	Memory module failed.	Replace memory 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.
No response to mouse commands.	Keyboard failed.	Replace keyboard or contact your authorized service representative.
	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.
Server operates correctly but application software does not.	Mouse driver not installed.	Install the appropriate mouse driver.
	Mouse trackball dirty.	Clean trackball.
	Mouse failed.	Replace mouse or contact your authorized service representative.
	Application software installed incorrectly.	Refer to your application software documentation.
	Having external cache enabled causes conflict with application software.	Run the SCU and disable external cache. Refer to Chapter 2 and Appendix C.

Disk Drive Troubleshooting

Problem	Possible Cause	Action
Server does not recognize an internal SCSI device.	SCSI device jumpers incorrectly set.	Refer to the supplied kit installation instructions.
	SCSI ID conflicts.	Refer to the supplied kit installation instructions and to the storage backplane jumper configuration in Chapter 7.
	Terminating resistors not removed from the SCSI device.	Remove terminating resistors. Refer to the supplied kit installation instructions.
	SCSI adapter has failed.	Contact your authorized service representative.
	Loose SCSI cable.	Secure all cable connections.
	SCSI cables incorrectly installed between SCSI adapter, SCSI device, or backplane.	Refer to Chapter 9 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 jumper configuration in Chapter 7.
	Terminating resistors not removed from the SCSI device.	Remove terminating resistors. Refer to the supplied kit installation instructions.
	SCSI adapter has failed.	Contact your authorized service representative.
	Loose SCSI cable.	Secure all cable connections.
	SCSI device has failed.	Replace SCSI device.

continued

Troubleshooting

Problem	Possible Cause	Action
Server does not boot from an internal SCSI hard disk drive.	Boot device not attached to the SCSI adapter at the lowest ROM address.	Run the SCU to define the server boot device. Refer to Chapter 8.
	PCI/EISA scanning order incorrect.	Refer to the bus scanning examples in Chapter 8.
	Bootable CD-ROM drive not connected to the primary SCSI adapter.	Connect the CD-ROM to the SCSI adapter. Refer to Chapter 9.
	SCSI boot hard disk drive not formatted.	Format the SCSI hard disk drive.
		CAUTION: Formatting the SCSI hard disk drive will destroy all the data on the drive.
	SCSI device drivers not installed or incorrectly installed on SCSI boot hard disk drive.	Properly install all required SCSI device drivers. Refer to Chapter 2.
	Operating system software is not installed on the SCSI boot hard disk drive.	Install the appropriate operating system.
	Requested partition does not exist.	Partition the SCSI hard disk drive and then reload the operating software.
	SCSI boot hard disk drive at wrong SCSI address.	Set SCSI boot hard disk drive to lowest "primary" SCSI address.
	SCSI device has failed.	Replace SCSI device.
SCSI hard disk drive cannot read or write information.	Incorrect disk drive jumper settings.	Refer to the supplied kit installation instructions.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
	SCSI hard disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
SBB failure.	Check SBB status LEDs for a drive failure indication.	Refer to Chapter 7 for additional information.

SBB Troubleshooting

Problem	Possible Cause	Action
SBB fault LED lit.	Disk drive failed.	Replace disk drive.
SBB activity and fault LEDs lit.	Disk drive hung or has failed.	Replace disk drive.
SBB fault LED flashing.	Disk drive failed and is spinning down.	Replace disk drive.
SBB fault status LED is either on or off; fault status LED flashing.	Disk drive is active and spinning down due to a fault.	Correct the fault or replace the disk drive.

Tape Drive Troubleshooting

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

Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator is not on.	Monitor is turned off.	Turn on the monitor.
	Power cord is not connected.	Connect the power cord to the server.
	No power at wall outlet.	Use another outlet.
	Power indicator is defective.	Contact your authorized service representative.
No screen display.	Configuration error.	Run the SCU to configure the server for video operation.
	Monitor brightness and contrast controls are incorrectly set.	Adjust the monitor brightness and contrast controls.
	Monitor has failed.	Replace monitor, or contact your authorized service representative.
Distorted, rolling, or flickering screen display, or wrong/uneven color.	Monitor incorrectly adjusted.	Adjust accordingly.
	Monitor signal cable incorrectly installed.	Straighten any bent connector pins and then reconnect.
Color monitor displaying monochrome.	Server was turned on before the monitor was turned on.	Turn off the server, turn on the monitor, then turn the server back on.
Monitor fails to switch to high-resolution mode.	Appropriate high-resolution video drivers are not installed or incorrectly installed.	Correctly install all appropriate high-resolution video drivers. Refer to the documentation supplied with 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.
	Incorrect SCSI ID assigned.	Make sure correct SCSI ID is assigned. Refer to Chapter 7.
	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.
Disk is spinning but drive is idle.	Application software not running.	Run application software.

Diskette Drive Troubleshooting

Problem	Possible Cause	Action
Target diskette drive cannot read or write information.	Diskette is not formatted.	Format the diskette.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write-protected.	Slide the write-protect switch so the hole is not visible.
	Diskette drive is empty.	Insert a diskette.
	Diskette write protection enabled.	Run the SCU and set the Diskette Write Protection option to "Disabled."
Server does not boot from a target diskette drive.	Disabled in SCU.	Run the SCU and enable the diskette drive.
	Drive ID incorrectly set.	Make sure the drive ID is correctly set. Refer to the documentation that came with the diskette drive.
	Diskette drive not enabled.	Run the SCU and enable the diskette drive.
	Diskette boot option disabled.	Run the SCU and set boot option 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.
Cannot write to target diskette drive.	Loose cables.	Secure all cable connections.
	Diskette drive write protected.	Run the SCU and disable the diskette write protection option.

RAID Troubleshooting

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

User Service Procedures

12

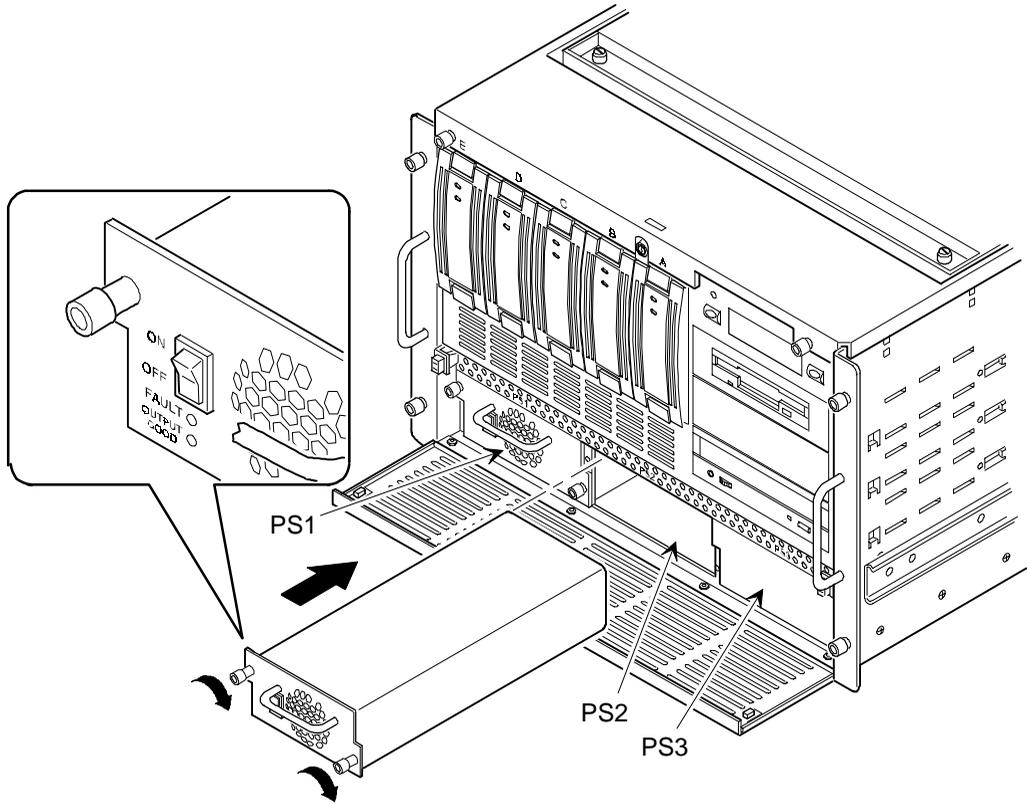
Introduction

This chapter provides procedures for hot swapping your server's cooling fans and power supplies. A procedure for installing a new server battery/Real-Time Clock (RTC) is also included.

Hot Swapping Power Supplies

You can hot swap power supplies while the server remains online and active. To hot swap a power supply:

1. If installed, remove the front bezel (see Figure 7-4).
2. Open the power supply door.
3. Turn off the dc power switch on the power supply (see Figure 12-1).
4. Loosen the thumbscrews and slide the old power supply out of the server.
5. Slide the new power supply into the server until it seats firmly into the chassis power connector. Tighten the thumbscrews.
6. Turn on the dc power switch on the new power supply.
7. Close the power supply door.
8. If removed, replace the front bezel.



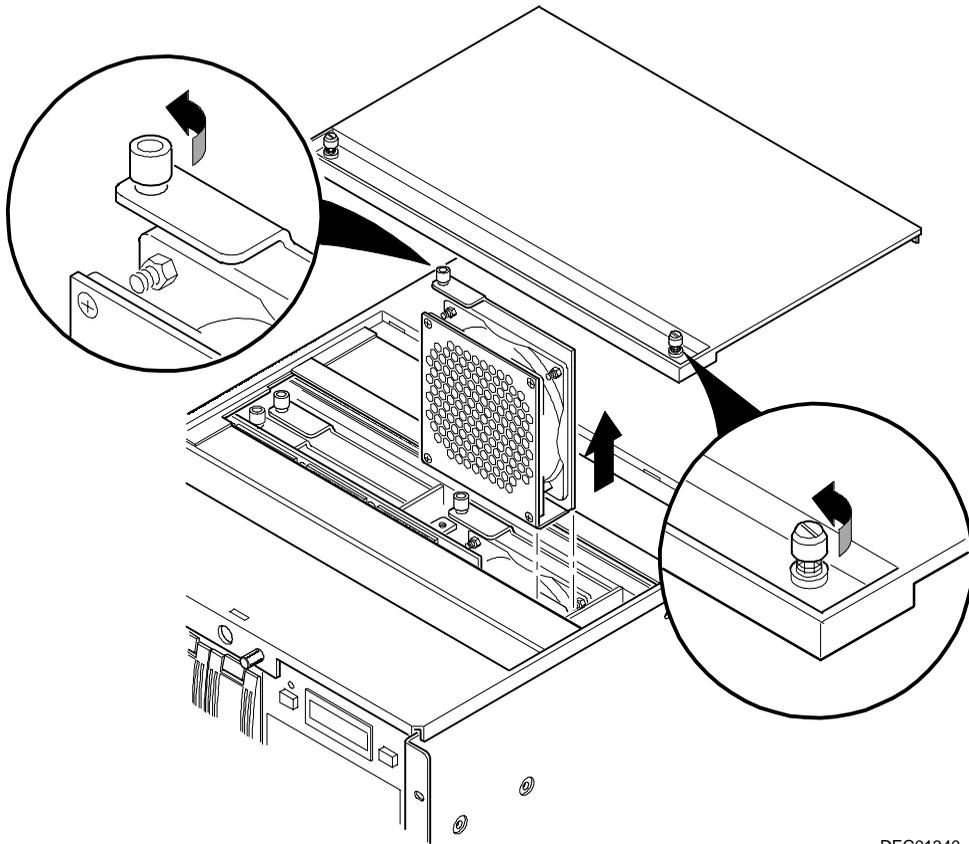
DEC01339

Figure 12-1. Hot Swapping a Power Supply

Hot Swapping Cooling Fans

You can hot swap cooling fans while the server remains online and active. To hot swap a cooling fan:

1. Refer to the label on the top cover for fan identification and location.
2. Unscrew the thumbscrews and remove the fan cover.
3. Loosen the thumbscrews and remove the old cooling fan.
4. Install the new cooling fan.
5. Replace the fan cover.



DEC01340

Figure 12-2. Hot Swapping a Cooling Fan

Replacing the Server Battery/Real Time Clock (RTC)

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 battery/RTC. The DIGITAL part number for this device is 21-39151-01. This part can be obtained through your DIGITAL service representative.

Dépannage

To replace the battery/RTC, perform the following:

1. If you have not already done so, record server configuration settings using the SCU.
2. Turn off your server.
3. Disconnect external devices, ac power, and monitor power.
4. Unlock and remove the top cover.
5. Remove the old battery/RTC (see Figure 12-3).



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

6. Install the new battery/RTC. Make sure pin 1 of the battery/RTC is aligned with pin one on the socket (A, Figure 12-3).



CAUTION: Danger of explosion if the server battery/RTC is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. If you have questions, consult your nearest authorized service provider.

7. Replace and lock the top cover.

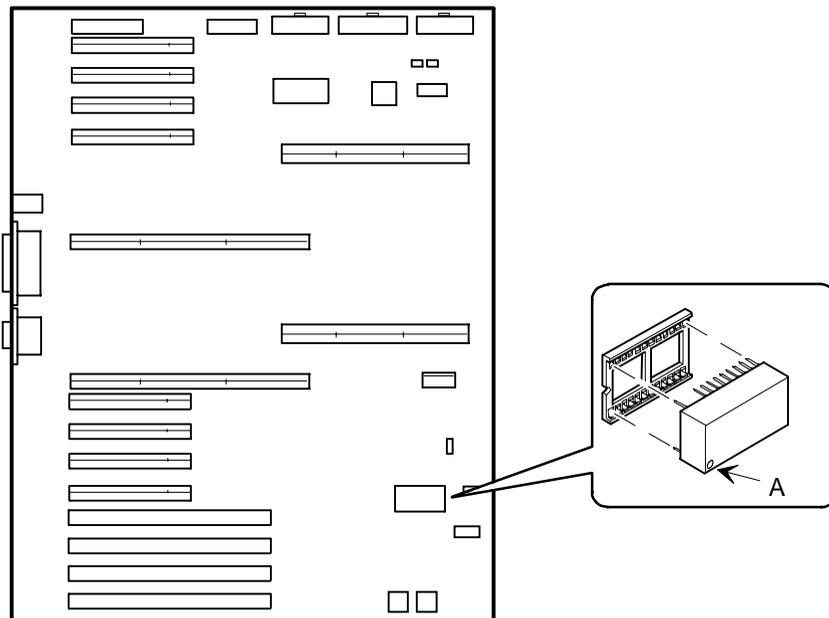


NOTE: Your server will not power up with the top cover removed.

8. Connect external devices and restore power.

9. Reboot and run the SCU:
 - a. Select `Configure Computer` from the SCU screen.
 - b. Select `View and Edit Details` from the displayed screen.
 - c. Edit the configuration settings to match what was recorded in step 1.
 - d. Select `Save and Exit` to configure your server.

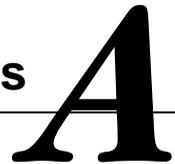
Refer to Chapter 2, "Server Software and Utilities."



DEC01320-4

Figure 12-3. Replacing the Server Battery/RTC

Technical Specifications



Introduction

This appendix provides the following technical characteristics for your server:

- Server specifications
- EISA expansion slots
- PCI expansion slots
- Power supply input power requirements
- Power supply output specifications
- Power cord requirements
- Main logic board switch settings
- Pentium® Pro processor module switch settings
- Server status messages
- POST OCP messages
- OCP messages
- Server processor voltage and temperature ranges

Server Specifications

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

Performance Specifications

Attributes	Specification
Bus clock	
EISA	7.5/8.33 MHz
PCI	30/33 MHz
Data I/O	
EISA	8-bit, 16-bit, and 32-bit
PCI	32-bit
Server memory	128 MB minimum (4 x 32 MB) to 4.0 GB (4 x 256 MB) of EDO/ECC-protected memory on two memory modules, using 32, 64, 128, or 256 MB DIMMs
System flash ROM BIOS	128 KB
VGA flash ROM BIOS	128 KB

Server Dimensions

Dimension	Specification
Width	45.1 cm (17.75 in.)
Length	66 cm (26 in.)
Height	7U or 31.12 cm (12.25 in.)
Weight	50 kg (110 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 halvesine

EISA Expansion Slots

The main logic board contains four EISA expansion slots (one slot is a shared PCI/EISA slot). These slots support +5 V dc.

PCI Local Bus Expansion Slots

The main logic board contains eight PCI local bus expansion slots (one slot is a shared PCI/EISA slot). These slots support:

- 5 V dc only PCI expansion boards
- 5/3.3 V dc universal PCI expansion boards
- Bus mastering



NOTE: PCI slots 1 through 3 do not support 3.3 V dc. If your PCI expansion board needs 3.3 V dc, use PCI slots 4 through 6.

Power Supply Input Power Requirements

One or more 400 W auto-sensing power supplies provide five dc voltages: +12 V dc, -12 V dc, +5 V dc, -5 V dc, and 3.3 V dc. These voltages are used by the various components within the server. The following table lists the input power requirements for each power supply.

Rated Voltage Range	Maximum Range	Rated Input Current ⁽¹⁾	Operating Frequency Range
100 V ac - 120 V ac	90 V ac - 135 V ac	9.5 A	47 Hz - 63 Hz
220 V ac - 240 V ac	180 V ac - 265 V ac	5 A	47 Hz - 63 Hz

⁽¹⁾ Includes outlet current



CAUTION: Certain large configurations could exceed the capacity of a single power supply. In these cases, a second power supply becomes mandatory.

Power Supply Backplane Specifications

The power supply backplane provides the following output ratings:

- +5 V dc +0.25 V dc to –0.10 V dc 100 A max.
- +3.3 V dc +0.035 V dc to –0.030 V dc 54 A max.
- +12 V dc +0.60 V dc to –0.50 V dc 17 A max.
- –12 V dc +1.20 V dc to –1.10 V dc 1.8 A max.
- –5 V dc +0.50 V dc to –0.40 V dc 1.0 A max.
- +5 V dc +0.50 V dc to –0.40 V dc 0.5 A max.

+5 V dc and +3.3 V dc maximum total output: 563 W.

+5 V dc and +3.3 V dc and +12 V dc maximum total output: 775 W.

Power factor correction: 0.95 minimum

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).
- One power cord is required.

Environmental Features

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

<i>Ozone Depleting Substances (ODS)</i>	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.
<i>Use of asbestos</i>	Digital Equipment Corporation does not use asbestos in any form in the manufacturing of its products.
<i>Recycled paper in documentation</i>	User documentation is printed on paper with a post-consumer recycled content of between 10 and 60%.
<i>Use of PVC in enclosure pieces</i>	Polyvinylchloride (PVC) is not used in plastic enclosure pieces.
<i>Design for disassembly/re-cycling</i>	This product has been designed for ease of disassembly so that materials can be easily separated for recycling at the end of the product's useful life. One type of fastener is generally used to minimize tools required to disassemble. Plastic components have been marked with standard identification symbols to facilitate separation for recycling. Snap fit fastening techniques have been used, where possible, to reduce disassembly effort. Fastening of dissimilar materials can be disconnected, allowing materials to be separated for recycling.
<i>Environmental packaging features</i>	The outer container on this product is made from unbleached, natural Kraft corrugated fiberboard which can be readily recycled in most areas. Protective cushioning pieces are made from expandable polypropylene which is more efficient than other foams and requires less material to provide equivalent protection, thereby reducing packaging waste. The cushioning pieces are marked with the Society of the Plastics Industry (SPI) material identification symbol for polypropylene to facilitate recycling.

Main Logic Board Switch Settings

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



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.

Technical Specifications

Feature	Function	Setting	Description
BIOS upgrade	Disabled Enabled ⁽¹⁾	J35-SW1, off J35-SW1, on ⁽¹⁾	Your main logic board's flash BIOS upgrade switch must be set to the disabled (OFF) position to prevent unauthorized personnel from loading a new server BIOS. Loading a new server BIOS might allow someone to override other server security features or introduce a virus into your server.
Recovery mode	Normal ⁽¹⁾ Recovery mode	J35-SW2, off ⁽¹⁾ J35-SW2, on	If your BIOS upgrade failed, refer to the README.TXT file that came with the BIOS upgrade.
Boot block update	Disabled ⁽¹⁾ Enabled	J35-SW3, off ⁽¹⁾ J35-SW3, on	Set this switch to disabled (OFF) position to prevent unauthorized personnel from changing the BIOS boot block.
Password clear	Normal mode ⁽¹⁾ Password clear (MFG test)	J35-SW4, off ⁽¹⁾ J35-SW4, on	If you forget your password, set this switch to the password clear (ON) position and then restart your server. Refer to Chapter 10 for more information.
RSM	Not installed ⁽¹⁾ Installed	J35-SW5, on ⁽¹⁾ J35-SW5, off	If you add DIGITAL's Remote Server Management (RSM) option to your server, you will need to connect the RSM reset cable to connector RSM and change the switch position to the installed (OFF) position.

(1) Factory default setting

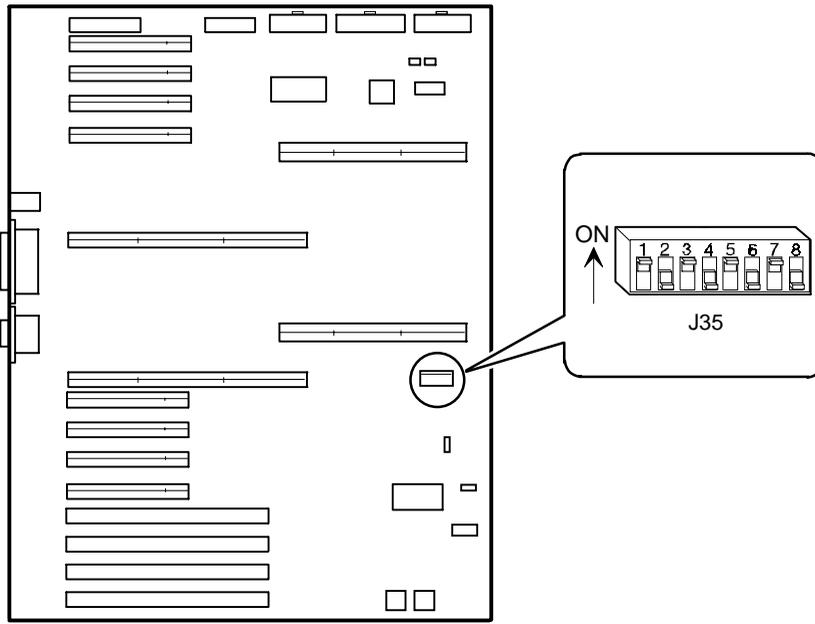
ON = switch closed; OFF = switch open

continued

Feature	Function	Setting	Description
NVRAM	Normal ⁽¹⁾ Clear	J35-SW6, off ⁽¹⁾ J35-SW6, on	Clears contents of NVRAM. Set only in the case when a configuration change using the SCU did not complete successfully (e.g. power failed while configuring), or a configuration was defined which no longer allows the server to boot. The BIOS settings will return to their default values, and the SCU will need to be rerun to reconfigure the server.
CPU bus speed	60 MHz 66 MHz ⁽¹⁾	J35-SW7, off J35-SW7, on ⁽¹⁾	Determines the processor clock speed for the installed processor(s). 200 MHz processor = 66 MHz
Reserved	Reserved	J35-SW8, off ⁽¹⁾	This switch should always be OFF.

(1) Factory default setting

ON = switch closed; OFF = switch open



DEC01320-6

Figure A-1. Main Logic Board Switch Location

Processor Module Switch Settings

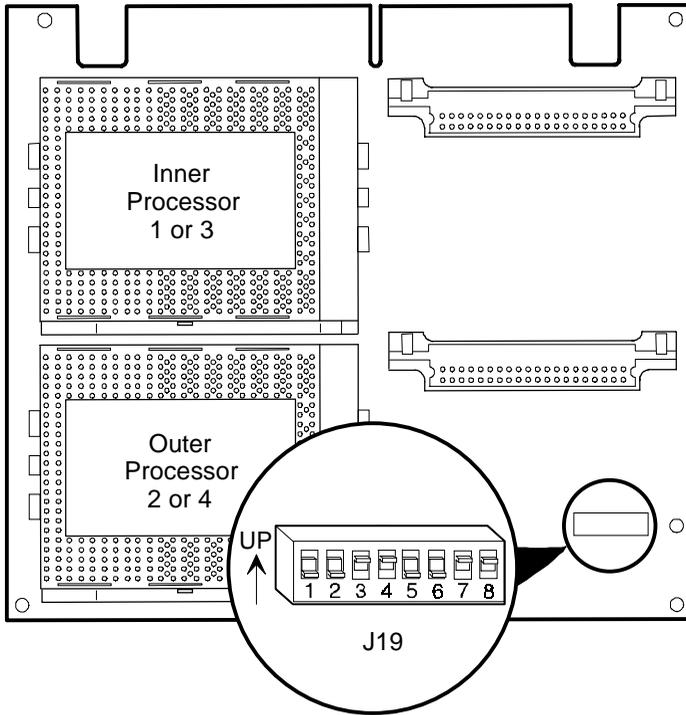
The following table lists the processor module switch and factory default settings. Figure A-2 shows the switch location.



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.

Technical Specifications

Speed	Position	Switches	J19 Switch Settings
120/133 MHz	<input type="checkbox"/> UP	4, 8	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
	<input checked="" type="checkbox"/> DOWN	1, 2, 3, 5, 6, 7	
150/166 MHz	<input type="checkbox"/> UP	3, 4, 7, 8	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	<input checked="" type="checkbox"/> DOWN	1, 2, 5, 6	
180/200 MHz	<input type="checkbox"/> UP	1, 4, 5, 8	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
	<input checked="" type="checkbox"/> DOWN	2, 3, 6, 7	
210/233 MHz	<input type="checkbox"/> UP	1, 3, 4, 5, 7, 8	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	<input checked="" type="checkbox"/> DOWN	2, 6	
240/266 MHz	<input type="checkbox"/> UP	2, 4, 6, 8	<input checked="" type="checkbox"/> <input type="checkbox"/>
	<input checked="" type="checkbox"/> DOWN	1, 3, 5, 7	
270/300 MHz	<input type="checkbox"/> UP	2, 3, 4, 6, 7, 8	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	<input checked="" type="checkbox"/> DOWN	1, 5	
300/333 MHz	<input type="checkbox"/> UP	1, 2, 4, 5, 6, 8	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
	<input checked="" type="checkbox"/> DOWN	3, 7	
330/363 MHz	<input type="checkbox"/> UP	1, 2, 3, 4, 5, 6, 7, 8	<input type="checkbox"/>



DEC01408-3

Figure A-2. Processor Module Switch Location

Server Status Messages

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

continued

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

POST OCP Messages

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



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

POST/Boot Codes

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

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

continued

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

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

Boot Code Descriptions	Normal OCP Display	OCP Error Display	Beep Codes
Do a complete RAM test			3-3-3-3-3
Boot the flash program			1
Boot code was read OK			3-1-1

OCP Messages

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



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

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



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

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

You can examine the server status messages by pressing the OCP switch located on the front panel repeatedly to sequence through the status list. The OCP switch is disabled during POST, during host request service from the 8031, or if an error is detected. The following table lists and describes the status messages and the error messages that display on the server's OCP panel. Also included are possible actions to take if a problem persists. If this action does not alleviate the problem, contact your authorized service provider.

OCP Status and Error Messages

Status	Normal OCP Display	OCP Error Display	Description of Error Display/Action
CPU ambient temperature	CPU1 temp=xxxC CPU2 temp=xxxC CPU3 temp=xxxC CPU4 temp=xxxC	CPU1 over heat CPU2 over heat CPU3 over heat CPU4 over heat	Temperature of processor 1 is out of range. Temperature of processor 2 is out of range. Temperature of processor 3 is out of range. Temperature of processor 4 is out of range. Action: Verify fans are operational. Action: Check that heat sink is correctly attached to the processor chip.
Power supply status	P/S1 OK P/S2 OK P/S3 OK	P/S1 fail P/S2 fail P/S3 fail	Power supply 1 is not working. Power supply 2 is not working. Power supply 3 is not working. Action: Check that power supply cables and connectors are connected correctly.
Fan status	Sys fans OK	Sys fan 1 fail Sys fan 2 fail Sys fan 3 fail Sys fan 4 fail	Fan 1 is not working. Fan 2 is not working. Fan 3 is not working. Fan 4 is not working. Action: Check that fan connectors are connected correctly.
CPU status	6000MPn n = CPU number	CPU1 fail CPU2 fail CPU3 fail CPU4 fail No CPU exists	Internal defect of processor 1 or internal temperature exceeds the upper limit. Internal defect of processor 2 or internal temperature exceeds the upper limit. Internal defect of processor 3 or internal temperature exceeds the upper limit. Internal defect of processor 4 or internal temperature exceeds the upper limit. No processors are present in the server. Action: Reboot server and check if the failed processor is still malfunctioning during POST.

continued

Technical Specifications

Status	Normal OCP Display	OCP Error Display	Description of Error Display/Action
System voltages	Sys voltages OK	Sys +12V = xxxV Sys +5V = xxxV Sys 3.4V = xxxV Sys -12V = -xxxV	+12V is out of tolerance. + 5V is out of tolerance. +3.4V is out of tolerance. -12V is out of tolerance. Action: Check that power supply cables and connectors are connected correctly.
CPU voltages	CPU voltages OK	VRM1 y.yyV=x.xxV VRM2 y.yyV=x.xxV VRM3 y.yyV=x.xxV VRM4 y.yyV=x.xxV	Voltage Regulator Module (VRM) 1 should be y.yy volts and is being measured at x.xx volts. VRM 2 should be y.yy volts and is being measured at x.xx volts. VRM 3 should be y.yy volts and is being measured at x.xx volts. VRM 4 should be y.yy volts and is being measured at x.xx volts. Action: Diagnose whether the VRM or the processor module is bad.
Memory size information	xxxxxMB		
System BIOS revision	BIOS Vx.yy		x = main version yy = sub-version
8031 BIOS revision	8031 Vx.yy		x = main version yy = sub-version

Server Processor Voltage and Temperature Ranges

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

Processor Voltage Range

Nominal	Nominal Tolerance	Normal Voltage Range	Server Error Occurs	Server Shutdown Occurs
+12	-4 to + 5	+11.1 to +13.0 V	<+9.0 V	>+13.8 V
+5	-2 to + 5	+4.80 to +5.35 V	<+4.3 V	>+5.80 V
+3.43	-1 to + 1	+3.32 to +3.54 V	<+3.0 V	>+3.80 V
-12	-10 to + 10	-13.7 to -10.3 V	>-9.0 V	<-14.2 V
VGTL	-10 to + 10	+1.32 to +1.68 V	<+1.10 V	>+1.80 V

VRM Voltage Range

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

Processor Temperature Warning Levels

Warning Level	Upper Limit	Backup Fan Activated
>85 °C	>90 °C	>82 °C

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 (keyboard controller, interrupt controller, DMA controller, etc.).

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 SCU.



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

Processor Memory Address Map

Address Range	Function	Size
00000 to 7FFFF	Main memory	512 KB
80000 to 9FFFF	Main/PCI/EISA/ISA memory	128 KB
A0000 to BFFFF	PCI/EISA/ISA video buffer memory	128 KB
C0000 to C7FFF	Video memory BIOS	32 KB
C8000 to DFFFF	PCI/EISA/ISA expansion board BIOS and buffer memory	96 KB
E0000 to E7FFF	EISA/ISA/PCI adapter RAM after POST completes	32 KB
	Used by BIOS Setup during POST	
E8000 to EFFFF	EISA/ISA and buffer memory	32 KB
F0000 to FFFFF	System BIOS memory	64 KB

Processor I/O Address Map

Range (hexadecimal)	Function
0000 to 0CF7	PCI I/O space
0CF8	Configuration space enable register
0CF9	Turbo and reset control register
0CFA to 6FFF	EISA/PCI I/O space
0CFC	Configuration space data register
0D00 to 6FFF	EISA/PCI I/O space
7000 to BFFF	PCI I/O space
C000 to CFFF	PCI configuration space
D000 to FFFF	PCI I/O space

I/O Address Map

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

Server Interrupt Levels

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

DMA Channel Assignment

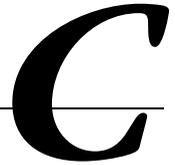
Channel	Controller	Function
0	1	Refresh
1	1	Not used
2	1	Diskette controller (if enabled)
3	1	Not used
4	2	Cascade DMA
5	2	Not used
6	2	Not used
7	2	Not used

PCI Configuration Space Address Map

PCI Bus No.	Device No.	Device
0	14	OMC
0	19	Primary PCI bridge
0	2	EISA bridge
0	6	PCI slot 1 ⁽¹⁾
0	7	PCI slot 2
0	8	PCI slot 3
0	9	PCI slot 4
0	D	PCI VGA Trio32/64
0	1A	Secondary PCI bridge
1	1	PCI slot 5
1	2	PCI slot 6
1	3	PCI slot 7
1	4	PCI slot 8

- ⁽¹⁾ Install a VGA expansion board in PCI slot 1, if used.
PCI slots 5-8 are located on the secondary PCI bus.

SCU Features



Introduction

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

System - DIGITAL Server 7100R

Menu Fields	Settings	Comments
System processor type	Not user selectable	Displays the type of the processor that is resident on the main logic board.
System processor clock	Not user selectable	Displays the clock of the processor that is resident on the main logic board.
System base memory	Not user selectable	Displays the amount of base (conventional) memory each time your server boots.
System extended memory	[memory amount], AT-bus space disabled ⁽¹⁾	Displays the amount of extended memory each time your server boots.
	[memory amount], AT-bus space enabled at F00000h, 1M	You can select disabling or enabling one of three memory ranges that could be used by expansion boards.
	[memory amount], AT-bus space enabled at E00000h, 2M	
	[memory amount], AT-bus space enabled at C00000h, 4M	
System extended memory mode	Compatibility ⁽¹⁾	Selects the means for supporting extended memory above 64 MB. Select [Compatibility] for using conventional service in BIOS.
	Non-compatibility	Select [Non-Compatibility] for memory support above 64 MB when using Windows NT v3.1 or above.
System information	Not user selectable	Displays the version of the server BIOS. Also, the resources occupied by the server BIOS can be viewed via this selection

⁽¹⁾ Factory default setting

System Management Group

Menu Fields	Settings	Comments
System reserved resources	Not user selectable Installed as a default ⁽¹⁾	Always shown as installed. Select [Enter] to display the Asset number of the server. The Asset number can be changed by the user.
Main logic board information	Not user selectable Installed as a default ⁽¹⁾	Select [Enter] to display main logic board information including Asset number, Serial number, Artwork Revision number, Model number, and System ID. The Asset number is the only item that can be changed by the user.
CPU module 1 information	Not user selectable Installed as a default ⁽¹⁾	Select [Enter] to display main logic board information including Asset number, Serial number, Artwork Revision number, Model number, and System ID. The Asset number is the only item that can be changed by the user.
CPU module 2 information	Not user selectable Not installed as a default ⁽¹⁾	If processor module 2 is installed, select [Enter] to display processor module 2 information including Asset number, Serial number, Artwork Revision number, Model number, and System ID. The Asset number is the only item that can be changed by the user.
Memory module 1 information	Not user selectable Installed	If memory module 1 is installed, select [Enter] to display memory module 1 information including Asset number, Serial number, Artwork Revision number, Model number, and System ID. The Asset number is the only item that can be changed by the user.
Memory module 2 information	Not user selectable Installed	If memory module 2 is installed, select [Enter] to display memory module 2 information including Asset number, Serial number, Artwork Revision number, Model number, and System ID. The Asset number is the only item that can be changed by the user.

⁽¹⁾ Factory default setting

Diskette Drive Group

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

⁽¹⁾ Factory default setting

Boot Options Group

Menu Fields	Settings	Comments
Boot option	A: then C: ⁽¹⁾ C: then A: C: only A: only	Each time your server boots, it will load your operating system from the sequence selected.
POST errors	Enabled ⁽¹⁾ Disabled	If enabled, the server pauses and displays POST errors. To continue, Press <F1>.
Floppy check	Enabled ⁽¹⁾ Disabled	Enabling this option forces the server to verify the diskette type during boot.
Summary screen	Enabled ⁽¹⁾ Disabled	Enables or disables the ability to display your server's configuration during boot.
OCP soft banner	Not installed ⁽¹⁾ Installed	If installed, you can define a 16 character string that appears on the Operator Control Panel (OCP).

⁽¹⁾ Factory default setting

Integrated Peripherals Group

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

⁽¹⁾ Factory default setting

Keyboard Features Group

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

⁽¹⁾ Factory default setting

Shadow Options Group

Menu Fields	Settings	Comments
Shadow video BIOS ROM	Enabled ⁽¹⁾ Disabled	The main logic board reserves an area of DRAM for a copy of video BIOS ROM. This DRAM called “shadow memory” is write-protected and has the same addresses as the video BIOS ROM locations. When you shadow video BIOS ROM, the ROM image is copied into an appropriate area in DRAM. This increases the server’s performance because the video BIOS instructions are in fast DRAM instead of low speed ROM. For PCI VGA devices, video BIOS is always shadowed in C0000h-C7FFFh, regardless of this field’s setting.
Shadow C8000h- CBFFFh	Disabled ⁽¹⁾ Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow CC00h- CFFFFh	Disabled ⁽¹⁾ Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow D0000h- D3FFFh	Disabled ⁽¹⁾ Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow D4000h- D7FFFh	Disabled ⁽¹⁾ Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow D8000h- DBFFFh	Disabled ⁽¹⁾ Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.
Shadow DC000h- DFFFFh	Disabled ⁽¹⁾ Enabled	Allows you to disable or enable the shadowing request for optional ROM at the corresponding addresses.

⁽¹⁾ Factory default setting

Security Options Group

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

⁽¹⁾ Factory default setting

Cache Options Group

Menu Fields	Settings	Comments
Internal cache	Enabled ⁽¹⁾ Disabled	Enables or disables your server's processor internal cache operation.
External cache	Disabled Write through Write back ⁽¹⁾	Allows you to select the external cache operation type.
Cache system BIOS ROM	Enabled ⁽¹⁾ Disabled	Enables or disables caching request for server BIOS ROM (F0000h to FFFFFh).
Cache video ROM	Enabled ⁽¹⁾ Disabled	Enables or disables the server to cache the video BIOS in the C000 to C7FFh segment.

⁽¹⁾ Factory default setting

Advanced Control Group

Menu Fields	Settings	Comments
CPU to PCI Write Posting	Disabled Enabled ⁽¹⁾	When enabled, allows processor writes to the PCI to be posted in the compatibility OPB chipset.
OPBC PCI to CPU Write Posting	Disabled Enabled ⁽¹⁾	When enabled, allows PCI writes to the processor to be posted in the compatibility OPB chipset.
OPBC CPU Line Read Pre-Fetch	Disabled Enabled ⁽¹⁾	When enabled, allows the compatibility OPB chipset's PCI memory read line commands to pre-fetch additional processor cache lines.
2nd OPB CPU to PCI Write Posting	Disabled Enabled ⁽¹⁾	When enabled, allows processor writes to the PCI to be posted in the 2nd OPB chipset.
2nd OPB PCI to CPU Write Posting	Disabled Enabled ⁽¹⁾	When enabled, allows PCI writes to the processor to be posted in the 2nd OPB chipset.

⁽¹⁾ Factory default setting

continued

Menu Fields	Settings	Comments
2nd OPB CPU Line Read Pre-Fetch	Disabled Enabled ⁽¹⁾	When enabled, allows the 2nd OPB's PCI memory read line commands to pre-fetch additional processor cache lines.
CPU in order queue depth	8 ⁽¹⁾ 1	Allows you to select the depth of the processor in-order-queue.
APIC & MP table	Disabled MPS 1.1 MPS 1.4 ⁽¹⁾	Applicable to single processor configurations only, always enabled for Multi-Processing (MP) operating system configurations. When set to MPS 1.1 or MPS 1.4, the processor's Advanced Programmable Interrupt Controller (APIC) is enabled, and the MP table used by MP operating systems will be created. Note: This parameter must be disabled for NetWare 3.12 single processor systems.
ECC interrupt	Disabled ⁽¹⁾ IRQ14, Shared IRQ14, Non-Shared IRQ15, Shared IRQ15, Non-Shared	Enables the Error Correction Code (ECC) interrupt. If enabled, you can select IRQ14 or IRQ15 as the ECC interrupt. You can also define the IRQ as shared with other devices, such as EISA or PCI devices.
GAT mode	Enabled ⁽¹⁾ Disabled	Should be enabled only when an ISA bus mastering card is installed in the server. Disable it for all other configurations.
System arbitration	CPU Bus first ⁽¹⁾ EISA Bus first Full Rotation	This option controls the operating modes of the server's PCI arbiter. The arbiter controls the arbitration priorities for EISA, PCI, and processor buses.

⁽¹⁾ Factory default setting

EISA or PCI Devices Group

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

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 wall outlet, then from 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. Remove the front bezel.
7. Using two people, carefully remove the server from the rack.
8. Package the server as described in the following section, "Packing the Server."

Packing the Server

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

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

Installing the Server at a New Location

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

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